



*Levante de Almería,  
a laboratory to test Integrated Coastal Zone Management*

This document contains the English version of the final report of each of the horizontal activities and individual projects that were developed during the implementation stage of CAMP Levante de Almería project. It also includes the Sustainable Development Reference Framework, an strategical document due to the integration of all activities.

As a practical experience pioneering the Integrated Coastal Zone Management model, CAMP Levante de Almería involved the implementation of multiple parallel activities and processes:

- Scientific and technical processes to analyze the key factors of sustainability in the territory.
- Social participation and institutional coordination processes.
- Socio-economic analysis of the production model processes.
- Information integration processes to obtain the Sustainable Development Reference Framework.

This English version only contains the final reports of each activity. The rest of the products obtained during the implementation of CAMP Levante de Almería, in Spanish version are linked as annexes.

## **EDITION**

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## TABLE OF CONTENTS

### **1 Reference Framework for Sustainable Development. Final Report**

#### **1.1 Implementation of the Levante de Almería CAMP Project**

Annex 1.1.I CAMP Levante de Almería Project video (spanish and english)

Annex 1.1.II ICZM Protocol

Annex 1.1.III Instrument of ratification of the ICZM Protocol (BOE 23th March 2011)

Annex 1.1.IV Feasibility study

Annex 1.1.V Inception report

Annex 1.1.VI Inception workshop report

#### **1.2 Reference Framework for Sustainable Development**

#### **1.3 Socioeconomic analysis of the development model within the area CAMP Levante de Almería**

##### **Executive summary**

#### **1.4 The Imagine participation process. Final report**

Annex 1.4.I. Report on the 1<sup>st</sup> Imagine Workshop

Annex 1.4.II. Report on the 2<sup>nd</sup> Imagine Workshop

Annex 1.4.III. Report on the 3<sup>rd</sup> Imagine Workshop

Annex 1.4.IV. Report on the 4<sup>th</sup> Imagine Workshop

#### **1.5 Project participants**

### **2 Training and capacity building. Final report**

Annex 2.I Training activities programs.

Annex 2.II Training activities contents.

Annex 2.III Evaluation surveys of training activities.

Annex 2.IV Short films of training activities contents.

### **3 Awareness raising of coastal sustainability. Final report**

Annex 3.I. Strategy for the dynamisation of volunteer networks and programmes of the 1st and 2nd meetings on: "Dynamisation of environmental volunteers in the Levante de Almería area".

Annex 3.II. Inventory of materials used in previous campaigns in the CAMP area.

Annex 3.III. Information leaflet on the CAMP Levante de Almería Project

Annex 3.IV. Material created and results obtained in the Good Practice Campaign for Sea and Beach Users:

- Good Practice Leaflet for Sea and Beach Users
- Report on the conclusions of the Imagine Children's Workshops
- Programme of commemorative activities for Coast Day
- Audiovisual summary of the campaign

Annex 3.V. Material created for the Campaign to Promote the Values of the Landscape and the Cultural Heritage in the Levante de Almería:

- Programme and catalogue of the photography exhibition
- Report on the guided routes of the cultural and landscape heritage of the Levante de Almería

Annex 3.VI. Material created for the campaign to promote sustainable consumption:

- Teaching material for the course on "Teaching strategies for education in sustainable consumption and production"
- Programme and content of the training course on: "How to organise sustainable events"
- Programme and content of the training course on: "Introduction to sustainable public procurement and tendering"

Annex 3.VII. Teaching materials:

- Teaching unit "Imagine the future of our coast"

Annex 3.VII. Other materials:

- Activity report "Coastal Landscapes of the Levante de Almería"

### **4 Levante de Almería Information System. Final report**

### **5 Landscape Valuation. Detailed memory**

### **6 Water cycle sustainable management. Final report**

Annex 6.I Initial diagnosis and planning

Annex 6.II Public participation. Design, results and future

Annex 6.II.a Contributions to the diagnosis

Annex 6.II.b Actions resulting from public participation process

### **7 Improvement of the management criteria for Maritime-Terrestrial and Hydraulic Public Domain.**

#### **Final report**

Annex 7.I Proposals of priorities areas of delimitation

Annex 7.II Proposal acquisition, management and where appropriate restoration of degraded areas

Annex 7.III A200 Proposal

### **8 Conservation of cultural heritage. Final report**

Annex 8.I. Integrated Inventory of the Cultural Heritage in CAMP area

Annex 8.II. Interpretation Itinerary of the Cultural Heritage

Annex 8.II.a. Cultural Elements integrated into the Interpretation Itinerary on the three timescales

Annex 8.II.b. Restoration Cards of the Cultural Elements identified as Priorities

Annex 8.II.c. Technical Specifications of the Interpretation Itinerary

Annex 8.II.d. Maps of the Interpretation Itinerary

Annex 8.II.e. Learning Guide of the Itinerary: Teachers' Book

Annex 8.II.f. Learning Guide of the Itinerary: Student Workbook

Annex 8.III. Report with the Results of the Citizen's Participation Processes

Annex 8.IV. Decalogue of Good Practices for Conservation of Traditional Architecture and Landscape in "CAMP Levante de Almería" Area

Annex 8.V. Strategy to promote Private Custody in "CAMP Levante de Almería" Area

## **9 Marine environment sustainable use. Final report**

Annex 9.I. Maps

Annex 9.I.a. Map of the study area

Annex 9.I.b. Map of coastal biodiversity

Annex 9.I.c. Map of marine biodiversity

Annex 9.I.d. Maps of habitat quality

Annex 9.I.e. Maps of sensitivity

Annex 9.I. f. Maps of vulnerability

Annex 9.I.g. Maps of uses

Annex 9.II. Problems of the traditional fisheries sector

## **10 Dissemination of good practices in productive activities**

### **10.1 Dissemination of good practices in the fishing sector. Final report**

Annex 10.1.I Survey performed on the fishing sector

Annex 10.1.II Informative materials: Training Workshop Poster and Brochure summarising the contents of the First Training Workshop

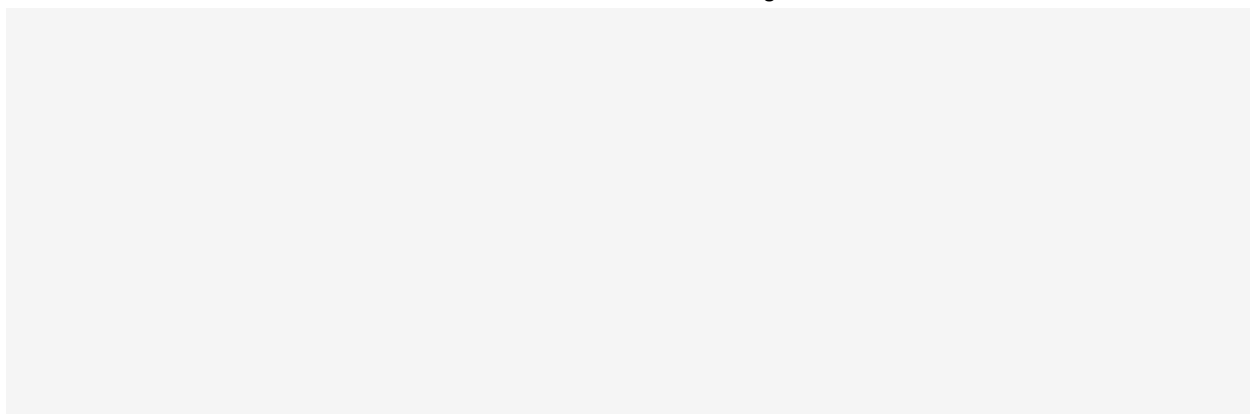
### **10.2 Dissemination of good practices in the agricultural sector. Final Report**

Annex 10.2.I Diagnosis of the Agricultural Sector in the Levante de Almería coastal area.

Annex 10.2.II Informative pamphlet about the workshops: Environmental situation and challenges for the agricultural sector in the Almería area of Levante: Water footprint management and sustainable production.

### **10.3 Dissemination of good practices in the tourism sector. Final Report**

Annex 10.3.I Good Environmental Practices in Tourism Sector Conference Programme.





# 1

## *Reference Framework for Sustainable Development.*

*Final Report*



# 1.1

## *Implementation of the Levante de Almería CAMP Project*

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## TABLE OF CONTENTS

- 1.- How did the Levante de Almería CAMP Project come about?
- 2.- What is the Project's purpose?
- 3.- How many stages does the CAMP Project have?
- 4.- How does Integrated Coastal Zone Management work?
- 5.- How did the implementation stage develop?
- 6.- How was the Sustainable Development Reference Framework prepared?
- 7.- How many people participated in the project?
- 8.- What are the main lessons learned in this pilot experiment in ICZM?

## INDEX OF ANNEXES

- Annex 1.1.I CAMP Levante de Almería Project video (spanish and english)
- Annex 1.1.II IZCM Protocol
- Annex 1.1.III Instrument of ratification of the ICZM Protocol (BOE 23th March 2011)
- Annex 1.1.IV Feasibility study
- Annex 1.1.V Inception report
- Annex 1.1.VI Inception workshop report

## LIST OF TABLES

- Table 1. Number of entities members of the social participation and coordination bodies.*
- Table 2. Number of participants in CAMP Project participatory or advisory processes*
- Table 3. Number of technical staff participating in the CAMP Project*

## LIST OF FIGURES

- Figure 1: The Levante de Almería CAMP Project area*
- Figure 2: CAMP Project Stages and their reflection in the Levante de Almería*
- Figure 3: SDRF preparation*
- Figure 4: Relevant milestones during the implementation stage of the Levante de Almería CAMP Project*
- Figure 5: CAMP Project Functional Diagram*
- Figure 6: SDRF conceptual model*

## ABBREVIATIONS USED

- CAMP: Coastal Area Management Project
- ARMAFE: Andalusian Regional Ministry of Agricultural, Fisheries and the Environment (formerly Andalusian Regional Ministry of Environment)
- ICZM: Integrated Coastal Zone Management
- MAFF: Ministry of Agriculture, Fisheries and Food (formerly Ministry of Environment)
- SDRF: Sustainable Development Reference Framework
- MAP: Mediterranean Action Plan
- UNEP: United Nations Environment Programme

## 1.- How did the Levante de Almería CAMP Project come about?

Coasts are fragile socio-ecosystems<sup>1</sup> characterised by the high value of their natural, cultural and landscape resources. The concentration of population in these areas, phenomena of urban expansion, increased water demand, contamination from urban, agricultural and/or industrial activities, the impact of tourist activities, overexploitation of natural resources, such as fishing, are examples of the pressures that these areas are continuously subject to. These impacts are a threat to the integrity of coastal ecosystems that compromise the future viability of economic activities and the well-being of the population.

In addition to these pressures, the risks derived from Global and Climate Change pose new threats to the integrity of these socio-ecosystems. The results of the intergovernmental Panel of Experts on Climate Change (IPCC) indicate that temperatures in the Mediterranean Region will continue to rise, probably at a faster rate than the global or European means. In the most unfavourable scenario, it is estimated that the mean annual temperature could rise by as much as 6°C in summer in Mediterranean Spain by the 2100 horizon. These changes in temperature overlap with the rise in sea level at rates estimated from 2.5 mm/year to 10 mm/year. Predictions for precipitation also forecast a drop in the amount of rainfall and significant interannual variations characterised by a higher incidence of draught. Related to all of the above, more frequent heat waves, decrease in availability of water, increased risk of fire, flood, changes in land use, disappearance of wetlands, salinisation of underground waters, loss of biodiversity, destruction of infrastructures, etc., are also forecast, which in addition to affecting health would cause, among other things, modifications to the way of life of its populations.

**The scenarios of uncertainty derived from Global and Climate Change, along with the obligation to preserve and use coastal regions judiciously to the benefit of present and future generations, justify the need for development strategies that maintain the integrity of coastal ecosystems, using integrated coastal management models able to mitigate risks and ensure the environmental and economic sustainability of these areas.**

This is the goal of the Protocol on Integrated Coastal Zone Management, which then becomes a fundamental instrument for achieving sustainability of the coast of the Mediterranean countries.

This Protocol came out of the United Nations Environment Programme (UNEP) Mediterranean Action Plan, the legal framework for which was founded in 1976 by the Convention for the Protection of the Mediterranean Sea against Pollution (Barcelona Convention). Although the Convention originally concentrated on preventing dumping from ships, after its amendments, which went into effect in 2004, its scope of action was widened to cover integral protection of the Mediterranean. This new Convention for the Protection of the Marine Environment and the Mediterranean Coastal Region is articulated in seven Protocols, the latest of which is related to Integrated Coastal Zone Management.

In Europe, ICZM was backed by *Recommendation 2002/413/CE of the European Parliament and Council of 30 May 2002 on Application of Integrated Coastal Zone Management in Europe*. In this recommendation, coastal Member States were asked to report to the European Commission on the progress made in its application and, in particular, in developing a national strategy to promote

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<sup>1</sup> Socio-ecosystems are understood here as an integrated set of natural and social processes in a unit of territory within a certain time constituting the structure of a system that functions as an organised whole.

integrated coastal zone management. The Spanish report in this respect was sent to the European Commission in 2005. In Andalusia, the regulatory framework for Integrated Coastal Zone Management was drafted in the *Proposal not for Law by the Andalusian Parliament concerning Integrated Coastal Zone Management* passed in June 2005 and propelled the Andalusian Strategy Proposal for the ICZM and the Levante de Almería CAMP Project.

**The Integrated Coastal Zone Management Protocol went into effect in Spain on 24 March 2011, and is the first binding legal instrument for integrated coastal zone management.**

This Protocol defines the ICZM as *a process of dynamic sustainable use and management for coastal zones that simultaneously takes into account the fragility of coastal ecosystems and landscapes, the diversity of its activities and uses, their interaction, the marine orientation of certain uses and activities, and, at the same time, their repercussions on land and sea*. Integrated Coastal Zone Management (ICZM) not only considers the diversity of activities and uses based on a fragile coastal environment, but also the need for democratic governance as a basic pillar ensuring the sustainability of Mediterranean regions. This involves decision-making based on institutional coordination among government administrations and on public participation.

The United Nations Environment Programme's Mediterranean Action Plan (UNEP-MAP) has been implanting the Coastal Area Management Programme (CAMP) Programme in Mediterranean coastal countries for over 20 years through pilot projects that put Integrated Coastal Zone Management into practice. This is the framework programme of the **Levante de Almería CAMP Project**, which is currently its peak achievement, starting a new generation of CAMP projects, since it **is the first that fully implements the ICZM Protocol**.

In our country, the Ministry of Agriculture, Food and Environment and the Andalusian Ministry of Agriculture, Fisheries and the Environment, in collaboration with the MAP, decided on the Levante de Almería coast as the site for carrying out this demonstration project putting into practice this new model of coastal management. This decision was justified by the Feasibility Study done during the project start-up, which made it clear that Levante de Almería was ideal as a demonstration area for the application of an ICZM pilot experiment. Among the reasons that justify the choice of this site are the very dynamic economy which has been an outstanding feature of the area in the recent decades, its exceptional natural and cultural values, and the complexity of its legal and governmental framework due to the different types of coexisting protection, action and territorial planning. In addition, the Feasibility Study identified this project as an exceptional opportunity for making the effort at institutional coordination necessary for effective management and greater involvement of the society in decision-making.

## **2.- What is the Project's purpose?**

The general purpose of the Levante de Almería CAMP Project is given in the Inception Report as, "... to serve as a demonstration experience that can be extrapolated internationally, nationally, regionally and locally, which ensures the application of the ICZM Protocol in the framework of the Barcelona Convention, thereby ensuring the principles established in it using the ICZM methodology." The indispensable step for arriving at this goal is the design of a sustainability strategy for the Levante de Almería, using the ICZM as an instrument. Unlike others, this project attempts to integrate the collective vision of everyone that participates in the process, by testing an innovative model of governance based on coordination of government coastal authorities (Ministries, regional ministries, city councils,

provincial governments and municipal associations) and participation of the Levante de Almería society (business, neighbourhood, ecologist, and cultural associations, NGOs, universities and the public in general). This pioneering initiative puts into practice a new way of working together to make decisions that affect the Levante de Almería coast.

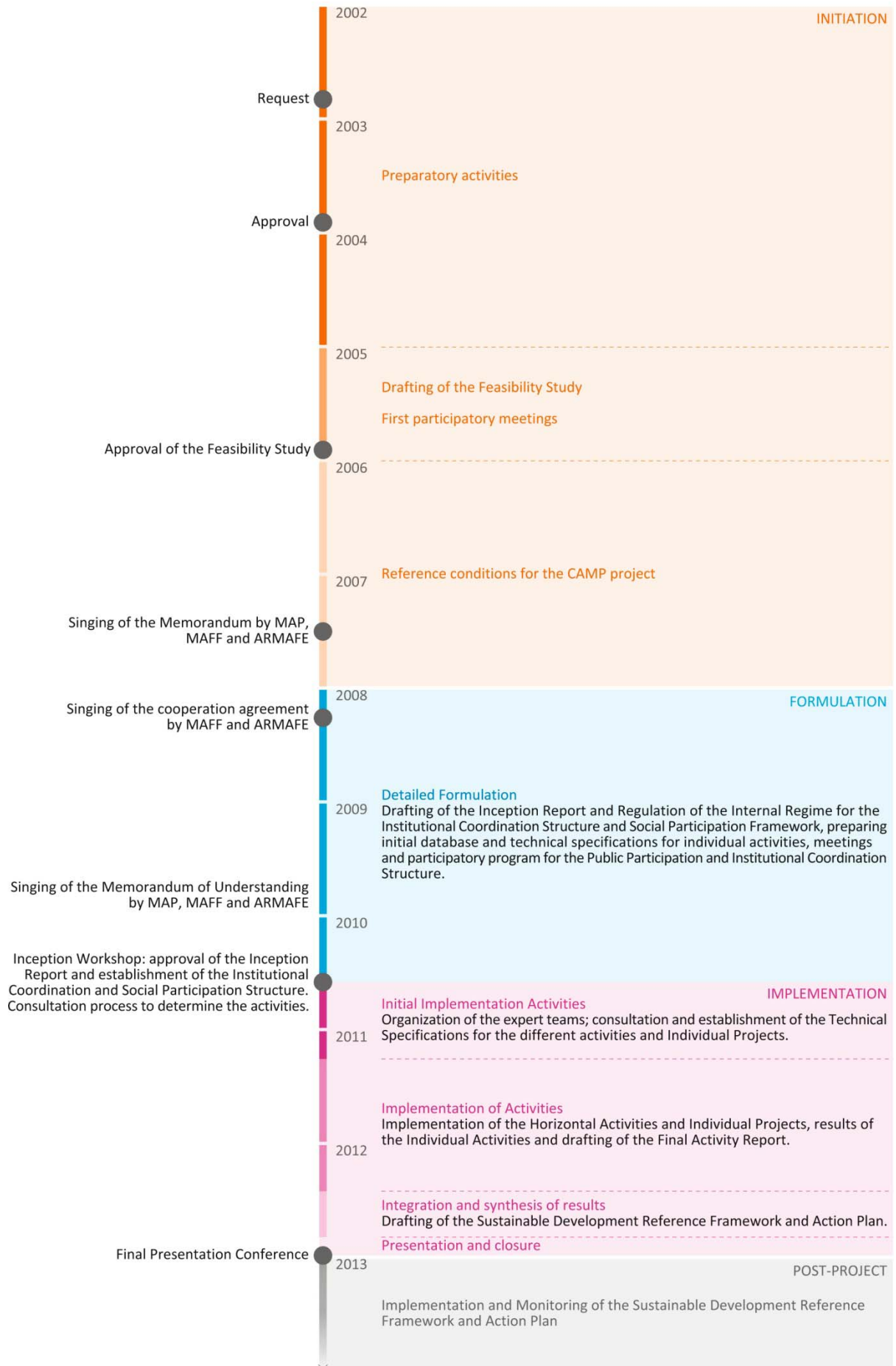


Figure 1: The Levante de Almería CAMP Project area

**The Levante de Almería CAMP Project pursues testing of new management formulas in which government and territorial actors study together and cooperate on essential aspects of coastal sustainability, identify the existing problems in their management, and produce a *collective project* which materializes in a strategy marking the steps to follow to make the socio-economic development compatible with the conservation of nature as a result. This mid-to-long-term sustainability strategy is called the Sustainable Development Reference Framework (SDRF).**

### **3.- How many stages does the CAMP Project have?**

Every CAMP Project is specifically designed for the country and area, keeping in mind the socio-economic and legal contexts of each. However, there are certain characteristics in common, such as counting on a participatory and institutional coordination programme, action for public awareness raising and training for local stakeholders, among others. Another CAMP Project pattern in common to all is the steps to be followed for their development. These steps are defined in four stages which contain the major milestones (Figure 2)



The specific case of the Levante de Almería CAMP Project began on a governmental level in 2002, after its application and approval and the reference conditions for the Feasibility Study had been set. This basic document helped define the specific area of action and determine the priority activities that would lead to the achievement of goals defined through the participatory processes carried out for its preparation.

Based on the Levante de Almería Feasibility Study, in 2005, a Memorandum of Understanding on the project was signed by the Ministry of Agriculture, Fisheries and Food, and the Andalusian Regional Ministry of Agricultural, Fisheries and the Environment, and the MAP. From that date until 2010, a collaboration agreement was signed by the National and Regional Governments, a database for identifying the key actors was prepared, and general directives were set to configure a project structure which would enable it to reach the goals set. The project was already designed in the 2010 Inception Report, actors were encouraged in a consultation process, and pre-agreements were arrived at with political, socio-economic and scientific-technical actors in the Levante de Almería.

When the formulation stage was completed in July 2010, implementation began based on an Inception Workshop. In this event, the Inception Report describing the methodology to be followed for transferring the ICZM model to this area was approved. During the workshop, the pilot Social Participation and Institutional Coordination structure was set up by adopting its Internal Rules, and participatory sessions were held to supplement the activities planned in the project. This workshop, along with consultations with the groups of experts for each activity, was the kickoff of the implementation stage in which all the project configuration activities were performed and the Sustainable Development Reference Framework was drafted. This stage ends in December 2012 with the Final Presentation Conference.

In the post-project stage, the Sustainable Development Reference Framework and its 10-year Action Plan will be executed through the social participation and institutional coordination structure.

#### **4.- How does Integrated Coastal Zone Management work?**

The CAMP Project was configured based on the specific features of the project area identified in the Feasibility Study, and was formalised during the Inception Workshop in the form of an Inception Report and Internal Rules. This configuration includes a series of *horizontal activities and individual projects briefly described below*.

##### **4.1. Horizontal activities**

The Horizontal Activities are mainly directed at the priority social issues identified in the participatory processes carried out during the preparation of the Feasibility Study, as follows:

Social Participation and Institutional Coordination:

The analysis that was done in the institutional context diagnosed the importance of promoting coordination of the various authorities in charge of coastal management and detected the scant participation of local actors in territorial decision-making. This led to the configuration of a structure

intended to put into practice a new model of governance to improve decision-making for more coordinated and participatory coastal management through the creation of three bodies:

*Coastal Commission:* This is a decision-making body made up of representatives of government administrations responsible for coastal management, which is in charge of deciding on matters related to the Sustainable Development Reference Framework and its Action Plan. Complementarily, to ensure continued participation of the government administrations in the Commission in project activities, and especially, in those within the framework of the social participation process, mainly in the Coastal Council, the representatives of these government administrations designated Technical Delegates. (See Document 1.5. List of project participants.)

*Coastal Council:* This is an advisory body that is made up of representative socio-economic agents in the area and which makes it possible for them to participate in decision-making related to coastal sustainability. (See Document 1.5. List of participants in the project.)

*Coastal Forum:* This is a second, more general advisory body, made available to the public to enable their participation in decisions related to coastal management. Participation is online and it collects opinions and suggestions through meetings, surveys and workshops.

Information and Awareness:

Levante de Almería Information System - > Facilitate information and public participation processes following Article 14 of the Protocol on Integrated Coastal Zone Management in the Mediterranean (ICZM Protocol).

Awareness on Coastal Sustainability - > Promote public awareness of ICZM matters as per Article 15.1 of the ICZM Protocol.

Trainee and Capacity Building - > Ensure the training of government technicians and socio-economic agents as per Article 15.2 of the ICZM Protocol.

#### 4.2. Individual Projects

The participatory analysis of the environmental and socio-economic context performed during the preparation of the Feasibility Study made it possible to detect the key points in achieving sustainability in the Levante de Almería area. These results became the basis for defining the project's technical structure. The six key points identified from which the so-called *individual projects* were defined were:

Sustainable Management of the Water Cycle --> Promote the sustainable use of the water resources in the Levante de Almería CAMP Area, following Article 5.c of the ICZM Protocol.

Sustainable Use of the Marine Environment --> Facilitate the application of Article 10.2 of the ICZM Protocol in the Levante de Almería CAMP Area through a coastal management planning proposal for sustainable use and conservation of natural resources.

Improvement of Management Criteria in the Marine Terrestrial and Hydraulic Public Domain - > Set better criteria to improve the protection and management of the Marine Terrestrial and Hydraulic Public Domain in the CAMP Area following the provisions of Article 20 of the ICZM Protocol "Territorial Policy".

Conservation of Cultural Heritage - > Ensure the protection of the Cultural Heritage in the CAMP Area following Article 13 of the ICZM Protocol “Cultural Heritage”.

Valorisation of the Area -> Ensure the protection of coastal landscapes and integration of uses in the area following the provisions of Article 11 of the ICZM Protocol “Coastal Landscapes”.

Dissemination of Good Practices in Productive Activities - > Ensure sustainability in the CAMP Area following the provisions of Article 9.1 of the ICZM Protocol “Economic Activities”.

These projects were conceived so as to analyse and evaluate the issues identified, and to draft sustainability proposals in the various environments. For each of these projects, sector expert teams were formed, made up of independent scientists and technicians from the various competent authorities. They advise and contribute scientific-technical criteria to the project leaders during their work in order to complement the sustainability proposals and ensure their post-project feasibility.

To summarise, on one hand, the project is intended to integrate the opinions of the local actors (government technicians, stakeholders and general public), and on the other, to analyse and evaluate key points and define sustainable coastal management (individual projects). However, these two project structures were not conceived to function independently, but to maintain a continuous interrelationship to achieve an integrated view of all aspects related to coastal management. The connection between them was basically through the *Imagine* Workshops. These workshops constituted a periodic meeting point for participants in the project, where they could explain, discuss and provide feedback to the diagnostics and proposals by the various territorial actors, share experiences, compare opinions, and mainly, agree on which aspects were the most relevant and should be paid the most attention for constructing a sustainable future together. (See Figure 3: SDRF preparation)

Finally, since the functioning of the project fabric requires permanent coordination and feedback, a technical structure was created for these tasks: General Coordination, Coastal Technical Office and Steering Committee, as well as a team for integrating all the project results in the Sustainable Development Reference Framework.



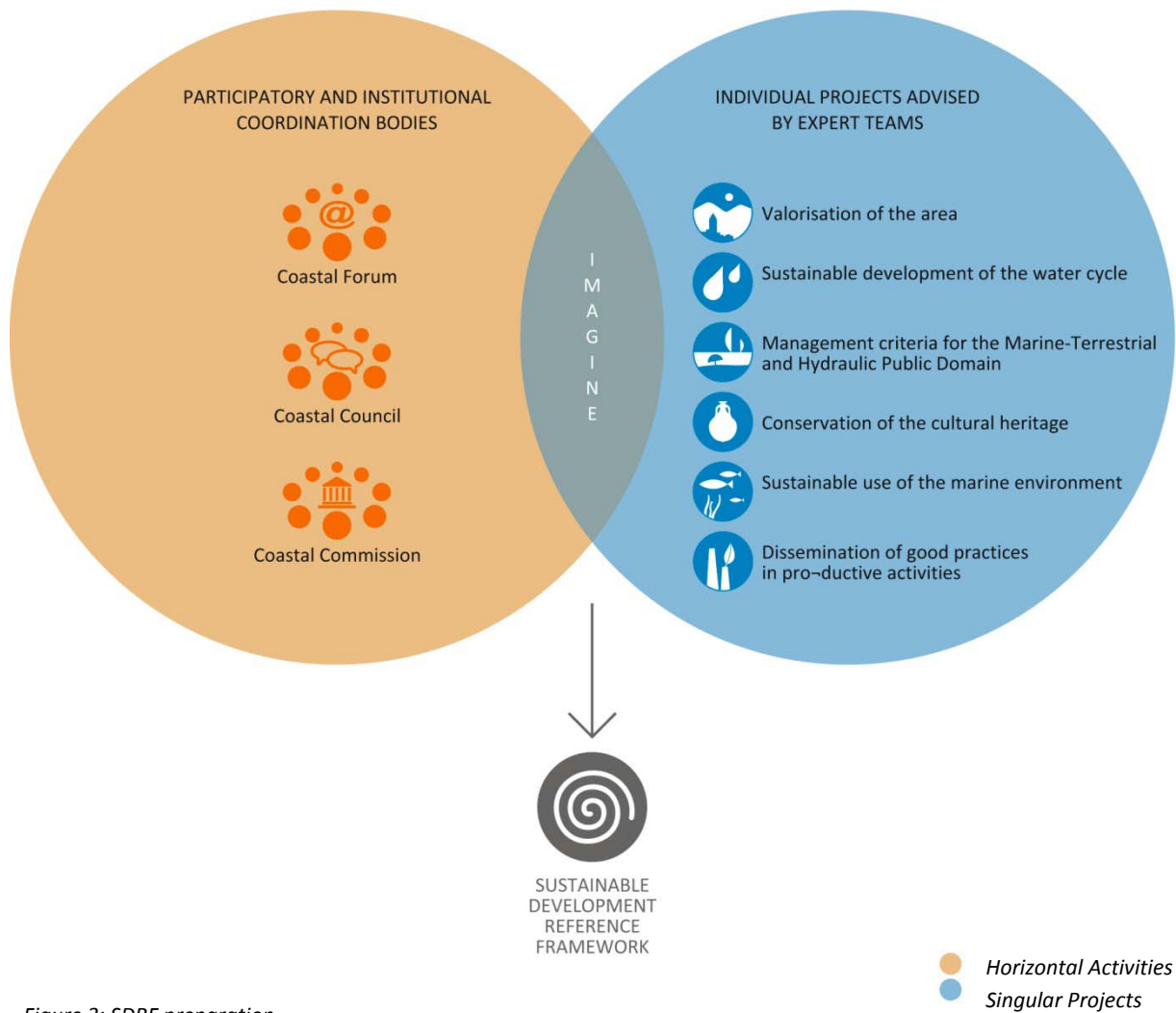
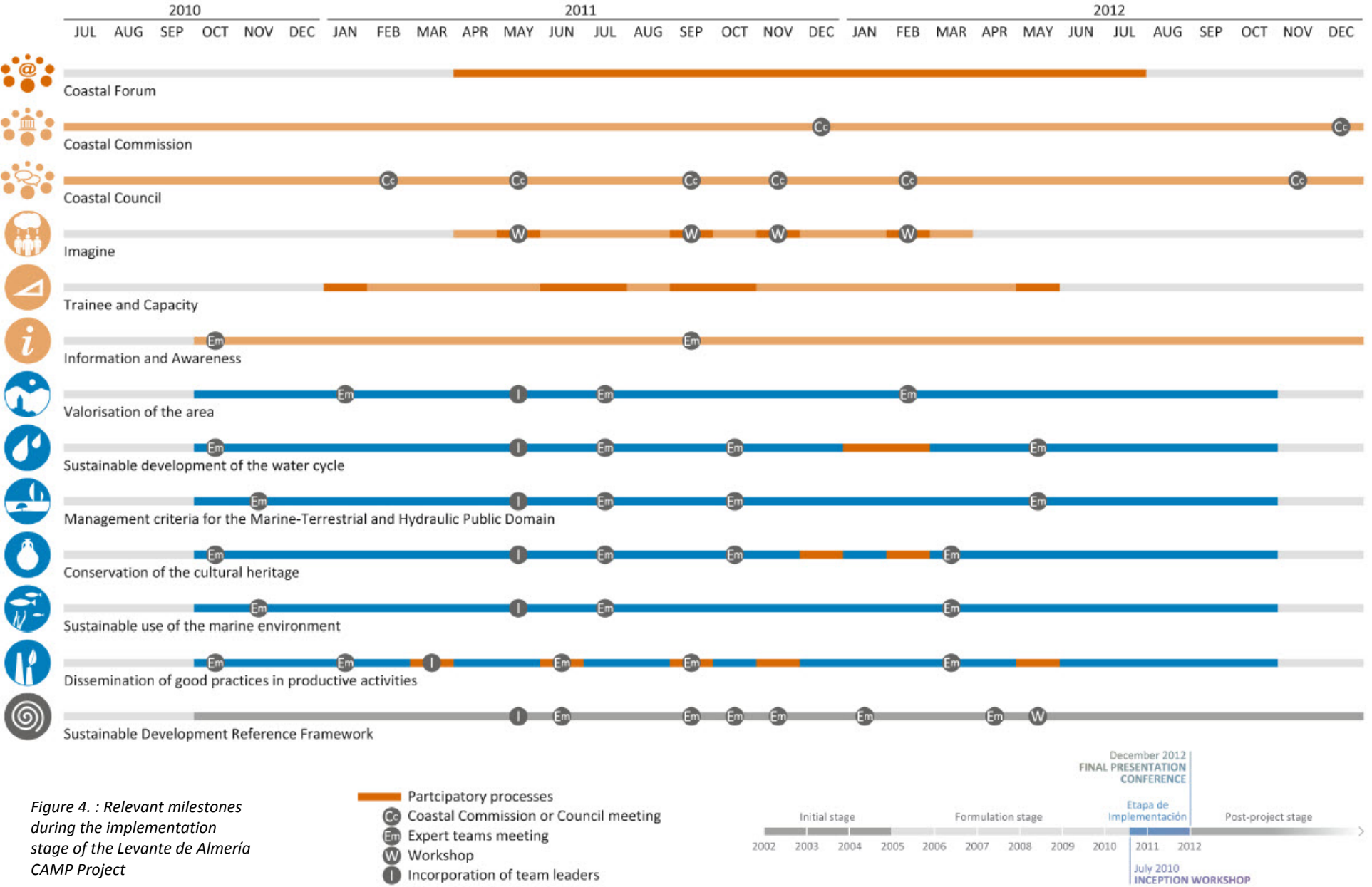


Figure 3: SDRF preparation

### 5.- How did the implementation stage develop?

During the implementation stage, a multitude of simultaneous activities aimed at the preparation of a sustainability strategy shared by all the participants were performed. Each of the components that make the project structure carried out its own activities for this, and these in turn were connected to the rest by feedback processes.

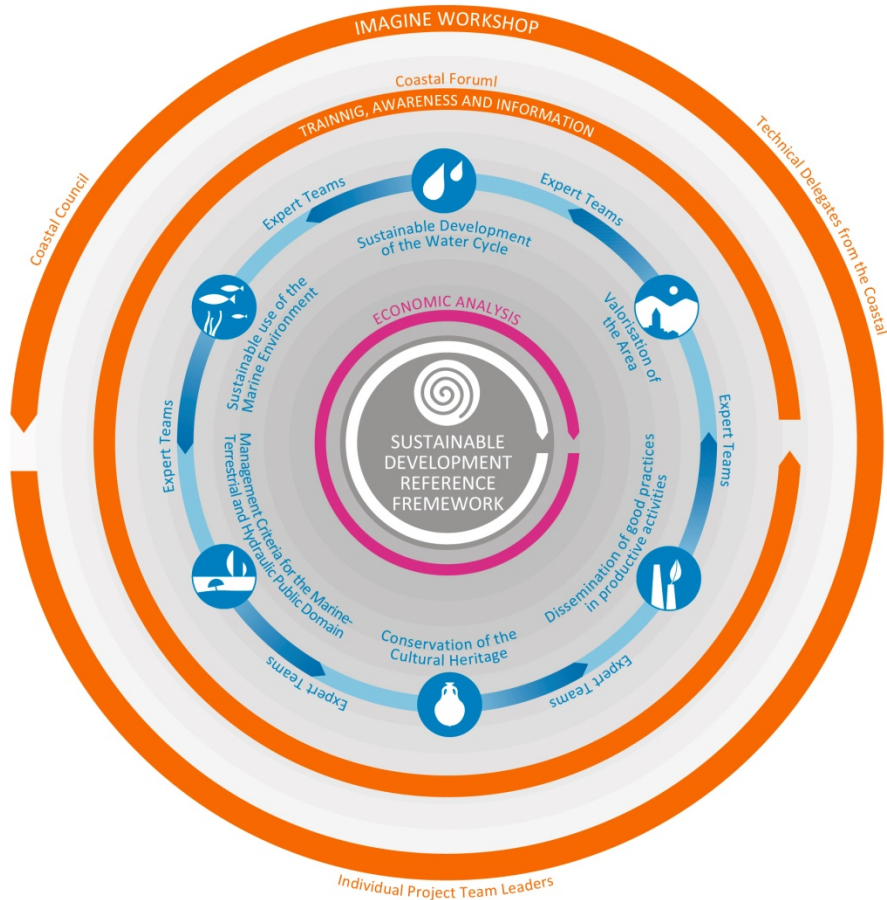


At their periodic meetings, the social participation and institutional coordination bodies were able to propose aspects related to coastal management and discuss them throughout the Project.

**During the process, the *Imagine* Workshops provided the main opportunity in which the voices of the government administration technicians and territorial agents were heard, and the results have been materialised in sustainability proposals.**

Thus, under the motto, “Let’s imagine our coast’s future”, the members of the Coastal Council (composed mainly of representatives of social, business, nature conservation and/or cultural heritage associations), the team leaders of the individual projects and the Technical Delegates of the Coastal Commission participated in four workshops with a dynamic group methodology to acknowledge the past, analyse the present and make proposals for designing the sustainable future of the Levante de Almería.

Based on the shared view in the *Imagine* workshops, and the public opinion expressed in the Coastal Forum, the team leaders of the individual projects collected the existing information, generating new knowledge and integrating all the results. These results have materialised in sustainability proposals for the Sustainable Development Reference Framework. The uniqueness of these proposals stems from the fact that they integrate the opinions of everyone who has participated in the project, in the *Imagine* workshops and the Coastal Forum participatory processes, as well as the scientific-technical criteria of the different Expert Teams.



- Social participation and institutional coordination processes.
- Scientific-technical processes related to the area's environmental keystones.
- Economic keystone analysis.
- Integration processes leading to the strategy

Figure 5: CAMP Project Functional Diagram strategy

## 6.- How was the Sustainable Development Reference Framework prepared?

The Sustainable Development Reference Framework was prepared under the basic premise of considering the Levante de Almería an area in which natural and social processes interact to shape an organised structure that functions as a whole, that is, as a “socio-ecosystem.” Thus the population and its means of earning a living are not foreign to the natural resources and services the ecosystem provides them with, just as these are affected by the social and economic activities in the area within a given period of time. Therefore, preparation of the Sustainable Development Reference Framework was based on a conceptual model in which information is integrated from a *socio-ecosystem* viewpoint<sup>2</sup>.

To configure the SDRF, the team responsible attended all the activities organised during the project implementation stage to collect information from the various project bodies and act as a link for transmitting information among them. This feedback was given in bilateral coordination meetings that provided periodic partial and integrated views of the whole project, identified and eliminated overlapping, established priorities and competencies among peripheral projects, and ensured that the collective opinion from the different bodies participating in the project (Coastal Council and Forum) were integrated in the sustainability proposals made by the individual projects.

Thus, during the project, a complicated labour of integrating information acquired and collected was undertaken in analyses, diagnostics, meetings, participatory processes and other activities during the two years of the CAMP implementation (See Figure 4. Relevant milestones during the Levante de Almería CAMP Project implementation stage.)

In the final stage of this arduous information integration process, the team in charge of constructing the SDRF analysed the sustainability proposals from the individual projects, made sure that they integrated the collective viewpoint of the *Imagine* workshops, and made new sustainability proposals. Among the SDRF team’s proposals, the most outstanding respond to the demands from the social participation and institutional coordination and the bodies that could not be included in the individual projects because they were out of their scope of application, others that were considered indispensable and/or complementary to those already proposed to ensure their start-up, and finally, proposals that emerged from the synergies among the various individual projects.

When the 129 sustainability actions or proposals had been analysed, they were grouped together by affinities and synergies generating 35 measures which, following the same dynamics, were grouped into 10 programmes and then into four major strategic goals. These four major strategic goals are in line with the directives set by the legal instruments in the scope of the Andalusian, Spanish and Mediterranean ICZM. The set of all the proposals

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<sup>2</sup> The methodological basis for the conceptual model for making the SDRF may be found at the end of this document.

structured in goals, programmes, measures and actions make up the Sustainable Development Reference Framework Action Plan.

When the Action Plan had been defined, it was subjected to feasibility auditing for social, economic and environmental assessment and to determine its feasibility, and set priorities in a ten-year frame. For this purpose a “*Workshop on Integration for the Sustainable Development Reference Framework*”, attended by the Observers from the Coastal Council, the Technical Delegates from the Coastal Commission, and the experts and project leaders, was organised on May 28, 2012.

Finally, based on these results, each action provided for in the Plan was assigned to the government authority with competence to implement it, and identification was made of the authority considered most appropriate for coordinating its implementation, the recommended deadline for its execution, some indicators for follow-up to check how well the action is being implemented, and possible entities with which to form strategic alliances for collaboration and/or financing their start-up.

**The Sustainable Development Reference Framework is propelled by the local actors and directs the implantation of a long-term strategy following the criteria established in the Integrated Coastal Zone Management Protocol including the risks derived from Global and Climate Change.**

## **7.- How many people participated in the project?**

The following tables summarise the number of people who participated in the various processes in the Project implementation stage:

<b>MEMBERS OF THE SOCIAL PARTICIPATION AND INSTITUTIONAL COORDINATION BODIES</b>	<b>NUMBER</b>
COASTAL COMMISSION	20 <sup>3</sup>
TECHNICAL DELEGATES TO THE COASTAL COMMISSION	16 <sup>3</sup>
COASTAL COUNCIL	46
COASTAL FORUM	unlimited

Table 1. Number of entities members of the social participation and coordination bodies.

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<sup>3</sup> The number of members shown is as of October 2012. The total number of participants involved during the implementation stage of the project was larger due to the successive changes in governments in the Coastal Commission.

PARTICIPATION PROCESSES DURING LEVANTE DE ALMERÍA CAMP PROJECT IMPLEMENTATION			NUMBER OF PARTICIPANTS
INCEPTION WORKSHOP			127
<i>IMAGINE</i> WORKSHOPS			86
PARTICIPATORY PROCESSES DEVELOPED IN THE COASTAL FORUM	I.P. WATER CYCLE MANAGEMENT: PUBLIC PARTICIPATION PROCESSES ON INTEGRATED MANAGEMENT OF THE WATER CYCLE IN THE CAMP AREA		50
	I.P. CONSERVATION OF CULTURAL HERITAGE	WORKSHOP ON PRIVATE CUSTODY OF THE TERRITORY: AN ALTERNATIVE FOR CONSERVATION OF CULTURAL AND LANDSCAPE HERITAGE IN THE LEVANTE DE ALMERIA	35
		CONSERVATION OF CULTURAL HERITAGE PARTICIPATION WORKSHOPS	43
	I.P. DISSEMINATION OF GOOD PRACTICES IN PRODUCTION ACTIVITIES	WORKSHOPS: THE ENVIRONMENTAL SITUATION AND CHALLENGES FOR THE AGRICULTURAL SECTOR IN LEVANTE DE ALMERIA – MANAGEMENT OF THE WATER FOOTSTEP AND SUSTAINABLE PRODUCTION	47
		WORKSHOP ON GOOD PRACTICES IN TOURISM	19
		MEETING OF TOURIST FOCAL POINTS IN THE LEVANTE DE ALMERIA	18
		WORKSHOPS FOR DISSEMINATION OF GOOD PRACTICES IN FISHERIES	67
		FISHERY SURVEYS TO INCORPORATE THE FISHERY COMMUNITY IN PARTICIPATORY PROCESSES	8
	ALL I.P. AND HORIZONTAL ACTIVITIES	WEB FORUM (ONLINE)	106
	HORIZONTAL ACTIVITIES	H.A. AWARENESS OF COASTAL SUSTAINABILITY	CHILDREN'S <i>IMAGINE</i> WORKSHOPS HELD IN THE FRAMEWORK OF THE AWARENESS CAMPAIGN
KICKOFF MEETING FOR ENVIRONMENTAL VOLUNTEERS IN THE LEVANTE DE ALMERIA			40
1ST SERIES OF DISCUSSIONS AND LECTURES ON THE LEVANTE DE ALMERIA COAST			68
TRAINING TEACHERS IN RESPONSIBLE PRODUCTION AND CONSUMPTION			19
H.A. TRAINEE AND CAPACITY BUILDING		TRAINING ACTIVITIES	130
<b>TOTAL</b>			<b>1,103</b>

Table 2. Number of participants in CAMP Project participatory or advisory processes



TECHNICAL STAFF IN CHARGE OF DEVELOPING THE LEVANTE DE ALMERÍA CAMP PROJECT	NUMBER OF PARTICIPANTS
GENERAL COORDINATOR	1
COASTAL TECHNICAL OFFICE	2
STEERING COMMITTEE	8
TEAM RESPONSIBLE FOR THE SUSTAINABLE DEVELOPMENT REFERENCE FRAMEWORK	5
INDIVIDUAL PROJECT TEAM LEADERS AND ADVISORS	30
I.P. EXPERTS IN DISSEMINATION OF GOOD PRACTICES IN PRODUCTION ACTIVITIES	15
I.P. EXPERTS IN SUSTAINABLE MANAGEMENT OF THE WATER CYCLE AND MTHP	29
I.P. EXPERTS IN CULTURAL HERITAGE	7
I.P. EXPERTS IN LEVANTE DE ALMERIA INFORMATION SYSTEM	4
I.P. EXPERTS IN SUSTAINABLE USE OF THE MARINE ENVIRONMENT	21
I.P. EXPERTS IN VALORISATION OF THE TERRITORY	15
<b>TOTAL</b>	<b>137</b>

Table 3. Number of technical staff participating in the CAMP Project

### 8.- What are the main lessons learned in this pilot experiment in ICZM?

Putting the ICZM into practice by developing the Levante de Almería CAMP Project has clearly shown that it is possible for local agents as a whole to present their problems, analyse and discuss them, decide in what direction they want to go, and depending on their agreements, collectively plan their future. **This new model of governance contributes to defining a territorial identity, providing cohesion to its socio-economic fabric, preserving environmental and cultural values, and thereby improving the quality of life of its inhabitants.**

This pilot experiment has shown the benefits brought by integrated management of the coastal zone, and in turn, has made it possible to detect aspects that should be considered in consolidating the sustainability strategy during the post-project stage. The most important of these aspects are:

- **[Governance]** The experiment demonstrated that dialogue among stakeholders is an effective tool for decreasing tension, optimising resources and reaching agreements of common interest that contribute to progressing along the road to sustainability. It is therefore

essential to maintain a model of governance, similar to the one in the CAMP Project, and transfer it to other areas in order to promote institutional and administrative-technical coordination and favour active public participation in coastal decision-making.

- **[Commitment]** During the CAMP Project implementation, some of the stakeholders were sceptical about the usefulness of the participatory processes in the Project. To justify the productiveness of stakeholder participation, the government administrations in charge of monitoring the results (in the Levante de Almería Camp Project SDRF Action Plan) should **make periodic progress reports to participants on the implementation of their proposals** or justify their exclusion.
- **[Empathy]** The **participatory processes that provided the best results were in the form of workshops** so it is recommended that this type of dynamics continue to be used. The participants express their opinions under equal conditions, discuss, empathise and come to agreements as a group.
- **[Knowledge]** In view of the satisfaction shown by the participants during the Project implementation, the awareness and information tasks are considered of special interest to reinforce social consciousness, increase interest of stakeholders in participating in coastal management decision-making processes, and encourage training, especially addressing further education of government technicians, socio-economic and scientific-technical actors in ICZM.
- **[Networks]** The **dynamics of social participation bodies must adapt to the predominant new technologies**. In a technological society, information transfer is more effective in open networked digital forums (Social networks: *Twitter, Facebook, LinkedIn, Google+*, etc.) than in forums that require the user to register his/her profile, and are of limited access to the rest of users who are not registered (Website with *keyword* and *password*).
- **[Teamwork]** In the Project implementation stage, noncompliance with legal requirements was found to be the basis for some of the problems affecting the coast. To increase dissuasive effectiveness of coastal inspection and control work, **a committee on improving coastal surveillance in the framework of institutional coordination is considered advisable**.
- **[Adaptive management]** The Action Plans that came out of the ICZM must be considered a dynamic tool which can be adapted in time and space to the particular circumstances of the area and the global change scenarios that affect it. It is therefore advisable to make plans for following up adaptive management that would make it possible to periodically evaluate the progress in achieving the goals far enough ahead of time to be able to implement new measures contributing to their success.
- **[Ecosystem view]** One aspect of special relevance is that ecosystem services must be considered an essential element of study to achieve territorial sustainability. Increased knowledge and awareness of **coastal processes as an ecosystem, and of the fact that the**

**services affecting the well-being of its citizens depend on its maintenance and integrity, contribute to reinforcing decision-making processes with sustainability criteria.**

(\*) For further information see the corresponding sections in the final project reports.

### Conceptual model of the Sustainable Development Reference Framework.

The conceptual model used to construct the Sustainable Development Reference Framework was based on integrating information from a socio-ecosystem viewpoint, which considers the Levante de Almería an area in which natural and social processes do not occur independently, but interact, shaping an organised structure that works as a whole, that is, as a “socio-ecosystem”<sup>4</sup>. Thus the population and its ways of life are not foreign to natural resources and services provided by the ecosystem, at the same time these are affected by social and economic activities in the area over a given period of time.

The primary work consisted in identifying the “unsustainable nodes” in this area, that is, the problems that place the environmental and economic sustainability at risk, and are therefore the challenges or goals to be met by means of the strategy. Since this area is not isolated, it was necessary to analyse these “unsustainable nodes” on different levels or scales: the Mediterranean Basin, the Spanish-Mediterranean arc, the Andalusian Mediterranean coast, the Levante de Almería CAMP area, the supra-municipal or district scale and the municipal scale. This conceptual model is represented as an inverted pyramid:

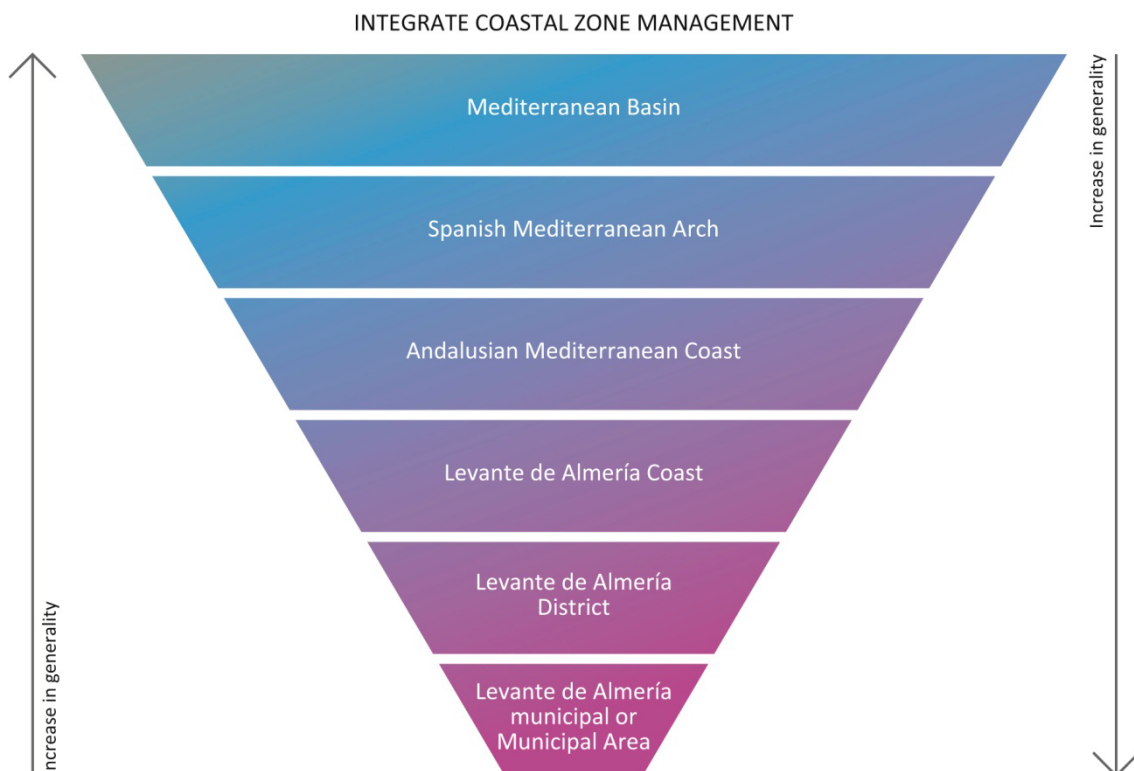


Figure. 6. Conceptual model.

<sup>4</sup> Socio-ecosystems are understood here as the integrated set of natural and social processes in a unit of territory over a certain period of time that constitute the structure of a system that functions as an organised whole.

The levels shown in the figure are determined by different territorial scales and different time scenarios in the scope of the current ICZM (Table 1. Socio-ecosystem levels of the SDRF conceptual model). The spatial scale that defines each of the levels determines the peculiarities of the area. The main unsustainable nodes on each level can be identified on that scale of approach, as well as the priority sustainability goals to be defined within a certain period of time. Thus the larger the spatial scale considered, the problems to be solved that are representative of the whole become more general, and the goals set will require a longer time scenario to solve.

Spatial scale	Time scale	Regulatory framework in the scope of the ICZM
Mediterranean Basin	25 - 50 years	Protocol on Integrated Coastal Zone Management in the Mediterranean  European Parliament Recommendation 2002/413/CE on application of ICZM in the Coastal Zones of Europe
Spanish Mediterranean Arch	10 - 20 years	Spanish Integrated Coastal Zone Management Report  Directives for preparing the National ICZM strategy
Andalusian Mediterranean Coast	10 - 15 years	Andalusian ICZM strategy proposal
Levante de Almería Coast	10 years	Levante de Almería CAMP Project Sustainable Development Reference Framework
Levante de Almería District	5 - 10 years	
Levante de Almería Supra-municipal or Municipal Area	< 5 years	

*Table 4. Socio-ecosystem levels of the SDRF conceptual model*

The socio-ecosystem approach implies that the way the problems are projected from higher levels onto lower levels is more and more specific. The pyramid represents an increase in uniqueness toward the lower levels, and on the contrary, a growing gradient of generality toward the upper levels. Thus the ICZM goals to be met on the lower levels are more concrete and must be achieved in a shorter period of time.

The number of interdependent processes that make up the different socio-ecosystem levels makes it hard to approach their study as a whole, and forms an obstacle to the identification of the major unsustainable nodes. Therefore, when the sustainability strategy was designed, it was necessary to apply a multidisciplinary focus the purpose of which consisted of integrating all the processes that make up the whole. To accomplish this, during the development of the SDRF, two information integration strategies were applied.

▪ *Bottom-up:* The sustainability proposals used were made by the various project bodies (Expert teams, Coastal Council and Forum), in the *Imagine* workshops, and in other more specific participatory processes which are supplemented or developed through the proposals made by the individual projects and horizontal activities. Through study, this strategy makes it possible for individual components on lower levels to be connected to form larger components that define higher levels.

The integration of all this information has allowed the socio-ecosystem levels typical of the Levante de Almería to be defined in the three lower levels shown in the pyramid. The proposals were classified for this in actions based on their character and scope of application. These, in turn, were combined according to synergies and affinities in aggregates called measures, and these into programmes, and finally goals.

▪ *Top-down:* The second strategy made it possible to design more detailed levels based on other more general levels. That is, three higher levels of the inverted pyramid were analysed and instruments were identified for achieving ICZM on each level. Unsustainable nodes were detected as well as the goals that are pursued on each of these scales, which appear in all their intensity in the CAMP area. The integration of all this information was used to check that the strategic goals defined for the CAMP area are in harmony with the directives set for each of the socio-ecosystem levels.

The convergence of these two information integration strategies permitted the four major strategic goals that define the Sustainable Development Reference Framework to be visualised clearly. The set of all of the proposals structured in goals, programmes, measures and actions, make up the Sustainable Development Reference Framework Action Plan. The SDRF is therefore definitely the result of integrating the Levante de Almería CAMP Project proposals, and verifies their being in keeping with those defined in the Mediterranean, Spanish and Andalusian areas.

Finally, once the Action Plan had been defined, it was subjected to sustainability auditing, the purpose of which was to evaluate the proposals from the social, economic and environmental points of view in order to determine their feasibility and priority in a 10-year time frame.

The result of this entire process was the final document, the Sustainable Development Reference Framework, on the agreed directives to be proposed to the competent authorities for implementing a sustainability strategy in the area.



## 1.2

### *Reference Framework for Sustainable Development*

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## **TABLE OF CONTENTS**

- 1.- Socio-economic heritage of the Levante de Almería
- 2.- Strategic goals for achieving sustainability on the Levante de Almería coast
- 3.- Sustainable Development Reference Framework Action Plan
- 4.- The Reference Framework for Sustainable Development as a dynamic management model

## **LIST OF TABLES**

*Table 1. Summary of SDRF Action Plan*

*Table 2. Sustainable Development Reference Framework Action Plan*

## **ABBREVIATIONS USED**

ACUAMED: Water in the Mediterranean Basin

CC: City Councils

CAMP: Coastal Area Management Programme

ARMAFE: Andalusian Regional Ministry of Agriculture, Fisheries and Environment

ARMCS: Andalusian Regional Ministry of Culture and Sports

ARME: Andalusian Regional Ministry of Education

ARMEISE: Andalusian Regional Ministry of Economy, Innovation, Science and Employment

ARMDH: Andalusian Regional Ministry of Development and Housing

ARMTC: Andalusian Regional Ministry of Tourism and Commerce

APG: Almería Provincial Government

FDG Levante: Fishery Development Group

RDG Levante: Rural Development Group

ICZM: Integrated Coastal Zone Management

MAFE: Ministry of Agriculture, Food and Environment

MAP CP/RAC: Mediterranean Action Plan Clean Production Regional Activity Centre

MD: Ministry of Defence

MEC: Ministry of Economy and Competitiveness

MD: Ministry of Development

MIET: Ministry of Industry, Energy and Tourism

SDRF: Sustainable Development Reference Framework

MAP: Mediterranean Action Plan

UNEP: United Nations Environment Programme



## 1.- Socioeconomic heritage of the Levante de Almería { XE "1.- Socioeconomic inheritance of the Levante de Almería" }

The CAMP area includes the coastal socio-ecosystems<sup>1</sup> located in the area defined by 8 municipalities on the coast of the Levante de Almería (Pulpí, Cuevas de Almanzora, Vera, Garrucha, Mojácar, Carboneras, Níjar y Almería), and the coastal waters adjacent to these municipalities covered by the Framework Water Directive (up to one nautical mile from the straight baseline).

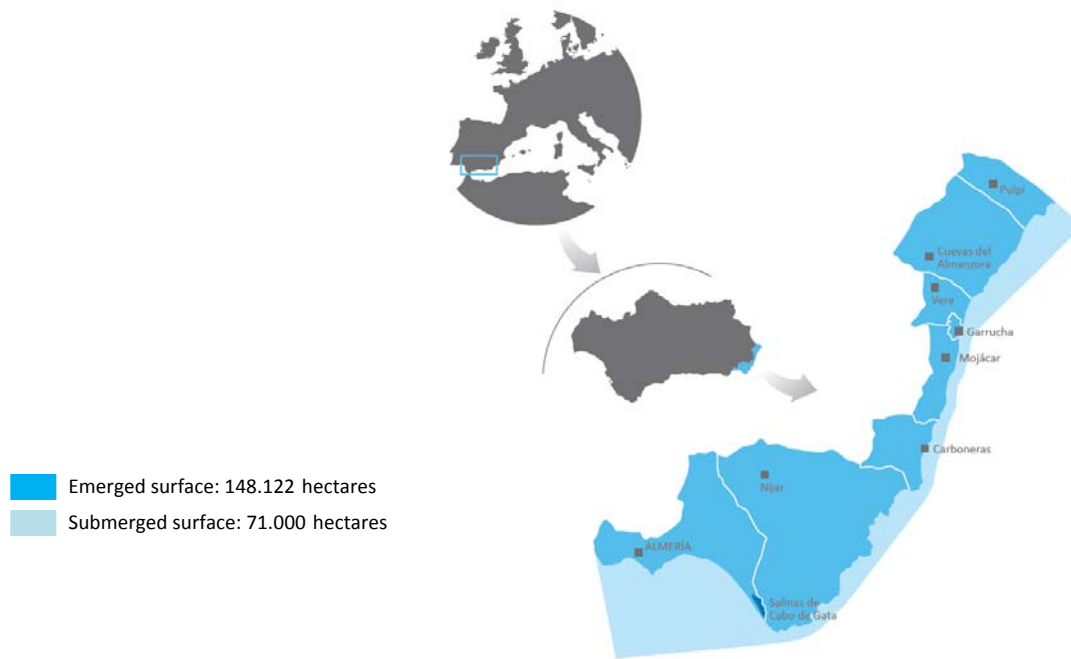


Figure 1: The Levante de Almería CAMP area

**The CAMP area is an extraordinarily unique and valuable ecological space** hosting an enormous number of habitats and species of flora and fauna of great interest in the European context. The physiography of the CAMP territory is characterised by flat areas, coastal steppes delimited by mountainous reliefs. For a long time, the territory's configuration and typically semiarid climate, characterised by a shortage of rainfall which is also highly variable in time and space, limited its socio-economic development.

Historically, the conditions for human settlement have not been very favourable. Isolation, accentuated by the orography and extreme aridity contributed to the territory's configuration as a remote frontier of the Iberian Peninsula. However, in the 19<sup>th</sup> century, the need for mineral ores by industrialised European countries and their easy removal from its wide coast stimulated the development of mining, which in turn acted as a motor for integrating the territory in international economic networks. The population growth which accompanied the mining boom stimulated the enlargement of the area cultivated. The intensification of human pressure on the coastal ecosystems and the nearby mountains was manifested

<sup>1</sup> Socio-ecosystems are understood here as the integrated set of natural and social processes in a unit of territory within a certain time constituting the structure of a system that functions as an organized whole.

in increased ploughing, large-scale increase in the use of surface and ground waters, and deforestation to satisfy the needs of people and mining. This industry finally entered a crisis due to the difficulties for international commerce when the First World War broke out, and some of the main mineral resources in the area were exhausted. This led to a long period of economic and social depression marked by significant transformations of the coastal mountains derived from mining in the mountains along the coast.

Since then and until the second half of the 20<sup>th</sup> century, the development model, limited primarily by a shortage of water and absence of communications infrastructure, was based essentially on primary activities that were in relative balance with the natural environment.

It was around the middle of the 20<sup>th</sup> century when the current socio-economic development model took off, led by the growth of intensive agriculture, hotel and residential tourism and the construction industry, associated or not.

i) Agriculture, by making use of underground water, and later, desalinated water and water brought in from other rivers, along with the introduction of technological innovations for relieving the main limiting factors for its development (water and land), high insolation and absence of winter temperatures, underwent dizzying growth and has become the main economic motor of the area. In the CAMP area there are two different types of intensive agriculture with different business bases and characteristics. In the southern municipalities (Almería and Níjar), the intensive agriculture is characterised by family-operated greenhouse crops, while in the north (Cuevas de Almanzora and Pulpí) it is characterised by outdoor crops, primarily vegetables, and on a larger business scale.

ii) During this time, a growth in services and improvement of communications infrastructure favoured the take-off of tourism and urban residential demand, tripling the regulated tourist offer in the past twenty years. However, the increase in the regulated offer only reflects a part of the growth in the accommodation capacity, since coastal urban expansion linked to construction of residential developments for foreigners and second homes for Spaniards has been enormous. Thus the regulated residential tourist offer is of limited significance within the total tourist offer, as the residential tourism has become the key element in the sector. This tertiary activity is especially important in the municipalities in the centre of the CAMP area (Carboneras-Mojácar-Garrucha-Vera), mainly along the coast and extending inland to some points with unique natural landscapes.

This development model has made the Levante de Almería one of the most socio-economically dynamic zones of Spain, doubling the national mean population growth rate in its area in the past three decades.

The socio-economic analysis of the CAMP area development model performed during the project implementation showed that several interwoven components of this intense development model impede its long-term **economic** stability:

- Wide social acceptance of the illusion of having overcome the water deficit.
- Mono-crop production derived from the absence of economic diversification.
- “Unlimited” real estate demand based on easily obtainable loans.
- Absence of an integrated development strategy in the area based on making effective use of renewable resources and the conservation of those more scarce and vulnerable.

This expansion model has transformed the demographic and socio-economic reality of the area with important negative repercussions on coastal resources and ecosystems. However, the Levante de Almería CAMP area continues to be one of the best conserved coastal façades of the Mediterranean, as shown by the recognition of the uniqueness of a high percentage of the territory for its biophysical and ecological conditions and landscape through its legal protection as a Protected Natural Space in the Andalusian Network of Natural Spaces (RENPA) and/or Sites of Community Importance in the European Natura 2000 Network.

Even though the intensive development during this period has generated a higher increase in revenues in the CAMP area than in others, this model is now experiencing the contrary, mainly due to, on one hand, by the quality demands of the European agricultural produce markets, and on the other by the fall in real estate prices and the growing provincial unemployment rate which is much higher than the Andalusian and national means.

**The economic recession, that has been affecting the production fabric of the CAMP area especially hard since 2007-2008, has also contributed to increased risk for its future stability. This situation brings the CAMP area to a crossroads in its history where the opportunity arises to improve the production model and achieve sustainable development of the coast.**

In this sense, putting into practice Integrated Coastal Zone Management through the CAMP Project constitutes an experiment for collectively leveraging a more efficient management model, a model based on sustainability of production and conservation of ecosystem services, which ensures progress and quality of life for the population of the Levante de Almería, by conciliating economic, social and cultural development with the protection of its environment and landscapes.

## **2.- Strategic goals for achieving sustainability on the Levante de Almería coast. { XE "2.- Strategic goals for achieving sustainability on the Levante de Almería coast." }**

*The challenge of the 21st century, in a world changing due to natural and/or human causes, is to consolidate a socio-economic development model that respects ecosystem services, and that will make the Levante de Almería a point of reference for sustainability by means of Integrated Coastal Zone Management (ICZM). This premise, of especial relevance in the Levante de Almería CAMP area because of its particular vulnerability to Global and Climate Change, defines the context in which the Sustainable Development Reference Framework is being carried out.*

*The basic strategic goal that sustains this proposal is the conviction that the conservation of coastal ecosystems articulated in a sustainable development model is an indispensable prerequisite if the CAMP area is to start behaving as an "intelligent area" in the coming years.*

*Intelligent areas have been defined (Vegara and de las Rivas, 2004) as those able to provide themselves with a shared coherent project for the future, and, definitively, those that face the challenges of globalization departing from a deep respect for their own local identity.*

*In the CAMP area, an area that has historically suffered from fragile articulation, the process which has led to the formulation of the SDRF has been able to initiate the path along which this new territorial identity will be built up. This new identity would be based on the acceptance of the following commitments by the social actors and administrations:*

**[Opportunity]** *The conviction that environmental conservation is not a restriction for a new model of economic development, but an opportunity for it, once the environmental and financial vulnerability and unsustainability of the old development models have been proven. In the Action Plan, measures are included that must favour this*

change based on valuation of environmental services, territorial integration of uses and production activities, and promotion of “green” employment.

**[Efficiency]** *The commitment to reduce negative externalities of all kinds that have been associated with the deployment of development models above the capacity of the limited resources of the territory. The opportunity they provided has been at the additional cost of the loss or deterioration of the public assets, which are the area’s natural capital, due to the inefficient use of scant resources and infrastructures. This lack of efficiency has not only had negative impacts on the environment, but has also been maintained at a high financial cost to the government and private stakeholders. As a relevant example of this commitment, actions provided for in the SDRF that would be implemented are cited in an integrated sustainable water management model (Strategic Goal 1), in one of the most arid regions of Europe.*

**[Governance]** *The commitment to overcome the lack of coordination among various authorities. This difficulty, which slows down both the action for conservation of ecosystems and the environmental services they procure, as well as deployment of infrastructures, must be overcome through the conviction that the area must enter a new stage of governance. One of the four pillars of the SDRF Action Plan concentrates on consolidating a transparent participatory governance system based on social participation and institutional coordination.*

**[Identity]** *Building of a new territorial identity, both inward and outward. Inward, so that the awareness of the value of a collective heritage, both existing and that yet to be constructed, develops within the territory itself. Outward, because in an age dominated by global competition, the quality of the development model is a fundamental piece of a strategy for territorial identification and positioning. Measures included in the Action Plan, such as the restoration of aquatic ecosystems, improved competitiveness of the tourist industry, and conservation of cultural heritage are witness to this commitment.*

*This strategic document, which is a result of integrating surveys, opinions and proposals made by more than 1000 people who participated more or less intensively, sets four priority goals to establish the basis of a sustainable development model in the Levante de Almería CAMP area.*

## **STRATEGIC GOAL 1: IMPLEMENT A SUSTAINABLE WATER CYCLE MODEL**

***“Implement an integrated sustainable water cycle management model that ensures that all bodies of water are in good condition by 2015, except as established by planning, in the context of Global and Climate Change and its derived risks (draught, flooding, etc.).”***

In the most arid zone of Europe, the Province of Almería, where mean precipitation does not usually surpass 200 mm per year, water becomes a priority, even more so when the problems associated with the shortage and quality of the water resource are due primarily to the socio-economic development. The particularities of the water cycle in the CAMP area, typical of a semiarid region characterised by the scarcity of rainfall and its strong variability over space and time, determine the relevance of an effective management of the resource to ensure its long-term availability.

The socio-economic development model of the area during the recent years has left its mark on the continental aquatic water systems, causing their gradual deterioration, especially of the underground water, the area’s main source of supply. In general, the main pressures on these ecosystems derive from their present and past overexploitation, in some cases causing a significant increase in salinity due to seawater intrusion, and pollution from agricultural leaching or occasional urban dumping. In addition to all of the above, the quality of the underground water strongly depends on the changes in precipitation, with a high organic mineralisation rate during draughts, and growing presence of emerging contaminants (antibiotics, veterinary residues and analgesics) in semiarid catchments.

This water scenario, along with the forecasts derived from the Global Change, predicts future availability of the water resource that is not very promising in terms of quantity or quality, as well as other risks of various natures. It is therefore indispensable to adopt an integrated water cycle management model following the principles of the Water Framework Directive (2000/60/CE), aimed at promoting integrated use of water to restore the aquatic ecosystems and palliate the effects of flood and draught.

The SDRF Action Plan proposed includes measures for complying with the Water Framework Directive, which is a legal imperative for all European countries, with commitments and deadlines which must be met. Among the commitments emphasised in this Directive is the need to recover the ecological integrity of aquatic ecosystems, governance with active participation of users, and recovery of the costs of the services it provides.

## **STRATEGIC GOAL 2: BOOST TERRITORIAL INTEGRATION OF USES AND PRODUCTION ACTIVITIES**

***"Boost action improving territorial integration of uses and production activities to conciliate their coexistence in the area by means of rational planning respectful of the integrity of terrestrial and marine ecosystems."***

The CAMP area is characterised by its high ecological value in the European context. Until the 1950s, the general water deficit in the area and the absence of territorial infrastructures had kept intact the nature of the area. This is confirmed by the significant percentage of its area recognised as protected. As much as 46.59% of the inland CAMP area is catalogued and included in the scope of the Andalusian Natural Spaces Network and Natura 2000 Network, as well as up to 77.3% of the marine environment.

At that time, a rapidly expanding economic cycle started, led by agriculture and tourism, with serious socio-economic and territorial repercussions. Since then, the high environmental and scenic qualities of the area's natural landscapes have coexisted with economic activities that have ensured the social well-being of the area. This circumstance causes territorial tensions, since the different uses, essentially agricultural, urban and tourism, compete for the occupation of the useful space available. Although many of the land uses are exchangeable in the long term, some of them are becoming incompatible, for example, the impact that certain economic activities near the protected spaces have on tourists who perceive severe landscape deterioration.

Governmental intervention is necessary in the matters of land-use planning to correct the detected trends. The actions proposed are intended to supplement and reinforce the current planning instruments in an attempt to avoid conflicts in land use and conciliate the different present and future terrestrial and marine landscapes. Land use planning linking the inherited and new uses to the biophysical suitability of the land, leads to increased landscape quality and an attraction for private economic investment, promoting an increase in dynamic business zones, and this in turn, generates employment. The distribution of public services and infrastructure in a rationally organised territory is facilitated and made more efficient, which means economic savings for the government administration by optimising the resources.

### **STRATEGIC GOAL 3: STIMULATE ADOPTION OF SUSTAINABLE PRACTICES**

***"Stimulate the adoption of sustainable practices that promote optimisation of natural resources, ensure maintenance of environmental services and propitiate the generation of green employment"***

In general terms, the current economic situation alone would justify the need to encourage reconversion and/or improvement of the economic activities (tourism, agriculture, etc.). In addition to the general effects derived from the crisis, other threats are closing in on these economic sectors, endangering their continuation. In this scenario, the adoption of sustainable practices appears as an alternative ensuring the maintenance of the activities themselves. Sustainable practices, in addition to contributing to the optimisation of natural resources, lower the costs of exploitation, whilst conserving the integrity of the ecosystems which supply services. The today's society is becoming increasingly aware of the need to maintain ecosystem services to ensure social well-being, which is propelling new market trends that demonstrate the increase in the demand for sustainable products. This justifies the adoption of good practices that also provide added value to products and services, and is a relevant factor for ensuring the survival of activities in the mid-to-long term.

Another relevant aspect related to sustainability of production activities is the reinforcement of the production sector through interaction of the main economic sectors, establishing synergies among them that contribute not only to the detection of new complementary activities, but at the same time propitiate, in the framework of sustainability, to a more stable business future linked to conservation of environmental services. This scenario is favourable for promoting, directly or indirectly, the creation of new businesses and a closer relationship between those already existing and those in other sectors, contributing to generation of new green employment and maintaining the production activities representative of the area.

Good agricultural practices and the need to accredit them are not only imperative in European, national and regional legislation, but are also appear as a growing demand of consumer associations and distribution and sales businesses, that is, as a growing market demand. Furthermore, the incorporation of sustainable practices in land use planning will increase the quality of the area, making it a more attractive place for both residents and visitors. The development of tourism is inextricably linked with the commitment to quality that goes beyond mass offer. This is the vision which frames the measures included in the SDRF Action Plan.

### **STRATEGIC GOAL 4: CONSOLIDATE A TRANSPARENT, PARTICIPATORY GOVERNANCE: SOCIAL PARTICIPATION AND INSTITUTIONAL COORDINATION**

***"Consolidate a transparent, participatory governance promoting social participation and institutional coordination in decision-making to ensure integrated coastal management for the benefit of present and future generations"***

The complexity of the institutional weave and various government administrations, along with a large number of sector plans and programmes existing in the CAMP area, imply the need for new instruments that would coordinate institutions and social participation in the decision-making in order to improve integrated coastal management. In this sense, the Integrated Coastal Zone Management introduces innovative proposals related to social participation, networking and transparent, participatory

governance to confront decision-making through conscious collective action and to strengthen government coordination mechanisms, socio-economic and public actors.

The social participation and institutional coordination structure of the CAMP Project is directed towards this goal. This structure, through its various bodies composed of citizens, socio-economic actors and government administrations, assisted by technical and scientific experts, is an example of transparent, participatory governance to be followed, as demonstrated during the joint development of a sustainable strategy for the future of the CAMP area. This strategy will enable the area to have agreed-upon, purely sustainable goals for its socio-economic development, as well as a programme of action to achieve them in the mid-to-long term. For their drafting and implementation, it is absolutely indispensable to continue counting on the institutions in the area and on public participation. The associative fabric and interpersonal and institutional networks are also indispensable for attempting to attain sustainable development in the CAMP area, and the progress on this pathway to sustainability involves training, awareness raising and information to extend the conviction of the importance of incorporating sustainability as a criterion of territorial competitiveness on all levels of society.

In coastal management, the new models of governance are not proposed as a restriction, but as an opportunity, since they help improve the diagnosis of its problems, social perception and generation of social networks that jointly participate in making proposals for decision making. These new models of governance with the active participation of social actors and local stakeholders included in the SDRF Action Plan do not form part of our inherited culture, but when developed, they provide more accurate and higher-quality results, which contribute to optimising investments and resources. This model of governance is not intended to replace the established institutions and democratic procedures, but complement and enrich them, supplying complementary views based on exploiting the potential of reinforced collaboration, co-responsibility in decision-making and social involvement on different levels.

### **3.- Sustainable Development Reference Framework Action Plan { XE "3.- Sustainable Development Reference Framework Action Plan" }**

**The Sustainable Development Reference Framework is a guideline containing a series of recommendations based on approval by the Coastal Council, which the members of the Coastal Commission could then approve for post-project implementation of its Action Plan.** From the proposals made in the SDRF Action Plan, the competent authorities, depending on their technical feasibility and available budget while the Plan is in effect, could boost measures or actions by creating a pool of specific municipal or supra-municipal projects on a scale of several years following a sustainable strategy defined for the Levante de Almería.

**The Sustainable Development Reference Framework Action Plan must be considered a dynamic tool able to adapt over time and space to the particular circumstances of the area and the global change scenarios affecting it. Thus it is advisable to make an adaptive management follow-up plan for periodically evaluating the fulfilment of its goals sufficiently far in advance to implement new measures that contribute to their achievement.**

The following table summarises the goals, programmes and measures in which the Sustainable Development Reference Framework is structured.

GOAL	PROGRAMMES	MEASURES
<b>1. IMPLEMENT A SUSTAINABLE WATER CYCLE MANAGEMENT MODEL</b>	<b>1.1. Integrated planning and management of water</b>	1.1.1. Progress toward unitary water cycle management
		1.1.2. Planning and management of water infrastructures based on cost/effectiveness analysis
		1.1.3. Promote complete reuse of waste water by means of Central User Committees
		1.1.4. Boost R&D measures in water resources management, including different lines of research in calls for application
		1.1.5. Promote efficiency in urban water cycle management
	<b>1.2. Restoration of aquatic ecosystems</b>	1.2.1. Boost hydro-morphological restoration of rivers and dry river beds
		1.2.2. Ensure compliance with wastewater discharge parameters.
		1.2.3. Gradually introduce the principle of water cost recovery
1.2.4. Progress in controlling groundwater extraction		
<b>2. BOOST TERRITORIAL INTEGRATION OF USES AND PRODUCTION ACTIVITIES</b>	<b>2.1. Integration of uses in the Terrestrial Environment</b>	2.1.1. Promote territorial integration of urban development
		2.1.2. Improve land-use planning of agricultural activities
		2.1.3. Improve management of the maritime, terrestrial and water public domain
		2.1.4. Promote conservation of the cultural heritage
		2.1.5. Minimise environmental impact of power plants (photovoltaic and wind)
		2.1.6. Minimise the environmental impact of tourist resorts with golf courses
		2.1.7. Improve integration of Protected Natural Spaces in the surrounding area
		2.1.8. Minimise the environmental impact of industrial plants
		2.1.9. Minimise the environmental impact of linear infrastructures
	<b>2.2. Sustainable Use of the Marine Environment</b>	2.2.1. Boost research in the marine environment and spread its results (Marine Strategy Framework Directive)
		2.2.2. Improve management criteria of the ILC according to EU legislation
		2.2.3. Promote integrated planning of uses in coastal spaces
<b>3. STIMULATE ADOPTION OF SUSTAINABLE PRACTICES IN PRODUCTION</b>	<b>3.1. Implement sustainable practices</b>	3.1.1. Promote available technical improvements and sustainable practices in agriculture
		3.1.2. Improve competitiveness in the tourism sector
		3.1.3. Support diversification of fisheries
		3.1.4. Improve sustainability in urban areas
	<b>3.2. Promote sustainability in production</b>	3.2.1. Involve the financial sector in implementing good practices in production
		3.2.2. Generate synergies among production activities in the CAMP area



<b>4. CONSOLIDATE A TRANSPARENT, PARTICIPATORY GOVERNANCE SYSTEM BASED ON SOCIAL PARTICIPATION AND INSTITUTIONAL COORDINATION</b>	<b>4.1. Improve social participation and institutional coordination</b>	4.1.1. Set up the social participation and institutional coordination structure resulting from the CAMP Project
		4.1.2. Incorporate the CAMP Project in administrative procedures submitted to public participation
	<b>4.2. Training and education</b>	4.2.1. Improve the training of strategic managers and actors
		4.2.2. Promote the diffusion of CAMP Project results by training
	<b>4.3. Awareness raising and volunteering</b>	4.3.1. Promote awareness of ICZM in strategic sectors
		4.3.2. Boost an environmental volunteering strategy
	<b>4.4. Information and diffusion of results demonstrated in the ICZM</b>	4.4.1. Diffusion of CAMP Project results
		4.4.2. Promote environmental information following the Aarhus Convention and European legislation

*Table 1. Summary of SDRF Action Plan*

The actions that comprise the measures and supplementary information to facilitate the launching of the SDRF Action Plan are given in tables further below (See *Table 2. SDRF Action Plan*). This information includes authorities responsible for implementing the various proposals, those responsible for coordinating their implementation, an indicative time scenario, follow-up indicators for finding out how well the implementation is being accomplished, and possible entities with which to form strategic alliances for collaborating in its launching. It also identifies the CAMP individual project or horizontal activity linked to this action, in the final report of which further details may be found on its feasibility and possible sources of financing.

Some of the measures proposed are already included in the strategies or policies of the competent authorities and have been included in the SDRF Action Plan as coherent with its goal.

		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
<b>Objective 1. Implement a sustainable management model of the integrated water cycle which guarantees the good ecological state of all water bodies from 2015, with the exceptions contemplated in the plan, within the context of Global and Climate Change and the derived risks (drought, floods, etc.)</b>						
<b>Programme 1.1. Planning and Integrated Water Management</b>						
<b>Measure 1.1.1. Progress towards unified management of the water cycle</b>						
1.1.1.1.	Action 1.1.1.1. Propose the incorporation of the creation of Central Users' Councils into the regulations.	Short	AGE (MAGRAMA) AA (CAPMA)	AA (CAPMA)	Number of Central Users' Councils created.	Interested parties
1.1.1.2.	Action 1.1.1.2. Create and/or streamline the Central Users' Councils in each of the hydrological environments of the CAMP area: Andarax, Níjar and Levante de Almería.	Short	AGE (MAGRAMA) AA (CAPMA)	AA (CAPMA)	Number of Central Users' Councils created	Interested parties
<b>Measure 1.1.2. Plan and manage the water infrastructure on the basis of the cost/efficiency analysis</b>						
1.1.2.1.	Action 1.1.2.1. Perform a cost-efficiency analysis prior to the construction of water infrastructure including a reliable market study.	Short	AGE (MAGRAMA) AA (CAPMA) AGE (ACUAMED)	AGE (MAGRAMA) AA (CAPMA)	Number of projects with cost-efficiency analysis.	Irrigators' and users' associations.
1.1.2.2.	Action 1.1.2.2. Prioritise exploitation of the existing water infrastructure to 90% of its capacity rather than construct new infrastructure.	Short	AGE (MAGRAMA) AA (CAPMA) AGE (ACUAMED)	AGE (MAGRAMA) AA (CAPMA)	Percentage of desalinated/stored water generated, compared to total potential.	Irrigators' and users' associations.
1.1.2.3.	Action 1.1.2.3. Produce periodical reports for public information with respect to the exploitation of water infrastructure, including desalination plants and water bodies.	Short, medium and long	AGE (MAGRAMA) AA (CAPMA) AGE (ACUAMED)	AGE (MAGRAMA) AA (CAPMA)	Number of reports made per year.	Irrigators' and users' associations.
<b>Measure 1.1.3. Encourage the total re-utilisation of waste water through the Central Users' Councils</b>						
1.1.3.1.	Action 1.1.3.1. Analyse the infrastructure required for the re-utilisation a of regenerated waste water depending on the final use of the water.	Short, medium and long	AGE (MAGRAMA) AA (CAPMA)	AGE (MAGRAMA) AA (CAPMA)	Performing diagnostic analysis	Central Users' Councils. Irrigators' associations. Users' associations. Private residential users. Town Councils Provincial Council of Almería.
1.1.3.2.	Action 1.1.3.2. Earmark investment for the progressive construction of the required infrastructure in response to the evolution of demand and use.	Short, medium and long	AGE (MAGRAMA) AA (CAPMA)	AGE (MAGRAMA) AA (CAPMA)	Investment in tertiary treatment	Central Users' Councils. Irrigators' associations. Users' associations. Private residential users. Town Councils Provincial Council of Almería.

		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
1.1.3.3.	Action 1.1.3.3. Take measures for the quality control of the resulting water and the efficiency of the system in accordance with current legislation.	Short, medium and long	AGE (MAGRAMA) AA (CAPMA)	AGE (MAGRAMA) AA (CAPMA)	Number of environmental and health inspections made by the competent authority	Central Users' Councils. Irrigators' associations. Users' associations. Private residential users. Town Councils Provincial Council of Almeria.
Measure 1.1.4. Promote R&D measures in water management, incorporating this line of research into the various calls for applications.						
1.1.4.1.	Action 1.1.4.1. Research projects aimed at the elaboration of a methodology to calculate environmental flows in the water bodies and the dissemination of results.	Medium	AGE (MAGRAMA) AA (CAPMA) AGE (ACUAMED)	AGE (MAGRAMA) AA (CAPMA) AA (CEICE)	Number of projects approved related to the environmental flow/total number of water projects.	Universities
1.1.4.2.	Action 1.1.4.2. Water and energy research projects to explore opportunities for the production of energy in the different phases of the water cycle.	Medium	AGE (MAGRAMA) AA (CAPMA) AGE (ACUAMED)	AGE (MAGRAMA) AA (CAPMA) AA (CEICE)	Number of projects approved related to water and energy/total number of water projects.	Universities
1.1.4.3.	Action 1.1.4.3. Research projects for the elaboration of a flood forecast system, emergency plans, evaluation of erosion and soil loss rates in the rivers Antas, Alías, Almanzora and Andarax.	Short	AGE (MAGRAMA) AA (CAPMA)	AGE (MAGRAMA) AA (CAPMA)	Number of research projects into the elaboration of a flood warning system/total number of water projects.	Research groups at public universities.
Measure 1.1.5. Promote efficiency in the management of the urban water cycle.						
1.1.5.1.	Action 1.1.5.1. Launch efficiency plans in the urban water supply network in order to reduce losses and improve the efficiency of water use.	Medium and long	AL (Town Councils)	AL (Town Councils)	Number of distribution network efficiency plans/total number of municipalities.	CAPMA
1.1.5.2.	Action 1.1.5.2. Encourage the launch of projects for the construction of systems for the exploitation of rainwater.	Medium and long	AL (Town Councils)	AL (Town Councils)	Number of project on systems for the use of rainwater/total number of municipalities.	Central Users' Councils Associations of Councils
1.1.5.3.	Action 1.1.5.3. Promote the development of supra-municipal bylaws in the CAMP area aimed at the efficient use of water, including grey water, domestic water, swimming pools and rainwater systems.	Short	AL (Town Councils)	AL (Town Councils)	Number of bylaws passed.	CAPMA. Provincial Council of Almeria. Associations of Councils.
Programme 1.2. Restoration of Aquatic Ecosystems						
Measure 1.2.1. Promote the hydro-morphological restoration of rivers and dry watercourses.						
1.2.1.1.	Action 1.2.1.1. Elaborate an action protocol to maintain rivers and dry watercourses, including actions to promote natural replenishment through scarification, water collection systems or plantations of the appropriate species.	Short	AGE (MAGRAMA) AA (CAPMA)	AGE (MAGRAMA) AA (CAPMA)	Action protocol elaborated	Interested parties

		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
1.2.1.2.	Action 1.2.1.2. Promote a priority action plan involving the creation of riverside promenades around settlements.	Short, medium and long	AA (CAPMA) AL (Town Councils)	AA (CAPMA)	Number of municipalities with priority actions planned	Neighbours' associations. Universities.
1.2.1.3.	Action 1.2.1.3. Develop annual plans for the maintenance of rivers, dry watercourses and drainage works following environmental and efficiency criteria.	Short, medium and long	AGE (MAGRAMA) AA (CAPMA)	AGE (MAGRAMA) AA (CAPMA)	Percentage of stretches of river maintained using environmental criteria/total.	Universities. Specialised companies.
Measure 1.2.2. Guarantee compliance with the parameters for the discharge of wastewater						
1.2.2.1.	Action 1.2.2.1. Perform a study of the current state and requirements for water treatment infrastructure.	Short	AGE (MAGRAMA) AA (CAPMA) AL (Town Councils)	AGE (MAGRAMA) AA (CAPMA)	Study made	Users' associations
1.2.2.2.	Action 1.2.2.2. Improve the efficiency of waste water treatment plants, promoting supra-municipal management.	Short, medium and long	AGE (MAGRAMA) AA (CAPMA) AL (Town Councils)	AGE (MAGRAMA) AA (CAPMA)	Number of projects/total number of municipalities	Users' associations
1.2.2.3.	Action 1.2.2.3. Prioritise the execution of infrastructure in accordance with the public interest, introducing criteria to guide investment towards this objective.	Short, medium and long	AGE (MAGRAMA) AA (CAPMA) AL (Town Councils)	AGE (MAGRAMA) AA (CAPMA)	Number of water infrastructure works completed in the public interest (through associations of local councils)	Users' associations
1.2.2.4.	Action 1.2.3.4. Disseminate updated information on the achievement of water treatment objectives in urban areas.	Short, medium and long	AGE (MAGRAMA) AA (CAPMA) AL (Town Councils)	AGE (MAGRAMA) AA (CAPMA)	Number of municipalities offering public access to information/total	Users' associations
Measure 1.2.3. Progressively implement the principle of the recuperation of water costs						
1.2.3.1.	Action 1.2.3.1. Promote the approval of the charge for general services (Law 9/2010, of 30 July, on Water in Andalusia).	Short	AGE (MAGRAMA) AA (CAPMA) AL (Town Councils)	AL (Town Councils)	Number of municipalities which have approved the planned charge for services/total	Ecologists' associations. Technicians. General public. Neighbours' associations.
Measure 1.2.4. Progress towards the control of the extraction of underground waters						
1.2.4.1.	Action 1.2.4.1. Update the inventory of water catchments.	Short, medium and long	AGE (MAGRAMA) AA (CAPMA) Central Users' Council	AA (CAPMA)	Percentage of water extractions updated/total.	Irrigators' associations. Central Users' Councils.
1.2.4.2.	Action 1.2.4.2. Streamline the processing of water extraction.	Short, medium and long	AGE (MAGRAMA) AA (CAPMA) Central Users' Council	CAPMA Central Users' Council	The average time for the processing of water extractions.	Irrigators' associations. Central Users' Councils.
1.2.4.3.	Action 1.2.4.3. Promote the installation of water meters at water extraction points.	Short, medium and long	AGE (MAGRAMA) AA (CAPMA) Central Users' Council	CAPMA Central Users' Council	Percentage of water meters/total number of extractions.	Irrigators' associations. Central Users' Councils.

		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
1.2.4.4.	Action 1.2.4.4. Adopt measures to strengthen the monitoring and periodical control of water extraction.	Short, medium and long	AGE (MAGRAMA) AA (CAPMA) Central Users' Council	AGE (MAGRAMA) AA (CAPMA)	Percentage of inspections/total number of extractions.	Irrigators' associations. Central Users' Councils.

		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
Objective 2. Promote actions aimed at improving the territorial integration of the use of water and productive activities in order to reconcile them in the area by means of rational planning which respects the integrity of land and sea ecosystems						
Programme 2.1. Integration of Water Use on Land						
Measure 2.1.1. Encourage the territorial integration of urban development.						
2.1.1.1.	<p>Action 2.1.1.1. Inform the competent administrations of the results of the CAMP project (territorial vulnerability maps, etc.) as a measure to complement land-use and urban planning instruments and the current and future processing of environmental issues:</p> <p>1. Incorporate as a guiding technical criterion the areas of high and very high vulnerability detected in the vulnerability analysis of the CAMP area as a reference for the prohibition of urban development.</p> <p>2. Incorporate as a guiding technical criterion that, in areas of medium vulnerability, strict landscape integration criteria are applied to new urban expansion , maintaining the environmental and cultural values which characterise the area in question.</p>	Pending approval of maps	AA (CAPMA)	AA (CAPMA)	<p>Number of municipalities in the CAMP area which have considered the vulnerability maps in the review of their approach.</p> <p>Number of <i>ad hoc</i> modifications which consider the results of the vulnerability map in the adoption of the approach.</p>	<p>Town Councils.</p> <p>Provincial Council of Almeria.</p> <p>Private operators</p>
Measure 2.1.2. Improve land-use planning of agricultural activities						
2.1.2.1.	Action 2.1.2.1. Promote the regulation, by means of the General Town Plan, of intensive agricultural land, including the delimitation of the space, and with regulations to govern the implementation and management of the activity.	Short	AA (CAPMA) AL (Town Councils)	AA (CAPMA)	Percentage of municipalities which regulate through the planning of the intensive agricultural land.	<p>Cooperative producers.</p> <p>Cajamar Foundation.</p> <p>Higher Council for Scientific Research.</p> <p>Universities.</p>
2.1.2.2.	Action 2.1.2.2. Update and/or elaborate Rural Health Plans in territorial units in areas of intensive agriculture under plastic.				Number of rural health plans drawn up in all of the municipalities of the CAMP area.	
2.1.2.3.	Action 2.1.2.3. Inform the competent administrations of the results of the CAMP project (territorial vulnerability maps, etc.) as a measure to complement current and future land-use and urban planning instruments:	Pending approval of maps	Number of municipalities in the CAMP area which have considered the vulnerability maps in their planning instruments with a view to			

		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
	1. Incorporate, as a guiding technical criterion, the areas of high and very high vulnerability detected in the vulnerability analysis of the CAMP territory as a reference in order to consider the prohibition of allowing new crop areas in greenhouses or the transformation of forest land to ordinary crops.				regulating the implementation of new crop areas in greenhouses and the transformation of forest land to crops.	
2.1.2.4.	Action 2.1.2.4. Promote R&D projects for the integration into the landscape of greenhouses and to promote biological control on farms by incorporating this line of research into calls for applications.	Short			Percentage of crop area in greenhouses subject to landscape integration projects/total crop area of greenhouses.	
2.1.2.5.	Action 2.1.2.5. Promote the elaboration of a guide for the integration into the landscape of agricultural installations and buildings.	Medium	AGE (MAGRAMA) AA (CAPMA) AL (Town Councils)	AA (CAPMA)	Guide elaborated	Cajamar Foundation. Agricultural cooperatives. Irrigators' associations. Universities. Agricultural unions. Agricultural and Fishery Training and Research Institutions.
Measure 2.1.3. Improve the management of the Maritime Terrestrial and Hydraulic Public Domain						
2.1.3.1.	Action 2.1.3.1. Define the demarcation of the Hydraulic Public Domain as a priority in those zones under agricultural or urban pressure, and identify types of occupation.	Short and Medium	AA (CAPMA)	AA (CAPMA)	Number of demarcations of the HPD in areas with high agricultural pressure/total number of demarcations.	Public university research groups. MAGRAMA.
2.1.3.2.	Action 2.1.3.2. Finalise the demarcation of the Maritime Terrestrial Public Domain between Garrucha and Cuevas del Almanzora.	Short and Medium	AGE (MAGRAMA)	AGE (MAGRAMA)	Kilometres of coastline pending demarcation/total number of kilometres of the stretch of coastline from Garrucha to Cuevas de Almanzora.	CAPMA
2.1.3.3.	Action 2.1.3.3. Urge the enforcement of article 23.2 of the Coastal Law which allows for the extension to 200 m of the servitude zone to protect the MTPD and of article 30 on the 500 m influence zone for residential use as contemplated under current land-use plans. Improve the coordination with, and involvement of, local and provincial councils in the performance of this task.	Short and Medium	AGE (MAGRAMA) AA (CAPMA) AL (Town Councils)	AGE (MAGRAMA) AA (CAPMA)	Number of municipalities with actions to disseminate the A-200 initiative.	Ecologists' associations Neighbours' associations

		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
2.1.3.4.	Action 2.1.3.4. Continue incorporating criteria related to the dynamic, interrelated nature of the MTPD and HPD at river mouths, estuaries, deltas, etc., in order to determine the demarcation process and urban planning.	Short and Medium	AGE (MAGRAMA) AA (CAPMA)	AGE (MAGRAMA) AA (CAPMA)	Inclusion or exclusion of these criteria in the demarcation process.	Universities
2.1.3.5.	Action 2.1.3.5. Promote the elimination of installations, constructions, buildings, etc., from the Maritime Terrestrial and Hydraulic Public Domain which have been declared illegal under a final judicial sentence, and also others which have become obsolete or which are disused and which do not have any current concession.	Short, medium and long	AGE (MAGRAMA) AA (CAPMA)	AGE (MAGRAMA) AA (CAPMA)	Number of facilities, constructions or buildings eliminated.	Ecologists' associations Neighbours' associations
Measure 2.1.4. Promote the conservation of the Cultural Heritage						
2.1.4.1.	Action 2.1.4.1. Develop an action plan to restore and rehabilitate cultural elements identified as being priorities among the results of the CAMP project and which form part of the interpretation itinerary, within budgetary possibilities:	Short, medium and long	AA (CAPMA) AA (CCD) AA (CTC) AL (Provincial Council of Almeria) GDR Levante	GDR Levante	Action plan developed	Various
	1. Restoration and valorisation of the Argamasón Mill as a museum.	Medium	AA (CAPMA) AA (CCD) AA (CTC) GDR Levante	GDR Levante	Number of interventions on different elements for the conservation/total number of elements identified as priorities	Carboneras Town Council. Tourist Board. Friends of the Park Association.
	2. Restoration of the Well and the Torregarcía Salting Factory.	Short	AA (CAPMA) AA (CCD) AA (CTC)	AA (CAPMA)		Almeria Town Council. Irrigators' Associations.
	3. Rehabilitation of the Alumbres Tower.	Medium	AA (CAPMA) AA (CCD) AA (CTC) GDR Levante	GDR Levante		Níjar Town Council. Tourist Board. Friends of the Park Association.
	4. Connection and improvement of the greenway between Lucainena and the Aguamarga pier.	Medium	AA (CAPMA) AA (CCD) AA (CTC) AL (Provincial Council of Almeria) GDR Levante	GDR Levante		Níjar Town Council. Tourist Board. Friends of the Railway Association. Friends of the Park Association.
	5. Improvement of accesses and valorisation of the river Álamo source.	Short	AA (CCD) AA (CTC) AL (Provincial Council of Almeria) GDR Levante	GDR Levante		Cuevas-Almanzora Town Council. Tourist Board.



		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
	6. Valorisation of the Jaravía Mining Complex as an area for the interpretation of the underground heritage.	Long	AA (CAPMA) AA (CCD) AA (CTC) GDR Levante	GDR Levante		Pulpí Town Council. Tourist Board.
	7. Restoration of the Fernán Pérez Aqueduct.	Long	AA (CAPMA) AA (CCD) AA (CTC) GDR Levante	GDR Levante		Níjar Town Council. Tourist Board. Friends of the Park Association.
	8. Action to prevent the deterioration of the mining buildings at El Arteal.	Medium	AA (CCD) AA (CTC) GDR Levante	GDR Levante		Cuevas-Almanzora Town Council. Tourist Board.
	9. Rehabilitation and refurbishment of the San Miguel Tower to be used as the Cabo de Gata School of Artisan Fishing.	Short	AA (CAPMA) AA (CCD) AA (CTC)	AA (CAPMA)		Almeria Town Council. Cabo de Gata Fisherman's Guild.
	10. Restoration and valorisation of the complex of water works at the Isabel II reservoir.	Medium	AA (CAPMA) AA (CCD) AA (CTC) GDR Levante	AA (CAPMA)		Níjar Town Council. Tourist Board. Friends of the Park Association.
2.1.4.2.	Action 2.1.4.2. Promote the development of municipal bylaws which respect the local architectural tradition.	Short	AA (Town Councils) AA (CCD)	AA (Town Councils)	Percentage of municipalities with bylaws approved/total.	Provincial Council of Almeria. Almeria Architects' Association.
2.1.4.3.	Action 2.1.4.3. Promote the elaboration of a guide to disseminate abandoned mining landscapes with a heritage value.	Medium	AA (CAPMA) AA (CCD) GDR Levante	AA (CAPMA)	Guide elaborated	Cultural Associations Ecologists' Associations Neighbours' Associations
Measure 2.1.5. Minimise the environmental impact of energy generation facilities (photovoltaic and wind energy)						
2.1.5.1.	Action 2.1.5.1. Provide the results of the CAMP project to local administrations (territorial vulnerability maps, etc.) as a measure to complement current and future environmental processing procedures:  1. Incorporate the zones of high and very high vulnerability identified in the analysis of the vulnerability of the CAMP area as a guiding technical criterion, to be used as a reference in the elaboration of studies of alternative locations in order to minimise the effect on these zones and include landscape integration measures.	Pending approval of maps	AGE (MAGRAMA) AGE (MEC) AA (CAPMA) AA (CEICE)	AA (CEICE)	Number of projects for the installation of new energy generation plants whose studies of alternatives take into account zones of high-very high vulnerability/total.	Energy, Environmental and Technological Research Centres.

		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
2.1.5.2.	Action 2.1.5.2. Incorporate landscape integration criteria into programmes of aid for the installation of renewable energy facilities.	Short	AGE (MEC) AA (CAPMA) AA (CEICE)	AA (CEICE)	Number of aid programmes which have incorporated these criteria.	Energy, Environmental and Technological Research Centres. Universities.
2.1.5.3.	Action 2.1.5.3. Promote the elaboration of landscape integration guides for energy generation and distribution infrastructure.	Medium	AA (CAPMA) AA (CEICE)	AA (CEICE)	Guide elaborated	Energy, Environmental and Technological Research Centres. Universities.
Measure 2.1.6. Minimise the environmental impact of tourist complexes with golf courses.						
2.1.6.1.	Action 2.1.6.1. Incorporate the results of the CAMP project (territorial vulnerability maps) as a guiding technical criterion for obtaining a Declaration of Tourist Interest to restrict the development of tourist complexes to areas classified as low or very low vulnerability.	Pending approval of maps			Percentage of projects for new golf courses which take into account zones of high-very high vulnerability/total.	Business associations. Residential, Sporting and Health Tourism of Andalucía (PROMOTUR). Private operators.
2.1.6.2.	Action 2.1.6.2. Include criteria for design oriented towards sustainability and integration in actions undertaken in projects, including: a) Optimisation of the use of resources and maximum efficiency in the use of water; b) Measures aimed at the improvement of the landscape and the adaptation of its elements to the semi-arid ecological functionality and aesthetics of the territory; c) Projection of corrective measures aimed at minimising the impact of light contamination.	Short	AA (CAPMA) AA (CTC)	AA (CAPMA) AA (CTC)	Percentage of projects for golf courses in the CAMP area which have special measures to adapt to the semi-arid environment.	
Measure 2.1.7. Improve the integration of Protected Natural Spaces.						
2.1.7.1.	Action 2.1.7.1. Streamline the integrated management plans for the different spaces included in the Natura 2000 Network on land in the CAMP area.	Short	AGE (MAGRAMA) AA (CAPMA) AL (Town Councils)	AA (CAPMA)	Number of Natural Spaces which have Integrated Action Plan for the spaces which do not have one already.	Higher Council for Scientific Research. Universities. Ecologists' associations.
2.1.7.2.	Action 2.1.7.2. Promote landscape integration in the planning instruments applicable in the areas where protected natural spaces border with other uses (intensive farming under plastic, golf courses, isolated industrial buildings, etc.).				Percentage of planning instruments reviewed under these criteria.	

		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
2.1.7.3.	Action 2.1.7.3. Promote and/or complete the development of management plans for the main coastal ecosystems (coastal lagoons, salt flats, wetlands, islands, among others) in order to maintain their ecological integrity and eco-system functions.				Percentage of management plans developed for the main coastal ecosystems/total.	
2.1.7.4.	Action 2.1.7.4. Promote a municipal inventory of coastal landscapes of high scenic value (beaches, cliffs, etc. ) and contemplate measures for their preservation.				Percentage of municipalities with a municipal inventory of landscapes/total.	
2.1.7.5.	Action 2.1.7.5. Disseminate the possibilities of the use of fiscal measures to offer incentives to private initiatives for the conservation of nature in accordance with Law 42/2007, of 13 December 2007, on the Natural Heritage and Biodiversity.				Number of dissemination actions undertaken on this subject.	
Measure 2.1.8. Minimise the environmental impact of the location of industrial facilities.						
2.1.8.1.	Action 2.1.8.1. Include more restrictive criteria in the planning instruments for obtaining the Declaration of Social Interest so that authorisation in Non-Building land is only given to those facilities which, by the nature of their production process, must be located in an isolated area far from other industrial facilities, in order to avoid the proliferation of disseminated industries.	Short	AA (CAPMA) AA (CEICE) AL (Town Councils)	AA (CAPMA) AL (Town Councils)	Number of Declarations of Public Utility authorised in a municipality in relation to the rest of the municipalities of the CAMP area.	Almeria Science and Technology Park
2.1.8.2.	Action 2.1.8.2. Streamline and/or include measures to encourage the construction of industrial estates which are supra-municipal or which are adapted to the existing local demand in urban and land-use planning instruments, in order to develop diverse economic activities.				Percentage of planning instruments reviewed under these criteria.	
2.1.8.3.	Action 2.1.8.3. Provide the competent administrations with the results of the CAMP project (territorial vulnerability maps, etc.) as a measure to complement current and future land-use and urban planning instruments:  1. Incorporate areas of high and very high vulnerability detected in the vulnerability analysis of the CAMP area as guiding technical criteria as a reference when evaluating restrictions on industrial buildings.	Pending approval of maps	Number of municipalities which use the results of the vulnerability map in order to refuse authorisation for the construction of industrial buildings on Non-Building Land.			

		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
	2. Incorporate as a guiding technical criterion that the construction of isolated industrial buildings should be restricted to areas of low or very low vulnerability.					
2.1.8.4.	Action 2.1.8.4. Promote the elaboration of landscape integration guides for different types of factories, industrial estates and business parks.	Medium	AA (CAPMA) AA (CEICE)	AA (CAPMA)	Guide elaborated	Business associations
Measure 2.1.9. Minimise the environmental impact of the linear and telecommunications infrastructure.						
2.1.9.1.	Action 2.1.9.1. Provide the results of the CAMP projects to the competent administrations as guiding technical criteria in environmental processing procedures in order to reconsider alternatives for the route of planned infrastructure so as to minimise its effect on highly and very highly vulnerable areas.	Pending approval of maps			Number of projects which contemplate landscape integration measures/projects which do not include them.	
2.1.9.2.	Action 2.1.9.2. Apply landscape integration criteria in semi-arid zones in the construction of overhead lines, both in works areas and in auxiliary or temporary zones.	Short	AA (CAPMA) AA (CFV)	AA (CAPMA) AA (CFV)	Percentage of linear infrastructure projects in the CAMP area which include landscape integration measures adapted to the semi-arid environment.	Red Eléctrica de España MF CAPMA ACUAMED
2.1.9.3.	Action 2.1.9.3. Guarantee that efficient corrective and compensatory measures are applied in order to improve habitats affected by large-scale linear infrastructure, especially as regards barriers and the isolation of animal populations.				Percentage of projects which include efficient corrective and compensatory measures for the improvement of habitats/total.	
2.1.9.4.	Action 2.1.9.4. Promote the elaboration of landscape integration guides for wireless telecommunications transmission infrastructure.	Medium	AGE (MAGRAMA) AA (CAPMA)	AA (CAPMA)	Guide elaborated	
Programme 2.2. Sustainable Use of the Marine Environment						
Measure 2.2.1. Promote research into the marine environment and dissemination of the results (Framework Directive on Marine Strategy)						
2.2.1.1.	Action 2.2.1.1. Design and execute projects to monitor invasive and/or exotic species.	Short, medium and long	AGE (MAGRAMA) AA (CAPMA)	AGE (MAGRAMA)	Number of projects elaborated on this subject.	Ecologists' associations
2.2.1.2.	Action 2.2.1.2. Increase knowledge of the functions of underwater canyons in order to determine the effects on marine erosive forces and on the ecological processes which occur there, and the effect on marine species of interest, such as the red shrimp in the underwater canyon at Garrucha, incorporating this line of research into the various calls for application.	Short, medium and long	AGE (MAGRAMA) AA (CAPMA)	AGE (MAGRAMA)	Number of research studies in underwater canyons/total investment in R&D in projects related to the Marine environment in the Sea of Alborán.	CAPMA. Universities. Fishing guilds.

		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
2.2.1.3.	Action 2.2.1.3. Design and execution of projects to establish a Network of Wireless Sensors to locate coastal elements such as reefs, aquaculture areas, undersea cables, etc.	Medium	AGE (MAGRAMA) AA (CAPMA)	AA (CAPMA)	Number of projects elaborated on this subject.	CAPMA
2.2.1.4.	Action 2.2.1.4. Support the installation of Remote On-board Stations (ROS) on fishing boats to facilitate the monitoring of the fishing effort and to achieve the traceability of fishery products.	Medium and long	AGE (MAGRAMA) AA (CAPMA)	AA (CAPMA)	Percentage of boats with ROS/total.	Universities
Measure 2.2.2. Improve the criteria for the management of SCIs in accordance with community regulations						
2.2.2.1.	Action 2.2.2.1. Update the delimitation of Reservation Areas and the spaces of the Natura 2000 Network (Sites of Community Importance) on the basis of the results of the LIFE Posidonia project.	Short	AGE (MAGRAMA) AA (CAPMA)	AGE (MAGRAMA)	Number of Natural Resource Plans and Management Plans updated on the basis of LIFE Posidonia.	Higher Council for Scientific Research Universities Ecologists' associations
2.2.2.2.	Action 2.2.2.2. Streamline the integrated management plans for the different spaces included in the Natura 2000 Network in the marine environment of the CAMP area.	Short	AGE (MAGRAMA) AA (CAPMA)	AA (CAPMA)	Number of Natural Spaces with an Integrated Management Plan/spaces which do not have plans.	Higher Council for Scientific Research Universities Ecologists' associations
2.2.2.3.	Action 2.2.2.3. Analyse the extension of the Water Police points so as to cover the coast more evenly, especially in Sites of Community Importance.	Short, medium and long	AGE (MAGRAMA) AA (CAPMA)	AGE (MAGRAMA)	Number of Water Police points incorporated into the control protocol.	Ecologists' associations
Measure 2.2.3. Promote the integrated planning of the uses of the coastal space						
2.2.3.1.	Action 2.2.3.1. Undertake marine environment planning projects using the results of the CAMP project (marine environmental sensitivity maps) as a guiding technical criterion, through which the following recommendations are established:  In zones identified as being highly sensitive:  1. Regulation of all professional and recreational activities undertaken in the zone. a. Regulation of the free anchorage of boats. b. Regulation of recreational fishing methods from boats, land and under water. c. Regulation of commercial fishery and aquaculture methods. 2. Limit the extraction of aggregate, the construction of jetties, spits and yachting marinas to those which are essential and, always, after appropriate assessment of the environmental effects.	Pending approval of maps	AGE (MAGRAMA) AA (CAPMA)	AGE (MAGRAMA) AA (CAPMA)	Nº of planning projects which use these technical criteria / total.	Ecologists' associations

		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
	<p>3. Limit the cleaning of beaches and coastal areas (managed, controlled cleaning).</p> <p>4. Limit activities related to the “regeneration” of beaches.</p> <p>5. Control of organic and chemical waste discharged into the sea.</p> <p>6. Control, monitoring and management of exotic and/or invasive species.</p> <p>In zones identified as being of medium sensitivity:</p> <p>7. Regulation of access and anchorage of commercial fishing vessels (SLSEPA and Electronic Logbook).</p> <p>8. Regulation and establishment of anchorage buoys for recreational nautical activities (diving, pleasure boating, recreational fishing, etc).</p> <p>9. Regulation of trawling (bottom trawling and dredge fishing).</p> <p>10. Regulation of integrated aquaculture.</p> <p>11. Control of organic and chemical waste discharged into the sea.</p> <p>12. Control, monitoring and management of exotic and/or invasive species.</p> <p>In low sensitivity zones:</p> <p>13. Regulation of commercial and recreational activities.</p> <p>14. Control of organic and chemical waste discharged into the sea.</p> <p>15. Control, monitoring and management of exotic and/or invasive species.</p>					
2.2.3.2.	Action 2.2.3.2. Promote the elaboration of a guide for the landscape integration of fishery and aquaculture facilities.	Medium	AGE (MAGRAMA) AA (CAPMA)	AA (CAPMA)	Guide elaborated	Ecologists' associations

		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
<b>Objective 3. Promote the adoption of sustainable practices which encourage the optimisation of natural resources, guarantee the maintenance of environmental services and encourage the generation of green employment</b>						
Programme 3.1. Implementation of Sustainable Practices						
Measure 3.1.1. Promote the available technical improvements and environmental practices in farming.						
3.1.1.1.	<p>Action 3.1.1.1. Design and application of incentives for the implementation of technologies aimed at the reduction and efficiency of the consumption of water and nitrogen in intensive crops, in order to:</p> <ol style="list-style-type: none"> <li>1. Encourage the collection of rainwater on the roofs of greenhouses.</li> <li>2. Encourage the use of probes to measure the need for water in the greenhouses.</li> <li>3. Encourage automated irrigation dosage and the use of fertilisers in accordance with real-time measurements of water and nutrients in the soil.</li> <li>4. Encourage the analysis of nutrients in the soil and leaf samples at key stages in all crops.</li> <li>5. Use drained water for other plantations outside the crop area.</li> <li>6. Seek technical solutions to disinfect drainage water.</li> <li>7. Improve the uniformity of irrigation systems.</li> <li>8. Develop protocols related to the washing of the soil to eliminate ballast salts.</li> </ol>	Medium	AA (CAPMA) AA (CEICE)	AA (CAPMA)	<p>Percentage of greenhouses with facilities to collect rainwater.</p> <p>Manual elaborated on the use and optimum monitoring of irrigation and soil.</p> <p>Number of actions taken to disseminate the manual.</p> <p>Number of new criteria incorporated into the quality rules for certified production.</p>	<p>Agricultural organisations.</p> <p>Certification bodies.</p> <p>Universities.</p> <p>Agricultural and Fishery Research and Training Institutes.</p>
3.1.1.2.	<p>Action 3.1.1.2. Promote R&amp;D projects to implement integrated energy solutions on farms, incorporating this line of research into various calls for application.</p>	Medium	AA (CAPMA) AA (CEICE)	AA (CEICE)	<p>Number of public calls for proposal with the line of research incorporated.</p>	<p>Agricultural organisations.</p> <p>Universities.</p> <p>Agricultural and Fishery Research and Training Institute.</p> <p>Tabernas Solar Platform.</p>
3.1.1.3.	<p>Action 3.1.1.3. Elaborate and disseminate a technical manual of good practices for the landscape integration of greenhouses by planting hedges of shrubs and trees for visual and plant health effects.</p>	Short	AA (CAPMA)	AA (CAPMA)	<p>Technical manual elaborated for the landscape integration of greenhouses.</p> <p>Number of dissemination actions undertaken.</p> <p>Number of dissemination actions taken on this subject.</p>	<p>Agricultural organisations.</p> <p>Universities.</p> <p>Agricultural and Fishery Research and Training Institute.</p>

	TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
<p>3.1.1.4. Adopt measures to reinforce the integrated management of agricultural waste in order to:</p> <p>1. Encourage the separation of the different types of waste generated in agriculture:</p> <p style="padding-left: 20px;">Differentiate the price paid by the farmer, depending on the homogeneity of the waste generated</p> <p style="padding-left: 20px;">Develop a protocol to plan the delivery of waste to waste management companies</p> <p>2. Improve the recycling of inputs:</p> <p style="padding-left: 20px;">Seek new 'destinations' for waste not currently recyclable</p> <p style="padding-left: 20px;">Include the cost of recycling in the purchase price of the products</p> <p>3. Management of plant waste:</p> <p style="padding-left: 20px;">Incorporate the consumption of plant waste as livestock feed into integrated and ecological agriculture manuals</p> <p style="padding-left: 20px;">Promote programmes to encourage small-scale, in-house compost production from the farm's own waste</p> <p style="padding-left: 20px;">Support research projects related to the use of plant waste for the production of biogas and biofuel, incorporating this line of research into the various calls for application</p> <p>4. Develop directives to encourage the reuse of the packaging of agricultural inputs</p> <p style="padding-left: 20px;">Extend the SIGFITO programme to the packaging of non-plant health products (nutrients, plant fortifiers, beehives, etc.)</p> <p style="padding-left: 20px;">Increase the number of collection points for packaging</p> <p>5. Run a campaign for the removal and elimination of old pesticides in storage</p> <p>6. Promote measures for the management of waste from micro-desalination plants</p>	<p>Medium</p>	<p>AA (CAPMA) AA (CEICE)</p>	<p>AA (CAPMA)</p>	<p>Percentage of waste recycled. Technical manual elaborated on the management and recycling of each different type of waste. Volume of plant waste used for livestock feed, compost or biofuel. Percentage of packaging of agricultural inputs reused. Number of collection points for agricultural packaging. Number of dissemination actions undertaken for the collection of expired plant health product packaging and to improve the management of waste from micro-desalination plants.</p>	<p>Agricultural organisations. Certification bodies. Universities. Agricultural and Fishery Research and Training Institute. SEPRONA.</p>



		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
3.1.1.5.	Action 3.1.1.5. Establish collaboration agreements with agricultural associations to encourage agri-tourism routes.	Short	AA (CCD) AA (CTC)	AA (CTC)	Number of collaboration agreements signed.	Agricultural organisations
3.1.1.6.	Action 3.1.1.6. Elaborate and disseminate in the agricultural sector a technical manual of good practices in order to achieve and maintain stable aquatic vegetation in irrigation ponds.	Short	AA (CAPMA)	AA (CAPMA)	Manual on the management of irrigation ponds elaborated.	Agricultural organisations Universities
Measure 3.1.2. Improve the competitiveness of the tourism sector						
3.1.2.1.	Action 3.1.2.1. Promote the CAMP area by seeking a story, promoting an interpretative itinerary around the cultural and natural heritage which results from the CAMP Project:	Short	AA (CAPMA) AA (CCD) AA (CE) AA (CTC) AL (Provincial Council of Almeria) AL (Town Councils)	AA (CTC) AL (Provincial Council of Almeria)	Elaboration of the story.	Levante de Almeria Association of Municipalities. GDR Levante. Local tourist business associations. Teachers' Centres. FACUA. Neighbours' associations.
	1. Undertake publicity and dissemination campaigns of the itinerary (Administrations, Companies and Public and Private Organisations)	Short	AA (CAPMA) AA (CCD) AA (CE) AA (CTC) GDR Levante	AA (CTC) AL (Provincial Council of Almeria)	Number of publicity and dissemination campaigns undertaken.	Local tourist companies.
	2. Creation of computer applications for mobile devices	Short	AA (CAPMA) AA (CCD) AA (CE) AA (CTC) GDR Levante	AA (CTC) AL (Provincial Council of Almeria)	Creation of the computer application.	Companies of the sector.
	3. Edition and publication of an Interpretative Guide of the Itinerary	Short	AA (CAPMA) AA (CCD) AA (CE) AA (CTC) GDR Levante	AA (CTC) AL (Provincial Council of Almeria)	Number of guides distributed per year.	Companies of the sector.
	4. Review and approval of the Educational Guide of the Itinerary as part of the programming of the school year	Short	AA (CCD) AA (CE)	AA (CE)	Percentage of schools which use the guide/total number of schools in the CAMP area.	Almeria Teachers' Centre. Universities.
3.1.2.2.	Action 3.1.2.2. Promote the regulation of leases under a civil or tourist regime to encourage the conversion of empty dwellings into accommodation services.	Short	AA (CEICE) AA (CFV) AA (CTC)	AA (CTC)	Establishment of the regulatory framework.	Town Councils

		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
3.1.2.3.	Action 3.1.2.3. Promote the development of a Plan to combat unregulated tourism.	Medium and long	AA (CEICE) AA (CCD) AA (CTC)	AA (CTC)	Plan to combat unregulated tourism elaborated.	Promoters in the area.
3.1.2.4.	Action 3.1.2.4. Promote the development of projects encouraging tourist activities through the valorisation of the local arts and crafts products (pottery, carpets, etc.)	Medium and long	AA (CEICE) AA (CCD) AA (CTC)	AA (CEICE)	Number of projects undertaken on this subject.	GDR Levante. Town Councils. Members of the Federation of Business Associations licensed to use the Natural Park Brand.
Measure 3.1.3. Support for the diversification of the fisheries sector						
3.1.3.1.	Action 3.1.3.1. Promote tourist activities related to fish auctions in the ports (e.g., the Garrucha fish auction).	Short	AGE (MF) AA (CAPMA) AA (CTC) AA (CCD)	AA (CAPMA) AA (CCD)	Number of fish auctions with tourist activities.	GDP Levante
3.1.3.2.	Action 3.1.3.2. Promote the legal framework for fishing tourism in order to encourage the development of tourist itineraries related to fishing and fish factories.	Short	AGE (MAGRAMA) AGE (MF) AA (CAPMA) AA (CCD) AA (CTC)	AGE (MAGRAMA) AGE (MF)	Number of fishing tourism projects launched.	GDP Levante. Andanatura Foundation.
3.1.3.3.	Action 3.1.3.3. Promote the protection of artisan fishing on the Almeria coast as an "Activity of Ethnological Interest" in accordance with Law 14/2007.	Short	AGE (MAGRAMA) AA (CAPMA) AA (CCD) AA (CTC) GDR Levante	AGE (MAGRAMA) AA (CCD)	Declaration of Ethnological Interest made.	Artisan fishers associations.
3.1.3.4.	Action 3.1.3.4. Support the development of projects for the controlled sale of fish from the Cabo de Gata-Níjar Natural Park by online marketing.	Short	AA (CAPMA)	AA (CAPMA)	Number of new direct sales initiatives launched.	Loxanet Foundation. Organisation of Almeria Fisheries Producers. Business associations.
3.1.3.5.	Action 3.1.3.5. Design and execution of a project to set up a school of artisan fishing for the CAMP area.	Short and Medium	AGE (MD) AA (CAPMA) AA (CCD) AA (CTC)	AA (CAPMA) AA (CCD)	Project completed.	GarruchaTown Council.
Measure 3.1.4. Improve the sustainability of the urban environment						
3.1.4.1.	Action 3.1.4.1. Incentivise the improvement of energy efficiency and the production of renewable energy in the domestic and public spheres.	Short, medium and long	AGE (MIET) AA (CEICE) AL (Provincial Council of Almeria)	AA (CEICE)	Percentage of facilities with energy efficiency measures and renewable energy production/total.	Ecologists' associations Neighbours' associations

		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
3.1.4.2.	Action 3.1.4.2. Creation of Consortia to improve the Management of Solid Urban Waste in the municipalities.	Short, medium and long	AA (CAPMA) AL (Provincial Council of Almeria) AA (Town Councils)	AA (CAPMA)	Percentage of municipalities with consortia/total number of municipalities.	Ecologists' associations
3.1.4.3.	Action 3.1.4.3. Promote the elaboration and application of sustainable mobility plans in the CAMP area.	Short, medium and long	AA (CAPMA) AL (Provincial Council of Almeria) AA (Town Councils)	AA (CAPMA)	Number of mobility plans drawn up in the CAMP area.	Neighbours' associations
<b>Programme 3.2. Encourage the Sustainability of Production Activities</b>						
<b>Measure 3.2.1. Involve the financial sector in the implementation of good practices in production activities</b>						
3.2.1.1.	Action 3.2.1.1. Promote the implementation of financial incentives linked to the development of good practices in production activities.	Short, medium and long	AGE (MEC) AA (CEICE)	AA (CEICE)	Number of initiatives to incentivise good practices.	Banks. Business associations.
3.2.1.2.	Action 3.2.1.2. Develop a brand name for the CAMP area which includes Corporate Social Responsibility criteria in the different economic sectors in the area.	Short, medium and long	AGE (MEC) AA (CEICE) AL (Provincial Council of Almeria) AA (Town Councils)	AA (CEICE)	Development of the CAMP brand name.	Banks. Business associations.
<b>Measure 3.2.2. Generate synergies among the various production activities in the CAMP area</b>						
3.2.2.1.	Action 3.2.2.1. Prioritise and incentivise business projects which involve tourist activities outside the summer months in order to reduce seasonality (agri-tourism, fishing tourism, among others)	Short, medium and long	AGE (MAGRAMA) AA (CAPMA) AA (CEICE) AA (CTC)	AA (CTC)	Number of business projects undertaken.	GDR Levante
3.2.2.2.	Action 3.2.2.2. Organise promotional events for local products and the gastronomy of Almeria in order to encourage collaboration between the agricultural, tourist and fisheries sectors.	Short, medium and long	AA (CAPMA) AA (CTC) AL (Provincial Council of Almeria) AL (Town Councils)	AA (CTC) AL (Provincial Council of Almeria)	Number of promotional events organised.	Business associations

		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
<b>Objective 4. Consolidate a participatory, transparent system of governance which promotes institutional coordination and public participation in the decision-making process in order to guarantee the integrated management of the coast, to the benefit of present and future generations</b>						
<b>Programme 4.1. Improvement of Institutional Coordination and Public Participation</b>						
<b>Measure 4.1.1. Establishment of the institutional cooperation and public participation structure resulting from the CAMP project</b>						
4.1.1.1.	Action 4.1.1.1. Consolidate the coordination and public participation structure of the CAMP Project (Coastal Commission, Coastal Council, Coastal Forum and Technical Secretariat) through their recognition in the regulations.	Short	AGE (MAGRAMA) AA (CAPMA) AL (Town Councils) AL (Provincial Council of Almeria)	AA (CAPMA)	Institutionalised structure.	Members of the Coastal Council
4.1.1.2.	Action 4.1.1.2. Reorganise the existing expert groups of the Coastal Commission in line with the four strategic objectives of the RFSD, and include a committee for "Coastal Vigilance" in order to improve coordination of compliance with applicable legal regulations affecting the coastline.	Short	AGE (MAGRAMA) AA (CAPMA) AL (Town Councils) AL (Provincial Council of Almeria)	AA (CAPMA)	Maintenance and consolidation of expert groups.	Members of the Coastal Council
4.1.1.3.	Action 4.1.1.3. Include the promotion of the Strategies for the Private Custody of the Levante de Almeria among the functions of the Technical Secretariat, in order to encourage the implementation of initiatives for the private custody of the natural and cultural heritage of the CAMP area.	Short	AA (CAPMA) AA (CCD)	AA (CAPMA)	Number of private custody initiatives launched.	Associations of the Levante de Almeria. Ínsulas Network. Biodiversity Foundation.
<b>Measure 4.1.2. Incorporate the participatory structure of the CAMP project into the administrative procedures subject to public participation</b>						
4.1.2.1.	Action 4.1.2.1. Implement the public participation methodology resulting from the CAMP Project for the monitoring of Hydrological Plans.	Short, medium and long	AGE (MAGRAMA) AA (CAPMA)	AA (CAPMA)	Incorporation of CAMP participatory methodology into the Hydrological Plan for Andalusian Mediterranean River Basins.	Town Councils Interested parties Provincial Council of Almeria
4.1.2.2.	Action 4.1.2.2. Promote the public participation methodology of the CAMP Project during the public information stage of the Management Plans of the natural spaces included in the Natura 2000 Network in the CAMP area.	Short, medium and long	AGE (MAGRAMA) AA (CAPMA)	AA (CAPMA)	Number of management plans of SCIs using CAMP methodology.	Town Councils. Provincial Council of Almeria. Ecologists' /business/cultural associations.
<b>Programme 4.2. Training and capacity building</b>						
<b>Measure 4.2.1. Improvement of the training of managers and strategic players</b>						

		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
4.2.1.1.	Action 4.2.1.1. Training course on "Energy diversification in production activities".	Short	AGE (MAGRAMA) AA (CAPMA) AA (CEICE) AL (Town Councils) AL (Provincial Council of Almeria)	AA (CEICE)	Number of training actions undertaken on this subject.	Biodiversity Foundation. Andalusian Institute of Public Administration. Levante Association of Councils. GDR Levante. Professional/business associations. Universities.
4.2.1.2.	Action 4.2.1.2. Training course on Land-use Planning and Integrated Management of Coastal Zones".	Short	AGE (MAGRAMA) AA (CAPMA) AL (Town Councils) AL (Provincial Council of Almeria)	AA (CAPMA)	Number of training actions undertaken on this subject.	Universities. Unions.
4.2.1.3.	Action 4.2.1.3. Training course on "Green entrepreneurship".	Short	AA (CAPMA) AA (CEICE) AA (CE)	AA (CEICE)	Number of training actions undertaken on this subject.	Associations of the Levante de Almeria. Ínsulas Network. Biodiversity Foundation.
4.2.1.4.	Action 4.2.1.4. Training course on "Specialisation in Private Custody Strategy initiatives".	Short	AA (CAPMA) AA (CCD)	AA (CAPMA)	Number of training actions undertaken on this subject.	Biodiversity Foundation. Andalusian Institute for Public Administration. Levante Association of Councils. GDR Levante. Professional/business associations. Universities.
4.2.1.5.	Action 4.2.1.5. Training course on the "Sustainable use of the Marine Environment".	Short	AGE (MAGRAMA) AA (CAPMA) AA (Town Councils) AL (Provincial Council of Almeria)	AA (CAPMA)	Number of training actions undertaken on this subject.	Andalusian Institute for Public Administration Levante Association of Councils GDR Levante Professional/business associations Universities
4.2.1.6.	Action 4.2.1.6. Training course on the "Dynamisation of groups: communication, negotiation and participation techniques".	Short				
4.2.1.7.	Action 4.2.1.7. Training course on "Geographic Information Systems".	Short				
4.2.1.8.	Action 4.2.1.8. Technical meeting on capacity building related to the "Application of ISLA products and WMS services in the territory".	Short	AGE (MAGRAMA) AA (CAPMA) AL (Town Councils) AL (Provincial Council of Almeria)	AA (CAPMA)	Number of training actions undertaken on this subject.	
Measure 4.2.2. Encourage the dissemination of the results of the CAMP project through training						

		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
4.2.2.1.	Action 4.2.2.1. Encourage the development of working groups, through Teachers' Centres, to design educational strategies related to responsible consumption.	Short, medium and long	AA (CE)	AA (CE)	Number of working groups established.	Cuevas de Almanzora Teachers' Centre. Almeria Teachers' Centre. Eco-schools Network. Parents' Associations. CCOO & UGT education sections.
4.2.2.2.	Action 4.2.2.2. Run a training course on the cultural heritage itinerary of the CAMP area for teachers, through the Teachers' Centres, the tourist sector and higher schools of tourism.	Short	AA (CAPMA) AA (CCD) AA (CE) AA (CTC)	AA (CE)	Number of persons taking the course.	Associations and companies of the Levante de Almeria
<b>Programme 4.3. Awareness Raising and Volunteers</b>						
<b>Measure 4.3.1. Promote awareness in different strategic sectors in order to promote the Integrated Management of Coastal Zones</b>						
4.3.1.1.	Action 4.3.1.1. Design and execution of a series of meetings on the "Application of good practices and sustainable production in the agricultural sector" (Application of eco-efficient techniques in agriculture, production of agricultural compost, environmental management of irrigation bombs, the importance of the integration of agricultural crops into the landscape, awareness of the application of legal principles: "the recuperation of water costs", "the polluter pays...", etc.).	Short	AA (CAPMA) AA (CE)	AA (CAPMA)	Number of meetings organised.	Agricultural organisations
4.3.1.2.	Action 4.3.1.2. Campaigns aimed at the "Application of good practices and sustainable production in the tourism and fishing sectors" (Promotion of KM0 for the acquisition of local products, responsible consumption, etc.).	Short	AA (CAPMA) AA (CTC)	AA (CTC)	Number of meetings organised.	Tourist business associations. Agricultural associations Fishers' associations GDP Levante GDR Levante Provincial Council of Almeria
4.3.1.3.	Action 4.3.1.3. A workshop for the two-way transfer of knowledge between scientists and fishermen.	Short	AA (CAPMA) AA (CEICE) AA (CCD)	AA (CAPMA)	Number of workshops run.	GDP Levante. Levante fishers' associations
<b>Measure 4.3.2. Promote the strategy to catalyse the environmental volunteer movement</b>						
4.3.2.1.	Action 4.3.2.1. Launch a coordination platform for volunteer associations through the <a href="http://www.camlevantedealmeria.com">www.camlevantedealmeria.com</a> website.	Short	AGE (MAGRAMA) AA (CAPMA) AL (Town Councils) AL (Provincial Council of Almeria)	AA (CAPMA)	Launch of the platform. Number of visits.	Volunteer associations of the CAMP area.

		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
4.3.2.2.	Action 4.3.2.2. "Coastal Observers" environmental volunteer programme with two priority lines of action: 1. Training and monitoring of environmental indicators; 2. An annual awareness-raising campaign to promote good practices resulting from the CAMP project among sea and beach users.	Short, medium and long	AGE (MAGRAMA) AA (CAPMA) AL (Town Councils) AL (Provincial Council of Almeria)	AA (CAPMA)	Number of volunteer actions taken within the framework of this programme.	Town Councils. Management of the Cabo de Gata-Níjar Natural Park. Andalusian Institute for Youth. Volunteer associations of the Levante de Almeria. Ecologists' groups. Neighbours' associations.
4.3.2.3.	Action 4.3.2.3. Cultural volunteer programme: 1. Training and monitoring of the state of conservation of the cultural heritage; 2. Training and promotion of the custody of the territory; 3. Volunteer camps for the restoration of the cultural heritage.	Short, medium and long	AGE (MAGRAMA) AA (CCD) AL (Town Councils)	AA (CCD)	Number of volunteer actions taken within the framework of this programme.	Town Councils. Management of the Cabo de Gata-Níjar Natural Park. Andalusian Institute for Youth. Volunteers' associations. Ecologists' groups; Neighbours' associations
Programme 4.4. Information and Dissemination of Results to demonstrate the Integrated Management of Coastal Zones						
Measure 4.4.1. Dissemination of the results of the CAMP project						
4.4.1.1.	Action 4.4.1.1. Elaborate a dissemination plan for the results of the project in magazines, specialised and a general websites, press, etc.	Short, medium and long	MAGRAMA CAPMA COUNCILS Provincial Council of Almeria	CAPMA	Number of media in which news related to the CAMP project have been published. Number of web pages in which news related to the CAMP project have appeared.	News media
4.4.1.2.	Action 4.4.1.2. Design and execution of projects in which the experience gathered in the CAMP project in the implementation of the IMCZ Protocol is used as a demonstration on regional, national and international scale (Alborán Sea and other Mediterranean countries).	Short, medium and long	MAGRAMA CAPMA	MAGRAMA	Number of projects executed with reference to the CAMP Levante de Almeria.	News media
Measure 4.4.2. Promote environmental information in accordance with the Aarhus Convention and community regulations						
4.4.2.1.	Action 4.4.2.1. Keep the <a href="http://www.camplevantedelameria.com">www.camplevantedelameria.com</a> website updated.	Short, medium and long	AGE (MAGRAMA) AA (CAPMA) AL (Town Councils) AL (Provincial Council of Almeria)	AA (CAPMA)	Number of visits.	Members of the Coastal Council

		TIMESCALE	PUBLIC ADMINISTRATIONS WITH COMPETENCE	PUBLIC ADMINISTRATIONS RESPONSIBLE FOR COORDINATION	MONITORING INDICATOR(S)	STRATEGIC ALLIANCES
4.4.2.2.	Action 4.4.2.2. Continue with the maintenance of the Visor ISLA viewing tool and the Web Map Server services provided to guarantee access to the spatial data of the CAMP Project.	Short, medium and long	AGE (MAGRAMA) AA (CAPMA) AL (Town Councils) AL (Provincial Council of Almeria)	AA (CAPMA)	Number of users who have connected to the WMS services. Number of users who have visited the ISLA viewer.	Levante Association of Councils. GDR Levante. University of Almeria.
4.4.2.3.	Action 4.4.2.3. Reach collaboration agreements with the competent administrations in order to analyse the possibility of including the Viewer and downloads (indifferent interoperable format is) of the geographical information of special interest in the CAMP area.	Short	AGE (MAGRAMA) AA (CAPMA) AL (Town Councils) AL (Provincial Council of Almeria)	AA (CAPMA)	Number of collaboration agreements reached.	Levante Association of Councils GDR Levante Universities



#### **4.- The Reference Framework for Sustainable Development as a dynamic management model**

According to the Protocol on Integrated Coastal Zone Management in the Mediterranean, ICZM is “a dynamic process for the sustainable management and use of coastal zones, taking into account at the same time the fragility of coastal ecosystems and landscapes, the diversity of activities and uses, their interactions, the maritime orientation of certain activities and uses and their impact on both the marine and land parts”.

For this reason, the Reference Framework for Sustainable Development of the Levante de Almeria area and its Action Plan needs to be a dynamic document, that is, that it can be revised during the post-Project stage and can receive regular feedback from the various bodies of the Public Participation and Institutional Coordination Structure of the CAMP Levante de Almeria.

The first three sections of this document were presented to, discussed and approved by the Coastal Council at its meeting held in Campohermoso on 15 November 2012, and the Coastal Commission at its 2<sup>nd</sup> meeting in Almeria on 11 December 2012. As a result of these two meetings, the Reference Framework for Sustainable Development was approved by the Coastal Council and Commission with a number of amendments presented in detail in the Section 4.1. It was also agreed that during the post-Project phase, a basic secretariat would be established to perform the following functions:

- To elaborate draft projects for those actions which require complementary funding, and to undertake the associated fundraising;
- To advocate the Reference Framework for Sustainable Development among the administration bodies and strategic alliances to ensure the smooth running of the coordination actions described in this document;
- To consolidate the institutional coordination and public participation structure through monitoring and evaluation of the implementation of the Reference Framework for Sustainable Development so that there is a regular review of the Framework in the form of an Implementation Report on the Reference Framework for Sustainable Development which highlights the activities performed and the difficulties encountered. This Report will serve as the basis for the Coastal Council and the observers of the Coastal Commission to review the Reference Framework for Sustainable Development, including new issues and the search for strategies to overcome the difficulties encountered, which will then be sent back to the decision-making body, that is, the Coastal Commission.
- To continue working on the following matters emphasised by the Coastal Council and Commission:
  - Dissemination of the methodology for the elaboration and in-depth study of the land and marine vulnerability maps produced by the CAMP Project with the members of the Council and of the Coastal Commission with a view to approval by these two bodies.
  - To study the incorporation of new heritage elements or routes of interest into Objective 2, Programme 2.1, Measure 2.1.4, Action 2.1.4.1.
  - To study how to improve fire prevention at organic waste recycling plants.

Derived from this dynamic feedback process, the subsequent modifications resulting from the regular review of the Reference Framework for Sustainable Development of the Levante de Almeria area are given in this document as new, consecutive sub-sections.

#### **4.1. Amendments to the Reference Framework for Sustainable Development of the Levante de Almeria area made during the approval process. December 2012.**

The Reference Framework for Sustainable Development of the Levante de Almería area and its Action Plan were approved by the Coastal Council and the Coastal Commission, including the following amendments:

**a. Prioritisation of Actions included in the RFSD**

The Coastal Council and the Coastal Commission deemed it necessary to prioritise the following actions during the post-Project stage:

- Within Objective 1, Programme 1.1, Measure 1.1.4. Action 1.1.4.3, it was suggested that not only should the need for this action be declared, but also, within the action, the elaboration of emergency plans should be prioritised, including the elaboration of emergency protocols or the improvement of the existing protocols with the involvement of civil society. It was therefore agreed that the action, as well as being prioritised, should be drafted as follows:

Action 1.1.4.3. Research projects for the elaboration of emergency plans and protocols, or the improvement of the existing plans and protocols with the involvement of civil society, a flood forecast system, the assessment of erosion and soil loss rates in the rivers Antas, Alías, Almanzora and Andarax.

- Within Objective 1, Programme 1.2, Measure 1.2.1. Perform the hydro-morphological restoration of rivers and water courses; actions 1.2.1.3. Develop annual plans for the maintenance of rivers, watercourses and drainage works following environmental and efficiency criteria, and 1.2.1.1. Elaborate an action protocol to maintain rivers and water courses, including actions which encourage the natural replenishment through scarification, water flow control infrastructure or plantations of appropriate species.
- Within Objective 4, Programme 4.1, Measure 4.1.1, Prioritise and modify the drafting of Action 4.1.1.1., to read as follows:

Action 4.1.1.1. Consolidate the coordination and public participation structure of the CAMP Project (Coastal Commission, Coastal Council, Coastal Forum and Technical Secretariat).

**b. Inclusion of new actions in the RFSD**

The Coastal Council and the Coastal Commission agreed:

- To include the study of biological rest periods, integrating this into Action 2.2.1.1. As follows:

Objective 2, Programme 2.2, Measure 2.2.1. *Development of research into the marine environment and dissemination of the results (Marine Strategy Framework Directive)*, Action 2.2.1.1. To design and carry out projects of monitoring of invasive and/or exotic species, and the study of biological rest periods.

- To treat accessibility as a transversal issue in RFSD and to include the improvement of accessibility in the tourism sector and in the cities in the following way:

Objective 3, Programme 3.1, Measure 3.1.2. To improve competitiveness in the tourism sector. Action 3.1.2.5. To increase and improve the tourism offer for persons with disabilities through the design of accessible tourism products.

Objective 3, Programme 3.1, Measure 3.1.4. To improve sustainability in the urban environment. Action 3.1.4.4. To promote the elaboration of integrated accessibility plans in the different municipalities.

An improvement was also requested of training in the field of accessibility in Protected Natural Spaces, including the following action:

Objective 4, Programme 4.2, Measure 4.2.1. To improve the training of managers and strategic players. Action 4.2.1.9. Training course in accessibility and disability for technical personnel providing services to the public in the CAMP area and, specifically, in natural spaces.

- To promote ecological aquaculture to breed autochthonous species and promote R&D, including the following action:

Objective 3, Programme 3.1, Measure 3.1.3. To support diversification in the fisheries sector. Action 3.1.3.6. To support the creation of sustainable, ecological aquaculture companies to breed autochthonous species and undertake R&D.

- With respect to the need to prevent effects such as those of the floods in the Levante de Almeria area in September 2012, to include the following action:

Objective 2, Programme 2.1, Measure 2.1.3. To improve the management of the Maritime, Terrestrial and Hydraulic Public Domain. Action 2.1.3.6. To develop floodable zones for return periods of 500 years, corrective measures in consolidated urban areas and regulatory measures for land use in urban and non-urban areas.

- To promote the co-operative movement, including the following action:

Objective 3, Programme 3.2, Measure 3.2.2. To generate synergies among the various productive activities in the CAMP area. Action 3.2.2.3. To promote the social economy through the co-operative movement.

- To use the experience gained through the participatory processes of the CAMP Project in other administrative procedures involving public participation, specifically Agenda 21, for which the modification of Action 4.1.2.1. in the following way is recommended:

Objective 4, Programme 4.1, Measure 4.1.2. To incorporate the participatory structure of the CAMP Project into the administrative procedures involving public participation. Action 4.1.2.1. To implement the public participation methodology used in the CAMP Project for the monitoring of hydrological plans and Agenda 21.

- To disseminate the experience and results of the CAMP Project among the public, including the following action:

Objective 4, Programme 4.4, Measure 4.4.1. Dissemination of the results of the CAMP Project. Action 4.4.1.3. To disseminate the experience gained and the results obtained in the CAMP Project among the general public.

### **c. Improvement of understanding of the RFSD**

In order to improve the understanding of the RFSD, and bearing in mind that the names of the administrations included in the Action Plan may change, it was agreed to use Local, Regional or Central State Administration as a reference. This improvement has already been applied to the Action Plan, grouping together the bodies which belong to the Central State Administration under the initials CSA, and in which the Regional Administration appears under the initials RA and the Local Administration under the initials LA.

**d. Issues to which more effort must be dedicated in the post-Project stage**

It was agreed to continue working, during the post-Project phase, on the issues listed below:

- Dissemination of the methodology for the elaboration and in-depth study of land and sea vulnerability maps produced in the CAMP Project with members of the Coastal Council and Commission, postponing the application of the actions related to these maps until they are approved by these bodies.

This has been reflected in the Action Plan, indicating in the Timescale, “Pending approval of maps”.

- The study of the incorporation of new heritage elements or routes of interest into Objective 2, Programme 2.1, Measure 2.1.4, Action 2.1.4.1. Development of an Action Plan to restore and rehabilitate the cultural assets identified as priorities in the results of the CAMP Project and which form part of the interpretative itinerary, within the limits of the budget.
- The study of how to improve fire prevention in organic waste recycling plants.



# 1.3

## *Socioeconomic analysis of the development model within the area CAMP Levante de Almería.*

*Executive summary.*

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**TABLE OF CONTENTS**

1.- Executive summary

**ABBREVIATIONS USED**

CAMP: Coastal Area Management Project

## **1.- Executive summary**

The Eastern Coastal (Levante) territory of Almería lies on a central position within the driest corner of the Iberian Peninsula. Its peripheral position and aridity have conditioned its socioeconomic evolution. From a historical point of view, it has been a hostile and poorly populated area with border clashes. However, in the 19th Century the region was integrated into the European industrialization networks thanks to the development of mining activities (lead and iron). When the First World War broke up the mining activity disappeared, the CAMP area entered into a long period of socio-economic depression. The recovery took a long time to be observed. In the 1980s a period of demographic and economic growth started to be registered.

During the last two decades, the area covered by the CAMP represents one of the most dynamic regions in Andalusia and in Spain, as the evolution of demographic and economic indicators shows. The population has reached 281.101 habitants in 2011, whereas in 1981 the figure was 178.338. The annual variation rate was notably higher than the average rate in Andalusia and in Spain. The population growth has been much more intense during the last fifteen years due to the reception of immigration flows. In this sense, in 2011 the foreign population represented the 18,3 percent out of the total population. This percentage doubles the average in Andalusia and exceeds considerably the percentage of foreign population over the total population in Spain. From an economic point of view, the growth of the average income available has been spectacular. It has made the municipalities within the CAMP area (which were at the bottom of the regional and national rankings) to occupy top rates of the average income available in Andalusia and middle positions in Spain.

Agriculture has been a decisive factor for the economic growth and the territory development within the CAMP area. The radical change experienced by the agricultural sector has been so intense and quick that it has affected its structural, productive and territory basis. In the CAMP area, the two most relevant development models of the agriculture in the Province are to be found. They are also the most relevant models in Andalusia and in Spain:

A) From the 1980's on, an intensive agriculture under plastic started to take place in the Capital and Níjar municipalities, the most Southern area of this area. This agriculture type is based on small and familiar exploitations, and it is mainly oriented to foreign markets. The greenhouse surface represents around the 35 percent of the total greenhouse surface in the Province of Almería, where the highest concentration of greenhouses is to be found at a global scale. From a socioeconomic point of view, this agriculture type is very relevant since the capital, technology and labor use is intensive. Furthermore, an endogenous development model has been shaped up, in which local agents are the main actors. This feature gives this model a great resistance and flexibility.

B) In the Northern area of the CAMP, especially in the municipalities of Cuevas del Almanzora and Pulpí, the agriculture development took longer to be developed. It was in the middle 1990s when the agriculture model changed. It evolved from a traditional model to one based on free-air horticulture exploitations at a great scale. The lettuce crop is the most illustrative example of this model. It is grown up on extensive plantations managed by a couple of big firms. They apply exploitation techniques with high levels of mechanization; a strong implantation of localized watering systems and a, mainly foreign, labor paid up on a daily basis. In this case, the enterprise foundations have been different to the previous model since a relevant presence of big agriculture societies is to be observed. They show a

notably dynamism and have a great financing capacity to undertake projects at a great scale and exploit extensive surfaces.

On the other hand, tourism is the second main activity of economic growth and territory development within the CAMP area. This area was incorporated to touristic activities relative late due to the lack of good communication infrastructures. For this reason, the area shows a good preservation of the coastal region, poorly urbanized and more “attractive” compared to other Mediterranean destinations which are much more saturated. However, in the last years the CAMP area has fully participated in the frenetic building and touristic activities, which has took place in the Mediterranean arc. It has reproduced some of the main features of well-established tourism destinations.

The regulated tourism offer shows the relevant dynamism of this sector during the last two decades. From 1988 to 2010, the number of beds in the establishments of the CAMP area has increased uninterruptedly. It has been trebled -from 8.485 to 25.355 beds. It concentrates the 49,4 percent of the Province. However, the increase of the regulated offer is only a part of the developed accommodation capacity since the real estate activity, linked to second homes, has experienced a spectacular growth in the CAMP area. Besides the growing arrival of tourists, which has led to a considerable increase of the regulated offer, a growing demand of houses for European residents has been experienced. They come mainly from the UK and are attracted to this region by the good climate conditions and the affordable prices to purchase a house. The building-up of flats and urbanizations for foreign residents and second homes for nationals has recently brought about a strong expansion of the housing activity. Holidays and second-homes have been proved to be key elements in the configuration and type of this tourist destination. As it was earlier stated, the regulated tourism offer is only a partial accommodation option (15-20 percent out of the total accommodation capacity).

The economic development model followed by the CAMP area, based mainly on the agriculture and tourism sectors, has characterized a particular territory structure. The territory is extensively used and is therefore much more valuable. The profitability calculation in terms of territory consumption income highlights such extensive feature. If the increase percentage of the necessary urban, industrial and infrastructure land is calculated to make the average reported income grow one percentual point within the CAMP area, a value of 2,17 is obtained. This figure is inferior to the average in the Province (2,31) but notably higher than the Andalusian average (1,57). A further relevant fact is the accumulation of free houses during last years. The price fall is therefore higher than the Andalusian and Spanish average: 25 percent from 2008 to 2011.

Water has been a further key natural resource for this economic development model. Hydric resources have been notably increased during last years thanks to external river transfers (Tajo-Segura and Negratín) and the building of desalination complexes (in Carboneras, Rambla Morales, Almería and Bajo Almanzora). Although huge investment efforts have been made to increase water supply, the development model of the CAMP area has forced the continuous deterioration of the coastal groundwater. All water bodies found in this area are classified as waters in bad state. The main reasons for such deterioration are related to the past and current over-exploitations of water bodies, mainly for watering purposes. Significant increases of salinity levels are registered due to sea-water intrusion and pollution by the watering feedbacks, which are rich in nitrogen compounds and phytosanitarios.

The hydrological planning aims to gradually reduce the over-exploitation of the groundwater bodies in the area covered by CAMP Levante. It is planned to substitute the current use of groundwater by sea-



water coming from desalination processes. In this way, the water demand can be satisfied. Furthermore, the balance and harmonization of the sector and regional development can be assured. The increased use of desalinated waters will not only take place for urban uses. It is also planned to be used in agrarian areas. In this sense, two interesting questions for the future are to be highlighted. Firstly, the desalination plants built during last years have been under-exploited. And, secondly, the effects of energy consumption should be taken into account in the substitution policy from groundwater to desalinated sea-water. If the planned hydrological assumptions are executed, in 2015 the energy consumption for watering water per cubic meter will be 2,5-fold compared to the current energy consumption. Such increase of energy demand will lead to higher water prices. We should also add the costs related to the applied technology. Increases of future water prices may probably lead to management difficulties in order to achieve the planned environmental objectives. This will happen if water users do not pay the environmental costs for the over-exploitation of groundwaters. We should not forget the previous experience; desalination plants in Almería and Carboneras are being under exploited.

The CAMP area territory faces a decisive moment in its territory history. A complex set of endogenous and exogenous factors has acted during an extremely short period of time. These factors have increased the scale of the socio-economic impact on the environment; they have also generated poorly sustainable dynamics to preserve coastal ecosystems. In order to indicate the most probable future scenes and challenges which the economic development model of the CAMP area may face, three key elements are to be pointed out:

**A) The reduction of restrictive factors for the extension of a developmental model**

During last twenty-five years, a spectacular improvement of infrastructures has taken place. They can sustain economic growth processes by means of a strong increase of public investment. In the CAMP area, the public investment has been oriented to the improvement and/or extension of communications, transport means, hydric supply, water cycle treatment, education and health services. This step forward has established favorable conditions which have made the economic and business dynamism strongly arrive to the CAMP territory. An advantage of the late arrival of the Spanish “developmental model” to our territory has been the opportunity for the Local Administrations to implement preservation measures for the Eastern Coastal area of Almería. They could take such actions like the Declaration of Protected Natural Areas, especially the Natural Park of Cabo de Gata-Níjar (1987).

Nevertheless, the extension of a developmental model till “this last border” of the Mediterranean coast has been intensified during the first decade of the 21st Century, due to the intensive agriculture appearance and especially to the development of residential tourism and its associated building sector. Such extension has been spurred on by:

- The illusion of overcoming the hydric deficit. A “mixed” offer of water in which desalination is becoming to be the main supplier. However, this solution does not implement the new European regulations related to the new culture of water
- The risks related to seasonal saturation and the impossibility of the public administrations to keep pace with the needed infrastructures and services for the new urban centers along the coast demonstrate the environmental and financial unsustainability of these developments.

- The historic heritage of poverty and under-development has served to justify the developmental defense. This area experienced a breakage of its economic model in the 20th Century suffering from a strong emigration flow.
- Furthermore, the measures taken by local administrations, especially by town halls, have favored the developmental strategy.
- The international economic environment, especially the European context, has stimulated this economic growth direction.

## **B) The increase of the ecological and territory tracks of this growth model**

As a consequence of all this, the development model of the CAMP area has been extended without considering the restrictions of both limited natural resources: territory of a good environmental quality and water resources in a good state.

There are also four further aspects to be taken into account in the Directives proposing a new development model for the Eastern coastal area of Almería.

- A need of change in the strategy and policies can be anticipated. They should focus on growth models where qualitative goals prevail over quantitative expectations.
- A model based on these criteria should make an efficient use of the most abundant resources and preserve the most vulnerable and limited resources (ecosystems). It is the region with the highest rate of insolation in the Iberian Peninsula. The development of renewable energies represents a valuable opportunity.
- The development strategy should follow the principle of economic diversification. Certain models based on a unique productive system should be avoided.
- The Global Change and its incidence on ecosystems and on resources of the Eastern coastal area of Almería represent an uncertainty factor in order to specify a future development model.

Regarding the economic sector, there are several aspects to be considered for its future development:

- A development model with a higher value added and differentiation of the offered product should be aimed at.
- In the real estate sector, it will take long to overcome the current crisis due to the incremented housing stock. The third highest stock of houses to be sold in Spain.
- In the tourism sector, the CAMP assets should be empowered. The model should commit itself to quality and to certain niches market
- In the agriculture sector, the position in the value chain and supply can be improved. Positive incentives related to good practices -subventions and preferential financing lines- should be implemented
- In the fishery sector, the different opportunities related to fishery and its linked touristic activities should be better used

## **C) The strengthening of the social capital to act as an intelligent territory**

Intelligent territories have been defined as fields where social participation, networking and democratic governance (reporting by the responsible public and private institutions) help the decision-making process through a conscious collective action.

In the CAMP area the social capital availability is weak. This resource is essential to build up an intelligent territory. The association tissue, personal and institutional networks are scarce. Strengthening this social muscle has a strategic relevance in order to define the sustainable development path. The methodology applied by the CAMP Levante Almería aims at this objective. It is therefore the right scene; where local agents can generate the necessary critical mass to move a welfare scene forward.



# 1.4

## *The Imagine participation process*

Final report

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## TABLE OF CONTENTS

- 0.- Executive summary
- 1.- Introduction
- 2.- Description of the project
- 3. - Results

## INDEX OF ANNEXES

- Annex 1.4.I. Report on the 1<sup>st</sup> Imagine Workshop.
- Annex 1.4.II. Report on the 2<sup>nd</sup> Imagine Workshop.
- Annex 1.4.III. Report on the 3<sup>rd</sup> Imagine Workshop.
- Annex 1.4.IV. Report on the 4<sup>th</sup> Imagine Workshop.

## LIST OF TABLES

- Table 1. Example of themes or matters to be addressed in order to achieve the sustainability of the area and preliminary indicators to measure them suggested by participants in the 1st Imagine Workshop.*
- Table 2. Selection of indicators and bands of equilibrium proposed by each group in the 2nd Imagine Workshop.*
- Table 3. Sustainability indicators and bands of equilibrium selected by the plenary session of the 4th Imagine Workshop.*
- Table 4. Basis for the action plan suggested by the participants of the 4th Imagine Workshop*

## LIST OF FIGURES

- Figure 1. Imagine model*
- Figure 2. Example of a Rich Picture, including the tasks and issues identified by the group, produced in the workshop.*
- Figure 3: Example of indicators and band of equilibrium produced by one of the groups.*
- Figure 4. Amoeba diagrams produced by Group C in different scenarios in the past.*
- Figure 5. Amoeba diagram produced by Group E for the year 2020.*
- Figure 6. Amoeba diagrams representing the scenario of the whole group with respect to the past, present and future of sustainability in the Levante de Almeria area.*

## ABBREVIATIONS USED

- SPSA: Systemic and Prospective Sustainability Analysis
- CAMP: Coastal Area Management Project
- ICZM: Integrated Coastal Zone Management
- SDRF: Sustainable Development Reference Framework

## **Executive summary**

This document describes the work done over 12 months by the imagine individual project team (Systemic and Prospective Sustainability Analysis - SPSA) of the CAMP Levante de Almeria project.

The general and specific objects of the individual project are explained below, together with the final products that have been generated in order to achieve them. The methodology used is described in detail, together with the actions taken in the project.

The results of each of the workshops held are as follows: the problems identified by the participants in the area covered by the project, a proposal of indicators to measure those problems, their past present and possible future evolution and the challenges faced on the coastal strip in order to achieve the desired future scenario in an economically, socially and environmentally sustainable manner. This work is the basis for the Sustainable Development Reference Framework, which is integrated with the rest of the results of the CAMP project.

### **1.- Introduction**

The imagine individual project forms part of the individual project on the Sustainable Development Reference Framework (SDRF), which is one of the most relevant activities in the CAMP Levante de Almeria area, since it is the basis for its elaboration. During the Viability Study of the CAMP project, in which local players were involved, it was revealed that public participation in the decision-making process regarding coastal management was still sectoral and there were no collegiate organs or debating forums to deal with a series of problems threatening the coast.

Through Imagine, the aim has been to set up a meeting point for the socio-economic and technical players in the Levante de Almeria area and to establish mechanisms to evaluate and examine the level of sustainability of the territory in the past, present and future, through the use of indicators and a participatory process which takes these local players as experts on their own level.

Thanks to the self-teaching process involved in the Imagine methodology, the players in the Levante de Almeria area have been able to improve their perception of the changes which have occurred historically in the territory in the fields which they deem of interest or of special relevance, to analyse the trends and agree on a desired future scenario with measurable targets. The results of this work will be the basis for the elaboration of the Sustainable Development Reference Framework, a sustainability strategy for this stretch of coastline.

In this way, the CAMP project contributes to the implementation of the general principles of Integrated Coastal Zone Management contained in Article 6 of the ICZM Protocol within the framework of the Barcelona Convention (in particular, the principles related to the integration of the different productive sectors and environmental elements, the ecosystemic focus in planning, the promotion of governance and institutional coordination) and, more specifically, to the involvement of the different territorial actors in the conception of the Sustainable Development Reference Framework of the Levante de Almeria area, making them participants in a collective construction process which will facilitate its implementation in the post-project stage.

With this aim in mind, this individual project has, throughout 2011 and 2012, run four workshops with the participation of members of the Coastal Council, the technical delegates of the Coastal Commission and the consultants responsible for the execution of the different horizontal activities and individual projects in the CAMP Levante de Almeria area. These workshops were run using the Imagine

methodology, which includes direct observation of the dynamics of the groups through the Triple Task Method<sup>1</sup> by a specialised consultant.

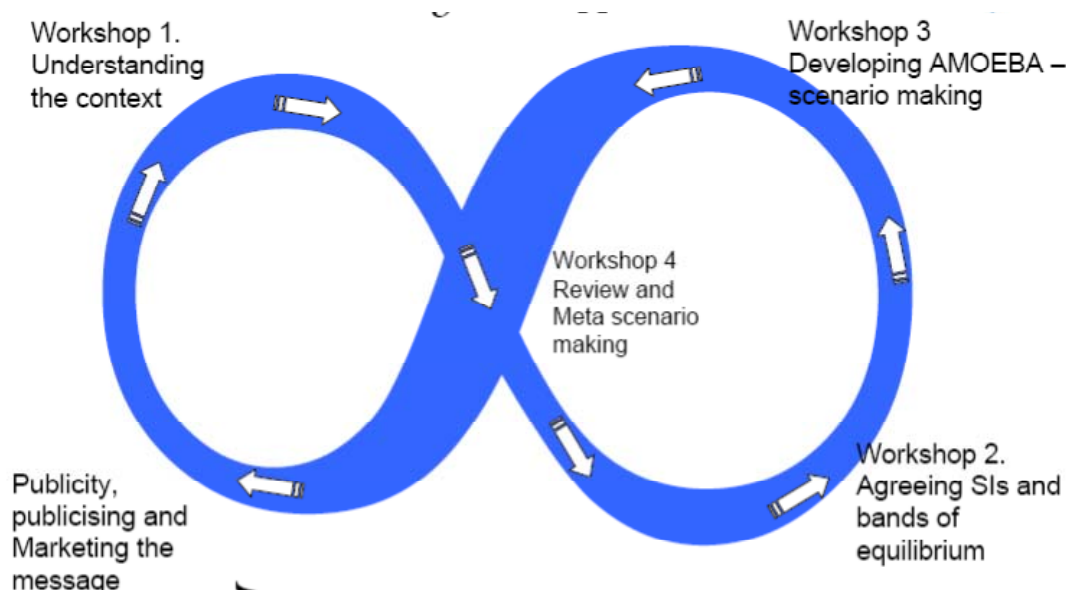
The detailed reports of the four workshops are attached as Annexes.

- Report on the 1<sup>st</sup> Imagine Workshop. Annex 1.4.I.
- Report on the 2<sup>nd</sup> Imagine Workshop. Annex 1.4.II.
- Report on the 3<sup>rd</sup> Imagine Workshop. Annex 1.4.III.
- Report on the 4<sup>th</sup> Imagine Workshop. Annex 1.4.IV.

## 2.- Description of the project

This individual project involved more than 80 persons who, in turn, represented their respective organisations. As mentioned above, the Imagine methodology is a participatory process which aims to help a group of players in a territory to understand together their context, agree how to measure the problems or issues which they consider important, create a model of the past, present and possible future conditions of this context and planned new roadmaps for progress. Figure 1 gives a graphic explanation of the Imagine model.

Figure 1. Imagine model



<sup>1</sup> For further information, see "Triple Task Method" in Wikipedia.

**It should be underlined that, in the Imagine process, there is no conditioning of the players through masterclasses or presentations of diagnoses. On the contrary, and with no information provided other than the participants' own experience, the participants, who come from very different social sectors and whose main instrument is their own perception, create their own debates and methods to arrive at meeting points in their quest for solutions.**

In summary, the results obtained from this Imagine process were:

- An overview of the current situation of the Levante de Almeria by each group of participants.
- Main tasks and issues to be addressed in order to achieve sustainability, freely chosen by each of the groups.
- Indicators to be used to evaluate sustainability in relation to the tasks and issues identified.
- A band of equilibrium agreed for each indicator which will indicate the sustainability of the issue addressed.
- Past, present and future scenarios.
- Table of indicators agreed for the Levante de Almeria area.
- The future scenario desired by all of the groups.
- The basis for the elaboration of an action plan.

### **3. Results**

#### **3.1. 1st Imagine Workshop.**

This workshop took place in the Multipurpose Centre in Mojácar on 27 and 28 May 2011. It was attended by 48 participants who were divided into six groups of around eight persons each. The groups carried out the first stage of the Imagine methodology, whose purpose is to understand the territorial context and problems. The following results were obtained:

- An analysis of the current situation in the Levante de Almeria by each of the groups, by means of a *Rich Picture* –such as that seen in Figure 2.
- The main tasks and issues to be addressed in order to achieve sustainability in the area.
- A first draft of indicators that could be used to measure the tasks and issues identified.



Figure 2. Example of a Rich Picture including the tasks and issues identified by the group, produced in the Workshop.



As mentioned above, in parallel, a consultant analysed the group dynamics using the Triple Task Method and made a lengthy report on the workshop which is included as **Annex 1.4.I** and which underlines that all of the groups achieved excellent results and worked efficiently. There was a high degree of creativity, good spirit and willingness among all of the groups to collaborate in the work.

The *Rich Pictures* of all of the groups were of high quality and gave a complete vision of the reality in the Levante de Almeria area, according to the territorial players themselves. The teams did excellent work in most cases, identifying the main tasks and issues to be addressed in order to achieve sustainability (which can be seen on the labels in Figure 2 and which are detailed in Table 1). The lists of indicators of the groups were interesting and more than enough to lay the basis for the following Workshop.

Table 1. Example of matters or issues to be addressed in order to achieve sustainability in the area and the preliminary indicators to measure them suggested by the participants in the 1<sup>st</sup> Imagine Workshop.

GROUP	TASK / ISSUE	INDICATORS
A	Inter-administrative coordination (governance)	Joint legislation (law enforcement) Number of coordination meetings Duplicity of administrations
	Public participation	Number of participatory bodies within the administrations % Population knowing participation bodies. Number of calls to various associations.
	Environmental education	Polls Where does the environmental information come from? Waste recycling rate carried out by the population Environmental habits Amount of environmental disclosure
	Effective legislation	Number of planning law infringements finalised with and without sanction in each municipality.

GROUP	TASK / ISSUE	INDICATORS
		Number of real hours of monitoring activities.
	Improving rural health and aesthetic environment of greenhouses	Number of existing waste containers Perceptions of visitors and locals. Number of toilets in crop and livestock farms. Difference between waste generated and recycled. Number of illegal landfills.
	Give economic content to environmental protection	Tax exemptions
	Valuation of wealth	Rate of consumption of local products % Cost of products in origin and destination Where does the capital of the companies in the area come from?
	Sectorised view Create a single view of camp area	Survey of knowledge of the area Number of joint activities Number of activities of associations and venue
	Polluting and recycling companies	Budget earmarked for environmental actions (actions performed) Number of companies that spend budget on environmental actions.
B	Environmental education Rational natural resource management	Percentage of waste recycling / number of beach users. Pre-summer and post-summer deterioration in each municipality
	Sustainable Production Extinction of the fisheries sector	Number of "lances nulls" / number of sailings of each boat (this means the number of times each boat goes fishing and captures nothing) Investment / profit % Agricultural waste / number of hectares Cubic metres of water consumed / number of hectares cultivated
	Conservation of the cultural and natural heritage Demarcation of heritage	Economic investment in recovery and valorisation / number of cultural assets
	Equal justice Protection of population	Number of court sentences / number of urban or environmental infringements committed.
	Biodiversity loss Marine Pollution	Nº of days of observation / number of different species observed % Invasion of alien species / total area
C	Natural Resources	Nº solar plants % Energy consumed / produced % of reutilised water consumed + % of rainwater consumed + % of desalinated water consumed Aquifer monitoring
	Education on values	Number of professional capacity building and training schools in relation to the number of unemployed. School failure.
	Recycling Waste management	Number of recycling plants of various types and their capacity Tonnes of recycled material Reuse - number of recycled packages
	Sectorisation / fragmentation	Number of initiatives Number of projects and measures agreed upon by associations of municipalities and the number of agreements.
	Economic and political manipulation	Index of economic traceability % Final value that remains in the production area
	Conversion of productive activities	% Production of organic agricultural products / conventional

GROUP	TASK / ISSUE	INDICATORS
		products % traditional fishing / trawling and recreational fishing % crop area with traditional irrigation in relation to area with drip irrigation.
	Training and values	Number of community centres and recreational spaces in relation to its inhabitants and their distribution.
D	Water	Litres of water consumed per citizen per day
	Spatial planning	Level of compliance with approved spatial plans.
	Responsible consumption	Ecological footprint of the territory
	Cultural Heritage	Number of cultural assets recovered / number of cultural assets inventoried
	Energy	Kw h from renewable energy / Kw h total energy produced
	Water treatment and reuse	Cubic metres of treated water / cubic metres of water consumed. Cubic metres of reused water / cubic metres of water consumed. Cubic metres of tertiary treatment water / cubic metres of water treated (secondary or primary)
	Urban Discipline	Nº of planning infringement cases resolved / number of building licenses. Nº of planning infringements cases initiated / number of building licenses.
	Public awareness on responsible consumption of resources	% Organic consumption compared to traditional consumption Turnover rate of consumer goods such as mobile phones, MP3, computers, etc.
	Bioclimatic Building	Number of homes with sustainable building elements / total number of existing homes.
	Planning of fisheries and agriculture	% of traditional fishing = $T_m$ of fish caught by traditional methods / $T_m$ total catch. Or: $T_m$ of traditional fishing captures / $T_m$ of catch with industrial methods. Average size of catch per species and taking into account the traditional fishing catch and the industrial fishing catch, measured as metric tons catch / number of individuals (the results would be an average weight per individual) or number of individuals / $T_m$ capture ( the results would be the number of individuals per tonne) $T_m$ organic fruit or vegetables / $T_m$ fruit or vegetable from conventional production. Volume of plant health products used per season / crop area.
E	Fisheries Management	Nautical miles from shore / volume of catch / time. Litres of fuel / kg catch
	Trawling	Rate of biomass
	Water	Measuring water quality in areas of discharge. Kw h consumed / m3 of demand satisfied. Hm3 water consumed by each economic sector.
	Integrated water management	Water balance. Hm3 of wasted resources. No water bodies in good ecological state / total nº of water bodies.
	Renewable energy	Renewable energy consumption in kW h / kW h fossil energy consumption. Potential renewable energy / real potential
	Training	Population engaged in volunteer activities / total population Degree of knowledge of the population on environmental

GROUP	TASK / ISSUE	INDICATORS
		issues / total Number of hours teaching environmental issues.
	Legal non-compliance	Number of prosecutions / year Nº municipalities that meet spatial plans / total municipalities
	Lack of coordination between administrations	Number of hours per year in coordination activities between administrations
	Radioactive decontamination	% Plutonium in soil.
F	Political commitment	Nº of politicians who attend the workshops voluntarily Level of budget spent at the end of the project. Degree of participation by the Coastal Commission in percentage.
	Administrative coordination	% of measures in this sense that are integrated into the regulatory framework. Number of plans / actions repeated by different administrations.
	Transparency in management	Number of Conferences / Workshops / Events / dedicated to citizenship information or participation that are performed within CAMP territory. % Budget dedicated to publication or communication with the public.
	Effective citizen participation	Number of public participation actions previous to decision making. Number of people satisfied with the results of their participation. Number of events organised by citizens' platforms
	Training and Education	Number of guides dedicated to good practices
	Agriculture and livestock	Evolution of the number of hectares of traditional agriculture and livestock farming converted to organic. Number of farmers who actually live from their activity.
	Waste and landscape	Number of companies involved in integrated waste management
	Urban models	Number of empty or second homes. Average percentage of m2 of green area per inhabitant.
	Attention to maritime terrestrial and hydraulic public domain	Number of public domain demarcation cases. Length in metres of regenerated beaches.
	Integrated Water Cycle Management	% of treated water. % of reused water.

### 3.2. 2º Imagine Workshop

This workshop was held at the University of Almeria on 30 September and 1 October 2011. The 44 participants were again divided into six groups of between five and eight persons, and they worked on the second stage of the Imagine methodology, whose objective is to **agree the sustainability indicators and bands of equilibrium**, on the basis of the work done in the first workshop. The results were as follows:

- Each group reviewed the previous work done and agreed on a subset of indicators to represent issues of concern to the group in relation to sustainability in the Levante de Almeria area.
- Each group also established maximum and minimum values for each indicator to represent the band of equilibrium (the sustainable value of each indicator).

Figure 3: Example of indicators and band of equilibrium produced by one of the groups.

The image shows a handwritten table on a piece of paper with a circled 'E' at the top center. The table has three columns: 'INDICADOR', 'MÍN.', and 'MÁX.'. The indicators and their corresponding minimum and maximum values are as follows:

INDICADOR	MÍN.	MÁX.
Nº DE ACCIONES REALIZADAS DE DESCONTAMINACIÓN RADIACTIVA	1/AÑO	4/AÑO
% DE APROVECHAMIENTO DE LA GRADIENTE DE DEGRADACIÓN	75%	100%
% DE MASAS DE AGUA EN BUEN ESTADO/TOTAL	80%	100%
% DE POBLACIÓN CON SISTEMA DE DEPURACIÓN	90%	100%
% DE AGUA REGENERADA/AGUA DEPURADA	50% ↑	100%
% DE ENERGÍA RENOVABLE INSTALADO/POTENCIAL TOTAL	10%	35%
Nº DE SENTENCIAS DE INCUMPLIMIENTO LEGAL POR CUESTIONES AMBIENTALES/TOTAL	25%	5%
Nº DE ESPACIOS DE COORDINACIÓN MULTINIVEL/TOTAL PLANES, PROGRAMAS Y PROYECTOS QUE LO REQUIERAN	50%	80%
LITROS DE COMBUSTIBLE/KG DE CAPTURA		

As we have said, in parallel, the consultant analysed the group dynamics using the Triple Task Method and made a comprehensive report on the workshop which is included as **Annex 1.4.II**. In summary, all of the groups produced excellent results and worked in a sustainable manner. Despite certain difficulties in the operation of two of the groups, this did not have a negative impact on the groups' results.

All of the groups completed the important issues and tasks given to them, reaching an agreement on a set of indicators and bands of equilibrium for each one of them, as shown in Table 2. This set of indicators will be the basis for the following workshop. The six groups managed to identify good sets of indicators.

Table 2. Selection of indicators and bands of equilibrium proposed by each group in the 2<sup>nd</sup> Imagine Workshop.

GROUP	INDICATOR	BAND OF EQUILIBRIUM LOWER LIMIT	BAND OF EQUILIBRIUM UPPER LIMIT
A	Nº of independent social organisations coordinating with the Public Administrations	50	100
A	Nº of calls for proposals from different associations and nº of proposals received and accepted by the Public Administration	45	80
A	Amount of dissemination organised through NGOs and nº of participants	70	100
A	Companies with tax bonuses or exemptions	40	70

GROUP	INDICATOR	BAND OF EQUILIBRIUM LOWER LIMIT	BAND OF EQUILIBRIUM UPPER LIMIT
A	Economic return in the local area (%)	40	70
A	Nº of joint (inter-municipal) activities / year	4	12
B	% waste recycled / nº users (waste collected)	30	70
B	Nº of environmental awareness initiatives / nº of inhabitants	70	100
B	Public-private investment in the fishing sector / economic sustainability-profitability	50	100
B	Tons of waste / productive hectares in agricultural sector	0	30
B	Economic investment in recuperation of cultural heritage / nº of visitors	30	60
B	% benefits returned to source (economic traceability index)	20	50
B	% students leaving school after obligatory education	90	100
B	Nº of places in occupational and professional training / nº of unemployed	10	20
B	Nº of days in which light pollution exceeds established limits / year	70	100
B	% benefits returned to source (economic traceability index)	50	99
C	% students leaving school after obligatory education	50	100
C	Nº of places in occupational and professional training / nº of unemployed	0	10
C	Nº of days in which light pollution exceeds established limits / year	80	100
C	% benefits returned to source (economic traceability index)	0	10
C	% inter-administration projects, actions or initiatives / total initiatives	80	100
C	% gross local product produced by sustainable sectors	70	100
D	Cubic metres of water treated / cubic metres of treated waste water	60	100
D	% of municipalities with an Energy Optimisation Plan	80	100
D	% implementation of Energy Optimisation Plans	60	100
D	% of population requesting information or visiting institutional websites about urban planning	5	20
D	Crop area of ecological-integrated agriculture / total crop area (%)	60	85
D	Kw of renewable energy / total (%)	40	80
D	Rate of increase of capture of key species	5	25

GROUP	INDICATOR	BAND OF EQUILIBRIUM LOWER LIMIT	BAND OF EQUILIBRIUM UPPER LIMIT
D	Conversion of industrial fishing fleet to artisan fishing (%)	5	20
E	Nº of radioactivity decontamination actions taken per year	1	4
E	% exploitation of desalination capacity	75	100
E	% of water bodies in good ecological condition / total	80	100
E	% of population with a water treatment system	90	100
E	% of water regenerated / treated water	50	100
E	% of installed renewable energy / total	10	35
E	% sentences-sanctions for environmental offences	25	5
E	Nº of multilevel coordination spaces / total nº of plans, programmes and projects which require them	50	80
E	Litres of fuel / Kg of catch	No figure	No figure
F	% of Administration budget spent on participation	5	10
F	Productivity of agriculture and livestock farming / total productivity in CAMP Area	30	40
F	Ecological and integrated agriculture and livestock farming / total	60	70
F	% of empty dwellings	5	10
F	Regenerated urban beaches / degraded urban beaches	40	60
F	% urban growth per decade	20	30

### 3.3. 3rd Imagine Workshop

This workshop was held on 11 and 12 November 2011 at the Rodalquilar Exhibition Centre, in Níjar. There were 36 participants in the workshop and they were again divided into six groups of between five and eight persons to work on the third stage of the Imagine methodology, with the objective of **analysing the sustainability of the area over different timescales and scenarios** using amoeba diagrams. Before the workshop, the managers of the individual projects gathered, wherever possible, the real values over different timescales of the indicators identified during the second workshop. Where there was no data available for the indicator, a series of indicators were proposed in order to measure the prioritised issues and tasks, thereby substituting those which were not viable. The following results were obtained:

- Amoeba diagrams of the current and recent past situation in the Levante de Almeria area, drawn up by each of the groups.
- An Amoeba diagram for each of the groups showing the development trend in the region up to 2020.

The amoeba diagrams show different points to represent the status of each indicator with respect to its band of equilibrium. An indicator which is located between the two concentric circles of the diagram means that it is within the band of equilibrium, that is, it is within the limits of sustainability as understood by the group for that indicator. Tracing a line between the different points produces an amoeba-shaped form. A sustainable time scenario shows a circular amoeba falling within the two concentric circles of the diagram.

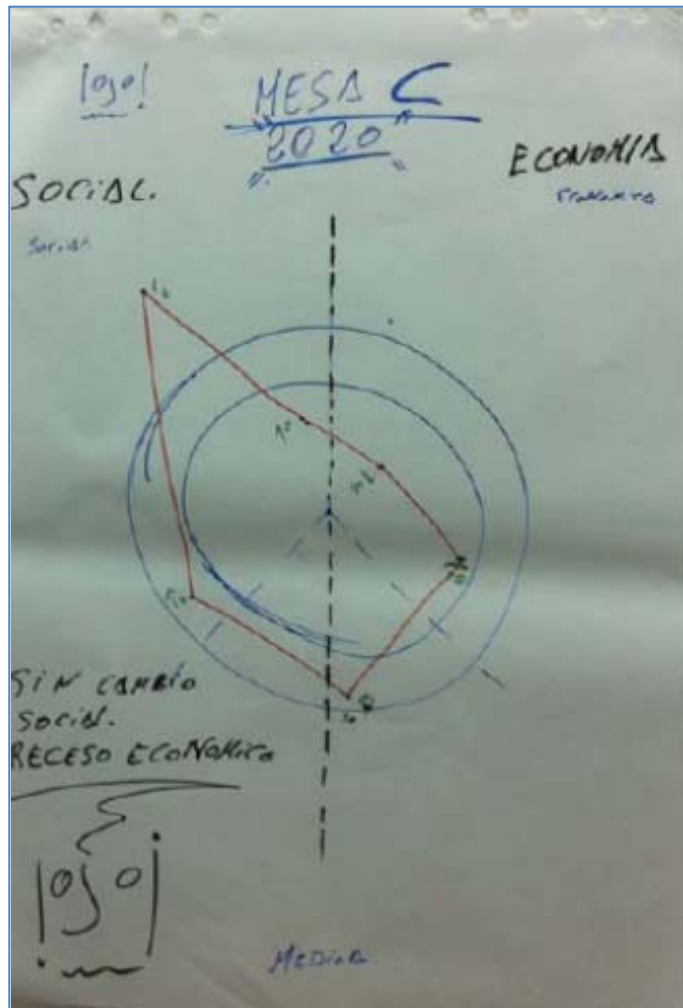
Figure 4 shows the Amoeba diagrams produced by one of the groups for the years 2000, 2005 and 2010, based on the band of equilibrium and the values of the indicators previously selected by this group. Figure 5 shows the future scenario produced by the group for the year 2020.

Figure 4. Amoeba diagrams produced by Group C in different past time scenarios.





Figure 5. Amoeba diagrams produced by Group E for 2020.



Along the timeline considered by this group, the amoeba gradually fills in, indicating a trend towards sustainability. The picture shows that the group has a relatively optimistic view of the future.

As in the rest of the workshops, the consultant analysed the dynamics of the groups using the Triple Task Method and drew up a comprehensive report on the workshop which is included as **Annex 1.4.III**. In brief, it should be highlighted that all of the groups produced excellent results and worked in an appropriate, sustainable manner, completing the tasks required of them and drawing a timeline and a future scenario by means of amoeba diagrams.

### 3.4. 4<sup>th</sup> Imagine Workshop

The last workshop was held in Garrucha, in Escobetas Castle, on 3 & 4 February 2012. Sixty-two persons participated in the workshop, working in groups of between 8 and 10 on the fourth stage of the Imagine methodology, whose objective is to analyse the work previously done by each group, prioritise and **give a global overview of sustainability in the Levante de Almería area**. The results were as follows:

- A table of indicators of the whole group for the Levante de Almería area (Table 3)
- The future scenario desired by the group as a whole (Figure 6)
- The basis for the elaboration of an action plan (Table 4)

Table 3. Sustainability indicators and bands of equilibrium selected by the plenary session at the 4<sup>th</sup> Imagine Workshop.

	INDICATOR	MINIMUM VALUE	MAXIMUM VALUE	PAST	PRESENT	FUTURE
A	GROSS RENEWABLE POWER PRODUCED AND CONSUMED IN THE CAMP AREA / TOTAL GROSS DEMAND	40	60	3.7%	18.5%	60%
A	NUMBER OF CALLS BY DIFFERENT ASSOCIATIONS AND PROPOSALS ASSUMED BY THE PUBLIC ADMINISTRATIONS	45	80	10%	20%	50%
B	% WASTE RECYCLED / Tm (average tonnes of) WASTE COLLECTED	50	100	10%	37%	80%
B	% BUILT-UP LAND IN 10 Km OF COAST	20	30	10%	19%	30%
C	SCHOOL DROPOUT RATE (%)	5	18	21.4%	21.3%	10%
C	AREA OF GREENHOUSES (hectares in whole province)	20,000	32,000	5,000	27,000	32,000
D	IMPLEMENTATION OF ENERGY OPTIMISATION PLANS	60	90	0	50	70
D	PLANNED AGRICULTURAL AND FISHERIES ACTIVITY	10	35	0	5	25
E	(Nº of inhabitants) POPULATION WITH WASTEWATER TREATMENT PLANTS ON THE COAST	343,154	619,130	172,025	343,154	500,000
E	PERCENTAGE OF RENEWABLE ENERGY INSTALLED / TOTAL POWER	10	50	6.3	10.6	18
F	DEGRADED / REGENERATED URBAN BEACHES	40%	60%	60	50	45
F	INTEGRATED AGRICULTURAL PRODUCTION / TOTAL	60	70	31	43	60

These indicators combine the priority issues and tasks for each of the six groups.

On the basis of the priority issues, tasks and indicators identified by the groups, the vision of a sustainable future for the Levante de Almeria is based on the following 11 main ideas:

- Renewable energy in the area
- Active public participation and political commitment in proposals for sustainable development
- Recycling of waste
- Urban planning
- Education of young people
- Control of greenhouses
- Energy optimisation
- Planning of agricultural and fishing activities
- Treatment of 100% of wastewater
- Regeneration of urban beaches
- Integrated agriculture

It should be emphasised that, over the four Workshops held, the 86 participants found common ground around these 11 ideas. In the same way, it should be highlighted that these ideas were considered by the group to be the key to a sustainable future and the participants suggested ways of measuring them.

As a result of the above table, the group as a whole produced amoeba diagrams which represent a common view of current sustainability in the Levante de Almería, as well as the past and future situations, showing gradual progress towards sustainability, as can be seen in Figure 6.

Figure 6. Amoeba diagrams representing the scenario as seen by all of the groups, with respect to the past, present and future of sustainability in the Levante de Almería area.



The participants believe that the future tends towards sustainability, and so they were asked to elaborate the basis for an **action plan** so as to achieve the desired scenario. Each group offered two proposals and a concern for the action plan and these were presented at the plenary session and which is to be found in detail in **Annex 1.4.IV** of this document.

Table 4 gives the basis for the elaboration of the action plan after incorporating the proposals of the participants at the 4<sup>th</sup> Imagine Workshop in order to lead the Levante de Almería area towards greater sustainability.

Table 4. Basis for an action plan drawn up by the participants at the 4<sup>th</sup> Imagine Workshop

THE ROAD TO A SUSTAINABLE FUTURE IN THE LEVANTE DE ALMERIA REQUIRES:
<ul style="list-style-type: none"> <li>• The creation of a Levante de Almería trademark, subsidised by local administration in order to promote environmentally sustainable productive activities (organic crops and fisheries), linked to waste recycling for the production of renewable energy.</li> </ul>
<ul style="list-style-type: none"> <li>• Greater control of waste and enforcement of town planning to control unsustainable / illegal urbanisation.</li> </ul>
<ul style="list-style-type: none"> <li>• Promotion of sustainable production through occupational training; energy diversification focusing on self-sufficiency and tax benefits for sustainable activities; protection of the coastline from speculative urbanism and enforcement of the public participation and institutional coordination framework based in the CAMP model.</li> </ul>
<ul style="list-style-type: none"> <li>• Sustainable use of water in terms of control of the exploitation of aquifers and the minimisation of water transfers. Priority should be placed on increasing use of water from existing desalination plants and waste water reuse.</li> </ul>
<ul style="list-style-type: none"> <li>• Efficient water cycle management, in particular taking care of aquifers (keeping in mind problems of over-exploitation and salinization) including institutional</li> </ul>

coordination and public participation; incentives for the stimulation of renewable energy, energy optimisation and sustainable mobility. Improvement of training and skill-building, environmental information, education and environmental awareness in the area.

- Improvement of water management including the governance model, diversification of productive activities which do not require a change of land use (for example, R&D, boost of the tourism sector through the valorisation of the cultural heritage), urban town planning control and continuing public participation and the use of an institutional coordination framework such as that based on the CAMP model.

**The main concerns were the unsustainable exploitation of the water cycle and unplanned / illegal urbanisation.**

As in the rest of the workshops, the consultant carried out an analysis of the group dynamics using the Triple Task Method and drew up a comprehensive report which is included as **Annex 1.4.IV**. Briefly, it should be highlighted that all of the groups worked appropriately and positively and, despite seeing enormous problems in the future at individual group level, when they developed a joint vision between all of the groups, they managed to focus on 12 key problems and the basis for an action plan to achieve a sustainable future.



*Participants at the 4<sup>th</sup> Imagine Workshop. Garrucha.*



*1<sup>st</sup> Imagine Workshop. Mojácar.*



*Plenary session of the 2<sup>nd</sup> Imagine Workshop.*



*Working groups at the 2<sup>nd</sup> Imagine Workshop.*



# 1.5

*Project participants*



## **TABLE OF CONTENTS**

1. Participants during the implementation stage
  - 1.1 Coastal Commission
  - 1.2 Technical delegates of the Coastal Commission
  - 1.3 Coastal Council
  - 1.4 Team of experts on Levante de Almeria Information System
  - 1.5 Team of experts on Landscape Valuation individual project
  - 1.6 Team of experts on Water Cycle Sustainable Management and Improvement of the Management Criteria for the Marine, Terrestrial and Hydraulic Public Domain individual projects
  - 1.7 Team of experts on Conservation of Cultural Heritage individual project
  - 1.8 Team of experts on Marine Environment Sustainable Use individual project
  - 1.9 Team of experts on Dissemination of Good Practices in Productive Activities individual project
  - 1.10 Working teams staff and team leaders
  - 1.11 Steering Committee
2. Participants during formulation stage
3. Participants during initiation stage

## **ABBREVIATIONS USED**

CAMP Coastal Areas Management Programme  
ICZM Integrated Coastal Zones Management  
SDRF Sustainable Development Reference Framework



The present document includes the list of all the participants involved in CAMP Levante de Almeria Project during its different development stages from the most recent (implementation stage) to the most distant in time (initiation stage).

We want to openly express our gratitude to all of them for their indispensable contribution to the project's results, but also to all the Coastal Forum participants, that anonymously have contributed to make more realistic and rich proposals through surveys, participations in the web and opinions expressed in courses, seminars and workshops.

## 1. Participants during the implementation stage

### 1.1 Coastal Commission

The Coastal Commission is a decision-making body made up of political representatives of the different public administrations with responsibilities for coastal management in the project area. It is in charge of deciding about the Sustainable Development Reference Framework and its Action Plan.

In alphabetical order of the current administration<sup>1</sup>.

Entidad	Cargo	1er apellido	2º apellido	Nombre
Ayuntamiento de Almería	Alcalde-Presidente	Rodríguez-Comendador	Pérez	Luis Rogelio
Ayuntamiento de Carboneras	Alcalde-Presidente	Hernández	Hernández	Salvador
Ayuntamiento de Carboneras <sup>A</sup>	Alcalde-Presidente	Fernández	Fernández	Cristóbal
Ayuntamiento de Cuevas del Almanzora	Alcalde	Caicedo	Bernabé	Jesús
Ayuntamiento de Garrucha	Alcalde-Presidente	Fernández	Martínez	Juan
Ayuntamiento de Mojácar	Alcaldesa-Presidenta	Cano	Montoya	Rosa María
Ayuntamiento de Níjar	Alcalde-Presidente. Vicepresidente-Representante de la Comisión del Litoral.	Rodríguez	Rodríguez	Antonio Jesús
Ayuntamiento de Pulpí	Alcalde-Presidente	García	Pérez	Juan Pedro
Ayuntamiento de Pulpí <sup>A</sup>	Alcaldesa-Presidenta	Muñoz	Pérez	María Dolores
Ayuntamiento de Vera	Alcalde-Presidente	Jorge	Blanco	José Carmelo
Ayuntamiento de Vera <sup>A</sup>	Alcalde-Presidente	López	Caparrós	Félix
Consejería de Agricultura, Pesca y Medio Ambiente	Delegado Territorial. Presidente-Representante de la Comisión del Litoral.	Ortiz	Bono	José Manuel
Consejería de Agricultura y Pesca <sup>A</sup>	Delegado Provincial	Deus	Deus	Juan
Consejería de Agricultura y Pesca <sup>A</sup>	Delegado Provincial	Salinas	Andújar	José Antonio
Consejería de Medio Ambiente <sup>A</sup>	Delegado Provincial	García	Valera	Clemente
Consejería de Medio Ambiente <sup>A</sup>	Delegada Provincial	Rodríguez	Torres	Sonia
Consejería de Cultura y Deporte	Delegada Territorial	Arévalo	Barrionuevo	Isabel
Consejería de Cultura	Delegado Provincial	Lucas	Sánchez	Antonio José
Consejería de Cultura	Delegada Provincial	Callejón	Maldonado	Yolanda

<sup>1</sup> Header translation: Entity; Position; Surname; Name.

Entidad	Cargo	1er apellido	2º apellido	Nombre
Consejería de Economía, Innovación, Ciencia y Empleo	Delegada Territorial	Valverde	Tamayo	Adriana
Consejería de Economía, Innovación y Ciencia <sup>A</sup>	Delegado Provincial	Pérez	Navas	Juan Carlos
Consejería de Economía, Innovación y Ciencia <sup>A</sup>	Delegada Provincial. Anterior Presidenta-Representante de la Comisión del Litoral	Rodríguez	Torres	Sonia
Consejería de Fomento y Vivienda. Consejería de Turismo y Comercio.	Delegada Territorial	Caparrós	Plaza	Encarnación
Consejería de Obras Públicas y Vivienda <sup>A</sup>	Delegado Provincial	Ortiz	Bono	José Manuel
Consejería de Vivienda y Ordenación del Territorio <sup>A</sup>	Delegado Provincial	Caparrós	Mirón	Luis
Consejería de Turismo, Comercio y Deporte <sup>A</sup>	Delegada Provincial	Pérez	Felices	Esperanza
Consejería de Turismo, Comercio y Deporte <sup>A</sup>	Delegada Provincial	Muñoz	Pérez	María Dolores
Consejería de Turismo, Comercio y Deporte <sup>A</sup>	Delegada Provincial	Requena	Yáñez	Maria Isabel
Delegación del Gobierno en Almería	Delegada del Gobierno	Ferrer	Tesoro	Sonia
Delegación del Gobierno en Almería <sup>A</sup>	Delegada	Requena	Yáñez	Maria Isabel
Delegación del Gobierno en Almería <sup>A</sup>	Delegado	Corpas	Ibáñez	Miguel
Diputación Provincial de Almería	Presidente	Amat	Ayllón	Gabriel
Diputación Provincial de Almería <sup>A</sup>	Presidente	Usero	López	Juan Carlos
Mancomunidad de Municipios del Levante Almeriense	Presidente	Fernández	Zurano	Domingo
Mancomunidad de Municipios del Levante Almeriense <sup>A</sup>	Presidente	García	Collado	Luis
Ministerio de Agricultura, Alimentación y Medio Ambiente	Director General de Sostenibilidad de la Costa y del Mar	Saavedra	Inaraja	Pablo
Ministerio de Medio Ambiente, y Medio Rural y Marino <sup>A</sup>	Director General de Sostenibilidad de la Costa y del Mar	Ríos	Martínez	Pedro
Ministerio de Fomento. Autoridad Portuaria de Almería	Presidenta	Cabeo	Rodríguez	Trinidad
Subdelegación de Gobierno	Subdelegado de Gobierno	García	Lorca	Andrés Miguel
Subdelegación de Gobierno <sup>A</sup>	Subdelegado de Gobierno	Heras	Sánchez	Andrés

2

<sup>A</sup> Those people who have participated during the implementation stage and are not representing the entity at the moment of drafting this document, October 2012, due to administrative changes.

## 1.2 Technical delegates of the Coastal Commission

Technical delegates are technical staff from the administrations which are part of the Coastal Commission. They have been specifically designated by the members of this body to act as observers during Coastal Council meetings, to participate in the Imagine workshops and other meetings in the frame of the social participation process, thus ensuring the continuous participation of the administrations member of the Coastal Commission in the development of the project. Detailed below is the list of technical delegates of the Coastal Commission, in alphabetical order of the entity they represent currently.<sup>3</sup>

Entidad	Cargo	1er apellido	2º apellido	Nombre
Ayuntamiento de Almería <sup>a</sup>	Concejal de Desarrollo Económico, Empleo y Nuevas Tecnologías	Martínez	Labella	Ana
Ayuntamiento de Almería <sup>a</sup>	Técnico	Rocafull	Gómez	Alberto
Ayuntamiento de Almería	Técnico	Galván	López	M <sup>a</sup> Ángeles
Ayuntamiento de Carboneras	Concejal de Turismo	Hernández	Ridao	Beatriz
Ayuntamiento de Carboneras <sup>a</sup>	Técnico	Belmonte		Antonia
Ayuntamiento de Cuevas del Almanzora	Concejal de Urbanismo	Pérez	Celdrán	Juan José
Ayuntamiento de Cuevas del Almanzora <sup>a</sup>	Técnico	Fernández	Campoy	Diego
Ayuntamiento de Garrucha	Técnico	Haro	Ponce	Juan Domingo
Ayuntamiento de Garrucha <sup>a</sup>	Concejal Urbanismo Y Medio Ambiente	Simón	Paredes	Bernando
Ayuntamiento de Mojácar	Técnico	Pérez	López	Francisco
Ayuntamiento de Mojácar <sup>a</sup>	Teniente de Alcalde	Aparicio	Montoya	Fernando
Ayuntamiento de Níjar	Técnico	Cañadas	Felices	Sonia
Ayuntamiento de Pulpí	Técnico	Sánchez	Pérez	Antonio Jesús
Ayuntamiento de Vera	Técnico de Turismo	Guerra	González	Pilar
Ayuntamiento de Vera <sup>a</sup>	Concejal	Martínez	Fernández	Miguel Angel
Consejería de Agricultura, Pesca y Medio Ambiente	Jefe de Servicio de la Oficina de Ordenación del Territorio y Urbanismo	Marín	Marín	Alberto
Consejería de Agricultura y Pesca <sup>a</sup>	Director de la Oficina Comarcal Agraria Costa Levante-Bajo Almanzora	Guerrero	Rivero	Ramón
Consejería de Medio Ambiente <sup>a</sup>	Jefe de Servicio de Espacios Naturales Protegidos y Participación	Roldán	Del Valle	Emilio
Consejería de Cultura y Deporte	Jefe del Departamento de Protección del Patrimonio Histórico	López	Galán	Juan Salvador
Consejería de Economía, Innovación, Ciencia y Empleo	Jefe de Servicio de Economía Social y Emprendedores	Batlles	Paniagua	Jesús
Consejería de Fomento y Vivienda.	Pdte. Designar	Pdte. Designar	Pdte. Designar	Pdte. Designar

<sup>a</sup> Those people who have participated during the implementation stage and are not representing the entity at the moment of drafting this document, October 2012, due to administrative changes.

<sup>b</sup> Those who participate regularly or occasionally replacing the officially designed Technical Delegate.

Entidad	Cargo	1er apellido	2º apellido	Nombre
Consejería de Obras Públicas y Vivienda <sup>^</sup>	Jefe de Servicio de la Oficina de Ordenación del Territorio y Urbanismo	Marín	Marín	Alberto
Consejería de Turismo y Comercio	Jefa de Servicio de Turismo	Navarro	Sorroche	Ana María
Delegación del Gobierno en Almería	Coordinador	Ayala	Amate	José Nicolas
Delegación del Gobierno en Almería <sup>^</sup>	Coordinador	Oliver	Martínez	Joaquín
Diputación Provincial de Almería	Técnico	López	Navarro	Antonio
Diputación Provincial de Almería <sup>^</sup>	Diputado de Agricultura y Medio Ambiente	Liria	Sánchez	Oscar Manuel
Diputación Provincial. Oficina Técnica de Mitigación del Cambio Climático <sup>^</sup>	Directora	Egea	Pérez	Sonia
Mancomunidad de Municipios del Levante Almeriense	Técnico	Fuentes	Acevedo	María Antonia
Ministerio de Agricultura, Alimentación y Medio Ambiente.	Director Técnico de la División para la Protección del Mar. Dirección General de Sostenibilidad de la Costa y del Mar	Buceta	Miller	José Luis
Ministerio de Agricultura, Alimentación y Medio Ambiente.	Jefe del Servicio Provincial de Costas en Almería. Dirección General de Sostenibilidad de la Costa y del Mar	Castillo	Mesa	Miguel Ángel
Ministerio de Medio Ambiente, y Medio Rural y Marino <sup>^</sup>	Jefe del Servicio Provincial de Costas en Almería. Dirección General de Sostenibilidad de la Costa y el Mar	Calleja	García	Miguel
Ministerio de Fomento. Autoridad Portuaria de Almería	Técnico	Bayo	Martínez	Antonio
Ministerio de Fomento. Autoridad Portuaria de Almería <sup>^</sup>	Técnico	Doucet	López	José Luis
Subdelegación de Gobierno en Almería	Jefe del Servicio Provincial de Costas en Almería	Castillo	Mesa	Miguel Ángel
Subdelegación de Gobierno en Almería <sup>^</sup>	Jefe del Servicio Provincial de Costas en Almería	Calleja	García	Miguel

### 1.3 Coastal Council

This is a consultative body integrated by socioeconomic stakeholders of the area which allows them to participate in decision making processes related to coastal sustainability.

Detailed below is the list of entities member of the Coastal Council and those people who have participated representing them in the different meetings or workshops, in alphabetical order of the entity they represent.

Entidad	Cargo	1er apellido	2º apellido	Nombre
AAVV Almería	Presidente FAVA "Espejo del Mar", Federación de Asociaciones Vecinales de Almería	López	Aguilera	Liberio
AAVV Almería <sup>a</sup>	Presidente FAVA	Ruano	López	Francisco
AAVV Carboneras	Presidente Aduteca	Lazo	Fuentes	Antonio Simón
AAVV Carboneras <sup>a</sup>		Pino	Villalba	Carmen
AAVV Carboneras <sup>a</sup>		Caparrós	Fernández	Adoración
AAVV Cuevas del Almanzora		Pryrne		Fraser
AAVV Garrucha	Presidenta	Giménez	Morales	Paula
AAVV Mojácar	Vocal	Padilla	Vizcaíno	José Manuel
AAVV Mojácar <sup>a</sup>		López	Segura	David
AAVV Mojácar <sup>a</sup>		Gagliardi	Uribe	Óscar
AAVV Níjar	Presidente	Ortiz	Vergel	Francisco Javier
AAVV Níjar <sup>a</sup>		Giménez	Segura	Mercedes
AAVV Pulpí	Presidente AAVV Terreros-Jaravía	Herrera	Barrios	Fernando
AAVV Vera	Secretario	Van Stuyvesant	Meijen	Jan Jacob
AAVV Vera <sup>a</sup>		Pérez	Garde	Luis
AAVV Vera <sup>a</sup>		Giménez		Timoteo
ASAJA-Asociación Agraria de Jóvenes Agricultores (Almería)		Román	García	Fermín
ASEMA	Vicepresidente	Hernández	Vizcaíno	Tomás
ASEMPAL-Confederación Empresarial de la Provincia de Almería - Sector Turismo y Hostelería	Presidente Asociación Empresarios de Actividades Turísticas del Levante Almeriense	Ferri	Belda	Ramón
ASEMPAL-Confederación Empresarial de la Provincia de Almería-Sector Hortofrutícola	Director General PRIMAFLOR S.A.	Mur	Gimeno	Emilio
ASEMPAL-Confederación Empresarial de la Provincia de Almería -Sector industrial <sup>c</sup>				
ASEMPARNA-Asociación empresarios del Parque Natural Cabo de Gata-Níjar <sup>c</sup>				
ASEMPAL <sup>a</sup>	Técnico	Delgado		Jesús
ASEMPAL <sup>a</sup>	Secretaria	Gil	Serra	Encarnación

4

<sup>A</sup> Those people who have participated during the implementation stage and are not representing the entity at the moment of drafting this document, October 2012, due to administrative changes.

<sup>B</sup> Those who participate regularly or occasionally replacing the officially designated member.

<sup>C</sup> Those entities members of the Coastal Council under the Rules of Procedure of the Institutional Coordination and Social Participation Framework of CAMP Levante de Almeria that, having been called for the different participation processes such as Imagine workshops and other meetings, for different reasons have not been able to attend in any occasion.

Entidad	Cargo	1er apellido	2º apellido	Nombre
ASEMPAL <sup>a</sup>		Barajas	Guzmán	José Antonio
Asociación de Amigos del Parque Natural Cabo de Gata-Níjar	Presidente	Hermosa	Bonilla	Antonio
Asociación de Amigos del Parque Natural Cabo de Gata-Níjar <sup>a</sup>		López		Charo
Asociación Salvemos Mojácar y el Levante Almeriense	Presidente	Del Val	Higuera	Jaime
ASOPECA-Asociación Provincial de empresarios de la Pesca <sup>c</sup>				
ASVOAL-Asociación de Voluntarios por Almería	Presidente. Observador suplente del Consejo del Litoral: sector ONGs.	Castillo	Ortega	Nicolás
CCOO Almería	Secretaría Provincial de Medio Ambiente	Hervás	López	Jerónima
COAG Almería	Secretario de Áreas y Sectores. Observador suplente del Consejo del Litoral: sector productivo.	Rull	Galdeano	Juan José
Cofradía de Pescadores de Carboneras <sup>c</sup>				
Cofradía de Pescadores de Garrucha	Presidente	Giménez	Morales	Gaspar
Cofradía de Pescadores de Garrucha <sup>a</sup>	Anterior Presidente	Cervantes	Flores	Juan
Confederación andaluza de federaciones deportivas	Miembro de la comisión del Consejo Andaluz del Deporte. Federación Andaluza de Vela	Reyes	Rojas	Manuel
Coprohnijar S.C.A. <sup>c</sup>				
Diputación Almería (Agenda 21 provincial) <sup>c</sup>	Observador electo del Consejo del Litoral: sector científico-técnico.	Felices	Esteban	Inmaculada
Ecologistas en Acción	Coordinador Provincial	Diéguez	Vidal	Marcos
FAAM-Federación Almeriense de Minusválidos	Presidente	Sola	Sola	Valentín
FAAM-Federación Almeriense de Minusválidos <sup>b</sup>		Padua	Ferrer	Miguel
FAAS-Federación Andaluza de Actividades Subacuáticas	Secretario	Pérez	Fernández	Maite
FACUA-Asociación de Consumidores en Acción de Almería	Presidente del Consejo del Litoral	Garrido	Ramos	José María
FADP-Federación Andaluza de Pesca Deportiva <sup>c</sup>				
FAECA-Federación Andaluza de empresas cooperativas agrarias		Algarra	González	Noemí
FAM-Federación Andaluza de Montaña <sup>c</sup>				

Entidad	Cargo	1er apellido	2º apellido	Nombre
Federación Andaluza de Caza y Pesca <sup>c</sup>				
GARCAVI-Asociación para la defensa de la pesca artesanal de artes menores del Levante Almeriense <sup>c</sup>				
GDR-Grupo de Desarrollo Rural del Levante de Almería	Gerente	Valero	Martínez	Juan Ginés
GDR-Grupo de Desarrollo Rural del Levante de Almería	Presidente	Haro	González	Miguel
GDR-Grupo de Desarrollo Rural del Levante de Almería <sup>b</sup>	Técnico	Iranzo	Alhambra	Pilar de Neri
Grupo Condor		Márquez	Calvo	Manuel
Grupo Condor <sup>b</sup>		González	Fernández	Pedro
Grupo Ecologista Mediterráneo	Socio	Alcalá	Guerrero	Fuensanta
PESCARTES-Asociación de Pescadores Artesanales del Parque Natural Cabo de Gata-Níjar	Vocal	González	Rueda	Vicente
PESCARTES-Asociación de Pescadores Artesanales del Parque Natural Cabo de Gata-Níjar <sup>b</sup>	Vocal	Rodríguez	Rodríguez	Luis
PESCARTES-Asociación de Pescadores Artesanales del Parque Natural Cabo de Gata-Níjar <sup>b</sup>		Molina	Hernández	Macarena
Productores Ecológicos del Levante Almeriense <sup>c</sup>				
UGT Almería	Secretario de Atención al Afiliado y al Delegado	Yeste	Martínez	Serafín
Universidad de Almería	Director Secretariado de SSCC de Investigación. Observador suplente del Consejo del Litoral: sector científico-técnico.	Cabello	Piñar	Javier
Universidad de Almería <sup>a</sup>		Lourenco		Patricia
UPA-Unión de Pequeños Agricultores y Ganaderos (Almería) <sup>c</sup>				
Usuarios del Agua-Almería	Presidente Comunidad de Regantes Las Cuatro Vegas de Almería. Observador electo del Consejo del Litoral: sector productivo.	Pérez	Sánchez	José Antonio
Usuarios del Agua-Níjar	Gerente de la Unidad de Gestión de Riesgos y Desarrollo de Aqualia	Morilla	Matarín	Manuel
Usuarios del Agua-Níjar <sup>a</sup>		Fernández	Mañas	José
Usuarios del Agua-Valle del Almanzora <sup>c</sup>				

#### 1.4 Team of experts on Levante de Almería Information System

Team of experts created to ensure the integration of the project results in REDIAM (Andalusian Environmental Information Network) thus facilitating the information and public participation processes according to IZCM Protocol.

Alphabetically by the name,

Entidad	Cargo	1er apellido	2º apellido	Nombre
Agencia de Medio Ambiente y Agua	Responsable REDIAM	Giménez de Azcárate	Fernández	Fernando
Consejería de Agricultura, Pesca y Medio Ambiente	Jefe del Servicio de Información y Prospectiva Ambiental	Cáceres	Clavero	Francisco
Consejería de Agricultura, Pesca y Medio Ambiente	Responsable REDIAM	Moreira	Madueño	José Manuel
Agencia de Medio Ambiente y Agua	Técnico REDIAM. Área de Aguas	Cañizares	García	Maribel

#### 1.5 Team of experts on Landscape Valuation individual project

Team of experts created to review and ensure the validity of “Landscape Vulnerability Assessment” methodology, developed by Mediterranean Action Plan, during its application in Levante de Almería, thus contributing to achieve the main and specific objectives of this individual project.

Listed below is the name of the members of this Team of Experts alphabetically by name.

Entidad	Cargo	1er apellido	2º apellido	Nombre
Consejería de Agricultura, Pesca y Medio Ambiente	Jefe de Servicio de la Oficina de Ordenación del Territorio y Urbanismo	Marín	Marín	Alberto
Plan de Acción del Mediterráneo	Consultor PAP/RAC	Mlakar		Ales
Universidad de Almería	Profesor del Departamento de Ingeniería Rural	García	Cruz	Amós
Consejería de Fomento y Vivienda	Jefe de Servicio de Urbanismo	Torres	Pérez	Francisco José
Consejería de Agricultura, Pesca y Medio Ambiente. Parque Natural Cabo de Gata-Níjar <sup>4</sup>	Director Conservador	Ávila	Elviro	Javier
Consejería de Agricultura, Pesca y Medio Ambiente. Parque Natural Cabo de Gata-Níjar	Técnico	Vargas	Escudero	Víctor
Consejería de Agricultura, Pesca y Medio Ambiente. Parque Natural Cabo de Gata-Níjar	Técnico	Navarro	Pastor	Javier
Diputación de Almería	Asesor Urbanismo	Martín	García	Juan



Entidad	Cargo	1er apellido	2º apellido	Nombre
Consejería de Agricultura, Pesca y Medio Ambiente	Técnico Servicios Centrales	Raya	López	Laura
Mancomunidad de Municipios del Levante Almeriense	Técnico	Fuentes	Acevedo	María Antonia
Consejería de Fomento y Vivienda. Servicio de Gestión y Ejecución de Planes Dpto. de Suelo. Dirección General de Urbanismo	Técnico	Jiménez	Nievas	Pedro
Centro de Estudios Paisaje y Territorio	Técnico	Medina	Borrego	Rafael
Consejería de Agricultura, Pesca y Medio Ambiente. Parque Natural Cabo de Gata-Níjar	Responsable del Plan de Desarrollo Sostenible	Moratalla	Martínez	Rafaela
Consejería de Agricultura, Pesca y Medio Ambiente	Jefa del Departamento de Uso Público y Servicios Ambientales. Responsable del Proyecto LIFE Posidonia	Mendoza	Castellón	Rosa M <sup>a</sup>

### 1.6 Team of experts on Water Cycle Sustainable Management and Improvement of the Management Criteria for the Marine, Terrestrial and Hydraulic Public Domain individual projects

Team of Experts created to participate in the design of the methodology to be implemented in both individual projects and to monitor and assess their results.

The members of this Team of Experts, alphabetically by the name, are listed below.

Entidad	Cargo	1er apellido	2º apellido	Nombre
Universidad de Almería	Profesor del Departamento de Derecho Internacional Público y Relaciones Internacionales	Lacalle	Marcos	Abel
Ministerio de Agricultura, Alimentación y Medio Ambiente	Técnico del Servicio Provincial de Costas en Almería. Dirección General de Sostenibilidad de la Costa y el Mar. También Jefe del Departamento de Geografía y Ordenación del Territorio del Instituto de Estudios Almeriense	Viciano	Martínez-Lage	Alfonso
Agencia de Medio Ambiente y Agua	Técnico Área de Patrimonio	Cañabate	Reche	Concepción
Agencia de Medio Ambiente y Agua <sup>a</sup>	Técnico de Área de Servicios Ambientales y Centro de Datos	Trillo	Montero	David
Aguas del Almanzora, S.A.	Director Técnico	Haro	Rojas	Fernando
Universidad de Almería <sup>a</sup>	Departamento de Hidrogeología y Química Analítica	Sola	Gómez	Fernando
Consejería de Agricultura, Pesca y Medio Ambiente <sup>a</sup>	Técnico	Sanz		Fernando

Entidad	Cargo	1er apellido	2º apellido	Nombre
Universidad de Almería	Investigador	Aguilar	Torres	Fernando J.
Consejería de Agricultura, Pesca y Medio Ambiente	Jefe de Servicio de Calidad Hídrica	Sempere	Gimenez	Francisco
Diputación Provincial de Almería. Servicio de Infraestructura Urbana	Ingeniero Técnico de Obras Públicas	Martínez	Rodríguez	Francisco Javier
Confederación Hidrográfica del Segura	Oficina de Planificación Hidrológica	Toral	Pérez	Ginés
Agencia de Medio Ambiente y Agua	Técnico responsable del proyecto clasificación del litoral andaluz en escenarios de gestión	Jiménez	Ruiz	Guadalupe
Universidad de Almería	Grupo de Investigación Recursos Hídricos y Geología Ambiental	Francés	Herrera	Isaac
Universidad de Almería	Investigador	Fernandez	Luque	Ismael
Comunidad de Regantes Las Cuatro Vegas de Almería	Presidente	Pérez	Sánchez	José Antonio
Ministerio de Agricultura, Alimentación y Medio Ambiente	Coordinador de Área. Dirección General de Sostenibilidad de la Costa y del Mar	Martínez	Cordero	José Ramón
Consejería de Agricultura, Pesca y Medio Ambiente	Jefe de Servicio de Dominio Público Hidráulico	Carrique	Pérez	José Ramón
AQUALIA-Gestión Integral del Agua	Gerente provincial	Colomina	Berenguel	José Vicente
Gestión de Aguas del Levante, S.A. (GALASA)	Director Gerente	Moya	Magro	Juan Ignacio
AQUAMED-Aguas de las Cuencas Mediterráneas	Gerente	Luque	Ibáñez	Juan José
Aqualia	Gerente de la Unidad de Gestión de Riesgos y Desarrollo	Morilla	Matarín	Manuel
Consejería de Agricultura, Pesca y Medio Ambiente	Jefa de Servicio de Protección Ambiental	Sánchez	García	María José
Agencia de Medio Ambiente y Agua	Técnico REDIAM. Área de Aguas	Cañizares	García	Maribel
Gestión de Aguas del Levante, S.A. (GALASA) <sup>8</sup>	Técnico	López	Benitez	Matilde
Ministerio de Medio Ambiente, y Medio Rural y Marino <sup>4</sup>	Jefe del Servicio Provincial de Costas en Almería	Calleja	García	Miguel
Agencia de Medio Ambiente y Agua	Coordinadora en Almería del Área de Gestión del Medio Hídrico	Tormo	Aguilar	Miriam
AQUAMED-Aguas de las Cuencas Mediterráneas <sup>9</sup>	Técnico	Valdecampos		Tomás

### 1.7 Team of experts on Conservation of Cultural Heritage individual project

Team of experts created to advise the team leaders of this individual project in the design of the methodologies to be put into practice during the implementation of the participation workshops and in the drafting of its final products.

The members of this Team of Experts are listed below alphabetically by the name.

Entidad	Cargo	1er apellido	2º apellido	Nombre
Consejería de Cultura	Gabinete Pedagógico de Bellas Artes	Ruiz	García	Alfonso
Universidad de Almería	Profesor Titular de Historia e Instituciones Económicas. Dpto. de Economía Aplicada	Sánchez	Picón	Andrés
GDR Levante de Almería	Técnico	Páez	Soto	Carmen
Museo Histórico Municipal de Vera. Actividades de Restauración, Etnografía y Arqueología	Historiador	Ortiz	Soler	Domingo
CEP Almería	Asesor	Muñoz	Muñoz	Juan Antonio
Consejería de Cultura	Jefe del Departamento de Protección del Patrimonio Histórico	López	Galán	Juan Salvador
	Geógrafo. Consultor. Director del Departamento de Territorio de AIT, S.L.	Caparrós	Lorenzo	Rodolfo

### 1.8 Team of experts on Marine Environment Sustainable Use individual project

Team of Experts created to support the design of the methodology to draft the marine environment sensibility maps to different activities.

The members of this Team of Experts are listed below, alphabetically by the name.

Entidad	Cargo	1er apellido	2º apellido	Nombre
Agencia de Medio Ambiente y Agua	Técnico Medio Marino Unidad de Gestión Integrada del Litoral y la Geodiversidad	Barrajón	Domènech	Agustín
IUCN Centre for Mediterranean Cooperation	Marine Conservation Programme Manager	Jeudy	de Grissac	Alain
Universidad de Málaga <sup>a</sup>		Reul		Andreas
UICN-Centro de Cooperación del Mediterráneo	Responsable de Relaciones Institucionales	Alcántara		Andrés
Tragsatec <sup>a</sup>	Coordinador científico Reservas Marinas de Cabo de Gata-Níjar e Isla de Alborán	Frías	López	Antonio
	Consultor	López	Ornat	Arturo

Entidad	Cargo	1er apellido	2º apellido	Nombre
UNEP MAP SPA/RAC-Regional Activity Center for Specially Protected Areas	Strategic Action Programme for Biological Diversity (SAP BIO)	Cebrián	Menchero	Daniel
Agencia de Medio Ambiente y Agua	Técnico Medio Marino Unidad de Gestión Integrada del Litoral y la Geodiversidad	Moreno	Lampreave	Diego
Universidad de Málaga	Catedrático Ecología Marina	Rodríguez	Martínez	Jaime
Ministerio de Agricultura, Alimentación y Medio Ambiente.	Consejero Técnico. División para la Protección del Mar. Dirección General de Sostenibilidad de la Costa y del Mar	Pantoja	Trigueros	Javier
Centro Oceanográfico de Málaga (Instituto Español de Oceanografía)	Director	Baro		Jorge
Empresa Pública de Desarrollo Agrario y Pesquero. Subdirección de Gestión de Recursos Marinos <sup>a</sup>	Técnico	Macías		José Carlos
Consejería de Agricultura, Pesca y Medio Ambiente	Jefe de Servicio de Gestión del Medio Natural	Nevado	Ariza	Juan Carlos
Universidad de Sevilla	Profesor del Departamento de Geografía Humana	Suárez	de Vivero	Juan Luis
Consejería de Agricultura, Pesca y Medio Ambiente	Jefa del Servicio de Recursos Pesqueros	Morales	Ortega	María José
Organización de las Naciones Unidas para la Agricultura y la Alimentación (FAO). Comisión Pesquera de la FAO en Málaga <sup>b</sup>	Departamento de Pesca y Acuicultura	Bernardon		Matthieu
MEDPAN	Presidenta	Canals	Ventín	Purificació María
Grupo Alnitak	Presidente	Sagarminaga	Van Buiten	Ricardo
Consejería de Agricultura, Pesca y Medio Ambiente		Abad	Abad	Rogelio
Ministerio de Medio Ambiente y Medio Rural y Marino	Jefa de Servicio. Subdirectora General de Recursos Marinos y Acuicultura. Dirección General de Recursos Pesqueros y Acuicultura	Revenga	Martínez de Pazos	Silvia

### 1.9 Team of experts on Dissemination of Good Practices in Productive Activities individual project

Team of experts created to support the design of the dissemination activities and to identify stakeholders and interest groups.

The members of this Team of Experts are listed below, alphabetically by the name.

Entidad	Cargo	1er apellido	2º apellido	Nombre
Consejería de Turismo y Comercio	Jefa de Servicio de Turismo	Navarro	Sorroche	Ana M <sup>a</sup>
Universidad de Almería	Dpto. Biología Aplicada	Rodríguez	Navarro	Estefanía
Grupo de Desarrollo Pesquero Levante de Almería (GDP)	Técnico	Torres	Cano	Inmaculada
COAG	Responsable Técnico	Navarro	Romero	Jorge
ACELA-Asociación de Comerciantes del Levante Almeriense	Presidenta	Haro	García	Juana M <sup>a</sup>
CIESOL UAL-CIEMAT Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas Plataforma solar de Almería	Director	García	Pérez	Manuel
Mancomunidad de Municipios del Levante Almeriense	Técnico	Fuentes	Acevedo	María Antonia
Carta Europea de Turismo Sostenible	Técnico	Molina	Padial	María del Mar
Koppert Sistemas Biológicos, S.L.	Técnico	López	Leyva	María José
Estación Experimental Las Palmerillas. Cajamar	Área de Agricultura y Medio Ambiente	González	Fernández	Mónica
GDR Levante de Almería	Técnico	Iranzo	Alhambra	Pilar de Neri
ASEMPAL-Asociación Empresarios de Actividades Turísticas del Levante Almeriense. Sector Turismo y Hostelería	Presidente	Ferri	Belda	Ramón
Consejería de Agricultura, Pesca y Medio Ambiente	Técnico	Abad	Abad	Rogelio
Consejería de Agricultura, Pesca y Medio Ambiente	Jefe de Departamento Sanidad Vegetal en Almería	Aparicio	Salmerón	Vicente

### 1.10 Working teams staff and team leaders

Team leaders and consultants staff for each of the horizontal activities and individual projects of CAMP Levante de Almería. The Coastal Technical Office is included, as it has developed the awareness-raising for coastal sustainability, information and social participation and institutional coordination horizontal activities.

In alphabetical order by the horizontal activity or individual project.

Actividad horizontal o proyecto singular	Cargo	1er Apellido	2º Apellido	Nombre
A.H. Formación y Capacitación	Responsable de equipo	Cabello	Piñar	Javier
A.H. Formación y Capacitación	Consultor	López	Rodríguez	María
A.H. Sistema de Información para el Levante Almeriense	Responsable de equipo	Francés	Herrera	Isaac
A.H. Sistema de Información para el Levante Almeriense	Consultor	Fernández	Revuelta	Alfonso
P.S. Valoración del Territorio	Responsable de equipo	Villalobos	Megía	Miguel
P.S. Valoración del Territorio	Consultor	Pérez	Muñoz	Ana Belén
P.S. Valoración del Territorio	Consultor	Salas	Martín	Ricardo
P.S. Gestión Sostenible del Ciclo del Agua	Responsable de equipo	Ballester	Ciuró	Alba
P.S. Gestión Sostenible del Ciclo del Agua	Consultor	Acebes	De Pablos	Elena
P.S. Gestión Sostenible del Ciclo del Agua	Consultor	Romera	Puga	María del Carmen
P.S. Mejora del Dominio Público Marítimo Terrestre e Hidráulico	Responsable de equipo	Losada	Rodríguez	Miguel Ángel
P.S. Mejora del Dominio Público Marítimo Terrestre e Hidráulico	Consultor	García	Contreras	Dario
P.S. Mejora del Dominio Público Marítimo Terrestre e Hidráulico	Consultor	Ortega	Sánchez	Miguel
P.S. Mejora del Dominio Público Marítimo Terrestre e Hidráulico	Consultor	López	Ruiz	Alejandro
P.S. Conservación del Patrimonio Cultural	Responsable de equipo	Marín	Irigaray	Elvira
P.S. Conservación del Patrimonio Cultural	Consultor	González	De Las Heras	Ángel
P.S. Conservación del Patrimonio Cultural	Consultor	Alarcón	López	Manuel
P.S. Uso Sostenible del Medio Marino	Responsable de equipo	Álvarez	Lopez	Antonio Agustín
P.S. Uso Sostenible del Medio Marino	Consultor	Sanjurjo	Franco	Rocio
P.S. Uso Sostenible del Medio Marino	Consultor	Zurita	Manrubia	Francisco de Paula
P.S. Uso Sostenible del Medio Marino	Consultor	Gálvez	César	Rafael
P.S. Difusión de Buenas Prácticas en Actividades Productivas	Responsable de equipo	García	Noguera	Roger
P.S. Difusión de Buenas Prácticas en Actividades Productivas. Sector Pesquero	Consultor	Martínez	Posse	Lucía
P.S. Difusión de Buenas Prácticas en Actividades Productivas. Sector Agrícola	Consultor	van der Blom		Jan
P.S. Difusión de Buenas Prácticas en Actividades Productivas. Sector Agrícola	Consultor	Robledo	Camacho	Antonio
P.S. Difusión de Buenas Prácticas en Actividades Productivas. Sector Agrícola	Consultor	Algra		Douwe
P.S. Difusión de Buenas Prácticas en Actividades Productivas. Sector Agrícola	Consultor	Giménez	Oter	Adriá
P.S. Difusión de Buenas Prácticas en Actividades Productivas. Sector Turístico	Consultor	Cheriff		Meryem
P.S. Difusión de Buenas Prácticas en Actividades Productivas. Sector Turístico	Consultor	Rodríguez	Gómez	Vanessa

Actividad horizontal o proyecto singular	Cargo	1er Apellido	2º Apellido	Nombre
P.S. Marco de Referencia de Desarrollo Sostenible	Responsable de equipo	Castro	Nogueira	Hermelindo
P.S. Marco de Referencia de Desarrollo Sostenible	Consultor	López	Rodríguez	María
P.S. Marco de Referencia de Desarrollo Sostenible. Análisis Socio-Económico	Consultor	Sánchez	Picón	Andrés
P.S. Marco de Referencia de Desarrollo Sostenible. Análisis Socio-Económico	Consultor	Aznar	Sánchez	José Ángel
P.S. Marco de Referencia de Desarrollo Sostenible. Análisis Socio-Económico	Consultor	Uclés	Aguilera	David
P.S. Marco de Referencia de Desarrollo Sostenible. Proceso Participativo Imagine	Consultor	Bell		Simon George
Oficina Técnica del Litoral	Responsable de equipo	Villegas	Campos	Pilar
Oficina Técnica del Litoral	Consultor	Callejón	Mayoral	Daniel
Oficina Técnica del Litoral	Diseñador gráfico	Chacón	Lora	Jorge
Coordinadora General del Proyecto	Consultora del PAP/RAC PAM.	Correa	Peña	Ana

### 1.11 Steering Committee

Alphabetically by the name,

Entidad	Cargo	1er apellido	2º apellido	Nombre
Consejería de Agricultura, Pesca y Medio Ambiente de la Junta de Andalucía	Jefe de Servicio de Espacios Naturales Protegidos y Participación de la Delegación Provincial de Almería	Roldán	del Valle	Emilio
Consejería de Agricultura, Pesca y Medio Ambiente de la Junta de Andalucía	Jefa de Servicio de Planificación y Desarrollo Territorial	De las Heras	Díaz de Liaño	Guadalupe
Ministerio de Agricultura, Alimentación y Medio Ambiente	División para la Protección del Mar. Coordinadora de Área. Dirección General de Sostenibilidad de la Costa y del Mar	Martín	Partida	Itziar
Consejería de Agricultura, Pesca y Medio Ambiente de la Junta de Andalucía	Director General de Gestión del Medio Natural	Cobos	Aguirre	Javier
Consejería de Agricultura, Pesca y Medio Ambiente de la Junta de Andalucía	Director General de Gestión del Medio Natural	Madrid	Rojo	Javier
Ministerio de Agricultura, Alimentación y Medio Ambiente <sup>4</sup>	Técnico Superior. División para la Protección del Mar	Alonso	Rodríguez	Jorge
Ministerio de Agricultura, Alimentación y Medio Ambiente	División para la Protección del Mar. Dirección General de Sostenibilidad de la Costa y el Mar	Buceta	Miller	José L.

Entidad	Cargo	1er apellido	2º apellido	Nombre
Consejería de Agricultura, Pesca y Medio Ambiente de la Junta de Andalucía	Técnico de Servicios Centrales	Guzmán	Álvarez	José Ramón
Consejería de Agricultura, Pesca y Medio Ambiente de la Junta de Andalucía	Técnico de Servicios Centrales	Raya	López	Laura
UNEP PAM PAP/RAC	Deputy Director (Director Adjunto)	Prem		Marko
Consejería de Agricultura, Pesca y Medio Ambiente de la Junta de Andalucía	Jefa de Servicio de Gestión de Planes Territoriales	Ormaechea	Cazalis	Olga
Ministerio de Agricultura, Alimentación y Medio Ambiente <sup>a</sup>	Consejero Técnico de la División para la Protección del Mar. Dirección General de Sostenibilidad de la Costa y el Mar	Escobar	Paredes	Víctor

## 2. Participants during formulation stage

The following people participated during the initial formulation stage and the first drafting of the Inception Report (between 2007 and 2009):

Entidad	1er apellido	2º apellido	Nombre
Oficina Técnica del Litoral <sup>a</sup>	Fernández	Estarlich	Francisca M <sup>a</sup>
Oficina Técnica del Litoral <sup>a</sup>	García	Reche	Pilar
Consejería de Agricultura, Pesca y Medio Ambiente	Mendoza	Castellón	Rosa M <sup>a</sup>

The following people participated during the detailed formulation stage and finished the Inception Report (January to June 2010):

Entidad	1er apellido	2º apellido	Nombre
Centro Andaluz de Evaluación y Seguimiento del Cambio Global	Castro	Nogueira	Hermelindo
Coordinadora General del Proyecto CAMP	Correa	Peña	Ana
Consejería de Agricultura, Pesca y Medio Ambiente	Roldán	del Valle	Emilio
Oficina Técnica del Litoral	Villegas	Campos	Pilar

## 3. Participants during initiation stage

The following people collaborated in the drafting of the Feasibility Study and boosting of CAMP Levante de Almeria during initiation stage (2002-2005):



Entidad	1er apellido	2º apellido	Nombre
Instituto de Desarrollo Rural	Alburquerque	Llorens	Francisco
Consejería de Medio Ambiente	Aragón	Mejías	Miguel Ángel
Colaborador científico	Barragán	Muñoz	Juan Manuel
Consejería de Medio Ambiente	Briones	Alcañiz	María
Consejería de Medio Ambiente	Cabezas	Saura	María Dolores
Ministerio de Medio Ambiente	Cachón	De Mesa	Javier
Colaborador científico	Caparrós	Lorenzo	Rodolfo
Consultor PNUMA PAM PAP-RAC	Da Mora	Cruz	Humberto
Instituto de Desarrollo Rural	Durán	Bustos	Diana
Consejería de Medio Ambiente	Fernández-Palacios	Carmona	Arturo
Consejería de Medio Ambiente	Gallardo	León	Alfonso
Consejería de Medio Ambiente	Gañán	De Molina	Cecilia
Instituto de Desarrollo Rural	García	Hermenegildo	Alejandro
Consejería de Medio Ambiente	Guirado	Romero	José
Ministerio de Medio Ambiente	Hermoso	Carazo	Francisco J.
GDR Levante de Almería	Iranzo	Alhambra	Pilar de Neri
Instituto de Desarrollo Rural	Jiménez	Taracido	Eva
Colaborador científico	Malvárez	García	Gonzalo
Instituto de Desarrollo Rural	Martín	Sánchez	Alfredo
Instituto de Desarrollo Rural	Mercado	Rodríguez	Verónica
Consejería de Medio Ambiente	Navas	Concha	Fátima
Colaborador científico	Ojeda	Zújar	José
Instituto de Desarrollo Rural	Sánchez	Sánchez	Florencio
Consejería de Medio Ambiente	Sanz	Fábrega	Fernando
GDR Levante de Almería	Valero	Martínez	Juan Ginés
Instituto de Desarrollo Rural	Vélez	Méndez	Susana



## 2

### *Training and capacity building*

Final report

**Authors in alphabetical order**

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## TABLE OF CONTENTS

- 0.- Executive summary
- 1.- Background
- 2.- Project description
- 3.- Training activities program
- 4.- Official validation of training activities
- 5.- Previous results to the integration stage
- 6.- Action plan for the Post-Project stage
- 7.- Lessons learnt

## INDEX OF ANNEXES

- Annex 2.I Training activities programs.  
Annex 2.II Training activities contents.  
Annex 2.III Evaluation surveys of training activities.  
Annex 2.IV Short films of training activities contents.

## LIST OF TABLES

- Table 1: Goals and number of participants.*  
*Table 2: Training course program "Stakeholders involvement techniques, negotiation and communication".*  
*Table 3: Training course program "Ecosystem and coastal processes".*  
*Table 4: Training course program "Spatial planning and Integrated Coastal Zone Management".*  
*Table 5: Training course program "Vulnerability Assessment of Landscape".*  
*Table 6: Training lecture program "Environmental good practices in nautical activities".*  
*Table 7: Training lecture program "Environmental good practices in fishing sector".*  
*Table 8: Training lecture program "Training activity: Present position and environmental challenges in agriculture sector of Levante de Almería".*  
*Table 9: Number of participants and global marks of training courses.*  
*Table 10: Interest training topics expressed by participants.*  
*Table 11: Summary of interest training topics.*  
*Table 12: Action Plan.*

## ABBREVIATIONS USED

- AP SDRF: Action Plan of the Sustainable Development Reference Framework  
CAMP: Coastal Area Management Programme  
ICZM: Integrated Coastal Zone Management  
SDRF: Sustainable Development Reference Framework  
ECTS: European Credits Transfer System  
RDG: Rural Development Group  
NGO: Non-Governmental Organization

## **Executive summary**

This report describes the “Trainee and Capacity Building” Horizontal Activity of the CAMP Levante de Almeria Project. The document includes details about the features, development and results of training activities, as well as other proposals for the Sustainable Development Reference Framework (SDRF), aimed at implementing the post-project stage.

### **1.- Background**

The Protocol on Integrated Coastal Zone Management (ICZM) in the Mediterranean, which is part of the Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean, states in its article 15.2: “The Parties shall organise, directly, multilaterally or bilaterally, or with the assistance of the Organisation, the Centre or the international organisations concerned, educational programmes, training and public education on integrated management of coastal zones with a view to ensuring their sustainable development”. This Protocol became effective in Spain on March 24, 2011, as a legal instrument for the ICZM upon being ratified by six countries.

The aim of the CAMP Levante de Almería Project is to put into practice a new management model originating from this Protocol. By supporting the coordination among the different public administrations and encouraging citizen participation in the decision-making of issues related to the Levante de Almería coast, it is expected to achieve the sustainability of this territory. The Feasibility Study for the CAMP Levante de Almería area, which was carried out in 2005, identified a certain lack of qualified skills related to Integrated Coastal Zone Management, particularly among public administration technicians and socio-economic agents. Therefore, the CAMP Levante de Almería Project, in accordance with the Protocol on Integrated Coastal Zone Management, sets in motion the “Trainee and Capacity Building” Horizontal Activity, in order to solve the issue with the lack of training.

The overall goal of the training courses carried out this far was to ensure the capacity building of public administration technical experts, who manage the coastal area, as well as of socio-economic agents. The focus was set on improving their knowledge on participatory processes, ecosystems and coastal processes, spatial planning and Integrated Coastal Zone Management, and the vulnerability assessment of landscape method.

On the other hand, the goals of the training lectures were to teach good practices in different productive activities, e.g. those related to Agriculture, Fishing and the Nautical sector.

### **2.- Project Description**

The “Trainee and Capacity Building” Horizontal Activity consisted on the development of four training courses. These were mainly aimed at putting into practice the Protocol on ICZM, whose fundamental goal is to achieve the sustainability of this territory. Furthermore, it also consisted on the development of training lectures focused on different productive activities related to Agriculture, Fishing and the Nautical sector. The details of training activities about the dissemination of good practices in productive activities are included in the final report of the “Good Practices in Productive Activities” Singular Project.

The training activities were designed in order to achieve the following goals:

Training activities	General goals	Specific goals	Number of participants
Stakeholders involvement techniques, negotiation and communication	To learn different techniques to improve participation skills, as well as abilities in negotiation and communication to optimize institutional coordination and facilitate Integrated Coastal Zone Management in the CAMP Project Area.	<ul style="list-style-type: none"> <li>▫ To understand the objectives, structure and operation of the CAMP Levante Almeria Project.</li> <li>▫ To report on the importance of participatory processes.</li> <li>▫ To develop techniques in social skills, conflict management and negotiation.</li> <li>▫ To encourage active participation in Integrated Coastal Zone Management.</li> <li>▫ To promote institutional coordination between different Public Administrations.</li> <li>▫ To create an attitude of collaboration between public and private entities.</li> </ul>	22
Ecosystem and coastal processes	To optimize decision-making systems related to Integrated Coastal Zone Management in the CAMP Project Area through knowledge about importance of ecosystem coastal processes.	<ul style="list-style-type: none"> <li>☑ To communicate the importance of ecosystem processes in the Integrated Coastal Zone Management.</li> <li>☑ To facilitate understanding of the impacts of certain human activities on ecosystem processes.</li> <li>☑ To awareness and encourage a responsible attitude in the Integrated Coastal Zone Management.</li> <li>☑ To encourage the foundations for a sustainable development model.</li> <li>☑ To promote the inclusion of sustainability criteria in the decision-making processes by managers.</li> </ul>	55
Spatial planning and Integrated Coastal Zone Management	To improve decision-making systems related to Integrated Coastal Zone Management through capacity building about major factors of spatial planning and coastal management.	<ul style="list-style-type: none"> <li>☑ To explain legal and institutional framework for Integrated Coastal Zone Management.</li> <li>☑ To facilitate the understanding of the major planning instruments in the coastal areas.</li> <li>☑ To promote the foundations of sustainable resource management model, mainly related to water resources.</li> <li>☑ To raise awareness about the vulnerability of coastal areas.</li> <li>☑ To encourage understanding of the origin and effects of global change.</li> </ul>	53
Landscape Vulnerability Assessment	To promote Landscape Vulnerability Assessment methodology as a tool to develop projects, plans and programmes on Integrated Coastal Zones Management.	<ul style="list-style-type: none"> <li>▫ To provide tools for Integrated Coastal Zones Management.</li> <li>▫ To promote the sustainable use of natural resources and the improvement of territorial management through multisectoral approaches.</li> </ul>	50

Training activities	General goals	Specific goals	Number of participants
Present position and environmental challenges for the agricultural sector in Levante de Almería: Water footprint management and sustainable production.	To analyze the current status of agriculture to promote Best Available Techniques and Best Environmental Practices.	To explore the advantages of the use of Best Practices in the sector, to study possible ways to anticipate market trends and to envisage new threats and foreseeable changes in consumers habits that could jeopardize the agricultural sector, by revealing methodologies which could solve them as the water footprint calculation.	47
1st, 2nd and 3rd conferences on Dissemination of Good Practices in fisheries sector	Dissemination of Good Practices in artisanal, trawling and longline fishing floats.	<p>To facilitate the exchange of experiences among different fishing communities.</p> <p>To gather information about traditional fishing among the Levante de Almería fishing community.</p> <p>To set a debate in the fishing sector regarding the feasibility of adopting different existing tools on sustainable fishing management.</p> <p>To address issues of concern regarding the future European regulation that results from the ongoing reform of the Common Fisheries Policy.</p>	67
Training lecture on Environmental Good Practices in Nautical Activities	Training in Environmental Good Practices among the different collectives that perform their activities in the coastal strip.	To present onboard behaviour patterns that permit the minimization of environmental impact in nautical recreational activities through the dissemination of the Good Practices for Nautical Users Guide developed by Fundació Mar and Regional Activity Centre for Clean Production of Mediterranean Action Plan.	7

Table 1: Goals and number of participants.

Before the training activities were carried out, some leaflets on the training activities program were published (Appendix I) and shared among the stakeholders. The main targets of these activities were the members of the Coastal Council. The leaflets were distributed via email, although leaflets were also distributed on paper in order to encourage the dissemination of training activities. Furthermore, the training activities were advertised on the website of the CAMP Levante de Almería Project ([www.camplevantedealmeria.com](http://www.camplevantedealmeria.com)) and on websites of collaborators, such as the Andalusian Centre for the Assessment and Monitoring of the Global Change - University of Almería ([www.caescg.org](http://www.caescg.org)).

The training activities targeted public administration technical experts, as well as socio-economic and scientific-technical agents from the area of Levante de Almería. However, given the high seating capacity of the classrooms where the activities took place, applications for participation were also accepted from the general public. In the particular case of the training activity on Landscape Vulnerability Assessment, consultant companies specialized in spatial planning were also targeted. As for the lecture on the Good Practices in nautical activities, the targets were marine managers and coordinators, nautical clubs, nautical schools and sport federations of nautical activities.

The training staff responsible for the training courses was formed by University faculty and prestigious technical and scientific experts in different topics, who have a valuable teaching experience in order to disseminate their knowledge to students effectively and are capable to give feedback for students. About the training lectures, specifically the ones for agriculture and fishing sector, were carried out by some Singular Project team leader, who made a evaluation previous about these sectors of Levante de Almería. The nautical sector lecture was taught by a specialist NGO.

The training courses were taught on campus in a theoretical-practical way. This type of teaching modality was considered the most appropriate way to encourage interaction between teachers and attendees, for solving doubts and questions which may arise, and to generate discussions on proposal of interest. The duration of training courses was 30 hours divided into different afternoon sessions in order to encourage the participation, except the training activity about Landscape Vulnerability Assessment, which lasted 6 hours.

In order to carry out the training courses were used: lecture halls with seating capacity of more than 80 people equipped with computers, wireless internet, projector, screen to view presentations from teachers, audio and sound equipment, air conditioning/heating, ergonomics equipment, lighting and comfortable rooms, simultaneous interpreting room, large enough rooms to workshops; audiovisual and computer technical assistance; bus service to field trip and project staff responsible for management, attendance control place and evaluation of training activities.

During the training courses writing material and USB memory (2GB) with other complementary files were given to every attendee (Appendix II).

The attendance percentage requested to obtain a training certificate of the course was the 80%. In addition, a test was given to every participant in order to evaluate their knowledge about the contents, knowing their satisfaction with the training activities and identifying future training needs in the CAMP Area with a view to include these results in the SDRF.

The results of training activities were evaluated by attendees with satisfaction surveys. The attendees assessed different aspects of activity training and they gave a mark between a minimum and maximum

from 1 to 10. These results are included in each evaluation report (Appendix III). Furthermore, this appendix includes the number of participants which is showed in the table 1 and in the photographic report.

While the training activities were carried out, short films were recorded of the professors of the long courses. These short films summarize the main knowledge of training activities (Appendix IV) and were linked on the CAMP Levante de Almeria Project website with the contents of training courses. They are available for watching or downloading at: (<http://www.camplevantedealmeria.com/content/v%C3%ADdeos-resumen-cursos-camp>).

On the one hand, this action aimed at giving the students the necessary knowledge to learn or resolve doubts and, on the other hand, disseminating the main knowledge to people who couldn't participate on the training activities and were interested.

In order to support the quality of the contents of three training courses noting that the University of Almería officially agreed to recognize the validation of this training course with one ECTS (European Credit Transfer System). In this way, the students can be able to formal request their validation by one credit. Before starting the training activities the official approval of Andalusian Institute of Public Administration was formal requested according to the requirements of legal process (Resolución de 27 de Diciembre de 2010). This Institution is responsible for monitoring the training activities given by other institutions and public administrations of Andalusia Government through their validation of civil servants career. As regards, the documents in accordance with the requirements were submitted on time, however, at the time this report is drafted, it hasn't receive any answer by this Institution yet.

Concurrently the training activities, other activities were carried out to the Institutional Coordination and Public Participation framework of the CAMP Levante de Almeria Project. The "Trainee and Capacity Building" team took part in the meetings of the Coastal Council. During these meetings, the team could explain to stakeholders the main progress made in this Horizontal Activity, resolve some doubts and study some proposals related to training and capacity building for the post-project stage.

About the Coastal Forum, noting that the students were asked through evaluation surveys in order to know their opinions about their training needs. The students answered the next question: In the future, what training topics will you like to study in the CAMP Levante de Almeria framework?

Also, the contents of training courses and short films are linked on the CAMP Levante de Almería website. This way, people who couldn't participate on the training activities are able to learn the main knowledge taught.

Furthermore, the "Trainee and Capacity Building" team took part in four Imagine workshops hold on the implementation stage of the CAMP Levante de Almeria Project. These events let, on the one hand, knowledge exchanges between stakeholders, Technical Delegates of the Coastal Commission and the Horizontal Activities and Singular Projects team leaders, and, on the other hand, to collect proposals for the post-project stage.

Finally, just to mention that trainee and capacity building are important skills on the Integrated Coastal Zone Management and they are a transverse axis related to other areas, so this team took part in the coordination meetings hold on in this period in order to identify other training needs required by other Singular Projects.



### 3.- Training activities program

The main features of training activities are summarized in the following tables:

TRAINING COURSE: STAKEHOLDERS INVOLVEMENT TECHNIQUES, NEGOTIATION AND COMMUNICATION				
Date	Timetable	Hours	Contents	Training staff
13/06/11	16:00 – 18:00	2	Introduction to CAMP Levante Almeria Project	Ms. Ana Correa Peña - CAMP Levante Almería General Coordinator
	18:00 – 22:00	4	Public participation in the Aarhus model (1998)	Ms. Pilar Villegas Campos - Coastal Technical Office Coordinator Mr. Abel La Calle Marcos - Professor of International Law and International Relations at the University of Almeria
14/06/11	16:00 – 22:00	6	Social skills, communication techniques and conflict management	Mr. Miguel Ángel Mañas Rodríguez - Professor of Humanities and Education Sciences at the University of Almeria
15/06/11	16:00 – 22:00	6	Altaguax Project: a participatory experience	Mr. Isaac Francés Herrera - Altaguax Project Research and T.I.C. expert to Andalusian Centre for the Assessment and Monitoring of Global Change (University of Almeria)
16/06/11	16:00 – 22:00	6	Analysis and synthesis problems in devising solutions	Ms. Alba Ballester Cuiró - Professor of a Social Communication, Communication and Public Opinion and Anthropology at the University of Zaragoza
17/06/11	16:00 – 22:00	6	Social participation and introduction to the methodology IMAGINE.	Mr. Simon G. Bell – IMAGINE team leader

Table 2: Training course program “Stakeholders involvement techniques, negotiation and communication”.

TRAINING COURSE: ECOSYSTEM AND COASTAL PROCESSES				
Date	Timetable	Hours	Contents	Training staff
4/07/11	16:00 – 20:30	4,5	Marine ecosystems to global change. Analysis of pressures and impacts on marine ecosystems.	Mr. Jaime Rodríguez Martínez - Professor of Ecology at the University of Malaga
5/07/11	16:00 – 20:30	4,5	Hydrodynamics, productivity and biodiversity of the Mediterranean Sea. Alborán Sea: a laboratory for design marine protected area network.	Mr. Jaime Rodríguez Martínez - Professor of Ecology at the University of Malaga
6/07/11	16:00 – 20:30	4,5	Processes and evolution coastal in the Earth system. Scales and principles for the maintenance of ecosystem processes. Human actions and engineering coasts.	Mr. Miguel Ángel Losada Rodríguez - Professor of Hydraulic Engineering at the University of Granada
11/07/11	16:00 – 20:30	4,5	Influence of the economic sectors in coastal ecosystem	Mr. Andrés Sánchez Picón - Professor of History and Economic Institutions at the University of Almeria
12/07/11	16:00 – 20:30	4,5	Management of coastal salt works: Cabo de Gata Salt Works. Planning and management in the Cabo de Gata marine reserves.	Mr. Hermelindo Castro Nogueira - Professor of Ecology at the University of Almeria
16/07/11	8:00 – 15:30	7,5	Field trip to salt works and marine reserves Cabo de Gata-Níjar Natural Park.	Mr. Hermelindo Castro Nogueira - Professor of Ecology at the University of Almeria

Table 3: Training course program “Ecosystem and coastal processes”.

TRAINING COURSE: SPATIAL PLANNING AND INTEGRATED COASTAL ZONE MANAGEMENT				
Date	Timetable	Hours	Contents	Training staff
26/09/11	16:30 – 21:00	4,5	International framework for Integrated Coastal Zone Management. Legal and Public Administration competence framework	D. Juan Manuel Barragán Muñoz - Professor of Regional Geographic Analysis at the University of Cadiz
27/09/11	16:30 – 21:00	4,5	Tools for Integrated Coastal Zone Management. Type and Nature. Integrated Coastal Zone Management Tools in the dialectic of conservation and development	D. Juan Manuel Barragán Muñoz - Professor of Regional Geographic Analysis at the University of Cadiz
28/09/11	16:30 – 21:00	4,5	Planning Tools: Spatial Planning, Urban Development Plan. Spatial planning focused on the reality of the coast. Landscape vulnerability against planned activities.	D. Alberto Marín Marín - Chief of Planning Office of the Provincial Delegation of the Ministry of Public Works and Housing in Almería
3/10/11	16:30 – 21:00	4,5	Water availability in planning. Sustainability. resources	D. Manuel López Rodríguez - Coordinator of the Directorate General of Andalusia and the Atlantic Basin Water Plans responsible for the Intra-Community of Andalusia Water General Secretary of the Ministry of Environmental of Andalucía
4/10/11	16:30 – 20:30	4	Water planning cycle	D. Abel La Calle Marcos - Professor of International Law at the University at the Almería
5/10/11	16:30 – 20:30	4	Natural and cultural heritage in the CAMP area strategies for the conservation and enhancement of natural and cultural landscapes value: Resource Management Plan of Cabo de Gata-Nijar Natural Park.	D. Cecilio Oyonarte Gutiérrez - Professor of Soil Science and Agricultural Chemistry at the University of Almería
6-/10/11	16:30 – 20:30	4	Strategies facing global change	D. Javier Cabello Piñar - Professor of Plant Biology and Ecology at the University of Almería

Table 4: Training course program "Spatial planning and Integrated Coastal Zone Management".

<b>TRAINING COURSE: LANDSCAPE VULNERABILITY ASSESSMENT</b>				
<b>Date</b>	<b>Timetable</b>	<b>Hours</b>	<b>Contents</b>	<b>Training staff</b>
26/01/11	17:00 – 20:00	3	<p>Welcome and introductions Objectives of the course and International Framework.</p> <p>Introduction to CAMP Levante de Almeria Project.</p> <p>Theoretical introduction to Landscape Vulnerability Assessment. Concepts and utility of its results.</p> <p>Practical example on the implementation of Landscape Vulnerability Assessment in Piran Region.</p> <p>Questions.</p>	<p>Mr. Marko Prem – Director a. i. UNEP MAP PAP-RAC (Priority Actions Programme Regional Activity Center. Mediterranean Action Plan. United Nations Environmental Programme).</p> <p>Ms. Ana Correa Peña – General Coordinator of CAMP Levante de Almería Project.</p> <p>Mr. Ales Mlakar – PAP/RAC Consultant.</p>
27/01/11	16:00 – 19:00	3	<p>Simulation on the implementation of Landscape Vulnerability Assessment methodology in Levante de Almería.</p>	<p>Mr. Ales Mlakar – PAP/RAC Consultant.</p>

Table 5: Training course program “Landscape Vulnerability Assessment”.

<b>TRAINING LECTURE: ENVIRONMENTAL GOOD PRACTICES IN NAUTICAL ACTIVITIES</b>				
<b>Date</b>	<b>Timetable</b>	<b>Hours</b>	<b>Contents</b>	<b>Training staff</b>
15/05/12	17:00 – 20:00	3	<p>Introduction</p> <p>Presentation of Good Practices for Nautical Users Guide entitled “Let’s talk about the sea”</p> <p>Ecoinnomar Programme: the use and implementation of technological innovations in the nautical sector for environmental sustainability.</p>	<p>Mr. Roger García Noguera – Mediterranean Action Plan Regional Activity Center for Clean Productions.</p> <p>Mr. Miquel Ventura Monsó – Fundació Mar Director.</p>

Table 6: Training lecture program “Environmental good practices in nautical activities”.

TRAINING LECTURE: ENVIRONMENTAL GOOD PRACTICES IN FISHING SECTOR				
ate	Timetable	Hours	Contents	Training staff
16/06/11 (Cabo de Gata)	17:30 – 20:30	3	Introduction to CAMP Project.	Ms. Lucía Martínez Posse – Consultant. Mediterranean Action Plan Regional Activity Centre for Clean Productions (CP/RAC) Mr. Daniel Cebrián Menchero – Consultant. Mediterranean Action Plan Regional Activity Centre for Specially Protected Areas. (RAC/SPA)
17/06/11 (Garrucha)			Climate Change and fisheries.	
			Co-management of fisheries marine protected areas.	Mr. Juan M. López Blanco –Lonxanet Foundation and Ms. Elena Vázquez Portela – Lonxanet Foundation.
			Diversification of the sector: fishing tourism. Direct marketing.	
23/09/11 (Cabo de Gata)	17:30 – 20:30	3	Summary of the 1st lecture	Ms. Lucía Martínez Posse – Consultant. Mediterranean Action Plan Regional Activity Centre for Clean Productions (CP/RAC)
24/09/11 (Garrucha)			Introduction to co-management of Fisheries Reserves in Andalucía (Conil de la Frontera)	
			Capture and certifications of sustainable fisheries.	Mr. Ramón Tarridas – Artisanal fishermen. President of the Minor Arts Shipowners Association of Catalonia (ADAMEC) and President of the Mediterranean Artisanal Fishermen Platform.
			Maresme Fishing Management Plan (Catalonia). The Mediterranean Artisanal Fishermen Platform and the Common Fisheries Policy reform.	
3/11/11 (Carboneras)	18:30 – 20:30	2	Current status on the activity related to Dissemination of Good Practices in the Fisheries Sector.	Ms. Lucía Martínez Posse – Consultant. Mediterranean Action Plan Regional Activity Centre for Clean Productions (CP/RAC)
4/11/11 (Almería)			Focal issues in the Common Fisheries Policy and its impact on the fisheries sector.	
			Responsible actions for a sustainable fishing activity.	
			Current status of red prawn populations.	
			Discussion, questions and analysis of proposals for Levante de Almería.	

Table 7: Training lecture program "Environmental good practices in fishing sector".

TRAINING LECTURE: PRESENT POSITION AND ENVIRONMENTAL CHALLENGES IN AGRICULTURE SECTOR OF LEVANTE				
Date	Timetable	Hours	Contents	Training staff
23/05/12	9:30 – 18:30	9	<p>Presentation of CAMP Levante de Almería Project. Presentation of the Agricultural Sector Diagnosis.</p> <p>Roundtable: Environmental challenges of agriculture in Almería: Leading initiatives.</p> <p>Waste management - phytosanitary containers.</p> <p>Water footprint management.</p> <p>Participative session: Challenges for a sustainable future in Levante de Almería agriculture.</p> <p>Water footprint calculation: Methodology and tools to reflect the real water consumption and to develop strategies to reduce it.</p>	<p>Mr. Jan van der Blom. Coordinator of Production Techniques Department. COEXPHAL.</p> <p>Mr. Antonio Marhuenda. Production Director. PRIMAFLOR.</p> <p>Mr. Antonio Ufarte. Manager. CESPAS – ALBAIDA.</p> <p>Mr. Santiago Bonachela Castaño. Professor. Department of Plant Production. University of Almería.</p> <p>Mr. Adrià Giménez. Project manager. Mediterranean Action Plan Regional Activity Centre for Clean Productions (CP/RAC).</p> <p>Mr. Victorino Martínez Puras. Development and Communication Director. SIGFITO Envases S.L.</p> <p>Mr. Jan van der Blom. Coordinator of Production Techniques Department. COEXPHAL and Mr. Adrià Giménez. (CP/RAC).</p> <p>Mr. Peter Penning. Antea GROUP President.</p> <p>Mr. Douwe Algra. Head of Antea GROUP Division of safety and environment.</p>
24/05/12	9:00 – 15:30	7	<p>Field guided tour to a green products greenhouse in Levante de Almería area.</p> <p>“Ecos del Tajo” Project. Ecological agriculture as a development model in Tajo River basin.</p> <p>Roundtable: On the way to a sustainable agriculture through integrated and ecological production in Levante de Almería.</p>	<p>Mr. Francisco Belmonte. Manager. BIOSABOR.</p> <p>Mr. Alejandro Martínez. CEDER Caparra.</p> <p>Mr. Antonio García Padilla. President of COPROHNIJAR.</p> <p>Mr. Alejo Salado Gil. Manager of Bio Sol de Portocarrero.</p> <p>Mr. José Requena Nieto. Councillor for Agriculture of Nijar Municipality.</p>

Table 8: Training lecture program “Training activity: Present position and environmental challenges in agriculture sector of Levante”

#### 4.- Official validation of training activities

In general, the training activities were carried out at optimal work environment, which was characterized by participation and interest of attendees every day. In order to achieve the training activities goals is very important to involve the students to get their best use. In this sense the practical training modality contributed to get this objective.

The results of three training courses evidenced that this type of training modality was considered the most appropriate way to encourage interaction between teachers and assistants, for solving doubts and questions which may arise, and to generate discussions on proposal of interest. This encouraged achieving the training goals aim at improving the training and capacity building of technicians and socio-economic agents in order to optimize institutional coordination, improve making-decision processes and facilitate Integrated Coastal Zone Management in the CAMP Project Area.

The work experience of the “Trainee and Capacity Building” team and reputable specialist responsible for the training courses, were the two significant elements to achieve a high level of participation, as can be clearly seen in the evaluation surveys. Other elements, which were assessed by attendees, were related to the training modality and facilities of the lecture rooms. This is because the University of Almería, as Centre of Higher Education, belongs to European Higher Education.

The suggestions from the audience, which were made through evaluation surveys of training courses, showed many opinions about the timetable of first training activity “Stakeholders involvement techniques, negotiation and communication”. In accordance with these suggestions the “Trainee and Capacity Building” team changed the timetable of next training course. These changes included to reduce daily hours and to increase day numbers. This decision was important in order to increase the number of participants in the next training activities.

Finally, noting through evaluation surveys that the audience expressed that their initial expectations were met and they gave a high mark to usefulness of the training courses.

In general, the students expressed a high satisfaction rate, which evidence that the training activities goals were fulfilled. The number of participants and the global marks of training courses, from one to ten, are showed in the following table:

Training course	Number of participants	Global mark (1 – 10)
Stakeholders involvement techniques, negotiation and communication	22	8,04
Ecosystem and coastal processes	55	8,82
Spatial planning and Integrated Coastal Zone Management	53	8,47
<b>Total</b>	<b>130</b>	

Table 9: Number of participants and global marks of training courses

Source: Andalusian Centre for the Assessment and Monitoring of Global Change



These results evidenced, that these training activities have improved the training and capacity building technicians of public administration and socio-economic agents, which will make easy to put into practice the Integrated Coastal Zone Management strategy.

About the proposals from institutional coordination and public participation framework to the post-project stage, noting that, during Imagine workshops, the Coastal Council members, the Technical Delegates of the Coastal Commission and the team leaders considered essential different training issues in order to achieve the sustainability of the CAMP area. The mainly training issues are:

“Promotion of sustainable production through occupational training, mainly energy diversification”

“The sustainability require education, training and awareness raising public and of high quality”

“The training and capacity building are issues necessary in order to achieve the project goals”

The training proposals about agriculture and fishing sector are included in the final report of the “Good Practices in Productive Activities” Singular Project.

The training proposals from Coastal Forum were made by attendees of the training courses. Their proposals were grouped into different topics. The following graphics show these training topics arranged in increasing order of importance:

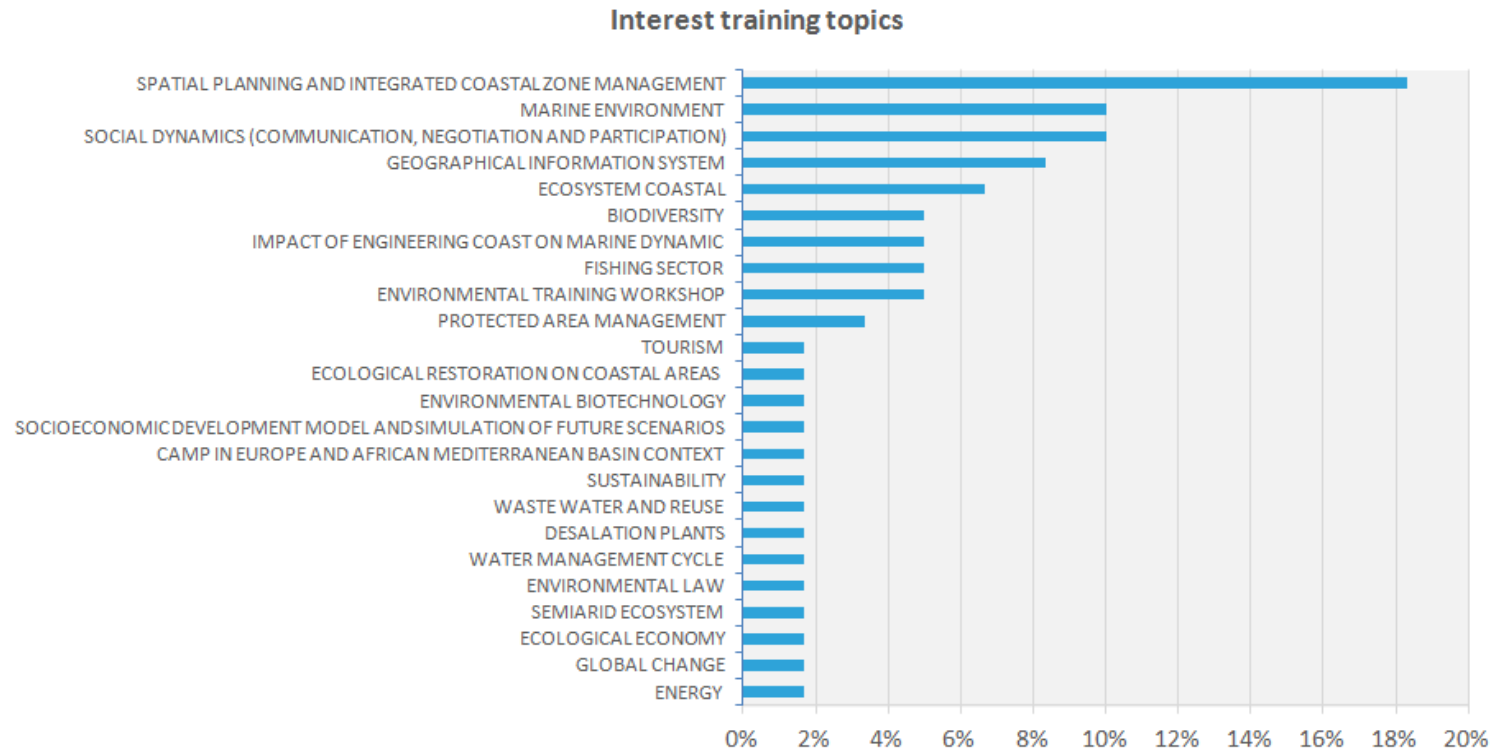


Table 10: Interest training topics expressed by participants

Source: Andalusian Centre for the Assessment and Monitoring of Global Change

In order to enhance understanding of the graph in the following table are summarized the ten training topics most demanded by students:

Interest training topics	Percentage of training demand from attendees
Integrated Coastal Zone Management	18 %
Marine environment	10 %
Social dynamics (Communication, negotiation and participation)	10 %
Geographical Information System	8 %
Ecosystem coastal	7 %
Water management cycle	6 %
Biodiversity	5 %
Impact of coastal engineering on marine dynamic	5 %
Fishing sector	5 %
Environmental training workshops	5 %

*Table 11: Summary of interest training topics*

*Source: Andalusian Centre for the Assessment and Monitoring of Global Change*

This table shows that some of the training topics most demanded are matched up with the training activities carried out in this project framework in 2011. Therefore, the attendees remain interested to improve their knowledge about these topics. The mainly training topics are: Spatial planning and Integrated Coastal Zone Management, Ecosystem and coastal processes and Social dynamics. Furthermore, the attendees are interest as well in other topics mostly like Marine environment, Geographical Information System, Water management cycle, Biodiversity, Impact of coastal engineering on marine dynamic, Fishing sector and Environmental training workshops.

After the analysis results, five training activities were considered appropriate to suggest to Sustainable Development Reference Framework. These proposals came from integration of Imagine workshops and Coastal Forum. The rest of the training activities related with other topics of Singular Projects are included like proposals to the post-project stage in these projects.

### **5.- Previous results to the integration stage**

The “Trainee and Capacity Building” team proposal to Sustainable Development Reference Framework pursue to inform to Coastal Commission about stakeholder training needs in order to achieve the sustainability of the CAMP area. As detailed above, the actions to put into practice on the post-project stage came from the proposals carried out by Levante Almeriense stakeholders, through their participation on Imagine workshops, and by the attendees of the training activities carried out in this “Trainee and Capacity Building” Horizontal Activity. These results, which evidenced the stakeholder proposals, through Imagine workshop, and the attendee proposals, were moved closer together.

Therefore the “Trainee and Capacity Building” team considered appropriate to propose the following post-project actions:

▫ Training course related to “Energy diversification in productive activities”

In order to contribute to put into practice the good practices in productive activities, like Imagine proposal, the “Training and Capacity Building” team thought it would be useful to carry out training activities related to energy diversification, mainly focusing on self-sufficiency through renewable energies in different productive activities. As well as this proposal was agreed by stakeholders, this is an important issue environmentally because this contribute to reduction fossil fuel consumption, it is also economically because this proposal can make best use of resources or reduce of supplies, therefore this has an effect decreasing operating costs in productive activities.

▫ Training course related to "Spatial Planning and Integrated Coastal Zone Management”

In 2011, in this Project framework, one training activity was carried out about this same topic. As seen from the evaluation surveys, the high satisfaction rate expressed by attendees with the last training activity favoured that the attendees were interested to improve their knowledge about this topic. This training activity was demanded by 18% of attendees so it had public support. Furthermore, the “Trainee and Capacity Building” team considered this activity is important on the implementation and post-project stages. This is evidenced because the currently training activity is linked with one goals of the Sustainable Development Reference Framework related with sustainable planning respectful with land and marine ecosystem. Given the above, this training activity required low investment, the Horizontal Activity team decided to include this proposal on the post-project stage.

▫ Training course related to "Sustainable use of the marine environment"

The importance about carrying out a sustainable of the marine environment linked with the land coastal environment, as it’s required by the Water Framework Directive (2000/60/EC), evidenced that this proposal was considered feasible due to the conservation of ecosystem process produce economic, social and environmental profits, which are essential to achieve successful a integrated coastal zone management strategy in the CAMP area. Furthermore, this training activity was demanded by the 10% of the public administrations technicians, socio-economic agents, prestigious technical and scientific experts and different professionals, who participated in the last training activities. This support made this action to be considered a good proposal to the post-project stage.

▫ Training course related to "Social dynamics: communication techniques, negotiation and participation"

In this Project framework, this topic is also similar to another training activity which was carried out in 2011. As detailed in the previous action, the high satisfaction rate expressed by attendees with the last training activity favoured that the attendees were interested in improving their knowledge about this topic. In this case, this training activity was demanded by 10% of attendees so it had public support as well. Furthermore, the “Trainee and Capacity Building” team considered this activity was important to achieve the proper operation of the institutional coordination and social participation framework of the CAMP Project. This action is necessary to put into practice on Integrated Coastal Zone Management

Protocol, for this reason the “Trainee and Capacity Building” team thought that this was an interesting action to the post-project stage. Furthermore, this activity is also linked with one goal of the Sustainable Development Reference Framework with the purpose of supporting the institutional coordination and public participation structure on the CAMP model. Given the above, this training activity required limited investment, the Horizontal Activity team decided to include this proposal to the post-project stage.

▫ Training course related to “Geographical Information System”

The Integrated Coastal Zone Management requires constant spatial analysis with Geographical Information System (GIS). This training course was demanded by 8% of attendees, which evidence that the attendees were interested to work with this kind of softwares. This proposal had a public support and the “Trainee and Capacity Building” team considerate that it was a good proposal in order to improve the decision-making processes related to the coast. For this reason, this action was proposed for the post-project stage.

### **6.- Action plan for the Post-project stage**

The training activities, which were described and justified in the section above, were included in the Action Plan to Sustainable Development Reference Framework. In addition to these five actions, the Action Plan include five else which are proposed by different Singular Projects and for this reason these actions aren’t contained in this report<sup>1</sup>. The next table shows the actions to SDRF proposed by the “Trainee and Capacity Building” team:

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<sup>1</sup> See Final Reports of the Singular Projects: Good practices in productive activities: tourism, Conservation of the cultural heritage, Levante de Almería Information System and Awareness on coastal sustainability.

Post Project action proposal	Indicative deadline (.)	Public Administration with responsibilities	Public Administration to coordinate	Indicator selected for AP SDRF	Strategic alliances
Action 4.2.3.1 AP SDRF. Training course related to "Energy diversification in productive activities"	1 <sup>st</sup> year	Ministry of Agriculture, Food and Environment Regional Ministry of Agriculture, Fisheries and Environment Regional Ministry of Economy, Innovation, Science and Employment Town Councils County Council of Almería	Regional Ministry of Economy, Innovation, Science and Employment	. Number of training activities on this subject	Biodiversity Foundation Andalusian Institute of Public Administration Grouping of municipalities Levante RDG Levante Professional and Business associations Universities
Action 4.2.3.2 AP SDRF. Training course related to "Spatial Planning and Integrated Coastal Zone Management".	1 <sup>st</sup> year	Ministry of Agriculture, Food and Environment Regional Ministry of Agriculture, Fisheries and Environment Town Councils County Council of Almería	Regional Ministry of Agriculture, Fisheries and Environment Ministry of Agriculture, Food and Environment	. Number of training activities on this subject	Biodiversity Foundation Andalusian Institute of Public Administration Grouping of municipalities Levante RDG Levante Professional and Business associations Universities
Action 4.2.3.5 AP SDRF. Training course related to "Sustainable use of the marine environment".	1 <sup>st</sup> year	Ministry of Agriculture, Food and Environment Regional Ministry of Agriculture, Fisheries and Environment Town Councils County Council of Almería	Regional Ministry of Agriculture, Fisheries and Environment Ministry of Agriculture, Food and Environment	. Number of training activities on this subject	Biodiversity Foundation Andalusian Institute of Public Administration Grouping of municipalities Levante RDG Levante Professional and Business associations Universities
Action 4.2.3.6 AP SDRF. Training course related to "Social dynamics: communication techniques, negotiation and participation".	2 <sup>nd</sup> year	Ministry of Agriculture, Food and Environment Regional Ministry of Agriculture, Fisheries and Environment Town Councils County Council of Almería	Regional Ministry of Agriculture, Fisheries and Environment	. Number of training activities on this subject	Biodiversity Foundation Andalusian Institute of Public Administration Grouping of municipalities Levante RDG Levante Professional and Business associations Universities
Action 4.2.3.7 AP SDRF. Training course related to "Geographical Information System".	2 <sup>nd</sup> year	Ministry of Agriculture, Food and Environment Regional Ministry of Agriculture, Fisheries and Environment Town Councils County Council of Almería	Regional Ministry of Agriculture, Fisheries and Environment	. Number of training activities on this subject	Biodiversity Foundation Andalusian Institute of Public Administration Grouping of municipalities Levante RDG Levante Professional and Business associations Universities

Table 12: Action Plan

*(\*) The appropriate indicative deadline to carry out the next training activities is between one and two years. This is due to the training needs should be reviewed in correlation with future training needs of the post-project stage. This training needs will be able to identify through Council and Forum Coastal as well.*

The weaknesses and strengths of integrated coastal model are base on decision-making which allow reduce threats faced by and take the opportunities in order to achieve a sustainable development model. The low investment required by the trainee and capacity building subjects, compared to multiplier profits given to them, conditioned that this topics were considered indispensable to put into practice and consolidate a coastal management model base on sustainability.

About the financial opportunities of post-project actions related to trainee and capacity building, it is advisable to proposal to Public Administrations involvement on the CAMP Project include the training activities on Integrated Coastal Zone Management into their training programs. These could be aimed at public administration technicians and social agents as well. In this connection, CAMP Project results provide enough information related to training needs in this sphere. The encouragement of this training topic would facilitate a correct implementation on Integrated Coastal Zone Management Protocol.

Apart from these training programs from Public Administrations, these institutions offer procedures of social aids about different training topics, so these constitute another opportunity to encourage future training activities on Integrated Coastal Zone Management. In this sense, the CAMP Project should try to find some strategic partners, which fulfil the regulatory requirement such as Rural Development Groups, Association, NGO, etc. in order to get these aids.

Other sources of financing funds could be the following:

- **Biodiversity Foundation.** It is a public national non-profit foundation whose activity is related to conservation, study and use sustainable of the biodiversity and cooperation on sustainable development. Through its Training, Information and Awareness Program framework with different strategic focus (Biodiversity, Rural Development, Climate Change, Marine Environment and Cooperation), this foundation carries out courses, conferences and lectures. Furthermore, this institution offer aids aimed to encourage training programs about sustainability.

- **Private entities.** Another financial opportunity is looking for agreement with private entities, which are interested to disseminate their involvement on sustainable development through their investment to carry out training activities on Integrated Coastal Zone Management. In these sense, there are different activities which can be sponsored, for example congress, courses, conferences, lectures, etc.

Finally, another financial source is searching for sponsors, which were interested to offer, into their social action framework, grant aimed at training technician and social agents on Integrated Coastal Zone Management.

### **7.- Lessons learnt**

The culture of continuous quality improvement implemented by “Trainee and Capacity Building” team encouraged to carry out an analysis of every proposals expressed by attendees through evaluation surveys. The training activities results with the opinion of attendees and the experience of the “Trainee and Capacity Building” team are the basis for making the following improvement proposal to other future training activities:

- Due to the training activities, which carried out within this Project framework, were aimed to professional worker from different sector, it is advisable decrease to hours per day in order to facilitate their best use. In this sense, four hour per day, with twenty minutes for break, is an optimal timetable to encourage attention span of the attendees. As well, it is advisable to reduce the number of total hours per training activity or, if necessary, to increase the day per training activity with fewer hour per day, in order to facilitate the attendance.
- In order to achieve the success in the implementation of Sustainable Development Reference Framework is necessary the involvement society. For this reason, it is advisable to increase recipients of the training activities, including everyone who is interested on Integrated Coastal Zone Management (for example, consultancy companies, freelances, teachers, etc.).
- Next training activities should include, at least, one trip field for attendees can learn in situ different topics. This favour, on the one hand, to learning processes and, on the other hand, to encourage the feedback between attendees and hence a good work environment.
- Finally, it is advisable to the next activities training to carry out theoretical and practical contents and organize workshops aimed to resolve real issues. The workshop groups should be transdisciplinary in order to achieve multifunction proposals, formed by a reduced group of people who swaps around every day to encourage the feedback between attendees.





# 3

## *Awareness raising of coastal sustainability*

Final report

**Authors in alphabetical order**

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## **TABLE OF CONTENTS**

Executive summary

1. Introduction
2. Coordination and public participation
3. Description of the activities
4. Prior results of the integration stage
5. Programme of post-Project actions
6. Economic, social and environmental viability of post-Project actions
7. Lessons learned

## **INDEX OF ANNEXES**

Annex 3.I. Strategy for the dynamisation of volunteer networks and programmes of the 1st and 2nd meetings on: "Dynamisation of environmental volunteers in the Levante de Almería area".

Annex 3.II. Inventory of materials used in previous campaigns in the CAMP area.

Annex 3.III. Information leaflet on the CAMP Levante de Almería Project

Annex 3.IV. Material created and results obtained in the Good Practice Campaign for Sea and Beach Users:

- Good Practice Leaflet for Sea and Beach Users
- Report on the conclusions of the Imagine Children's Workshops
- Programme of commemorative activities for Coast Day
- Audiovisual summary of the campaign

Annex 3.V. Material created for the Campaign to Promote the Values of the Landscape and the Cultural Heritage in the Levante de Almería:

- Programme and catalogue of the photography exhibition
- Report on the guided routes of the cultural and landscape heritage of the Levante de Almería

Annex 3.VI. Material created for the campaign to promote sustainable consumption:

- Teaching material for the course on "Teaching strategies for education in sustainable consumption and production"
- Programme and content of the training course on: "How to organise sustainable events"
- Programme and content of the training course on: "Introduction to sustainable public procurement and tendering"

Annex 3.VII. Teaching materials:

- Teaching unit "Imagine the future of our coast"

Annex 3.VII. Other materials:

- Activity report "Coastal Landscapes of the Levante de Almería"

## **LIST OF TABLES**

*Table 1: Schedule of activities of the Campaign for Sea and Beach Users. Summer 2011*

*Table 2: Programme of the travelling photography exhibition "Landscape, heritage, ways of life and sustainable practices on the Levante de Almería coast".*

*Table 3: Programme of the Campaign: "The Cultural and Landscape Heritage of the Levante de Almería... A treasure waiting to be discovered".*

*Table 4: Details of the training course on “Teaching Strategies for Education in Sustainable Consumption and Production (SCP)”.*

*Table 5: Details of the training course on “How to organise sustainable events”*

*Table 6: Details of the training course on “Introduction to Sustainable Public Procurement and Tendering “*

*Table 7: Programme of the “1st Cycle of Talks and Conferences of the Levante de Almería”*

*Table 8: Route “Coastal Landscapes of the Levante de Almería”.*

*Table 9: Programme for the implementation of actions. Table 12: Action Plan.*

#### **ABBREVIATIONS USED**

CAMP: Coastal Area Management Programme

ICZM: Integrated Coastal Zone Management

CP/RAC: Regional Activity Centre for Cleaner Production

SCP: Sustainable Consumption and Production

RDG: Rural Development Group

NGO: Non-Governmental Organisation.

AP SDRF: Action Plan of the Sustainable Development Reference Framework of the Levante de Almería.

## **Executive summary**

This report covers the activities performed within the framework of the Horizontal Activity for Awareness Raising of the Sustainability of the Coast of the CAMP Levante de Almería Project undertaken by the Coastal Technical Office between 15 June 2010 and 15 October 2012. It presents the general and specific objectives included in this horizontal activity, as well as the actions taken to achieve them.

The report goes on to lay out the future challenges identified in the area of awareness raising of the sustainability of the coastline and it proposes a programme of post-project actions complemented by a list of possible sources of funding and possible indicators to monitor the proposals. It concludes with all of the incidences, difficulties and other aspects which should be borne in mind in order to improve in the post-Project stage.

## **1.- Introduction**

The Horizontal Activity on “Awareness Raising of the Sustainability of the Coast” is part of the CAMP Levante de Almería Project. During the Feasibility Study of the project, in which local players were involved, a low level of awareness was detected in the field of the environment and sustainable development in the area, despite the efforts made by different public administrations and local associations. In this regard, following the recommendations of the Feasibility Study of the CAMP Project (October 2005), actions have been taken to improve the environmental behaviour of beach and sea users, working on both the improvement of the cleanliness of beaches and on environmental awareness among the public by encouraging environmental volunteers, which is a basic tool in order to improve the environmental education of the permanent and seasonal resident population and in order to encourage habits of collective action which help to solve the problems of the territory.

The legal framework of this Horizontal Activity is based on the Barcelona Convention, signed in Barcelona on 16 February 1976 and amended on 10 June 1995, through its seventh protocol, the Protocol on the Integrated Management of Coastal Zones in the Mediterranean (hereinafter, the ICZM Protocol), which came into force on 23 March 2011, thereby becoming the only binding international instrument in ICZM. In the Protocol, *the Parties undertake to carry out, at the national, regional or local level, awareness-raising activities on integrated coastal zone management and to develop educational programmes, training and public education on this subject. [...]* It also lays the basis for the stimulation of national, regional and local initiatives through institutional coordination and public participation in order to promote efficient administration in the service of the integrated management of the coastal zones of the Mediterranean.

Therefore, in compliance with Article 15.1 of the Protocol on the Integrated Management of Coastal Zones in the Mediterranean, the Horizontal Activity for awareness raising of the sustainability of the coast has the general objective of encouraging awareness of the coastline and its values, involving the competent public administrations and NGOs of the CAMP Area.

The specific objects of the activity were:

- To improve the use of the coastline by the public.
- To promote the value of the cultural and landscape heritage of the CAMP Levante de Almería Area.
- To encourage Responsible Consumption, with special attention to the use of water.
- To dynamise volunteer networks.

To achieve these objectives, the following actions were taken:

- ✓ Information gathering on previous campaigns.
- ✓ Design and implementation of a campaign aimed at the users of the sea and beaches in the CAMP area.
- ✓ Design and implementation of a campaign aimed at promoting the values of the cultural and landscape heritage among the public.
- ✓ Design and implementation of a campaign aimed at promoting Responsible Consumption among the public, through three training actions:
  - Training campaign for teachers in Responsible Consumption and Production.
  - Awareness-raising campaign on Environmental Events.
  - Awareness-raising campaign on Public Procurement.
- ✓ Elaboration of a proposal to dynamise volunteer networks in the CAMP Levante de Almería area.

The final products obtained were:

- Inventory of materials used in previous campaigns in the CAMP area.
- Campaigns elaborated.
- 3 training courses for awareness officers in the different administrations and NGOs involved, as well as in the educational community.
- Dissemination material published.
- Celebration of Coast Day.
- Proposal for the dynamisation of volunteer networks in the Levante de Almería area.

## **2.- Coordination and public participation**

The Coastal Technical Office, which has run this Horizontal Activity for Awareness Raising of Coastal Sustainability, has worked closely with the two main organs of the CAMP Project in the design and elaboration of each of the campaigns.

Firstly, one of the organs of the project which has most influenced the awareness-raising activities was the Coastal Council, the consultative and public participation body of the Project, through the representatives of volunteer organisations, NGO, etc., which has made proposals to improve the volunteer movement and public participation in the Levante de Almería area, and whose contributions and participation in the different campaigns has made the activities highly popular among their target public. The volunteers were represented on the Coastal Council and participated in the meetings and the Imagine Workshops.

Secondly, the intense involvement and participation throughout the project of the administrative coordination organ, the Coastal Commission, should also be highlighted. As a result of the regular meetings prior to the campaigns, this has made it possible to establish the necessary level of coordination in order to optimise the available resources and run the campaigns successfully.

Furthermore, bearing in mind that one of the main objectives of the project was to encourage public participation, the Coastal Forum has been used as a communications platform, allowing the public to participate and give their opinion about the awareness campaigns, in order to make them partners and to integrate their contributions into the activities carried out.

The dynamisation of volunteer networks in the area of the CAMP Project was a very relevant line of action in the awareness-raising activities, since it made it possible to strengthen the social basis of the integrated coastal management model. In this regard, throughout the implementation of the CAMP Project, volunteer associations have been involved in the different public participation activities in order to hear their proposals for the improvement of the volunteer movement and public participation in the Levante de Almería. With this aim in mind, a series of Volunteer Movement Dynamisation Meetings was held in the Levante de Almería area. At these meetings, through open participation workshops, contributions have been received in order to establish a **strategy for the dynamisation of volunteer networks**, which is attached as Annex 3.I.

### **3.- Description of the activities**

Initially, in order to coordinate, through CAMP, the awareness activities promoted by the different organisations and administrations participating in the CAMP Project, an **inventory was compiled of materials from previous campaigns run in the CAMP area (Annex 3.II)** for users of the beaches and the sea and planned for the implementation period of project. To this end, coordination meetings were held with the local Councils of the CAMP Area together with informal meetings to compile information from the campaigns and programmes run by the Regional Ministries of Agriculture and Fisheries, Tourism, Trade and Sport and the Regional Ministry of the Environment. This took place between October 2010 and March 2011.

The conclusions of this preliminary coordination work were that, during the implementation period of the CAMP Project (2011 – 2012), the only awareness-raising campaigns planned were that of the LIFE + Posidonia Project, run by the Regional Ministry of the Environment, a few voluntary activities which fell within the framework of the Andalusian Volunteer Plan and the annual activities included in the Programme of Visits to Protected Natural Spaces in Andalusia. No funds had been earmarked by the local councils for awareness-raising among beach and sea users. It was therefore decided to **design and run a campaign to disseminate specific good practices** with the collaboration of local councils in the project area and to link, as far as possible, the awareness-raising activities of CAMP with the planned initiatives.

Prior to the commencement of the awareness-raising campaigns and activities of the project, with the active participation of the members of the Coastal Council through the Coastal Forum,

an **Informative Leaflet of the CAMP Project** (attached as **Annex 3.III**) and a **Good Practice Leaflet for Sea and Beach Users** (attached as **Annex 3.IV**) were prepared. These documents were in Spanish and English and 16,000 copies have been distributed during the different activities undertaken and delivered to the local councils involved, tourist offices and the information points of the Cabo de Gata - Níjar Natural Park, etc.

Under the title **“How do you imagine the future of our coast?”**, the first campaign consisted of **8 dissemination days** (one in each municipality) which included the following activities: animation-parade distributing informative material (Good Practice Leaflet for Sea and Beach Users and the Informative Leaflet of the Project), an adapted Imagine Workshop for children and an open-air theatre event about the changes seen on the coastline down through the ages, seen through the eyes of the pirate, *“El Joraique”*, with a resulting evaluation of the coastal landscape and the cleanliness of the seas and beaches. The calendar of activities was as follows:

Town	Date	Workshop participants
San José	06/08/2011	14*
Carboneras	14/08/2011	22*
Villaricos	15/08/2011	22*
Garrucha	20/08/2011	32*
S. De los Terreros	26/08/2011	26*
Vera	28/08/2011	15*
Mojácar	03/09/2011	22*
S. Miguel de Cabo de Gata	25/09/2011	14*
Retamar	25/09/2012	75*

*Table 1: Schedule of activities of the Campaign for Sea and Beach Users. Summer 2011  
(\*) N<sup>o</sup> of participants in the Imagine Workshops.*

It should be highlighted that all of these activities were included in the cultural programme of each municipality. Likewise, the activity in San Miguel de Cabo de Gata on 25 September 2011 was programmed to coincide with the **celebration of Coast Day**, a day devoted to the protection of the natural coastal environment and its interaction with human culture and socio-economic activities. In 2012, the celebration of Coast Day involved similar activities in the Torremar infants and primary schools in the Retamar neighbourhood of Almería.

The total number of spectators in the theatres came to around **1,650 people and 240 children took part in the Imagine Children’s Workshops**, which produced the **Report on the conclusions of the Imagine Children’s Workshops** dealing with the main problems detected by the children on the Levante de Almería coast (attached at us **Annex 3.IV**). A **video**

**documentary** was also made, available on the official Project website in English and Spanish and in **Annex 3.IV**.

Another of the activities undertaken to promote the values of the landscape and the cultural heritage of the CAMP Levante de Almería area was a **photography competition**, held at the end of 2011 and whose jury selected 26 pictures to be shown in an event organised in collaboration with the local councils of the Levante area in a travelling exhibition called *“Landscapes, Heritage, ways of life and sustainable practices on the Levante de Almería Coast”* in the municipalities of the Project area. The purpose of this exhibition was to raise awareness among the public of the value of the coast, its fragility and the usefulness of the goods and services that it provides, showing how the local inhabitants perceive this stretch of coastline, and encouraging them to appreciate its value. The exhibition received a large number of visitors. The photography exhibition and its catalogue are attached as **Annex 3.V**. A gallery was also uploaded on Flickr for online visitors.

Town	Date	Venue
San Miguel de Cabo Gata (Almería)	29.11.11-22.12.11	Virgen del Mar Primary School, Cabo de Gata
Cuevas de Almanzora	17.01.12-30.01.12	“La Tercia” at the Marqués de Los Vélez Castle
Mojácar	01.02.12-14.02.12	Handicrafts Centre
Vera	15.02.12-29.02.12	La Victoria Convent
Carboneras	01.03.12-14.03.12	Centro Abierto Forum
Pulpí	15.03.12-29.03.12	Cultural Centre
Níjar	01.04.12-19.04.12	Níjar Tourist Office
Garrucha	20.04.12-04.05.12	Cultural Centre
Almería	11.05.12-25.05.12	Exhibition Hall of the Andalusian Youth Institute
Huércal Overa	01.06.12-14.06.12	Municipal Theatre

Table 2: Programme of the travelling photography exhibition *“Landscape, heritage, ways of life and sustainable practices on the Levante de Almería coast*.

A **campaign to promote the values of the cultural and landscape heritage** was designed and run in the summer of 2012. The purpose of this campaign was to inform the key players in the tourism and cultural sectors in a creative, innovative way by means of **eight theatrical guided visits**, forming part of the Itinerary of the Cultural and Landscape Heritage of the Levante de



Almería, prepared by the working team of the Individual Project on the Conservation of the Cultural Heritage, in order to valorise and promote the potential that this valuable resource offers both visitors and the local population.

The Local Councils of the municipalities involved and the members of the Coastal Council of the CAMP Levante de Almería Project participated in the design and the selection of the dates of the guided visits, both as regards the activities included in the visit such as, for example, the dissemination of the local intangible heritage, and also invitations to members of the tourism and cultural sector of the territory. After the campaign, a report of the conclusions regarding the guided routes was drafted. The programme of guided routes through the cultural landscape heritage of the Levante de Almería and a report on those routes is included as **Annex 3.V**.

Title	Theme	Municipality	Date	Cultural or Landscape Heritage visited
<b>Treasure hunt... the history of water</b>	Water as an essential resource, water infrastructure, from mills to the Isabel II hydraulic complex	Níjar	30/08/2012	Tangible heritage: Mills, irrigation channels, irrigation ponds, old farmsteads. Isabel II reservoir and associated infrastructure. / Intangible heritage and cultural landscapes: traditional use of water, landscape of the mills at Huebro, traditional pottery and <i>jarapa</i> rugs of Níjar.
<b>Treasure hunt... beneath the earth</b>	Natural resources, water and gold	Níjar	06/09/2012	Tangible heritage: waterwheel, washhouse and the mill at the Pozo de los Frailes, San Felipe Castle, eolianites and volcanic domes at Los Escullos, mines and township at Rodalquilar. / Intangible heritage and cultural landscapes: gold extraction techniques, use of public wash houses, mining landscape of Rodalquilar.
<b>Treasure hunt... in traditions</b>	Visits to the traditional trades in the towns of the Levante	Cuevas del Almanzora and Vera	13/09/2012	Tangible heritage: Vera Water Museum, Cuatro Caños Fountain, Vera washhouses, ethnographic museum, Cerro del Espíritu Santo, Casa Torcuato, manor houses in Cuevas and Marqués de Los Vélez Castle. / Intangible heritage and cultural landscapes: traditional cuisine of the Levante area, Cuevas Carnival, traditional trades and pottery.
<b>Treasure hunt... on the pirate coast</b>	Defensive constructions on the coast and the industrial heritage of Aguamarga.	Carboneras and Níjar	14/09/2012	Tangible heritage: San Andrés Castle in Carboneras, Mesa Roldán watchtower, Mesa Roldán Lighthouse, Lucainena-Aguamarga greenway and Aguamarga mine pier. / Intangible heritage and cultural landscapes: lighthouse keeping and mine work.
<b>Treasure hunt... between the sea and land</b>	The importance of agriculture from ancient times to today.	Pulpí	Not held due to bad weather	Tangible heritage: Rural Habitat Interpretation Centre, Pulpí town centre, cave houses at San Juan de los Terreros, Negra Island, Terreros Island and the Los Cocederos Cove / Intangible heritage and cultural landscapes: esparto grass technology, irrigation landscapes at Pulpí and the mining landscape of Jaravía.
<b>Treasure hunt... the first settlers</b>	The first settlers, mining activity in Cuevas de Almanzora and coastal defences.	Cuevas del Almanzora and Pulpí	Not held due to bad weather	Tangible heritage: The necropolis and town of Villaricos, the watchtower at Cuevas, Fundición Nueva, Las Conchas Cove, Negra Island, Terreros Island and Castle. / Intangible heritage and cultural landscapes: Industrial landscape of Sierra Almagrera, La Vieja Day.

<b>Treasure hunt... at sea</b>	Harvesting and use of salt and the traditional fishing industry	Almería and Níjar	25/09/2012	Tangible heritage: Torregarcía Hermitage, Torregarcía Tower, remains of the Roman salting works, Cabo de Gata Salt Flats, San Miguel Tower, Cabo de Gata fishing village. / Intangible heritage and cultural landscapes: Torregarcía Pilgrimage, salting, traditional fishing methods, landscape of traditional fisheries at Cabo de Gata, salt harvesting.
<b>Treasure hunt... Andalusia</b>	Morisco and Christian constructions	Mojácar and Garrucha	21/09/2012	Tangible heritage: Historical centre of Mojácar (Fuente de Mojácar, Jewish quarter, traditional architecture), in Garrucha, Escobetas Castle, fishing port and market at Garrucha. / Intangible heritage and cultural landscapes: Moors and Christians festival, traditional cuisine and fishing methods of the Levante de Almería area.

Table 3: Programme of the Campaign: "The Cultural and Landscape Heritage of the Levante de Almería... A treasure waiting to be discovered"

In collaboration with the Regional Activity Centre for Clean Production (CP/RAC), **three training actions** were designed and carried out. They consisted of courses aimed mainly at the promotion of responsible consumption among the teaching community and the general public.

- On 18 & 19 March 2011, a course on “**Teaching Strategies for Education on Sustainable Consumption and Production (SCP)**” was held in Rodalquilar (Níjar). The targets of the course were teachers in the CAMP area. The purpose of the action was to promote sustainable consumption through education strategies. A total of 20 teachers took part in the course. In the publicity and organisation of the course and its linking with the teaching community, the Almería and Cuevas del Almanzora Teacher Training Centres were very actively involved. The programme of the course and other related documentation, such as the manual on “Teaching strategies for education on Sustainable Consumption and Production” aimed at teachers of young people and adults, as used on the course, are attached as **Annex 3.VI**. The course was practical and participatory and in their evaluation of it, teachers considered it to be of great help to include responsible consumption in classes in schools on the Levante de Almería coastline. Table 4 gives the details of the activity.

<i>COURSE ON TEACHING STRATEGIES FOR EDUCATION IN SUSTAINABLE CONSUMPTION AND PRODUCTION (SCP).</i>				
<b>Date</b>	<b>Time</b>	<b>Duration (hours)</b>	<b>Content</b>	<b>Instructor</b>
18-03-11 and 19-03-11	16:00-21:00 and 09:00-14:00	10	Adopting teaching strategies that help teachers to educate in responsible consumption. Build skills to design educational actions related to responsible consumption. Analyse the relationship between the environmental crisis and our consumption, become familiar with the concepts of Responsible Consumption, Ecological Footprint and Ecological Rucksack.	<b>Gema Sanchez Úbeda</b>

*Table 4: Details of the training course on “Teaching Strategies for Education in Sustainable Consumption and Production (SCP)”*

- On 27 October 2011, a training course was held in Garrucha on “**How to organise Sustainable Events**” aimed mainly at members of the Coastal Council and Commission and also open to private companies which frequently organise events and meetings (travel agencies, event managers at hotels, etc.). The content was aimed at learning different techniques, systems and tools for the organisation of events in an environmentally responsible manner in order to minimise the environmental impact of the events on the coastal zone of Almería. The course combined theory with practical exercises and was attended by 18 persons. The programme and content of the course are attached as **Annex 3.VI**. Table 5 gives details of the course.

TRAINING COURSE ON “HOW TO ORGANISE SUSTAINABLE EVENTS”.				
Date	Times	Duration (hours)	Content	Instructor
27-10-11	09:30-13:30 and 15:00-17:00	6	<p>Provide information about impacts associated with event organisation.</p> <p>Provide data on the benefits of a sustainable event.</p> <p>Introduction to concepts such as the life cycle, the carbon footprint and eco-labels.</p> <p>Give tools and advice to help organise sustainable events.</p>	<p><b>Marta Anglada</b>, researcher and manager of projects of the UNESCO Chair of the Life Cycle and Climate Change, consultant and communications director of the spin-off, <i>Cyclus Vitae Solutions</i>, joint author of the guide on Green Meetings of the United Nations Environment Programme and member of the training team of the Iberian Section of the Green Meeting Industry Council.</p> <p><b>María Serentill</b>, communications and sustainable event organisation manager of the Regional Activity Centre for Cleaner Production.</p>

Table 5: Details of the training course on “How to organise Sustainable Events”

- Among the awareness-raising activities aimed at tendering and/or procurement managers of the different administrations in the CAMP area, a course on “**Introduction to Sustainable Public Procurement and Tendering**” was held on 26 and 27 March in Almería. The purpose of the meetings was to promote sustainable public procurement and tendering among personnel of the public sector responsible for purchases and contracting. The course included a theoretical element which explained the legal aspects of the introduction of sustainability criteria into the public procurement and tendering process, followed by a practical session with experiences of other public administrations and practical exercises. A total of 10 persons took part in the course. The programme and content of the training is attached as **Annex 3.VI**. The course was very participatory, with interesting contributions from the trainees, given their long experience in procurement and tendering in different sectors of the public administration. Table 6 gives the details of the course.

TRAINING COURSE ON “INTRODUCTION TO SUSTAINABLE PUBLIC PROCUREMENT AND TENDERING”.				
Date	Times	Duration (hours)	Content	Instructor
26-03-12 and 27-03-12	17:00-20:00 and 17:00-21:00	7	<p>Presentation of the existing legal framework and its evolution with regard to Sustainable Public Procurement and Tendering.</p> <p>Learning about essential aspects in order to recognise the most sustainable products/services and the criteria to be incorporated as considerations in public tendering.</p>	<p><b>Josep Esquerrà i Roig</b>, graduate in Biology from the University of Barcelona (1986) and in Environmental Studies from the Higher Technical School of Nürtingen, Germany (1994), founding member of Ecoinstitut Barcelona in 1999, technical officer and coordinator of studies and the development of projects for public administrations (local, regional, national and European), especially in Procurement and Tendering.</p> <p><b>Vanessa Rodriguez Gomez</b>, technical officer responsible for the Sustainable Public Procurement Project for the Mediterranean, run by the Regional Activity Centre for Cleaner Production, of the Mediterranean Action Plan of the United Nations Environment Programme.</p>

Table 6: Details of the training course on “Introduction to Sustainable Public Procurement and Tendering”

(\*) The appropriate indicative deadline to carry out the next training activities is between one and two years. This is due to the training needs should be reviewed in correlation with future training needs of the post-project stage. This training needs will be able to identify through Council and Forum Coastal as well.

A digital **Teaching Unit** called "*Imagine the future of our coast*" was designed. Its objective was to present in an entertaining manner to schoolchildren the values of their coastline and the need to guarantee its sustainability. The Teaching Unit included a complete set of material for the teacher which explained both how the different activities should be run and also their objectives, content, timing and the necessary resources. It included a number of attractive activity cards for the students. Activity 5 of the teaching unit should be highlighted: "*Imagine*", which was elaborated in collaboration with the consultant, Simon G. Bell, of the Open University in the United Kingdom. Mr Bell ran the Imagine Workshops with the Coastal Commission and Council and he believes that applying a similar methodology with schoolchildren can help them to hold two visions of coastal sustainability, the vision of adults and that of the children who live on this singular stretch of coastline. This Teaching Unit has become part of the Care for the Coast Programme (part of the ALDEA Environmental Education Programme) given its value as an educational resource. The Teaching Unit is included as **Annex 3.VII**. Throughout May and June 2011, visits were made to three schools in the CAMP area whose teachers had taken part in the Course on Teaching Strategies for Education in Responsible Consumption in order to put some of the activities of the Teaching Unit into practice.

As one of the specific lines of action within the project, **Coast Day** was celebrated on 25 September 2011 and 2012. This Day aimed to increase awareness among politicians and the general public about the value of the Coast. In 2011, beaches were cleaned and good practices were publicised among users of the Cabo de Gata - Níjar Natural Park (San José, Genoveses and Mónsul). The programme is attached as **Annex 3.IV**. San Miguel de Cabo de Gata also held an event in the good practice dissemination campaign for sea and beach users with entertainment and public information, environmental education workshops and a theatre play in the town square.

As a complement to the activities to commemorate Coast Day, throughout the months of September and October 2011, the **1<sup>st</sup> Cycle of Talks and Conferences of the Levante de Almería** was held with the aim of presenting the latest lines of scientific research into coastal management to the municipalities of the CAMP Project, thereby helping to improve their knowledge and management. The programme is attached as **Annex 3.IV** and is summarised below:

<b>1<sup>st</sup> CYCLE OF TALKS AND CONFERENCES OF THE LEVANTE DE ALMERÍA</b>			
<b>Date</b>	<b>Town</b>	<b>Title</b>	<b>Speaker</b>
22-09-11	Mojácar	“Socio-economic evolution and its impact on the coastal ecosystems of the Levante de Almería”	<b>Andrés Sánchez Picón.</b> Lecturer in History and Economic Institutions at the University of Almería.
05-10-11	Níjar (Campohermoso)	“New challenges for public participation. The specific case of Water Management”	<b>Abel La Calle Marcos.</b> Lecturer in Public International Law at the University of Almería.
11/10/11	Cuevas del Almanzora	“The challenges of global change for the conservation of Mediterranean biodiversity”	<b>Hermelindo Castro Nogueira.</b> Director of the Andalusian Centre for the Evaluation and Monitoring of Global Change. University of Almería.
14/10/11	Vera	“Coastal dynamics, human interventions and the maritime-terrestrial public domain. Video forum and conference”	<b>Miguel A. Losada Rodríguez.</b> Director of the Andalusian Environment Centre. University of Granada.
15-10-11 (*)	Níjar (Rodalquilar)	“The coastal economy: sustainable or sustained? Video forum and conference”	<b>Miguel A. Losada Rodríguez.</b> Director of the Andalusian Environment Centre. University of Granada.

*Table 7: Programme of the “1st Cycle of Talks and Conferences of the Levante de Almería”*

*(\*) Activity run in collaboration with the Environmental Education Activity Programme of the Cabo de Gata – Níjar Natural Park and Biosphere Reserve.*

In 2012, the main actors of Coast Day were the schoolchildren of the 3<sup>rd</sup> cycle at the Torreomar Infants and Primary School in Retamar (Almería), who enjoyed an open-air theatre performance on the subject of coastal conservation and held Imagine Workshops to reflect on the problems of their coastline. In the afternoon, they joined in one of the routes of the Campaign to Promote the Cultural and Landscape Heritage which was held to coincide with Coast Day.

As a result of the coordination meetings helped to establish synergies with other awareness-raising initiatives held in the territory, a route of **"Coastal Landscapes of the Levante de Almería"** was designed in collaboration with the Programme of Visits to Protected Natural Spaces of Andalusia. The purpose of these routes was to promote the values of the cultural and landscape heritage among schoolchildren through a route along a stretch of the coastline where a mosaic of coastal landscapes with a greater or lesser impact of human activity could



be observed, and this served as a basis to teach the schoolchildren about the values of sustainability in territorial management, the heritage value of the landscape and the need to make economic activity compatible with the conservation of natural resources. This route was offered during the 2011-2012 academic year and was taken by five schools and a total of 168 pupils. The report on the activity is attached as **Annex 3.VIII**.

ROUTE "COASTAL LANDSCAPES OF THE LEVANTE DE ALMERÍA"			
Date	School	Activity	Nº of Participants
24/02/2012	GUADALENTIN SECONDARY SCHOOL (JAEN)	Coastal Landscapes of the Levante	40
07/03/2012	FRANCISCO JAVIER DE BURGOS SECONDARY SCHOOL (MOTRIL)	Coastal Landscapes of the Levante	27
26/04/2012	LA CHANCA PRIMARY SCHOOL	Coastal Landscapes of the Levante	42
30/05/2012	VALLE DEL ALMANZORA SECONDARY SCHOOL	Coastal Landscapes of the Levante	35
15/06/2012	SAN MATIAS DE GRANADA ADULT EDUCATION CENTRE	Coastal Landscapes of the Levante	24
Total students			168

Table 8: Route "Coastal Landscapes of the Levante de Almería"

In parallel, the **main activities undertaken with regard to volunteers** were as follows:

- 11 June 2011. Coastal Action Day was held in association with ASVOAL.** The purpose of this event of the CAMP Project run by the Association of Volunteers for Almería (ASVOAL) and with the collaboration of Níjar Town Council and the Cabo de Gata-Níjar Natural Park, was to raise awareness among the public of the good use of the coastline of the Cabo de Gata-Níjar Natural Park, to publicise the CAMP Project in which ASVOAL participated as a member of the Coastal Council, and to inform beach users of the state of the coastal strip, emphasising the valuable endemic flora of the Cabo de Gata-Níjar Natural Park. The activities consisted of litter collection from the beach and awareness raising among beach users through the distribution of a leaflet of good practices for beaches and fishing, as well as information on the ecosystem of the Cabo de Gata Natural Park (San José, Genoveses and Mónsul), and an environmental education workshop for 6 to 12-year-olds using the Teaching Unit "*Imagine the Future of Our Coast*" created by CAMP to increase environmental awareness among schoolchildren.
- 7 August 2011. Beach cleaning and good practice promotion at Los Escullos,** in collaboration with ASVOAL, ECOLOGISTAS EN ACCIÓN and local businesses. During this event, several different activities were held on the beaches of the Escullos area of the Cabo de Gata-Níjar Natural Park, especially a litter collection activity complemented by

the dissemination of good practices among sea and beach users through the distribution of purpose-designed material.

This activity required an effort to bring together all of the organisations whose objectives include the promotion of the values of a healthy, diverse, unique coastline, such as the coast of the Levante de Almería. It was, therefore, of special value that this initiative received the collaboration of the Municipality of Níjar and the Provincial Delegation of the Regional Ministry of the Environment through the Cabo de Gata-Níjar Natural Park. About 60 volunteers took part in the day's entertainment and environmental awareness activities.

- **16 September 2011. Talk: “International cleaning of coasts, bringing together volunteers from all over the world to raise awareness of the global problem of waste at sea”.** In collaboration with the NGO, Ocean Conservancy. The purpose of the talk, which was held in Rodalquilar, was to promote networking among volunteers. The project TRASH FREE SEAS was offered as an example. This is an international project which promotes co-ordinated beach cleaning actions as a means of denouncing marine pollution originating from land. Thirty volunteers took part. It should be highlighted that 2011 was the first time in the 25 years of the existence of the Trash Free Seas Project that Spanish organisations have taken part in international data gathering.
- **19 May 2012. 1<sup>st</sup> Meeting for the Dynamisation of Environmental Volunteers in the Levante de Almería Area.** The purposes of this meeting were: to analyse the situation of volunteers both in the Biosphere Reserve and in the rest of the CAMP territory, to exchange experiences with other volunteer groups, to make proposals and suggest initiatives in a participatory manner for the dynamisation of the volunteer movement for subsequent implementation. The programme is attached as **Annex 3.I.**

The 40 participating volunteers were split into three working groups and they held a workshop to make proposals in three key areas. The recommendations of the participants and all of the volunteer actions undertaken during the implementation stage of the CAMP Levante de Almería project were taken into consideration in the **elaboration of the strategy for the dynamisation of volunteer networks** which appears in **Annex 3.I.**

- **16 June 2012. Ringing of waders in Rambla Morales, Cabo de Gata.** A volunteer action to complement the 1<sup>st</sup> Meeting on the Dynamisation of Environmental Volunteers, in collaboration with the Rodopechys Bird-Ringing Group and ASVOAL.
- **13 and 28 July and 4 August 2012. 2<sup>nd</sup> Meeting on the Dynamisation of Environmental Volunteers in the Levante de Almería area.** The objective was promoted in a practical manner the environmental volunteer movement among social groups and schools in the towns of the Levante de Almería, in order actively to encourage environmental volunteers. The programme is attached as **Annex 3.I.** The activities were:

- **A theoretical training session** held on 13 July in Vera, with 25 volunteers. Technical speakers from the Regional Ministry of Agriculture, Fisheries and the Environment, the Coordinator of the CAMP Levante de Almería Project and volunteers from the Alyssum Association and the Rodopechys Bird-Ringing Group gave a practical explanation of how volunteer actions are performed.
  - **Practical volunteer action** on 28 July, which brought together 17 volunteers and numerous bathers on the beaches of Vera. The Alyssum Association demonstrated to participants how to **take environmental data at the mouth of the River Antas**, following the criteria of the Andarríos Volunteer Programme and the Posidonia Association led an **entertaining action to disseminate good practices** among bathers and to raise awareness of the importance of conserving the habitats of the loggerhead sea turtle on the coast.
  - **Practical volunteer action** on 4 August, which brought together 18 volunteers for **water bird ringing** in Salar de Los Canos (Vera), in collaboration with the Rodopechys Bird-Ringing Group.
- **6 October 2012. Participation in International Coast Cleaning Day** organised by the Subparke Diving Club, together with other diving clubs and volunteers of the Cabo de Gata - Níjar Natural Park.

#### 4. Results prior to the integration stage

The proposals made in the Horizontal Activity on “Awareness-Raising for Coastal Sustainability” within the Sustainable Development Reference Framework aim to inform the Coastal Commission of the needs in the field of the awareness of the interested parties in order to favour the implementation of a sustainable development model in the Levante de Almería area.

The actions to set in motion the post-project stage are based on the contributions made by the main agents operating in the Levante de Almería area during their participation in the Imagine workshops and the conclusions of the different awareness-raising activities carried out throughout the project implementation stage.

On the basis of those results, the following post-project actions were considered appropriate:

Promote the development of a working group, through the Teachers’ Centres, to design teaching strategies for responsible consumption.

As a result of the experiences during the implementation of the project with the Teachers’ Centres and given their potential as a “resource” to create public awareness that will influence consumption habits and publicise the alternatives which exist for more responsible consumption, it is proposed to create a stable, dynamic working group among the Teachers’

Centres of the Levante de Almería to design, implement and evaluate the results of new teaching strategies oriented towards responsible consumption and applied within the educational community.

Launch of a platform to coordinate volunteer associations to the [www.camlevantedealmeria.com](http://www.camlevantedealmeria.com) website

An analysis of the situation of the volunteer movement in the Levante de Almería area detected a low level of networking between these associations. Although some of them work in Andalusia-wide projects, there has so far been very little collaboration between them. Furthermore, at the meetings for the Dynamisation of Environmental Volunteers in the Levante de Almería which were held during the implementation of the Project, the participants spoke of the importance of coordination between associations in certain volunteer actions, and also of the importance of making information more accessible through new technologies. This justifies the proposal to use the website already created and in operation for the CAMP Project ([www.camlevantedealmeria.com](http://www.camlevantedealmeria.com)) as a common information platform for volunteer associations to exchange initiatives, call and coordinate events, mobilise volunteers, etc., so that there is a continuous network connection between existing and future volunteer associations in the Levante de Almería.

Programme of volunteer environmental observers on the coastline and programme of cultural volunteer action:

Some of the conclusions of the workshops held during the Meetings to Promote Environmental Volunteer Action in the Levante de Almería recommended the establishment of environmental volunteer programmes and cultural volunteer programmes with the general objective of improving the usefulness of the work done by volunteer associations in the Levante de Almería. See the strategy document for the dynamisation of the volunteer networks, attached as **Annex 3.I**.

The two programmes proposed are:

**Programme of volunteer environmental observers on the coastline:**

1. Training and monitoring of environmental indicators.
2. Running an annual awareness-raising campaign to promote the good practices resulting from the CAMP Project among sea and beach users.

**Programme of cultural volunteers:**

1. Training and monitoring of the state of conservation of cultural assets.
2. Training and promotion of the custody of the territory.
3. Volunteer camps for the restoration of cultural assets.

## 5. Action Plan for the post-project stage

The awareness-raising actions described and justified in the previous section have been included in the programme of post-project actions of the Sustainable Development Reference Framework. The following table gives details of the programme for the implementation of the actions proposed by the working team of the Coastal Technical Office for the Horizontal Activity for Awareness Raising on Coastal Sustainability:

### **Action 4.2.2.1 AP SDRF. Promote the development of working groups, through the Teachers' Centres, to design teaching strategies for responsible consumption.**

Approximate timescale: year 1 to 10

Competent Public Administrations: Regional Ministry of Education

Public Administration responsible for coordination: Regional Ministry of Education

Indicator selected for AP SDRF: Nº of working groups established.

Strategic alliances: Cuevas del Almanzora and Almería Teachers' Centres; Ecoescuelas Network, Associations of Parents of Pupils; teaching sections of the CCOO and UGT trade unions.

### **Action 4.3.2.1. AP SDRF. Launch of an online platform to coordinate volunteer associations in the CAMP area through social networks and the [www.camplevantedealmeria.com](http://www.camplevantedealmeria.com) website.**

Approximate timescale: 1<sup>st</sup> year.

Competent Public Administrations: Ministry of Agriculture, Food and the Environment; Regional Ministry of Agriculture, Fisheries and the Environment of the Andalusian Regional Government; Town Councils; Provincial Council of Almería

Public Administration responsible for coordination: Regional Ministry of Agriculture, Fisheries and the Environment.

Indicator selected for AP SDRF: Launch of the platform. Number of visits.

Strategic alliances: Volunteer associations in the CAMP area.

### **Action 4.3.2.2. AP SDRF. Volunteer Programme: Coastline Observers in the CAMP area, with two priority lines of action:**

1. Training of volunteers and execution of coordinated actions to monitor environmental indicators.

2. Running an annual awareness-raising campaign to promote the good practices resulting from the CAMP Project among sea and beach users.

Approximate timescale: From 1 to 10 years.

Competent Public Administrations: Ministry of Agriculture, Food and the Environment; Regional Ministry of Agriculture, Fisheries and the Environment of the Andalusian Regional Government; Town Councils; Provincial Council of Almería.

Public Administration responsible for coordination: Regional Ministry of Agriculture, Fisheries and the Environment.

Indicator selected for AP SDRF: Nº of volunteer actions taken within the framework of this Programme.

Strategic alliances: Town Councils of the CAMP area, management of the Cabo de Gata - Níjar Natural Park, Andalusian Youth Institute, Volunteer Associations of the Levante de Almería, Ecologists Groups, Neighbours Associations.

**Action 4.3.2.3. AP SDRF. Cultural Volunteer Programme in the CAMP area, with 3 priority lines of action:**

1. Training of volunteers and monitoring of the state of conservation of cultural assets;
2. Training and promotion of actions for the custody of the territory;
3. Volunteer camps to restore cultural assets.

Approximate timescale: From 1 to 10 years.

Competent Public Administrations: Ministry of Agriculture, Food and the Environment; Regional Ministry of Culture and Sport; Town Councils

Public Administration responsible for coordination: Regional Ministry of Culture and Sport.

Indicator selected for AP SDRF: Nº of volunteer actions taken within the framework of this Programme.

Strategic alliances: Town Councils del CAMP Area, Management of the Cabo de Gata – Níjar Natural Park, Andalusian Youth Institute, Occupational Training Schools in the CAMP Area, Volunteer Associations in the CAMP area, Ecologists Groups, Neighbours Associations.

**Action 4.4.2.1. AP SDRF. Keep the [www.camplevantedealmeria.com](http://www.camplevantedealmeria.com) website updated.**

Approximate timescale: Year 1-10

Competent Public Administrations: Ministry of Agriculture, Food and the Environment; Regional Ministry of Agriculture, Fisheries and the Environment of the Andalusian Regional Government; Town Councils; Provincial Council of Almería

Public Administration responsible for coordination: Regional Ministry of Agriculture, Fisheries and the Environment.

Indicator selected for AP SDRF: Nº of visits.

Strategic alliances: Members of the Coastal Council.

**6. Economic, social and environmental feasibility of post-project actions**

It is proposed to use the European Union's LIFE + instrument to finance these actions, together with funding from the Regional Ministry of Education for continuous teacher training.

At the social level, the actions proposed for the dynamisation of the volunteer movement have arisen out of the participation of the volunteers themselves during the meetings held, and so they are supported by the movement. Likewise, the activities already undertaken with local councils demonstrate the institutional support enjoyed by these volunteer activities.

And the environmental level, all the actions proposed have the basic aim of raising awareness among the public so that, as far as possible, they act in favour of coastal sustainability. The action involving training of teachers has been designed taking into account the fact that

teachers are the main source of the message of sustainability within the educational community.

## **7. Lessons learned**

In the post-Project period, it is necessary to continue with awareness-raising activities, mainly through the volunteers themselves and the NGOs which are active in the area, with the close collaboration of local councils. It would be useful for closer links with local ecologists' groups to be established in the post-Project stage.



*Photo 1. Campaign to promote the cultural and landscape heritage. 13 September 2012. Vera Ethnographic Museum.*



*Photo 2. Celebration of Coast Day. 25 September 2012. Torremar School. Almería.*





Photo 3. Imagine Workshop for children. Campaign to spread good practices among sea and beach users.



Photo 4. 1<sup>st</sup> Meeting for the Dynamisation of the Environmental Volunteer Movement. 19 May 2012. Rodalquilar.



*Photo 5. Volunteer action. Ringing water birds at Salar de los Canos. Vera. 4 August 2012.*



*Photo 6. Campaign to promote the cultural and landscape heritage. Theatrical visit to Los Escullos Castle. 6 September 2012.*



Photo 7. Campaign to promote the cultural and landscape heritage. Exhibition of photography at the Andalusian Youth Institute. Almería. 11 May 2012.



Photo 8. Volunteer action. Celebration of Coastal Action Day. Beach cleaning in collaboration with ASVOAL. 11 June 2011.



# 4

## *Levante de Almería Information System* Final report

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## **TABLE OF CONTENTS**

Executive summary

1. Introduction
2. Description of the project
3. Compilation and summary of the information
4. Results prior to the integration stage
5. Action plan for the post-Project stage
6. Economic, social and environmental feasibility of post-Project actions
7. Lessons learned

## **INDEX OF ANNEXES**

Annex 4.I. Contents of the generated databases

## **ABBREVIATIONS USED**

AP SDRF: Sustainable Development Reference Framework Action Plan

CAMP: Coastal Area Management Programme

ETRS89: European Terrestrial Reference System 1989

ICZM: Integrated Coastal Zone Management

INSPIRE: Infrastructure for Spatial Information in Europe

IUCN-MED: International Union for Conservation of Nature, Centre for Cooperation in the Mediterranean

KML: Keyhole Markup Language

LAIS: Levante de Almería Information System

NGIC: National Geographic Information Centre

RDG: Rural Development Group

REDIAM: Andalusian Environmental information Network

SDRF: Sustainable Development Reference Framework

SMC: Spanish Core Metadata.

WMS: Web Map Service.

## Executive summary

This report describes the characteristics, development and results of the horizontal Levante de Almería Information System (hereinafter LAIS) and this project's contributions to the Sustainable Development Reference Framework: proposals for post-project action and their economic feasibility.

### 1.- Introduction

The Protocol on Integrated Coastal Zone Management in the Mediterranean, in the framework of Article 14 of the Barcelona Convention for Protection of the Marine Environment and Coastal Region of the Mediterranean, a binding legal instrument in these matters for six countries including Spain and the European Union since it came into effect on 24 March 2011, states that States must ensure public participation. This implies that the agencies involved must provide adequate, timely and effective information.

The legal framework of this activity is in turn complemented by the Aarhus Convention on public access to information in decision making and access to justice in environmental matters, effective since 2001, and also Directive 2003/4/EC of The European Parliament and Council of 28 January 2003, related to public access to environmental information.

The **main purpose**, but not the only one, of the LAIS is therefore to facilitate information processes and public participation. It also includes the following **specific objectives**:

- Increase visibility of the Levante de Almería CAMP Project and thereby the efforts made for its success by the various government authorities and socioeconomic stakeholders in the CAMP Area.
- Promote on-line participation using the new technologies.
- Facilitate access to relevant information for integrated management in the CAMP Area.

All of these objectives are further directed at achieving the proposals of Articles 16 and 27 of the Protocol on Integrated Coastal Zone Management in the Mediterranean:

*Art. 16. Mechanisms and networks for monitoring and observation:*

*[...] 16.4. The parties shall take any measure necessary to ensure public access to information from the monitoring and observation mechanisms and networks*

*Art. 27. Exchange of information and activities of common interest:*

*[...] 1. The parties shall be committed to cooperation for exchange of information on the use of best environmental practices, either directly or with the assistance of the competent international organisation or organisations.*

The Levante de Almería CAMP Project Feasibility Study, written in October 2005, already included the creation of a GIS territorial management tool for providing services to city councils and other public and private actors among its horizontal activities in its section on participation and institutional coordination

Finally, according to the Memorandum of Understanding which sets the basis for the Levante de Almería CAMP Project, the Levante de Almería Information System was included in its

horizontal activities. Specifically, it is included in the Information and Environmental Awareness Horizontal Activity, and is considered a primary activity for the development of the CAMP Project, since it includes collection, harmonization and later diffusion of the information prepared by the various individual projects (bibliography, studies, plans and programmes, current legislation, cartography and spatial data layers).

The LAIS was conceived from the beginning as a tool to be integrated in the Andalusian Environmental Information Network (REDIAM), which pertains to the Andalusian Regional Ministry of Agriculture, Fisheries and Environment. The purpose of the REDIAM is to integrate all the environmental information on the Autonomous Region in order to make the information available to groups of citizens, scientists, technicians and managers.

REDIAM criteria therefore had to be followed in creating data, metadata, WMS services, etc., and this is why throughout the project the REDIAM representatives participated in expert meetings and reported on progress made during the project.

## **2.- Description of the project**

The work done in the horizontal activity Levante de Almería Information System followed the recommendations and opinions outlined by the various agencies involved, which are organized into different pilot bodies formed during the CAMP Project.

Concerning the social participation framework, the horizontal activity, Levante de Almería Information System, was backed across the board in the participatory forums, as shown by access to adequate environmental information being collected as one of the priority measures for the participatory processes.

Another of the bodies in the CAMP Project structure is the Expert Teams. In the CAMP Projects carried out throughout the Mediterranean, this figure is formed by a group of specialized consultants. In this case, the LAIS Expert Team was formed during project formulation, and has been integrated mainly by representatives of the REDIAM, which at periodic meetings, contributed to the initial design of this horizontal activity, defining the results to be achieved and the method to be followed, and during project implementation, advised the consultants in charge of its execution, making contributions and appropriate corrections, thus contributing their experience to the final results.

Two of these meetings were held during Project implementation. The purpose of the first one was to validate the working methodology and actions to be carried out with the experts, since the idea was to respect the REDIAM criteria and protocol throughout CAMP information generation, design of the data model, creation of metadata, etc.

At the second experts meeting matters concerning WMS services to be generated and LAIS display tool were agreed upon.

This activity was also advised and formed for use as a tool for generating the rest of the CAMP Project work teams, thus complying with its commitment to coordination and integration.

Counting on the social participation and institutional coordination structure as its basis, specific actions taken during the development of this horizontal activity were:

1. Review of information available from government authorities and mainly in the REDIAM catalogue.

First, the activity description sheets containing the information necessary to carry out each project and the spatial information that would be generated for the LAIS in the framework of each project were collected. All six individual projects generated spatial information as a final project. These projects are: Sustainable Management of the Water Cycle, Sustainable Use of the Marine Environment, Diffusion of Good Practices in Production Activities, Valorisation of the Territory, Conservation of Cultural Heritage, and Improvement of Management Criteria in the Marine, Terrestrial and Hydraulic Public Domain.

When the needs of each Project had been analysed, the information available in the REDIAM catalogue was reviewed and analysed, first through its channel, and then by contacting the persons in charge of managing the information. The information available from other authorities of interest to development of the projects was also tracked. The information available in the following scopes was analysed:

- International (information from the IUCN-MED, etc.).
- National (Ministries, Spanish Oceanographic Institute, universities, etc.).
- Regional (REDIAM and rest of regional ministries).
- Local (Levante de Almería RDG, city councils, irrigation communities).

All of the information collected from these sources was reorganised and standardised to REDIAM criteria.

This stage of activity was closely coordinated with the rest of the individual projects in order to find out the information that would be generated in each project, agree to the protocol to be followed for handling the information, identify priority information to be acquired and clarify questions related to the data model resulting from each individual project.

In this regard, it should be clarified what is understood by data model for the set of information that it describes and how data are structured and organized, as well as the relationships and restrictions existing among them.

2. Request for and management of information necessary for project development.

A large amount of information of different types was requested, mainly thematic cartography in digital format, but also reports, diagnostics, data, etc. The requests for information were addressed to the REDIAM and other bodies (government authorities, irrigation communities, Rural Development Group, etc.) which have information. Requests were sent by post and e-mail and were followed up by phone.

The excellent cooperation of government authorities with the CAMP Project should be emphasized as most of the information request was provided, with few exceptions.

Once the information was received it had to be revised and made uniform. The information format, reference system, scale acquired on, date of creation, etc., all had to be revised to verify that all the information given the various individual projects was the most up-to-date, the one on the finest scale and in the most appropriate format for the requirements of each of the projects.



After this quality control, the CAMP data server was put into service where the information collected was then uploaded so each individual project could have quick and easy access to it. The large amount of information collected, its size, and the appearance of new information needs made it necessary to create a data server with access permission for all the projects and that could be constantly updated.

A total of over 300 layers of digital cartographic information were provided to the projects.

### 3. Quality control of the information generated by the individual projects.

As the various individual projects completed their work, they submitted the information generated and the corresponding data models to the LAIS team.

The documents that guide quality control of the data models are *Technical Criteria for the Creation of Data Models* and *Documentation of data models*, both written by the REDIAM.

The LAIS team prepared a simplified document for the individual projects so it would be easier for them to describe their data model. Based on these documents, the LAIS team constructed the final data models using the REDIAM documents.

Quality control of the individual project data models was done gradually following the REDIAM technical criteria. The layers, fields, relationships, etc., were revised and their coherence with the products submitted. The correct application of the datum type was particularly revised, definition of unique identifiers and absence of null values or without data.

Concerning the spatial information submitted was revised for the reference system, relationship among tables, empty fields, topology, etc. The reference system of the layers submitted was transformed according to the REDIAM criteria, and the European Datum 1950 reference system layers were converted to the ETRS 89 using the strict Minimum Curve method – the CNIG transformation grid (National Geographic Information Centre).

It should be explained, with regard to the above, that the geodesic reference system is a mathematic resource that allows coordinates to be assigned to points on the Earth's surface, making it possible to correct georeferencing elements. The ETRS89, European terrestrial reference system established in 1989, is the reference system used in the European reference framework and by Spain since its approval in Royal Decree 1071/2007 regulating the official geodesic reference system in Spain.

Furthermore, the geodatabases were created for each individual Project. That is, the conversion of vector layers into a collection of tables included in a Database Management System. The Geodatabase format is the ESRI trademark system and is the one used by REDIAM.

Data were also converted to an interoperable KML format (language for three-dimensional representation of spatial data according to the Open Geospatial Consortium standard).

The territorial reference bases were also checked that they were as agreed at the beginning of the project, specifically, the Topographic Map of Andalusia 1:100,000, and that the vector and

raster geographic information, the data models, metadata and other documents to be included were in the proper format.

Quality control work was done in collaboration with the various projects: the suitability of some layers was discussed, concepts were clarified and information received was returned if necessary.

#### 4. Integration of project information in the Andalusian Environmental Information Network.

All the information generated was integrated in the REDIAM following the *Technical Criteria for the Creation and Integration of Environmental Information in the Andalusian Environmental Information Network*

It was structured in the folders designed by the REDIAM and later the information was sent in on digital support.

Metadata (data that describe the data in the project) was sent in XML format following the document *Directives for cataloguing environmental information*. Each individual project has its own metadata, so each section of metadata had to be completed hand in hand with each project. There was also exchange with the REDIAM technicians and individual project leaders.

The LAIS team developed a metadata editor that structures the information in conformity with the NEM standard (Spanish Core Metadata) and therefore, with the REDIAM criteria, in order to create compatible and exchangeable information. The NEM standard is in turn based on the two most important international metadata standards, ISO 19115:2003 "Metadata" and ISO 15836: 2003 "The Dublin Core Element Set". It is a metadata web editor, with which accessibility is gained, very easy to use and has a practical help in each field to be filled in. The editor also offers the possibility of exporting metadata in XML format, the standard used for information exchange, which allows it to be easily integrated in other metadata catalogues, such as the REDIAM.

After sending in the information in the required format, the data model and metadata, the *Proposal Formula for Integration in the REDIAM* has to be filled out. As always throughout this project, the REDIAM technicians actively cooperated in its preparation.

#### 5. Generation of de los WMS services and display tool.

After various meetings of the LAIS team and the experts group (which as mentioned above was comprised mainly by members of the REDIAM), the Regional Ministry of Agriculture, Fisheries and Environment promised that, as a result of the CAMP Project, the LAIS would be integrated in the REDIAM to ensure post-project continuity of the viewer.

Thus the WMS services generated will be located on the Web of the Ministry itself after quality control and submission of the cartography and database layers. It was also agreed that the Viewer would be part of the Regional Ministry of the Environment Web to ensure its continuity. Thus one of the two initial goals is ensured: the creation of a GIS easily accessible by all social actors in the CAMP Area (especially the public, who do not usually have easy access to this type of information) that compiles all kinds of data (documents, maps, indicators, etc.) resulting from the project.

This way duplication of products and efforts is avoided, since the REDIAM Viewer has all the desirable functionalities and only personalization on an imaging level and map presentation would be necessary. The Viewer serves the WMS generated by the REDIAM itself directly, and reproduces the symbology designed by the LAIS team, which it submitted in .MXD: the ArcGIS file format of the GIS project (Map).

### **3.- Compilation and summary of the information**

As mentioned in the sections above, for this project, and at the same time, the rest of the individual projects, a large amount of thematic cartography was collected in digital format, in addition to reports, diagnostics, data, etc., from the various authorities, irrigation communities, Rural Development Group, etc.).

Furthermore, since one of the main tasks of the LAIS was organisation of the information following REDIAM criteria, all the manuals on criteria for each aspect had to be consulted constantly throughout the project. These documents are listed below:

- Creation of auxiliary documents for information integrated in the REDIAM.
- Basic technical criteria for creation and integration of information in the REDIAM.
- Directives for cataloguing environmental information.
- Regional Ministry of the Environment Metadata Editor. Users Manual.
- Technical criteria for creation of the data model.
- Documentation for REDIAM data models.
- Technical criteria for the definition and proposal of map services following the OGC WMS 1.1.1 Protocol.
- Form for managing OGC services.
- Protocol for integrating information in the REDIAM.

### **4.- Results prior to the integration stage**

The proposed actions to be taken after completion of the CAMP Project derive from the contributions made by the main stakeholders in the Levante de Almería through their participation in Imagine Workshops and the experience accumulated during this horizontal project. The following actions were proposed:

- Maintenance of the LAIS Display-Viewer and Web Map Server services provided. The purpose is to ensure access to spatial data produced in the CAMP Project over time after project completion, allowing interoperability of CAMP WMS services and the rest of the WMS services on the net, as well as maintenance of the CAMP Viewer.
- Make collaboration agreements with the competent authorities for possible inclusion in the Viewer and downloading (in various interoperable formats) geographic information of special interest related to the CAMP Project results. (For example, at an experts meeting in the Improvement of Management Criteria in the Marine, Terrestrial and Hydraulic Public Domain individual project, it was mentioned that it would be of interest to include the dividing line between public marine-terrestrial domain and the service area, information available from the Ministry of Agriculture, Food and Environment, in the Viewer).
- Diffusion of new WMS services provided and of the new display tool in specialized journals, webs, press, etc.

- Training technicians from the various interested authorities competent for territorial management in the CAMP Project and its integration in corporate GIS. Make them (the same technicians) aware of the Levante de Almería CAMP Viewer and the spatial information included in it.

This measure arose mainly from the final results of the participatory IMAGINE Workshop parallel to the project. As may be observed in the Report on the 4<sup>th</sup> IMAGINE Workshop, two of the working groups mentioned training as critical for reaching sustainable development. Group C proposed:

*More professional training to assist sustainable production sectors. [...] Public authorities must make professional training plans (generating a sustainable production activity).*

The rest of the measures are related to one of the proposals made by the 4th IMAGINE Workshop. Specifically, Group E stated the following concern about achieving sustainable development:

*Education, information and awareness. We see education, training and public awareness of quality as very necessary in the CAMP Area. This matter needs to be solved throughout the CAMP Area.*

Therefore, information and awareness were considered a primary element in the participatory bodies. The LAIS Viewer plays a very important role in this sense.

#### **5.- Action Plan for the post-project stage**

The following actions were prioritized according to the project integration process. That is, the contributions from the Coastal Council participation workshops, the results of the rest of the individual projects, and finally, the workshop on administrative-technical integration for preparation of the Sustainable Development Reference Framework were taken in to consideration.

*Levante de Almería, a laboratory to test Integrated Coastal Zone Management*

Post-project action proposals	Approximate timescale	Competent Public Administrations	Public administration responsible for coordination	Possible indicator/s	Strategic alliances
Action 4.2.1.8. AP SDRF. Technical training session on “Application of LAIS products and WMS services to the territory.”	1st year	Ministry of Agriculture Food and Environment Andalusian Regional Ministry of Agriculture, Fisheries and Environment City Councils Almería Provincial Government	Andalusian Regional Ministry of Agriculture, Fisheries and Environment	. Number of training actions in this subject . . Number of participants	Instituto Andaluz de Administración Pública Mancomunidad del Levante Levante RDG Professional / business associations University of Almería
Action 4.2.2.2. AP SDRF. Continue maintenance of the LAIS Viewer display tool and Web Map Server services provided to ensure access to spatial data produced by the CAMP Project.	Next 10 years and following	Ministry of Agriculture Food and Environment Andalusian Regional Ministry of Agriculture, Fisheries and Environment City Councils Almería Provincial Government	Andalusian Regional Ministry of Agriculture, Fisheries and Environment	. Number of users who have connected to the WMS services. . Number of users who have visited using the LAIS Viewer	Mancomunidad del Levante Levante RDG University of Almería
Action 4.4.2.3. AP SDRF. Make collaboration agreements with the competent authorities to analyse inclusion in the Viewer and download (in various interoperable formats) geographic information of special interest to the CAMP Area.	1st year	Ministry of Agriculture Food and Environment Andalusian Regional Ministry of Agriculture, Fisheries and Environment City Councils Almería Provincial Government	Andalusian Regional Ministry of Agriculture, Fisheries and Environment	. Number of collaboration agreements made	Mancomunidad del Levante Levante RDG University of Almería
Action 4.4.1.1. AP SDRF. Make a plan for diffusion of project results in magazines, generalist and specialized websites, press, etc.	Next 10 years and following	Ministry of Agriculture Food and Environment Andalusian Regional Ministry of Agriculture, Fisheries and Environment City Councils Almería Provincial Government	Andalusian Regional Ministry of Agriculture, Fisheries and Environment	. Number of communications media in which news on the CAMP Project has appeared . Number of Web pages on which news about CAMP has been published.	Local communications media.

## 6.- Economic, social and environmental feasibility of post-project actions

Each of the actions proposed is analysed below for its economic, social and environmental feasibility and a series of proposals on sources of public and private funding that can be applied for to finance each action.

### **Action 4.2.1.8. AP SDRF. Technical training session on “Application of LAIS products and WMS services to the territory.”**

This post-project training action took shape in a technical session mainly for government technicians and other potential users, in which the information generated in the CAMP Project, how to interoperate with it using WMS services on local equipment, using the LAIS Viewer and the various applications in territorial organisation and integrated coastal zone management were explained

The time scenario foreseen for the execution of the sessions is the year following project completion. Depending on requests for participation, one or several sessions will be held on the same subject.

The possible coordinators of this action are the Regional Ministry of Agriculture, Fisheries and Environment through the REDIAM, in charge of maintaining the LAIS and the University of Almería- The indicators proposed for following up on this action are the number of training actions performed and the number of participants.

#### Economic-financial feasibility and possible sources of funding:

It is estimated that the investment necessary to hold the sessions would be minimal compared to the benefits derived from training and education, indispensable for implementing and consolidating a sustainable coastal management model. Improved training of managers leads to improved public services and management, thereby including the CAMP environmental goals.

It is considered appropriate to propose as possible sources of funding for these training actions the government authorities involved in the CAMP Project, which include this subject in their training programmes, mainly directed at their own technicians, but also the rest of social agents.

In addition to training programmes instigated by the competent authorities themselves, they also establish procedures for granting financial aid through competitive public offers designed to encourage programmes related to training in different areas.

Another of the possible alternative sources of funding could be the Biodiversity Foundation in the framework of its Training, Information and Awareness Programme and its different strategic lines (Biodiversity, Rural Development, Climate Change, Marine Environment and Cooperation). This entity establishes procedures for granting aid designed to encourage programmes related to different areas of sustainability.

**Action 4.2.2.2. AP SDRF. Continue maintenance of the LAIS Viewer display tool and Web Map Server services provided to ensure access to spatial data produced by the CAMP Project.**

Maintenance of the display tool and WMS services offered as CAMP Project results by making use of the Regional Ministry of Agriculture, Fisheries and Environment infrastructure through the REDIAM and the Andalusian Spatial Data Infrastructure seems feasible.

Therefore, the coordinator of this post-project action would be the Regional Ministry of Agriculture, Fisheries and Environment's Environmental Information Service. The indicators proposed for follow-up would be the number of users who connected to the WMS services and the number of users who used the LAIS Viewer.

The advantage of this measure is the permanent diffusion of results. The diffusion of data increases public environmental awareness and knowledge of the environmental values of the Levante de Almería.

Economic-financial feasibility and possible sources of funding:

Economic feasibility of this action is conditioned by maintenance work being taken over by the REDIAM and its technical team and therefore, a new source of funding would not be necessary. The time scenario suggested is the next ten years and following.

**Action 4.4.2.3. AP SDRF. Make collaboration agreements with the competent authorities to analyse inclusion in the Viewer and download (in various interoperable formats) geographic information of special interest to the CAMP Area.**

The third post Project action proposed is to pursue and deepen collaboration among the various authorities to incorporate information of interest to the CAMP Project generated by each of them in the LAIS Viewer. This action could be performed by the Regional Ministry's Environmental Information Service, which handles applications for information to other authorities and signs agreements for providing information, and therefore the economic investment would be minimal.

The time horizon is one year at first, which in principle is sufficient to analyse the information of interest and make collaboration agreements with other government authorities. Therefore, if in future generation of new spatial information or updating of existing information should be detected, this post-project action would be renewed.

Economic-financial feasibility and possible sources of funding:

This measure is considered feasible and would not require any economic investment, since the tasks are undertaken by the Ministry of Agriculture, Fisheries and Environment.

**Action 4.4.1.1. AP SDRF. Make a plan for diffusion of project results in magazines, generalist and specialized websites, press, etc.**

Diffusion and promotion of the CAMP Project are considered to be among the primary post-project lines of action. This same undertaking, project diffusion and promotion, was the main goal from which the idea of the Levante de Almería Information system originated. The LAIS

therefore suggested the need for significant diffusion of project results, the Viewer and the WMS services in magazines generalist and specialized websites, press, etc.

In fact, the CAMP Project would not make sense without participation of society in all of its respects, and therefore, project diffusion and promotion are indispensable, already done during its development, but should not therefore be abandoned once the project is completed.

The time horizon is one year at first, which in principle emphasizing the efforts on the first and later post-project years.

#### Economic-financial feasibility and possible sources of funding:

This measure is considered feasible and would not require any economic investment, since these tasks are undertaken by the Ministry of Agriculture, Fisheries and Environment's communications department, which is responsible for sending press releases to the media.

#### **7.- Lessons learnt**

It is of utmost importance to carry out the actions proposed, even more so if it is considered that hardly any effort in addition to current management is required. All of them are related to diffusion of the CAMP Project, a matter that is indispensable for this project's success as an ICZM demonstration project. The larger the number of people who receive the CAMP information and conclusions, the more successful it will be. Furthermore, it should be emphasized that tools like the LAIS improve access to adequate local territorial and environmental information, which is demanded by the public as may be observed in the social framework developed.

This line of facilitating access to spatial information has been under development for several years. Proof of this is the INSPIRE initiative, launched by the European Commission, the purpose of which is to make relevant, uniform quality geographic information available to the public.

In this regard, the vital importance of institutional coordination and cooperation also became obvious during the project, especially in management of basic information that must be used by territorial managers, and likewise, the need for all basic information to be standardized, essential for generation of new information of interest.

In conclusion, the need to spread environmental information should be underlined, as such information has obviously become a social demand and is necessary to further knowledge and improve environmental management.





# 5

## *Landscape Valuation Detailed memory*

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## TABLE OF CONTENTS

<b>1. EXECUTIVE SUMMARY .....</b>	<b>11</b>
<b>2. RESULTS AND CONCLUSIONS .....</b>	<b>14</b>
<b>3. INTRODUCTION .....</b>	<b>31</b>
3.1. THE CAMP OF THE LEVANTE DE ALMERÍA .....	32
3.2. ENVIRONMENT OF THE LEVANTE ALMERIENSE CAMP PROJECT .....	35
<b>4. DESCRIPTION .....</b>	<b>36</b>
<b>5. COMPILATION OF INFORMATION .....</b>	<b>40</b>
<b>6. COASTALISATION DIAGNOSIS .....</b>	<b>44</b>
6.1. THE ENVIRONMENT .....	46
6.2. DESCRIPTION OF THE TERRITORY .....	47
6.2.1. THE PHYSICAL KEYS .....	47
6.2.2. THE ECOLOGICAL KEYS .....	54
6.2.3. THE LANDSCAPE SINCE THE PERSPECTIVE ESTHETICS .....	65
6.2.4. CULTURAL HERITAGE .....	70
6.2.5. THE USES OF THE GROUND .....	71
6.3. THE ADMINISTRATIVE INTERVENTION IN MATTER OF PLANNING .....	84
6.3.1. PLANNING OF THE TERRITORY OF THE Levante Almeriense (POTAL) .....	86
6.3.2. PLANNING OF THE TERRITORY OF THE URBAN AGGLOMERATION OF ALMERIA (POTAUA) .....	87
6.3.3. PLANNING OF NATURAL RESOURCES .....	88
6.3.4. THE HYDROLOGIC PLANNING .....	92
6.3.5. CONCLUSIONS .....	92
6.4. CONCLUSIONS RELATING TO THE COASTALISATION DIAGNOSIS .....	94
<b>7. LANDSCAPE VULNERABILITY ASSESSMENT .....</b>	<b>96</b>
7.1. OBJECTIVES .....	96
7.2. METHODOLOGY .....	97
7.3. LANDSCAPE VULNERABILITY ASSESSMENT .....	100
7.3.1. IDENTIFICATION OF USES/ACTIVITIES WITH POTENTIAL SIGNIFICANT INCIDENT ON THE TERRITORY .....	100
7.3.2. IDENTIFICATION AND DEFINITION OF THE TERRITORIAL AND ENVIRONMENTAL VARIABLES .....	100
7.3.3. MODELS OF VULNERABILITY .....	112
7.3.4. DEFINITION OF INDICATORS, VALUES OF BALANCE AND RESULTS OBTAINED .....	122
7.3.5. NUMERICAL ANALYSIS FOR EVALUATION OF THE VULNERABILITY .....	133
7.3.6. MAPS OF VULNERABILITY BY USES .....	137
<b>8. ELABORATED PROPOSALS ACCORDING TO THE RESULTS OF THE PROJECT .....</b>	<b>148</b>
8.1. INTRODUCTION .....	149
8.2. TRANSFORMATION TO INTENSIVE UNDER PLASTIC CULTIVATION (GREENHOUSES) .....	150
8.3. NEW URBAN DEVELOPMENT .....	156
8.4. RESIDENTIAL TOURIST COMPLEXES WITH GOLF COURSE (MODEL RESORT TYPE) .....	159

8.5.	ISOLATED INDUSTRIAL BUILDINGS IN NON-BUILDING LAND .....	163
8.6.	TRANSFORMATION TO CULTIVATIONS "OF STREET .....	167
8.7.	ESTABLISHMENT OF LINEAL AIR OR EMERGING INFRASTRUCTURES .....	170
8.8.	PLANTS OF ELECTRIC PRODUCTION FROM RENEWABLE ENERGIES (PHOTOVOLTAIC). .....	173
8.9.	WIND FARMS .....	176
<b>9.</b>	<b>LESSONS LEARNED .....</b>	<b>179</b>

**TABLE OF FIGURES**

FIGURE 1. ENVIRONMENT CAMP LEVANTE DE ALMERÍA (ELABORATED BY THE AUTHOR).....	16
FIGURE 2. DISTRIBUTION OF THE POPULATION IN THE MUNICIPALITIES OF THE CAMP AREA (YEAR 2011). SOURCE: INE.....	17
FIGURE 3. THE POPULATION GROWTH RATE FOR THE PERIOD 1981 - 2011 OF THE AREA CAMP. SOURCE: PS ANÁLISIS SOCIOECONÓMICO .....	18
FIGURE 4. EVOLUTION OF THE SEALED LAND IN THE FIRST 200 M OF COASTAL STRIPE FOR THE YEARS 1956 AND 2007 IN THE CAMP ENVIRONMENT; ALMERÍA AND ANDALUSIA. (SOURCE: URBAN LANDS OF THE COASTAL STRIPE, REDIAM) .....	18
FIGURE 5. SEALED LAND IN THE COASTAL STRIPE OF 200 M IN THE YEAR 2007 IN THE CAMP ENVIRONMENT, ALMERÍA AND ANDALUSIA (SOURCE: URBAN LANDS OF THE COASTAL STRIPE, REDIAM) .....	18
FIGURE 6. EVOLUTION OF THE SEALED LAND IN THE FIRST 200 M OF COASTAL STRIPE FOR THE YEARS 1956 AND 2007 IN THE CAMP ENVIRONMENT; ALMERÍA AND ANDALUSIA. (SOURCE: URBAN LANDS OF THE COASTAL STRIPE, REDIAM) .....	33
FIGURE 7. GENERAL MAP OF THE GEOGRAPHICAL LOCATION OF THE CAMP ENVIRONMENT INSIDE THE PROVINCE OF ALMERÍA. SCALE 1:400.000. SOURCE: INITIAL DOCUMENTATION CAMP PROJECT ....	46
FIGURE 8. 3D IMAGE SHOWING THE PHYSIOGRAPHY OF THE CAMP AREA (APPROXIMATE SCALE 1:500.000) SOURCE: ELABORATED BY THE AUTHOR FROM THE DIGITAL MODEL 1:10.000 JUNTA DE ANDALUCÍA. ....	47
FIGURE 9. IDEALIZED SCHEME REFLECTING THE GEOLOGICAL SYNTHESIS OF THE TERRITORY. SOURCE: GEOLOGY OF THE DRY ENVIRONMENT OF ALMERÍA. DIDACTIC FIELD GUIDE. JUNTA DE ANDALUCÍA. ....	48
FIGURE 10. MAPS OF ANNUAL AVERAGE TEMPERATURE, TO THE LEFT, AND ANNUAL AVERAGE RAINFALL, TO THE RIGHT, IN THE ANDALUSIAN SOUTHEAST. SCALE 1:700.000, SOURCE: REDIAM (JUNTA DE ANDALUCÍA).....	49
FIGURE 11. MAPS OF POTENTIAL INSOLATION, TO THE LEFT, AND POTENTIAL EVAPOTRANSPIRATION, TO THE RIGHT, IN THE SOUTHEAST OF ANDALUSIA. SCALE 1:700.000, SOURCE: REDIAM (JUNTA DE ANDALUCÍA).....	50
FIGURE 12. GROUNDWATER MASSES MAP IN THE CAMP ENVIRONMENT. SCALE 1:425000. SOURCE: REDIAM (JUNTA DE ANDALUCÍA).....	51
FIGURE 13. EDAPHOLOGICAL CLASSIFICATION IN THE CAMP ENVIRONMENT. SCALE 1:300.000 (SOURCE: REDIAM).....	53
FIGURE 14. BIOGEOGRAPHICAL MAP OF ANDALUSIA ON WHICH THE CAMP AREA HAS BEEN LOCATED. UNDEFINED SCALE. SOURCE: RIVAS MARTÍNEZ, S., ASENSI, A., MOLERO-MESA, J. AND VALLE, F. 1989 .....	54
FIGURE 15. MAP OF DISTRIBUTION OF HABITATS IN THE CAMP AREA . SCALE 1:425.000. SOURCE: REDIAM (JUNTA DE ANDALUCÍA) .....	56
FIGURE 16. SPATIAL DISTRIBUTION (EXPRESSED IN HAS) OF THE DIFFERENT TYPOLOGY OF HABITATS. SOURCE: ELABORATED BY THE AUTHOR FROM THE INFORMATION OF THE REDIAM (JUNTA DE ANDALUCÍA) .....	57

FIGURE 17. MAP OF PRESENCE OF FLORA AND FAUNA PROTECTED AND OF INTEREST SPECIES. SCALE 1:300.000. SOURCE: ELABORATED BY THE AUTHOR FROM THE INFORMATION SUPPLIED BY THE REDIAM (JUNTA DE ANDALUCÍA) .....	58
FIGURE 18. ECOLOGICAL CONNECTIVITY MAP OF THE CAMP ENVIRONMENT. SCALE 1:420000. SOURCE: DEPARTMENT OF ENVIRONMENT (JUNTA DE ANDALUCÍA) .....	60
FIGURE 19. MAP OF ECOLOGICAL VALUE OF THE BIOLOGICAL GROUP OF THE HABITAT. SCALE 1:300.000 SOURCE: ELABORATED BY THE AUTHOR FROM THE INFORMATION SUPPLIED BY THE REDIAM (JUNTA DE ANDALUCÍA) .....	62
FIGURE 20. MAP OF ECOLOGICAL VALUE OF THE BIOLOGICAL GROUP OF THE SPECIES OF FLORA AND FAUNA. SCALE 1:300.000 SOURCE: ELABORATED BY THE AUTHOR FROM THE INFORMATION SUPPLIED BY THE REDIAM (JUNTA DE ANDALUCÍA) .....	63
FIGURE 21. MAP OF GLOBAL ECOLOGICAL VALUE. SCALE 1:300.000 SOURCE: ELABORATED BY THE AUTHOR FROM THE INFORMATION SUPPLIED BY THE REDIAM (JUNTA DE ANDALUCÍA).....	64
FIGURE 22. MAP OF LANDSCAPE REGIONS OF ANDALUSIA. SCALE 1:300.0000. SOURCE: REDIAM (JUNTA DE ANDALUCÍA) .....	66
FIGURE 23. MAP OF LANDSCAPE AREAS OF ANDALUSIA. SCALE 1:300.0000. SOURCE: REDIAM (JUNTA DE ANDALUCÍA) .....	67
FIGURE 24. MAP OF PHYSIOGRAPHIC UNITS OF ANDALUSIA. SCALE 1:300.0000. SOURCE: REDIAM (JUNTA DE ANDALUCÍA) .....	68
FIGURE 25. SPATIAL AND TEMPORARY EVOLUTION OF THE NATURAL AND FOREST LANDS IN THE CAMP ENVIRONMENT. SCALE WINDOWS 1:650.000. SOURCE: MAP OF USES AND VEGETABLE COVERS OF ANDALUSIA (REDIAM, 2007).....	73
FIGURE 26. EVOLUTION OF THE SURFACE OF THE NATURAL/FOREST LANDS. SOURCE: ELABORATED BY THE AUTHOR FROM THE CARTOGRAPHY OF USES OF THE FLOOR AND COVERS OF ANDALUSIA (REDIAM, 2007) .....	74
FIGURE 27. SPATIAL AND TEMPORARY EVOLUTION OF THE AGRICULTURAL LANDS IN THE CAMP ENVIRONMENT. SCALE WINDOWS: 1:650.000. SOURCE: MAP OF USES AND VEGETABLE COVERS OF ANDALUSIA (REDIAM, 2007) .....	75
FIGURE 28. EVOLUTION OF THE SURFACE OF THE AGRICULTURAL LANDS. SOURCE: ELABORATED BY THE AUTHOR FROM THE CARTOGRAPHY OF USES OF THE FLOOR AND COVERS OF ANDALUSIA (REDIAM, 2007) .....	76
FIGURE 29. SPATIAL AND TEMPORARY EVOLUTION OF THE SURFACE OF THE SEALED LANDS. SCALE WINDOW: 1:650.000 SOURCE: MAP OF USES AND VEGETABLE COVERS OF ANDALUSIA (REDIAM, 2007). .....	77
FIGURE 30. EVOLUTION OF THE SURFACE OF THE SEALED LANDS FOR URBAN AND INFRASTRUCTURES USES. SOURCE: ELABORATED BY THE AUTHOR FROM THE CARTOGRAPHY OF USES OF THE FLOOR AND COVERS OF ANDALUSIA (REDIAM, 2007) .....	78
FIGURE 31. EVOLUTION OF THE POPULATION OF THE CAMP AREA BETWEEN 1981 AND 2011. SOURCE: PS ANALYSIS SOCIOECONOMIC.....	79
FIGURE 32. POPULATION GROWTH RATE BETWEEN 1981 AND 2011. SOURCE: PS ANALYSIS SOCIOECONOMIC.....	80
FIGURE 33. POPULATION EXTRACTED WITH RESPECT TO THE TOTAL IN THE CAMP AREA, ALMERÍA, ANDALUSIA AND SPAIN IN 1996 AND 2011. SOURCE: PS ANALYSIS SOCIOECONOMIC.....	80

FIGURE 34.	MUNICIPALITIES OF ALMERÍA WITH GREATER PROPORTION OF FOREIGN POPULATION IN 2011. SOURCE: PS ANALYSIS SOCIOECONOMIC.....	81
FIGURE 35.	THE IRRIGATED CULTIVATIONS SURFACE IN THE CAMP AREA FOR MUNICIPALITIES ACCORDING TO TYPE OF CULTIVATION IN 1995 AND 2010 (HAS). SOURCE: PS ANALYSIS SOCIOECONOMIC.....	82
FIGURE 36.	EVOLUTION OF THE TOURIST OFFERING IN THE CAMP AREA FROM 1988 TO 2010 (NUMBER OF PLAZAS). SOURCE: PS ANALYSIS SOCIOECONOMIC.....	83
FIGURE 37.	TERRITORIAL ENVIRONMENT OF THE SUBREGIONAL PLANS (SOURCE: DEPARTMENT AGRICULTURE, FISHING AND ENVIRONMENT.....	85
FIGURE 38.	LISTING OF MUNICIPALITIES INCLUDED IN BOTH TERRITORIAL PLANS (SOURCE: DEPARTMENT AGRICULTURE, FISHING AND ENVIRONMENT. ....	86
FIGURE 39.	NATURAL SPACES PROTECTED IN THE CAMP AREA . SCALE: 1/300.000. SOURCE: REDIAM (JUNTA DE ANDALUCÍA) .....	90
FIGURE 40.	THE PLANNING OF THE PROTECTED NATURAL SPACES (SOURCE: REDIAM).....	91
FIGURE 41.	AREAS OF TERRITORIAL PROTECTION OF THE EXISTING TERRITORIAL PLANS (SOURCE: DEPARTMENT OF AGRICULTURE, FISHING AND ENVIRONMENT).....	93
FIGURE 42.	METHODOLOGICAL PLAN FOLLOWED FOR THE ANALYSIS OF THE VULNERABILITY. SOURCE: ELABORATED BY THE AUTHOR.....	98
FIGURE 43.	MAP OF LUMINANCE ZONING . SCALE 1:10.000 (SOURCE: REDIAM, JUNTA DE ANDALUCÍA) .....	101
FIGURE 44.	MAP OF SLOPES. SCALE 1:100.000 (SOURCE: ELABORATED BY THE AUTHOR FROM THE DIGITAL MODEL OF THE LAND SUPPLIED BY THE REDIAM) .....	102
FIGURE 45.	GROUNDWATER MASSES MAP AND SUPERFICIAL. SCALE 1:10.000 (SOURCE: REDIAM, JUNTA DE ANDALUCÍA) .....	103
FIGURE 46.	FLOOD MAP. SCALE 1:10.000 (SOURCE: REDIAM, JUNTA DE ANDALUCÍA).....	104
FIGURE 47.	MAP OF THE INVENTORY OF SOURCES AND SPRING. SCALE 1:10.000. (SOURCE: REDIAM, JUNTA DE ANDALUCÍA) .....	105
FIGURE 48.	MAP OF UNITS GEOMORPHOLOGICAL COASTAL OF THE CAMP AREA . SCALE 1:100.000 (SOURCE: REDIAM, JUNTA DE ANDALUCÍA) .....	106
FIGURE 49.	MAP OF ECOLOGICAL VALUE. SCALE 1:100.000 (ELABORATED BY THE AUTHOR FROM INFORMATION SUPPLIED BY THE REDIAM, JUNTA DE ANDALUCÍA).....	107
FIGURE 50.	MAP OF LANDSCAPE UNITS. SCALE 1:100.000 (ELABORATED BY THE AUTHOR).....	110
FIGURE 51.	MAP OF CULTURAL RESOURCES LOCATION. SCALE 1:100.000 (ELABORATED BY THE AUTHOR) .....	111
FIGURE 52.	MAP OF LUMINANCE ZONING OF ATMOSPHERIC SPACE (1:100.000) (DEPARTMENT OF ENVIRONMENT. JUNTA DE ANDALUCÍA).....	123
FIGURE 53.	SLOPES MAP (1/100.000). ELABORATED BY THE AUTHOR.....	124
FIGURE 54.	HYDROLOGICAL SYNTHESIS MAP (1.100.000). ELABORATED BY THE AUTHOR. ....	126
FIGURE 55.	MAP OF TERRITORY ECOLOGICAL VALUE 1/100.000. ELABORATED BY THE AUTHOR. ....	128
FIGURE 56.	MAP OF QUALITY ASSESSMENT OF LANDSCAPE UNITS 1/100.000. ELABORATED BY THE AUTHOR. ....	131

FIGURE 57.	MAP OF DELIMITATION OF PROTECTION PERIMETERS ACCORDING TO BUFFERS OF 200 AND 300 METERS. ELABORATED BY THE AUTHOR.....	133
FIGURE 58.	VULNERABILITY MAP TO THE ESTABLISHMENT OF CROPS UNDER PLASTIC (GREENHOUSES). ELABORATED BY THE AUTHOR. ....	139
FIGURE 59.	VULNERABILITY MAP TO NEW URBAN DEVELOPMENTS. ELABORATED BY THE AUTHOR..	140
FIGURE 60.	VULNERABILITY MAP TO INTENSIVE CULTIVATIONS "OF STREET". ELABORATED BY THE AUTHOR. ....	141
FIGURE 61.	VULNERABILITY MAP TO LINEAL AIR OR EMERGING INFRASTRUCTURES. ELABORATED BY THE AUTHOR .....	142
FIGURE 62.	VULNERABILITY MAP TO INDUSTRIAL FACILITIES IN NON-BUILDING LAND. ELABORATED BY THE AUTHOR .....	143
FIGURE 63.	VULNERABILITY MAP TO PHOTOVOLTAIC AND THERMOSOLAR PLANTS. ELABORATED BY THE AUTHOR. ....	144
FIGURE 64.	VULNERABILITY MAP TO WIND FARMS. ELABORATED BY THE AUTHOR.....	145
FIGURE 65.	VULNERABILITY MAP TO RESIDENTIAL TOURIST RESORTS WITH GOLF COURSE (MODEL TYPE RESORT). ELABORATED BY THE AUTHOR.....	146
FIGURE 66.	MAP OF ACCUMULATED VULNERABILITY. ELABORATED BY THE AUTHOR.....	147
FIGURE 67.	GUIDE MAP: INTENSIVE UNDER PLASTIC CULTIVATION (GREENHOUSES). SCALE: 1:300.000. SOURCE: ELABORATED BY THE AUTHOR.....	155
FIGURE 68.	GUIDE MAP: NEW URBAN DEVELOPMENTS IN PROCESS. SCALE: 1:300.000. SOURCE: ELABORATED BY THE AUTHOR.....	158
FIGURE 69.	GUIDE MAP: HOUSING DEVELOPMENTS WITH GOLF COURSES. SCALE: 1:300.000. SOURCE: ELABORATED BY THE AUTHOR.....	162
FIGURE 70.	GUIDE MAP: INDUSTRIAL COMPLEXES IN NON-BUILDING LAND. SCALE: 1:300.000. SOURCE: ELABORATED BY THE AUTHOR.....	166
FIGURE 71.	GUIDE MAP: INTENSIVE "OF STREET" CULTIVATIONS. SCALE: 1:300.000. SOURCE: ELABORATED BY THE AUTHOR.....	169
FIGURE 72.	GUIDE MAP: INFRASTRUCTURES. SCALE: 1:300.000. SOURCE: ELABORATED BY THE AUTHOR .....	172
FIGURE 73.	GUIDE MAP: PHOTOVOLTAIC PLANTS. SCALE: 1:300.000. SOURCE: ELABORATED BY THE AUTHOR .....	175
FIGURE 74.	GUIDE MAP: WIND FARMS. SCALE: 1:300.000. SOURCE: ELABORATED BY THE AUTHOR .....	178



## **ABBREVIATIONS USED**

CAMP: Coastal Areas Management Programme  
CAP: Common Agricultural Policy  
CIP: Competitiveness and Innovation Framework Programme  
EAFRD: European Agricultural Fund for Rural Development  
ERDF: European Regional Development Fund  
ESF: European Social Fund.  
EIB: European Investment Bank  
ICZM: Integrated Coastal Zone Management  
IEE: Intelligent Energy Europe  
ISLA: Levante de Almería Information System.  
LOUA: Law of urban development of Andalusia.  
MAP: Mediterranean Action Plan  
RENPA: Protected Natural Spaces of Andalusia  
REDIAM: Network of Environmental Information of Andalusia.  
PGOU: General Plan for Urban Development.  
POTLA: Planning of the Territory of the Levante Almeriense.  
POTAUA: Planning of the Territory of the Urban Agglomeration of Almería.  
POTA: Planning of the Territory of Andalusia



## **1. EXECUTIVE SUMMARY**

In the following report is described in a synthetic form the Individual Project of Landscape valuation that undertakes two main activities:

Elaboration of a coastalisation diagnosis that has as an objective the identification, characterization and analysis of the evolution of the main cultural, environmental, ecological, and physical variables that define the territory and its relation with the occupation and the evolution of the human utilization of the environment along the last decades

The CAMP area vulnerability assessment. From the uses and activities that determine the evolution of the CAMP Area, as well as the environmental variables that are seen affected by its development, the vulnerability assessment is carried out, using a specific methodological model. Their results, which consist of locating particular territorial interventions and determining the associated impacts to different alternative future settings, have thereby, a preliminary and reference character. This evaluation has been carried out according to the proposed methodology by the Centre of Regional Action PAP/RAC, with some modifications conditioned by the personality of the analyzed territory.

Along the different phases of the work, diverse documents that describe the evolution of the project have been produced, which have been object of analysis and discussion with the group of experts. Besides these reports a battery of covers and maps has been generated and delivered to the System of Information of the Levante de Almería for its incorporation to the cartographic viewfinder of the CAMP Levante de Almería in [www.camplevantedealmeria.com](http://www.camplevantedealmeria.com).

As a conclusion, the coastalisation diagnosis carried out has made clear the important level and the features of the socioeconomic development reached in the CAMP Area, as well as the magnitude and peculiarities of the impacts induced on the natural environment and the environment transformed by human activity. It has allowed to identify those uses and activities that have been determining in the transformation of the territory in the last decades. In turn, the vulnerability assessment of the area has provided the image of the capacity or aptitude of this territory to make room for such uses, permitting to identify those areas in which the impacts derived from their establishment reach smaller magnitude. With both results a diagnosis of the vulnerability of the territory has been carried out to stand out the problems detected in each use and to establish measures that help decisions-taking and resolution of the prioritized problematic, with the aim of providing objective criteria according to the available cartographic information and a wide group of experts to decide the location of the new territorial interventions – programs, plans, and projects- and to determine the associated impacts to different alternative future settings.

## **2. RESULTS AND CONCLUSIONS**

### **The Levante Almeriense: an extraordinarily dynamic territory**

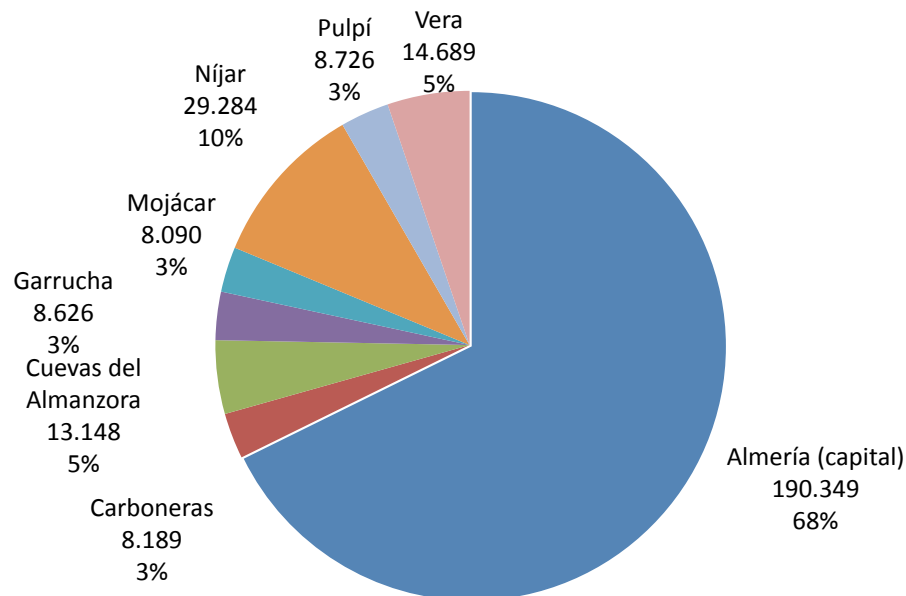
The territory that represents the CAMP area extends on the oriental end and part of the southern boundary of the province of Almería, in the called Spanish semiarid southeast. It comprises, in the emerged zone, the municipal terms of Almería, Níjar, Carboneras, Mojácar, Garrucha, Cuevas de Almanzora, Vera and Pulpí, as well as the adjacent coastal water with these municipalities covered by the Framework Directive on Water.



Figure 1. Environment CAMP Levante de Almería (Elaborated by the author)

The indicated municipalities totalize a surface of 1487.18 km<sup>2</sup> and a population of 281,101 inhabitants with an average population density of 189.02 hab/km<sup>2</sup>.





**Figure 2.** Distribution of the population in the municipalities of the CAMP area (Year 2011).  
Source: INE

The CAMP Levante Almeriense territory has constituted one of the most dynamic zones from the socioeconomic point of view in Andalusia and Spain during the three last decades just as the evolution followed by the economic and demographic indicators shows.

This intense expansive economic cycle has been led by agriculture and tourism, including in the last one the urban development component, having important repercussions in the territorial and socioeconomic field.

The Population growth Rate for the period 1981 - 2011 of the area CAMP (57,60 %), duplicates that of Spain (25,20%) and almost the one of Andalusia (30,8), although is significantly smaller than that of the province of Almería (71,10%).

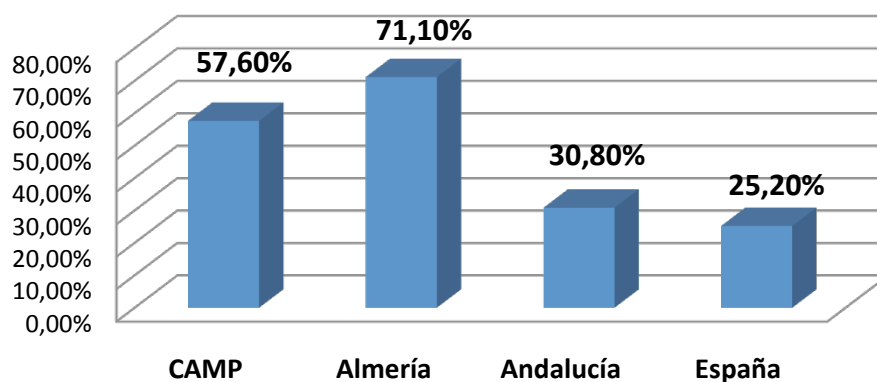


Figure 3. The Population growth Rate for the period 1981 - 2011 of the area CAMP. Source: Socioeconomic analysis

The sealed land for tourist and urban uses in the first 200 m of coastal stripe has passed to have a lineal occupation of 20.39% in the year 2007 from the 3.66% in the year 1956 to.

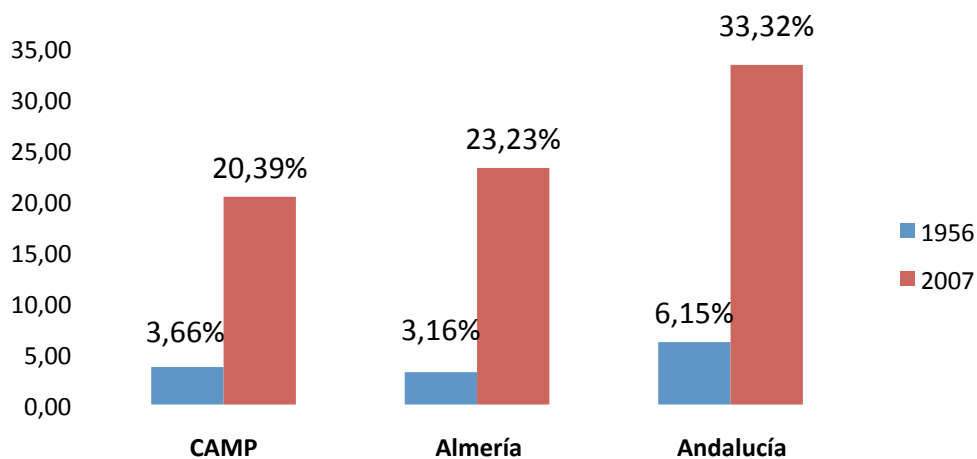


Figure 4. Evolution of the sealed land in the first 200 m of coastal stripe for the years 1956 and 2007 in the CAMP environment; Almería and Andalusia. (Source: Urban lands of the coastal strip, REDIAM)

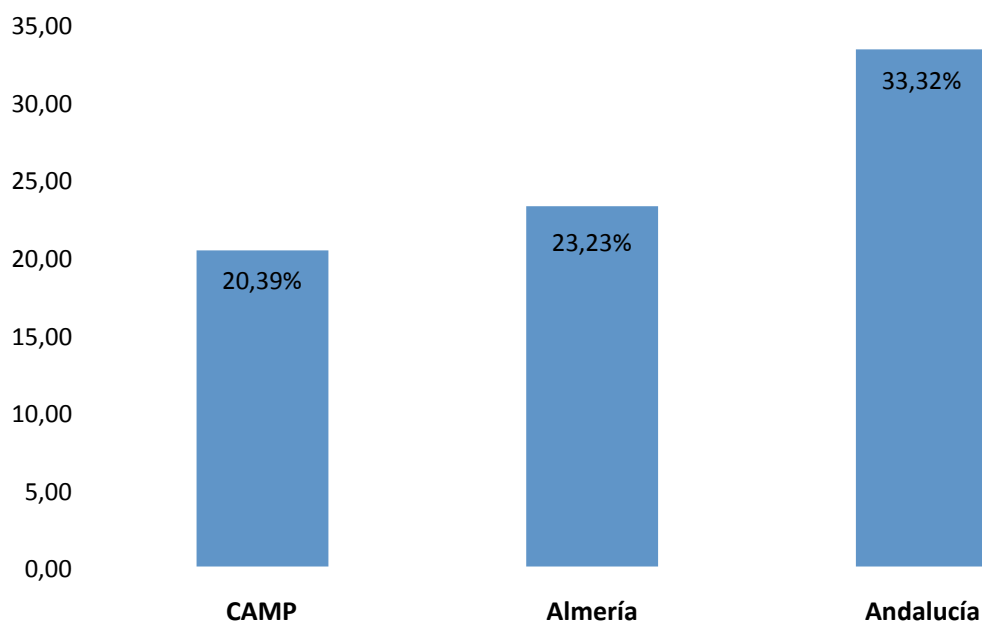


Figure 5. Sealed land in the coastal stripe of 200 m in the year 2007 in the CAMP environment, Almería and Andalusia (Source: Urban lands of the coastal stripe, REDIAM)

## A territory with exceptional natural qualities

The physiographic of the CAMP Area is characterized for the existence of plain areas, coastal steppes that are delimited by mountainous country. Plain areas correspond with neogene - quaternary coastal sedimentary depressions, like the Bahía of Almería, located to the south, and the basins of the Aguas and Almanzora rivers, in the north of the Levante Almeriense. Delimiting these, geographical accidents with very different reliefs are found. On the one hand, the Sierras of Alhamilla, Cabrera, Almagro, Los Pinos and Almagrera are identified, and on the other, Cabo de Gata and Serrata de Níjar. This differentiation in the betic rough reliefs responds so much to the lithology of the surfacing material (metamorphic rocks for the first and, volcanic for the seconds), as to altitude, vegetation, uses of the floor and landscape.

The mountain ranges, in general, offer natural landscapes of high environmental quality, and natural settings of the territory, while in the plain areas the activities that guarantee the welfare and economic of the society of Almería are superposed, at times in conflict with the conservation of the thickets of recognized ecological value of the semiarid coastal steppes of Almería.

From the environmental point of view the CAMP project area is an extraordinarily singular and valuable space. This wealth is product of a series of physical - environmental factors, among them, a privileged and strategic geographical position with regard to the Alboran Sea, its peculiar climatic pattern, of semiarid character, its recent geological and palaeographic evolution, common with the north of the African continent, and its scarce degree of development up to the second half of the 20th century. This last circumstance is, in turn, consequence of its generalized historic water deficit and of the absence of good territorial infrastructures, especially of communication.

All of it has conditioned the formation of a mosaic of mountainous reliefs and coastal steppes of extraordinary ecological value in the European context, that harbor a huge quantity of habitats and of species of flora and fauna of great interest, for its rare and even endemic character in the European context.

The 55.35% of the terrestrial CAMP territorial environment corresponds with vegetable communities catalogued as of priority interest, of general interest and of priority interest and general interest according to the Habitats Directive.

Another indicator of the ecological value, and environmental in general, of this territory corresponds to the so significant percentage of surface, the 46.59% of the surface terrestrial CAMP (148.717,61 has), that is at present catalogued as Natural Space Protected (RENPA/Natura 2000 Network). Of this percentage, a 26.39% corresponds to RENPA territory (Natural Park Cabo de Gata - Níjar, Nature Reserve of Sierra Alhamilla and Natural Monuments of Isla de San Andrés and Isla Negra and Terreros), and a 20.20% to the Natura 2000 Network territory not included in the previous one. The diversity of cataloguing and environmental distinctions present in this environment is extensive: Nature Reserve, Nature Reserve, Natural Monuments, ZIC, ZEPIM, RAMSAR, Reserve of the Biosphere and Geopark. As for the marine environment, it is enough just to indicate that the 77.3% of the 182.27 km of coast are also catalogued as RENPA/Natura 2000 Network.

The 46.59% of the terrestrial CAMP Area is catalogued and included in the environment of RENPA/Natura 2000 Network

### **Agriculture and tourism: the pillars of the Almería's economic miracle**

This territory, as it has been indicated, has arrived quite unchanged, and, therefore, with a degree of very high naturalness, to the beginnings of the second half of the 20th century, moment in which the constant and progressive establishment of the agriculture of greenhouse starts, in the shape of under plastic intensive cultivations, and the tourist development of the coastal façade. Up to that period, the population developed primary essential activities, agriculture, stockbreeding and fishing, in state of natural equilibrium with the environment that supported them.

Before to that time, only the powerful mining and mining - industrial activity, related to the benefits of lead, silver, iron and gold, developed during the called "mining century of Almería", 19th century and first half of the 20th century, would produce important environmental transformations in the Almería's environment, mainly an intense deforestation. Nowadays the traces of this activity remain unnoticed, since the natural formations affected have been benefited by an important process of auto regeneration, although with the degradation that supposes the loss of the indigenous arboreal stratum in good part of the reliefs of the coastal mountains exploited. These areas show nowadays some thickets of great environmental and ecological interest and they offer a cultural heritage, in the shape of mining - industrial patrimony, of notable value, not only cultural, but economic also, as asset of interest for the tourism offer.

Therefore, in spite of the transformation and deforestation that the mining industry caused in the coastal landscapes of the Levante Almeriense, the territory reaches the second half of the 20th century with a notable degree of environmental virginity. To it contributed its limited degree of territorial and economic development, circumstances favoured by the scarce availability of water and infrastructures, especially on communication matter.

The agricultural productivity was very low, with main predominance of the dry land cultivation and a model of subsistence farming, scarcely commercial. The tourism and urban development of the coastal façade has been also very limited up to recent dates by the scarce availability of water resources to satisfy the provisions.

The true transformation of the valuable landscapes of the coastal steppes of the Levante Almeriense would be initiated with the intensification of the processes of change of use of the traditional agricultural lands, dry land generally, and of the natural thickets, to crops under plastic, the greenhouses, backbone of the "Almería's economic miracle"

The discovery of groundwater availability in the detritic aquifers of the Almería's neogene coastal basins and the possibility of its benefit would bring to Almería, at the beginning of the decade from the 60 of the 20th century, an exploitation model practised with success already on the coast of Granada, the covered with sand, first, and the greenhouses, later. Unproductive lands up to that moment from the agricultural point of view, thickets or dry

land, become highly productive lands, as this model of exploitation only needs space, but not highly agricultural capacity, climate or water.

Between 2003 and 2007 they have been deforested more than 8000 hectares of thicket in the CAMP Area environment, due essentially to the change of use to crops under plastic and urban and/or infrastructures development.

It should be indicated that to the territorial problems associated to the initial lack of ordering and planning of the transformation of natural lands to crops under plastic (and any another type of use consuming floor in significant proportions) the scarce or null appraisal that the local population has of their thickets is added, which are perceived as sterile lands of scarce value, being unaware of their scientific, hereditary, and environmental relevance, and not receiving a positive estimation from the aesthetic point of view.

In other occasions, nevertheless, the transformation of natural lands or cultivations of dry land to cultivations in irrigated land has taken place, especially in the municipality of Pulpí, toward a very specialized agriculture and "of street", free of greenhouses.

In the year 1956 the surface under plastic in the CAMP environment was nonexistent and currently is of 9.200,60 hectares, which supposes the 6.19% of the total surface and the 20.67% of the surface dedicated to agricultural use

The first actions in matter of infrastructural conditioning in Almería and the Levante Almeriense would come also demanded by the increasingly more booming fruit and vegetable sector of the plastic industry, thus being opened also an opportunity to the tourism development of the coastal façade, positioning Mojácar, Vera and Garrucha as tourist settlements increasingly consolidated in time.

The growing demand of land for urban residential and tourism uses in this section of coast comes conditioned at the same time by the one that originates the also increasing resident's settlement phenomenon or foreign tourists that share their time of residence during the year between its countries of origin and this coast section of Almería.

The foreign population acquires each time more specific weight in the CAMP Area, rising from 4,434 inhabitants in 1996 to 51,401 in 2011. This important increase has its reflection in the total population data. Thus, the 51,401 foreigners that reside in the CAMP area in 2011 represent the 18.29% of the total population, percentage that surpasses the double of the Andalusian average (8,67%) and extensively surpasses the national one (12,19%), although situating slightly under the provincial average (22,1%).

The municipalities with higher rates of cumulative annual variation in population, Mojácar, Vera, Níjar and Garrucha, are the same that gather a greater proportion of foreign population.

These population growths obviously condition a greater demand of uses of the land, not only for urban development, but for the adaptation of territorial infrastructures.

In 1956 the sealed land for urban and infrastructural uses occupied the 0.85% of the surface of the territory. At present that land corresponds to a 6,80%, more than all the surface of crops under plastic.

The degree of territorial development of the CAMP environment is nowadays top-level, comparable to that of any European region, although with important deficits in infrastructures and environmental equipment, essentially in purification and recycling of urban sewage and general efficiency of the water cycle. It in spite of the fact that the secular water deficit of the area has been surpassed with the contribution of external resources, essentially the incoming of the desalination of seawater, and other contributions originating in transfers from adjacent hydrographic basins.

The arrival of external water resources alleviates the historic resource deficits, but in fact itself has not been produced, at least at the moment, the necessary process of replacement of the resources coming from groundwater masses utilized, overexploited all of them and in bad or worse than good state according to the Framework Directive on Water.

In the CAMP environment the industrial sector does not have a significant weight (except for the supply industry of the greenhouse), if the industrial pole of Carboneras and some significant isolated industry relevantly placed in the seaboard (Deretil) is excluded.

The supply industry of the greenhouse demands industrial lands that are satisfied with offers of industrial land of local character, although there is a high tendency to locate the installations in scattered settlements.

The increasingly intense dispersion of isolated industrial settlements in natural lands (Suelo No Urbanizable) already constitutes a problem in the territory today.

These facilities are located on Suelo No Urbanizable and its urban and environmental development processing, has taken place via the corresponding Singular Project of Action or Special Plan in Suelo No Urbanizable, according to the decisions of the Law for urban development of Andalusia (LOUA, 2002). In fact, and save exceptions, each of these industrial facilities thus located does not cause a significant environmental or territorial impact. The problem of this type of scattered constructions resides in the synergy and cumulative effect of its presence in the territory which begins to cause important dysfunctions, especially in which to the alteration of the natural landscapes refers.

On the other hand, the state and regional economic incentives to the establishment of energy production installations from renewable resources have favoured a growing demand of use for the establishment of eolian and photovoltaic parks, built generally at the cost of the natural land loss. In this precise moment those economic incentives have been withdrawn, for which, predictably, a standstill in the demand of lands for this type of installations will be produced.

The solutions to the main infrastructural problems of this territory, high speed railway, gas pipeline, etc, have been already implemented or they are about to be solved.

The degree of territorial development reached makes of this sector of coast an attractive area for future investments and continues promoting intense dynamics of socio-economic development, only slowed down at this time by the sharp general economic crisis.

### **The public intervention in matter of planning**

Because of it, the Junta de Andalucía gave priority to the edition of the corresponding Plans of Ordering of the Territory of subregional environment. That of the Levante, Planning of the Territory of the Levante Almeriense (POTLA), approved in 2009 (Decree 26/2009 of 3 of February) which includes the municipalities of Huércal Overa, Cuevas de Almanzora, Vera, Carboneras, Pulpí, Garrucha, Mojácar, Antas, Turre, Los Gallardos and Bédar (in bold those included in the CAMP Area), and that of the Planning of the Territory of the Urban Conglomeration of Almería (POTAUA), approved in 2011, which includes the municipalities of Almería, Benahadux, Gádor, Huércal Of Almería, Níjar, Pechina, Rioja, Santa Fe de Mondújar and Viator, of which only Almería and Níjar are included in the CAMP Area.

Both plans observe with growing concern the dynamics that affect to the loss and/or fragmentation of the lands of natural character, especially those not integrated in the Network of Natural Spaces Protected of Andalusia, that include a detailed plan.

Two of the main measures that articulate the Territorial Plans are the Territorial Protection Zones delimitation, in which the new establishment of greenhouses is prohibited, and the extension to the 200 meters of the Protection Obligation of the Terrestrial-Maritime Public Domain, in the lands without an approved development plan, limiting this way the consolidation of the urban development conglomeration of the coastal façade.

Also both models of ordering observe and stand out the high value landscape (not only ecological, but also in aesthetics key) and the significant density of elements of the cultural and natural heritage that harbors this territory. Said elements are observed as an optimum base of support to prompt active politics that favour the extensive recreational and tourist use, pillars, along with the agriculture, of the socio-economic development model, current and future, of this territorial environment. This strategy helps besides to de-seasonalise and to complement the established summer offer of tourism of "sun and beach". The Groups of Rural Development present in the territory work intensely the activation and impulse of this model of sustainable rural development.

For which it refers to the environmental planning, only the Terrestrial Maritime nature reserve of Cabo de Gata - Níjar has its Natural Resources Ordering Plan and Principal Plan of Use and Management approved. Neither the Natural Area of Sierra Alhamilla neither the remainder of territories included in the Natura 2000 Network have their own planning approved, lacking therefore of specific regulation of uses and activities.

### **Scarcely sustainable dynamics, impacts of difficult reversibility**

An analysis of the Map of Uses and Covers of the Land of this territory, among 1956 to 2007, confirms the previous affirmations and allow concluding that the loss of virginity of this territory is related, or, at least has been related historically, as far as the terrestrial environment is concerned, with the following socioeconomic dynamics:

- I. The agricultural transformations of forest lands of traditional agricultural and natural character to intensive under plastic cultivation.
- II. The fast and accentuated growth of the urban developments for tourist and residential uses, in general, in the coastal façade, particularly, and very especially in the coastal section between Mojácar and Pulpí.
- III. The important consumption of natural character lands for the establishment of infrastructures and equipment of territorial character (roads, highways, high speed railway line, lines of energy transportation, gas pipelines, hydraulic infrastructures, airport, ports, plants of energy production, etc.).
- IV. The frequent and growing establishment of actions, generally industrial, isolated and dispersed, although legal, in the natural environment, established by the urban development way of Project of Singular Action or Special Plans in Suelo No Urbanizable.

All of them affect one way or another in the territory with the following negative effects:

- Transformation, in small or great scale, of natural lands of very high ecological value, and consequently, destruction, deterioration and/or fragmentation of natural habitats of interest and ecological corridors.
- Occupation and environmental degradation of the still natural and conserved spaces of the coastal façade.
- Degradation of the aesthetics and cultural components of the landscape, main assets of the strategies for tourist development in the territory.
- Deterioration of the urban environments that are found immersed in the under plastic cultivation plain
- Overexploitation of aquifers, marine intrusion and saline contamination.

### **CAMP Levante Almeriense: a highly vulnerable territory**

According to the conclusions obtained in the Coastalisation Diagnosis, the uses and activities chosen for their analysis, with a view toward evaluating the vulnerability of the territory before their potential establishment have been the following:

- Transformations of natural or agricultural traditional lands to crops under plastic.
- New urban developments.
- Establishment of isolated tourist complexes - golf, resort type.
- Isolated industrial buildings in Suelo No Urbanizable.
- Transformations of forest lands to cultivations of street.
- Establishment of industrial energy plants of photovoltaic production.
- Establishment of wind farms.
- Execution of large lineal emerging or air infrastructures

For each one of these uses itself a model of vulnerability has been elaborated, reaching a consensus with the Group of Experts (see chapter 4 of this document) translated to a matrix of identification and qualitative appraisal of potential impacts on the environment.



The environmental and territorial variables taken into consideration for the application of the model of vulnerability have been the following:

- Light quality of the atmosphere
- Relief/Slope
- Water
- Ecological value
- Landscape
- Cultural Resources

The territorial unit of analysis utilized has been a raster grid of 10m x 10m.

The use of these and not other variables in the analysis of vulnerability has been related to the availability of georeferenced information of them, useful for the spatial analysis. For that reason, essential for the application of the methodology, another type of variables have been ruled out, of which, if there would have been available information, they would have complemented or improved the result of the work. Some of these absent variables are the air, noise and pollution.

The results obtained of the analysis of vulnerability for each evaluated use/activity confirm that the marked physical – environmental, ecological and landscape personality of the territory conditions in an extreme way its territorial problems.

According to the vulnerability diagnosis carried out, almost three quarters of the total terrestrial surface of the CAMP Area shows a clear and unmistakable vocation towards the conservation. These same environments are sure to be the cultural and natural settings in which the strategies of sustainable tourism should be developed. Only one fourth of the territory, therefore, is offered as a useful area to receive the set of economic activities that develop in the territory. This circumstance causes tensions of territorial kind, since different uses, essentially agricultural, urban and tourist, they compete for the occupation of the available useful area.

The public intervention carried out in matter of spatial planning is determinant in this case to correct the dynamics detected, aiming to avoid conflicts of use in the territory with it.

## **Orienting proposals**

According to the results obtained, separated by uses and activities as a criterion towards the management of the conclusions that emanate from the project, the main proposals of action are put forward.

### ***Establishment of new under plastic cultivations***

The under plastic agriculture is immersed in these moments in a continuous process of improvement of its environmental and technological efficiency. The progressive increment of the integrated and with biological control productions, the establishment of measures aiming to minimize water and phytosanitary consumption and the improvements obtained in matter of rural hygiene guide the sector in the right direction, although the efforts in some aspects

should be doubled, like the use of the nitrogen (see the Report relating to the Diagnosis of the Agricultural Sector in the coastal area of the Levante Almeriense of the individual project dedicated to the study of the agricultural sector in the CAMP environment).

Even so, the great unfinished business of this activity sector continues being the landscape integration of the structures, the greenhouses, and the infrastructures to its service.

In the last 10 years the under plastic surface itself has been hardly increased in the CAMP Area. Nevertheless, the translocation of crops under plastic sites from assimilated by the urban development areas toward certain geographical environments as the feet of Sierra Alhamilla and of the coastal mountainous areas of Cabrera, Almagro and Almagrera, constitutes a medium and long-term territorial risk. This risk has been undertaken in the Territorial Plans being prohibited the establishment of new greenhouses in the areas defined as of territorial protection.

With all of this, the following measures are proposed:

- Priority and urgent elaboration of the Plans of management of the spaces included in the Natura 2000 Network in the CAMP Levante Almeriense environment.
- Urban development regulation via PGOU of the under plastic agriculture: express delimitation of authorized areas and detailed definition of rules of application, for establishment and management.
- Evaluation of the spatial delimitation of the Areas of Territorial Protection (areas with express prohibition of change of use to plastic) in future reviews of the POTLA and POTAUA.
- Valuation of the incompatibility of the new establishment of greenhouses in the very high and high vulnerability classes.
- Delimitation of stripes of buffering and regulatory guidelines in the edge spaces among the cultivations under plastic and the natural spaces protected.
- Analysis of the viability of singling out the lands intended for crops under plastic as a special category of land (agroindustrial land) with a view towards its urban development classification (proposal for LOUA review).
- Priority and urgent demarcation of the Hydraulic Public Domain of river courses in the areas with greater demand of use for establishment of greenhouses.
- Execution of an information and communication plan about the importance of the problems resulting from rural environments landscape degradation aimed to the professional agrarian associations.
- Elaboration of a technical manual of best practices for the landscape integration of the cultivations under plastic.
- Rural Hygiene Plans Elaboration by municipalities for under plastic agricultural environments.

#### ***New urban development developments***

The dimension of the new urban developments is at present marked out by the limit of growth regulated by the Planning of the Territory of Andalusia (POTA), so much in population as in floor.

For which it refers to the coastal façade, both territorial plans expand the protection Obligation Area of Terrestrial – Maritime Public Domain in not developed lands up to 200 meters, limiting the establishment possibilities of private character residential areas.

Under these circumstances new developments of significant dimensions are not foreseeable. The POTLA establishes a great strategic reserve of land in the so called Llano Central area for the purpose of minimizing the tensions caused by the demands of lands for residential and tourist uses in the section of coast between Mojácar and Pulpí.

With general character, nevertheless, it should be noted, the following proposals:

- Evaluating the incompatibility of new urban developments in areas of high and very high vulnerability
- In medium value areas, the instruments for general planning and development should be:
  - Limiting the development of new sectors of building lands in terrains that involve a high visual impact or which limit the perspective of the existing urban setting, unless their low impact be justified by means of a study of landscape integration.
  - Ordering the new urban extensions attending to strict criteria of landscape integration, incorporating the maintenance of the cultural and environmental values that personalize the area in question.
  - Introducing sustainability criteria in the design of the urban development actions, especially for which refers to sustainable mobility and to the increment of green spaces endowment such as parks, woodland in the streets, etc.
  - Reducing the mobility needs integrating the functions of residence, commerce, work and leisure in the plans of renewal of the centre of cities and in the planning of new urban zones.

### ***Golf resorts***

In the CAMP Area there exists a consolidated offering of resorts with golf course that has six facilities located along the coast. This offering has an important pull effect and there exists forecasts of new golf resorts, which at present are in processing phase. Nevertheless, facing the future, the POTLA contemplates this type of urban developments in three of the planned Areas for Tourist and Residential Reserve.

At an overall level, the problems connected with this type of action is related fundamentally with the significant consumption of natural resources (water, floor, habitats), the transformation or change of use of the land on which its installation its planned, the disappearance or fragmentation of habitats of interest, the unsustainable use of the water, contamination by fertilisers and phytosanitary, introduction of allochthonous species of flora, substantial modification of the landscape, etc.

According to all of this the following measures are proposed:

- Priority and urgent elaboration of the Plans of management of the spaces included in the Natura 2000 Network in the CAMP Levante Almeriense environment.
- Considering the correlation about the limitations for its establishment in sites located on very high and high vulnerability classes.
- Favouring the development of this type of tourist resorts preferably in areas whose vulnerability class would be low or very low.
- Elaboration of a Manual of Design, Construction, Use and Management of the golf courses in semiarid media.
- Delimitating of buffering stripes in edge spaces between golf and protected natural areas.
- Incorporation to the design criteria project oriented to the sustainability and integration of the actions:
  - Optimization in the use of the resources and maximum water efficiency
  - Articulation of measures aiming to the landscape improvement and adaptation of its elements to the aesthetics and semiarid ecological functionality of the territory.
  - Projection of corrective measures oriented to the minimizing of light impact
  - Cultural and social integration

#### ***Isolated industrial Buildings in Suelo No Urbanizable***

The price of the urban or suitable as urban land intended for the establishment of industrial activities is high in the area. This contributes to the frequent establishment of isolated industrial installations in Suelo No Urbanizable more frequently than it would be desired.

The following measures are proposed:

- Evaluating the incompatibility of the establishment of industrial facilities in high and very high vulnerability classes.
- Favouring the establishment of new facilities in low or very low vulnerability areas.
- Generally speaking, only those facilities whose productive process' nature make them only suitable for isolated environments, far from other industrial complex, should be authorized in Suelo No Urbanizable, avoiding the proliferation of industries in scattered settlements.
- Reviewing of the criteria to obtain of the Declaration of Social Benefits and Public Interest of this kind of facilities and their concreteness through the regulation established in the corresponding General Urban Development Planning for each municipality.
- Encouraging the establishment of industrial land oriented to the local and supramunicipal demand of land (increment on the offering of industrial land).
- With a view toward preventing the associated impacts to future isolated industrial settlements, the following proposals are established:
  - Delimitation of buffering stripes in the edge areas with the natural protected areas.
  - Establishment of measures aiming at the landscape integration of the facilities.
  - Establishment of preventive measures and correction of air and light pollution.

### *Transformations of forest lands to cultivations of street*

The street cultivations establishment has experienced an important growth just like the greenhouses, although in a less accused rhythm. The spread of the street cultivations has affected all the CAMP Area, although its greater concentration is located in the north sector, especially in the basin of Pulpí. Concretely this area, is delimited by the POTLA as Transformed Zones of Intensive Agriculture, and therefore, has some determinations that limit the development of these cultivations and its evolution.

According to the problems detected, the following proposals are exposed:

- Evaluating the restriction of the establishment of these use transformations in high and very high vulnerability areas.
- Establishing technical measures that optimize the consumption of natural resources
- Encouraging and reinforcing the mechanisms of motivation for integrated and ecological agriculture models
- Elaborating Integral Plans for Agricultural Residues Management, by municipalities.

### *Large lineal air infrastructures*

The planning deriving from the land-use planning that affect the CAMP environment foresees the building of large infrastructures that affect the road, railway and electric networks. The problems detected in such actions are related to the scarcity of adequate environmental measures for its integration in the natural environment where they are going to be installed. In relation, the following proposals are established:

- Carrying out rigorous studies of location alternatives for the layout of infrastructures in planning process, in order to minimize the affection on the maximum vulnerability classes.
- In the electric lines case, favouring the establishment of laid out underground wiring when crossing spaces of high or very high vulnerability classes.
- Working out landscape integration manuals for these constructive projects
- Undertaking the environmental integration of temporary and auxiliary areas
- Requiring forceful compensatory and corrective measures for the improvement of the affected habitats and, especially, as far as barrier effect and isolation of wildlife populations is concerned.

### *Industrial parks of photovoltaic energy production*

The number of photovoltaic energy facilities has increased substantially, in fact, in recent years in the province of Almería. These projects were executed and maintained with help from subsidies coming from the European administration. Since the interruption of the economic flow to this sector, these initiatives have been reduced to the point in which the existence of no project of this kind affect to the CAMP Area is known to be in process. The problems connected with the sector could become important in the future if the determining factors exposed previously would change. It is due to the high potentiality of this geographical environment for the location of this type of facilities, the great consumption of land that they require and the environmental interest that the areas with greater potentiality for their

establishment present, coinciding obviously with the lands of lower price in the market, generally thicket forests without another specific use.

In this sense, the risks that the establishment of this type of facilities present, affect to the natural environment (ground, fauna, flora, landscape, etc.). To reduce the affections caused by these facilities the following proposals are marked:

- Adopting as reference criterion the cartography of vulnerability to produce location alternatives studies, in order to minimize the affection on the maximum vulnerability classes.
- Stimulating investments in i + d projects and encouraging the execution of demonstrative projects addressed to the establishment of photovoltaic technology associated to other uses: covers for greenhouses, industrial facilities, public furnishing, etc
- Developing of detailed studies for the landscape integration in the corresponding procedures of environmental prevention.

### *Wind farms*

In order to prevent the impacts associated to the establishment of future wind farms in the CAMP Area, the following proposals can be presented:

- Adopting as reference criterion the cartography of vulnerability to develop location alternatives studies, in order to minimize the affection on the maximum vulnerability classes.
- Developing of detailed studies for the landscape integration in those high or very high vulnerability areas.
- Investing in i + d projects to establish technologies of smaller visual impact
- Adopting preventive and corrective measures to minimize the impact on the bird life.
- Elaboration of information material to capture the sensibility of the society

### **3. INTRODUCTION**

### 3.1. THE CAMP OF THE LEVANTE DE ALMERÍA

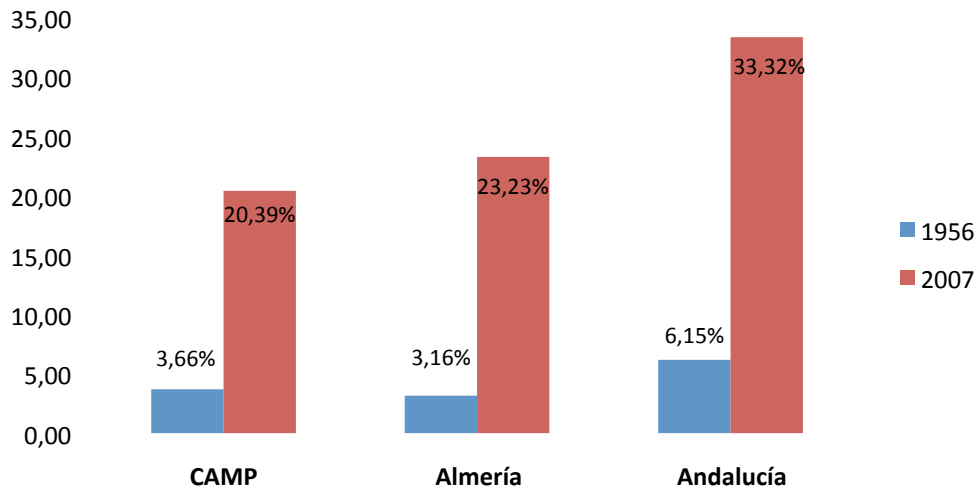
The Protocol on Integrated Coastal Zone Management in the Mediterranean, was signed by all the Mediterranean countries on January the 21st of 2008 in Madrid and ratified by Spain June 22, 2010, though did not go into effect until March the 24th of 2011. It constitutes the seventh protocol in the Framework of the Barcelona Convention and represents an important milestone in the history of the Mediterranean Action Plan (MAP).

In 2003 the Government of Spain, as Contracting Party of the Barcelona Convention, suggested the proposal to set in motion a CAMP project in the Spanish Mediterranean coast, which was approved in the Ordinary Meeting of Catania of November of that year. In this meeting, the emerged part of the oriental coast of the province of Almería, as well as the submerged one, were chosen for its study, being called Levante de Almería CAMP. The initial works of preparation for this project began in November of 2004, in which the Ministerio de Medio Ambiente and Consejería de Medio Ambiente participated. The first work consisted on the elaboration of a feasibility study, document whose purpose is to carry out an analysis of the legal and institutional context of the work area and the development of a diagnosis of the main environmental, economic, and social problems. This study was undertaken following the recommendations carried out in the XV Contracting Party of the Barcelona Convention Conference held in Catania (from 15th to 18th of January of 2008), where the PAM secretary (MEDU) was urged to put in practice the CAMP projects under way, as well as those whose implementation had been agreed.

The territory that represents the CAMP area extends on the eastern end and part of the southern border of the province of Almería, in the so called Spanish semiarid southeast. It includes the terrestrial area conformed by 8 municipalities, Almería, Níjar, Carboneras, Mojácar, Garrucha, Cuevas de Almanzora, Vera and Pulpí, and another marine one, corresponding to the coastal waters bordering these municipalities protected by the Framework Directive on Water. In this project, only the terrestrial part has been analyzed. The mentioned municipalities total a surface of 1487.18 km<sup>2</sup> and a population of 281,101 inhabitants with an average density of population of 189.02 hab/km<sup>2</sup>.

The Levante Almeriense CAMP area has constituted one of the most dynamic zones of Andalusia and Spain from the socio - economic point of view in the three last decades just as the evolution followed by the economic and demographic indicators shows. This strong expansive economic cycle has been leaded by agriculture and tourism, having important repercussions in the territorial and socioeconomic environment.





*Figure 6. Evolution of the sealed land in the first 200 m of coastal stripe for the years 1956 and 2007 in the CAMP environment; Almería and Andalucía. (Source: Urban lands of the coastal strip, REDIAM)*

This territory, so extraordinarily dynamic as far as socio-economic development is concerned in the last decades, is characterized for being a space with exceptional natural qualities. In an environmental key, it is a valuable and extraordinarily singular space. This wealth is the product of a series of physical - environmental factors, among which a privileged and strategic geographical position with regard to the sea of Alboran, the peculiar climatic regime that characterizes it, of semiarid character, its geological evolution and recent palaeography, common with the north of the African continent, and its scarce degree of development up to the second half of the 20th century. This last circumstance is, at the same time, consequence of its historic generalized water deficit and the absence of good territorial infrastructures, especially of communication.

All of it has conditioned the formation of a mosaic of mountainous reliefs and coastal steppes of an extraordinary ecological value in the European context, which harbour a huge quantity of habitats and species of flora and fauna of great interest, for its rare and even endemic character in the European context.

The 55.35% of the CAMP terrestrial area environment corresponds with vegetable communities catalogued as of priority interest, of general interest and of priority interest and general interest according to the Habitats Directive.

Another indicator of the ecological, and environmental in general, value of this territory corresponds to the percentage of so significant surface, the 46.59% of the CAMP terrestrial surface (148.717,61 has), that is at present catalogued as Protected Natural Space (RENPA/Natura 2000). Of that percentage, 26.39% corresponds to territory RENPA (Cabo de Gata – Níjar Natural Park, Sierra Alhamilla Natural Area and the Natural Monuments of Isla de San Andrés and Isla Negra and Terreros) and 20.20% to the Natura 2000 territory not included in the previous. The diversity of categories and environmental awards present in this area is extensive: Natural Park, “Paraje Natural”, Natural Monuments, ZIC, ZEPIM, RAMSAR,

Biosphere reserves and Geopark. In relation to the marine environment, it is enough only point out that 77.3% of the 182.27 km of coastline are also catalogued as RENPA/Natura 2000 Network.

46.59 % of the land territory CAMP is catalogued and included in the scope of RENPA/ NATURA 2000 Network territory

All of these reasons and many more that have not been indicated justify the need to get over an excessively sectorial vision of the different existing problems, and to reach an integrated vision that harmonize the different sectoral policies. The CAMP implementation is justified also by the complexity of the institutional framework and an important number of plans and sectoral programs influencing the area. Both factors imply the need for a new instrument, working as a coordinated action between the administrations and their instruments of planning and programming. It should be noted the pioneering character of the project which implies a practical experience of application of the Protocol GIZC in the framework of the Barcelona Convention , and of the Andalusian Strategy for Integrated Coastal Zone Management.

The Protocol on Integrated Coastal Zone Management in the Mediterranean, in the framework of the Convention of Barcelona for the Protection of the Marine Environment and the Coastal Area of the Mediterranean, contemplates two articles for which the individual project of Landscape valuation should provide an answer. These articles are the following:

- Ensuring the protection of the coastal landscapes according to the established in the article 11 on Coastal Landscapes of the Protocol on Integrated Coastal Zone Management in the Mediterranean.
- Implementing the article 5 of General Measures of the European Convention of the Landscape, in which each Part is committed to integrate the landscape in the politics of urban development and spatial planning and in their policies on economics, social, agricultural, environmental, and cultural matter, as well as in any other policies that can have a direct or indirect impact on the landscape.

These articles are considered the main objectives of the project, together with the ones pursuing other specific objectives, which are the following:

- Obtaining the recognition of the landscape heritage as resource inside the CAMP area.
- Reaching a consensus among the actors, both public and private, about a strategy of management that ensure the landscape protection, acknowledging this as an asset for the development inside the CAMP area.
- Defining Vulnerable Areas subject to the planned activities.

Therefore, the individual project of Landscape valuation pursues the objective of carrying out a diagnostic of the CAMP environment from the point of view of its coastal territory, as well as an analysis of vulnerability, proposing possible solutions to the questions related to the coastal character of this environment.

### 3.2. ENVIRONMENT OF THE LEVANTE ALMERIENSE CAMP PROJECT

The environment of the project is located in the southeast area of the province of Almería, and is configured by the lands that cover the municipal terms of Pulpí, Cuevas de Almanzora, Vera, Garrucha, Mojácar, Carboneras, Níjar and Almería, as well as the coastal waters in a nautical mile from the straight baseline. It equals to a total surface of 219,000 has, of which 71,000 correspond to the submerged area and 148,122 to the emerged land.

This CAMP area represents one of the best preserved coastal and marine areas of the Mediterranean Sea and harbors a considerable natural (geological and biological), landscape and cultural heritage. Some of these coastal natural areas have been recognized and included in several figures of protection, like the Cabo de Gata-Níjar Natural Park, declared Reserve of the Biosphere by the UNESCO and Geopark by the European Network of Geoparks; part of the Sierra Alhamilla Natural Area, the Natural Monuments of Isla Terreros and Isla Negra and Isla de San Andrés, two Zones of Special Conservation for Birds (ZEPAS of the Natura 2000 Network), twelve Places of Common Interest (IT), a protected space by the Ramsar Convention (Salinas de Cabo de Gata), and two Especially Protected Zones of Importance for the Mediterranean (ZEPIM).

More than the 50% of the surface of the CAMP area is found under some figure of protection, and this has represented the development and application of different instruments of management for these spaces, such as the Management Plan of the Natural Resources, the Use and Management Plan and the Sustainable Development Plan of the Cabo de Gata – Níjar Natural Park, and the Rules and Guidelines of Use and Management of the Natural Monuments.

Its large surface and territorial continuity make of these natural spaces essential pieces of the management integrated in the context of a changing world, as they are natural laboratories where it is possible to analyze the vulnerability of its functions set against disruptions of natural or anthropic origin. This fact acquires a special importance in the economic and environmental situation, immersed in deep processes of global change that are undoubtedly affecting the Levante de Almería.

## **4. DESCRIPTION**

The commanded work for this individual project of Landscape valuation undertakes in the first place, the elaboration of a preliminary coastalisation diagnosis of the CAMP Levante de Almería area. Such report shows the degree and the features of the urban development in this coastal environment, as well as the impacts on the natural environment and on the transformed by the human activity. Its main objective is the identification, characterization and analysis of the evolution of the main cultural, environmental, ecological, and physical variables that define the territory and its relation with the occupation and the evolution of the human use of the environment during the last decades.

The diagnosis thus conceived is initiated with a description of the territory in natural and anthropic key; subsequently, it is analyzed how the uses since 1956 to our days have evolved; likewise, the current planning instruments whose decisions impact directly on the environment are also studied; to conclude finally with the identification of those uses and activities that have been the true principal actors in the transformation of this territory.

The coastalisation diagnosis determines, therefore, two essential questions with a view towards establishing the subsequent analysis of vulnerability of the territory:

- The territorial and environmental variables to be taken into consideration in the Landscape Vulnerability Assessment.
- The uses or economic activities to be considered for such analysis.

In parallel, the methodological bases for the analysis of vulnerability have been elaborated from the information obtained in the "Landscape Vulnerability Assessment" Formation Course, which the drafting team attended.

The Vulnerability assessment of the CAMP area is carried out to evaluate the vulnerability of the natural environment of the area in the presence of certain economic activities according to the proposed methodology by the PAP/RAC, already successfully practiced in other CAMP territories of the Mediterranean basin, with the necessary adaptations conditioned by the own cultural, environmental, and physical personality of the analyzed territory. The analysis consists of the following works: models of vulnerability; selection of indicators and values of balance; mapping of the indicators of each variable; numerical analysis; maps of vulnerability by uses and guide maps and intentional diagnostic.

From its initiation stage, the drafting team has considered the contributions and proposals carried out through the technical segment of the Coastal Commission, the technical delegates and groups of experts designated for this project, the Counsel and the Coast Forum. One the more active agencies that has worked hand by hand with the drafting team has been the group of Experts that bring together an assembly of people from the scientific sector as well as technicians from the public administrations, specialists in different matters, who have met up to give a joint vision to the diagnosis, the methodology and the proposals that have emanated of such works. The jointly developed activities and the analyzed documents are exposed subsequently. In the 2<sup>a</sup> Meeting of the Group of Experts, held on 18 and 19 of July 2011, took place the presentation of the first documents in a preliminary phase. The results of this

meeting were positive for the project, as far as the ideological and methodological bases on which the future project was to be developed and oriented were consolidated.

After the meeting, the work of the drafting team has consisted of the collection of necessary cartographic information for its utilization in the analysis of vulnerability. This has been, without any doubt, the longest phase, as for time it refers, since the obtaining of the information from the REDIAM and other public agencies has been extended in time. Once available all the necessary information, the work has been focused on obtaining the five environmental variables (slopes, light quality, water, ecological value, landscape and cultural heritage). At the same time, and from the first results of the coastalisation diagnosis relating to the uses and activities considered, the models of vulnerability for each one of these uses have been drafted. Such models are summarized in some cause-effect impact matrix. By means of this analysis they intend to identify the use/medium potential interactions and qualitatively evaluating the magnitude of the impacts that each necessary action to undertake for the establishment of the use/activity that is evaluated could cause on the different variables of the environment and, therefore, on the environment itself.

The to date, the achievements reached so much in the coastalisation diagnosis as in the analysis of the vulnerability, were presented in the 3<sup>a</sup> Meeting of the Group of Experts, held in Almería, February 2, 2012. In the meeting, the maps of the environmental variables classified according to the indicators and values of balance selected for each one of them, the models of vulnerability and the first vulnerability map on an activity, concretely to the establishment of intensive under plastic cultivation (greenhouses), according to the methodology presented were shown (see Chapter VII. Vulnerability assessment).

The Group of Experts requested the drafting team the delivery of the information provided in their original formats for the purpose of revising in depth and with greater detail the first results. For this task a period of about twenty days was established, after which, some experts emitted their corresponding reports of allegations. Once received these, the drafting team prepared a report that gave answer to each of the considerations provided, although it is concluded that a great part of these were already considered and included in the different documents.

The individual project in parallel to the development of its work, has participated in the elaboration of a survey for its access in the Coastal Forum, through its platform. It consists of a questionnaire titled "Survey for the Valuation of the social perception on the aesthetic value of the landscapes of the Levante Almeriense" in which certain quantitative units of landscape presented by means of images are evaluated. The object of such survey was to know the social perception of the local population and the visitors of the landscapes that surround it, grouped in different units. A quantitative valuation of a total of 13 units of landscape was proposed, employing a balance scale of ten terms, being the lower one the 1 and the highest one the 10. A total of 45 people have participated in this activity and its results can be consulted in the Annex 3 of the present document.

The work developed during the months of April and May has consisted in the obtaining of the maps of vulnerability for the remainder of uses and activities. Once these were obtained, the purpose diagnostic is carried out. The results obtained are analyzed exhaustively from an

objective point of view, this is, which are the strengths and opportunities of the territory, as well as the main problems detected in the light of the conclusions of the work. From the maps themselves, it is also determined the degree of convergence of the territorial proposals of the current plans, as well as the main problematic and conclusions in the so called Guide Maps, one for each use or activity taken into consideration also are spatially represented. The analysis of such maps feeds back likewise the purpose diagnostic.

The resulting conclusions of the guide maps and their corresponding proposals were transferred by means of internal coordination meetings with the drafting team of the Reference Framework for Sustainable Development, with the purpose to summarize the proposals that emanate from the final report of the individual project and the ones that are going to be incorporated to the framework.

Finally, all the cartographic documentation generated, so much the covers as the data model, has been supplied to the System of Environmental Information of the Levante Almeriense, for its incorporation to the system. The information has been adjusted to the specifications required by the REDIAM.

During all the year and combining it with the development of the project, the drafting team of the present individual project has taken part in the four workshops IMAGINE addressed to the Coastal Counsel. These encounters have allowed exchanging opinions among the different agents that work in the CAMP Levante de Almería environment, as well as among the different individual projects team responsible. The contributions of these workshops have been transferred to the individual project of Landscape valuation. In parallel to these encounters, meetings of coordination have been held also, attended by the drafting team, and in which the technical direction of the project and the remainder of teams of the individual projects have taken part. Finally, mentioning that, during the last phase of the project, the team of the present individual project has held two meetings for internal coordination with the team of the Reference Framework for Sustainable Development, with the purpose to summarize the proposals that emanate from the present report and the ones to be finally incorporated to the Framework.

## **5. COMPILATION OF INFORMATION**



The cartographic information on which the coastalisation diagnosis is supported has been very numerous and diverse in terms of subject matters. Climate, relief, geology, geomorphology and land cartography has been consulted for the description of the physical keys of the territory; the databases containing the flora species and fauna distribution, the habitats and the resulting covers of the project of Ecological Connectivity in phase of editing, to describe the ecological keys of the environment; the landscape units map in which landscape regions are identified, landscape areas and physiographic units, for the landscape chapter; the map of Uses of the land and Vegetable Covers of Andalusia for this territory, from 1956 to 2007, to know the evolution of the urban, agricultural, and forest lands in the mentioned period, for the epigraph of the evolution of the uses of the land. This information, along with another that has not been mentioned, has been supplied by the REDIAM.

The themes related to the water, cultural heritage and socioeconomic model have also been dealt with in the coastalisation diagnosis, but such information comes from the partial reports and endings of the corresponding individual projects.

Referring to the administrative intervention in this territory, diverse documents of planning have been consulted, as well territorial as environmental. Relating to the territorial planning two territorial plans of subregional character have been analyzed: the Planning of the Territory of the Levante Almeriense (POTLA, Decree 26/2009 of 3 of February) which includes the municipalities of Huércal Overa, Cuevas de Almanzora, Vera, Carboneras, Pulpí, Garrucha, Mojácar, Antas, Turre, Los Gallardos and Bédar; and that of the Urban Conglomeration of Almería (POTAUA, Decree 351/2011, of 29 of November) that includes the municipalities of Almería, Benahadux, Gádor, Huércal of Almería, Níjar, Pechina, Rioja, Santa Fe de Mondújar and Viator (in boldface the municipalities included in the CAMP Area ).

In environmental matter, the documents of reference have been the Natural Resources Plan and the Master Plan of Use and Management of Cabo de Gata-Níjar Natural Park. The associated cartography comes from the cover of the Network of Protected Natural Spaces of Andalusia, also supplied by the REDIAM.

The documentary base for the development of the work itself is completed with a set of documents, among which some works like "Integrated Management of Coastal Areas in Spain" and "Living the Coast: criteria for the Andalusian Strategy of Integrated Management of Coastal Areas" are to be emphasized.

The analysis of vulnerability, regarding the election of environmental and territorial variables, has been conditioned from the first moment by the availability of official geo-referenced cartographic information, for which an exhaustive study of all the information existing in the REDIAM has been carried out. After such study is concluded that the layers of information that will represent the environmental variables for the analysis of vulnerability are:

Information layers	Environmental and territorial variables
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Information layers	Environmental and territorial variables
Digital model of the Land with resolution 10x10 m	Relief/Slope
Map of Luminance Zoning Atmospheric	Light quality of the atmosphere
<p>Groundwater masses Cover and superficial 1:10.000</p> <p>Flood Map of the territory 1:10.000</p> <p>Inventory of sources and springs of Andalusia 1:10.000</p> <p>Morphodynamic units associated to the coastal dynamics. Map geomorphological of Andalusia 1:100.000</p>	Water
<p>Habitats: "Map of Interest Community Habitats distribution at scale 1: 10,000 in the woodland of Andalusia, in 1996 - 2006".</p> <p>Fauna: database of the territory faunal component on a grid of 1 x 1 km. (SILVIA) (JJAA), and Biodiversity National Inventory (MARM)</p> <p>Flora: database of the territory floristic component on grid 1 x 1 km. (SILVIA) (JJAA) and Biodiversity National Inventory (MARM).</p> <p>Ecological connectivity: preliminary covers in phase of review of the Index of Terrestrial Connectivity of Andalusia, using the following groups of habitats: not wooded forest masses (thicket), woodlands, grasslands and aquatic habitats and associated to river bed. (REDIAM, Junta de Andalucía)</p>	Ecological value
<p>Map of Landscape Units 1:100,000. Andalusia</p> <p>Countryside work</p>	Landscape
<p>General Catalogue of Andalusian Historical Heritage (Department of Culture and Sport. Junta de Andalucía).</p> <p>Inventory of popular architecture of Andalusia (Department of Culture and Sport. Junta de Andalucía).</p> <p>Inventory of Farmhouses, estates and wineries of Almería (Department of Culture and Sport. Junta de Andalucía).</p> <p>Identification of the additional Elements in the Individual Project of Landscape and Cultural Resources).</p> <p>Inventory of Cultural Geo-resources 2011 (REDIAM, Junta de Andalucía)</p> <p>Catalogues of protected Elements and Goods of the Planning of the Territory of Subregional environment of the Urban Agglomeration of Almería and of the Levante Almeriense, and General Plans of urban</p>	Cultural Resources

Information layers	Environmental and territorial variables
development of municipal environment (Department of Public Works and Transportations, Junta de Andalucía).	

The territorial unit of analysis used for the analysis of the vulnerability has been a raster grid of 10m x 10m. The methodology applied can be consulted in the Annex 1 of the present document.

## **6. COASTALISATION DIAGNOSIS**

The coastalisation diagnosis of the CAMP area has as an objective the identification, characterization and analysis of the evolution of the main cultural, environmental, ecological, and physical variables that define the territory and its relation with the occupation and the evolution of the human use of the environment during the last decades.

Since the methodological point of view, the coastalisation diagnosis has been developed taking as starting information the cartography of the Maps of Uses of land and Vegetable Covers of Andalusia (period 1956 – 2007), the analysis of certain indicators of socio economic character (INE, 1981 – 2011), the documents relating the two current plans (POTAUA and POTLA) and the documents that affect the environmental and hydrologic planning. Other documents linked to the coastalisation diagnosis have been the works "Integrated Management of Coastal Areas in Spain" and "Living the Coast: Criteria for the Andalusian Strategy of Integrated Management of Coastal Areas", whose conclusions have been of great utility. Finally, to give a wide vision to the chapter, the conclusions obtained from other Individual Projects developed in the framework of the CAMP Levante Almeriense Project have been incorporated.

The description of the diagnosis that is presented subsequently is structured according to a logical script. It begins with an exposition of the territory, described in physiographic key, in which aspects related to slope, climate, geology and geomorphology, water and finally, land are included. Once the gea is characterized, the biological qualities that have led this territory to its singularization are related. In them, the habitats and the species of fauna and flora are described in an ecological key, in base to the existing geographical information. Related to the biological aspects, in the Appendix 1 of this document is included the methodology applied for the obtaining of ecological value of the territory. Subsequently, and in an epigraph separated for the importance that it has for the project, the landscape is collected, as one of the environmental variables in which the project is based. The cultural heritage is also described.

Once known the territory from diverse points of view, the evolution of the uses of the territory since 1956 up to 2007 is analyzed to determine the economic dynamics that have marked the development of the environment of study.

Given the particularity the CAMP Area presents from the administrative and competence point of view, it has been seen the need to analyze the current instruments of planning whose decisions impact directly on the environment.

Finally, the diagnosis concludes with the identification of those uses and activities that have been the true protagonists of the transformation of this territory and with the territorial and environmental variables to be taken into consideration in the Landscape Vulnerability Assessment.

## 6.1. THE ENVIRONMENT

The territorial environment of the CAMP Levante Almeriense project is located in the southeast area of the province of Almería. It is delimited in its interior border by the eight coastal municipal terms from Almería to Pulpí, while the external boundary has been delimited in a nautical mile beyond the straight base-line that delimit the interior water, being thus adjusted to that defined by the Managing Framework of Water for the coastal area.

The municipalities that conform the environment of study are Almería, Níjar, Carboneras, Mojácar, Garrucha, Vera, Cuevas de Almanzora and Pulpí. It presents a total surface of 219,000 has, of which 71,000 has. correspond to the submerged area and 148,122 has. to the emerged land.



Figure 7. General map of the geographical location of the CAMP environment inside the province of Almería. Scale 1:400.000. Source: Initial documentation CAMP project

## 6.2. DESCRIPTION OF THE TERRITORY

### 6.2.1. THE PHYSICAL KEYS

#### Physiographic Features

The geological evolution of the territory conditions the clear differentiation of two types of large physiographic units: the mountains and the coastal plains. The plain areas correspond to coastal sedimentary depressions of Neogene – Quaternary age; they are the Bahía de Almería and Campo de Níjar, located to the south, and the basins of the rivers Antas, Agua and Almanzora, in the northern half. Delimiting these depressions the Andalusian mountains are found. On the one hand, the mountains of Gádor, Alhamilla, Cabrera, Almagro, Los Pinos and Almagrera are identified, and on the other, the Sierra de Cabo de Gata and the Serrata de Níjar. This differentiation in the Andalusian rugged reliefs responds essentially to the lithology of the surfacing material, metamorphic schists for the first and, volcanic rocks for the second. The territory reaches its greater altitude, with 1300 meters above water level, in Sierra Alhamilla (Almería and Níjar). With lower altitudes, around the 600 msnm, the mountains of Gádor (Almería), Cabrera (Carboneras) and Almagro (Cuevas de Almanzora) follow in height. Subsequently, with elevations around the 400 – 500 meters, the Cabo de Gata and Serrata (Níjar) and Sierra de Almagro, Los Pinos and Aguilón (Cuevas de Almanzora and Pulpí) coastal reliefs are situated. Around these geographical features, and with elevations near the sea level, the large coastal plains develop.

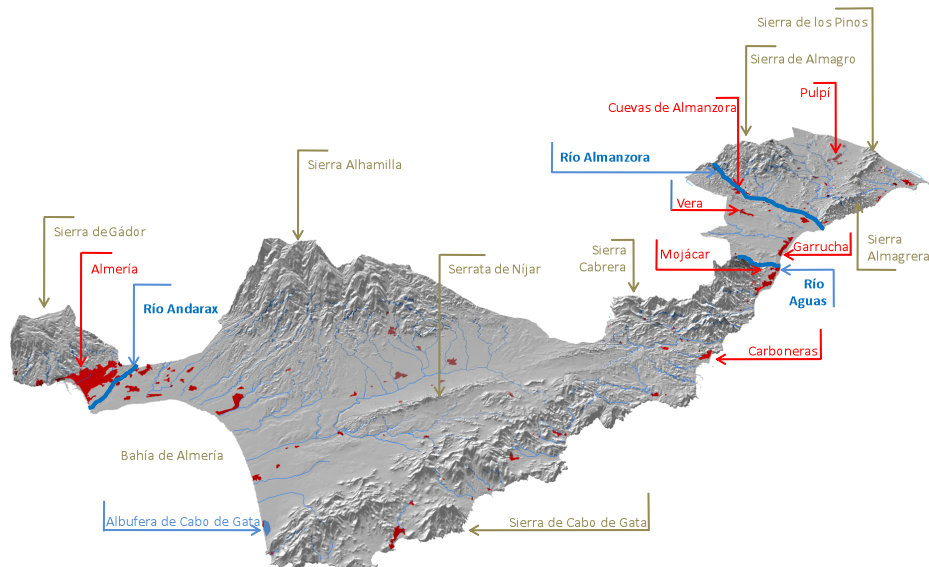


Figure 8. 3D Image showing the physiography of the CAMP Area (approximate Scale 1:500.000) Source: Elaborated by the author from the digital model 1:10.000 Junta de Andalucía.



*Figure 9. Idealized scheme reflecting the geological synthesis of the territory. Source: Geology of the dry environment of Almería. Didactic field guide. Junta de Andalucía.*

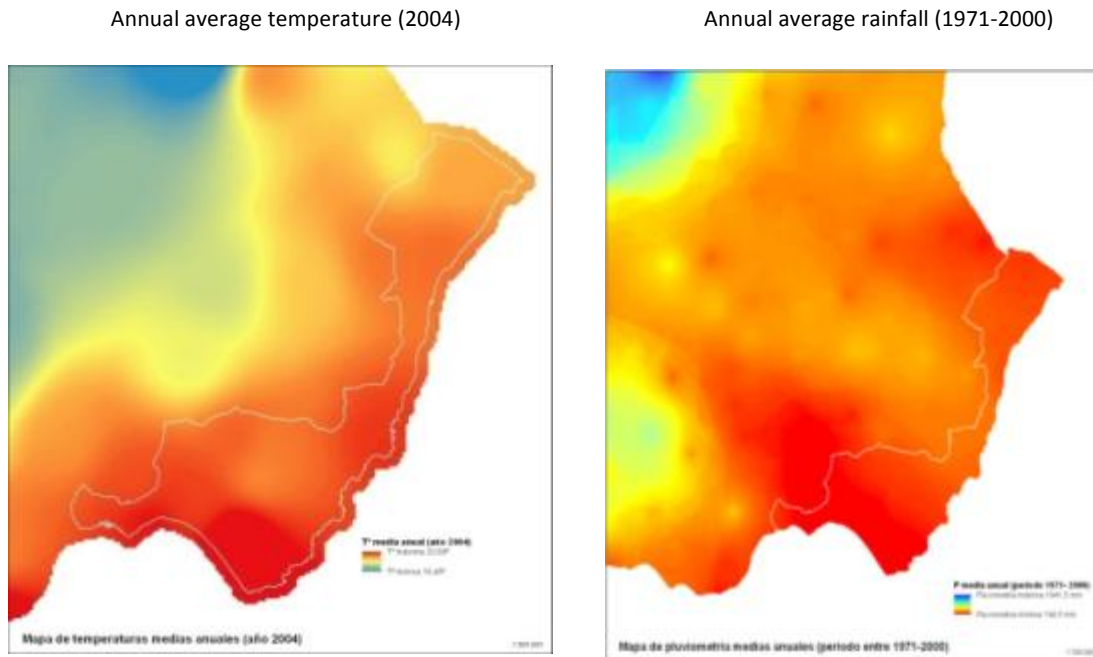
These contrasts between abrupt mountainous areas and extensive plains are also shown along the coastal strip, in which marked cliffs with other smoother morphologies, constituted by beaches, dune ranges, lagoons and deltaic systems, these last in the estuary of the main rivers and watercourses (Andarax, Alías, Aguas or Antas, among others) alternate.

The cliffs conform on the mountain – sea contact interface, while the seconds do it in the coastal plain – sea contact. The geomorphology of the coastal stripe has been incorporated as a part of the water variable in the methodology of vulnerability of the territory (see corresponding block in the present report).

## Weather

The CAMP area is characterized for the presence of a subtropical Mediterranean climate, with a clearly semi-arid subtle nuance, with low and irregular rainfall and mild temperatures.





*Figure 10. Maps of annual average temperature, to the left, and annual average rainfall, to the right, in the Andalusian southeast. Scale 1:700.000, Source: REDIAM (Junta de Andalucía).*

It is possibly the area with greater index of dryness of Europe, nevertheless its particular climatology has enabled the development of the techniques of greenhouse cultivations and has helped to consolidate the area as destiny of climatic tourists.

The average temperatures in the coastal stripe are situated between the 18 and 20 °C. It emphasizes the great number of localities with presence of free of frosts period of 365 days/year.

The average total rainfalls are very scarce and irregular, around the 250 - 300 mm of annual average rainfall, being among the lowest in the European context.

The annual potential insolation is high, being surpassed the 3500 hours/year, which influences to a large extent the reduction of the cycles of flowering and ripening of the cultivations in relation to other regions.

The evapotranspiration reaches extreme values of the 75%.

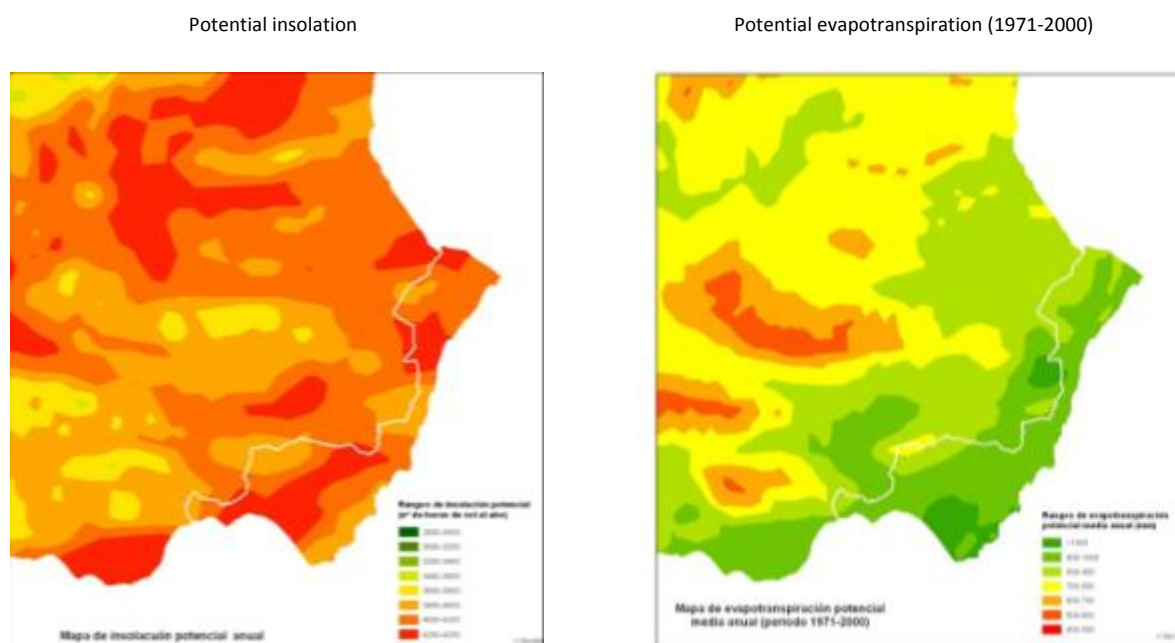


Figure 11. Maps of potential insolation, to the left, and potential evapotranspiration, to the right, in the southeast of Andalusia. Scale 1:700.000, Source: REDIAM (Junta de Andalucía).

With regard to the wind regime, the province of Almería is one of the registered sites with higher number of wind days during the year. The wind regime is of seasonal character, being the north direction the one that prevails from November to February, reaching its maximum during the month of December, and the east southeast directions prevailing during June, July and august with its maximum during the month of July.

## Water

The CAMP environment forms part of the competence of two hydrographic basins, the Andalusian Mediterranean Basin, which is the one that has a greater surface, and the Hydrographic Basin of the Segura, barely represented in the most northern sector.

The shortage of rainfall is reflected in the hydrologic model that characterizes the area. The hydric network is marked by the presence of four large river axes that split the territory, the Andarax, to the south, and the Antas, Aguas and Almanzora, along the Levante Almeriense. Some tributaries of the main riverbeds acquire also a prominent territorial role, like the watercourse of the Artal, which travels through the interior of the Campo de Níjar, or the watercourse of Canalejas, that dissects and drains the basin of Pulpí. All of them are alluvial systems of watercourse type, typical of semiarid environments, with refills of rain origin of marked seasonal nature and even high yearly irregularity. They are courses with intermittent overflow regime, that remain generally dry most of the year, but evacuate great quantity of water and sediment after high intensity rain episodes, very typical, on the other hand, in the entire Mediterranean basin, having a highest capacity erosive power.

In fact, the risk of flood of these alluvial apparatuses is high or very high. The floods of 1892 are to be recalled by their devastating consequences for the population of Almería. Some activities, especially the agricultural, invade the Hydraulic Public Domain that, save in certain sections of the main riverbeds lacks demarcation approved.

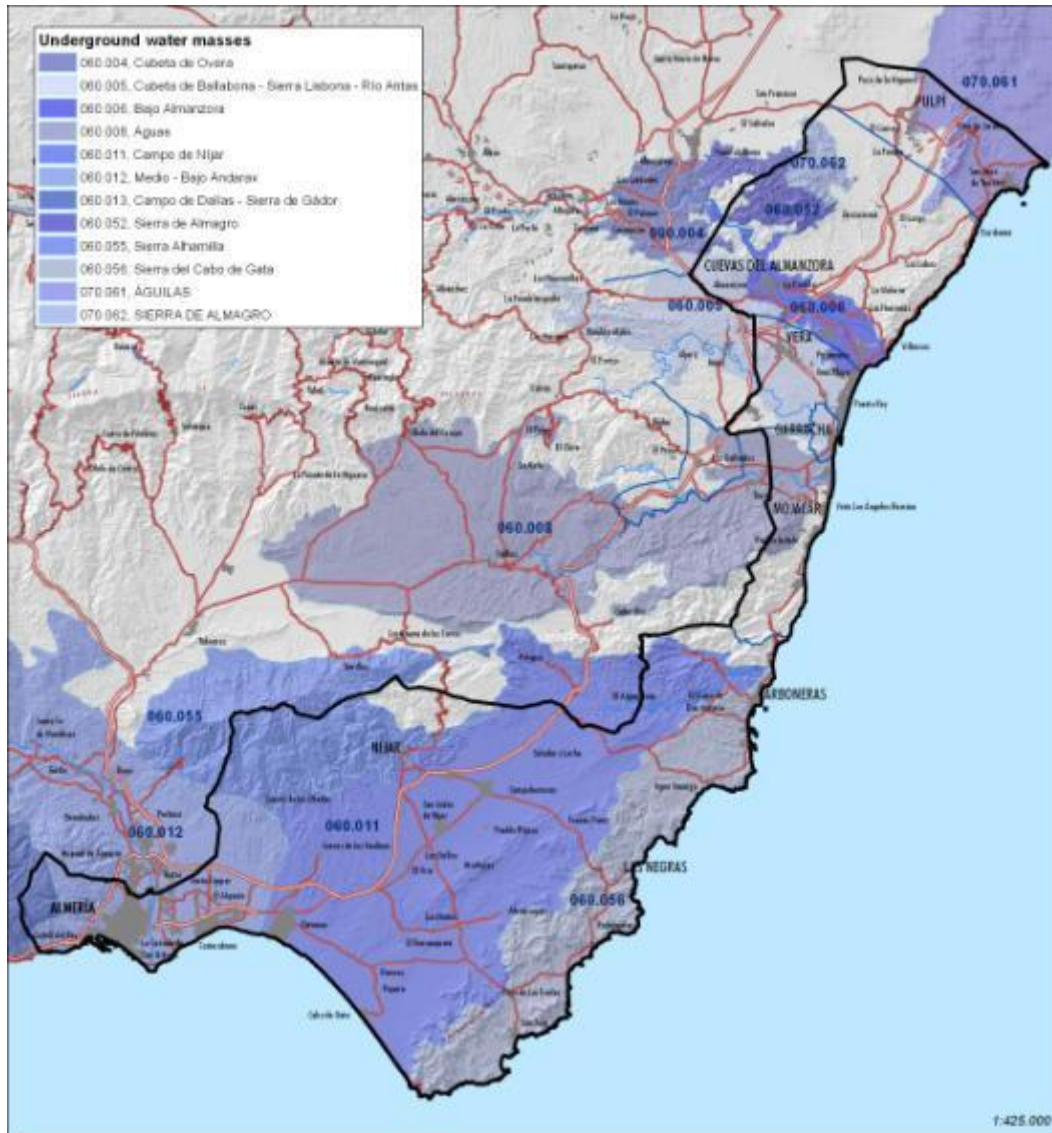


Figure 12. Groundwater masses map in the CAMP environment. Scale 1:425000. Source: REDIAM (Junta de Andalucía)

From a hydrogeological point of view, the area offers important productive masses of groundwater, although historically overexploited upon bearing the consumption of the agricultural growth in the last decades. In fact, the mountains, as corresponds to their dominant lithology, generally metamorphic schists, quartzites and marbles or metamorphic limestones, are not productive units from the hydrogeological point of view since they are of very low permeability nature. The coastal plains, on the contrary, conform to ceiling of the refill of sedimentary detritic basin that constitute aquifers or hydrogeological units of high

productivity. Nevertheless, the level of overexploitation of the groundwater masses makes them to be catalogued as masses in risk according to the Framework Directive on Water.

No regulation of superficial water exists. The only reservoir that of the Almanzora is conceived as a flood lamination reservoir intended to correct the risk of flood in the low Almanzora.

The water deficit is balanced currently with the contribution of external resources, well coming from transfers from other basins or well by means of seawater desalination devices. Nevertheless, there persist important deficits in infrastructures and equipment for purification and recycling of urban sewage and the general efficiency of the cycle of the water.

## **Floors**

The result obtained on the analysis of the Soils Map Scale 1:100.00 of the Project LUCDEME concludes that the soils of the CAMP environment are in general very varied but of scarce productive capacity, as corresponds to a global area qualified as Semiarid Area. The geomorphological features, defined by steep slopes in the hills, the major presence of soft lithology, easily subject to erosion, and the torrential regime of rainfall do not they permit the development of mature and evolved edaphological formations. The soils are found in a state of advanced degradation. They are generally skeletal floors, with scarce capacity to retain water and nutrients, that do not permit, in a general form, the development of a conventional agriculture, if is not by means of an important transformation.

With a view towards its use, it should be pointed out that the agricultural capacity of these soils is found significantly limited by the conditions of climatic dryness, the physiography, the scarce effective depth of the soils, and the low fertility and high stoniness of them. In spite of the scarce edaphic quality for its agricultural use, on this an intensive under plastic farming (greenhouses) has been settled that does not consider the soil as a constraining factor, not even for the slope, being carried out levelling in abrupt zones. Nevertheless, other areas inside the environment of study with high agricultural potential are identified, with little slope and coincident with the fertile floors developed in the river valleys, as they are the fertile plains of the Andarax, Antas or Almanzora.

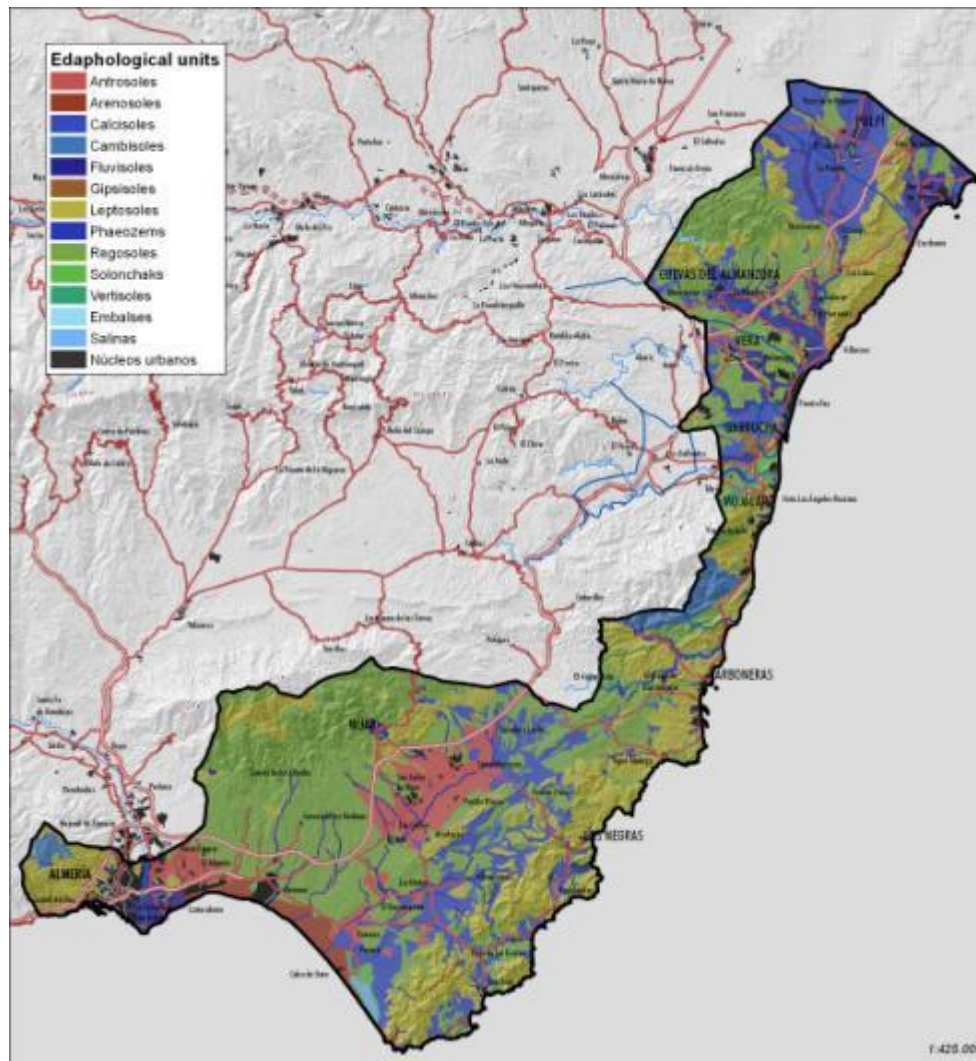


Figure 13. Edaphological classification in the CAMP environment. Scale 1:300.000 (Source: REDIAM).

The consideration of the soil factor in the analysis of the vulnerability is used to be observed from two points of view: a) from the perspective of induction or soil loss process acceleration, erosion and desertification, and b) from its productive capacity. Regarding the first reflection, fits to indicate that the floor has been kept in mind at the moment of valuating the vulnerability of the territory by means of processing of the "slope of the land" variable that is obtained from the digital model of the land. Relating to the second vision, from the perspective of its productive value for the agricultural activity, this really has not been kept in mind, since in the CAMP area there is not spatial correspondence among the scarce soils with high productivity and the presence of industrial agriculture under the modality of "greenhouse". This is: the agricultural settlement of new areas in the modality of intensive under plastic farming does not require the presence of soils of high biological productivity, furthermore, does not even require the presence of any soil at all.



Cabrera. Special geographical situations, as the coastal watershed of some mountains, present more xerophilous vegetation due to the drying effect of the wind.

So much or even more important than the water, the nature of the substrate plays a fundamental role in the semiarid environments in the distribution of the organisms. The variety of surfacing lithology ranges from the siliceous substrates with neuter or slightly acid floors, present in the mountains, to the very basic, proper of the depressions, or the volcanic ones of the Sierra de Cabo de Gata and the Serrata of Níjar. On the schistose substrates, grows an acidophilic vegetation, which softens this character as the climate turns drier. In the depressions and the calcareous environment of some mountains appears, on the contrary, vegetation clearly basophilic and also halophytic when the quantities of salts presents on the ground are very high, very frequent fact in the feet of the mountains and in the coastal lagoons. The existence of gypsum in some sectors (like in the base of Sierra Alhamilla, Sierra Cabrera and Sierra de Almagro) harbors the gypsum pits, some thickets with a flora very specialized, whose singularity confers him a high ecological value. But, there also exist elements and communities connected with geomorphological particularities as rocky lands (rupicolous plants), dunes (sabulicola plants), etc., increasing thus the biodiversity of the area.

The cast of vegetable communities is quite wide, and includes habitats little frequent in the European and Spanish context as the groves of jujube, Maytenus, Periploca, barrillares, or gypsum pits, etc., as well as other more known like they are dwarf palm groves, esparto fields, Lygeum groves, communities of dunes, salt cedar groves, thymes, boxwood groves, among a long one etc. The predominance of the vegetation xerophilous united to the physical conditions allow the landscape of Almería to enjoy of a singularity inside the European context that features it as subdesert area.

As for the flora, it should be mentioned the high number of endemism, being this territory one of the main "hot points" of speciation of the Mediterranean region. The current distribution of the alive beings is reflection of the recent geological history, which has determined the floral composition of the territory. In fact, the environment of Almería counts on a multitude of floral elements common with the north of Africa, due to the connections that existed in the past between the Andalusian mountain range and the African continent. These elements remain, in European territory, relegated to the peninsular southeast, conferring to the territory one slighter feature of singularity.

It is, therefore, an environment that maintains species that only live in this territory inside the European context (*Androcymbium europaeum*; *Antirrhinum charidemi*; *Euzomodendron bourgaeum*; *Narcissus tortifolius*; *Cosentinia vellea bivalens*; *Helianthemum alypoides*; *Limonium tabernense*; *Linaria nigricans*; *Loeflingia baetica*; *Maytenus senegalensis subsp. europaea*; *Salsola papillosa*; *Teucrium charidemi*; *Teucrium turredanum*, etc.). Among the species that share distribution with the north of Africa they are found *Ziziphus lotus*, *Anabasis articulata*, *Helianthemum squamatum*, *Lepidium subulatum*, *Koelpinia linearis*, *Leysera leyseroides*, *Rosmarinus eriocalix*, *Ammochloa palaestina*, etc.

Relating to the value and importance of the habitats, protected by the 92/43/CEE Directive known as Habitats Directive, it was the European legal framework in which endangered species and, for the first time, the habitats that harboured this species or which were representative of the biodiversity of the European environment were protected. In this

context two categories were established according to its ecological importance, representativity or their peculiarity:

- Habitats of general interest, like those that were representative of the biodiversity of a country.
- Habitats of priority interest, for those which are endangered for their singularity, fragility, composition of species and scarce superficial representation

The cartography of habitats, carried out to a scale of detail, 1:10.000, has supposed a very useful tool in the ordering of the territory, since it defines the main lines of the surfaces with interest for their protection in the light of the scientific know-how that are possessed in the last decades. The cartography of habitats defined for the CAMP Area can be seen in the following figure.

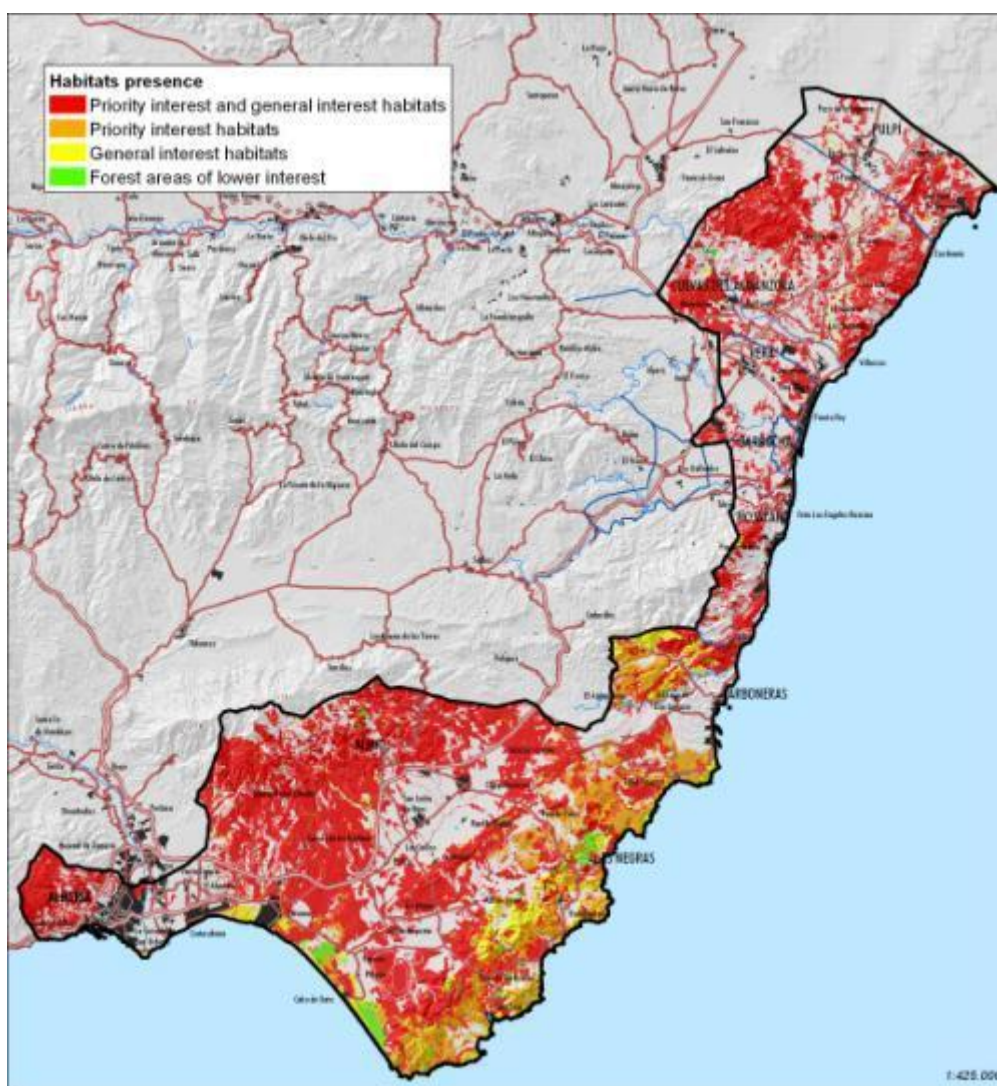
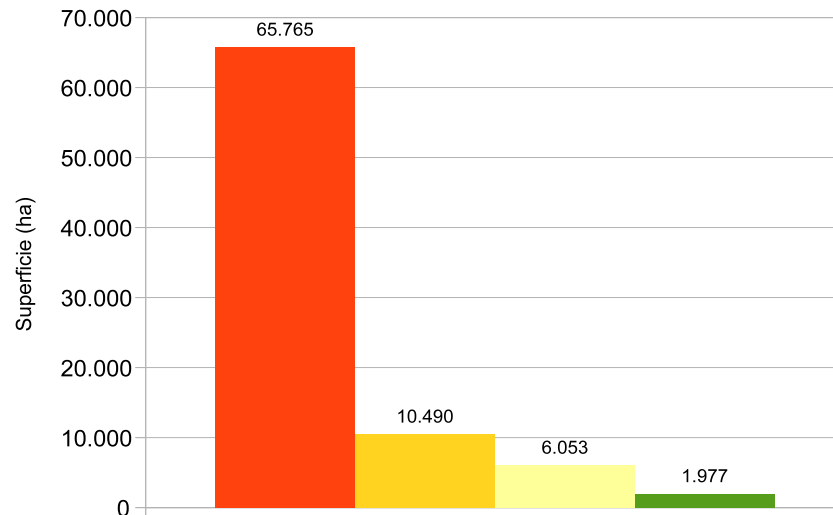


Figure 15. Map of distribution of habitats in the CAMP Area. Scale 1:425.000. Source: REDIAM (Junta de Andalucía)





**Figure 16.** *Spatial distribution (expressed in has) of the different typology of habitats. Source: Elaborated by the author from the information of the REDIAM (Junta de Andalucía)*

As it is observed in the map and in the graphic, can be concluded that the 55.35% of the CAMP terrestrial environment corresponds to vegetable communities catalogued as of priority interest, of general interest and of priority interest + general interest according to the Habitats Directive.

The wealth and botanic diversity showed previously allows the zoological component in the area of study to be also diverse and singular, from all the points of view (by number of species, degree of endemism, protected species, etc.).



Figure 17. Map of presence of Flora and fauna protected and of interest species. Scale 1:300.000. Source: Elaborated by the author from the information supplied by the REDIAM (Junta de Andalucía)

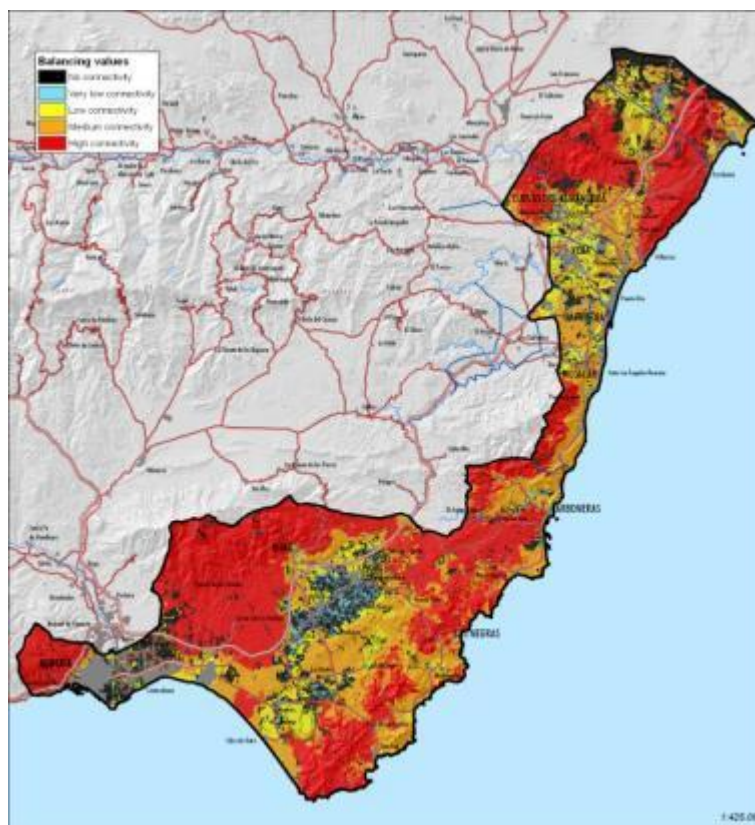
In the CAMP environment, an extensive number of biotopes with a great zoological diversity exist, among which they are remarkable, in order of importance:

- The fauna of the semiarid thicket that covers an important number of associated species to the singularities of the thickets of Almería and other more generic of steppe character. It is distributed on the areas that still maintain the thicket communities, and includes species so characteristics of these semiarid environments as are Moorish tortoise, stone curlew, little bustard, black-bellied sandgrouse, Dupont’s lark, trumpeter finch, European roller, Bonelli’s eagle, North African hedgehog, besides endemic invertebrates in many taxonomic categories. The skirts of the coastal mountains are areas of exceptional importance for the populations of steppe birds, being of singular interest their support corridor character for the small autumn-winter and spring-summer migrations, between the line of coast and the inner semiarid environments.
- The salt mines of the lagoons of Cabo de Gata, that permit the living to a bird fauna of special importance in the Spanish and Andalusian environment as is the pink flamingo,

marbled duck, grey heron, black-winged stilt, avocet, Audouin's seagull, common tern, dunlin, among a very long cast of species. These natural values have been recognized with the declaration of the Cabo de Gata salt mines as figure of international protection for the birds RAMSAR. Also some species are identified in the old salt mines of San Juan of Terreros, very altered nowadays, and in the estuaries of Rambla del Moral, the river Aguas and Antas.

- The cave-dwelling fauna associated to the natural cavities and to old mines of the Sierras of Gádor, Almagro, Almagrera, Los Pinos and Aguilón. The presence of several species of bats and of endemic invertebrates of some cavities confers to this place a very special interest inside the environment of study. This fauna, still in study, presents besides a great fragility by the much constant ecological conditions of the cavities, being altered with the minimum change or human intrusion.
- The fauna of dunes, that survives in the few territories that remain of "dead dunes" in the coastal stripe that goes from the airport to Cabo de Gata, and includes species of interest adapted to the mobility of the land and to vegetation of scarce size as they are the spiny-footed lizard, Bedriaga's skink, lesser short-toed lark, North African hedgehog, garden dormouse, etc. and some endemic insects of these environments.
- The fauna of cliffs that exist in the base of Sierra de Gádor, in the Cabo de Gata-Níjar Natural Park, Sierra Cabrera and Almagrera, and Isla Negra, Island of Terreros and Island of San Andrés, where several species of seagulls appear, cormorants and shearwater. It is, in any case, fauna with a very reduced habitat, therefore is limited spatially to the few cliffs that remain virgins in the province.
- The fauna of forests, limited essentially to the mountainous woodland areas of Sierra Alhamilla and Sierra de Almagro with oak groves and pine forests of reforestation, includes elements proper of these forests as are golden eagle, booted eagle, goshawk, sparrowhawk, mountain goat, garden dormouse, as well as an important cast of taxa of vertebrates and invertebrate.

Besides of the species and habitats, has been incorporated to the ecological Landscape valuation the ecological connectivity variable from the results obtained from the project elaborated by the Department of Environment called Plan of Improvement of the Ecological Connectivity in Andalusia that is found in phase of editing. This has consisted on the elaboration of cartography and an ecological connectivity diagnosis in Andalusia to establish an Improvement Plan. The mathematics methodologies application and systems of geographical information has permitted obtaining the Index of Conectividad Terrestrial of Andalusia (ICTE). The first results of this analysis are the ones shown in the attached figure.



*Figure 18. Ecological connectivity map of the CAMP environment. Scale 1:420000. Source: Department of Environment (Junta de Andalucía)*

The biological characterization of the environment ends up with the description of the ecological value of this territory. The term "ecological value", in function of the objectives of the CAMP project, relates to the ability or disability of a specific territorial environment to bear the impacts and environmental affections derived from the establishment in it of new uses without altering its state of quality and biological diversity. Its concept is superimposed to other as quality and landscape naturalness, productive capacity, biodiversity, etc., although, in our case, it is oriented to the search of useful technical criteria for the sustainable management of the territory. The concept is interrelated, from this point of view, with the impact capacity, in a way that, as greater is the ecological value of the territory, greater is the potential impact that can produce an activity that develop on the it.

The ecological value is an aspect of great importance in the environment CAMP, to the point that has been seen necessary to consider it as an environmental variable to be explicitly included in the methodology of the vulnerability (see specific block). Its valuation presents a great methodological complexity by the multiplicity of factors that intervene in the ecosystem valuation, reason why it will be described in detail in Annex 1 of the present document.

To be able to obtain the Ecological Value of the Territory a series of criteria in relation to 11 environmental variables of great ecological importance have been followed. It should be remarked that this ecological value obtained is of absolute nature, that is to say, is not relating

to an specific surface, which would permit the comparative with other Spanish or European territories, since it obeys to criteria of biological diversity, intervention capacity and regeneration, biogeographic singularity, ordering and legal status of the species and habitats that develop in the lands of study.

The obtaining of ecological value for each community/habitat has been obtained as an addition of the values of the different ecological variables. The importance or weight of each variable is different, for which the distribution of values of the following board has been used:

Biological groups	Ecological variable	Maximum value
Habitats	Vegetable series	0,5
	Serial or paraserial level	7
	Habitat rarity	0,5
	Habitat regeneration ability	0,5
	Habitat restoration possibility	0,5
	Habitat protection status	2
Species	Protected flora	unlimited
	Non protected endangered flora	unlimited
	Protected fauna	unlimited
	Non protected endangered fauna	unlimited
Connectivity	Ecological connectivity	1

In essence, the habitats constitute the fundamental base of the ecological valuation, which is complemented with the presence of flora and fauna species of interest, and with aspects related to the connectivity of those habitats.

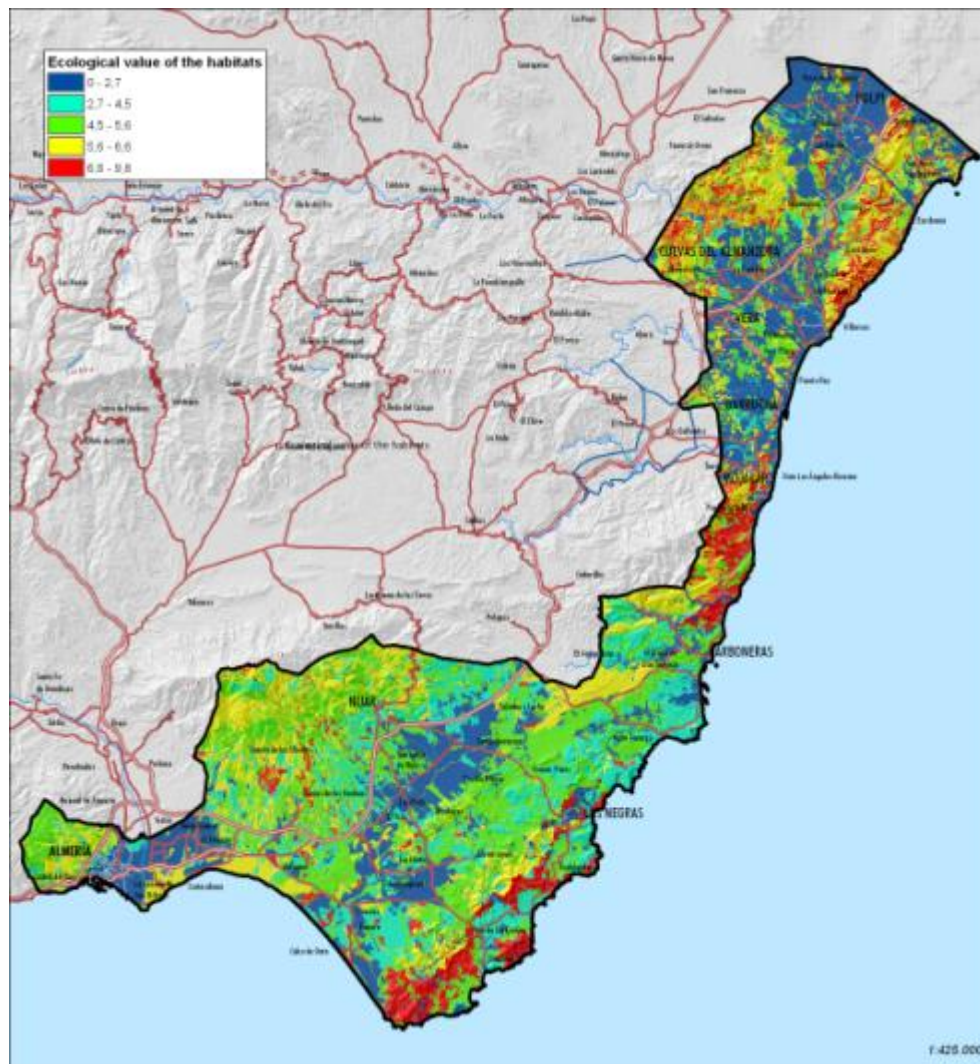
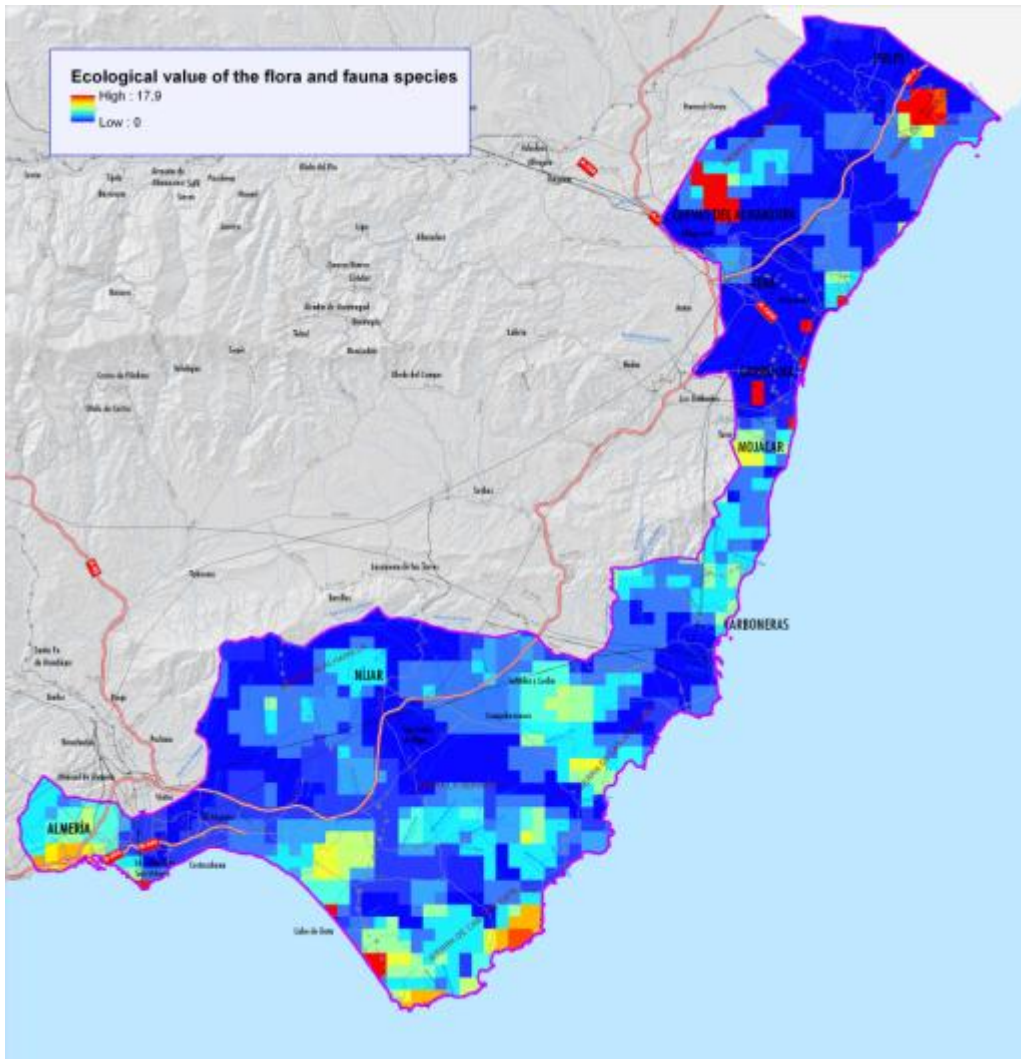


Figure 19. Map of ecological value of the biological group of the habitat. Scale 1:300.000  
Source: Elaborated by the author from the information supplied by the REDIAM (Junta de Andalucía)



*Figure 20. Map of ecological value of the biological group of the species of flora and fauna. Scale 1:300.000 Source: Elaborated by the author from the information supplied by the REDIAM (Junta de Andalucía)*

The above-mentioned ecological value to the ecological connectivity variable is the same one that appears in the figure 12 of this section.

After the combination of the cartography of these biological variables, plus the floors sealed by the human activity, the resultant map of the ecological value for the CAMP environment is the one observed in the following figure:

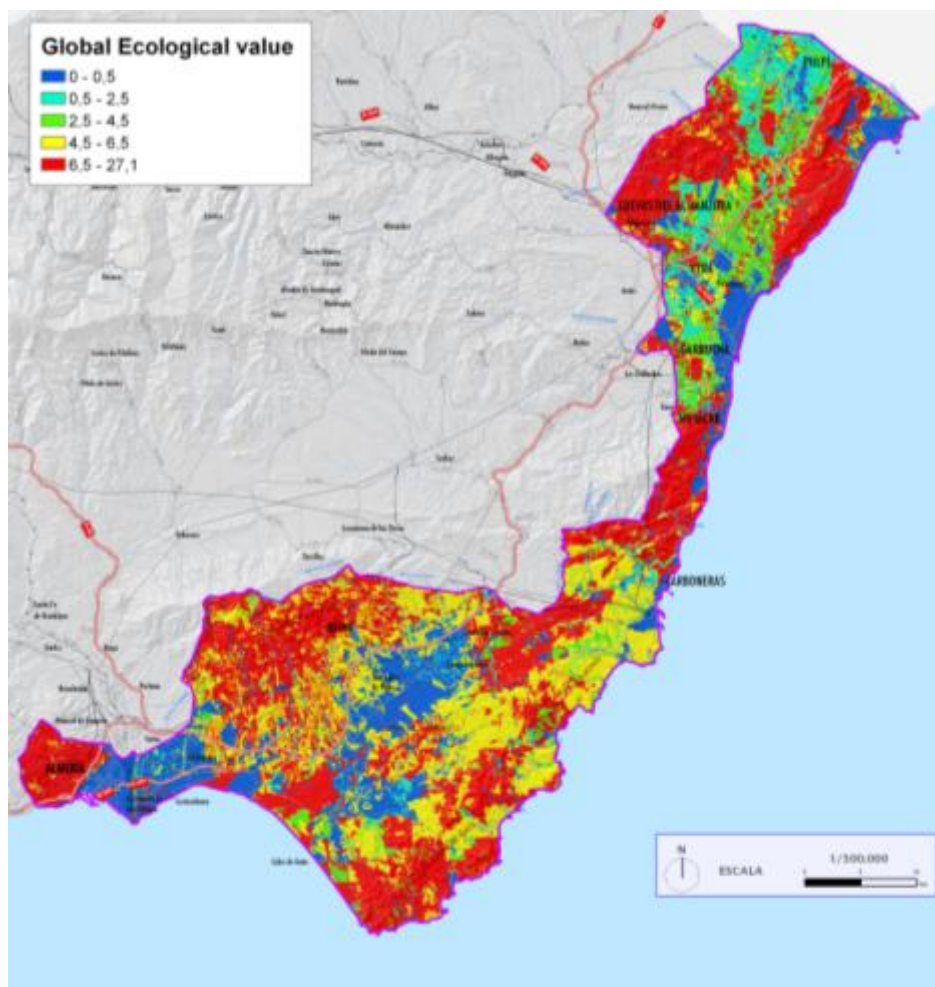


Figure 21. Map of global ecological value. Scale 1:300.000 Source: Elaborated by the author from the information supplied by the REDIAM (Junta de Andalucía)

The conclusions derived from the previous map are summarized this way:

- The units of high and very high value for the conservation are represented in the territory in a 42.77% and a 26.12% of the environment respectively. The 7.99% corresponds to units of medium value, and the 6.82% to units of low value. The 16.29% of the CAMP Area presents a very low value or lacks environmental interest.
- The areas of very high value match particularly with the mountain areas geographically present in the Sierras de Gádor, Alhamilla, Cabo de Gata, Serrata, Sierra Cabrera, Almagrera, Almagro, Los Pinos and Aguilón, as well as in other definite sectors of pronounced relief.
- Extensive areas of the Sierra of Cabo de Gata, and some interstitial zones of the class of previous value in the main mountains of the environment present high ecological values.
- Finally, the lands classified as medium value ones concentrate mainly in the basins of Vera-Garrucha and Pulpí. The areas of low ecological and very low values they concur with



urban zones, infrastructures and areas intended for intensive cultivation under plastic (greenhouses), among others.

### 6.2.3. THE LANDSCAPE SINCE THE PERSPECTIVE ESTHETICS

It is undertaken the analysis from an exclusively aesthetic perspective, since the ecological components of the territory are treated in an individualized way. The texts of reference have been the European Convention of the Landscape and the Andalusian Strategy for Landscape (Junta de Andalucía, 2012). The taxonomy of landscape comes from the nomenclature used in the Map of Landscapes of Andalusia (scale 1:100.000).

The study of the landscape in this work parts from two premises: one, to develop at a regional level the orientation and typologies of landscapes established in European Agency of Environment, and two, to carry out a cartography based on a far from territorial recognition of the traditional studies of landscape based on the visions of an observer. In their elaboration, besides, other aspects as the lithology, the morphological systems and the geomorphological processes, the uses of the floor, etc have been kept in mind. The use of tools like Geographical Information Systems has facilitated the processing and the analysis integrated of all the elements involved.

The map of landscape it is itself structured in three levels, which, from greater to smaller scale they are: landscape regions, landscape areas and physiographic units. Subsequently those categories are represented by means of a succession of figures.

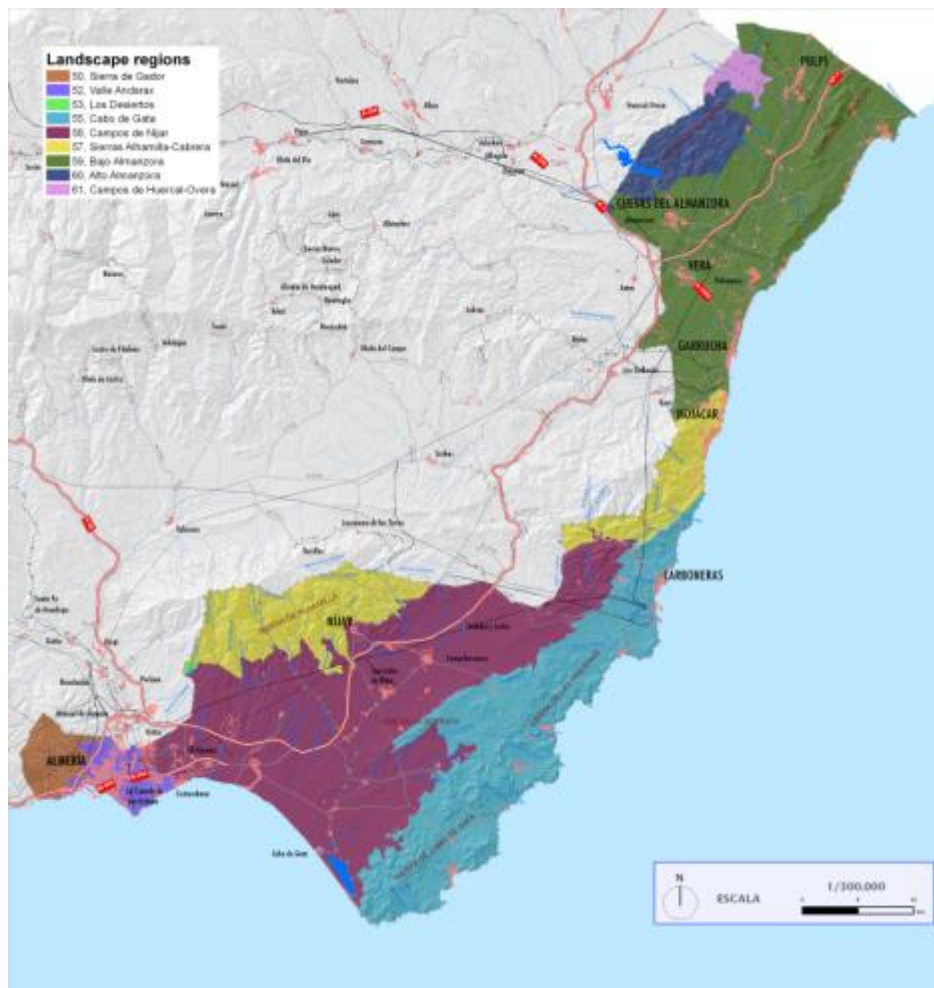


Figure 22. Map of landscape regions of Andalusia. Scale 1:300.000. Source: REDIAM (Junta de Andalucía)

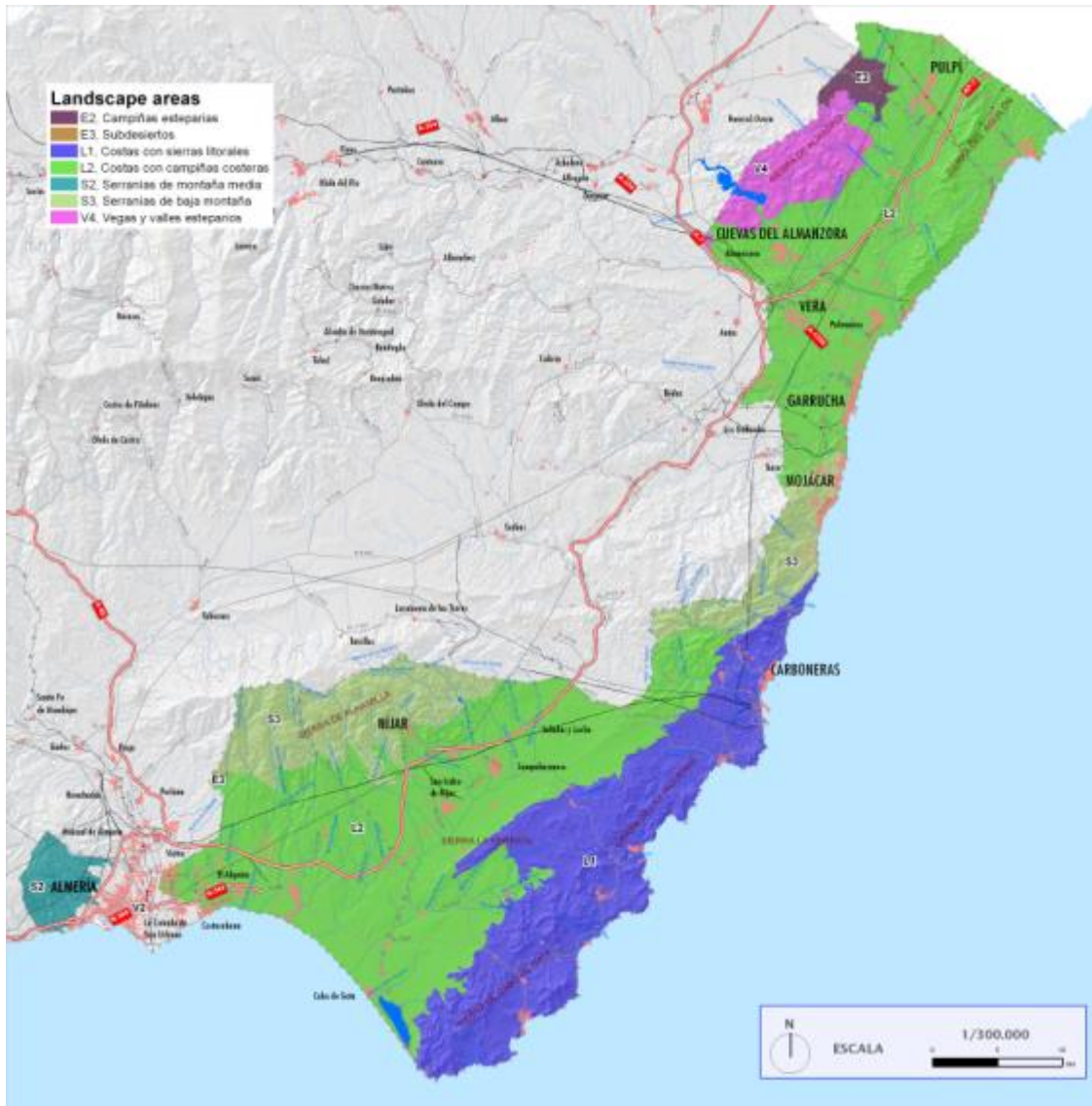


Figure 23. Map of landscape areas of Andalusia. Scale 1:300.000. Source: REDIAM (Junta de Andalucía)

With all of this, the characterization of the landscape in the CAMP Area has required of an ex novo cartography adapted to the territorial reality. For its execution, it has been taken as a basis the original cover of physiographic units, and it has been complemented with an intense fieldwork. The result is a landscape units map, in which they have been identified a total of 74 units, that vary from the more anthropized (city centres) to the most natural (mountainous summits). These units have been grouped in 15 systems (see the figures relating to the variable landscape in the block of methodology). The high number of units shows the landscape diversity of the CAMP Area, some of their with own personality.

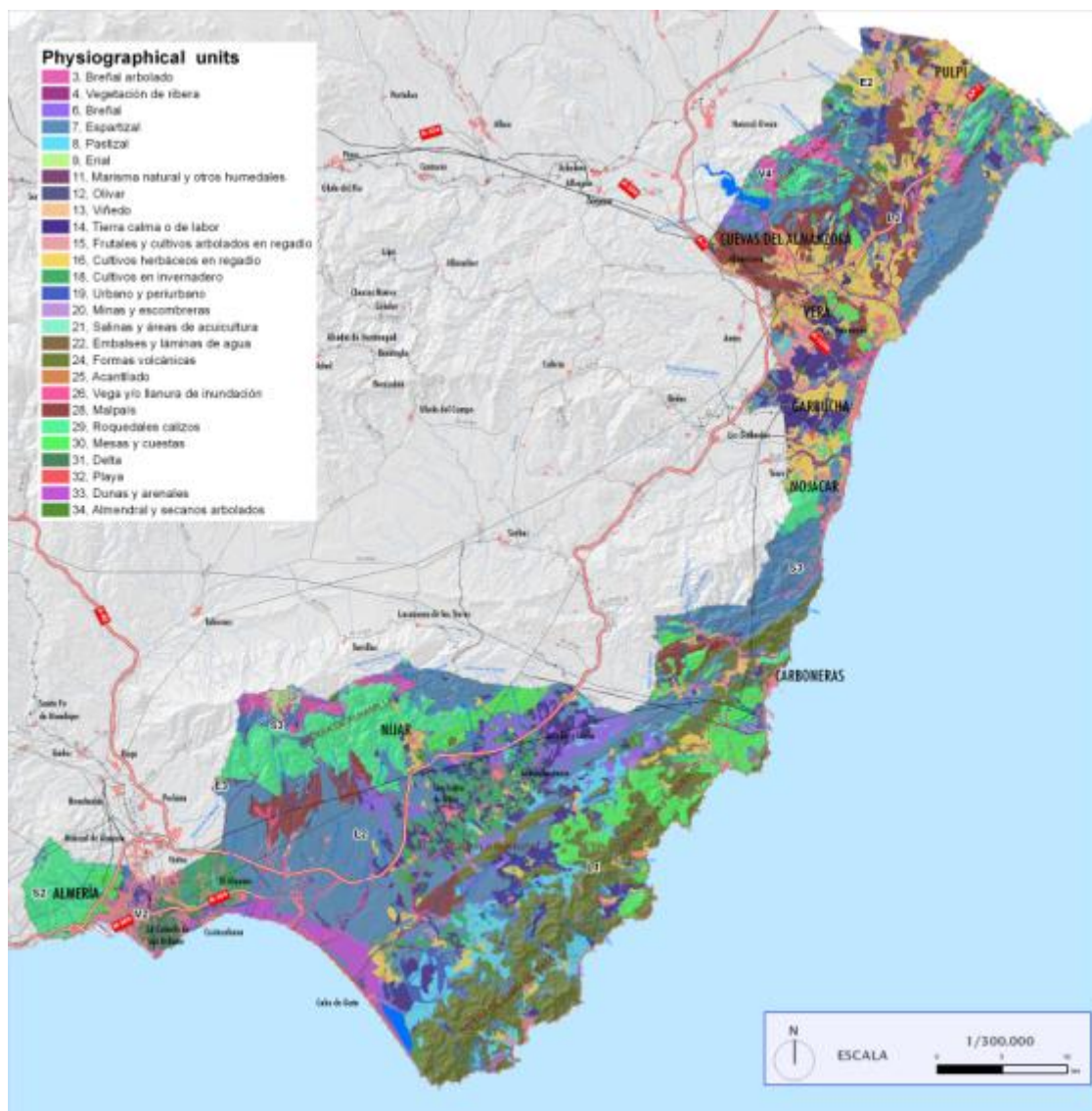


Figure 24. Map of physiographic units of Andalusia. Scale 1:300.0000. Source: REDIAM (Junta de Andalucía)

The identification of units has permitted to affirm that the values of nature and landscape in the CAMP Area are expressed territorially in extensive sets or areas with levels of harmonious and high naturalness adaptations of the forms of human occupation to the ecological potential; in other occasions, these values are summarized in milestones, elements or small spaces, in many occasions out of the large areas of environmental interest, and exactly for that reason, they acquire an strategic value and a special attention.

In their coastal façades of the Levante, the mountains, scarcely built-up, add the value of the clean contrast between the sea and the cliffs (already exceptional in the Spanish Mediterranean) and special and valuable ecological conditions. These interior mountain and coastal environments and landscapes are object of urban development tensions on the part of

a model that tends to occupy, on the one hand, the mountainous interior, according to patterns of high occupation, and unrelated to the possibilities of a quality offer, and, by another, the coastal mountainous fronts, by means of urbanizations more or less conventional.

The intrinsic values that harbour these environments and landscapes, and the role that perform in the image and in the own mark of quality that the Levante intends for their tourist offering, are put into question with this type of operations. In the plains, the values and the interest of the landscape essentially have to do with environments and agrarian plots associated to the fertile plain, that mark besides an intense and surprising contrast between dry steppes and oasis, and with elements and noticeable sets that permit at the same time panoramic views and foregrounds, and offer patterns of landscape narrowly associated to the image of the Levante; is the case of the escarpments of the fertile plain, ravine-like and with caves, the mining sets to the foot of the Sierra Almagrera and the small lagoons in the estuary of the rivers Antas and Aguas.

The counterpoint in the environments and landscapes of the plains are marked by a new agriculture of irrigation that radically transforms the physical bases of the landscape and of the ecosystems, with the introduction, functional and formal, of new elements and, meanwhile, the chaotic peri-urban developments of some populated areas, taking advantage of uncultivated and wasted lands for establishments without any integration in the environment.

In the region of Níjar and the Bahía de Almería, the ecological and physical attributes of the territory reproduce settings of great personality, curtained by the Mediterranean Sea, on which the silhouette of the Cabo de Gata is drawn, beyond the dunes and beaches of the Bahía de Almería. The interior valleys of Níjar and El Hornillo – Fernán Pérez, separated by the volcanic relief of the Serrata, delimit the corridor linking with the Levante Almeriense.

These territorial elements that so clearly delimit the landscape conform its identity, recognized and valued global and local, by the promotion of the environment in certain sectors of activity, particularly the tourist one, in which the landscape is shown like a resource and a strategic opportunity.

Nevertheless, this landscape is scarcely recognized as sign of identity, being frequent the landscape infractions derived from the execution of large infrastructures around the Mediterranean corridor, or by the disorderly advance of the greenhouse. The highway makes the visibility of such actions easy, executed, some, on units of landscape of high fragility as they are promontories well exposed to the human eye. The traces of the mining activities are also notable in sectors as the Sierra de Gádor or Cabo de Gata.

In the same way, the advance of the greenhouse on lands of forest vocation is causing intrusions in valuable landscape environments, where the greater slopes force levellings with pronounced dismounts of great visual impact. These situations are detected, fundamentally in the contact with the mount foot of Sierra Alhamilla, north of the highway on his passage through El Alquíán, and in the north sector of Campo de Níjar, as well as in the border of the Cabo de Gata Natural Park, in the valley of the Hornillo - Fernán Pérez.

Finally, in those areas in which they are integrated the intensive purely agricultural use and the traditional one, with the industrialist, residential, tourist, etc., as is the case of the nuclei of La

Cañada or El Alquíán, Campohermoso, or San Isidro, a territorial disorder is detected, fruit of the mixture and superimposition of uses, whose aesthetic repercussion is quite negative.

#### 6.2.4. CULTURAL HERITAGE

The information used for the description of this epigraph comes from the Individual Project of Conservation of Cultural Heritage, which has carried out an exhaustive analysis of the cultural resources of the CAMP environment, emphasizing above all, those that are going to be a part of the cultural itinerary that the own project defines. The information thus obtained has been completed for it facilitated by the Provincial Delegation of Almería of the Culture Department. The consulted sources are shown in the Chapter 5 Compilation of information of this document.

The total number of identified elements rises up to 561, which are represented in a figure of the variable cultural resources included in the analysis of the vulnerability (see specific block).

In all of the categories a high number of Protected Goods by the current legislation have been identified. They are Goods that show off the maximum protection, by the Law of 16/1995, June 25 of the Spanish Historical Heritage, or by generic collective or specific inscription in the General Catalogue of the Andalusian Historical Patrimony by the Law 14/2007, of November 26, of the Historical Heritage of Andalusia.

The inventoried elements correspond to diverse categories:

- Archaeological Patrimony, with excellent representations from the Palaeolithic.
- Architectural Patrimony, emphasizing, in addition to the catalogued urban real estate goods, a magnificent representation of the defensive military architecture, from the Nasrid period, with its maximum exponent in the Alcazaba de Almería, to a dense set of castles and fortresses of the age of Charles III, built on fortification purposes on the coast.
- Ethnological Patrimony, including those outstanding elements of the very rich, Mining and Industrial Patrimony in all the studied area, and an extensive cast of ethnological elements of hydraulic character, like cisterns, water wheels, mills, windmills, hydraulic mills, etc.
- Natural Patrimony (cultural geo-resources and cultural landscapes)

The associated problems to the cultural resources itself is concentered in:

- A great number and diversity of heritage elements of interest is identified.
- Except for the most symbolic and best known elements, most of them show a reduced degree of conservation and of use.
- A lack of awareness about the importance of the conservation of the cultural heritage on the part of the citizenship is observed, reason why plundering problems and other attacks against the heritage are recurrent in all the environment analyzed
- The management and rehabilitation of the cultural elements of private property results problematic, generally for lack of agreement between administration and proprietary, and for lack of initiatives of private custody of the patrimony.

- Difficulty of access to lines of economic support to private owners to recover its cultural goods.
- The infrastructures of access and of information to cultural goods of great historic relevance in the context of the Levante, even for those internationally renowned, are scarce.

## 6.2.5. THE USES OF THE GROUND

### 6.2.5.1. Historical background

In spite of the transformation and deforestation that the mining industry caused in the coastal landscapes of the Levante Almeriense, this territory arrives at the second half of the 20th century with a notable degree of environmental naturalness. To it contributed its scarce degree of territorial and economic development, circumstances favoured by the scarce availability of water and of infrastructures, especially of communication. The agricultural productivity was very low, with a big predominance of rain-fed lands and a subsistence agriculture model of, barely commercial, and the tourist and urban development of the coastal façade.

Before that time, only the powerful mining and mining-industrial activity, related to the benefit of leads, silver, iron and gold, happened during the called "mining century of Almería", 19th century and first half of the 20th century, would produce important environmental transformations in the natural environment of Almería, mainly an intense deforestation. Nevertheless, in time, the traces of this activity will pass unnoticed, due to the process of auto regeneration of the natural formations affected, that nowadays exhibit some thickets of great environmental and ecological interest and offer a cultural legacy, in the shape of mining – industrial heritage, of notable value, not only cultural, but also economic, as assets of interest for the tourist offering.

From the 50's on, start the constant and progressive establishment of the intensive farming under plastic (greenhouse) and the tourist development of the coastal façade, responsible for the true transformation of the landscapes of the coastal steppes of the Levante Almeriense.

The discovery of the availability of groundwater in the detritic aquifers of the Neogene coastal depressions of 60's decade of the 20th century, a model of exploitation already practiced with success in the coast of Granada, covered with sand first, and with greenhouses later. Unproductive lands from the agricultural point of view to that moment, thickets or rain-fed fields, become highly productive lands, since this model of exploitation only needs space, but do not need soils of high agrologic capacity, climate and water.

It should be pointed out that to the territorial problems associated to the initial lack of planning of the transformation of natural lands to crops under plastic (and any another type of use that consumes land in significant proportions) is added the scarce or null value that the local population gives to their "thickets", that are perceived as sterile lands of scarce value, not knowing its scientific, patrimonial, and environmental importance, and not receiving a positive estimation from the aesthetic point of view. In other occasions, nevertheless, the transformation of natural lands or cultivations of rain-fed land to cultivations in irrigation has

taken place, especially in the municipality of Pulpí, towards a very specialized and "of street" agriculture, free of greenhouses.

In the three last decades has been the growth urban development associate to the tourist potentiality of the coastal façade and to the territorial development reached the responsible for its intense transformation.

#### **6.2.5.2. Main uses of the land in the CAMP Area**

To determine the main uses of the land and its environmental and territorial evolution in the CAMP environment has been used as reference the Maps of Uses and Vegetable Covers from Andalusia on a scale 1:25.000 (REDIAM 1956 - 2007). This cartography uses a hierarchical codification that divides the types of uses or of occupation of use in four types:

- Natural and forest lands
- Agricultural lands
- Built-up or infrastructure lands
- Surfaces or sheets of water.

This information brings together a valuable documentation relating to the following sequence of years: 1956, 1999, 2003 and 2007. This graphic document has allowed to establish the temporary interval of analysis, establishing the year 1956 as year of departure, and the 2007, like the year that represents the current state. In the date of writing this document has not been possible to have the information corresponding to the year 2010, since at present it is in progress, being established as temporary milestones the following: 1956, 1999, 2003 and 2007.

Since a spatial and temporary sequence of the information is available, subsequently, the different types of use will be described and will be analyzed the different typologies of land in the current situation and how they have evolved from 1956 to 2007.

#### **Natural and forest lands**

Forest and natural woodlands, non wooded thickets, grasslands and open spaces with poor vegetation are included in this type of land. In the following figure the temporary and spatial distribution of these lands in the CAMP Area can be observed.



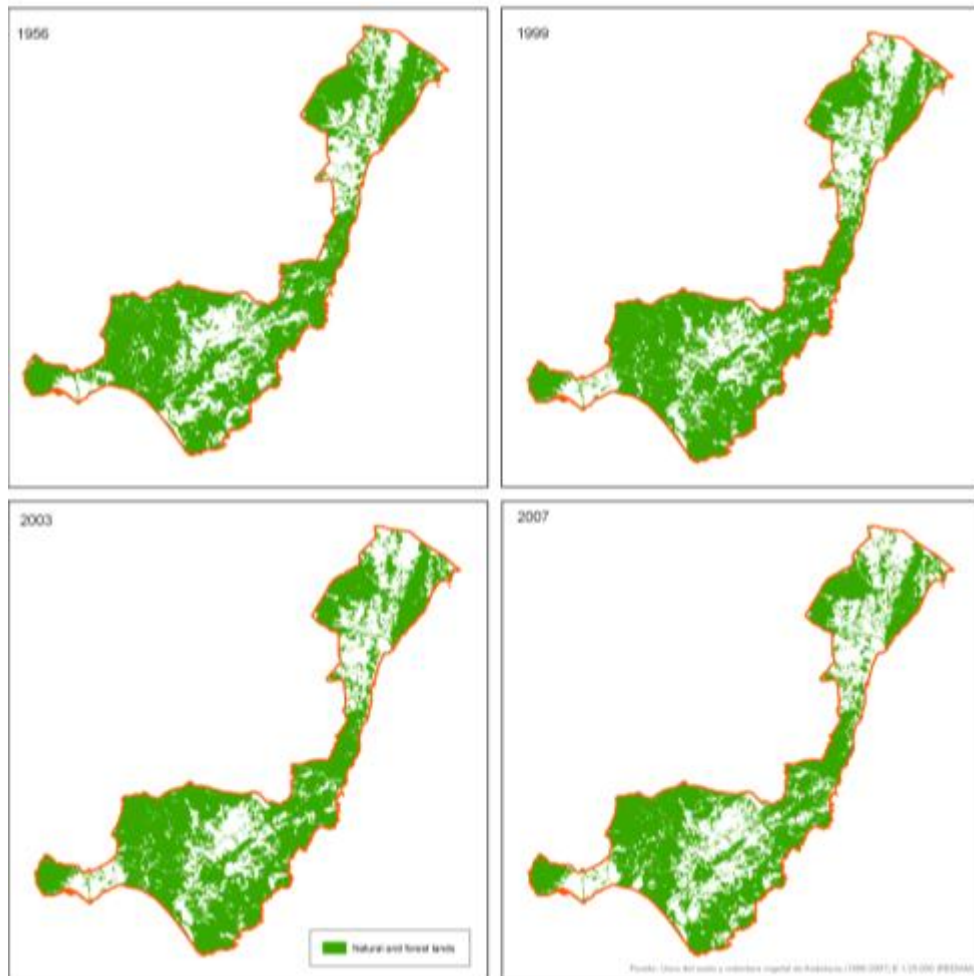


Figure 25. Spatial and temporary evolution of the natural and forest lands in the CAMP environment. Scale windows 1:650.000. Source: Map of Uses and vegetable Covers of Andalusia (REDIAM, 2007)



	1956	1999	2003	2007
naturales /forestales (has)	101571.67	103713.89	101483.73	93189.95
Superficie (%)	68.30	69.74	68.24	62.66

*Figure 26. Evolution of the surface of the natural/forest lands. Source: Elaborated by the author from the cartography of uses of the floor and covers of Andalusia (REDIAM, 2007)*

As it is observed in the previous figure, the most extended use in the CAMP Area is the forest one, with a clear predominance of the formations of thickets (with woodland, as in the summits of Sierra Alhamilla, Cabrera and Almagro; and without woodland, in the skirt of Sierra Alhamilla, Cabo de Gata, etc.).

From the productive point of view, and in spite of its extensive distribution, the forest uses do not have a special importance, being formations of thicket, whose value is fundamentally ecological, environmental and of landscape. Most of the forest formations are catalogued as priority habitats and/or of interest.

As a significant data of the analysis one must emphasize that, in quantitative terms, between 2003 and 2007 they have been deforested in the CAMP environment more than 8,000 has. of thicket, due essentially to the transformations of use to crops under plastic and, in smaller measure, to the urban and/or infrastructural development.

### **Agricultural land**

Agricultural lands are considered, in this context, all the types of pure agricultural cultivations, the associations and mosaics of these, the mosaics (set of small adjacent plots of different agricultural units) of agricultural cultivations with forest or natural spaces of vegetation and abandoned cultivations.

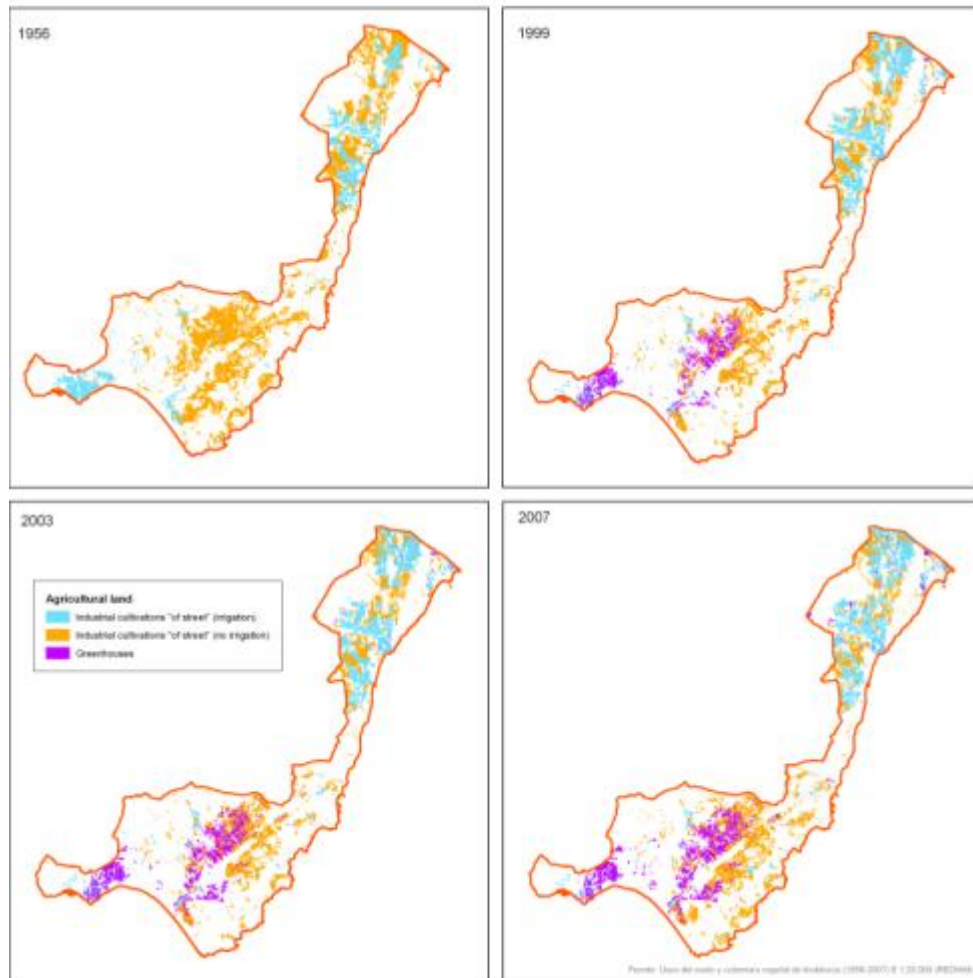
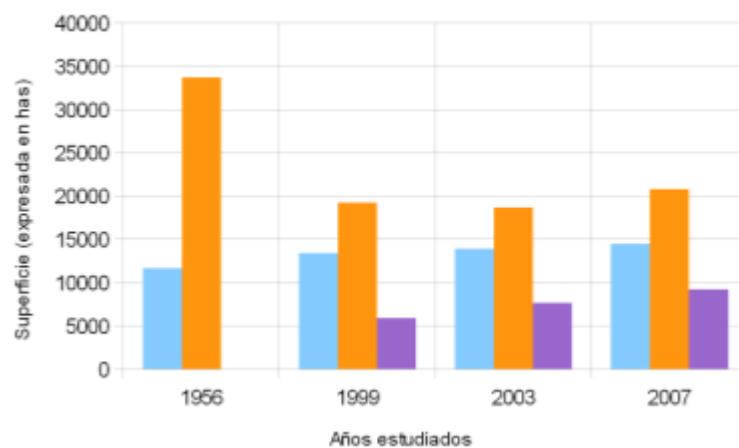


Figure 27. Spatial and temporary evolution of the agricultural lands in the CAMP environment. Scale windows: 1:650.000. Source: Map of Uses and vegetable Covers of Andalusia (REDIAM, 2007)



Año	Suelos agrícolas	Has	%
1956	Suelos agrícolas de calle	11.680	7,85
	Suelos agrícolas de secano	33.725	22,68
	Cultivos bajo plástico	0	0,00
	<b>Total</b>	<b>45.404</b>	<b>30,53</b>
1999	Suelos agrícolas de calle	13.453	9,05
	Suelos agrícolas de secano	19.248	12,94
	Cultivos bajo plástico	5.938	3,99
	<b>Total</b>	<b>38.639</b>	<b>25,98</b>
2003	Suelos agrícolas de calle	13.935	9,37
	Suelos agrícolas de secano	18.670	12,55
	Cultivos bajo plástico	7.677	5,16
	<b>Total</b>	<b>40.282</b>	<b>27,09</b>
2007	Suelos agrícolas de calle	14.489	9,74
	Suelos agrícolas de secano	20.815	14,00
	Cultivos bajo plástico	9.201	6,19
	<b>Total</b>	<b>44.505</b>	<b>29,93</b>

Figure 28. Evolution of the surface of the agricultural lands. Source: Elaborated by the author from the cartography of uses of the floor and covers of Andalusia (REDIAM, 2007)

The agricultural activity responds to two basic models of exploitation, that are identified, besides, with two concrete geographical spaces: the agriculture under plastic (greenhouses), widely developed in El Campo de Níjar and Los Llanos de la Cañada - El Alquíán (Almería), and the industrial cultivations "of street", located geographically in the basin of Pulpí and the basin of Vera. Notwithstanding, traditional agricultural spaces, associated to the low terraces of the river bed and wetlands are still preserved.

As it can be observed in the previous figures, in the year 1956 the agricultural surface in the environment CAMP was of 45,405 has, being nonexistent the cultivations under plastic. In the year 2007 the cultivated surface raised up to 44,505 has (similar data), but of which 9.200,60 they corresponded to greenhouses, which supposes the 6.19% of the total surface of the environment and the 20.67% of the surface devoted to agricultural use.

The production of the greenhouse cultivations is not found excessively diversified, incorporating to the market, mainly tomato and pepper, and, in smaller measure, lettuce, watermelon, melon, courgette, cucumber and green beans. The productive specializations of quality are scarce, as well as the "ecological" ones. The specialized agriculture of street of the north sector is dominated by the irrigation cultivations alternation with those of rain-fed land. They consist of citrus, fruit trees (rosaceae in general) plantations, as well as with traditional species of the orchard like tomato, pepper, melon, watermelon, onion, radish etc.

The cultivations in rain-fed land are mainly almond tree and cereal, though the olive grove proliferates enough exactly where clayey soils exist. Given the xeric character of the area, the productivity of these cultivations is very low.

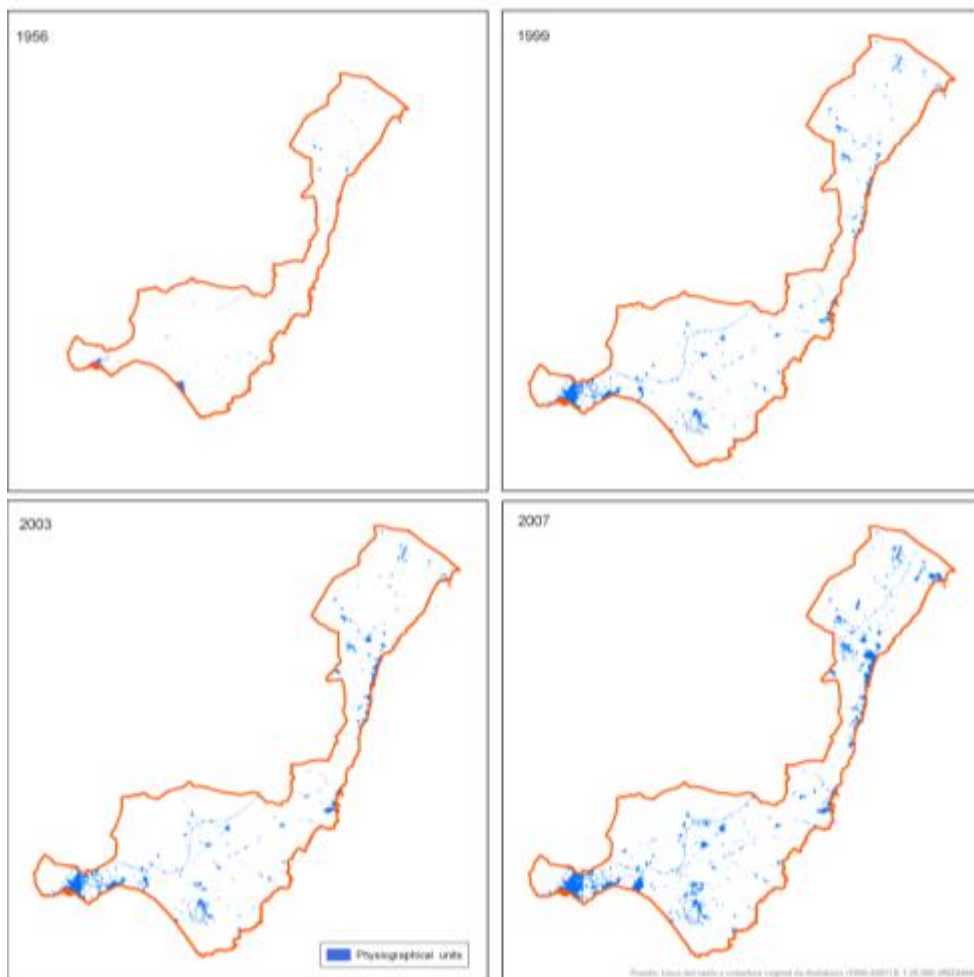
### Urban and infrastructure land

Under this epigraph are considered the surfaces sealed by urban zones, isolated urbanizations, commercial and industrial areas, superficial infrastructures of communications, mining areas, dumps, sports, recreational, and green equipment and zones under construction.

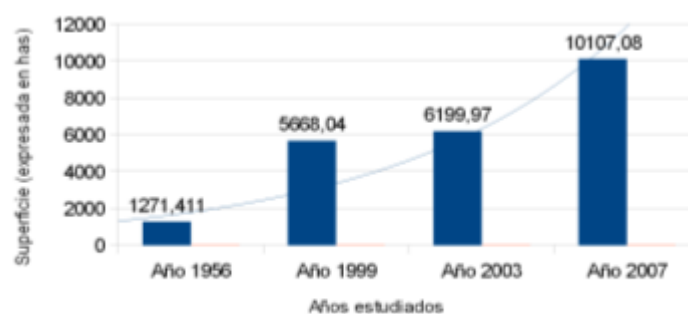
In the enclosed figure it is illustrated the evolution of the urban land in the territory from 1956 to 2007. In 1956 the urban land occupied the 0.85% of the surface of the territory, while currently that floor corresponds to a 6,80%.

The spectacular territorial development that has suffered Almería in the three last decades, especially the Levante Almeriense, has a lot to do, besides the considerable backwardness suffered up till then, with the infrastructures demanded by the increasingly more booming fruit and vegetable sector of the industry of the plastic, that opened at the same time an opportunity to the tourist development of the coastal façade, positioning Mojácar and Vera as tourist sites increasingly consolidated.

A growing demand of land for residential and tourist urban uses in this section of coast has followed, encouraged, at the same time, by the one that originates in the also ascending residents establishment phenomenon or foreign climatic tourists, that share generally their time of residence during the year between its countries of origin and this coast section of Almería.



**Figure 29.** Spatial and temporary evolution of the surface of the sealed lands. Scale window: 1:650.000 Source: Map of Uses and vegetable Covers of Andalusia (REDIAM, 2007)



Suelos sellados de uso urbano e infraestructuras	Has	%
Año 1956	1271,411	0,85
Año 1999	5668,04	3,81
Año 2003	6199,97	4,17
Año 2007	10107,08	6,80

*Figure 30. Evolution of the surface of the sealed lands for urban and infrastructures uses. Source: Elaborated by the author from the cartography of uses of the floor and covers of Andalusia (REDIAM, 2007)*

The industrial lands barely have a significant weight in the environment of study it is worth noting that the industrial pole of Carboneras and some significant industry located in isolation from the coast (Deretil). Another type of industry, very different to the previous one, is the auxiliary industry to help the greenhouse. It demands industrial land that is satisfied with offerings of industrial land of local character, nevertheless the increasingly intense dispersion of isolated industrial sites isolated from natural lands (Non-Building lands) constitutes already today a problem in the territory. They consist of installations located in Non-Building land and its urban and environmental development processing has taken place via the corresponding Singular Action Project or Special Plan in Non-Building land, according to the decisions of the Law of Urban Planning of Andalusia (LOUA, 2002). In fact, and save exceptions, each one of these industrial installations thus located does not cause an environmental or territorial significant impact. The problem of this type of dispersed constructions resides in the synergy and cumulative effects of its presence in the territory that begins to cause important dysfunctions, especially in which to the alteration of the natural landscapes refers.

The explanation to this circumstance must be sought in the oscillations of so considerable price for the square meter of land, which goes from the 200 - 300 euro in the case of already developed industrial land to 6 euro in forest lands without specific protection.

On the other hand, the strategic locating of the CAMP environment in the Mediterranean arch as hinge of connection between the Levante Español and the Costa del Sol place this territory as a suitable place for the establishment of logistic areas related to the projected infrastructures, particularly railways and harbours, which makes predictable a dynamics of positive growth for this type of uses.

As a counterpart, the elimination of subsidies to the energy sector will not contribute directly to the loss of natural character lands.

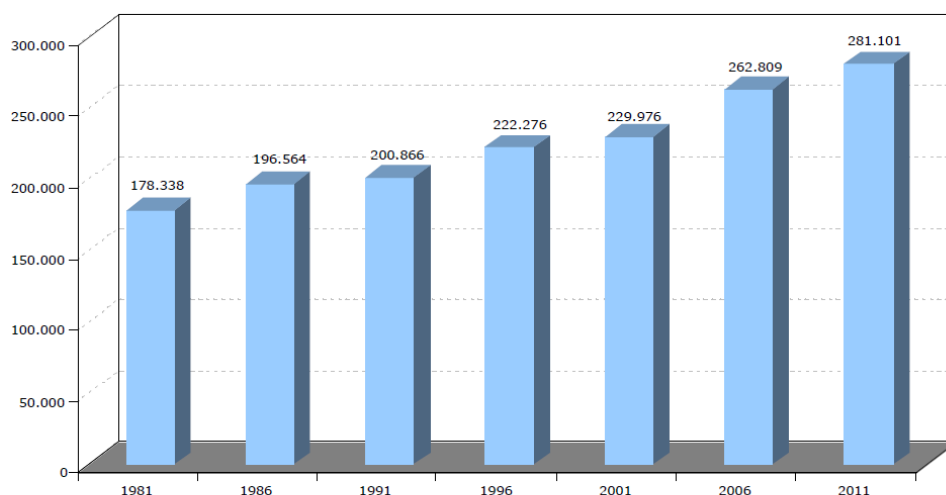
The degree of territorial development of the CAMP environment is nowadays top-level, comparable to that of any European region, which impacts in a demand of basic infrastructures, particularly those related to the electric provision of the territory.

### The socioeconomic model

According to the data produced in the Socioeconomic Analysis of the development model of the CAMP Levante de Almería area, the extraordinary socioeconomic dynamism of the province of Almería in the three last decades, qualified as the economic miracle of Almería, has been supported in two essential pillars: the intensive farming and the tourism of sun and beach.

### The population dynamism

The CAMP area has suffered, with the whole of the province, one of the most impressive population growths of the national territory, based on the experienced economic growth, and the migratory process that it has favoured.



**Figure 31.** Evolution of the population of the CAMP area between 1981 and 2011. Source: PS Analysis Socioeconomic

The balance of the evolution of the total population of the environment between the years 1981 and 2011 has been positive of important and uninterrupted form during all the period, raising from 178,338 inhabitants in 1981 to 281,101 inhabitants in 2011 (see previous graphic). The Population Growth Rate for the period 1981 - 2011 of the CAMP area (57,60%), duplicates to that of Spain (25,20%) and almost to that of Andalusia (30,8), although is significantly smaller than that of the province of Almería (71,10%).

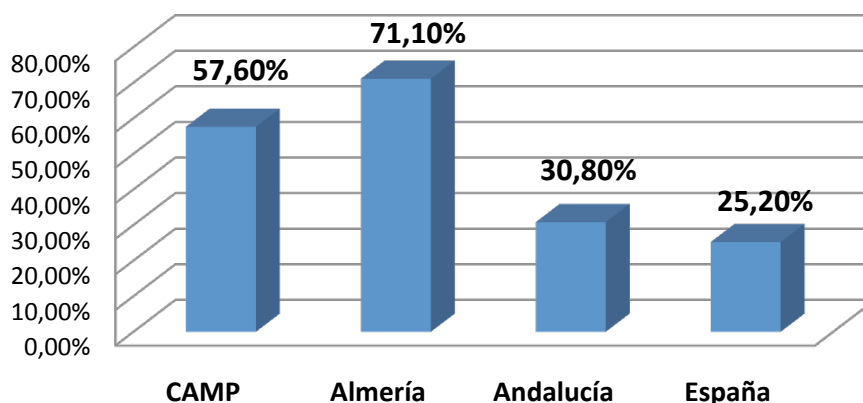


Figure 32. Population growth rate between 1981 and 2011. Source: PS Analysis Socioeconomic

This population dynamism comes explained in great measure by the growing arrival of immigrants, especially in the last fifteen years, which have supposed more than the 80% of the increase of the population between 1996 and 2011 (see following graphic). The accentuated tendency of growth of the foreign population from the middle of the 90's has made its significance bigger on the total population in a notable form. Thus, the 51,401 foreigners who lived in the CAMP area in 2011 represented the 18,29% for 100 of the total of the population, percentage that more than duplicates the regional one (8,67%) and extensively surpasses the national one (12,19%), placing it slightly under the provincial average (22,1%).

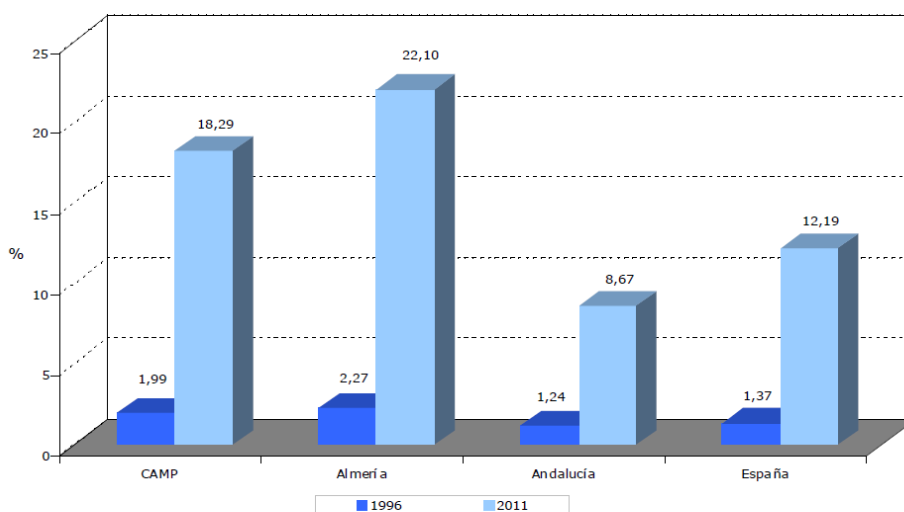


Figure 33. Population extracted with respect to the total in the CAMP area, Almería, Andalusia and Spain in 1996 and 2011. Source: PS Analysis Socioeconomic

As for the guidelines of attraction of these immigrants two models are distinguished:



- i. The municipalities in which European citizens have settled (mainly British people), attracted by the optimum climatic conditions, the quality of life and the possibility of acquiring a house at accessible prices (Mojácar, Vera and Cuevas of the Almanzora)
- ii. Those that receive non-EU citizens - Rumanian, Moroccan and Ecuadorian - that incorporate themselves to the labour market, linked to the agriculture and tourism (Níjar, Pulpí, Garrucha, Carboneras and Almería).

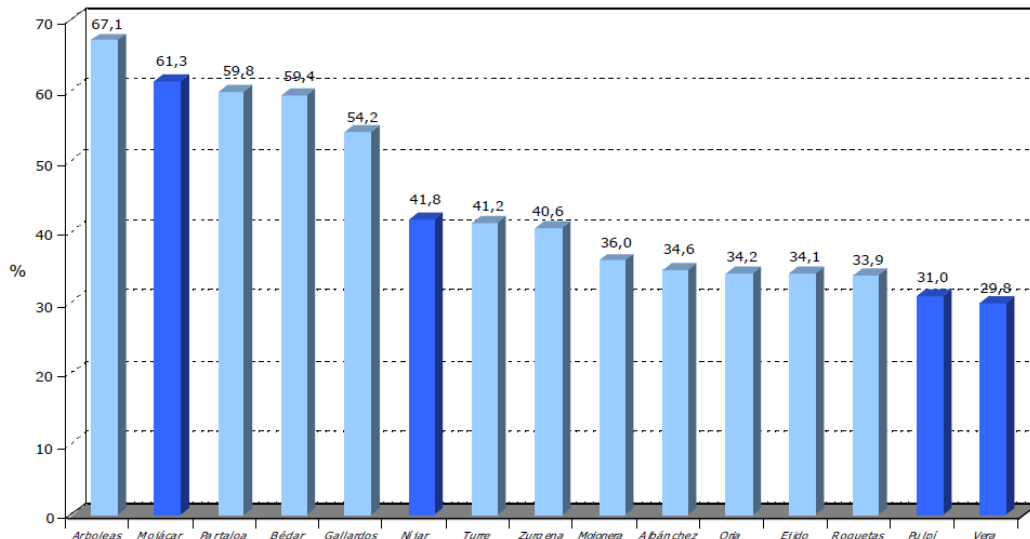


Figure 34. Municipalities of Almería with greater proportion of foreign population in 2011.  
Source: PS Analysis Socioeconomic

### The hegemony of an intensive and expansive farming

The agriculture constitutes the basic pillar of the economic growth of Almería, in spite of the bad features evils of its soils and the secular water deficit that the province has suffered from.

In the most southern area, consisting of the municipalities of Almería and Níjar, an intensive farming under greenhouse has developed, based on small exploitations of family character and increasingly oriented towards overseas markets. The greenhouse surface in Níjar has risen from 571 has in 1985 to the current more than 5,300 has, becoming the main referring on this type of agriculture, after El Ejido. Almería, with 3,600 has of greenhouse, is placed as the third municipality in greenhouse number of hectares.

Only these two municipalities total the 35% of Almería's province greenhouse's surface that bring together the greater concentration of greenhouses on a worldwide basis, upon counting on some excellent climatic and geomorphological features for the development of the intensive farming under plastic, which, besides, was prompted by the shortage of arable land in the West of Almería and the expectations generated by the arrival of desalinated water.

This type of agriculture has a great socioeconomic importance upon being featured for being intensive in the use of capital, technology, and workforce, factor this last one that has forced to resort to the growing employment of wage-earning workers (basically immigrant).

In the northern part of the CAMP area, a change from a traditional agricultural model has been operated towards another based on horticultural productions in open air at a great scale. The cultivation of the lettuce is its maximum exponent, developed in extensive plantations, negotiated by some few large businesses that employ techniques of exploitation with high levels of mechanization, strong establishment of located systems of irrigation and a large quantity of wage-earning labourers (essentially of foreign origin).

The dynamics followed by the agricultural irrigated surface from 1995 to 2010 has registered a growth of 8.3% of the surface, increase that has taken place in all the municipalities of the CAMP area except in Níjar. In spite of it, this municipality occupies the first place, with near 5,000 has, followed by Cuevas del Almanzora with 3,702 has, the capital city, with 2,521 has, and Pulpí with 2,319 has.

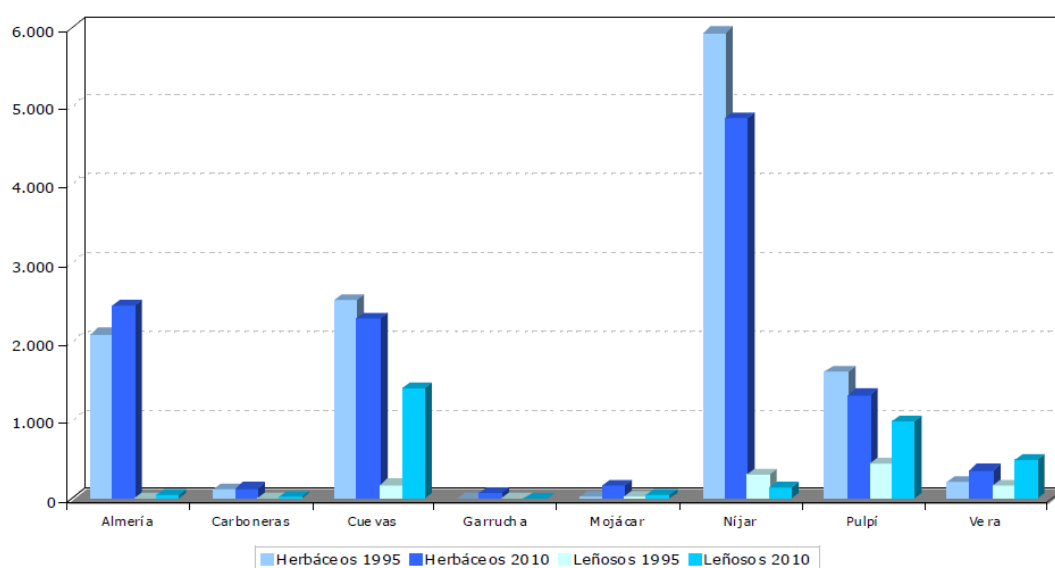


Figure 35. The irrigated cultivations surface in the CAMP area for municipalities according to type of cultivation in 1995 and 2010 (Has). Source: PS Analysis Socioeconomic

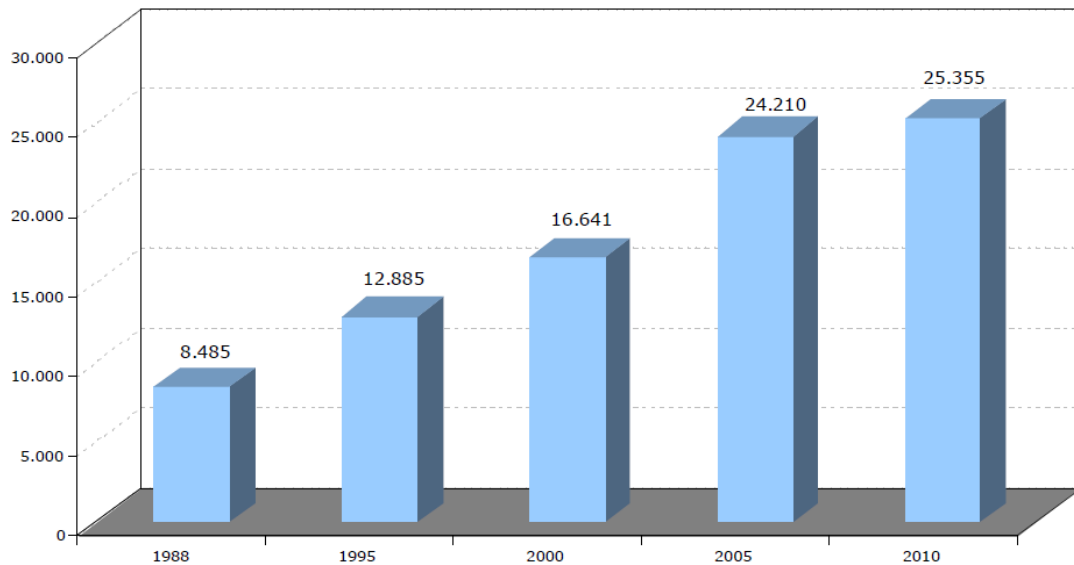
### The recent residential and tourist expansion

The other great central activity of the economic growth and of the territorial development of the CAMP area has been the tourism, though this area has been incorporated of late form to this activity, which has permitted the conservation of a relatively little built-up coastal front and a "quite tempting" set against other more saturated Mediterranean destinies.

Nevertheless, during the last years the CAMP area has been fully incorporated to the frantic activity of building that has taken place in the Mediterranean arch, reproducing some of the features proper of the mature tourist destinies.

The tourist offering regulated has grown in an uninterrupted way from 1988 to 2010, - coming to be tripled, rising from 8,485 up to 25,355 places, fact that reflects the notable dynamism of the sector during the two last decades. The greater increments have been produced in Níjar

(857%), Cuevas del Almanzora (643%) and Mojácar (307%), being at present, the greater referents of the Mojácar, Níjar and Vera area.



*Figure 36. Evolution of the tourist offering in the CAMP area from 1988 to 2010 (number of plazas). Source: PS Analysis Socioeconomic*

Nevertheless, alongside the arrival of occasional tourists, that has conditioned a notable increment of the regulated offering, a growing demand of residence housing for European immigrants has been produced (essentially British people) attracted by some good climatic conditions and some very accessible acquisition prices. The building of apartments and housing states intended to these foreign residents and also as second residence of the national ones has caused a strong expansion of the real estate agencies activity in very recent dates. This way the holiday housing and second-home uses have become key elements in the configuration and operation of this tourist destiny.

The offering of housing for potential tourist use concentrates on the coast and increasingly in some bordering sites of the interior of natural and landscape singularity. Mojácar is the residential nucleus par excellence and this is endorsed upon standing out as the municipality with the greatest number of housing for potential tourist use and presenting the major percentage of second-homes on the total, followed by Pulpí, Vera and Garrucha.

### 6.3. THE ADMINISTRATIVE INTERVENTION IN MATTER OF PLANNING

The planning in the CAMP Area affects so much to the territorial environment as to the environmental one, besides, of course, from to the different competencies and sectorial fields (agriculture, water, coast, etc.). The CAMP Area sees itself affected by two territorial plans of subregional character. The Planning of the Territory of the Levante Almeriense (POTLA, Decree 26/2009 of February 3) includes the municipalities of Huércal Overa, Cuevas de Almanzora, Vera, Carboneras, Pulpí, Garrucha, Mojácar, Antas, Turre, Los Gallardos and Bédar.

That of the Planning of the Territory of the Urban Agglomeration of Almería (POTAUA, Decree 351/2011, of November 29) includes the municipalities of Almería, Benahadux, Gádor, Huércal of Almería, Níjar, Pechina, Rioja, Sante Fe de Mondújar and Viator (in boldface the municipalities included in the CAMP Area). Both documents set out the high degree of territorial development reached in these coastal municipalities, which makes them an attractive space for future investments is converted and promotes the intense dynamics of socioeconomic development.

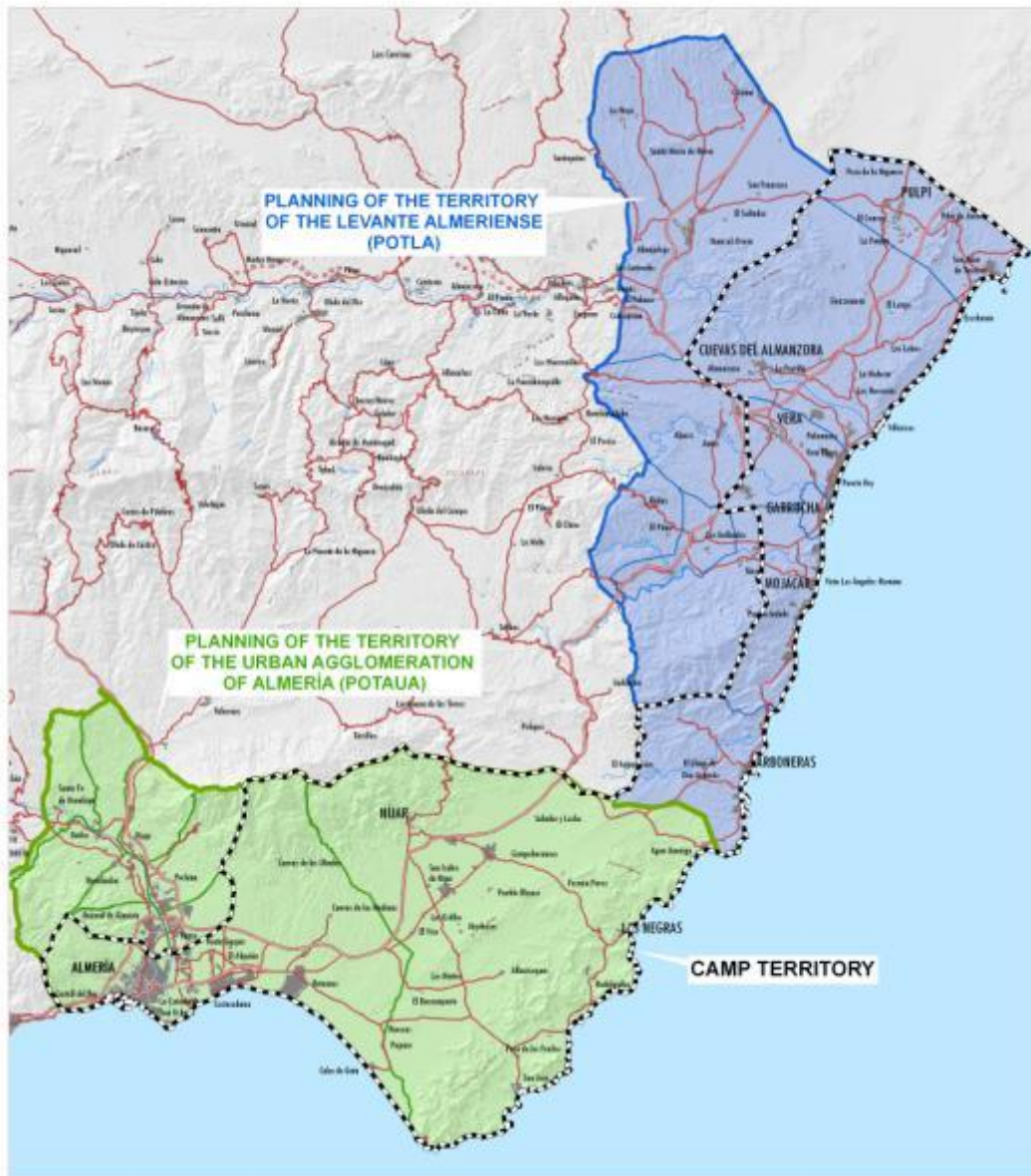


Figure 37. Territorial environment of the sub regional plans (Source: Department Agriculture, Fishing and Environment).

PLANNING OF THE TERRITORY OF THE URBAN AGGLOMERATION OF ALMERIA (POTAU)	PLANNING OF THE TERRITORY OF THE LEVANTE ALMERIENSE (POTLA)
Almería Benahaduz Gálor Huércal de Almería Níjar Pechina Ríoja Santa Fé de Mondújar Viator	Huércal Overa Cuevas de Almanzora Vera Carboneras Pulpi Garrucha Mojácar Antas Turre Los Gallardos Bédar

*Figure 38. Listing of municipalities included in both territorial plans (Source: Department Agriculture, Fishing and Environment).*

In relation to the environmental planning of this area, by means of Decree 37/2008, of February 5, the Planning of Natural Resources and the Master Plan of Use and Management of the Cabo de Gata-Níjar Natural Park are approved, which includes the CAMP municipalities of Almería, Níjar and Carboneras. The remainder of spaces environmentally catalogued, that comes to totalize almost a 50% of the CAMP Area, lacks instruments of own specific planning.

### 6.3.1. PLANNING OF THE TERRITORY OF THE LEVANTE ALMERIENSE (POTAL)

The coastal façade of this environment configures a great landscape set whose character resides in the evident fact of constituting the coastal front of the region and the area of contact between mountains and dry plains with the sheet of water of the sea. That circumstance offers to all the set a structuring value of first-class in the configuration of the regional landscape, above the diverse landscape pieces that integrate it, of its state of conservation and of the different interest that each one can deserve.

The occupied space up to now by the building has broken already the identity image and of true quality attributed to the "Mojácar" phenomenon in the tourist panorama of the Iberian Mediterranean. The advance on the abrupt sides of Cabrera, besides destroying habitats of interest, would contribute to increase the saturation and congestion of this coastal section. Towards the south, to the boundaries of the environment, the succession of powerful mountain cliffs and small coves, the beach of the Algarrobico, associated to the estuary of the river Alías, and the headlands, coastal shelves and coves of Mesa Roldán, they configure probably the most spectacular and appreciated image of the regional coast, in which the urban façade of Carboneras is well integrated, with the counterpoint –a milestone also- of the thermal power plant and the cement factory.

The key points of the diagnosis of the Plan contemplate: the urban system as resource for the organization and structuring of the territory; the infrastructures of suprarregional level to reorder the system of transportations; the water deficit that conditions the model of occupation of the territory; the dynamism of the transformations that complicates the sustainable development of the productive activities; the unbalance of the tourist model by the predominance of the holiday housing and the potentiality of the landscape, cultural, and environmental resources of the territory.

The territorial model that proposes the plan is established in base to some objectives that are the following: a) establishing the areas that preserve themselves for their values or cultural, landscape, and environmental potentialities from the process of urbanization; b) identifying areas of opportunity for the development of uses and economic activities, c) reinforcing the interior and exterior articulation of the environment favouring the construction of new infrastructures and improving the existing ones d) establishing criteria that allow to measure the growth of housing, equipment and endowments coherently with the predicted needs; e) ordering the new needs of energy and hydraulic infrastructures for the provision, sanitation and processing of residues; among others.

This territorial model aims at a series of proposals that will be considered in the present report of Landscape valuation. These are:

- Delimitation of Territorial Protection Areas that should remain excluded of the process of urbanization and of new transformations to crops under plastic by their natural or landscape values.
- Identification of opportunity areas defined by its strategic position for the location of productive and residential uses.
- Construction of high speed railway Almería-Murcia line and of the highway of the Almanzora, besides intervention for conditioning and splitting in two interstates and regional roads.
- As for the cycle of water, the Plan fights for the desalination plant of the Low Almanzora and in the improvement of the connections of this type of plants with the supply network.
- Environmental protection of the 37 kilometres of the coast of the Levante Almeriense, upon establishing a corridor of 200 meters inland in all the areas that have not been built-up, doubling thus the area of obligation provided by the Law of Coasts.

### 6.3.2. PLANNING OF THE TERRITORY OF THE URBAN AGGLOMERATION OF ALMERIA (POTAUA)

The POTAUA recognizes the coastal front of the environment as a tourist space that presents some quite relevant natural features, with a magnificent coast, little overcrowded and a valuable rural interior, aspects that combine to make of this space an almost unique site in the peninsular and Andalusian context. The statement of the Cabo de Gata Natural Park in 1987 has restricted notably the possibilities of urban development of the coastal city centres, favouring the attributes of naturalness of this space, which constitute one of its greater attractions. The municipalities of Níjar and Almería have in the tourist activity an important income and employment generation motor.

The Plan opts, consequently, to maintain these inherent qualities of the environment, settling down the bases to project a competitive tourist space to national and international level, based on its attributes of tourist excellence, and to make room for a demanding tourist, sensitive to the characteristics of local identity and its alternative options, without endangering the natural resources on the which it is supported.

The key points of this territory are the following: the exceptional value of its landscape, the prominence of the water; the alteration of the hydric environment, the

deficits of infrastructures for the urban cycle of water; the deficiency and disintegration of the system of spaces free; the development of energy infrastructures; the great specialization of the agricultural model, intensive and in expansion and a valuable territorial heritage.

According to the problematic detected in the territory, the Plan compiles a set of decisions related to:

- a) In relation to the system of settlements: it tries to bring back the current dynamics of the processes of measured of the growth and execution of the new urban developments

- b) Improvement of the accessibility, mobility and transportation: endows the Urban Agglomeration of Almería of a model of an efficient external and internal articulation model, environmentally sustainable and socially cohesive.
- c) The conservation and valuation of the territorial heritage is supported in the appreciation and protection of the cultural, landscape, environmental, and natural heritage, by means of measures that permit their conservation, contributing to their put into value and use. In this line, the Plan determines the following actions:
- Delimitation of areas of greater territorial value (Areas of Territorial Protection) with prohibition of new greenhouse settlements and new urban developments.
  - Measures of integrated ordering and protection of the coast, establishing a coastal corridor of 200 m as general plan of protection for its natural values.
- d) Tourist matter is based on assuming an urban development growth with a perception of limits and a territorial strategy in the medium term
- e) Delimitation of opportunity areas for the development of tourist activities that guarantee a sufficient offering and with a ceiling that oscillates between the profit value and the capacity of reception of the territory in question.
- f) In relation to the greenhouses, the plan establishes criteria to guide its expansive dynamics, confronting the necessary strategies to secure its establishment in those lands agriculturally eligible for this use, to guarantee its development in conditions of environmental quality and to establish the special requests of urban development planning that require these agricultural environments.

### 6.3.3. PLANNING OF NATURAL RESOURCES

The climatic and geomorphological singularity of this territory makes it especially valuable since the environmental, landscape and territorial points of view. Its botanic, biological, geological, geomorphological, and landscape wealth of the environment is definitive, accentuated, besides, by its ethnological interest.

In numerical terms, the environmental protection through the Natural Protected Spaces (RENPA/Natura 2000 Network) represents the 46.59% of the CAMP terrestrial surface (148.717,61 has).

The territory receives various Natural Protected Spaces under the following figures of protection:

- Cabo de Gata – Níjar Terrestrial Maritime Natural Park
- Sierra Alhamilla Natural Area
- Isla de Terreros and Isla Negra Natural Monuments
- Isla de San Andrés Natural Monument



Under the proposal of cataloguing as spaces belonging to the Natura 2000 Network the following are included also:

- Sierras of Gádor and Enix
- Piedemonte and Ramblas of Gérgal, Tabernas and south of Sierra Alhamilla
- Serrata de Níjar
- Sierra Cabrera – Bédar
- Sierra of High Almagro
- Sierra of Almagro, of Los Pinos and El Aguilón
- Seabeds of the Levante Almeriense

Besides this cataloguing, determined areas of the coast enjoy other environmental protections like:

- Reserve of the Biosphere and Geopark (Cabo de Gata – Níjar Terrestrial Maritime Natural Park)
- Wetland of International Importance RAMSAR (Salinas of Cabo de Gata)
- Especially Protected Areas for its Importance for the Mediterranean (ZEPIM)
  - Cabo de Gata – Níjar Sea and Land Natural Park
  - Seabeds of the Levante Almeriense

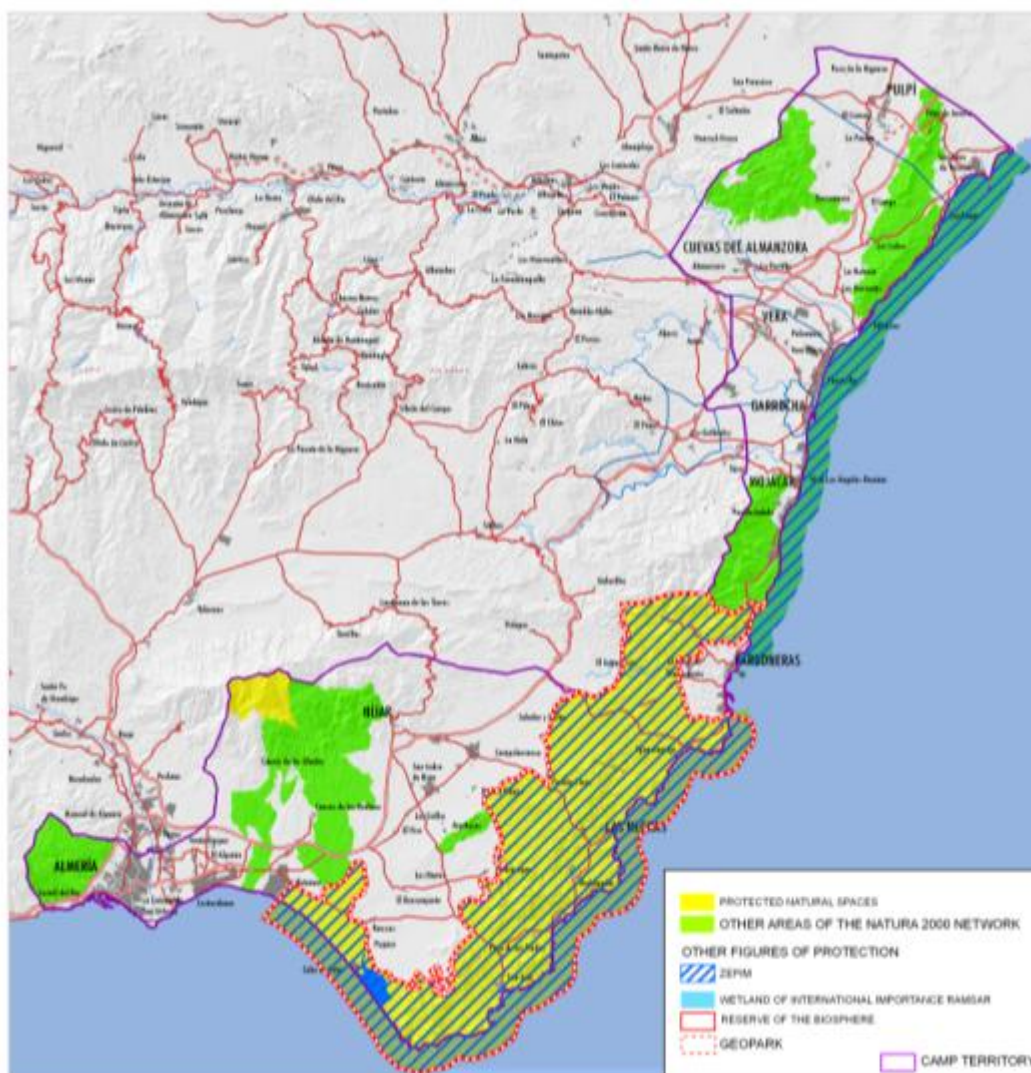


Figure 39. Natural spaces Protected in the CAMP Area. Scale: 1/300.000. Source: REDIAM (Junta de Andalucía)

With all this, is concluded that almost the 50% of the terrestrial surface of the CAMP area is found under some figure of protection.

Notwithstanding the above, the only documents of environmental planning approved at present correspond to the Planning of the Natural Resources and the Master Plan of Use and Management (Decree 37/20008, of February 5) and to their own Sustainable Development Plan.

The remainder of the catalogued territory lacks at the moment of planning instruments or any proper specific planning.

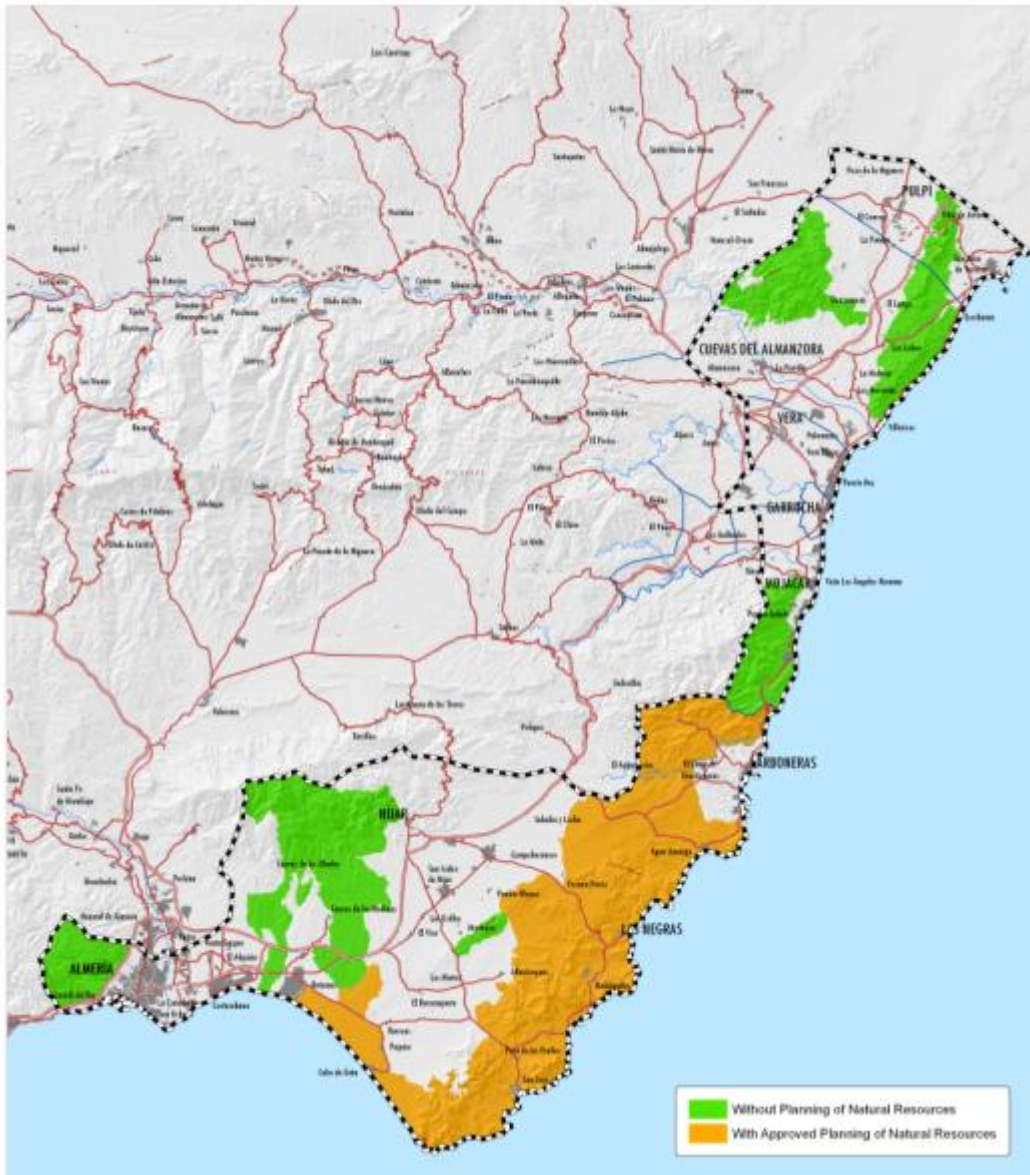


Figure 40. The planning of the protected natural spaces (Source: REDIAM)

As far as the PORN and PRUG of Cabo de Gata are concerned, the objectives that they establish are based, fundamentally, in the framework of the sustainable development as the only way to harmonize the diverse uses and activities that take place in the space with the conservation of the natural resources of the same one. The Plan incorporates the already existing sectorial normative elements, along with new criteria, guidelines and rules, for thus articulate around the space a proposal of integral character that guarantee the conservation of the natural resources in the framework of a sustainable development. Finally, the Plan establishes a zoning whose objective is to delimit the different areas inside the park with the object of establishing an ordering of the uses and exploitations specific for each one of them.

#### 6.3.4. THE HYDROLOGIC PLANNING

The water has been one of the most worrying subjects in the environment of the CAMP Area. The degree of territorial development of the area of study is nowadays top-level, comparable to that of any European region, although with important deficits in infrastructures and environmental equipment, essentially in the purification and recycling of urban sewage, and to the general efficiency of the cycle of water. It in spite of the fact that the secular water deficit of the area has been surpassed with the contribution of coming, external resources essentially of the desalination of seawater, and other inputs coming bypasses from adjacent hydrographic basins. The arrival these external resources alleviate the historic supply deficits, but in practice it has not happened, at least for the moment, the necessary process of replacement of the resources used coming from masses of groundwater, overexploited all of them and endangered according to the Framework Directive on Water.

A very detailed diagnosis of the problems of the water in general in the CAMP Area has been carried out for the individual project of sustainable Management of the Cycle of Water. The team responsible for this project has produced numerous documentation on the matter.

#### 6.3.5. CONCLUSIONS

The diagnosis of the two Plans of the Territory current in the environment presents a remarkable degree of convergence with the coastalisation diagnosis.

Some of the main measures that articulate you said plans are:

1. They delimit in the planning models areas called Territorial Protection Areas in which it is prohibited the new urban development and the new establishment of crops under plastic.
2. It extends the corridor of 200 meters of depth the Obligation Area of Protection of the Terrestrial Maritime Public Domain, avoiding with it the urban development overcrowding the coastal line.
3. Standing out the high landscape value and the significant density of elements of the cultural and natural patrimony that harbours this territory. These elements are observed as an optimum base of support to prompt active politics that favour the extensive recreational and tourist use, pillars, along with the agriculture, of the socioeconomic development model, current and future, of this territorial environment.

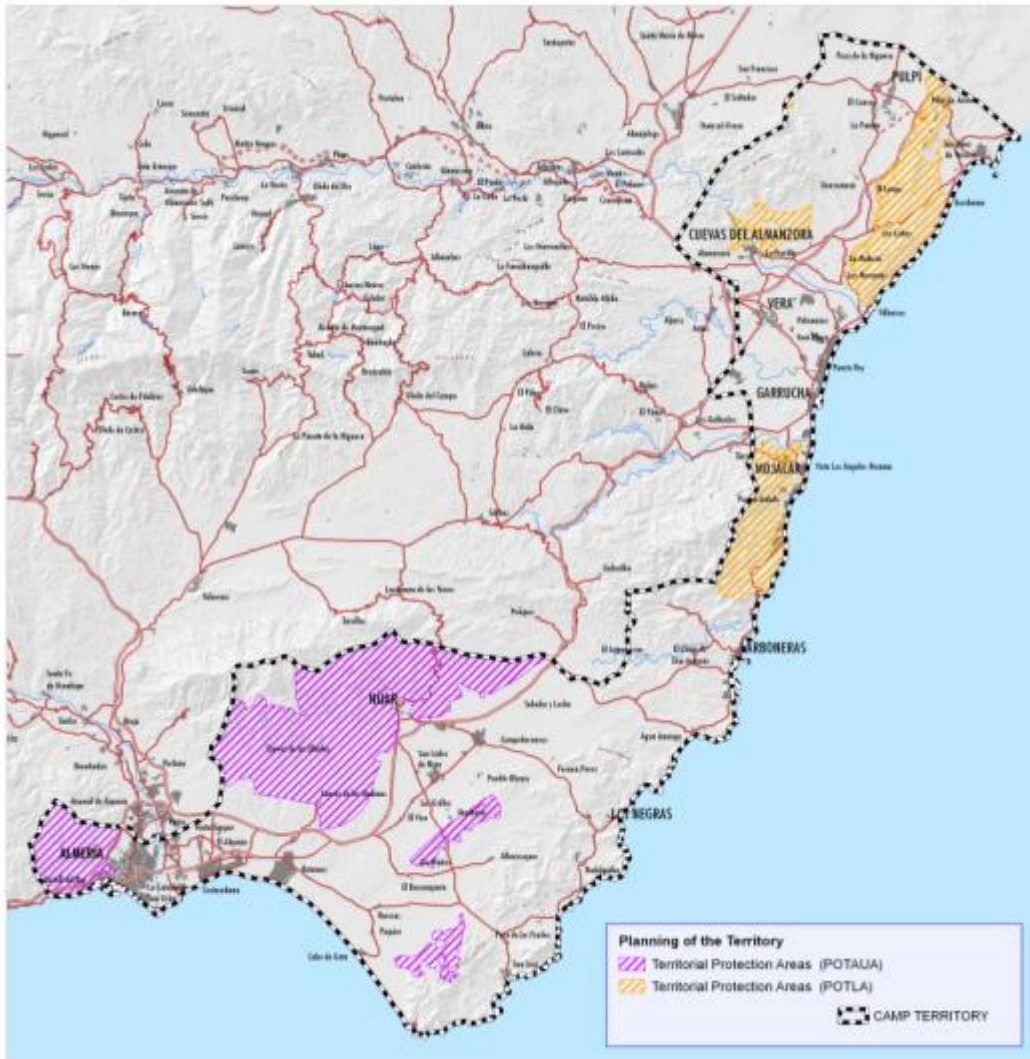


Figure 41. Areas of territorial protection of the existing territorial plans (Source: Department of Agriculture, Fishing and Environment).

As far as the environmental planning is concerned, only the Cabo de Gata – Níjar Natural Park has planning and own specific ordering. The remainder of the environment with environmental cataloguing, which totalizes almost the 50% of the territory, is regulated by means of dispositions of generic character.

#### 6.4. CONCLUSIONS RELATING TO THE COASTALISATION DIAGNOSIS

It is possible to conclude in a preliminary manner that the loss of naturalness in this territory is concerned by the following socio-economic dynamics:

1. Agricultural transformations of traditional agricultural towards intensive crops under plastic (greenhouse transformations).
2. Fast and remarkable growth of the urban developments for tourist and residential uses, especially over the coastal line.
3. Major consumption areas of natural character for the implementation of infrastructure and equipment of a territorial nature (highways, roads, high-speed railway lines of energy transport, pipeline, water infrastructure, airport, ports, plants for energy production, etc.).
4. The frequent and increasing implementation of installations, usually industrial, isolated and scattered, although legal, in the natural land, implemented by the urban action Singular project or Special Plans in "Non-Building land".

All they impact of one and another way in the natural middle with the following effects:

- Transformation, small or large scale, of natural areas of high ecological value, and in consequence the destruction, deterioration and fragmentation of natural habitats of interest.
- Occupation and environmental degradation of the coastal line still preserved and natural.
- Degradation of the aesthetics and cultural components of the landscape, main assets of the strategies for tourist development in the territory.
- Deterioration of the urban environments located among the greenhouse plain area.
- Overexploitation of aquifers, marine intrusion and another type of saline contamination.

Consequently, it can be concluded that the uses and activities that have marked the evolution of the territory, true protagonists of its transformation, are the following:

- Transformation of traditional natural or agricultural land to crops under plastic.
- Settlement expansion
- Transformations of forest lands to cultivations of street
- Implantation of isolated Resorts - golf.
- Isolated industrial facilities on Non-Building land.
- Introduction of plants for energy production on an industrial scale (solar thermal and photovoltaic).
- Implementation of large-scale linear infrastructure emerging or air (are discarded the underground).

Being these uses and activities those proposed in this Individual Project, for the landscape vulnerability assessment in relation to its potential establishment.

## **7. LANDSCAPE VULNERABILITY ASSESSMENT**

## 7.1. OBJECTIVES

Once known the uses that determine the evolution of the CAMP Levante Almeriense area, as well as the environmental variables that are seen affected by its development, the vulnerability assessment of the CAMP environment resulting from a specific methodological process, fruit of particular options and criteria, next to what could be considered a territorial model. The results have permitted to decide the specific territorial intervention locating and determining the associated impacts to different settings of alternative future.

The vulnerability assessment, carried out according to the proposed methodology by the PAP/RAC, goes especially directed to:

- Knowing the foreseeable answer of the territory before the establishment or intensification of the different uses that develop on it.
- Identifying those areas in which a smaller impact for the establishment of the uses and activities of significant ecological track on the territory is given.
- Identifying impacts and incompatibilities coming from the more significant actions planned on the Protected Natural Spaces (RENPA and Nature 2000 Network).
- Establishing, in base to all of it, proposals to correct or minimize the predictable negative effects on the territory in base to the dynamics detected.



## 7.2. METHODOLOGY

The methodology carried out for the landscape vulnerability assessment has been based on the method proposed by the PAP/RAC, already tested with success in other CAMP territories of the Mediterranean basin, with the necessary adaptations conditioned by the own cultural, environmental, and physical personality of the analyzed territory.

Prior to the description of the methodology, one must keep in mind the following specific considerations for the CAMP Levante de Almería environment.

1. The general scale of work used has been 1/100.000 and as a base the official vectorial cartography 1/100.000 of the Institute of Statistics and Cartography of Andalusia. It with independence that in you determined respected sectors of interest have itself worked with cartographic scales of greater detail (1/50.000 or 1/10.000).
2. The Landscape Vulnerability Assessment will be made taking as a territorial unit of work a virtual raster cell of 10 x 10 m.
3. When reference is made to existing urban soils currently it is understood that included in this category the urban terrains (consolidated or not) and the Urban Sectored terrains that are classified as such by the current Municipal urban planning at the present time. That is, those terrains already occupied or intended for occupation by urban uses, whose development depends on its corresponding urban procedure, and not a further environmental processing. The terrains classified as Non-sectored Urban land are discarded because its later development is conditioned to its previous classification, and this, regulated environmental prevention process, being said procedure that determines without will or not definitely soils with possibilities of urban development (they are in final reversible situations).

The methodology used is summarized in the following diagram:

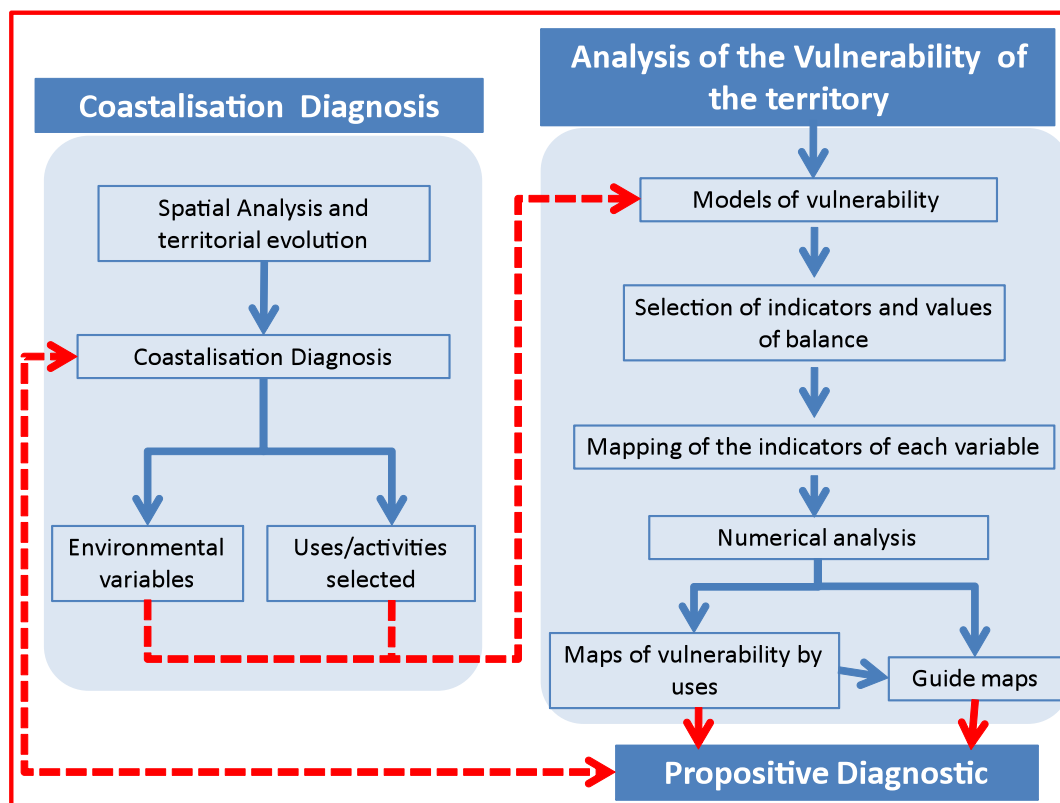


Figure 42. Methodological plan followed for the analysis of the vulnerability. Source: Elaborated by the author

### Models of vulnerability

Defined from the Coastalisation Diagnosis, the environmental variables to have in consideration and the uses/activities selected to assess the vulnerability of the environment before their potential establishment in the territory, the models of vulnerability are defined, one by each use or considered activity. Such models are summarized in some cause-effect impact matrix. By means of this analysis it is intended to identify the use/medium potential interactions and to evaluate qualitatively the magnitude of the impacts that each necessary action to undertake for the establishment of the use/activity that is evaluated could cause on the different variables of the environment and, therefore, on the whole environment. The models of vulnerability have been discussed and agreed by consensus with the Group of Experts of the project.

### Selection of indicators and values of balance

Subsequently, the indicators to have in consideration for the analysis of each variable selected in function of the available information, as well as the values of balance of them has been selected. Such values are placed in a scale of 5 terms contained among 0 (minimum balance value) and 4 (maximum balance value).

## **Mapping of the indicators of each variable**

The methodology used requires obtaining a continuous territorial cover of each indicator of environmental variable, so that to each point of the territory corresponds, for each indicator, a unique value between 0 and 4. By means of SIG tools it has been obtained, in this way, a map of value measured for each one of the 6 indicators selected, according to the criteria that are detailed in the corresponding epigraph.

## **Numerical analysis**

Once obtained the maps of measured indicators of the variables, the algorithms are defined and summarized, one for each use or activity analyzed, which will permit to operate numerically. The specific weights with which each indicator of variable in the algorithm of each use or activity are directly related with the values of magnitude of impact defined in their vulnerability model.

## **Maps of vulnerability by uses**

Related the values and weights for each indicator in its corresponding algorithm the vulnerability map of the territory for each one of the uses is obtained in an analytic way for of the considered activities. Therefore, and in a numerical way, the six values (one for each indicator of variable) that correspond to each raster cell of 10 x 10 m., becomes on value alone, which corresponds to the integrated vulnerability of the territory of such cell before the establishment of the use or activity. The series of numerical values thus obtained itself discretizes in five classes of value, that corresponds to terms, again qualitative, of very high, high, average, low, and very low vulnerability.

## **Guide maps and propositive diagnostic**

Once obtained the maps of vulnerability of the territory for each one of the uses and activities considered, the propositive diagnostic is carried out. The results obtained have been analyzed to detect which are the strengths and opportunities of the territory and the main identified problems in light of the conclusions of the work. The maps of vulnerability allow, at the same time, to determine the degree of convergence with the territorial proposals of the current plans, and to represent spatially the main problematic and conclusions in the so called Guide Maps, one also by each use or considered activity. The analysis of such maps feeds back likewise the propositive diagnostic.

### 7.3. LANDSCAPE VULNERABILITY ASSESSMENT

Subsequently, the results obtained are exposed to apply the methodology of vulnerability in the CAMP Levante Almeriense territory. The identified uses and activities, and the environmental variables that are going to take part on the analysis for the obtaining of the maps of vulnerability are included in the coastalisation diagnosis.

#### 7.3.1. IDENTIFICATION OF USES/ACTIVITIES WITH POTENTIAL SIGNIFICANT INCIDENT ON THE TERRITORY.

According to the territorial, environmental, cultural and socio-economic contexts, progress in the “coastalisation diagnosis”, the uses/human activities increased demand for deployment on land under analysis are:

1. Settlement expansion
2. Greenhouse transformation
3. Transformation cultures “street” (intensive or extensive cultivation, irrigated or rained, but cultivated “in street”, without emissions)
4. Implementation of large linear infrastructure and emerging resources.
5. Industrial plants for energy production (photovoltaic or solar thermal)
6. Wind farms
7. Implementation of industrial projects by way of Special Plans Performance in Singular or undeveloped land (industrial buildings isolated in SNU)
8. Tourist resort projects, type golf course – like.

#### 7.3.2. IDENTIFICATION AND DEFINITION OF THE TERRITORIAL AND ENVIRONMENTAL VARIABLES

The identifying variables in the Coastalisation Diagnosis for the Landscape Vulnerability Assessment are the following:

1. Light quality of the atmospheric space
2. Relief
3. Water
4. Ecological value
5. Landscape
6. Cultural resources

#### **VARIABLE 1: LIGHT QUALITY**

**Definition of the variable:** degree of light quality of the atmospheric space.

**Source of information:** territorial cover to scale 1/10.000 of municipal environment of the Map of Luminance Zoning Atmospheric (source: REDIAM, Junta de Andalucía.)

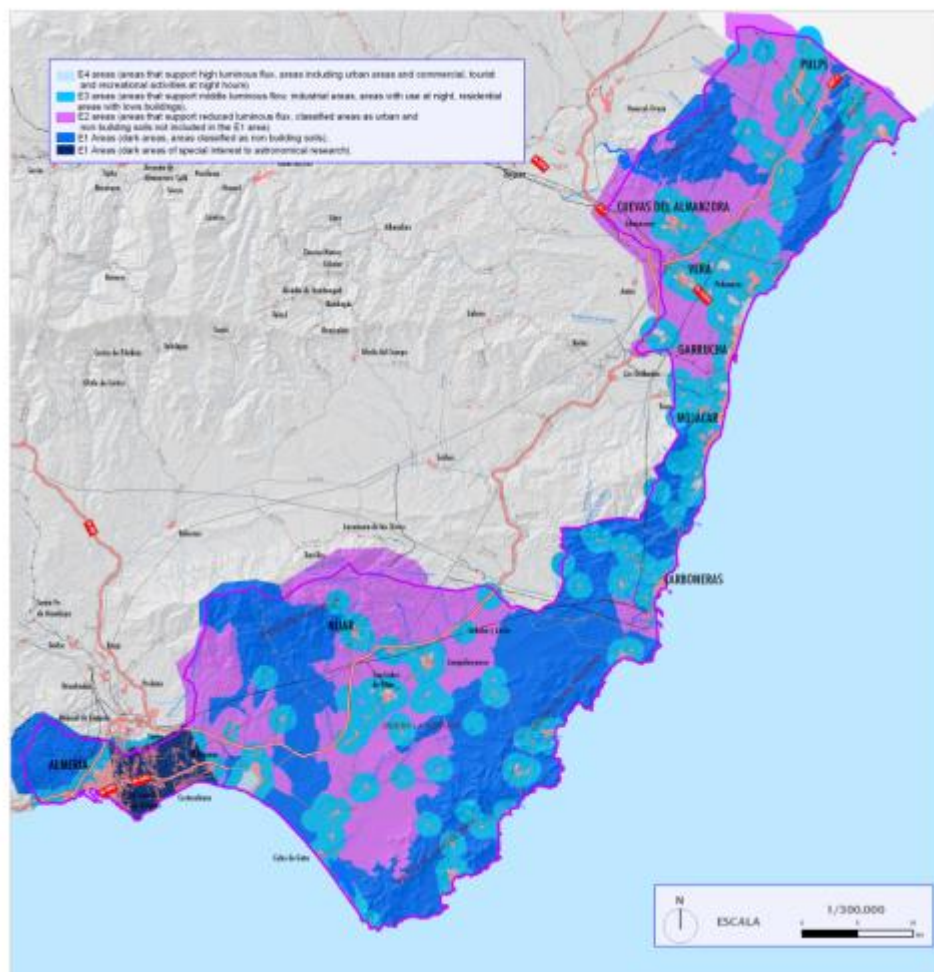


Figure 43. Map of Luminance Zoning. Scale 1:10.000 (Source: REDIAM, Junta de Andalucía)

## VARIABLE 2: RELIEF

**Definition of the variable:** rank or interval of slope of the unit.

**Source of information:** Digital model of the Land with resolution 10x10 m (source: REDIAM, Junta de Andalucía) intermediate

**Documents produced:** Map of Slopes (1/100.000).

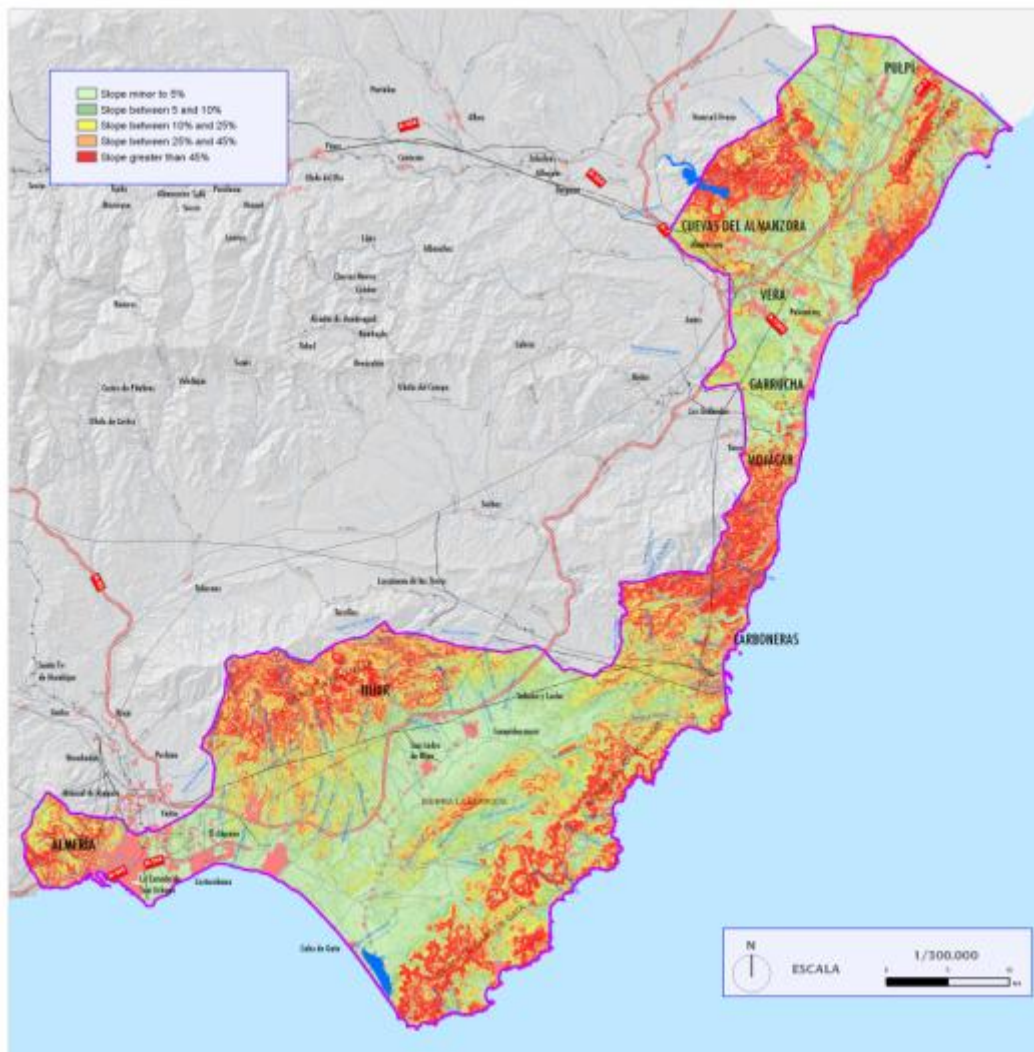


Figure 44. Map of slopes. Scale 1:100.000 (Source: Elaborated by the author from the digital model of the land supplied by the REDIAM)

### VARIABLE 3: WATER

**Definition of the variable:** The presence of groundwater values itself or superficial as factor of quality.

**Sources of the information:**

- ✓ Groundwater masses Cover and superficial 1.10.000 (REDIAM, Junta de Andalucía)

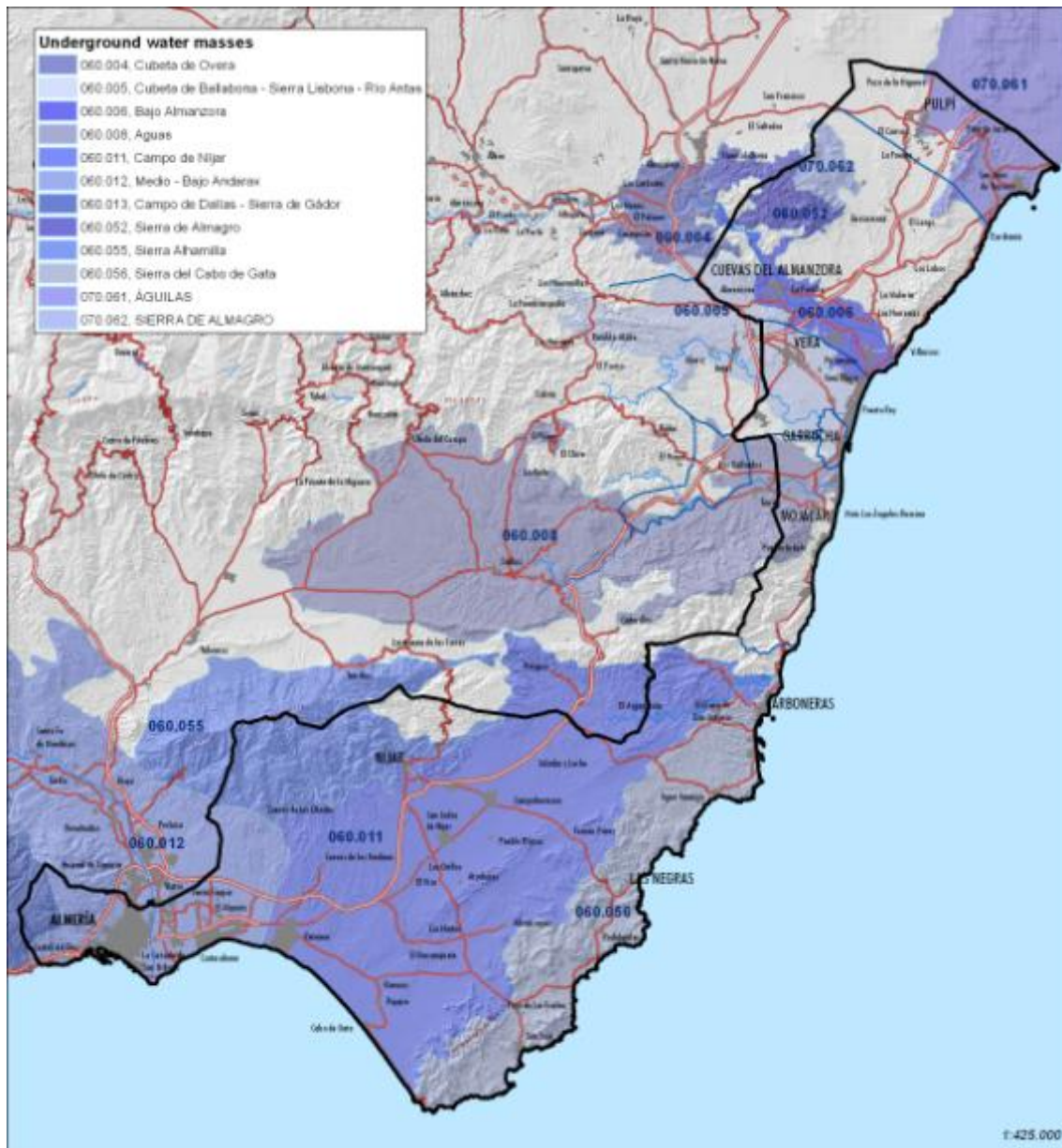


Figure 45. Groundwater masses map and superficial. Scale 1:10.000 (Source: REDIAM, Junta de Andalucía)

- ✓ Flood Map of the territory 1:10.000 (REDIAM, Junta de Andalucía) 1/10.000)



Figure 46. Flood Map. Scale 1:10.000 (Source: REDIAM, Junta de Andalucía)

- ✓ Inventory of sources and springs of Andalusia 1:10.000 (REDIAM, Junta de Andalucía). 1/10.000).



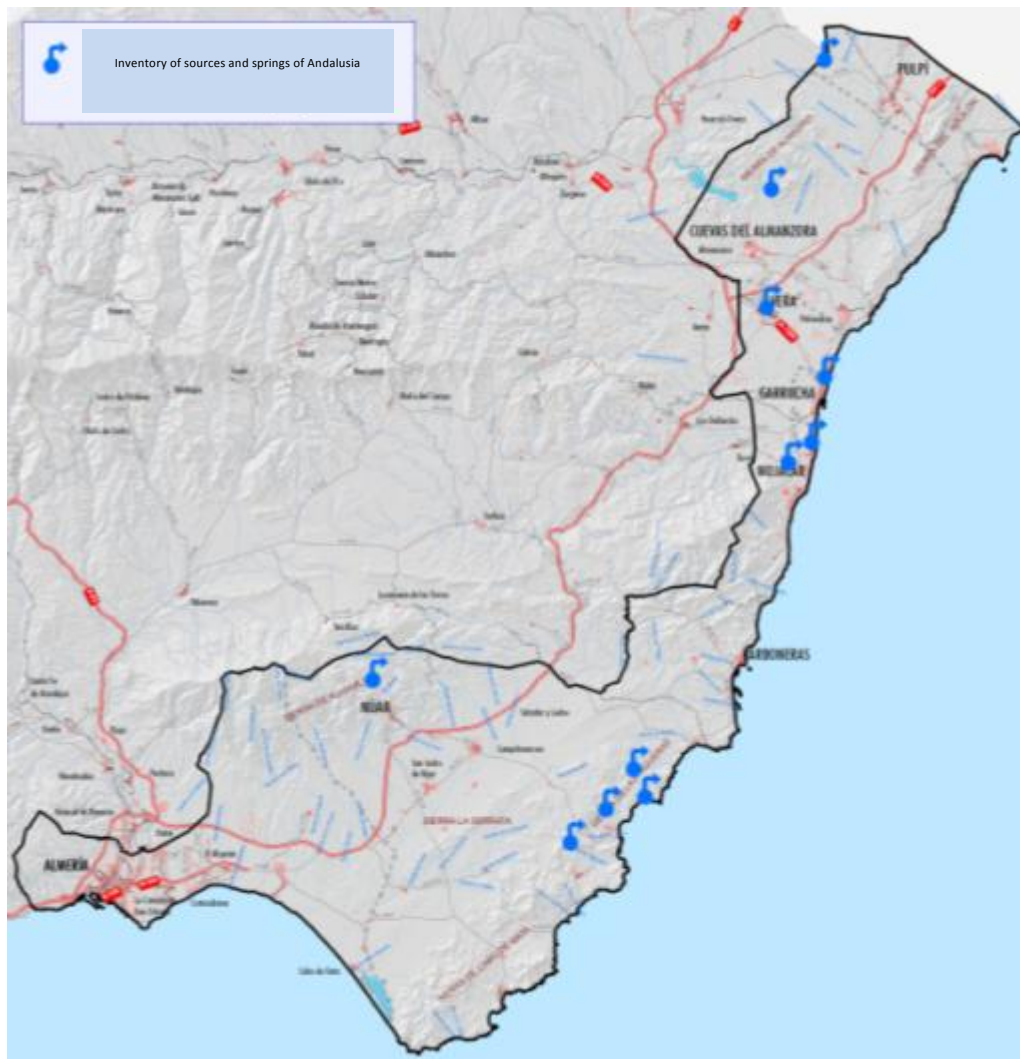


Figure 47. Map of the inventory of sources and spring. Scale 1:10.000. (Source: REDIAM, Junta de Andalucía)

- ✓ Morphodynamic units associated to the coastal dynamics. Map geomorphological of Andalusia 1:100.000 (REDIAM, Junta de Andalucía).

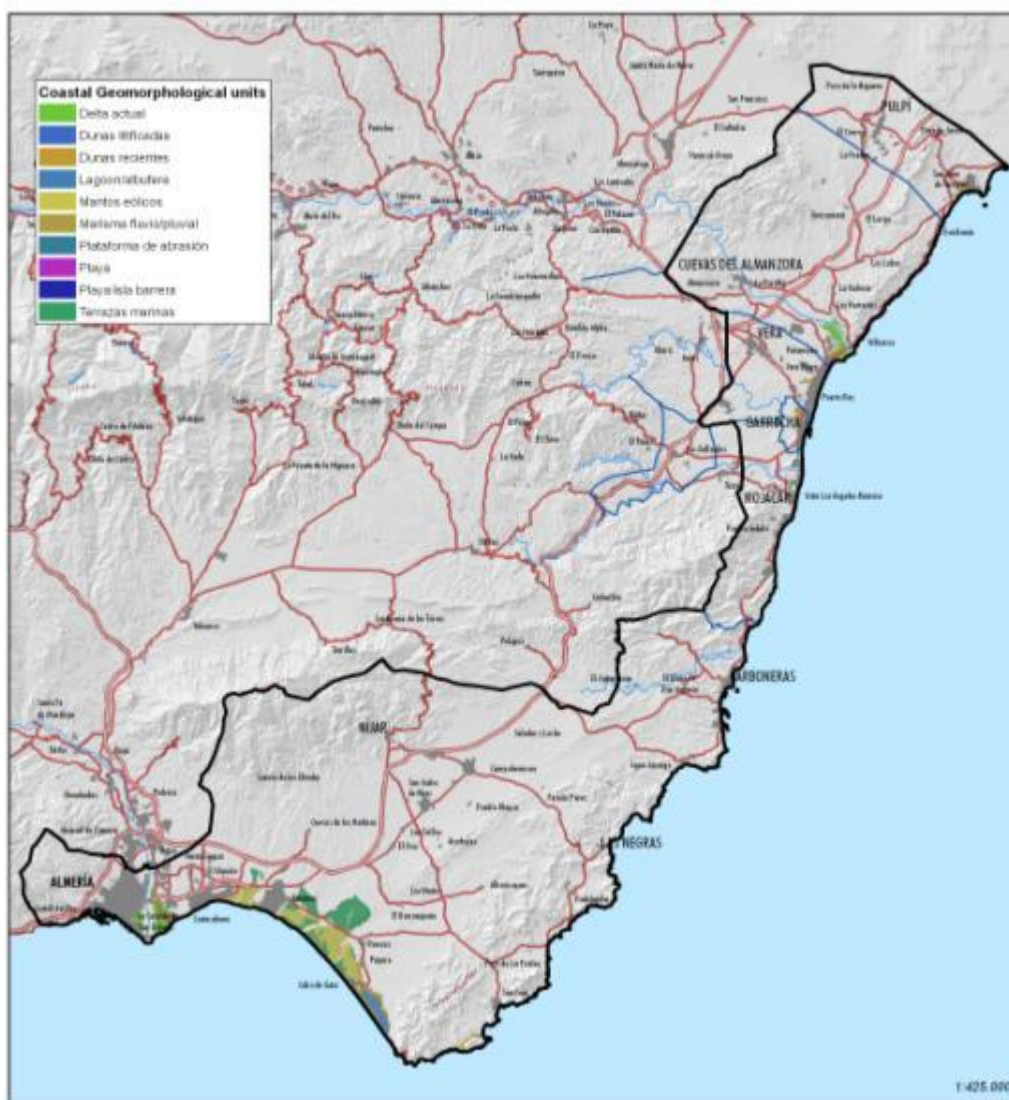


Figure 48. Map of units geomorphological coastal of the CAMP Area. Scale 1:100.000 (Source: REDIAM, Junta de Andalucía)

#### VARIABLE 4: ECOLOGICAL VALUE

**Definition of the variable:** presence or absence of flora, fauna and habitats.

**Sources of the information:**

- ✓ Habitats: "Map of Interest Community Habitats distribution at scale 1: 10,000 in the woodland of Andalusia, in 1996 - 2006". (REDIAM, Junta de Andalucía).
- ✓ Fauna: database of the territory faunal component on a grid of 1 x 1 km. (JJAA), and Biodiversity National Inventory (MARM)
- ✓ Flora: database of the territory floristic component on grid 1 x 1 km. (JJAA) and Biodiversity National Inventory (MARM).

- ✓ Ecological connectivity: preliminary covers in phase of review of the Index of Terrestrial Connectivity of Andalusia, using the following groups of habitats: not wooded forest masses (thicket), woodlands, grasslands and aquatic habitats and associated to river bed. (REDIAM, Junta de Andalucía) The maps of habitats, species of flora and fauna and ecological connectivity can be seen in the chapter 3, corresponding to the Coastalisation Diagnosis.

**Intermediate documents produced:** Map of Ecological Value of the Territory 1:100.000. (Elaborated by the author)

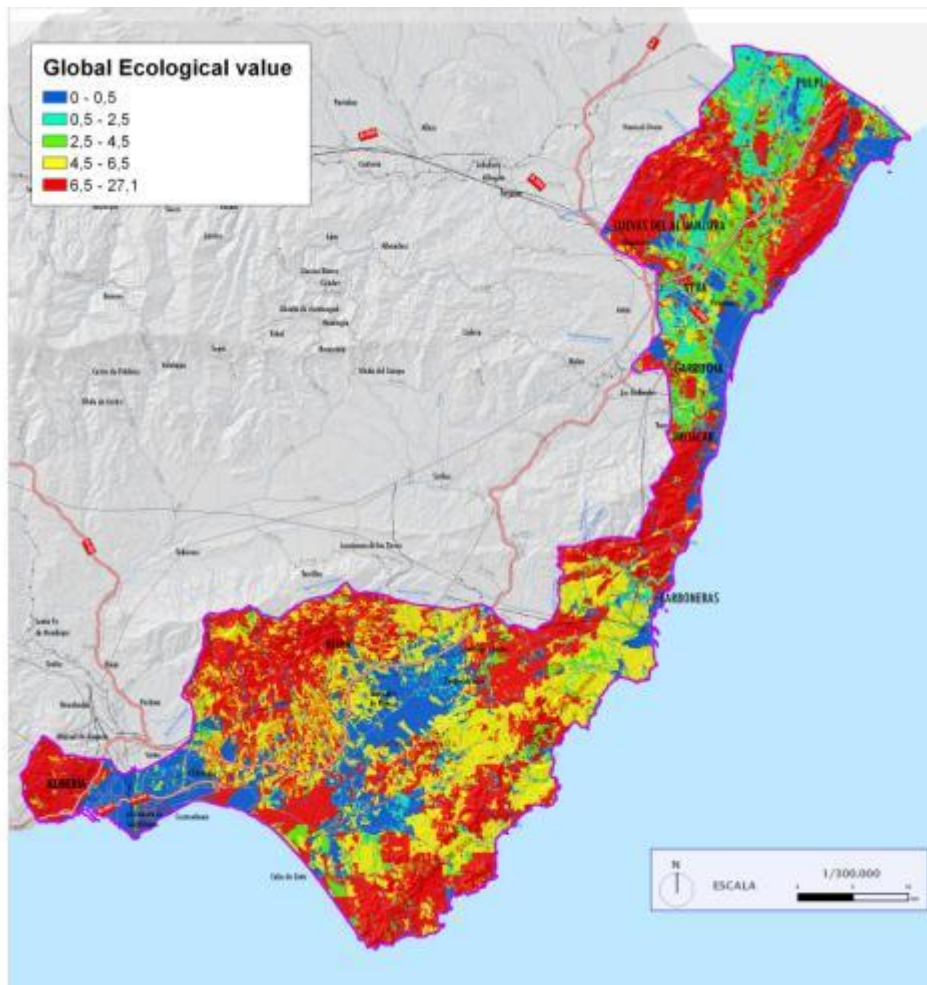


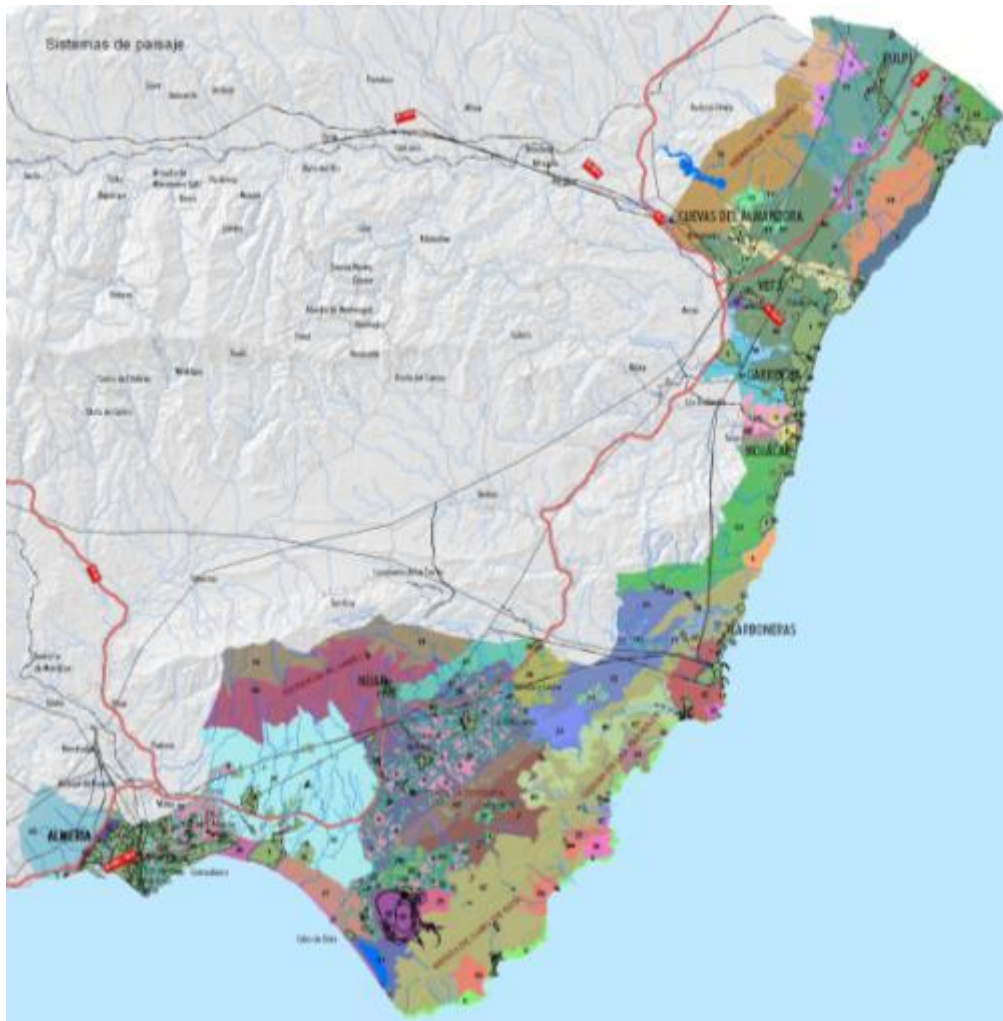
Figure 49. Map of Ecological Value. Scale 1:100.000 (Elaborated by the author from information supplied by the REDIAM, Junta de Andalucía)

## VARIABLE 5: LANDSCAPE

**Definition of the variable:** presence of natural/cultural landscapes qualities. The landscape seen from the perspective of the social value of their natural and cultural aesthetic not from an ecosystem perspective.

**Sources of information:**

- ✓ Map of Landscape Units 1:100,000. Andalusia. (CMA, 2005).
- ✓ Countryside work (Elaborated by the author).



Landscape units (Code, denomination)

- 0, Cultivos bajo plástico, Capa general
- 1, Suelos urbanos, Suelos urbanos
- 2, Acantilados de San Juan de Terreros, San Juan de Terreros
- 3, Acantilados de Sierra de Almagrera, Sierra de Almagrera
- 4, Acantilados de Sierra de Cabrera, Sierra de Cabrera
- 5, Acantilados del Cañarete, Cañarete
- 6, Acantilados volcánicos de Cabo de Gata, Cabo de Gata
- 7, Cañada del Hornillo-Fernan Pérez, Cañada del Hornillo-Fernan Pérez
- 8, Relieves aislados del entorno de Mojácar, Entorno de Mojácar
- 9, Cítricos de la cubeta de Pulpí, Cubeta de Pulpí
- 10, Cultivos intensivos del Antas, Antas
- 11, Cítricos del Bajo Almanzora, Bajo Almanzora
- 12, Corona periurbana oeste de Almería capital, Corona periurbana oeste de Almería capital
- 13, Cultivos tradicionales de la cubeta de Pulpí, Cubeta de Pulpí
- 14, Cumbres de Sierra Alhamilla, Sierra Alhamilla
- 15, Delta del río Aguas, Río Aguas
- 16, Desembocadura del río Andarax, Río Andarax
- 17, Desembocadura del río Antas, Río Antas
- 18, Entorno de la Michelin, Entorno de la Michelin
- 19, Cultivos bajo plástico de Hoya Altica, Hoya Altica
- 20, Cultivos bajo plástico de Hoya de Níjar, Hoya de Níjar
- 21, Vega del Almanzora, Vega del Almanzora
- 22, Cultivos bajo plástico de Pujaire-Nazareno-Albaricoques, Pujaire-Nazareno-Albaricoques
- 23, Llanos de Balsa Blanca, Llanos de Balsa Blanca
- 24, Cultivos bajo plástico de Fernán Pérez, Fernán Pérez
- 25, Cultivos bajo plástico de los Llanos de la Cañada - El Alquíán, Llanos de la Cañada - El Alquíán
- 26, Llanos de la Venta del Pobre, Llanos de la Venta del Pobre
- 27, Llanura litoral de las Amoladeras-Cabo de Gata, Amoladeras-Cabo de Gata
- 28, Llanura litoral del Perdigal, Perdigal
- 29, Los Cambronales, Los Cambronales
- 30, Matorrales con restos de cultivos de secano de Garrucha, Garrucha
- 31, Sierra Almagro, Almagro
- 32, Matorrales de Vera, Vera
- 33, Matorrales del Caballón-Gafares, Caballón-Gafares
- 34, Matorrales del margen oriental de la Sierra del Aguilón, Sierra del Aguilón
- 35, Matorrales del pie de monte Sierra Alhamilla, Matorrales del pie de monte Sierra Alhamilla
- 36, Mesas arrecifales de Cerro de los Lobos, Cerro de los Lobos
- 37, Mesas arrecifales de los Molatas, Las Molatas

38	Mesa arrecifal del Cerro de la Higuera, Cerro de la Higuera
39	Mesa Roldán, Mesa Roldán
40	Matorrales sobre relieves carbonatados, Sierra de la Higuera
41	Mesa arrecifal de la Rellana de San Pedro, Rellana de San Pedro
42	Matorrales del entorno de Carboneras, Carboneras
43	Mesas arrecifales del Hoyazo de Níjar, Hoyazo de Níjar
44	Mosaico de cultivos con restos de vegetación natural SJT, San Juan de Terreros
45	Mosaico de cultivos de la cubeta de Pulpil, Cubeta de Pulpil
46	Mosaico de cultivos del Almanzora, Valle del Almanzora
47	Playa de Agua Amarga, Agua Amarga
48	Playa de Garrucha, Garrucha
49	Playa de las Martinicas, Las Martinicas
50	Playa de levante de Carboneras, Levante de Carboneras
51	Playa de los Muertos, Los Muertos
52	Playa de Mojácar, Mojácar
53	Playa de poniente de Carboneras, Poniente de Carboneras
54	Playa de Vera, Vera
55	Playa del Algarrobico, Algarrobico
56	Playa Macenas, Macenas
57	Playas de Retamar-Cabo de Gata, Retamar-Cabo de Gata
58	Playas de San Juan de Terreros, San Juan de Terreros
59	Rellanas litorales de la costa de Cabo de Gata, Cabo de Gata
60	Roquedos calizos de Sierra Alhamilla, Alhamilla
61	Salinas de Cabo de Gata, Salinas de Cabo de Gata
62	Serrata de Níjar, Serrata de Níjar
63	Sierra Cabrera, Cabrera
64	Sierra de Almagrera, Almagrera
65	Sierra de Gádor, Gádor
66	Sierra de los Pinos y Aguilón, Pinos y Aguilón
67	Sierras y roquedos volcánicos de Cabo de Gata, Cabo de Gata
68	Vega Alta del río Aguas, Alta del río Aguas
69	Vega Baja del río Aguas, Baja del río Aguas
70	Vega de la Rambla del Saltador, Rambla del Saltador
71	Vega de Níjar, Níjar
72	Vega del río Alias, Río Alias
73	Vega tradicional del Pilar de Jaravía, Pilar de Jaravía
74	Cultivos bajo plástico de la Cañada del Hornillo, Cañada del Hornillo

Figure 50. Map of landscape units. Scale 1:100.000 (Elaborated by the author)

## VARIABLE 6: CULTURAL HERITAGE

**Definition of the variable:** It assesses the presence of elements of the cultural and natural heritage.

**Sources of the information:**

- ✓ General Catalogue of Andalusian Historical Heritage (Department of Culture and Sport. Junta de Andalucía).
- ✓ Inventory of popular architecture of Andalusia (Department of Culture and Sport. Junta de Andalucía).
- ✓ Inventory of Farmhouses, estates and wineries of Almería (Department of Culture and Sport. Junta de Andalucía).
- ✓ Identification of the additional Elements in the Individual Project of Landscape and Cultural Resources).
- ✓ Inventory of Cultural Georresources 2011 (REDIAM, Junta de Andalucía)
- ✓ Catalogues of protected Elements and Goods of the Planning of the Territory of Subregional environment of the Urban Agglomeration of Almería and of the Levante Almeriense, and General Plans of urban development of municipal environment (Department of Public Works and Transportations, Junta de Andalucía).

**Intermediate documents produced:** Map of Cultural Resources location 1/100.000 (Elaborated by the author)

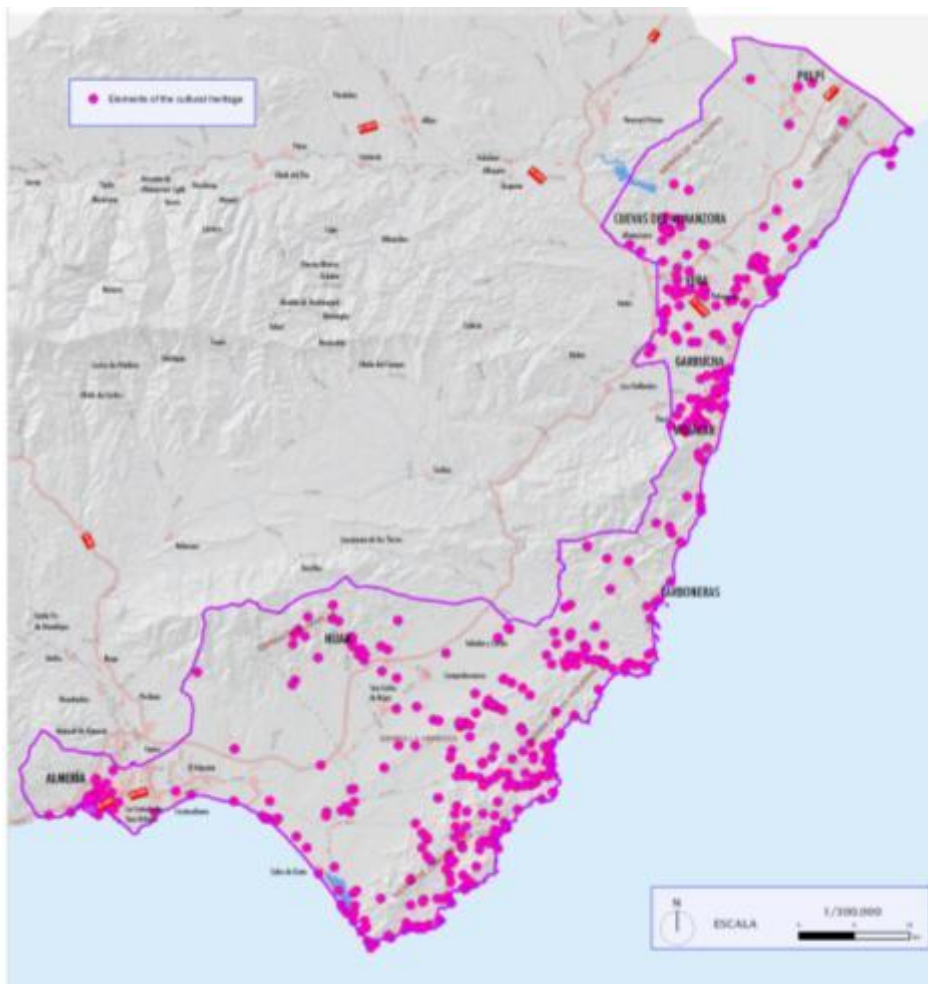


Figure 51. Map of Cultural Resources location. Scale 1:100.000 (Elaborated by the author)

### 7.3.3. MODELS OF VULNERABILITY

The methodology PAP/RAC used has as an objective to evaluate the vulnerability of the territory before the establishment of any use or specific economic activity. Because of it, an essential task of the work carried out has been the definition of the model of vulnerability of each one of the uses or economic activities that have been selected for its analysis from the conclusions obtained in the coastalisation diagnosis.

In this sense, it is understood by model of vulnerability the identification and qualitative valuation of the predictable potential impacts on the different environmental variables considered of the natural environment, in each one of the phases of establishment of the use or activity in question.

The models of vulnerability have been widely discussed and arrived at by consensus with the Group of Experts that advises this individual project and they are synthesized in the corresponding matrix of impacts, attending to the same nomenclature of terms and of impact magnitude values that uses the current legislation in Environmental Impact Evaluation matter.

This way, a matrix of impacts has elaborated, that synthesizes the conceptual model of vulnerability applied, for each use or economic activity analyzed.

Subsequently the matrix used is presented:



INTERACTION MATRIX																	
SURFACE			Use / Activity: Tourist resort projects, type golf course – like														
SYSTEM	SUBSYSTEM	IMPACT	Magnitude of impacts of Use or Activities on Eqs. 2 (Table 2)														
			Soil/Fog			Phytodiversity			Geomorph			Biot			Socioculture		
			M	A	R	M	A	R	M	A	R	M	A	R	M	A	R
ATMOSPHERE	Air quality	Light pollution															
WATER	Water	Risks of abuse and alterations of the soil															
WATERBODIES	Surface waters	Contribution to the network of drainage and collection of rain															
		Pollution of surface water															
	Underground waters	Pollution of underground waters															
WOODLAND	Shrubland	Disturbance of habitats															
		Fragmentation of habitats															
	Forest	Disturbance of populations of animals															
		Fragmentation of populations of animals															
		Disturbance surface vegetation															
Park	Parkland abandonment																
	Recreation Change																
WATERBODIES	Landscape	Disturbance of the landscape															
	Cultural heritage	Disturbance of cultural heritage items															
		Disturbance of populations of animals															
		Disturbance of populations of animals															
		Disturbance of populations of animals															
		Disturbance of populations of animals															



MATRIZ DE IDENTIFICACIÓN DE IMPACTOS POTENCIALES														
SURFACE			Use / Activity: Industrial plants for energy production (photovoltaic or solar thermal)											
SECTION	VARIABLE	IMPACTS	Algunas susceptibilidades de efectos al medio natural											
			Leveling			Infraestructuras			Construction			Maintenance		
			Magnitudes of impacts (N: Null, M: Moderate, A: High, S: Critical)											
			N	A	S	N	A	S	N	A	S	N	A	S
ATMOSPHERE	Air quality	Light pollution							M			M		
GEOSPHERE	Relief	Risks of slope and alterations of the relief		M			M			M				
HYDROSPHERE	Surface waters	Contribution to the network of drainage and induction of risks	M			M			M			M		
		Pollution of surface water	M											
	Underground waters	Pollution of underground waters	M			M			M			M		
BIOSPHERE	Habitats	Destruction of habitats			S		M			M			M	
		Fragmentation of HABITATS			S		M			M			M	
	Flora	Destruction of populations of Fragmentation of populations of			S		M			M			M	
ANTHROPOSPHERE	Landscape	Deterioration of the landscape Environmental degradation of the			S		M			M			M	
		Cultural heritage	Destruction of cultural heritage Environmental degradation of the		M						S		M	

NUL: magnitude of impact: non-existent or barely significant condition.

MODERATE: magnitude of impact: impact of average intensity and localized extension (affects less than 3 factors)

HIGH: magnitude of impact: impact of high intensity and localized extension or medium intensity and significant extension.

CRITICAL: magnitude of impact: impact of very high intensity or high intensity and significant extension.

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MATRIZ DE IDENTIFICACIÓN DE IMPACTOS POTENCIALES																	
SURFACE			Use / Activity: Industrial plants for energy production (photovoltaic or solar thermal)														
SPHERE	SUBSPHERE	IMPACTS	MAGNITUD DE IMPACTOS DE CADA UNO DE LOS SUBESFERAS														
			Leveling			Infraestructuras			Construction			Maintenance					
			M	A	R	M	A	R	M	A	R	M	A	R			
ATMOSPHERE	Air quality	Light pollution															
GEOSPHERE	Soil	Risk of slope and alterations of the relief															
HYDROSPHERE	Surface waters	Alteration to the network of drainage and induction of risks															
		Pollution of surface water															
	Underground waters	Pollution of underground waters															
BIOSPHERE	Habitats	Destruction of Habitats Fragmentation of HABITATS															
	Flora	Destruction of POPULATIONS of Fragmentation of populations of															
	Fauna	Reduction surface Production displacement Behavior Changes															
ANTHROPOSPHERE	Landscape	Deterioration of the landscape Environmental degradation of the															
	Cultural Heritage	Destruction of natural heritage Environmental degradation of the															

NULL: magnitude of impact: non-existent or barely significant condition.  
 MODERATE: magnitude of impact: impact of average intensity and localized extension (effects less than 3 factors).  
 HIGH: magnitude of impact: impact of high intensity and localized extension or medium intensity and significant extension.  
 VERY HIGH: magnitude of impact: impact of very high intensity or high intensity and significant extension.

INTERACTION MATRIX														
SURFACE			Use / Activity: Implementation of industrial projects by way of Special Plans Performance in Single or undeveloped land											
SCENE	VARIABLE	IMPACT	Actions which may affect the natural environment											
			Landfill			Infrastructure			Construction			Maintenance		
Magnitude of impact: N - Not, M - Moderate, A - High, E - Critical														
			M	A	E	M	A	E	M	A	E	M	A	E
ATMOSPHERE	Air quality	Light pollution	M			M			M				A	
SCENES	Visual	Rate of slope and alterations of the soil	M			M								
HYDROSPHERE	Surface waters	Condition to the network of drainage and infiltration of rain		A			A		M					
		Pollution of surface water		A			A			A			A	
	Under ground waters	Pollution of under-ground waters		A			A			A			A	
BIOSPHERE	Flora	Destruction of Habitats			E									
		Fragmentation of HABITATS			E									
	Fauna	Destruction of populations of interest			E									
	Fauna	Fragmentation of populations of interest			E									E
		Reduces surface vegetation			E									E
	Landscape	Population displacement			E									E
		Behavior Changes			E									E
ANTHROPOSPHERE	Cultural Heritage	Deterioration of the landscape		A			A			A				E
		Environmental degradation of the		A			A			A				E
		Destruction of cultural heritage sites			E					E			A	
		Environmental degradation of the			E					E			A	

N - magnitude of impact non-existent or barely significant condition.

M - MODERATE magnitude of impact: impact of average intensity and localized extension (affects less than 2 hectares)

A - HIGH magnitude of impact: impact of high intensity and localized extension or medium intensity and significant extension.

E - CRITICAL magnitude of impact: impact of very high intensity or high intensity and significant extension.

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INTERACTION MATRIX														
SURFACE			Use / Activity Implementation of large linear infrastructure and emerging resources											
EFFECT	IMPACT	IMPACTS	Activities that may affect the natural environment											
			Landfill			Infrastructure			Construction			Maintenance		
			M	A	C	M	A	C	M	A	C	M	A	C
ATMOSPHERE	Air quality	Light pollution	Y			Y			Y			Y		
GEOSPHERE	Soil	Slope of slope and alterations of the soil		O			O		Y			Y		
HYDROSPHERE	Surface waters	Contribution to the network of drainage and reduction of risks	Y			Y			Y					
		Pollution of surface water										Y		
	Underground waters	Pollution of underground waters	Y			Y			Y			Y		
BIOSPHERE	Wildlife	Destruction of habitats		O				C			C			
		Fragmentation of habitats			C									C
	Flora	Destruction of associations of interest		O										
		Fragmentation of associations of interest			C									
	Fauna	Wedge surface reduction		O										
		Population displacement												
		Behavior changes												
ANTHROPOSPHERE	Landscape	Deterioration of the landscape			C									C
		Disappearance or degradation of the landscape					O			O				
	Cultural Heritage	Destruction of cultural heritage items		O								O		
		Disappearance or degradation of the landscape										O		

M: Low magnitude of impact, low extension or barely significant condition.  
 O: MEDIUM magnitude of impact, impact of average intensity and localized extension (affects less than 1 hectare).  
 A: High magnitude of impact, impact of high intensity and localized extension or medium intensity and significant extension.  
 C: Very high magnitude of impact, impact of high intensity and high extension or high intensity and significant extension.

INTERACTION MATRIX											
SURFACE			Use / Activity: Transformation cultures "street"								
SYSTEM	VALUES	IMPACTS	Address which may affect the natural environment								
			Land Use			Infrastructure			Recreation		
Magnitude of impact: M (Low), A (Medium), H (High), C (Critical)											
			M	A	H	M	A	H	M	A	H
ATMOSPHERE	Air quality	Light pollution									
GEOSPHERE	Soil	Risks of slope and alterations of the soil		A			A		M		
HYDROSPHERE	Surface waters	Condition to the network of drainage and induction of risks		A		M					
		Pollution of surface water								A	
	Under-ground waters	Pollution of under-ground waters								A	
BIOSPHERE	Habitats	Destruction of habitats			H		A				
		Fragmentation of habitats									
	Fauna	Destruction of populations of interest		A			A			M	
		Fragmentation of populations of interest									
Flora	Reduction surface vegetation		A			A				A	
	Population displacement								M		
		Behavior Changes							M		
ANTHROPOSPHERE	Landscape	Deterioration of the landscape		A			A				A
		Environmental degradation of the	M			M			M		
	Cultural Heritage	Destruction of cultural heritage items									
		Environmental degradation of the	M			M			M		

**LOW** magnitude of impact: non-existent or barely significant condition.  
**MEDIUM** magnitude of impact: impact of average intensity and localized extension (affects less than 1 habitat).  
**HIGH** magnitude of impact: impact of high intensity and localized extension or medium intensity and significant extension.  
**CRITICAL** magnitude of impact: impact of very high intensity and significant extension.

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INTERACTION MATRIX																	
SURFACE			Use / Activity Settlement expansion														
SYSTEM	IMPACT	EFFECTS	Leveling			Revolvement			Infrastructure			Build			Maintenance		
			M	A	C	M	A	C	M	A	C	M	A	C	M	A	C
ADVERSE	Accidents	Right of way															
GEOPHYSICAL	Risk	State of preservation of the coast															
HYDROLOGICAL	Surface waters	Condition to the reduction of drainage and reduction of risk															
		Pollution of surface waters															
	Underground waters	Pollution of underground waters															
BIOSPHERE	Habitats	Disturbance of habitats															
		Degradation of habitats															
		Disturbance of populations of species															
	Flora	Degradation of populations of species															
Degradation of populations of interest																	
	Fauna	Wetland or fish reduction															
Population disturbance																	
	Land Use	Behavior changes															
Disturbance of the landscape																	
ENVIRONMENTAL	Cultural Heritage	Disturbance of the landscape															
		Environmental degradation of the landscape															
	Cultural Heritage	Disturbance of cultural heritage items															
Environmental degradation of the landscape																	

RED: magnitude of impact: non-existent or barely significant condition.

ORANGE: magnitude of impact: impact of average intensity and localized extension (Effects localized / Limited).

RED: magnitude of impact: impact of high intensity and localized extension or medium intensity and significant extension.

RED: magnitude of impact: impact of very high intensity and significant extension and significant extension.





#### 7.3.4. DEFINITION OF INDICATORS, VALUES OF BALANCE AND RESULTS OBTAINED

Subsequently, the indicators, the values of balance of the different indicators, and the results obtained corresponding to the valuation of each variable used according to the indicators, are described in a synthetic way.

##### **VARIABLE 1: LIGHT AND ATMOSPHERIC QUALITY**

**Definition of the variable:** light quality of atmospheric space.

**Indicator:** level of current light pollution.

**Way of the indicator displacement:** minor less light pollution, increased environmental quality.

**The Weights of the indicator:**

0: E4 areas (areas that support high luminous flux, areas including urban areas and commercial, tourist and recreational activities at night hours)

1: E3 areas (areas that support middle luminous flow, industrial areas, areas with use at night, residential areas with low buildings),

2: E2 areas (areas that support reduced luminous flux, classified areas as urban and non building soils not included in the E1 area)

3. E1 Areas (dark areas, areas classified as non building soils)

4. E1 Areas (dark areas of special interest to astronomical research centre of Calar Alto).

**Document produced:** Light pollution map. (1:100.000) (Department of Environment. Junta de Andalucía).

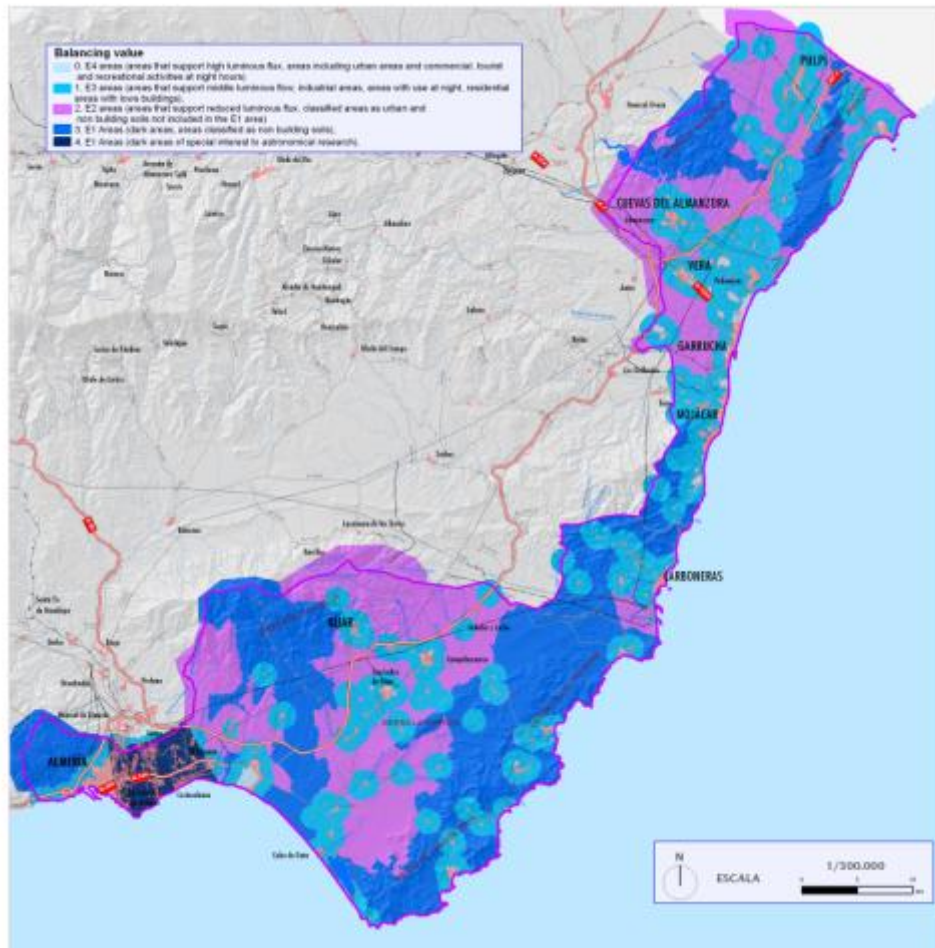


Figure 52. Map of Luminance Zoning of atmospheric space (1:100,000) (Department of Environment. Junta de Andalucía).

## VARIABLE 2: RELIEF

**Definition:** rank or interval slope of the unit

**Indicator:** land slope as percent

**Way of the indicator displacement:** greater slope higher environmental quality

**Weighting of the indicator values:**

0: slope minor to 5%

1: slope between 5 and 10%

- 2: slope between 10% and 25%
- 3: slope between 25% and 45%
- 4: slope greater than 45%

**Document produced:** Slopes Map (1/100.000). Elaborated by the author.

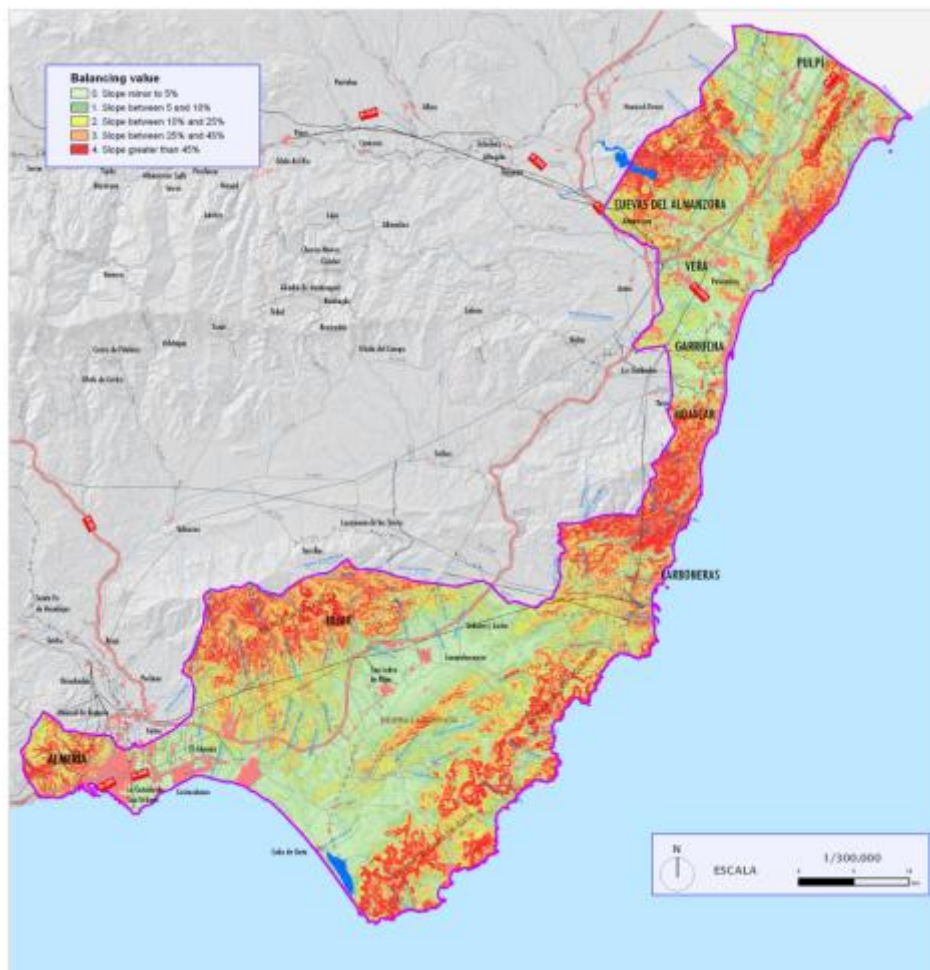


Figure 53. Slopes Map (1/100.000). Elaborated by the author.

### VARIABLE 3: WATER

**Definition:** presence or under-ground and surface waters.

**Indicator:** presence or absence of under-ground and surface waters

**Way of the indicator displacement:** the presence of water increases the environmental quality of the unit of the territory

**Weighing of the indicator values**

0: No presence of surface and underground water sources

1: No presence of surface waters, though in the influence area of groundwater masses detrital (in unsaturated zone) without exploitation for human supply

2: No surface waters, though with water masses detrital (in unsaturated zone) for human supply

3: No surface waters, though with water masses carbonate and (presence of seasonal surface waters (rivers and flooding areas with higher return period of 50 years).

4: Presence of permanent or semi-permanent surface waters (lagoons, deltas - rambla, reservoirs, springs, lagoons, spit, channels and flood areas with lower return period 50 years).

**Document produced:** Hydrological Synthesis Map (1.100.000).Elaborated By The Author.

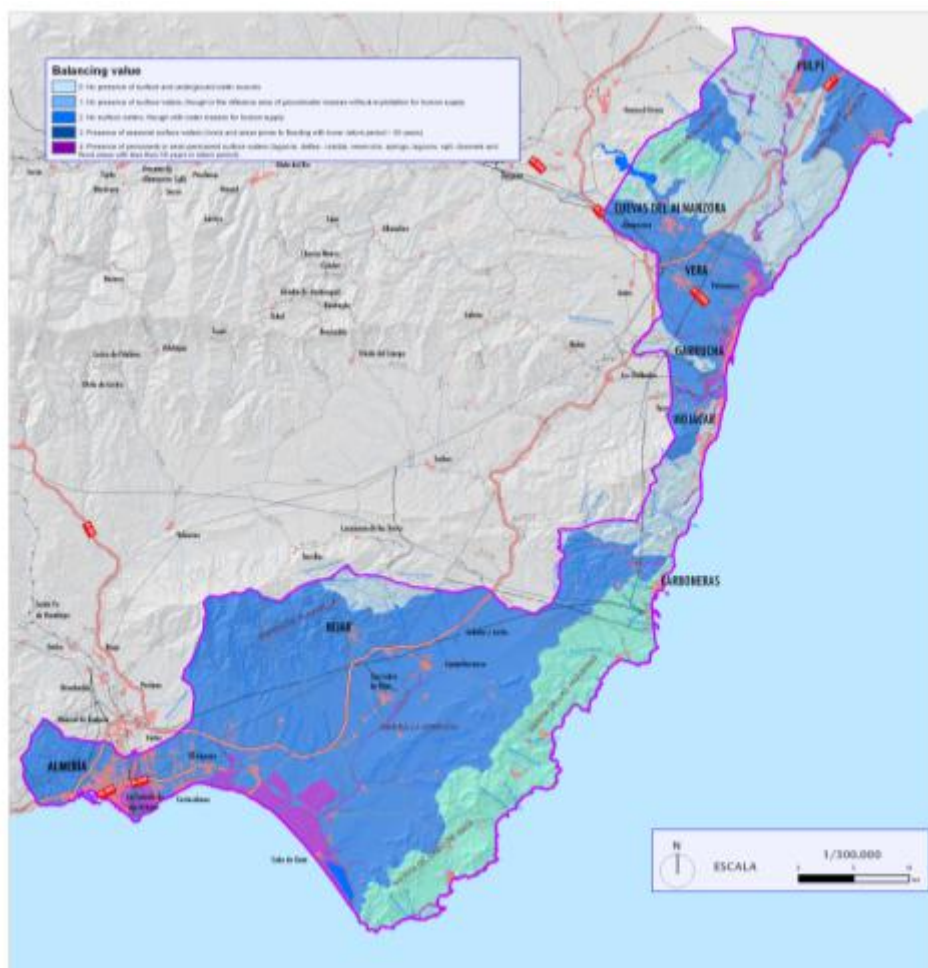


Figure 54. Hydrological Synthesis Map (1.100.000). Elaborated by the author.

#### VARIABLE 4: ECOLOGICAL VALUE

**Definition:** Value of habitats development level, and presence of threatened flora and fauna taxa.

**Indicator:** ecological value of the territory (homemade, see methodology detailed in annex 1), made at the same time with multiple criteria based on serial development state, status of plant communities in the Habitats Directive, the presence of threatened wildlife, capacity of regeneration, singularity, etc. Full methodological development proposed is detailed in annex 1 of this document about proposal for ecological assessment of the territory.

**Variable displacement effect:** higher ecological value greater environmental quality.

**Weighing of the indicator values:** given the diversity of situations and possible combinations with the sources of information used, an approach to the description of the values might be the following:

0: no presence of interesting habitats or species of flora or fauna (urban and industrial soils, infrastructures, mining areas, etc.).

1: Crops, abandoned crops and forest areas with initial states of the series (Habitat pioneros) not included in the Habitats Directive and without threatened wildlife

2: Second or third degree serial scrubs with habitats of general interest and endangered species, or initial states of the series included in the Habitats Directive without /with endangered species. Forest plantations.

3: Serial scrubs and first-grade forests, either serial second-degree scrubs included in the Habitats Directive and with endangered species.

4: First degree forest lands (climax or close to the climax) included in the Habitats Directive, and/or with presence of endangered flora and fauna species.

**Documents produced:** map of territory ecological value 1/10,000. Elaborated by the author.

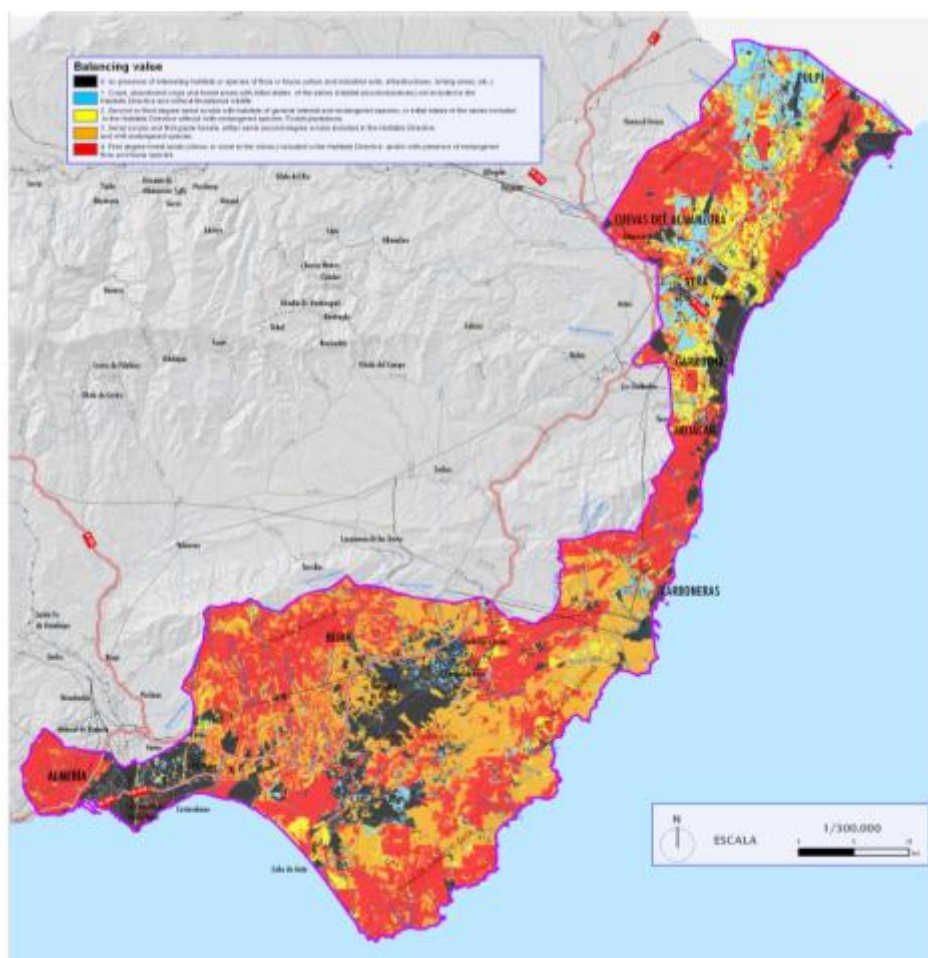


Figure 55. Map of territory ecological value 1/100.000. Elaborated by the author.

## VARIABLE 5: LANDSCAPE

**Definition:** Appreciates the presence of quality landscape scenarios due to their natural or cultural characteristics. In this regard, the landscape is observed, exclusively, from the perspective of the social value of their natural and cultural aesthetic characteristics, not from an ecosystem perspective (a question that is reflected directly in the analysis of the variable "ecological value").

The parameters to be considered for the assessment of the landscape units, according to the methodology PAP/RAC are valued on a scale from 0 (minimum) to 4 (maximum value). They are as follows:

1. Naturalness Degree (state of preservation of natural and anthropic elements that form, structure and order the landscape).



Value 0: grounds sealed by constructions or facilities in which are impossible to recognize the appearance and the constructor elements of the original landscape (urban zones, industrial grounds, cultures under plastic, great infrastructures, etc.).

Value 1: areas intensely transformed into which the natural conditions of the territory have been altered profusely for their productive use (mining zones left, great surfaces of cultures in regime of industrial exploitation, etc.)

Value 2: areas in which the transformation of uses of the ground has adapted to the natural conditions of the territory, without producing too significant changes in the forms of the relief, depth or distribution of grounds natural regime of the cycle of the water, etc. (hoisted dries land, traditional, mosaic fertile valleys of cultures with natural vegetation, etc.)

Value 3: areas with good preservation of its natural terrain features, without significant changes or with uses of the ground integrated and adapted to the conditions and natural processes (forest, mosaic scrubs of traditional cultures and forest areas, urban beaches, etc.)

Value 4: areas with very good preservation of its natural terrain features with nonexistent transformations of use (the steep coasts and natural beaches, summits and steep slopes of the spaces of mountain range, native forest zones with climax vegetation, conserved wet lands, etc.)

2. Diversity Degree (level of homogeneity/heterogeneity of the natural and anthropic elements on which articulate the physical structure of the landscape unit).

Value 0: units with very low diversity of relief forms, processes and structural elements of natural character (urban, industrial areas, intensive cultures under plastic, coastal cliffs, beaches, etc.)

Value 2: units with average diversity of relief forms, processes and structural elements of natural character (agricultural mosaics, agroforestry mosaics, forest mosaics, etc.)

Value 4: units with very high diversity of relief forms, processes and structural elements of natural character: (mountain ranges, diversified slopes of heterogenous relief and uses, etc.)

3. Spatial Order (the patterns that determine the organization and evolution of the landscape are easily recognizable or not).

Value 0: very high degree of difficulty to recognize the space order of the elements that compose and articulate the landscape (constructed grounds and intensive agriculture under plastic in units of little relief, areas cultivated without visible structures, etc.)

Value 2: average degree of difficulty to recognize the space order of the elements that compose and articulate the landscape (mountain ranges, heterogenous mosaic scopes, etc.)

Value 4: simple and recurrent patterns that condition a high level of spatial order easily perceivable: traditional cultures of dry land and fertile valleys with visible structures, beaches, wet lands, badlands, etc.)

4. Symbolic Value or identity for the population (valuing each landscape according to the recognition that the population makes with criteria of a historical, cultural, religious, mythological and symbolic in general).

Value 0: Very low or null

Value 1: Low

Value 2: Medium

Value 3: High

Value 4: Very high

The "landscape value" is obtained by weighted aggregation of the partial values of the four parameters indicated.

**Way of the indicator displacement:** higher quality landscape greater territorial value.

**Indicator:** quality landscape

**Weighing of the indicator values "landscape quality":**

0: Very low

1: Low

2: Medium

3: High

4: Very high

**Documents produced:**

- Map of landscape units 1/100.000

- Map of quality assessment of landscape units 1/100.000. Elaborated by the author.

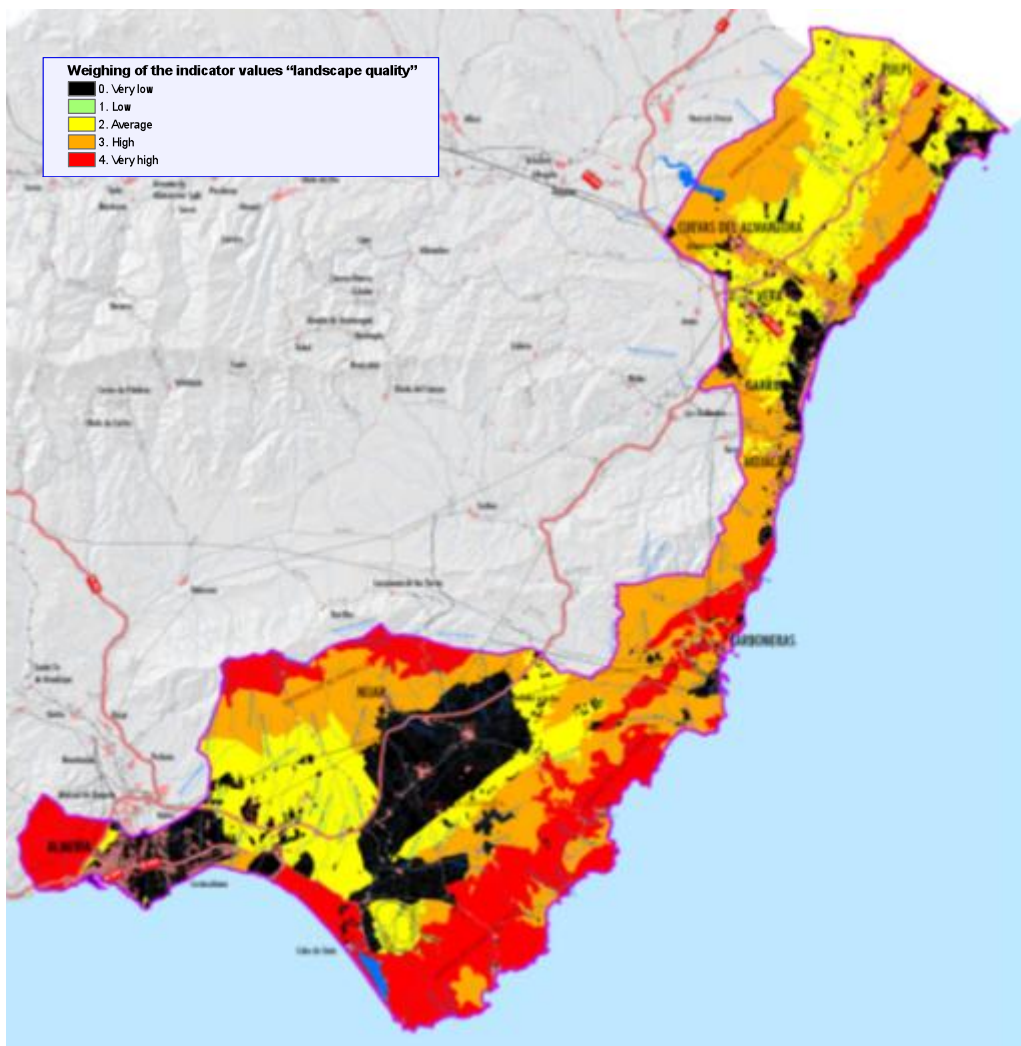


Figure 56. Map of quality assessment of landscape units 1/100.000. Elaborated by the author.

## VARIABLE 6: CULTURAL HERITAGE

**Definition:** Appreciates the presence of outstanding elements of the natural and cultural heritage

**Indicator:** distance of the unit to identified cultural elements of interest

**Way of the indicator displacement:** existence or not of elements of cultural interest to smaller distances to 200 and 300 meters.

**Weighing of the indicator values:**

0: no identified heritage elements inside buffers of 300 meters from the unit

1: Group 2 elements identified among the buffers 200 and 300 meters.

2: Group 2 elements identified in a buffer of less than 200 meters

3: Group 1 elements identified among the buffers 200 and 300 meters.

4: Group 1 elements identified in a buffer of less than 200 meters

For the purposes of the previous weighting Groups 1 and 2 are defined as follows:

**Group 1:** in this group are the following:

- Items included in the database of the General Catalogue of the Andalusian Historical Heritage (with official legal protection)
- Natural elements included in the Inventory of Georesources of Andalusia (2011)

**Group 2:** in this group are the following:

- Items not included in of the General Catalogue of the Andalusian Historical Heritage (without legal protection)

**Documents produced:**

- Spatial Identification Map of cultural elements.
- Protection areas Map of cultural elements (Vectorial Map 1/100.000).
- Protection areas Map of cultural elements (Raster Map 1/100.000).

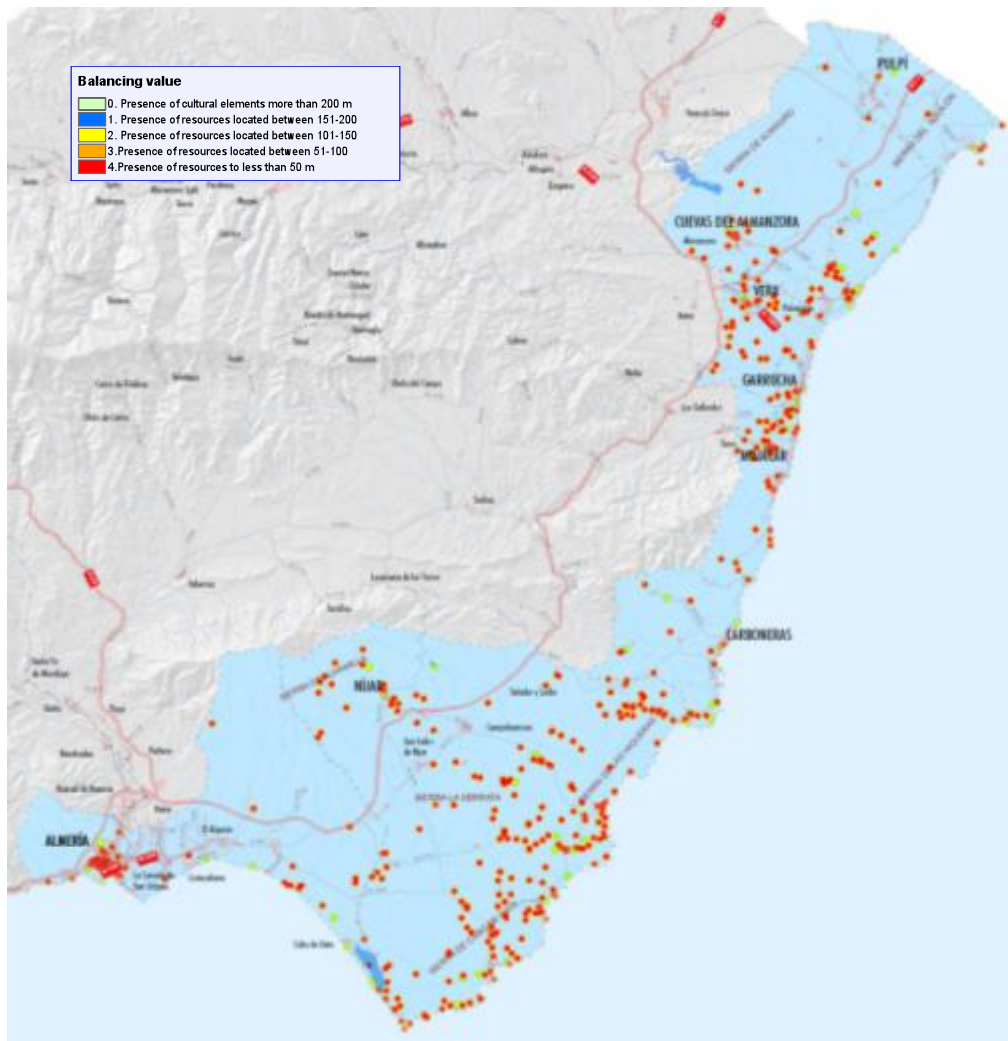


Figure 57. Map of delimitation of protection perimeters according to buffers of 200 and 300 meters. Elaborated by the author

### 7.3.5. NUMERICAL ANALYSIS FOR EVALUATION OF THE VULNERABILITY

Evaluate the assessment of the territory according to the vulnerability models previously established for each use/activity concerned.

For that, Arc-Gis 9.3 and specific utilities packs will be used. So, each raster cell (10x10 m) will be assigned six different values, one by each environmental variable considered.

Homogenous spatial units: cell 10 x 10 m.

LIGH QUALITY. <b>at</b> (value 0 to 4)	RELIEF/SLOPE <b>p</b> (value 0 to 4)	WATERS <b>a</b> (value 0 to 4)
ECOLOGICAL VALUE <b>ve</b> (value 0 to 4)	LANDSCAPE <b>pj</b> (value 0 to 4)	CULTURAL HERITAGE <b>pc</b> (value 0 to 4)

If any environmental variable had the same weight, it would be possible to obtain de Global Quality Value (CG) using an aggregation method (arithmetic mean):

$$CG = (Vat + Vp + Va + Vve + Vpj + Vpc) / 6.$$

Subsequently it would be necessary to discretize the numerical sequence obtained into five classes of territorial quality values: very low, low, medium, high and very high. These five classes of value of territorial quality could be assimilated to others classes of territorial assessment (low quality means low assessment).

However, territorial assessment cannot be a homogeneous value for any use/activity. Each cell will have different values depending on the specific use/activity that is being considered. On the other hand each environmental variable interact in a different way depending on the use/activity considered. So, it is logic to suppose that each environmental variable “weigh” in a different way according to the use/activity taken in account. This is:

$$CG = (Pat \times Vat + Pp \times Vp + Pa \times Va + Pve \times Vve + Ppj \times Vpj + Ppc \times Vpc) / \sum P$$

Where *P* is the specific weight of each environmental variable to calculate the overall quality of the unit according to one specific use/activity, and *V* is its pondered value.

The allocation of weights specific to each one of the environmental variables into account for each type of use/activity has been discussed and agreed with the group of experts. As a result we have obtained a final proposal (see vulnerability models).

Returning to the matrix that synthesized the vulnerability model for each use/activity, to proposal is to assign the value of specific weight to each variable according to the magnitude of the estimated impact in the interaction between this use/activity with those variables of the territory, in the following way:

- Specific weight 0: the maximum magnitude of the potential impact expected on that variable is NULL
- Specific weight 1: the maximum magnitude of the potential impact expected on that variable is MODERATE
- Specific weight 2: the maximum magnitude of the potential impact expected on that variable is HIGH
- Specific weight 3 : the maximum magnitude of the potential impact expected on that variable is CRITICAL

The magnitude of the potential impact is a variable whose value is estimated for each specific action in the definition of the model of vulnerability of each use/activity, and must account for its allocation by two features:

- Intensity: related to value of quality of the variable that affects.
- Extension: related to the size of the potentially afectable surface.

The qualitative characterization of the concept of magnitude is specified as:

- NULL magnitude of impact: non-existent or barely significant condition.
- MODERATE magnitude of impact: impact of average intensity and localized extension (affects less than 1 hectare)
- HIGH magnitude of impact: impact of high intensity and localized extension or medium intensity and significant expansion.
- CRITICAL magnitude of impact: impact of very high intensity or high intensity and significant expansion.

The Quality Global Value (CG) for each use / activity is:

1) Settlement expansion (table 1)

$$CG = (2 \times Vat + 2 \times Vp + 1 \times Va + 3 \times Vve + 3 \times Vpj + 3 \times Vpc) / 14$$

2) Greenhouse transformation (table 2)

$$CG = (1 \times Vat + 2 \times Vp + 2 \times Va + 3 \times Vve + 3 \times Vpj + 3 \times Vpc) / 14$$

3) Transformation cultures "street" (intensive or extensive cultivation, irrigated or rained, but cultivated "in street", without emissions) (table 3)

$$\text{CG} = (2 \times \text{Vp} + 2 \times \text{Va} + 3 \times \text{Vve} + 2 \times \text{Vpj} + 1 \times \text{Vpc}) / 10$$

- 4) Implementation of large linear infrastructure and emerging resources (table 4)

$$\text{CG} = (1 \times \text{Vat} + 2 \times \text{Vp} + 1 \times \text{Va} + 3 \times \text{Vve} + 3 \times \text{Vpj} + 2 \times \text{Vpc}) / 12$$

- 5) Industrial plants for energy production (photovoltaic or solar thermal) (table 5)

$$\text{CG} = (1 \times \text{Vat} + 2 \times \text{Vp} + 1 \times \text{Va} + 3 \times \text{Vve} + 3 \times \text{Vpj} + 3 \times \text{Vpc}) / 13$$

- 6) Windfarms (table 6)

$$\text{CG} = (1 \times \text{Vat} + 1 \times \text{Vp} + 3 \times \text{Vve} + 3 \times \text{Vpj} + 2 \times \text{Vpc}) / 10$$

- 7) Implementation of industrial projects by way of Special Plans Performance in Singular or undeveloped land (industrial buildings isolated in SNU) (table 7)

$$\text{CG} = (2 \times \text{Vat} + 1 \times \text{Vp} + 2 \times \text{Va} + 3 \times \text{Vve} + 3 \times \text{Vpj} + 3 \times \text{Vpc}) / 14$$

- 8) Tourist resort projects, type golf course – like (table 8)

$$\text{CG} = (2 \times \text{Vat} + 3 \times \text{Vp} + 2 \times \text{Va} + 3 \times \text{Vve} + 3 \times \text{Vpj} + 2 \times \text{Vpc}) / 15$$

This produces a numerical series of values, as many as raster cells, whose potential minimum is 0 and the maximum potential value is 4, which through statistical treatment will obtain five classes or value ranks.

The statistical method used is the “Natural Break” or “Jenks”. It is based on the implementation of the algorithm Jenks (Error on Choroplethic Maps: Definition, Measurement, Reduction”, in the Annals of the American Geographers, 1971). Consists in grouping quantitative data according to their own natural breaks. Maximizes the points where the difference is used as the limit of the class. Under this method, the defined ranges are different for each use / activity.

The following table shows the ranges for the greenhouse transformation. Each interval is assigned a vulnerability class.



Greenhouse transformation			
GLOBAL QUALITY ABSOLUTE VALUE	NUMBER	QUALITY CLASS	VULNERABILITY CLASS
0,00 to 0,85	1	<b>VERY LOW</b>	<b>VERY LOW</b>
0,85 to 1,49	2	<b>LOW</b>	<b>LOW</b>
1,49 to 2,06	3	<b>MODERATE</b>	<b>MODERATE</b>
2,06 to 2,49	4	<b>HIGH</b>	<b>HIGH</b>
2,49 to 4,00	5	<b>VERY HIGH</b>	<b>VERY HIGH</b>

It is considered, by express indication of the group of experts, that the covers of the urban land and sectorized for building land of the current urban development planning, that of the river bed of watercourses and rivers and that of existing infrastructures of the environment should be superimposed to the Global Quality Value cover for each use, and assigned directly the maximum class of vulnerability, that is to say, very high. This means, that the real value of the cells of the cover of CG that overlap with the cells of the imposed covers, will be replaced for the value 4.

Once completed the methodological part, the results have been represented obtaining the maps of vulnerability of the territory for the reception of each one of the respected uses/activities for their analysis.

Finished the analytic part of the evaluation of the vulnerability, the system of geographical information is in conditions to give answer to the questions of origin, elaboration and edition of the maps of vulnerability of the territory by uses/activities, as well as to other questions of interest that could arise during all the process of elaboration, such as synthetic valuations of combined uses, spatial definition of areas recommended for different uses, definition of lineal corridors layout for the establishment of infrastructures.

### 7.3.6. MAPS OF VULNERABILITY BY USES

The resulting maps of vulnerability are presented subsequently to apply the above-mentioned methodology. Besides a graphic of distribution of the represented classes of vulnerability is incorporated and its proportion, expressed in %.

The classes of vulnerability, as it has been reviewed in the epigraph of methodological proposal, represent the classification or legend of the maps of vulnerability. The different classes attend to the absolute values of the cover of global quality, which are differentiated in

five classes attending to the statistical method selected. According to this, the resultant intervals are correlated with the classes of vulnerability. These are:

- Very high Vulnerability. Very vulnerable areas before the use or activity that is being analyzed.
- High Vulnerability
- Medium Vulnerability
- Low Vulnerability
- Very low Vulnerability. Scarcely vulnerable areas before the use or activity that is being analyzed.

A commented reading of such maps as a conclusion is carried out, activity by activity, in the Chapter 8 of this document, corresponding to the devised Proposals according to the results of the project.

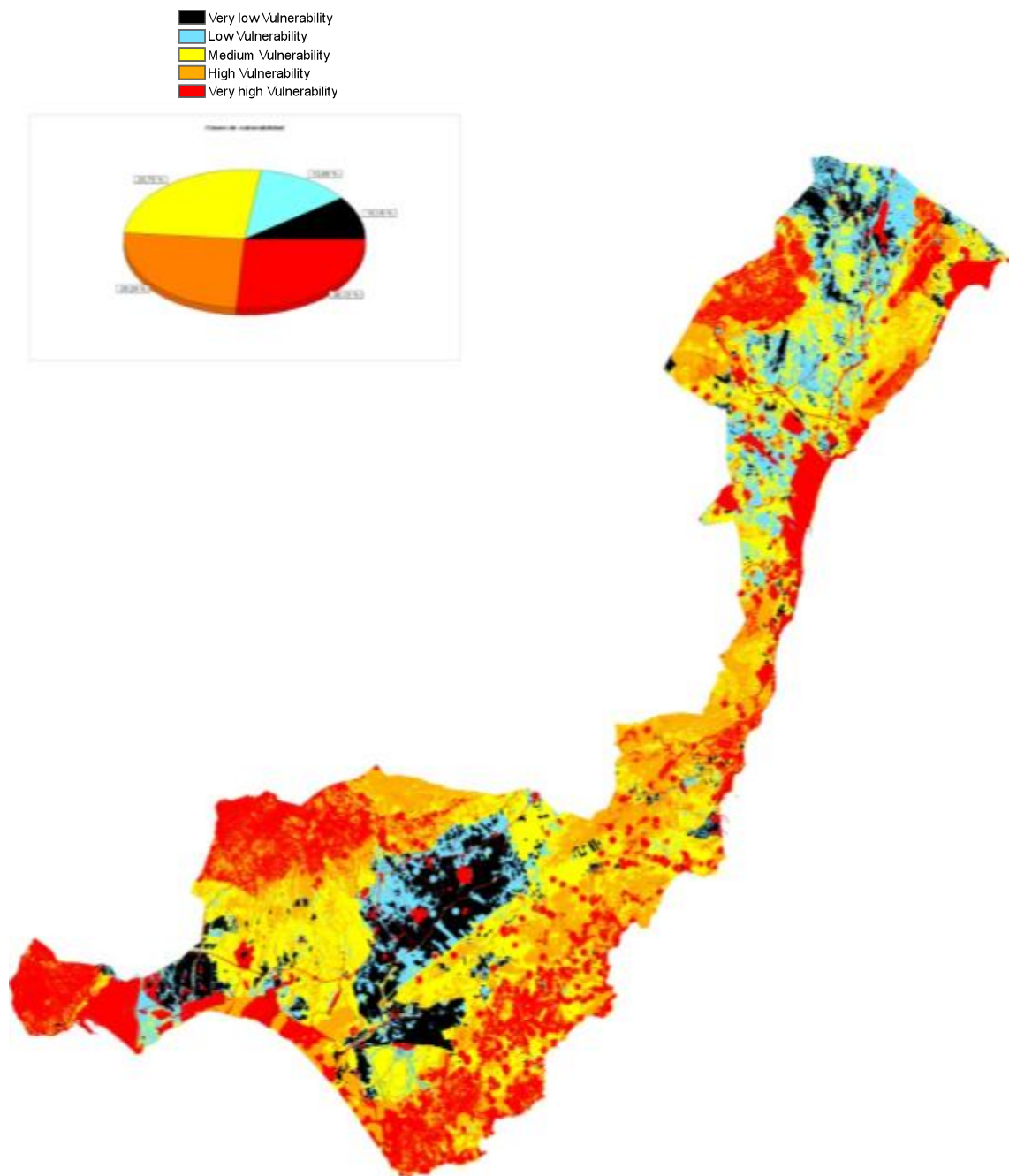


Figure 58. Vulnerability map to the establishment of crops under plastic (greenhouses).  
Elaborated by the author.

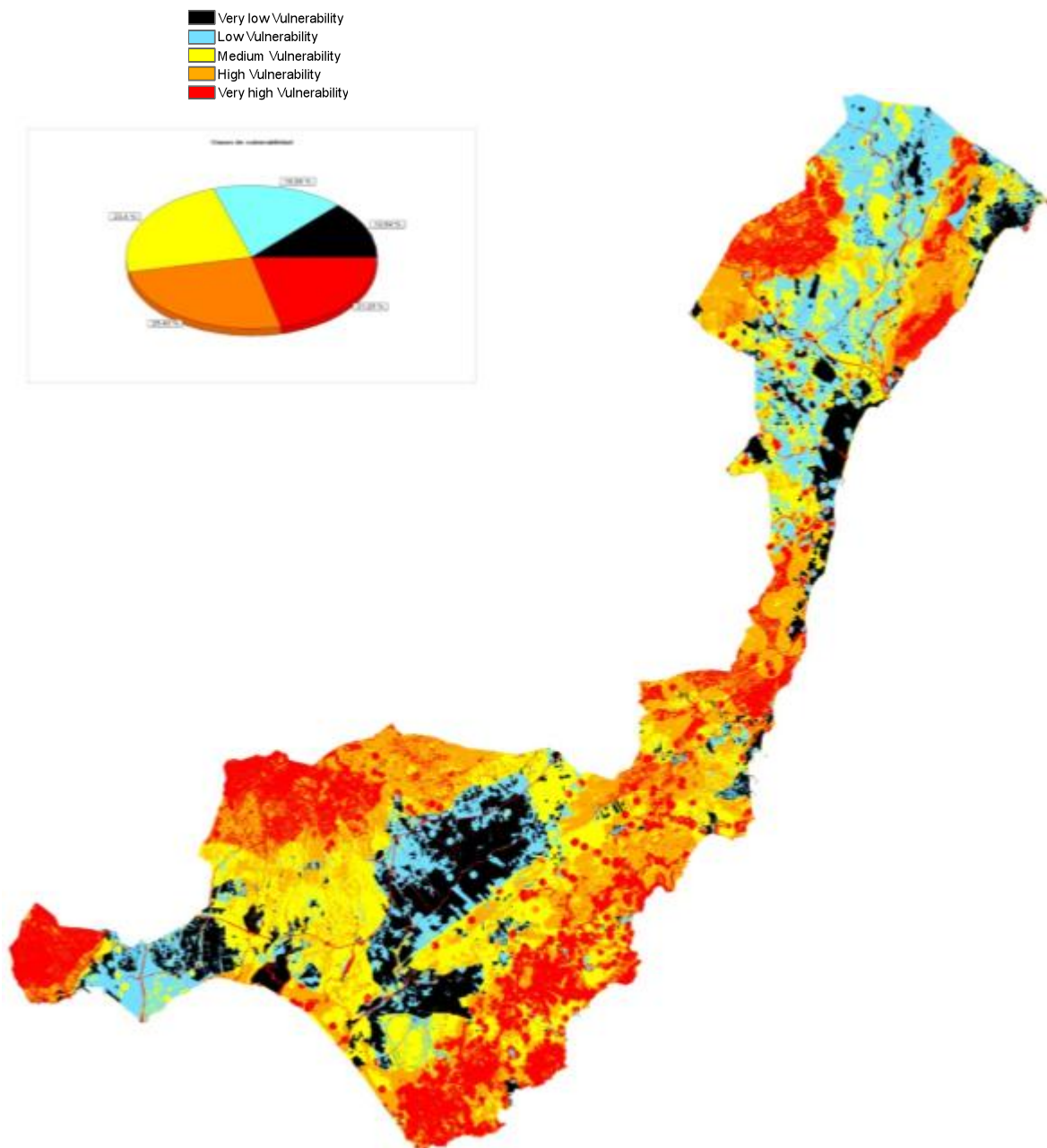


Figure 59. Vulnerability map to new urban developments. Elaborated by the author

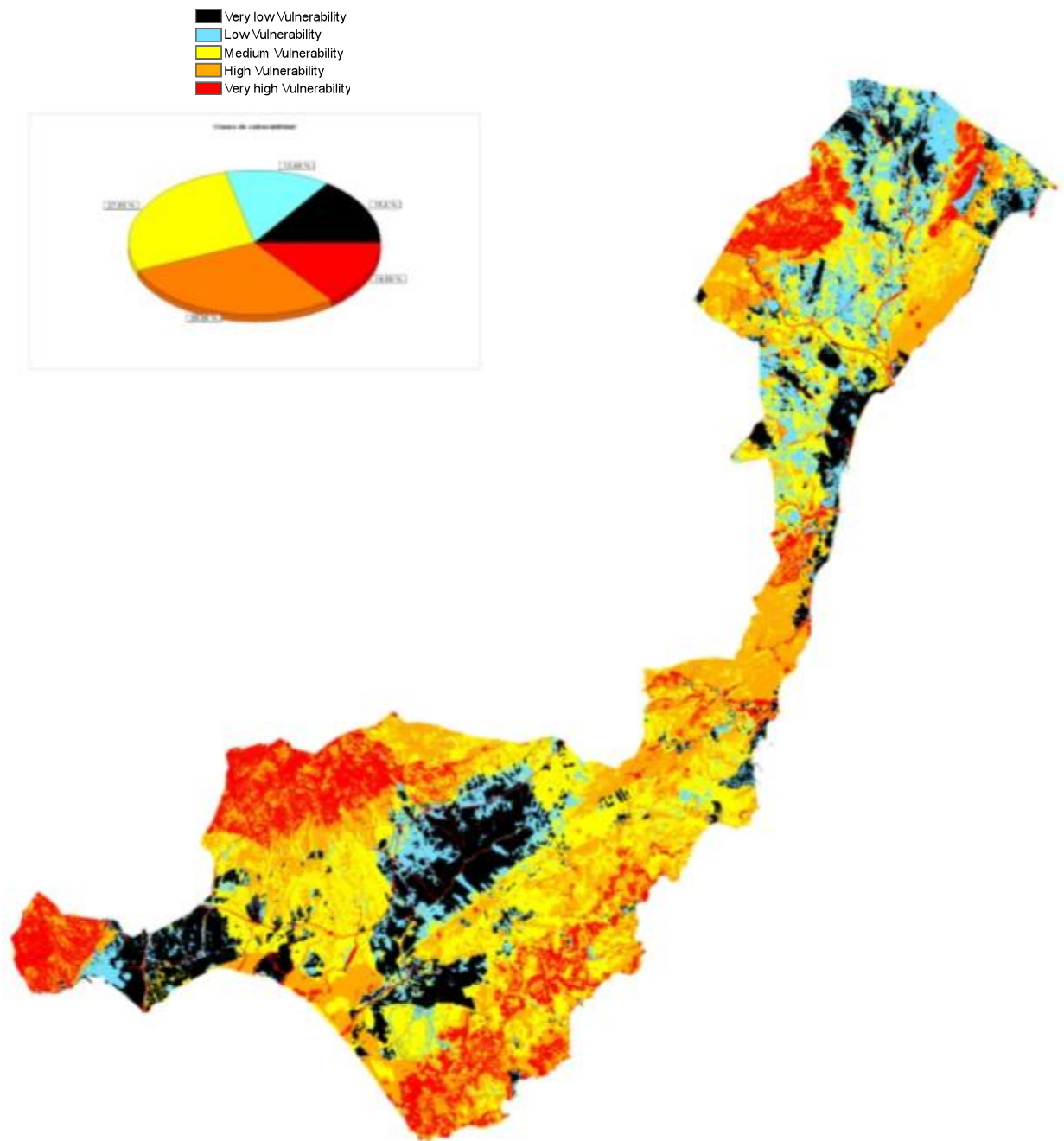


Figure 60. Vulnerability map to intensive cultivations "of street". Elaborated by the author.

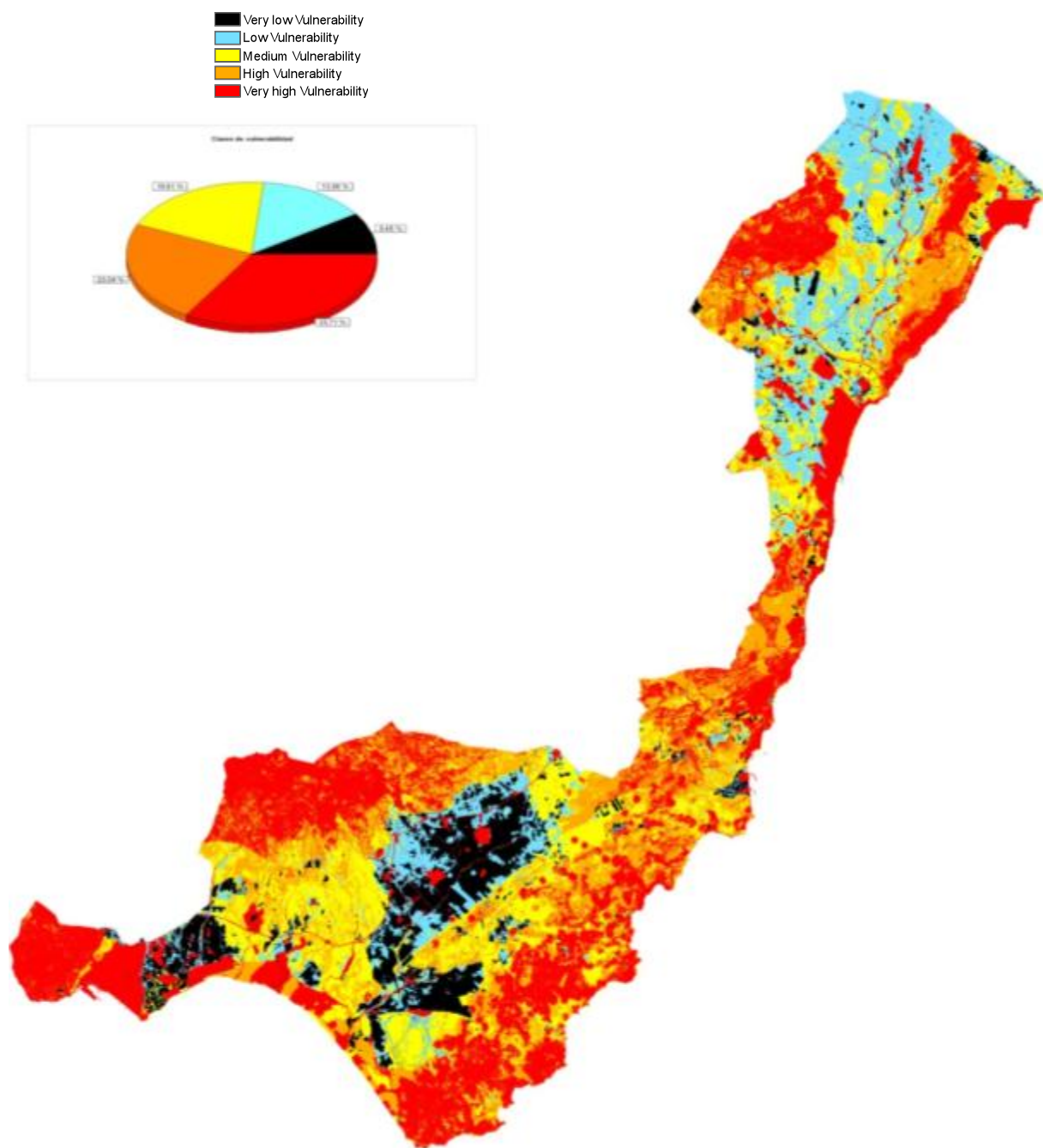


Figure 61. Vulnerability map to lineal air or emerging infrastructures. Elaborated by the author

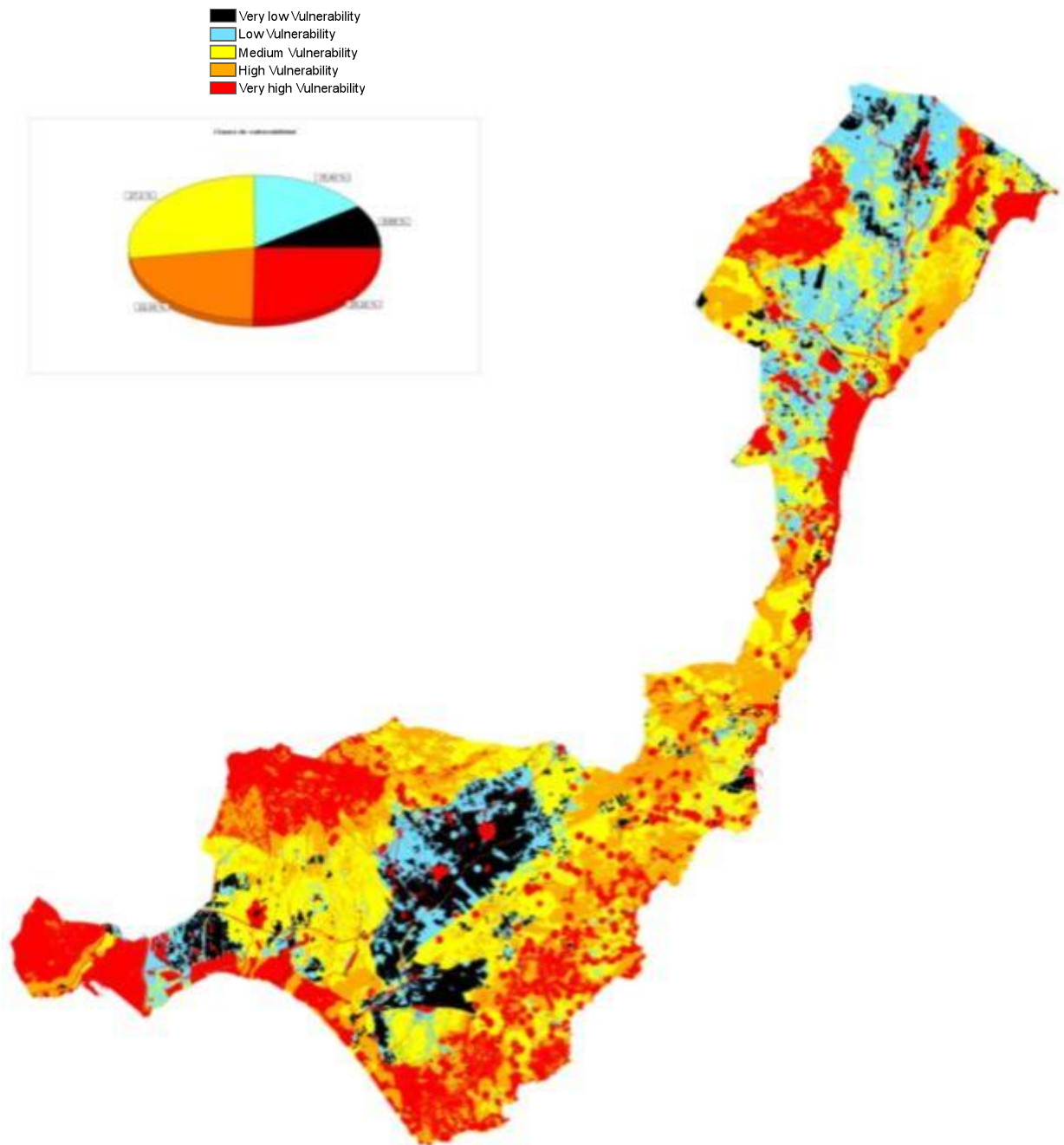


Figure 62. Vulnerability map to industrial facilities in Non-Building land. Elaborated by the author

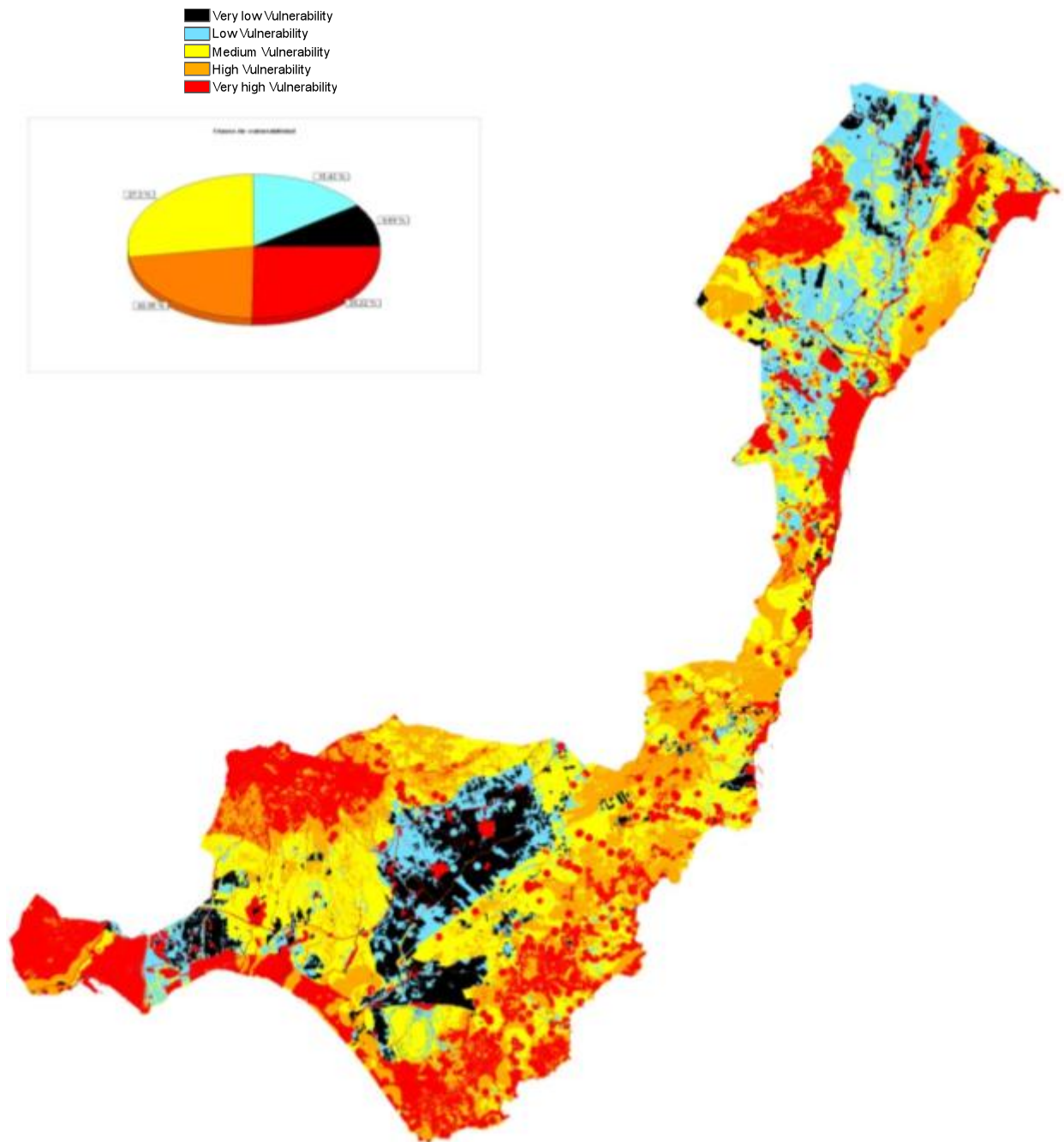


Figure 63. Vulnerability map to photovoltaic and thermosolar plants. Elaborated by the author.



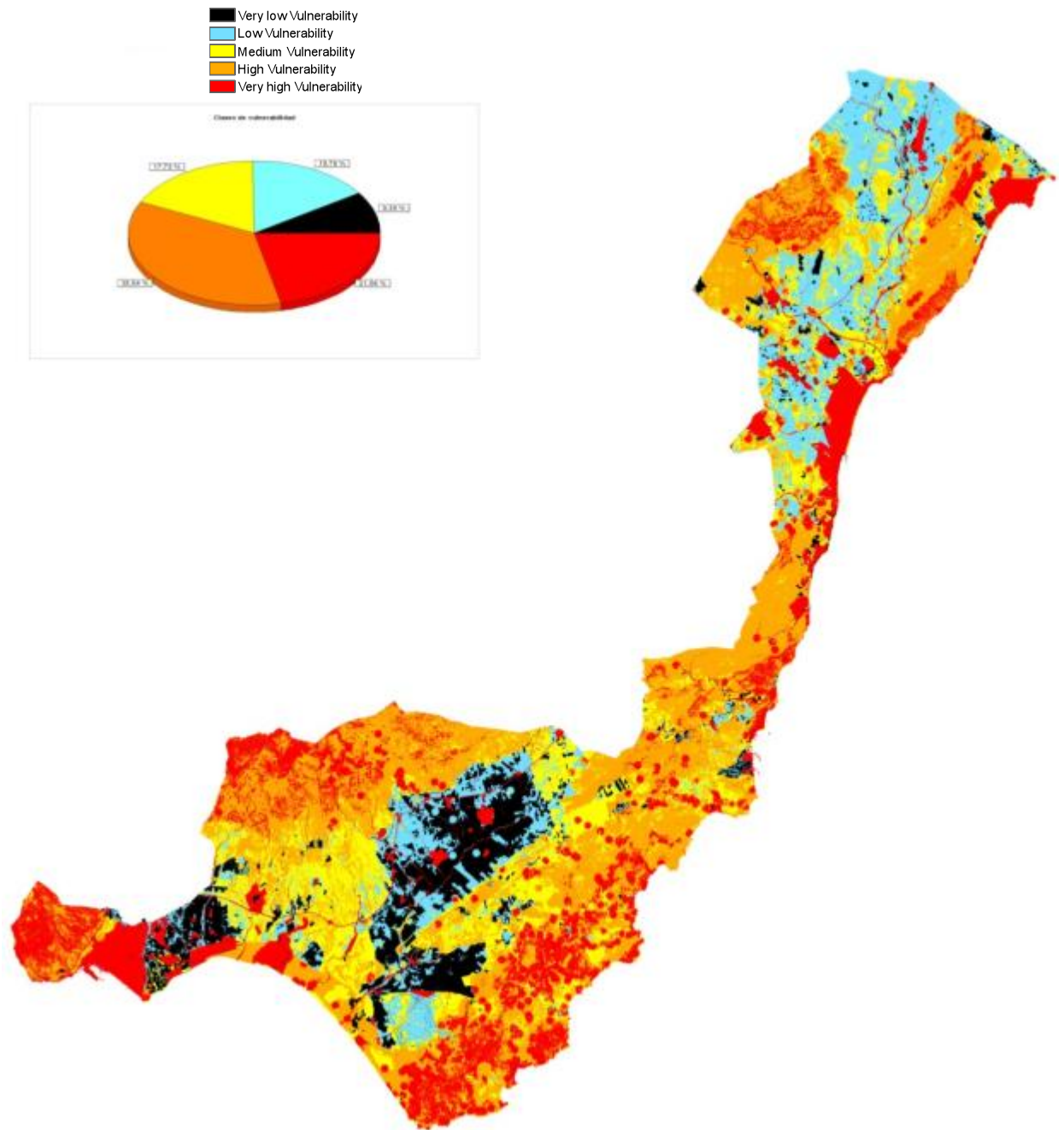


Figure 64. Vulnerability map to wind farms. Elaborated by the author.

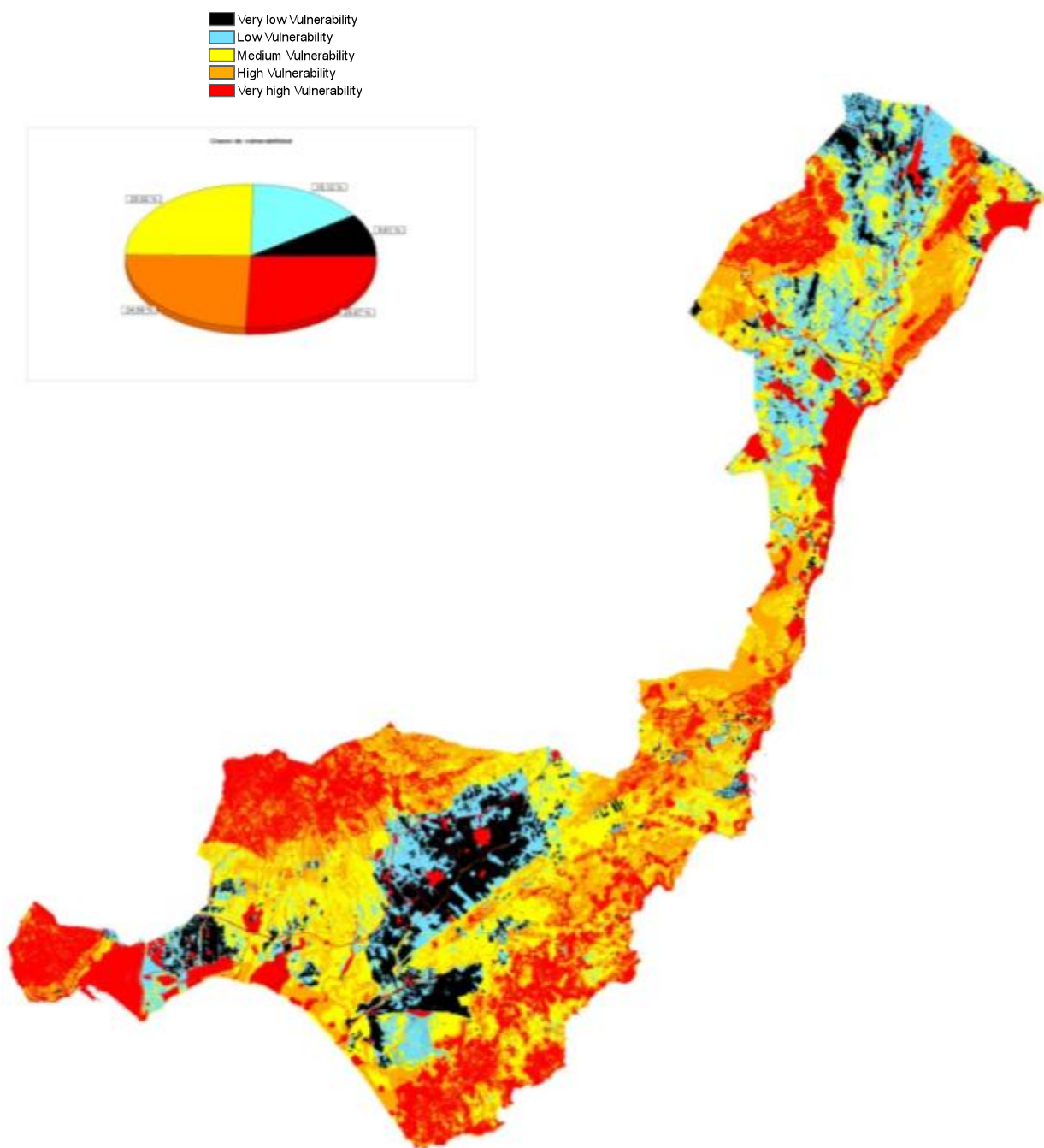


Figure 65. Vulnerability map to residential tourist resorts with golf course (model type resort).  
Elaborated by the author.

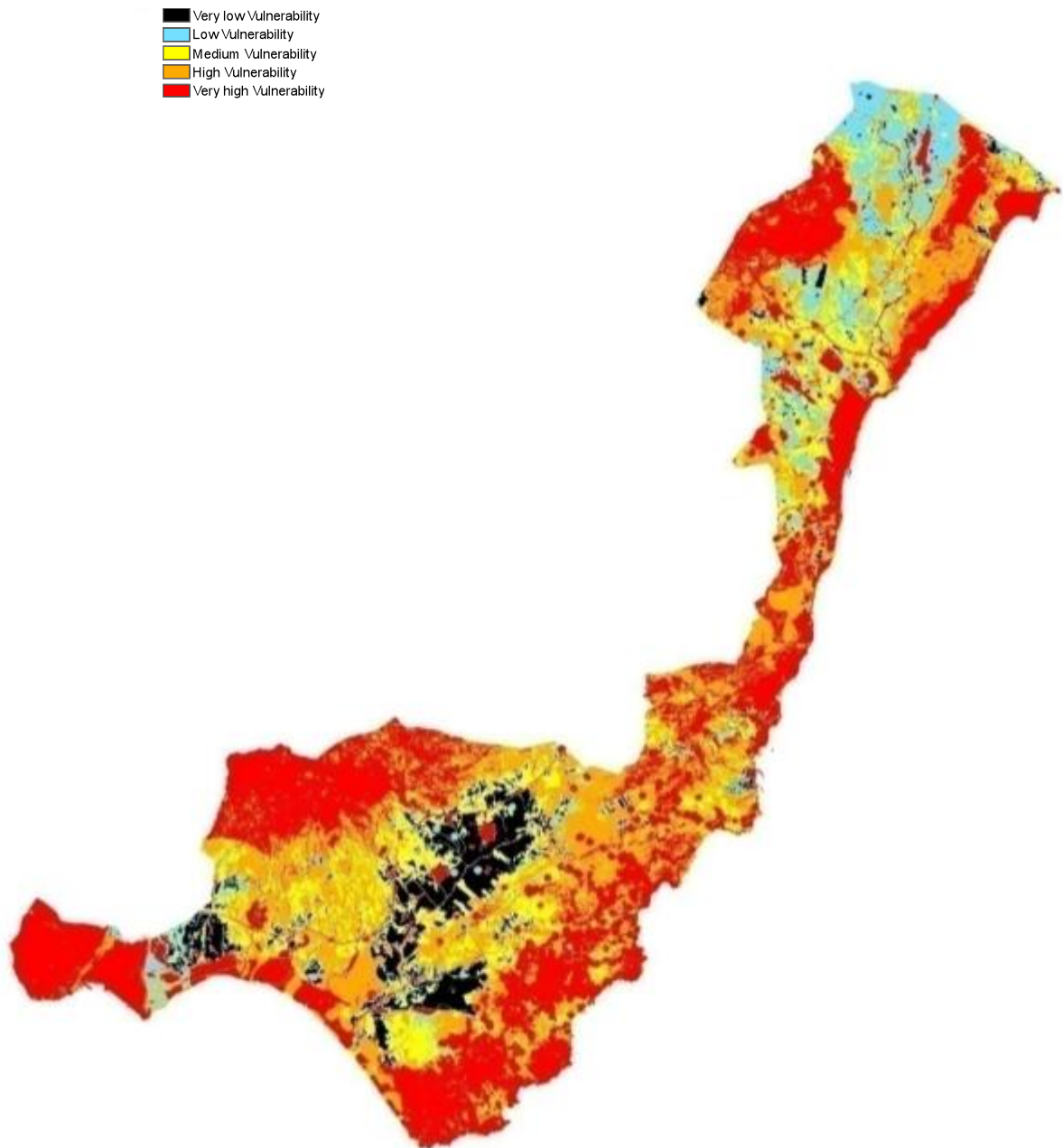


Figure 66. Map of accumulated vulnerability. Elaborated by the author.

## **8. ELABORATED PROPOSALS ACCORDING TO THE RESULTS OF THE PROJECT**

## 8.1. INTRODUCTION

The coastalisation diagnosis carried out has revealed the important level and the characteristics of the socioeconomic development reached in the CAMP Area, as well as the magnitude and peculiarities of the impacts induced on the natural environment and the transformed by the human activity environment. All of it has permitted to identify those uses and activities that have been determinants to the transformation of the territory in the last decades.

On the other hand, the valuation of vulnerability of the area has facilitated the image of the capacity or aptitude of this territory to make room for such uses, permitting to identify those areas in which the impacts produced from their establishment reach smaller magnitude.

In this chapter, the diagnosis of the vulnerability of the territory for each of these uses in particular is carried out, showing the problems detected in each one of them. Likewise, some proposals are established to help with the decision taking and the resolution of the prioritized problematic, with the last end to contribute objective criteria according to the available cartographic information and a wide group of experts to decide the location of the new territorial interventions – programs, plans, and projects- and to determine the associated impacts to different alternative future settings

## 8.2. TRANSFORMATION TO INTENSIVE UNDER PLASTIC CULTIVATION (GREENHOUSES)

### **Results of the analysis of vulnerability**

The geographical distribution of the classes of vulnerability to the establishment of greenhouses responds to the physiographical reality of the territory. Thus therefore, the high and very high classes correspond to the mountainous reliefs (Sierra de Gádor, Alhamilla, Cabo de Gata, Serrata and Cabrera, to the south, and Sierra de Almagrera, Los Pinos, Aguilón and Almagro, in the Levante) representing the 26.13% and 25.29% of the CAMP environment, respectively. It means that the 51.42% of the total of the territorial surface offers a high or very high vulnerability to the establishment of greenhouses (see vulnerability map in chapter 7).

In comparison, the areas with low vulnerability concentrate on determined areas of the coastal depressions (coastal plain of the Bahía de Almería, Campo de Níjar and basin of Vera and their environment) occupying a surface of the 10.16% of very low class, and the 12.68% of low class. These areas correspond with areas in which an important degree of under plastic cultivations establishment already exists.

The intermediate class, represented in a 25,75%, extends along the strip of transition between the mountain reliefs and the depressions, that is to say, on the standing units of mount of such reliefs. These units of medium class are the ones that, for their intermediate character, require a greater attention at the moment of planning and regulating the new establishments of greenhouses. The current Plans of the Territory limit normatively the activity in some of these intermediate units by means of the Territorial Protection Areas delimitation.

### **Tending Situation**

The results contributed by the vulnerability map cast figures of the 51.42% for the values high/very high and of the 48.59% for the low and medium values; it means that more than the half of the CAMP Area exhibits a great fragility to the establishment of greenhouses.

Relating to the new transformations, the environmental and territorial planning that operates on this territory medium class (Plannings of the Territory and Natural Resources Planning of the Cabo de Gata Natural Park) prohibit by means of specific regulation the establishment of greenhouses in very specific areas, regardless the results of the vulnerability here obtained. This prohibition affects to the Areas of Territorial Protection and to the totality of the defined areas in the PORN of Cabo de Gata, except for those intended for this type of use. This restriction, superimposed to the areas with class of high and very high vulnerability, totals the 65.98% of the environment CAMP.

Relating to the preventive planning that could be derived from the spaces catalogued in the Natura 2000 Network, the limitations for this type of use could even reach the 67.99% of the territory.

Keeping in mind the surface at present occupied by greenhouses (5,88%), only the 27.88% of the CAMP surface offers aptitudes to harbour new uses of greenhouse.

The sectorial studies carried out at the entrance in recession of the national economy, indicated good perspectives of development for the greenhouse in the two regions of the Agglomeration of Almería, due to the different convergent factors in this territory, particularly, the wide surface of available land, and the arrival of the desalinated water. The evident extra charges of the desalinated water set against the natural hydric resources, did not appear to be a problem in an economically dynamic area as the Urban Agglomeration of Almería, where the profitability of the cultivations allows to assume, in general, that additional price.

Nevertheless and, aside the current economic situation, the problems of market, the European Agrarian Politics, and the incorporation to the European Union of Mediterranean Countries with a significant agricultural potential, it is foreseeable, in the medium term, an increase of the horticultural offering, with the consequent loss of profitability, and tendency to the decrease of these cultivations. Many of the studies carried out admit already, as a reality, that the financial profitability of the system has decreased sharply because of the increment of the expenses of investment due fundamentally to the rise land prices-, the difference of productivity of the family labour set against the wage earner, and the scarce increment of the incomes.

The available labour, mainly of not European Union origin, represents also an important social problem with the one this agrarian system is dealing at present, upon being presented the already true risk of unbalancing the composition of populations and municipalities that experience serious problems to integrate its immigrant population. An important risk of this expansive tendency can be derived from the load capacity of the territory, in an environment in which the accumulation of population and productive activity is generating a strong degradation of the natural environment and a perceptible deterioration of the conditions of habitability.

Another of the key questions to determine the dynamics of growth, has to be the guarantee of the conditions of necessary environmental quality to make compatible and profitable the other uses that operate in the territory, particularly the tourist and residential ones. The model of exploitation of the forced cultivations will have to set out also the long-term reconversion of its systems of massive use of chemical products towards a model of integrated production, and to confront the need to apply strategies to improve and plan the rural landscape.

In any case, in a coastal environment as this, with large extensions of "free" and exempt of environmental or territorial protection land, the debate on the load capacity should come into play, because technically all is possible due to the availability of water. The problem can be reduced to the capacity of investment and of decision in relation to the different uses, the agricultural one and the tourist one, that compete for this territory.

### **Problems linked to the sector**

The territorial problems connected with this productive sector itself centre in the following aspects:

- Problems of efficiency for the sustainability of the productive process: fertilizing (nitrogen), energy, management of residues, etc.
- Environmental and territorial problems related to the change of use, location, occupation and sealed of floors for the establishment of crops under plastic:
  - Destruction of habitats
  - Fragmentation of habitats
  - Alterations in the functionality of ecological corridors
  - Functional alterations in the drainage network for the occupation of the Hydraulic Public Domain.
  - Strong landscape impact
  - Intense Degradation of urban and peri-urban borders
  - Degradation of spaces with high potentiality for tourist uses
  - Degradation and pressure on limits of natural spaces protected
  - Overexploitation of water for irrigation
  - Occupation of river beds and margins
  - Functional alterations of the drainage network
  - Contamination by pesticides and nitrification of water and soil
  - Increase of forest fire risk and air pollution for residues of the greenhouse burning
  - Direct or indirect affection to the cultural resources next to the agricultural exploitations.
- Social and of unauthorized immigration problems.
- Besides, territorial conflicts related to the location of some of the susceptible of transformation areas can be presented. These potential areas, besides being detached from each other, can affect for their situation to areas of great fragility:
  - Lands located in the immediate environment of Cabo de Gata-Níjar Natural Park:
    - Hoya Altica
    - Entorno de Pujaire
    - Nazareno - Los Cambronales
    - Llanos de la Cañada del Hornillo
    - La Venta del Pobre environment



- Greenhouses of Fernán Pérez
- Sites located in the immediate environment of spaces catalogued as Natura 2000 Network:
  - South skirt of Sierra Alhamilla
  - Sierra de Almagro
  - Basin of Pulpí
  - Border tensions generated by:
- Greenhouse and urban areas
- Greenhouse and protected natural spaces

## Proposals

The under plastic agriculture is immersed at the time in a continued process of improvement of its environmental and technological efficiency. The progressive increment of the integrated and with biological control productions, the establishment of measures aiming to minimize the consumption of water and phytosanitary and the advances obtained in matter of rural hygiene guide the sector in the direction of the sustainability, although the efforts should be redoubled in some aspects, like the use of the nitrogen.

However, the great unfinished business of this sector of activity continues being the landscape integration of the structures, the greenhouses, and of the infrastructures at its service.

In the last 10 years the under plastic surface almost has not been increased in the CAMP Area. The translocation, nevertheless, of sites of crops under plastic from areas assimilated by the urban development developments towards determined geographical environments as the feet of Sierra Alhamilla and of the coastal Sierras de Cabrera, Almagro and Almagrera, constitutes a territorial risk in the middle and long term. Such risk has been undertaken in the Territorial Plans being prohibited the establishment of new greenhouses in the areas defined as of territorial protection.

This way, the following measures are proposed:

- Priority and urgent elaboration of the plans of management of the spaces included in the Natura 2000 Network in the CAMP Levante de Almería environment.
- Regulation of urban development via PGOU of the under plastic agriculture: explicit delimitation of authorized areas and detailed definition of regulation of application, for establishment and management.
- Evaluation of the spatial delimitation of the Areas of Territorial Protection (areas with express prohibition of change of use to plastic) in the future reviews of the POTLA and POTAUA.
- Valuation of the incompatibility of the new establishment of greenhouses in the classes of high and very high vulnerability.

- Delimitation of buffering stripes and normative regulation in the border spaces between the under plastic cultivations and the protected natural spaces.
- Analysis of the viability to single out the lands destined to under plastic crops as a special category of land (agroindustrial land) with a view towards its urban development classification (proposal of review of LOUA).
- Priority and urgent demarcation of the Hydraulic Public Domain of the river courses in the areas with greater demand of use for greenhouse establishment.
- Execution of a plan of information and communication on the gravity of the problems derived from the landscape degradation of rural environments aimed to the professional agrarian associations.
- Elaboration of a technical manual of good practices for the landscape integration of the under plastic cultivations.
- Elaboration of Rural Hygiene Plans by municipalities for under plastic agricultural environments.

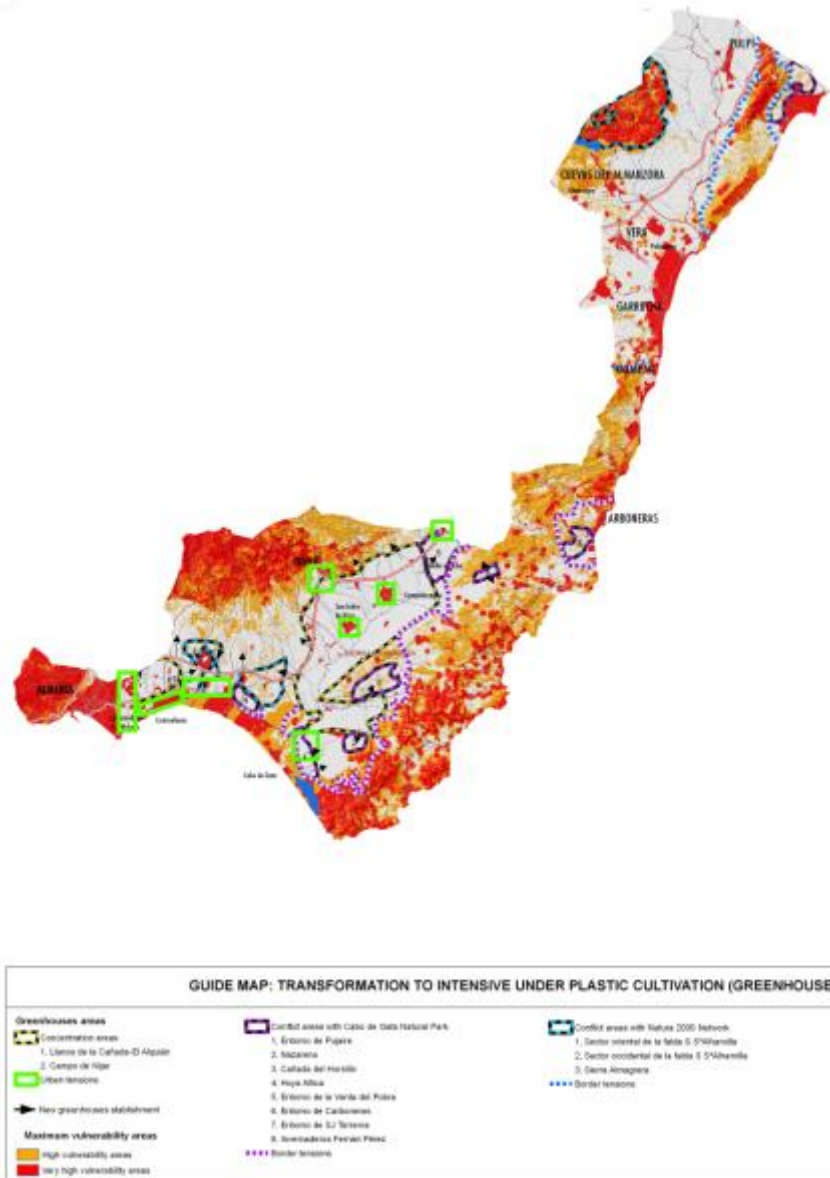


Figure 67. Guide map: Intensive under Plastic Cultivation (greenhouses). Scale: 1:300.000.  
Source: Elaborated by the author

### 8.3. NEW URBAN DEVELOPMENT

#### **Results of the analysis of vulnerability**

According to the results obtained in the vulnerability map for this use, is observed that more than the 46% of the CAMP Area shows classes of high and very high vulnerability for this type of use. These areas correspond geographically with the mountainous reliefs. At the feet of these reliefs extensive areas of medium vulnerability extend, representing the 23% of the surface. Finally, and coinciding with plain areas, the low and very low classes come together, in a 28% (see vulnerability map in chapter 7).

#### **Tending situation**

The dimension of the new urban developments is at present restricted by the limit of regulated growth from the Planning of the Territory of Andalusia (POTA), so much in population as in floor.

Concerning the coastal façade, both territorial plans broaden the protection Obligation Area of the Terrestrial Maritime Public Domain in not developed lands to 200 meters, limiting the possibilities for residential land of private character establishment.

To evaluate the tendencies of urban development growth of the municipalities of the CAMP the current planning has been analyzed, save the case of Almería, in which it has been analyzed besides the document for Provisional Approval of the Review of the current General Planning for Urban Development 2011 (pending of approval). Except for Garrucha, that has Subsidiary Rules (2003), the remainder of municipalities have an Urban General Planning by adaptation of the Subsidiary Rules to the LOUA, approved in different years.

For the analysis of tendencies, the classified as Non-Sectored Urban lands have been considered as potential "new urban developments" in the current planning (in process of review in the case of the municipality of Almería).

According to the analysis carried out, 5 municipalities, Carboneras, Níjar, Mojácar, Pulpí and Vera have their forecasts of land growth closed in the medium term, upon having classified the totality of their land as urban or sectored urban lands.

Cuevas de Almanzora and Garrucha contemplate in their urban development code the qualification of Non-Sectored Urban Land, though always on spaces of low or very low vulnerability. Almería, notwithstanding, given the great extension of Non-Sectored Urban Land that proposes in its proposal of planning, occupies some areas of lands with values of medium vulnerability, particularly in the skirt of Sierra Alhamilla.

Finally, it should be mentioned that the Planning of the Territory of the Levante Almeriense proposes in the Llano Central, affecting six municipal terms, a great space for future productive, tourist, and residential developments. From the point of view of the Vulnerability Map obtained, such lands do not offer, in no case, high or very high values of vulnerability.

### Problems linked to the sector

The problems around the new urban developments lie in:

- Sealed of floors
- Alterations of geomorphological type
- Destruction and fragmentation of priority and/or of interest habitats
- Light Impact
- Punctual hydric deficit to satisfy the demands of urban provision
- Insufficient infrastructure for the purification and recycling of urban sewage
- Potential affection to dynamics of river bed and risk of flood
- Degradation of landscape of interest environments
- Social problems, in the presence of the excessive increase of developments of the urban land in all the municipalities of the CAMP area, without considering the high number of existing empty housing. It is important the concern of the society about the depopulation that the coastal nuclei suffer during the vacation and summer period, as it was transmitted in the IMAGINE workshop.

### Proposals

With general character fits to indicate the following proposals:

- Valuation the incompatibility of new urban developments in areas of high and very high vulnerability
- In the areas of medium value, the instruments of general planning and of development should:
  - Limiting the development of new sectors for urban land in areas that involve a high visual impact or which limit the perspective of the existing urban set, unless their low impact be justified by means of a study of landscape integration.
  - Planning the new urban extensions attending to strict criteria of landscape integration, incorporating the maintenance of the cultural and environmental values that personalize the area in question.
  - Introducing criteria of sustainability in the design of the urban development actions, especially for those that refer to sustainable mobility and to the increment of the supply of green spaces such as parks, woodland in the streets, etc.

- Reducing the needs of mobility integrating the functions of housing, commerce, work and leisure, in the plans of renewal of the city centres and in the urban planning of new areas.

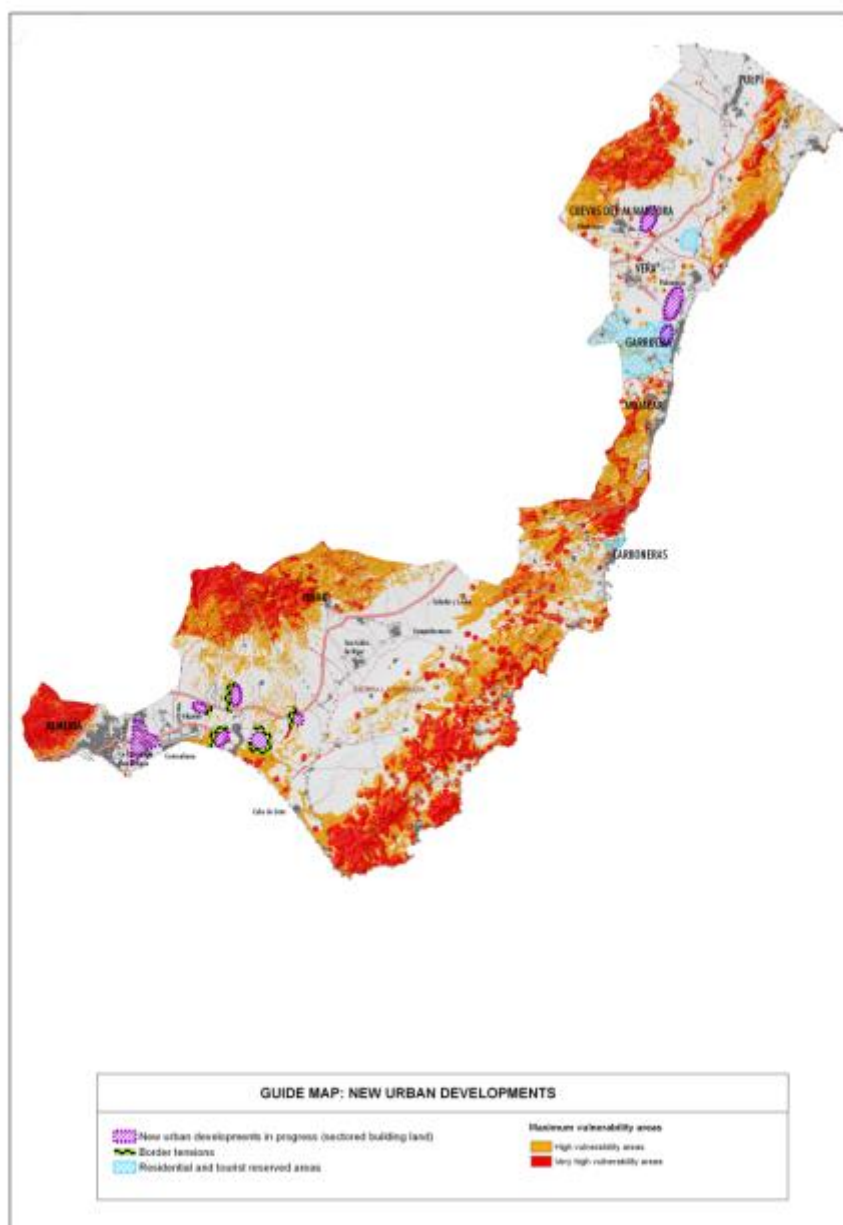


Figure 68. Guide map: new urban developments in process. Scale: 1:300.000. Source: Elaborated by the author

## 8.4. RESIDENTIAL TOURIST COMPLEXES WITH GOLF COURSE (MODEL RESORT TYPE).

### Results of the vulnerability analysis

The vulnerability map for this use shows a distribution in terms of surface very equitable in the three highest classes, that is to say, the 26.67% of the territory presents very high vulnerability to the settling of this kind of tourist complexes, following the high class with a 24.58% and with a 25.02% the medium class. The remainder, barely more than the 24% of the territory of study receives the lowest classes (see vulnerability map in chapter IV).

Geographically, the high classes are represented by the mountain reliefs and, exceptionally, the urban areas, infrastructures and river beds. On the contrary, the lowest classes meet with plain areas, although dedicated normally to agricultural activity. The intermediate class, again spreads over the skirt of you such reliefs.

### Tending situation

In the current situation a consolidated offering of resorts with golf course along the coast already exists, distributed in 6 facilities:

- Alborán Golf. Almería
- Marina de las Torres. Mojácar
- Desert Spring. Cuevas de Almanzora
- Valle del Este. Vera
- Playa Macenas. Mojácar
- Mundo Aguilón. Pulpí

This offering has an important pull effect and forecasts of new fields exist of, at least, two tourist complexes with golf course in Valle Altica (Almería) and Los Cambronales (Níjar), according to the information provided by the Department of Environment.

The analysis of vulnerability has highlighted that the first one is located on very low and lower-class land and the second on medium class, which, a priori does not seem an impediment for their development. Nevertheless, both are found contiguous to the Cabo de Gata-Níjar Natural Park, for which, if they are to be developed, rigorous conditions that guarantee the landscape and environmental integration of the facilities should be imposed.

With a view toward possible future developments, the POTLA contemplates this type of urban developments in three of the planned Areas for Tourist and Residential Reserve, located in Carboneras, the Llanura Central and Cuevas de Almanzora, all of them on medium or low classes of vulnerability, in general terms.

On the other hand, it should be emphasize that the PORN of Cabo de Gata prohibits through its guidelines, the installation of golf courses in the areas A, B and C of such natural space, which correspond with those of greater ecological value (A and B) and of agricultural use (C).

Save such prohibitions, in the remainder of the territory no other administrative limitation ruled by current regulations exists that prevent this activity, for which is to be expected that the evolution of the demand will adapt itself to the rhythms of the market and the economic situation.

### **Problems linked with the sector**

The problems linked with this type of action are related to:

- Significant consumption of natural resources: water, floor, habitats, etc.
- Transformation or change of use of the land on which it is foreseen its establishment
- Disappearance or fragmentation of habitats of interest
- Unsustainable use of the water
- Contamination by fertilizers and phytosanitary
- Introduction of alien species of flora
- Qualitative change of the landscape
- Cultural uprooting
- Tensions among the representatives of the society of the IMAGINE workshop before development of new golf courses and the way they should be developed or managed

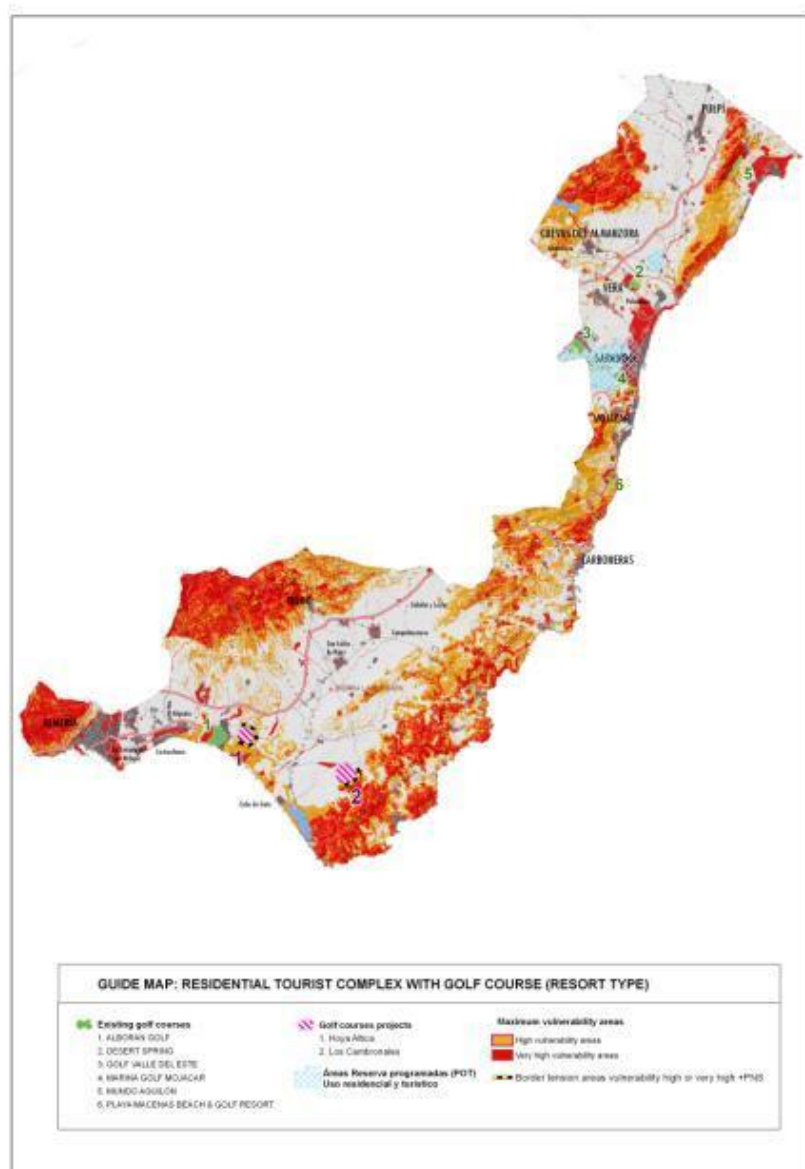
### **Proposals**

With a view towards preventing the associated impacts to alternative future of growth of complexes with golf course, the following measures are proposed:

- Priority and urgent elaboration of the management plans for the spaces included in the Natura 2000 Network in the CAMP Levante de Almería environment.
- Considering the linking regarding the limitations for its establishment in sites located on classes of very high and high vulnerability.
- Favouring the development of this type of tourist complexes preferably in areas whose class of vulnerability be low or very low.
- Elaboration of a Manual of Design, Construction, Use and Management of the golf courses in semiarid environments.
- Delimitation of buffering stripes in the border spaces between golf and protected natural spaces.
- Incorporation to the project of design criteria directed to the sustainability and integration of the actions:



- Optimization in the use of resources and maximum hydric efficiency
- Articulation of measures intended for the landscape improvement and adaptation of its elements to the aesthetics and ecological functionality of the semiarid territory
- Projection of corrector measures intended for the minimization of the light impact
- Cultural and social integration.



*Figure 69. Guide map: housing developments with golf courses. Scale: 1:300.000. Source: Elaborated by the author*

## 8.5. ISOLATED INDUSTRIAL BUILDINGS IN NON-BUILDING LAND

### Results of the vulnerability assessment

The distribution of the vulnerability in the high, very high and medium classes is very similar, in terms of surface. The best represented class is the medium one, 27,3%, followed by the very high one, 25,22%, and subsequently the high one, 22,35%. The remainder of classes (low and very low) barely reaches the 25% (see vulnerability map in chapter 7).

As for the geographical distribution, the medium class is spread over the territory occupying the skirts of the reliefs and even is prolonged towards the higher parts of such reliefs.

### Tending Situation

To evaluate the growth tendency of these actions in the CAMP Area the following documentary sources of the Andalusian environmental administration in relation to the expedients in environmental procedure have been consulted:

- Demolition and construction residues processing plant, in the site of La Almazara del Benzal, Pulpí
- Project of construction and exploitation of the residues management center coming from the construction and demolition and inert residues of La Calera, Barranquete, Níjar
- Project of concentration of dumping and book of bases of the EDAR for the agglomeration of El Cautivo, Níjar
- Project of residues evaluation and processing of contaminated soils center, La Jaula, Guazamara, Cuevas de Almanzora site
- Second generation biofuel plant of production of 40,000 tn/year, Cueva de las Monjas, Almería site
- Project for the installation of an asphalt agglomerate plant, Níjar
- Recycling Plant for the residues of the construction and RCD demolition and dump, in El Zorzo of Vera site
- Projects for the establishment of electric substations of 132 kV of tension.

On the other hand, the scheduled actions in the territorial planning relating to industrial actions are the following:

- Logistic activities area of Almería
- Logistic activities area of Níjar
- Environment of La Venta del Pobre
- Environment of km 21

In sight of these data, is deduced that the dynamics of growth of the isolated industrial facilities in the CAMP environment shows a tendency of continued growth, which supposes a demand of industrial land to be satisfied in the next years. To this dynamics contributes that the price of the land in already developed industrial areas multiplies even by 40 the price of the land in natural environments, without specific protection, in Non-Building land.

The sites expected to cover the current demand, corresponding to projects in process, are located on classes of vulnerability with low and basically medium values, for which a priori, the generation of significant environmental problems is not foreseeable.

### **Problems linked to the sector**

The deficit of industrial land properly prepared to receive this type of activity is a proved fact, circumstance admitted itself by the diagnoses carried out by the two current Plans of the Territory.

On the other hand, the scarce industrial culture of the territory makes this type of uses to be generally related to the so called greenhouse supply industry and that it tends to be settled as near as possible from the areas of agricultural exploitation themselves.

The price of the developed industrial land is, on the other hand, considerably greater, up to 40 times higher, than that of the Non-Building land, which united to the circumstances previously exposed conditions the existence of an important dissemination of isolated industries in Non-Building land. These industries are related generally with those of storage and first transformation of horticultural products, with the greenhouse supply industry, associated facilities to the building supply industry and facilities associated to the transformation and production of the industrial mining sector.

Such facilities have been able to be established via Singular Action Project in Non-Building land, counting for it on the required declaration of Utility of Public Interest.

Even so, the problems connected with this type of action are related to:

- Risk of formation of isolated industrial settlements of larger scale
- Dispersion of infrastructures in rural land.
- Consumption of natural lands.
- Contamination of superficial or subsoil water
- Intense landscape degradation
- Degradation of the environment: dumps, landfills, etc.
- Disappearance and fragmentation of habitats of interest.
- Degradation of the atmospheric quality
- Light impact
- Affections to the cultural resources

## Proposals

The proposed measures are the following:

- Valuation of the incompatibility of the establishment of industrial facilities in the classes of high and very high vulnerability.
- Favouring the establishment of new facilities in areas of low or very low vulnerability.
- With general character, it is recommended the authorization in Non-Building land of only those facilities that by the nature of their productive process should be established in an isolated way and far from other industrial agglomerations, avoiding the proliferation of industries in the disseminated.
- Review of the criteria to obtain the Statement of Social Utility and Public Interest for this type of facilities and concreteness of the same through the regulation established in the corresponding General Plans of urban development of each municipality.
- Encouraging the establishment of industrial land oriented to the local and supramunicipal demand of land (increment of the offering of industrial land).
- With a view towards preventing the associated impacts to future isolated industrial establishments, the following proposals are established:
  - Delimitation of buffering stripes in the border spaces with the protected natural spaces, if appropriate.
  - Establishment of measures for the landscape integration of the facilities
  - Establishment of preventive and corrective measures for air and light pollution.

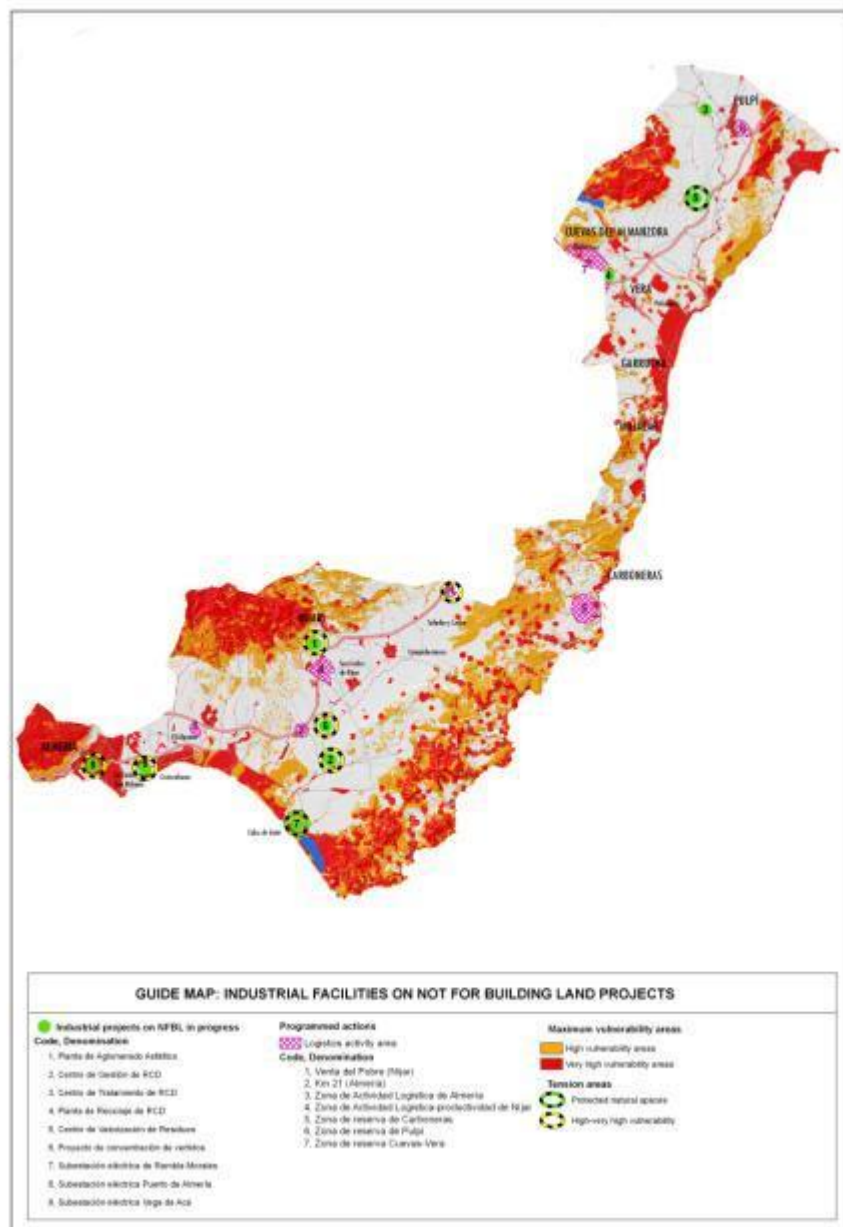


Figure 70. Guide map: Industrial complexes in Non-Building land. Scale: 1:300.000. Source: Elaborated by the author

## 8.6. TRANSFORMATION TO CULTIVATIONS "OF STREET"

### Results of the vulnerability assessment

The vulnerability map to the transformation to "of street" cultivations casts the following results: only the 14.58% of the CAMP surface presents a very high vulnerability to this activity, followed with values very similar for the high classes, 29,08%, and medium, 27,69%. The other end of the sequence is represented by the low and very low classes, with values near the 13% and 15%, respectively (see vulnerability map in chapter 7).

### Tending situation

Just like occurred with the greenhouses, although with a rhythm of growth quite less accused, the intensive "of street" cultivations have increased their surface progressively in the CAMP Area during the last decades, mainly in the north sector of the environment, and very especially in the basin of Pulpí.

In fact, the Planning of the Territory of the Levante Almeriense delimits in its environment the Transformed Areas of Intensive Farming, which meet geographically with the plains of the basin of Pulpí and the Rambla de Canalejas, and that affect to areas of low or very low vulnerability for this activity. The Plan establishes decisions for the establishment and planning of these areas, as well as for the adjacent forest lands to the same.

It is to be expected that these regulations somehow limit the development of these cultivations, whose evolution, in any case, given the availability of resources – water and land - will be subject to the rules of market.

### Problems linked to the sector

It is not foreseeable, neither are detected tendencies in this sense, the transformation of under plastic cultivations to crops of street. The growth of the street agricultural surface for intensive irrigation cultivations has been carried out through the transformation of forest use lands and of extensive rain-fed lands.

The territorial and environmental integration of the street intensive cultivations landscapes is considerably greater than that of the under plastic cultivations, especially for which to the landscape impact refers. Even so, this activity involves certain affections that should be corrected:

- Loss of forest land
- Contamination of soils and aquifers by pesticides and fertilizers (nitrification).
- Landscape Impact, by generation and dispersion of infrastructures and isolated buildings at the service of the agricultural exploitations.

- Geomorphological alterations consequence of the tasks of levelling and terracing.
- Occupation of natural river beds and destruction of river margins
- Functional and morphological alterations of the river network
- Fire risk as a result of stubble burning
- Abandonment of used residues (containers, etc.)
- Destruction and fragmentation of habitats

## **Proposals**

The following measures are proposed:

- Valuation of the restriction of the establishment of these transformations of use in areas of high and very high vulnerability
- Establishing technical measures to optimize the consumption of natural resources
- Encouraging and reinforcing the mechanisms to motivate integrated and ecological agricultural models
- Elaboration by municipalities of Integral Plans of Management of Agricultural Residues.





## 8.7. ESTABLISHMENT OF LINEAL AIR OR EMERGING INFRASTRUCTURES

### Results of the vulnerability assessment

The vulnerability map for the air lineal infrastructures casts the following results: more than 53% of the CAMP Area presents high and very high class of vulnerability to this sector of activity, concretely, the 33.71% to the very high one and 23.04% to the high one. Subsequently the medium class follows them, with a 19.31% of the surface, and finally, the 13.96% and 9,45%, for the very low and low classes, respectively (see vulnerability map in chapter 7).

Geographically, the most vulnerable areas are those located on the reliefs, while the less vulnerable, and are in the plainer areas. In this use in particular, the areas of intermediate value are spread over the skirts of the reliefs, concretely at the feet of Sierra Alhamilla and in the Cabo de Gata – La Serrata range.

### Tending Situation

According to the planning resulting of the current two plans of the territory of subregional environment, the forecasts of development in this sector are the following:

- ✓ **Railway Network:** construction of various railway corridors of high performance (AVE):
  - High Speed Railway Line (AVE) Murcia-Almería. (Some sections under construction)
  - High Speed Railway Line (AVE) Granada-Almería
  - High Speed Railway Line (AVE) Almería-Málaga

The connection of all of them with the city of Almería is proposed to be built underground, bellow the city, although currently the agencies with competence in the matter discuss diverse proposals. Also it is expected the AVE connection in the section that travels along the municipality of Pulpí and the valley of the Almanzora, going through Huércal Overa.

- ✓ **Road Network.** In this sense several road sections of new creation are identified to favour the connectivity of the Urban Agglomeration of Almería. At the same time, and along the Levante, they are proposed a set of roads of different hierarchy that will favour the fluency of the internal articulation, between the coastal and interior nuclei, and external, with the bordering natural regions.
- ✓ **Electric Network.** From the plans a dense electric network of different tension (400 kV, 220 kV, 132 kV and 66 kV) is projected which have its origin in the coastal area and it is spread towards the interior of the province.

Analyzing the vulnerability map, it is observed that the foreseen railway infrastructures go through classes of low and medium vulnerability, except for the AVE Almería- Malaga that will see itself forced in any case to go through areas of very high vulnerability in the environment of Sierra de Gádor in its way out of Almería towards the West of the province.

As for the road network, the most affected classes correspond with those of very high and high values, just like in the case of some high-voltage electric networks. This fact is justified in the circumstance that more than the half of the territory (56%) shows high or very high values of vulnerability.

### Problems linked to the sector

The problems linked with these actions are focused in the following questions:

- Landscape intrusion
- Loss of forest lands of ecological value
- Barrier effect for the wildlife populations
- Functional alteration of the ecological corridors.
- Direct affection to species of fauna: (electrocution, abuses, etc.)
- Fragmentation of habitats
- Affections to the cultural heritage

### Proposals

The proposed measures are the following:

- Carrying out studies for the location of alternatives of the layout of the infrastructures in process of planning, in order to minimize the affection on the classes of maximum vulnerability.
- In the electric power conduction lines case, favouring the establishment of laid out subways upon crossing spaces with high or very high classes of vulnerability.
- Devising manuals of landscape integration for these constructive projects.
- Undertaking the environmental integration of the supporting and temporary areas
- Contemplating appropriate compensatory and corrector measures for the improvement of affected habitats and, especially, for which refers to the barrier effect and isolation of wildlife populations.

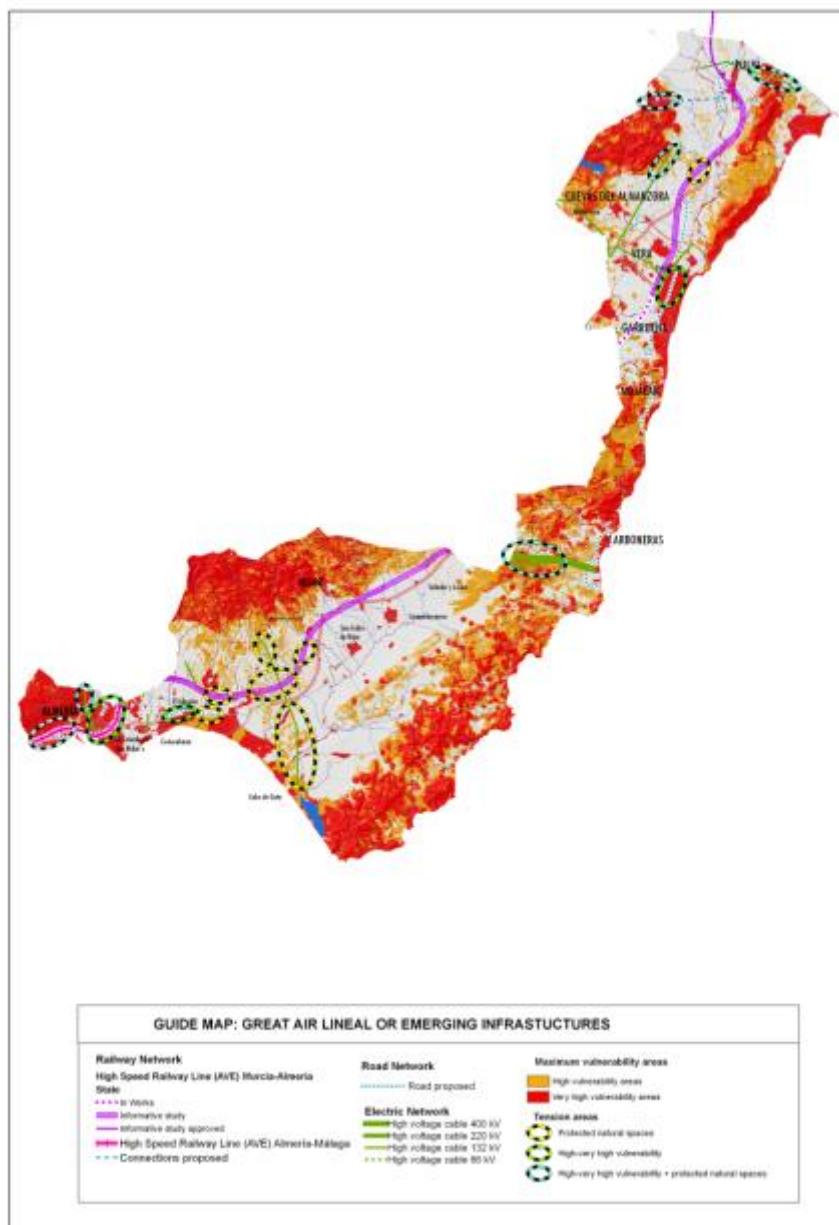


Figure 72. Guide map: Infrastructures. Scale: 1:300.000. Source: Elaborated by the author

## 8.8. PLANTS OF ELECTRIC PRODUCTION FROM RENEWABLE ENERGIES (PHOTOVOLTAIC).

### **Results of the vulnerability assessment**

The vulnerability map of the territory for this sector of activity is featured for presenting values of similar surface among the medium, high, and very high classes (25,22%, 22,35% and 27.3% respectively). Finally, the low classes and very low do not surpass the 25% of the CAMP Area (see vulnerability map in chapter 7).

The geographical distribution of the classes of vulnerability differs to a certain extent with the distribution of those of other uses studied, since, in this case in particular, the areas of medium vulnerability occupy the greater surface and they associate to areas with certain relief. It means that the surface of lands with aptitude to harbour this type of use is expanded, in a general form.

The active photovoltaic facilities in the CAMP Area rise up to 28, according to the data provided by the Andalusian Agency of the Energy (Department of Economy, Innovation and Science). The vulnerability map shows that such sites are located on areas with different classes of vulnerability, from very high, when they are placed in city centres, to very low, when they are in areas with greenhouses. Between both extremes, there are facilities on the intermediate classes.

### **Tending Situation**

The Almería's tradition in matter of investigation and development in technological fields related to the solar energy is very prominent at a national level. It can be told that Almería is a leader in this matter. To it contributes its geographical situation, which conditions the fact to be the territory with more hours of insolation during the year registers in Europe, and the public and financial economic support to the projects of establishment and exploitation of this type of installations. The number of photovoltaic energy facilities has increased substantially in the province of Almería. These projects were executed and maintained with aid of subsidies coming from the European administration. Since the interruption of the economic flow to this sector, the initiatives related to the renewable energies have been reduced, and therefore, there is no project in process known that can be found affecting the CAMP Area.

### **Problems linked to the sector**

Even so, the problems linked to this sector in the CAMP Levante Almeriense territory can become important in the future if the determining factors showed previously would change. Due to the highest potentiality of this geographical environment for the location of this kind of facilities, the great consumption of land that they require and the environmental interest that

the areas with greater potentiality for their establishment present, obviously matching with the lands of smaller price in the market, generally forest thickets without another specific use.

The problematic linked to these actions are focused in the following questions:

- Important consumption of floor
- Destruction and fragmentation of habitats
- Affections on the fauna and the flora
- Generation and dispersion of infrastructures in the natural environment
- Strong landscape impact
- Impact on the microclimate
- Affections on the cultural heritage

## **Proposals**

The following measures are proposed:

- Adopting as a reference criterion the cartography of vulnerability to devise alternative location studies, in order to minimize the affection on the classes of maximum vulnerability.
- To stimulate investments in i + d project and encouraging the execution of demonstrative projects intended for the establishment of photovoltaic technology associated to other uses: covers with greenhouses, industrial facilities, public furniture, etc.
- Elaboration of detailed studies for the landscape integration in the corresponding procedures of environmental prevention.

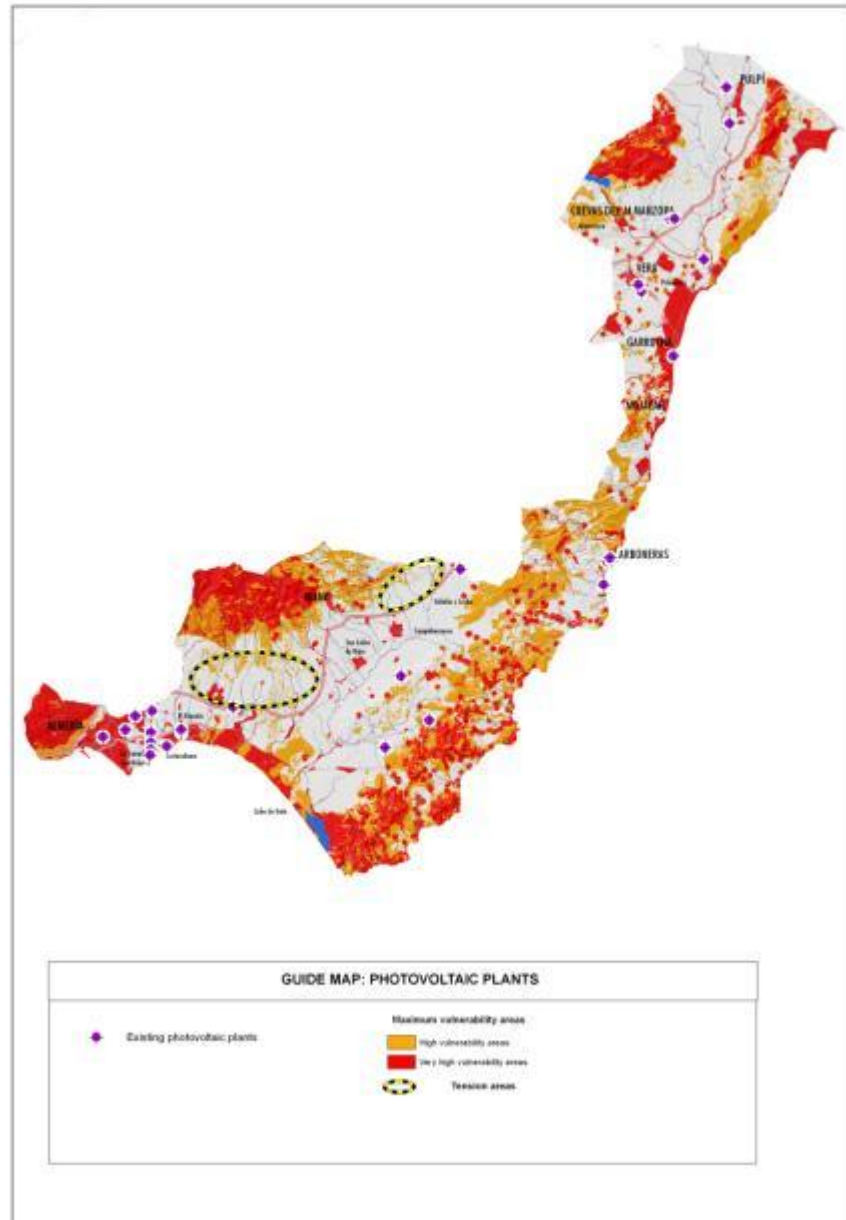


Figure 73. Guide map: photovoltaic plants. Scale: 1:300.000. Source: Elaborated by the author

## 8.9. WIND FARMS

### **Results of the vulnerability assessment**

The classes of vulnerability most represented superficially are the high and very high one, that occupies a 56% of the territory. Its geographical distribution includes the majority of the existing reliefs, with the presence of the Sierra de Gádor, the western sector of Sierra Alhamilla and the Sierra de Cabo de Gata.

The medium and low classes exhibit similar values, of 17.73% and 15,78%, respectively. Finally, the remaining 9.39% has very low vulnerability to this activity (see vulnerability map in chapter 7).

The reading of these data shows that the suitable areas for the establishment of these facilities are limited to the 34% of the territory, in areas that besides they do not comply, generally, with the requests that demands the locating of the wind farms. It means that the necessary location of future projects there should be carried out to a large extent on vulnerable areas, so it should to be assumed certain impacts, being ruled out those areas considered environmentally more sensitive.

### **Tending Situation**

Is not expected the establishment of new wind farms in the CAMP Area, except for an initiative of wind farm still found in a conceptual state in the Serrata de Níjar range area, protected by the Natura 2000 Network and with high vulnerability, on the other hand.

### **Problems linked to the sector**

The problems connected to these actions are focused in the following questions:

- Affection to the bird and bats life
- Landscape impact
- Loss of forest land
- Generation of environmental noise
- Dispersion of infrastructures in the rural environment

### **Proposals**

The proposed measures are the following:



- Adopting as a reference criterion the cartography of vulnerability to devise alternative location studies, in order to minimize the affection on the classes of maximum vulnerability.
- Elaboration of detailed studies for the landscape integration in those areas of high/very high vulnerability.
- Investments on i + d projects to establish the technologies of smaller visual impact
- Preventive and corrective measures to minimize the impact on bird life.
- Elaboration of information material to grasp the sensitivity of the society.

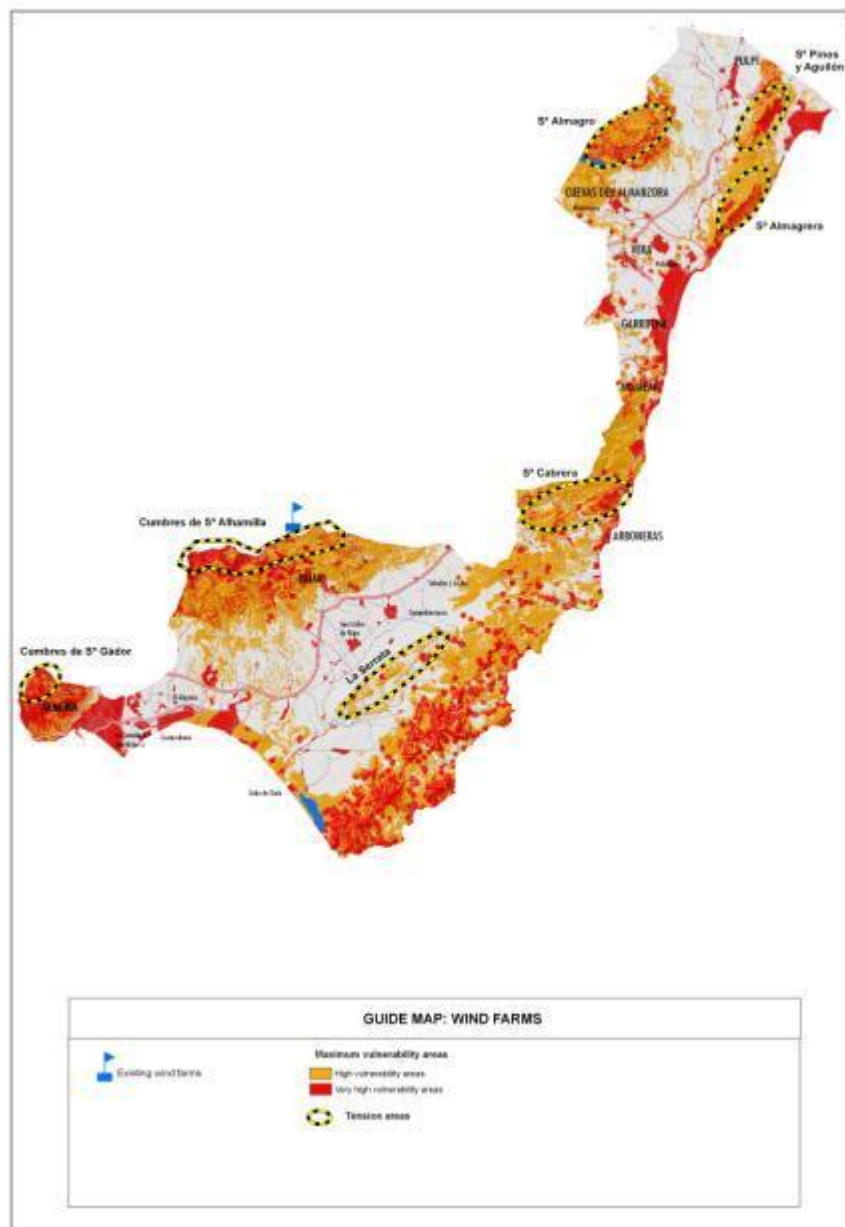


Figure 74. Guide map: Wind farms. Scale: 1:300.000. Source: Elaborated by the author

## **9. LESSONS LEARNED**

The CAMP Levante Almeriense territory, as regards to terrestrial environment, is an extraordinarily singular space in the Spanish and European context as in the Andalusian one. Its biogeographical position, its climatic and geological features and the very high degree of naturalness that has retained up to only some decades ago, confer it a singular semiarid character and an exceptional environmental, landscape, and ecological value in general.

In the last decades, nevertheless, the naturalness and the aesthetic and ecological value of the landscapes of Almería have deteriorated notably as a result of the disappearance, transformation or fragmentation of the habitats and natural landscapes, main consequence of the establishment of new under plastic cultivations (greenhouses) and urban development on natural lands.

Approximately the half of the CAMP Area is included in the Natura 2000 Network although at the moment only the environment of the Cabo de Gata Natural Park has a specific normative regulation of uses and activities (PORN-PRUG). The absence at times of specific regulation, regardless the one that could be of general application, on the uses and activities that can be carried out in certain sensitive environments generates a legal insecurity on the investors and the owners of the lands, that does not favour in anything nor to the economy of Almería neither the objectives of conservation of such spaces.

The two current subregional plans of the territory observe these problems and set limitations to the new establishments of under plastic crops and urban development in areas defined and delimited as of Territorial Protection, although in sight of the results obtained in the Landscape Vulnerability Maps by activities, the areas of maximum sensitivity surpass in surface to those of Territorial Protection.

With independence of the governmental obligations contracted in strict matter of environmental protection of our natural resources, the maintenance, and even promotion, of the ecological, aesthetics and cultural qualities of the semiarid landscapes of Almería must be the key on which the complementary offering of the tourist sector of Almería should be supported in the middle and long term.

It aggravates this problem, the denaturalization of the rural environment of Almería, the circumstance that a great part of Almería's society does not have knowledge, not even perception, of the extraordinary value of these natural lands, neither the terrible damage that for the own society and for its economy, would signify the final disappearance of these natural landscapes. These efforts of communication should be aimed directly to the citizenship in general, and not only to the collective directly implied or sensitized, with opinions badly influenced from time to time.

From the Project of Landscape valuation measures are oriented to give solutions to these problems, in the following direction:

It is urgent and priority in the Andalusian environment to edit and publish the plans of management of the spaces included in the Natura 2000 Network recorded in the CAMP Levante Almeriense territory, fitting the normative regulation of uses and activities to its specificities and singularities. It is necessary to insist that the degree of fragility and threat of disappearance of the semiarid ecosystems of Almeria is critic relating to other, even to those of similar ecological value, in the Andalusian context, so much by their environmental specificities as by the intensity of the socio-economic dynamics that affect the territory in which they are registered.

In the future reviews of the current plans the results of the Vulnerability Maps by activities obtained to redefine the spatial delimitation of the areas of Territorial Protection should be kept in mind, according to the normative regulation established for them.

The General Plans of Urban Development should carry out a special effort to analyze the criteria of regulation of the Non-Building land so much for the territorial strategies as for the regulations derived from the subregional plans and of the PORN and PRUG, and, very especially to review the conditions to grant license that permit the building and settling of buildings and isolated industrial facilities through exceptionality (social and public interest) in not for building land.

On the other hand, it is considered a priority insisting and reinforcing all the possible actions in matter of communication, divulgation, conscience raising, etc., that contribute to transfer to the citizenship in general the singularity and the value of its natural settings, of its thickets and the strategic character that for the economy of Almeria has its conservation in the middle and long term



# 6

## *Water cycle sustainable management* Final report.

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## TABLE OF CONTENTS

Executive summary

- 1.- Introduction
- 2.- Description of the project
- 3.- Compilation and summary of the information
- 4.- Diagnosis
- 5.- Analysis of the existing problems
- 6.- Results prior to the integration stage
- 7.- Action plan for the post-project stage
- 8.- Social, environmental and economic feasibility of post project actions
- 9.- Lessons learnt

## INDEX OF ANNEXES

- Annex 6.I Initial diagnosis and planning
- Annex 6.II Public participation. Design, results and future
  - Annex 6.II.a Contributions to the diagnosis
  - Annex 6.II.b Actions resulting from public participation process

## LIST OF TABLES

*Table 1: Water bodies in CAMP Levante de Almeria Area.*

*Table 2: Identified problems in participation process and hydrological planning.*

## LIST OF FIGURES

*Figure 1: Participation process scheme.*

*Figure 2: Hydrological System of CAMP Levante de Almeria Area.*

## LIST OF CHARTS

*Chart 1: Number of people by participation regions.*

*Chart 2: Participating sectors.*

*Chart 3: Present and forecast of water consumptions distribution.*

*Chart 4: Present and evolution of supply water sources.*

*Chart 5: Detected problems and proposed measures in the participation process.*

*Chart 6: Grouping of proposed measures and their relative percentages.*

## ABBREVIATIONS USED

- AAA Andalusian Water Agency
- AP SDRF Action Plan of the Sustainable Development Reference Framework
- AQUAMED Waters of Mediterranean Basin
- CAMP Coastal Area Management Programme
- CEDEX Centre for Public Works Studies and Experimentation
- DCMA Andalusian Mediterranean Basin Authority
- EDAR Wastewater Treatment Plant
- EPER National Register of Polluting Sources and Emissions
- ERDF European Regional Development Fund
- I+D+i Innovation, Research & Development
- IPPC Integrated Pollution Prevention and Control
- INTERREG European Programme for the Interregional Cooperation
- MAGRAMA Ministry of Agriculture, Food and Environment
- SDRF Sustainable Development Reference Framework



PHN National Hydrological Plan

## **Executive summary**

Present report summarizes the work and results of the individual project “Water Cycle Sustainable Management” as part of CAMP Levante de Almería project. It compiles main conclusions and contributions of the individual project to the SDRF regarding to water cycle. The contents of this report are the result of the management water cycle diagnosis realized, the public participation process based on the diagnosis, the coordination of these results with the rest of individual projects, the expert group contribution and their integration in the SDRF.

### **1.- Introduction**

In the viability analysis, undergone during CAMP project initiation stage, both social actors and technical team stated the need for: reviewing the “sustainable use” concept as applied to aquifers and rivers along the coastal areas; evaluating the environmental sustainability of water resources coming from inter-basin transfers and present or potential desalination plants; analysing the various water demands (agricultural, urban and industrial) along the year in CAMP territory, as well as the chemical and biological quality of water resources; proposing a comprehensive water management model based upon rationality and sustainability. Therefore, one of the CAMP’s individual projects deals with water cycle sustainability.

The main objective of individual project Water Cycle Sustainable Management is to promote the sustainable use of water, in accordance with article 5.c of the Protocol on Integrated Coastal Zone Management in the Mediterranean in the CAMP Levante de Almería Area .

Specific objectives of this project include: Improving knowledge about water resources in CAMP area regarding their quality, quantity, alternative supplies and relationships with existing water demands; promoting water management that guarantees the good ecological status of all water bodies, in accordance to Article 4 of the Environmental Objectives in Water Framework Directive, thus respecting the natural water cycle and encouraging the use of already existing alternative water resources.

In order to achieve the objectives of this project, a participation process has been developed through which the perception of the area’s inhabitants about water planning has been channeled, and a proposal of measures towards sustainable water management has been produced together with the population.

### **2.- Description of the project**

Works developed by the individual project’s team have followed the recommendations and opinions of the various involved agents, organised in the different bodies conforming CAMP project’s structure.

Expert Teams are one of those bodies. In CAMP projects developed along the Mediterranean this teams are composed by a group of people who are specialized in different matters and are therefore able to yield a multidisciplinary approach to problems and to formulate solution proposals.

In CAMP Levante de Almería project the usual composition of experts groups has been modified, addressing the invitation to participate in them not only to the scientific sector but also to the public administrations’ technicians who are in charge of the management of the individual projects’ objects of study. The purpose of this modification is to obtain final proposals which are multisectoral and acceptable by the public administrations. This should as well facilitate its posterior implementation, due to the feeling of “own construction” arising from participating in the proposals elaboration. The aim is resulting proposals to be assumed by part of the Coastal Commission (Comisión del Litoral), the decision making organism within CAMP project, composed by the different units of the local, regional and national levels of the Administration with coastal management competencies, and who are in charge of

adopting the Sustainable Development Reference Framework. Another advantage of this composition of Experts Groups is the encouragement of experience and knowledge exchange between managers and scientists, therefore incorporating their rigor and support to the proposal elaboration process.

The Experts Team for this individual project was created during the project formulation stage with all the mentioned aims, and was integrated by representatives of the various public administrations with competences in water management who, through periodical meetings, contributed to the initial design of this individual project by defining the results to be achieved and the methodology to be followed. During the implementation stage they have developed advising tasks, making pertinent contributions and corrections, therefore incorporating their experience to the final results of the individual project.

Other CAMP bodies involved in the works of this individual project have been those related to public participation. On one hand, the Coastal Council (Consejo del Litoral, composed by citizens and social actors of the CAMP area) has highlighted the social perceptions and worries about water management. On the other hand, the Coastal Forum (Foro del Litoral, managed through a telematic application carried out in CAMP Levante de Almería web site [www.camplevantedealmeria.com](http://www.camplevantedealmeria.com)), open to general public and used to gather their opinions and encourage their participation in the various questions stated by the project team. Complementarily, participation workshops open to general public have been carried out in the context of this individual project, and will be described below.

Specific actions of the sustainable water management individual project have been carried out from June 2011 to June 2012. From June to September 2011, information about water cycle management in CAMP Levante de Almería was gathered. Public access materials, planning documents and legislation were reviewed. In order to complete the available data, information request was cursed to various entities and people listed herein:

- Irrigation communities of CAMP area.
- Municipalities within the CAMP area.
- Environmental Prevention Service of Andalusian Government.
- Aquamed.
- Andalusian Water Agency.
- Segura River Basin Authority.
- Authors of urban supply studies in the area: Francisco Javier Martínez and María Dolores López Rodríguez.

Simultaneously, at this initial stage an expert team meeting was held, in order to know their perception about expected results for the project, and the basis for participation methodology development in Coastal Forum (Foro del Litoral) were stated.

Second stage of the project was carried out from September to December 2011, focusing in water cycle analysis within the CAMP Levante de Almería Area and paying special attention to hydrologic planning in the Andalusian Mediterranean Basins (Cuencas Mediterráneas Andaluzas), as it affects most of the surface of CAMP area.

In the same period, the participation process structure was outlined and submitted to the expert team of the individual project for advice and comments.

During January 2012 participation methodology was completely defined. The CAMP area was thus divided into three participation regions according to hydrologic and social criteria: Andarax, Níjar and Levante, besides identifying two sub-regions for both Níjar and Levante cases. Ad-hoc diagnosis and measures workshops were designed for each of the regions, always trying to take into account the particular characteristics of each territory (Figure 1).

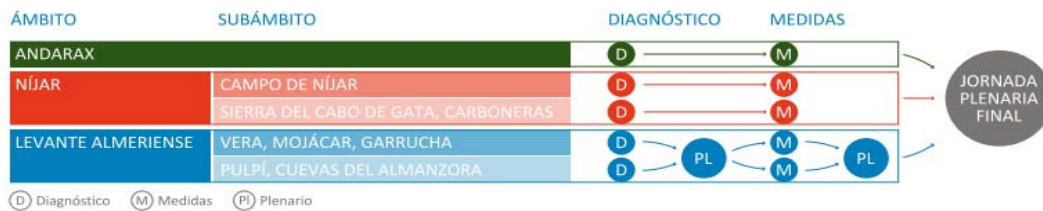


Figure 1: Participation process scheme.

During February and Mars 2012 the participation process was carried out, through the organisation of 12 workshops and a final plenary session.

In the Andarax participation region, it was decided to take advantage of the existence of a prior participation process, carried out in the context of research project Altaguax, in order to progress in debate contents instead of repeating them. Therefore, only two participation workshops were carried out, and aimed to deepen into the Altaguax project results.

Regarding participation region of Levante, the initial purpose was to develop two diagnosis workshops (Pulpí, Garrucha) plus two of measures (Cuevas de Almanzora, Mojácar), together with two plenary workshops (Vera, Garrucha). The inclusion of those plenary sessions was intended to help the project to get closer to the territory, thus encouraging the desired social implication, and was also justified by the greater hydrological interdependency of both sub-areas. The low attendance at the first diagnosis workshops caused a reframing of the participation process design, consisting in the suppression of the two planned plenary sessions, which were replaced by an additional diagnosis workshop in Vera and another measures workshop in Garrucha.

A total of 50 people have participated along the process, being some of them involved in more than a participation area. The area in which the attendance was highest was Níjar, followed by Levante and Andarax. Registered participation is considered to be low, which can be explained by a variety of causes: poor participation culture; low mass media coverage; lack of guarantees regarding a real usefulness of the process; saturation of activities in the CAMP area during the process period; prioritization of other activities; lack of knowledge about the discussed matter; and low predisposition to travel to other villages in order to participate in the various workshops.

Participants in the process represented public Administration, the agricultural sector, social scoped and environmental NGOs, and the industrial sector. Regarding an overall picture of the participation process, we consider that the different sectors' participation has been achieved. This diversity has enriched the process and is reflected in the final results of the project.

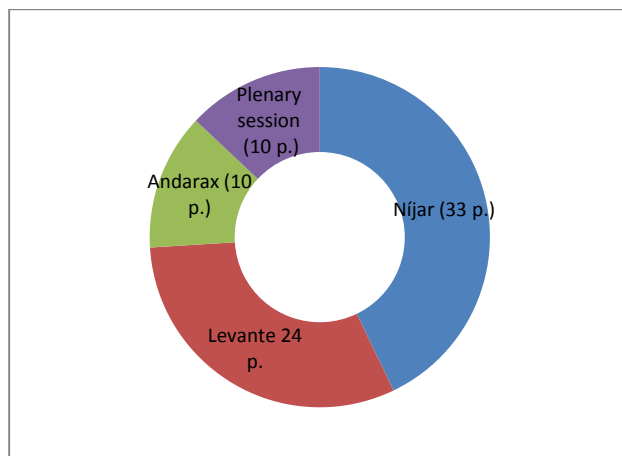


Chart 1: Number of people by participation regions.

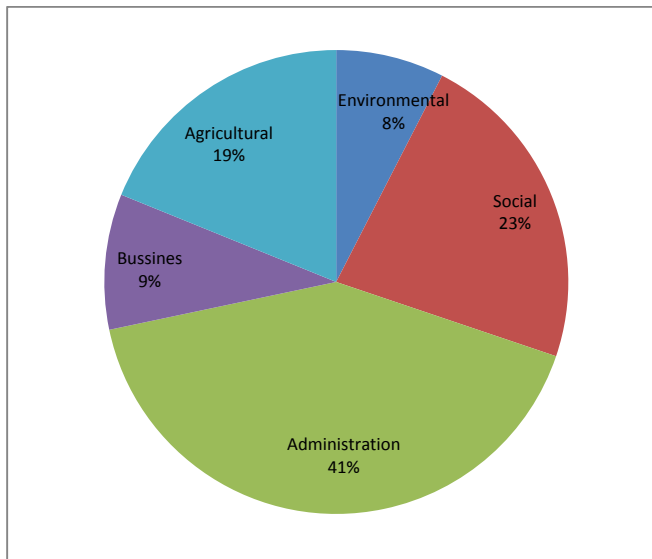


Chart 2: Participating sectors.

During April and May 2012 works were undergone on the analysis and integration of the data obtained through the participation process: Prioritised measures obtained in the process were studied, other results of the process were analysed, and a proposal of methodology for future participation processes related to hydrological planning was therefore stated. Conclusions were also presented to the experts' team, jointly validating and defining both the measures prioritised during the participation and the scope of the participation methodology. Finally, works on the integration of individual projects and the definition of Sustainable Development Reference Framework were also carried out in the same period, jointly with other consulting groups and project coordination.

The dissemination of the individual project has been generally developed using the website of CAMP Levante de Almería project, in which documents and periodical progress reports of the individual project were uploaded. During the participation process an additional dissemination was carried out through divulging press releases at the beginning and the end of the participation process, dissemination through local communication media of the workshops that were going to be hold in specific municipalities, leaflets and posters disseminated in all the municipalities of the area, and specific contact with entities and people involved in water cycle management.

### 3.- Compilation and summary of the information

The base for the Diagnosis and the analysis of the proposed measures has been elaborated from the information content in the Hydrological Plan for the Andalusian Mediterranean Basin and draft Hydrological Plan for the Segura Basin. Finally following main information fonts has been considered for the whole Project:

- Hydrological Plan for the Andalusian Mediterranean Basin.
- Information provided by the Segura River Basin Authority related to details of bodies of water belonging to the Segura River Basin.

This information has been revised, verified and completed by population of the CAMP area, different studies related to water cycle in CAMP area and Regional Development Plan for the Levante region of Almeria. Finally following documents has been analyzed:

It will be responsible for promoting and channelling those initiatives and concerns of the local population

- Information received regarding urban water supply at municipal level (quantity supplied, origin, rates and efficiency of networks), provided by the municipality of Níjar and Aqualia, concessionaire of urban water supply service in Almería.
- Information regarding agricultural demands, water supply sources, average consumption and rates provided by the Irrigation Community 4 Vegas, Los Morenos and Board of Users Valle del Almanzora.
- Spatial Planning of Levante Almeriense (POTLA)
- Energy Footprint Study of Urban Water Supply in the province of Almería. Author: Francisco Javier Martínez. 2011.
- Master Thesis "Water and Environment in Arid Zones (Aquadrid)". Author: María Dolores López Rodríguez. (It corresponds to the rate regulatory charges in 2011).
- Initiatives and concerns of the local population, results of the participation process.
- Directive 2000/60/EC, establishing a European framework for action in terms of water policy (Water Framework Directive)

#### 4.- Diagnosis

CAMP Levante de Almería Area is managed by two different River Basin Authorities (Segura River Basin and Andalusian Mediterranean Basin), which identify four exploitation systems, six subsystems and up to 25 water bodies in the territory (figure 2).

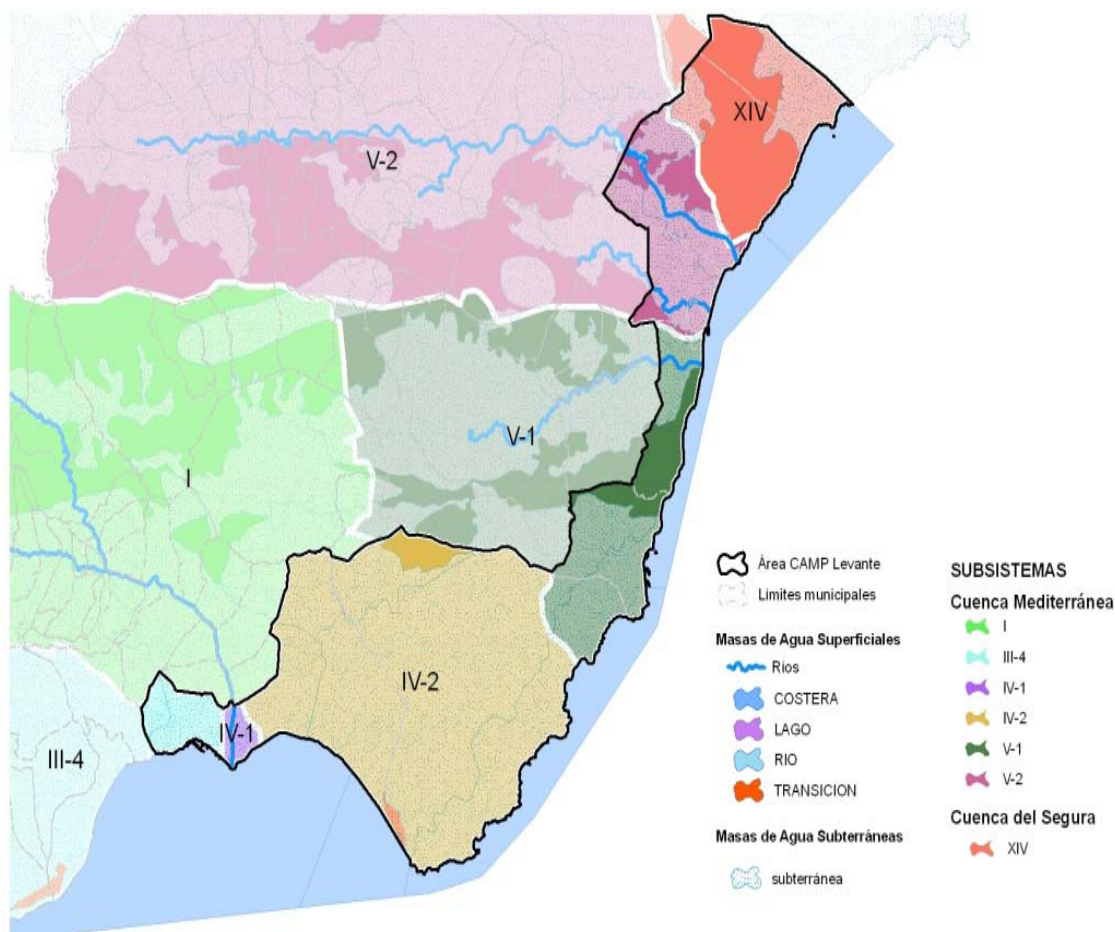


Figure 2: Hydrological System of CAMP Levante de Almería Area. Source: compiled by authors based on Hydrological Plan for the Andalusian Mediterranean Basin and draft Hydrological Plan for the Segura Basin

In CAMP Levante de Almeria Area there are 22 water bodies that belong to the Andalusian Mediterranean Basin and 3 which belong to Segura River Basin. Between all of them, 12 are subterranean water bodies, 6 surface water bodies, 6 coastal and 1 transitional water body.

Economical development of the area has depended traditionally on demands of subterranean water resources. In 1980s there was in CAMP Area (Almeria and Nijar mainly) a significant development of intensive greenhouse agriculture which meant an important increase of water resources demands. The surface under greenhouses in Nijar moved up from 571 ha in 1985 to more than 5.300 ha actually; the process in Almeria has happened later on, but its greenhouse area has increased quickly up to 3.600 ha, becoming the third municipality in number of hectares under greenhouses. Nijar and Almeria represents over 35% of total area under greenhouses of the province of Almeria, which is also where it is found highest density of greenhouses of the world. In northern CAMP Area, near the towns of Cuevas del Almanzora and Pulpi mainly, agricultural development was late so their growth happened in the middle of 1990s, when horticultural productions expanded to a big scale, mainly lettuce crops.

Tourism is the second main economic activity in CAMP Area, which also involves a high water demand. Tourism has been developed later than agriculture, but it has grown constantly between 1988 and 2010 so that the number of accommodations for tourists has tripled from 8.485 up to 25.355. Mojácar is the town with more touristic activity and offers 37% of accommodations.

Economic activities have a quite high dependence on water, which is currently one of their main resources. Agriculture reach over 75% of consumption of water in CAMP area, followed by urban supply which involve over 20% of consumption and industrial uses with specific connection, golf and cattle industry over 5% of consumption. According to hydrological planning, it is expected that water consumptions distribution remain almost stable next years.

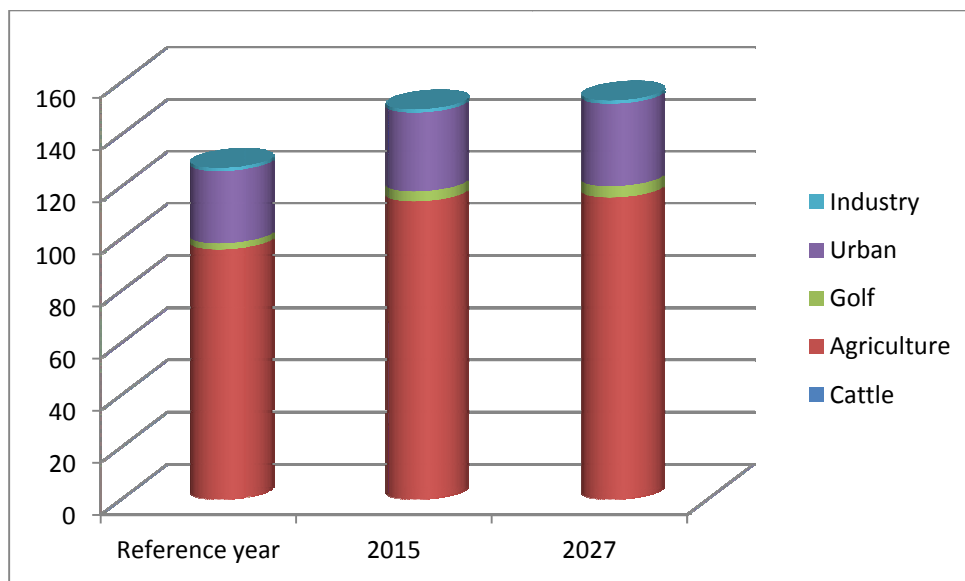


Chart 3: Present and forecast of water consumptions distribution

Deterioration of groundwater bodies in CAMP area has been caused by the territorial development model in CAMP Levante de Almeria Area during past siècle and beginning of actual, but also by own hydrological characteristics of a semiarid territory, legislative framework in force at the time and by agricultural and water policies applied. There is no doubt about relation between water and territory which has heavily contributed to the socio-economic development of the whole province of Almeria, but currently a change of mentality is essential regarding water resources management, as a first step for reaching their sustainable use.

According to hydrological planning information, coastal water bodies are in “good state”, while groundwater bodies and surface water bodies are classified as “bad state” or “worst than bad” with the

exception of groundwater bodies of Sierra Alhamilla and Sierra Almagro in Andalusian Mediterranean Basin. Basic information related to surface and groundwater bodies belonging to CAMP Area hydrographic basins is shown below:

Table 1: Water bodies in CAMP area Levante de Almería Area

ANDALUSIAN MEDITERRANEAN BASINS AUTHORITY				
Name of the body of water		Status of the body of water		
Code	Name	Ecological	Chemical	Global
River-category bodies of water in CAMP area				
641050	Medio Andarax	Bad	Good	Worst than Good
0641060Z	Bajo Andarax*	Bad	Good	Worst than Good
651030	Bajo Aguas*	Bad	Unassessed	Worst than Good
652010	Antas	Moderated	Unassessed	Worst than Good
652050	Embalse de Cuevas de Almanzora*	Bad	Good	Worst than Good
652060	Bajo Almanzora*	Bad	Unassessed	Worst than Good
Transitional bodies of water in CAMP area				
Name of the body of water				
Code	Name			
610035	Albufera del Cabo de Gata	Moderated	Unassessed	Worst than Good
Coastal bodies of water in CAMP area				
Name of the body of water				
Code	Name			
610017	Guardias Viejas-Rambla de Morales	Good	Good	Good or better
610018	Rambla de Morales-Cabo de Gata	Good	Good	Good or better
610019	Cabo de Gata-Límite del PN Cabo de Gata	Good	Good	Good or better
610020	Límite del PN Cabo de Gata - Límite demarcación mediterránea andaluza / Segura	Good	Good	Good or better
610026	Puerto de Almería*	Good or maximum	Good	Good or better
Subterranean bodies of water in CAMP area				
Name of the body of water				
Code	Name	Quantitative	Chemical	Global
60.004	Cubeta de Overa	Bad	Bad	Bad
60.005	Cubeta de Ballabona-Sierra Lisbona-Río Antas	Bad	Bad	Bad
60.006	Bajo Almanzora	Bad	Bad	Bad
60.008	Aguas	Bad	Bad	Bad
60.011	Campo de Níjar	Bad	Bad	Bad



60.012	Medio-Bajo Andarax	Bad	Bad	Bad
60.052	Sierra de Almagro	Good	Good	Good
60.055	Sierra Alhamilla	Good	Good	Good
60.056	Sierra del Cabo de Gata	Bad	Bad	Bad

SEGURA RIVER BASIN AUTHORITY

Name of the body of water		Estado de la masa de agua		
Code	Name	Quantitative	Qualitative	Global
Subterranean bodies of water in CAMP area				
70.061	Águilas	Bad	Bad	Bad
70.062	Sierra de Almagro	Good	Good	Good
Coastal bodies of water in CAMP area				
Code	Name	Ecological	Chemical	Global
710024	Limit DCMA / Segura	Good	Good	Good

\* Heavily modified water bodies

In spite of substantial public and private investments made in desalination plants in recent years (Carboneras, Bajo Almanzora, Rambla Morales and Palomares), the rate of this source of water resources is still quite reduced, so it is obvious their under-use. Although in next future it is foreseen an increasing participation until it becomes the main supply source (Graphic 4). On the other side, it is worth noting that dependence on groundwater is too high in CAMP Levante de Almeria Area, mainly in the irrigated land of Nijar. In this sense, Planning aims to gradually reduce over-exploitation of CAMP Levante de Almeria Area water bodies basically by changing a great part of actual groundwater resources by others coming from desalination of marine water. Despite the forecast of changing supply water sources for 2015, water bodies recovering will take many years in being effective, so their “good state” is only estimated for water bodies that already have “good state”; for the rest of water bodies, hydrological planning estimates their “good state” for period 2021-2027. The use evolution of different supply water sources predicted by hydrological planning is shown in following graphic.

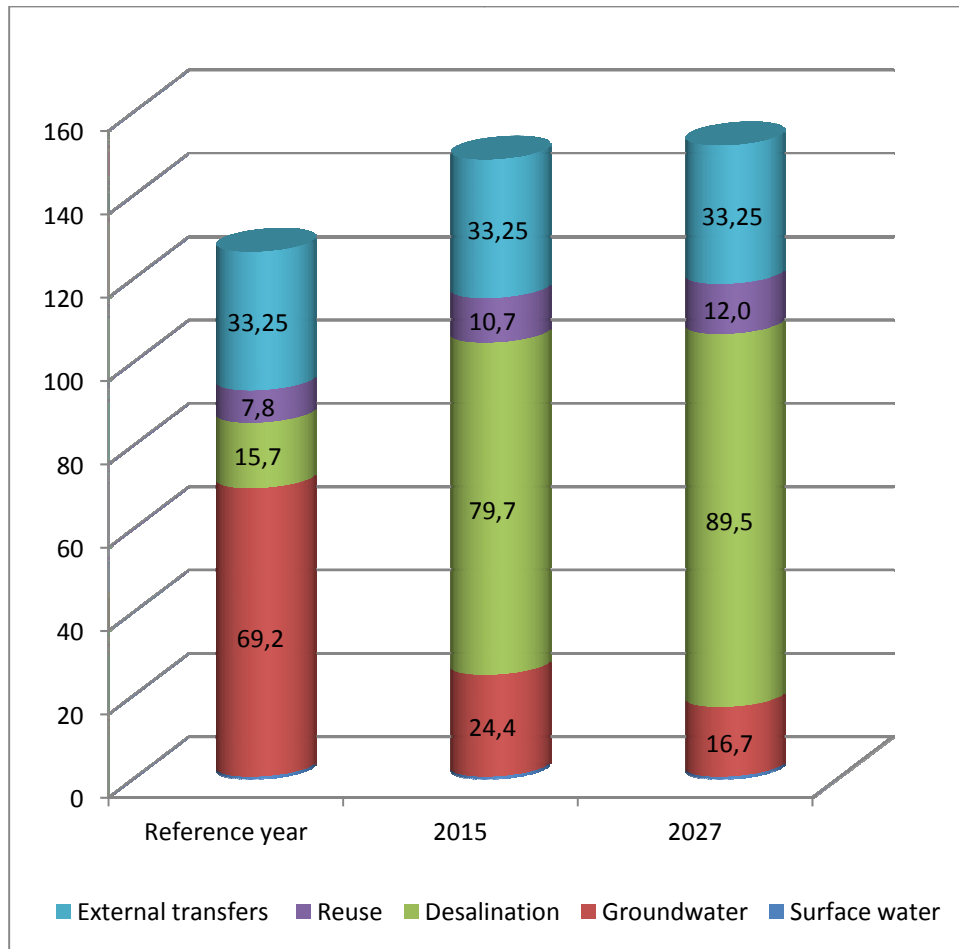


Chart 4: Present and evolution of supply water sources

The desalination infrastructures of CAMP Area are currently under-used. During participation process, local population showed interest for optimizing the use of these infrastructures, although the forecast of supply sources for the period 2015-2027 does not encourage regeneration and does not value energy and economic costs associated to the change of supply sources. These two questions have been of high interest for people during participation process, where they have shown doubts, interest and need for more and better information.

## 5.- Analysis of the existing problems

During participation process problems of water cycle management in CAMP Levante de Almeria Area have been focused under different scales; from a general point of view of the whole area to specific questions or situations of a municipality or specific point. It has been specially identified problems common to all participation subareas as water regeneration, discharges and irregular intakes.

Beyond general problems, in each participation subarea specific problems have been prioritised. Main problems are: geographic and administrative discrepancy and water shortage in Levante; social conflict resulting from the desalination plant of Rambla Morales in Nijar; and not integral costs recovering in Andarax. The question of not integral costs recovering was not in depth in other participation subareas.

Below are included main problems identified during participation workshops as well as problems identified in hydrological planning within groundwater bodies of each participation subarea. In Andarax

subarea are also included problems identified in Altaguax Project that were validated during participation workshops.

Table 2: Identified problems in participation process and hydrological planning

<b>LEVANTE</b>	
IDENTIFIED PROBLEMS IN PARTICIPATION WORKSHOPS	IDENTIFIED PROBLEMS IN THE BODIES OF WATER OF THE AREA BY PLANNING
Deficit of drainage and waste-water treatment infrastructures.	601030-Bajo Aguas
Wastewater discharges without proper treatment.	Point-source pollution of inland water bodies.
Geographical and administrative discrepancy.	Marine intrusion and other salinization processes.
Complexity of Water Stewardship.	60005-Cubeta de Ballabona-Sierra Lisbona-Río Antas
Bad internal management of River Basin Authority and Water Stewardship.	Nitrate pollution from agricultural sources.
Natural waterways are not kept clean.	Phytosanitary products pollution.
Plantations of native species are not carried out.	Marine intrusion and other salinization processes.
Water shortage.	60006-Bajo Almanzora
Over-exploitation of aquifers.	Nitrate pollution from agricultural sources.
Waste of rainwater.	Salinization processes.
Poor water quality.	60004- Cubeta de Overa
High water price.	Nitrate pollution from agricultural sources.
Low awareness about a rational use of water.	Phytosanitary products pollution.
	Salinization processes.
	70061- Aguilas
	Marine intrusion and other salinization processes.

<b>NÍJAR</b>	
IDENTIFIED PROBLEMS IN PARTICIPATION WORKSHOPS	IDENTIFIED PROBLEMS IN THE BODIES OF WATER OF THE AREA BY PLANNING
Insufficient Drainage, Waste-water treatment and Reuse.	Water-body Campo de Níjar
Wastewater discharges without proper treatment.	Nitrate pollution from agricultural sources.
Over-exploitation and salinization of the aquifer.	Phytosanitary products pollution.
Pollution from nitrates, phosphates and sulphates.	Pollution from urban wastewater discharges.
Invasion and disappearance of riverbeds.	Over-exploitation of aquifers, marine intrusion and other salinization processes.
High water price.	Water-body Cabo de Gata
Bad state of maintenance of supply networks.	Nitrate pollution from agricultural sources.
Waste of traditional methods to collect rainwater: "Aljibes"	Over-exploitation of aquifers, marine intrusion and other salinization processes.
Lack of a Central Users' Council.	
Bad taste of drinking water.	

Macro and micro desalination are redundant and lack of coordination. Duplicity of desalination infrastructures.	
Lack of solutions for the brine.	
Social conflict related to the implementation process of the Níjar Desalination Plant (Rambla Morales)	
Dumping of rubbish in riverbeds.	

#### ANDARAX

IDENTIFIED PROBLEMS IN PARTICIPATION WORKSHOPS	IDENTIFIED PROBLEMS IN THE AREA BY PLANNING	IDENTIFIED PROBLEMS BY ALTAGUAX
Bad chemical state of groundwater.	Water intakes.	Problems with the current and future satisfaction of demands.
Insufficient reuse of urban wastewater of the city.	Over-exploitation of aquifers.	Insufficiency of flows.
Marine intrusion processes in the coastal groundwater body.	General land use.	Over-exploitation of aquifers, marine intrusion and other salinization processes.
Groundwater management.	Marine intrusion.	Nitrate pollution from agricultural sources.
To exclude the coastal water bodies from the analysis of the quantitative degradation.	Urban discharges without EDAR, Industrial discharges (IPPC, IPPC-EPER and others), confined livestock buildings and landfills.	Phytosanitary products pollution.
Use of terms "Insufficiency of flows" and "Satisfaction of demand" as problems of quantitative degradation.	Morphological alterations because of channelling.	Pollution from urban wastewater discharges.
Not total cost recovering.	<u>Non-point sources</u> : Petrol stations, agriculture and livestock farming, urban areas and transport routes, industrial areas, livestock-intensive areas and intensive irrigated areas.	Pollution from industry and others.
Lack of an efficient use of water and water supply.	<u>Other pressures</u> : Urban discharges with EDAR, agroalimentary industry discharges and salted meats, invasion of non-native species, mining activity and land uses.	Degradation of the biotic environment.
Lack of good governance, administrative lack of coordination and neglect of duties and competences.	<u>Point-sources</u> : Urban discharges of EDAR El Bobar and discharges of Almeria's desalination plant. Waste from farms and feedlots (very important) and locations. Mixed and urban landfills and petrol stations. Industrial landfills (existing and abandoned).	Morphological alterations and instability of riverbeds.
Irregular groundwater intakes.	<u>Morphological pressures</u> : port's dock, offshore breakwaters and dykes, seawalls, jetties, regenerated beaches and longitudinal defence structures.	Desertification processes and entering of solids to the river network.
Inefficiency of the implemented measures and those in process of implementation. Also inefficiency		Effects on habitats and species of interest.

of the budgets allocated to them.		
		Overflows and floods risk.
		Vulnerability to droughts.
		Management, operational and administrative problems.
		Lack of information, awareness raising and education.

### 6.- Results prior to the integration stage

A total of 128 measures to improve water cycle and solve the 70 problems identified in the area have been proposed during the project. Amongst these measures, 89 proceed from the participation process through Coastal Forum (Foro del Litoral), 25 from Altaguax project (validated by the participants in the Andarax region), and 14 were proposed in the Imagine workshops by Coastal Council (Consejo del Litoral).

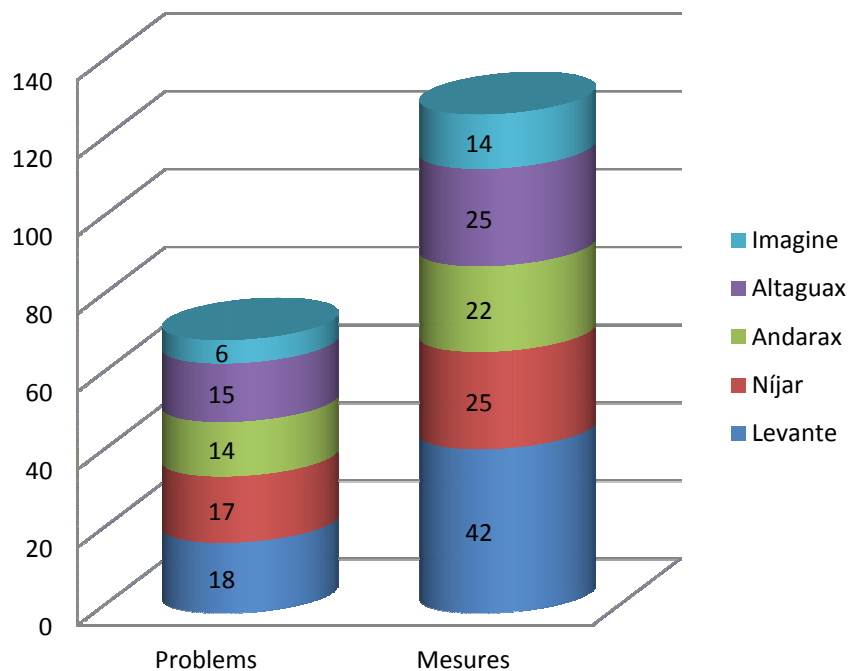


Chart 5: Detected problems and proposed measures in the participation process.

Among the proposed measures, those related with natural hazards and environmental protection, and governance and information are remarkable, with 22% and 19% respectively, and are followed by those related with the quantitative deterioration and sewage and wastewater treatment, both of them

reaching 17,3%, and, afterwards, measures about water supply and demands, deterioration by pollution and deterioration of hydromorphological and biological quality.

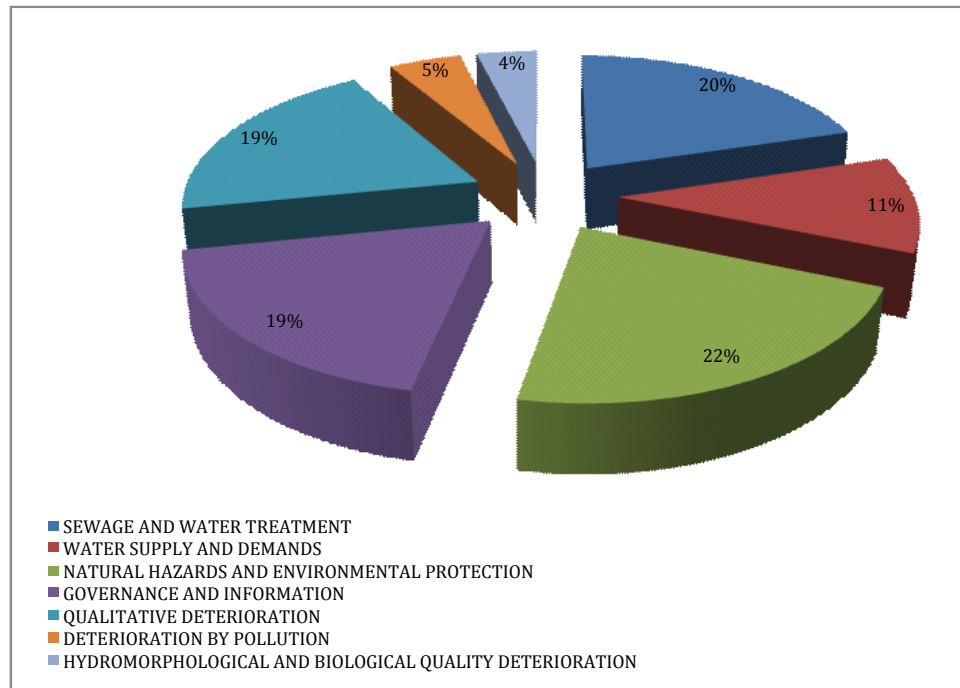


Chart 6: Grouping of proposed measures and their relative percentages.

The measures proposed in the process are complementary to those measures already considered in the recently approved hydrological planning. The redaction of these measures has resulted from the analysis of diagnosis data, the knowledge and perceptions of the participants, and the measures proposed by the hydrological planning for each participation region.

The actions proposed as a result of the individual project are those prioritised in the plenary session of the participation process. In that session, seven priority measures for all CAMP area were concretised starting from the 128 proposed measures. Afterwards, the prioritised measures were presented to the individual project experts group to be completed and discussed. As a result of that discussion, the information tables corresponding to each of these measures were elaborated as presented below:

- Reuse:

ACTION	REUSE
Description	Reuse of treated wastewater, greywater and rainwater. Previous purification until secondary level accomplishing legislation.
Objective	Increasing reuse progressively until reaching 100% reuse. Previous construction of secondary level treatment facilities. Reuse should consider any possible environmental use. Resources coming from reuse should be allocated as a priority to those users who might release groundwater overexploited resources.

<b>Actions and milestones</b>	<ol style="list-style-type: none"> <li>1. Optimal tertiary treatment study in the area regarding final use.</li> <li>2. Comprehensive analysis of needed reuse infrastructures regarding final allocation of these resources.</li> <li>3. Progressive execution of infrastructures upon uses and demands' evolution.</li> <li>4. Resulting water quality and system efficiency monitoring.</li> <li>5. Sound study about potential and real users (social awareness, normative...)</li> <li>6. Effective accomplishment, obligation, responsibility.</li> <li>7. Online dissemination of actualised data about wastewater treatment objective achievement in urban agglomerations.</li> </ol>		
<b>Beginning</b>	2013	<b>Duration</b>	
<b>Responsible</b>	Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente), Provincial Council of Almeria (Diputación Provincial de Almería), Town Councils and final users.		
<b>Budget</b>			
<b>Funding</b>	FEDER, Life Environment, subsidies to agricultural infrastructures.		
<b>Indicators</b>	m <sup>3</sup> of reused water with tertiary treatment / m <sup>3</sup> of treated wastewater. Tertiary water treatment capacity / Treatment capacity in the area.		

- Cost recovery:

<b>ACTION</b>	<b>COST RECOVERY</b>		
<b>Description</b>	Including cost recovery in general services fees, as well as rate actualising in the various water related services.		
<b>Objective</b>	Compliance with the legal requirement to recover water costs and effective implementation of "polluter pays" principle. To recover 100% of costs, avoiding public subsidies.		
<b>Actions and milestones</b>	Approving of a decree corresponding to the implementation of the fees established in Law 9/2010. Awareness campaigns in cost recovery matter.		
<b>Beginning</b>	2012	<b>Duration</b>	Immediate implementation.
<b>Responsible</b>	Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente), local administrations.		
<b>Budget</b>			
<b>Funding</b>	Administrations' own funds.		
<b>Indicators</b>	Cost recovery index in relation to water services. User's cost / real cost.		

- Governance

<b>ACTION</b>	<b>GOVERNANCE IMPROVEMENT: NORMATIVE AND CONTROL</b>		
<b>Description</b>	Governance improvement through legislative measures and control. Promotion of changes in the perception of water services demanded by society.		
<b>Objective</b>	Compliance with actual legislation and approbation of new normative intended to improve the integrated water cycle management.		

<b>Actions and milestones</b>	<p>1. Accomplishment of actual legislation about groundwater abstractions. Abstraction points control: Inventory, legal regularization, and water meters installation.</p> <p>2. Compliance with actual legislation established sewage parameters. Dimensioning of treatment facilities taking into account the summer requirements. Construction of necessary infrastructures.</p> <p>3. To develop an ordinance for the efficient use of water in all CAMP area. To prosecute illegal uses, and never legalize them afterwards.</p>	
<b>Beginning</b>		<b>Duration</b>
<b>Responsible</b>	<p>Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente). Local administrations. Andalusian Water Agency (Agencia Andaluza del Agua). Users Communities. Minister. Segura River Basin Authority (Confederación Hidrográfica del Segura).</p>	
<b>Budget</b>		
<b>Funding</b>	<p>Consider INTERREG programme for normative development. Administration's own funds.</p>	
<b>Indicators</b>	<p>CSIC perception, Ecobarómetro poll in Andalucía. Community law objectives' achievement index. Number of water abstractions equipped with water meter.</p>	

<b>ACTION</b>		
<b>GOVERNANCE IMPROVEMENT: AWARENESS RAISING IN AGRICULTURAL USE</b>		
<b>Description</b>	<p>Governance improvement through awareness raising campaigns intended for the population responsible for agricultural consumptions.</p>	
<b>Objective</b>	<p>Reduce deterioration of water bodies due to agriculture for improving of integrated water cycle management.</p>	
<b>Actions and milestones</b>	<p>1. To create an environmental quality certification in agricultural practices, that should include the development of good agricultural practices in relation to water bodies. The certification will evaluate: The use of polluting compounds, the water footprint, and the origin of water supply.</p> <p>2. Disseminate the mentioned quality certification within farmers and consumers as a quality distinctive.</p> <p>3. To carry out initial certifications.</p> <p>4. Good practices training.</p> <p>5. Reduction of agricultural sewage related to irrigation excesses.</p> <p>4. Effective communication about new (desalination...) and actual water sources taking into account their environmental costs.</p>	
<b>Beginning</b>		<b>Duration</b>
<b>Responsible</b>	<p>Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente). Rural Development Groups.</p>	
<b>Budget</b>		
<b>Funding sources</b>	<p>INTERREG</p>	
<b>Indicators</b>	<p>Tons of production / m3 of water consumption Area or tons of organic crops / area or tons of total crops. Water Framework Directive monitoring network. Opinion poll (broadening Ecobarómetro survey)</p>	



ACTION		GOVERNANCE IMPROVEMENT: ORGANISATION AND COORDINATION	
<b>Description</b>	To create a Central Board of Users in each of the hydrological regions in CAMP area: Andarax, Níjar and Levante de Almería. Supramunicipal management consortium: Coordination, integral management, expenses/effort duplication avoidance. It is doubted that CAMP area has it already in an effective way.		
<b>Objective</b>	Coordination and organisation to improve integral water cycle management.		
<b>Actions and milestones</b>	To incorporate the legal obligation for Junta de Andalucía.		
<b>Beginning</b>		<b>Duration</b>	
<b>Responsible</b>	Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente). Andalusian Environmental and Water Agency (Agencia Andaluza de Medio Ambiente y Agua)		
<b>Budget</b>			
<b>Funding sources</b>			
<b>Indicators</b>	Number of Central Boards of Users created. Volume of water consumed in agriculture and managed through a Central Board of Users /total volume of water consumed in agriculture.		

- Infrastructures:

ACTION		CONNECTION BY INFRASTRUCTURE	
<b>Description</b>	Execution, as soon as possible, of the connection included in the hydrological planning in a branch of the Almazora – Poniente Almeriense conduction, between la Venta del Pobre and Jabonero (municipality of Níjar) in the Bajo Andarax Region.		
<b>Objective</b>	This action will allow the use of desalinated waters from Carboneras IDAM in the irrigation of the region, supporting irrigations of Cuatro Vegas. The hydrological planning also identifies as an objective of the connection the supply to PITA and the urban water supply to the capital city in emergency situations. This was prioritised at a lower level than reuse, and subjected to the existence of feasible payment guarantees of construction amortization and treatment.		
<b>Actions and milestones</b>	This measure has been included in Cuencas Mediterráneas Andaluzas hydrological plan as "Conexión presa Cuevas de Almazora-Poniente Almeriense (sector sur)". Construction of the connection channel Carboneras- Los Llanos de Almería.		
<b>Beginning</b>	2012	<b>Duration</b>	Planned for 2015, proposed advance to 2013.
<b>Responsible</b>	In compliance with Aquamed planning through direct management agreement signed by MAGRAMA.		
<b>Budget</b>	15.400.000€ have been assigned in the Plan.		
<b>Funding</b>	This action is part of the investment plan of National Hydrological Plan approved by law		

<b>sources</b>	11/2005.
<b>Indicators</b>	

- Desalination:

ACTION		DESALINISATION	
<b>Description</b>	Do not build new desalination facilities until exploiting present ones at 90% of their capacity.		
<b>Objective</b>	Optimization of existent infrastructures, reduction of desalinated water's cost. To make explicit the environmental costs of the use of conventional water resources, in order to allow its adequate comparison with desalination.		
<b>Actions and milestones</b>	To undergo a cost-efficiency analysis prior to the execution of any measure related to desalination. Reliable market survey. Transparency in the dissemination of the exploitation rate of the desalination facilities and the water bodies in real time.		
<b>Beginning</b>		<b>Duration</b>	
<b>Responsible</b>			
<b>Budget</b>			
<b>Funding sources</b>			
<b>Indicators</b>	Use of desalinated water vs. production capacity in %.		

- Hydromorphological restoration:

ACTION		HYDROMORPHOLOGICAL RESTORATION OF RAMBLAS	
<b>Description</b>	Hydromorphological restoration of ramblas.		
<b>Objective</b>	This action has three objectives: 1. To improve hydromorphological quality. 2. To create recreational areas (prioritizing the effective improvement of riverbed hydromorphological quality). 3. To increase security regarding floods and forest fires.		
<b>Actions and milestones</b>	Elaboration of an action plan. Measures for the promotion of natural recharge through scarification, sluices or plantations (with species according to the criteria established in the existing plans). Creation of fluvial promenades. Ramblas maintenance protocol.		
<b>Beginning</b>		<b>Duration</b>	
<b>Responsible</b>	Consejería Agricultura, Pesca y Medio Ambiente. Andalusian Environmental and Water Agency (Agencia Andaluza de Medio Ambiente y Agua). Segura River Basin Authority (Confederación Hidrográfica del Segura).		
<b>Budget</b>	Reference: The plan includes "Conditioning and stabilization of river bed and ecological restoration of the Rambla las Eras margins in the municipality of Níjar" with a budget of 6.000.000 €.		

<b>Funding sources</b>	
<b>Indicators</b>	Km of restored riverbeds. Water Framework Directive monitoring network. Specific poll about the recreational spots.

- Research:

ACTION		RESEARCH	
<b>Description</b>	To encourage RDI projects on water and energy issues.		
<b>Objective</b>	To explore the opportunities of energy production at the different stages of the water cycle, as well as the utilisation of renewable energy sources in the hydrological infrastructures functioning. To improve knowledge about real time status of the aquifers both regarding quantitative and qualitative parameters. To explore the incorporation of soft engineering constructions intended to storm waters utilization.		
<b>Actions and milestones</b>	To increase use of wind power, thermo solar and solar energies.		
<b>Beginning</b>		<b>Duration</b>	
<b>Responsible</b>	Regional Economy Administration (Consejería de Economía, Innovación, Ciencia y Empleo); Spanish Ministry of Economy (Ministerio de Economía y Competitividad); Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente). CEDEX possible collaboration to be considered.		
<b>Budget</b>			
<b>Funding sources</b>	7th Framework Programme of the European Commission, Science and Innovation Cities Network. Europe's Smart Energy. Eco-innovation.		
<b>Indicators</b>	Water saving Energy consumption/m3 of water resource. Consumption in m3/habitant (urban water supply) Consumption m3/ha (irrigation systems)		

## 7.- Action plan for the post-project stage

Herein the results for the action program are exposed, after integration of measures resulting from the participation process with those ones from the rest of the CAMP project's structure. This means that the results of all the other individual projects and de technical-administrative integration workshop for the Sustainable Development Reference Framework have been taken into account.

### Action 1.1.1.1. AP SDRFAP SDRF. To propose the normative incorporation of Central Boards of Users.

- Approximate timescale: 1-3 years.

- Competent Public Administrations: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente)<sup>1</sup>.
- Public Administration responsible for coordination: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente).
- Selected indicator/s for AP SDRFAP SDRF: Number of Central Boards of Users created.
- Strategic alliances: Stakeholders.

**Action 1.1.1.2. AP SDRFAP SDRF.** To improve or to create Central Boards of Users in each of the hydrological regions of the CAMP Area: Andarax, Níjar y Levante de Almería.

- Approximate timescale: 1-3 years.
- Competent Public Administrations: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente).
- Public Administration responsible for coordination: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente).
- Selected indicator/s for AP SDRFAP SDRF: Number of Central Boards of Users created.
- Strategic alliances: Stakeholders.

**Action 1.1.2.1. AP SDRFAP SDRF.** To develop a cost-efficiency analysis prior to construction of any water infrastructure, including a reliable market survey.

- Approximate timescale: 1-2 years. Periodical progress reports.
- Competent Public Administrations: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente); AQUAMED.
- Public Administration responsible for coordination: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente).
- Selected indicator/s for AP SDRFAP SDRF: Number of projects with cost-efficiency studies.
- Strategic alliances: Irrigation communities and other users.

**Action 1.1.2.2. AP SDRFAP SDRF.** Prioritize the exploitation of already constructed infrastructures up to 90% of their capability before building new infrastructures.

- Approximate timescale: 1-2 years. Periodical progress reports.

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<sup>2</sup> The Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente) is competent and/or responsible Authority regarding actions in charge of Segura River Basin Authority (Confederación Hidrográfica del Segura), as the latter is administratively ascribed to the mentioned Ministry. These same water management competencies correspond to Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente) of Junta de Andalucía in the CAMP area belonging to Mediterranean River Basins District.

- Competent Public Administrations: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente); AQUAMED.
- Public Administration responsible for coordination: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente), Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente).
- Selected indicator/s for AP SDRFAP SDRF: Percentage of desalinated water and water stored in dams over the total desalination and storage potential.
- Strategic alliances: Irrigation communities and other users.

**Action 1.1.2.3. AP SDRFAP SDRF. To produce periodical reports for public information about exploitation rate of water infrastructure, including desalination facilities, and water bodies.**

- Approximate timescale: 1-10 years of implementation period. Periodical progress reports.
- Competent Public Administrations: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente); AQUAMED.
- Public Administration responsible for coordination: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente).
- Selected indicator/s for AP SDRFAP SDRF: Annual number of reports.
- Strategic alliances: Irrigation communities and other users.

**Action 1.1.3.1. AP SDRFAP SDRF. To study which infrastructures would be necessary in order to reuse the regenerated wastewater depending on expected final use of this resource.**

- Approximate timescale: 1-10 years of implementation period.
- Competent Public Administrations: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente); Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente).
- Public Administration responsible for coordination: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente); Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente).
- Selected indicator/s for AP SDRFAP SDRF: Diagnosis study execution.
- Strategic alliances: Central Boards of Users; Irrigation Communities; Users Communities; private residential users; Town Councils; Provincial Council of Almería (Diputación Provincial de Almería).

**Action 1.1.3.2. AP SDRFAP SDRF. Earmark investment for the progressive construction of the required infrastructure in response to the evolution of demand and use.**

- Approximate timescale: 1-10 years of implementation.
- Competent Public Administrations: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente); Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente).

- Public Administration responsible for coordination: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente); Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente).
- Selected indicator/s for AP SDRFAP SDRF: Investment in tertiary treatment.
- Strategic alliances: Central Boards of Users; Irrigation Communities; Users Communities; Private urban users; Town Councils; Provincial Council of Almería (Diputación Provincial de Almería).

**Action 1.1.3.3. AP SDRFAP SDRF. Implementation of measures regarding product quality and system efficiency control, in compliance with current legislation.**

- Approximate timescale: 1-10 years of implementation.
- Competent Public Administrations: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente) ; Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente).
- Public Administration responsible for coordination: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente); Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente).
- Selected indicator/s for AP SDRFAP SDRF: Number of environmental and sanitary inspections carried out by competent authority.
- Strategic alliances: Central Boards of Users; Irrigation Communities; Users Communities; Private urban users; Town Councils; Provincial Council of Almería (Diputación Provincial de Almería).

**Action 1.1.4.1. AP SDRFAP SDRF. Development of research projects focused on the elaboration of environmental flow regimes calculation methodologies for water bodies, and dissemination of their results.**

- Approximate timescale: Since year 4.
- Competent Public Administrations: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente) , Spanish Ministry of Economy (Ministerio de Economía y Competitividad); Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Regional Economy Administration (Consejería de Economía, Innovación, Ciencia y Empleo).
- Public Administration responsible for coordination: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente); Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Regional Economy Administration (Consejería de Economía, Innovación, Ciencia y Empleo).
- Selected indicator/s for AP SDRFAP SDRF: Number of approved projects about environmental flow regimes / total number of hydraulic projects.
- Strategic alliances: Universities.

**Action 1.1.4.2. AP SDRFAP SDRF. Research projects on water and energy issues, intended to exploration of energy production possibilities along the various water cycle stages.**

- Approximate timescale: Since year 4.
- Competent Public Administrations: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente); Spanish Ministry of Economy (Ministerio de

Economía y Competitividad); Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Consejería de Economía, Innovación, Ciencia y Empleo.

- Public Administration responsible for coordination: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente) : Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Regional Economy Administration (Consejería de Economía, Innovación, Ciencia y Empleo).
- Selected indicator/s for AP SDRFAP SDRF: Number of approved projects on water-energy binomial / total number of hydraulic projects.
- Strategic alliances: Universities.

**Action 1.1.4.3. AP SDRFAP SDRF. Research projects for the elaboration of a flood forecast system, emergency plans, evaluation of erosion and soil loss rates in Antas, Alías, Almanzora and Antarax rivers.**

- Approximate timescale: 1 year.
- Competent Public Administrations: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente).
- Public Administration responsible for coordination: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente).
- Selected indicator/s for AP SDRFAP SDRF: Number of research projects into flood forecast system elaboration / total number of hydraulic projects.
- Strategic alliances: Public Universities' Research Groups.

**Action 1.1.5.1. AP SDRFAP SDRF. Launch efficiency plans in the urban water supply network in order to reduce losses and improve the efficiency of water use.**

- Approximate timescale: Since year 5.
- Competent Public Administrations: Town Councils
- Public Administration responsible for coordination: Town Councils.
- Selected indicator/s for AP SDRF: Number of distribution network efficiency plans / total number of municipalities.
- Strategic alliances: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente).

**Action 1.1.5.2. AP SDRF. Encourage the launch of projects for the construction of rainwater exploitation systems.**

- Approximate timescale: Since year 5.
- Competent Public Administrations: Town Councils
- Public Administration responsible for coordination: Town Councils.
- Selected indicator/s for AP SDRF: Number of projects on rainwater exploitation systems / total number of municipalities..
- Strategic alliances: Central Boards of Users; Associations of Town Councils.

**Action 1.1.5.3. AP SDRF. Promote the development of supra-municipal bylaws in the CAMP area aimed at the efficient use of water, including grey, domestic and swimming pool water management, and rainwater exploitation.**

- Approximate timescale: Year 1.
- Competent Public Administrations: Town Councils
- Public Administration responsible for coordination: Town Councils.
- Selected indicator/s for AP SDRF: Number of bylaws passed.
- Strategic alliances: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Provincial Council of Almería (Diputación Provincial de Almería); Associations of Town Councils.

**Action 1.2.1.1. AP SDRF. To elaborate an Action Protocol to rivers and “ramblas” (intermittent watercourses), including actions to promote natural recharge through riverbed scarification, water collection systems or plantations of the appropriate species.**

- Approximate timescale: Protocols in year 1, implementation since year 4.
- Competent Public Administrations: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente); Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente).
- Public Administration responsible for coordination: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente); Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente).
- Selected indicator/s for AP SDRF: Action Protocol elaborated.
- Strategic alliances: Stakeholders.

**Action 1.2.1.2. AP SDRF. To promote a priority action plan involving the creation of riverside walks around population nuclei.**

- Approximate timescale: 1 to 10 years.
- Competent Public Administrations: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Town Councils.
- Public Administration responsible for coordination: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente)
- Selected indicator/s for AP SDRF: Number of municipalities with priority actions planned.
- Strategic alliances: Neighbours' associations. Universities.

**Action 1.2.1.3. AP SDRF. To develop annual plans for the maintenance of rivers, “ramblas” (intermittent watercourses) and drainage works under environmental and efficiency criteria.**

- Approximate timescale: From 1 to 10 years.
- Competent Public Administrations: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente).
- Public Administration responsible for coordination: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente).



- Strategic alliances: Universities; Specialised companies.
- Selected indicator/s for AP SDRF: Percentage of river stretches maintained under environmental criteria / total.

**Action 1.2.2.1. AP SDRF. To perform a study of the current status and requirements of water treatment infrastructure.**

- Approximate timescale: Study on year 2, later implementation.
- Competent Public Administrations: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente); Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Town Councils.
- Public Administration responsible for coordination: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente) ; Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente);
- Selected indicator/s for AP SDRF: Study elaborated.
- Strategic alliances: Users Communities.

**Action 1.2.2.2. AP SDRF. To improve the efficiency of Waste Water Treatment Facilities, promoting their supra-municipal management.**

- Approximate timescale: Years 2 to 10.
- Competent Public Administrations: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente); Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Town Councils.
- Public Administration responsible for coordination: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente); Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente).
- Selected indicator/s for AP SDRF: Number of projects / total number of municipalities.
- Strategic alliances: Users Communities.

**Action 1.2.2.3. AP SDRF. To prioritise the execution of water infrastructure in accordance with their public interest, introducing criteria to guide investment towards this objective.**

- Approximate timescale: Years 1 to 10.
- Competent Public Administrations: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente); Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Town Councils.
- Public Administration responsible for coordination: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente); Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente).
- Selected indicator/s for AP SDRF: Number of water infrastructure works executed under the public interest scope (through associations of local councils).
- Strategic alliances: Users Communities.

**Action 1.2.3.4. AP SDRF. To disseminate updated information on the achievement of water treatment objectives in urban areas.**

- Approximate timescale: Years 1 a 10.
- Competent Public Administrations: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente); Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Town Councils.
- Public Administration responsible for coordination: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente); Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente).
- Selected indicator/s for AP SDRF: Number of municipalities offering public access to information/total.
- Strategic alliances: Users Communities.

**Action 1.2.3.1. AP SDRF. To promote the approval of the water general services fee (Law 9/2010, of 30 July, on Water in Andalusia).**

- Approximate timescale: Since year 1.
- Competent Public Administrations: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente); Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Town Councils.
- Public Administration responsible for coordination: Town Councils.
- Selected indicator/s for AP SDRF: Number of municipalities which have approved the planned fee for water general services / total number of municipalities.
- Strategic alliances: Environmental NGOs, technicians, general public, neighbours' associations.

**Action 1.2.4.1. AP SDRF. To update water abstractions' inventory.**

- Approximate timescale: Years 2 a 10.
- Competent Public Administrations: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente) ; Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Central Users' Council.
- Public Administration responsible for coordination: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente).
- Selected indicator/s for AP SDRF: Percentage of updated water abstractions / total.
- Strategic alliances: Irrigation Communities; Central Users' Council.

**Action 1.2.4.2. AP SDRF. To speed up water abstraction's administrative processing.**

- Approximate timescale: Years 2 a 10.
- Competent Public Administrations: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente) ; Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Central Users' Council.
- Public Administration responsible for coordination: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Central Users' Council.
- Selected indicator/s for AP SDRF: Mean waiting time for water abstraction processing.
- Strategic alliances: Irrigation Communities; Central Users' Council.

**Action 1.2.4.3. AP SDRF. To promote the installation of water meters at water abstraction points.**

- Approximate timescale: From 2 to 10 years.
- Competent Public Administrations: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente) ; Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Central Users' Council.
- Public Administration responsible for coordination: Central Users' Council.
- Selected indicator/s for AP SDRF: Percentage of water abstractions provisioned with water meters/total number of water abstractions.
- Strategic alliances: Irrigation Communities; Central Users' Council.

**Action 1.2.4.4. AP SDRF. To adopt measures regarding the monitoring and periodical control of water abstraction points.**

- Approximate timescale: From 2 to 10 years.
- Competent Public Administrations: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente) ; Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Central Users' Council.
- Public Administration responsible for coordination: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente); Central Users' Council.
- Selected indicator/s for AP SDRF: Percentage of developed inspections/total number of abstraction points.
- Strategic alliances: Irrigation Communities; Central Users' Council.

**Action 4.1.2.1. AP SDRF. To implement the public participation methodology resulting from the CAMP Project for the monitoring of Hydrological Plans.**

- Approximate timescale: Since year 1.
- Competent Public Administrations: Spanish Ministry of Agriculture, Food and Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente); Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente).
- Public Administration responsible for coordination: Regional Agriculture Administration (Consejería de Agricultura, Pesca y Medio Ambiente).
- Selected indicator/s for AP SDRF: Incorporation of CAMP participatory methodology into the Hydrological Plan for Andalusian Mediterranean River Basins.
- Strategic alliances: Town Councils; Stakeholders; Provincial Council of Almería (Diputación Provincial de Almería).

**8.- Social, environmental and economic feasibility of post project actions**

Each proposed action is analyzed from a social, economic and environmental point of view; just as possible public or private financial sources that could be applied for financing each action. Actions are the result of integrating individual project proposal with both actions proposed by other individual projects and their feasibility evaluated by administrations with competence.

1.1.1 Progress towards unified management of the water cycle:

1.1.1.1. Propose the incorporation into the regulations of the creation of Central Users' Councils

1.1.1.2. Create and/or bring agility to Central Users' Councils in each of the hydrological environments in the CAMP area: Andarax, Níjar and Levante de Almeria.

**Social Feasibility:** Population involved in participation process has manifested to identify lack of coordination as a problem associated to management of the water cycle. One of proposals to create one Central Users' Councils in each of the hydrological environment in the CAMP area (Andarax, Níjar and Levante de Almeria) was to improve management and coordination. In order to achieve the objective, geographical limits of these Central Users' Councils are marked with hydrological and resource management criteria. That is why limits of CAMP Levante de Almeria Area are not most suitable option for integral water cycle management and so this action also includes bordering areas.

**Environmental Feasibility:** This action is proposed because of the belief that the integral water cycle management is an advance towards a greater knowledge and control of the state of the bodies of water and therefore, its better conservation.

**Economic, Technical and Financial Feasibility:** It is an improvement measure in the management of low investment but able to reach a high cost-efficiency profitability. This action does not need specific funding. The work can be done by the technical staff of the administration and the start-up costs can be assumed by entities of the own central council.

Measure 1.1.2. Plan and manage the water infrastructure on the basis of the cost/efficiency analysis

1.1.2.1. Action 1.1.2.1. Perform a cost-efficiency analysis prior to the construction of water infrastructure including a reliable market study.

1.1.2.2. Action 1.1.2.2. Prioritize exploitation of existing water infrastructure to 90% of its capacity rather than construct new infrastructure.

1.1.2.3. Action 1.1.2.3. Produce periodical reports for public information with respect to the exploitation of water infrastructure, including desalination plants and water bodies.

**Social Feasibility:** This action has the same final objective as the one before, the coordination in the management of the water cycle. As it has been mentioned before, this is a question mentioned during the participation process. At this time, the proposal of coordination is focused on management and planning in order to do not construct new water infrastructure until the existing ones operate at least 90% of its capacity. The case more times mentioned by participants was the under-utilization of existing desalination plants in the CAMP area. There was a unanimous agreement in the proposal of not construct new desalination plants until the optimization of existing ones in the same area.

**Environmental Feasibility:** This action reduces the construction of new water infrastructure and also the impact associated, optimizes existing water resources and contributes to water management coordination. The measure will be applied if there are operating water infrastructures able to meet detected needs.

**Economic, Technical and Financial Feasibility:** One of main goals of this action is to make profitable investments and reduce costs associated too water cycle management. The optimization of infrastructures can need some works that can be financed with European funds.

Measure 1.1.3. Encourage the total re-utilization of waste water through the Central Users' Councils

1.1.3.1. Action 1.1.3.1. Analyze the infrastructure required for the re-utilization of regenerated waste water depending on the final use of the water.

1.1.3.2. Action 1.1.3.2. Earmark investment for the progressive construction of the required infrastructure in response to the evolution of demand and use.

1.1.3.3. Action 1.1.3.3. Take measures for the quality control of the resulting water and the efficiency of the system in accordance with current legislation.

**Social Feasibility:** This is the most common action in all participation subareas and the one most prioritised in plenary session; it was also a measure proposed by several groups in the Imagine workshops. This means that it is a measure highly supported by participants in the participation workshops of the individual project, characterized by having more relation and experience in the aim and thus more knowledge than the average of society. The acceptance of this measure by general public would make necessary an informative task and the creation of accessible communication forums where solve any possible doubt or related uncertainty.

**Environmental Feasibility:** Re-utilization implies important environmental benefits from a wastewater treatment point of view. Re-utilization of 100% of wastewater would ensure its right treatment. From a demand point of view, re-utilization is an important step because it contributes to reduce dependence on bodies of water and supply sources with high energetic costs.

**Economic, Technical and Financial Feasibility:** Wastewater re-utilization needs investment on tertiary treatment infrastructures in the CAMP area. This investment is made profitable obtaining water with a lower energetic and environmental cost that the rest of sources of supply in the area. Energetic cost of re-utilized water has values over 0,7 Kwh/m<sup>3</sup> much lower than other sources of supply as desalination, that is between 3 and 5 Kwh/m<sup>3</sup>. Necessary investment that allows re-utilize water can benefit from funding from the ERDF, LIFE-Environment support and agricultural infrastructure support. Open calls during investment years must be taken into account.

Measure 1.1.4. Promote R&D measures in water management, incorporating this line of research into the different calls for applications.

1.1.4.1. Action 1.1.4.1. Research projects aimed at the elaboration of methodology to calculate environmental flows in the water bodies and the dissemination of results.

1.1.4.2. Action 1.1.4.2. Water and energy research projects to explore opportunities for the production of energy in the different phases of the water cycle.

Action 1.1.4.3. Research projects for the elaboration of a flood forecast system, emergency plans, evaluation of erosion and soil loss rates in the Rivers Antas, Alías, Almanzora and Andarax.

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**Social Feasibility:** Among priority measures, this is the one with less social support during the participation process. Generally population knows that research and development are necessary, but in the actual economic context and with the uncertainty of achieving results that allow a real improvement in the water resource management, the action was proposed with caution and was not highly supported. The proposal of participants was mainly focused on the research proposed in the point 1.1.4.2 associated to the research in water and energy.

**Environmental Feasibility:** Increase in knowledge compared to water resource management and the research on the matters proposed appears with the objective of applying improvements in the water management and the resources environmental conservation.

**Economic, Technical and Financial Feasibility:**

This action implies an investment on later management improvement, but there is uncertainty about final applicability of the results. Possible funding sources are the Seventh Framework Programme (FP7) of the European Commission, Network of Cities of Science and Innovation. Intelligent Energy Europe Programme, Energy companies ...

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Measure 1.1.5. Promote efficiency in the management of the urban water cycle.

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1.1.5.1. Action 1.1.5.1. Launch efficiency plans in the urban water supply network in order to reduce losses and improve the efficiency of water use.

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1.1.5.2. Action 1.1.5.2. Encourage the launch of projects for the construction of systems for the exploitation of rainwater.

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1.1.5.3. Action 1.1.5.3. Promote the development of supra-municipal bylaws in the CAMP area aimed at the efficient use of water, including grey water, domestic water, swimming pools and rainwater systems.

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**Social Feasibility:** The efficiency of distribution networks and the rainwater collection systems were discussed during participation process and they did not obtain preferential social support because participants think that cost-efficiency relation is less appropriate than in other measures. The action of promoting the development of local ordinances was proposed in the participation process and also in the Imagine workshops were proposed actions as the establishment of an eco-tax that if it were appropriate could be defined into the model of ordinance.

**Environmental Feasibility:** Higher efficiency in the urban water cycle management means an environmental improvement and it does not have risks to conservation. Regarding to the application of the proposed ordinance, it means the improvement of the urban water cycle management, mainly through the optimization of water consumption.

**Economic, Technical and Financial Feasibility:** Action 1.1.5.2 associated to rainwater system is considered to have a high cost in relation to the improvement that it can suppose. In order to finance the investment needed, it could apply for European funding as Programme SUDOE through ERDF; the action related to local ordinance does not entail a large investment and even it can mean an important support for an environmental and management improvement. In order to finance the implementation

of local ordinance it would be possible to consider the possibility of accessing to European funds as INTERREG and also to count on own technical staff and funds of local administration.

Measure 1.2.1. Promote the hydro-morphological restoration of rivers and dry watercourses.

1.2.1.1. Action 1.2.1.1. Elaborate a Protocol for action to maintain rivers and dry watercourses, including actions to promote natural replenishment through Gary scarification, water collection systems or plantations of the appropriate species.

1.2.1.2. Action 1.2.1.2. Promote a priority action plan involving the creation of riverside walks around population nuclei.

1.2.1.3. Action 1.2.1.3. Develop annual plans for the maintenance of rivers, dry watercourses and drainage works under environmental and efficiency criteria.

**Social Feasibility:** This action was proposed in the participation process with three main objectives: A) To improve hydro-morphological quality (e.g., promotion of natural replenishment through Gary scarification, water collection systems or plantations). B) To promote public spaces as riverside walks. C) To improve security against fire and flooding. (e.g., protocol to maintain dry watercourses). During participation process it was emphasized/highlighted the importance of defining guidelines for hydro-morphological restoration.

**Environmental Feasibility:** The hydro-morphological restoration of rivers and dry watercourses and the maintaining actions mean a better environmental management themselves.

**Economic, Technical and Financial Feasibility:** European funds can be considered for financing this action and also for specific cases in which rivers and dry watercourses host species of special interest. Other sources of funding can be considered as annual project calls of Biodiversity Foundation.

Measure 1.2.2. Guarantee compliance with the parameters for the discharge of wastewater

1.2.2.1. Action 1.2.2.1. Perform a study of the current state and requirements for water treatment infrastructure.

1.2.2.2. Action 1.2.2.2. Improve the efficiency of Waste Water Treatment Plants, promoting supra-municipal management.

1.2.2.3. Action 1.2.2.3. Prioritise the execution of infrastructure in accordance with the public interest, introducing criteria to guide investment towards this objective.

1.2.2.4. Action 1.2.3.4. Disseminate updated information on the achievement of water treatment objectives in urban areas.

**Social Feasibility:** The compliance with the parameters for the discharge of wastewater is an action proposed in the participation process associated to regulation and control measures. This is an action socially supported.

**Environmental Feasibility:** This action involves the ending of uncontrolled and uncontrolled discharges and the environmental problems associated.

**Economic, Technical and Financial Feasibility :** There is agreement between experts and participants about it is not necessary to research in new wastewater treatment techniques because current technology allows the parameters to be reached. They also agree that greater difficulty is to size infrastructure taking into account summer season needs. The summer is the peak of greatest touristic activity and coastal waters (most tourism is “sun and beach”) is one of most valued aspects by tourists. Images of beaches polluted with wastewaters or spillways near the coast have an impact on the feeling of quality of tourists and can therefore cause a major economic damage to one of the main economic sectors of the area. For financing the investment needed, it can be considered the European funds available during the year in which the action is implemented.

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Measure 1.2.3. Progressively implement the principle of the recuperation of water costs

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- 1.2.3.1. Action 1.2.3.1. Promote the approval of the charge for general services (Law 9/2010, of 30 July, on Water in Andalusia).
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**Social Feasibility:** This measure is supposed to have a low social support because it involves an increase in water rates. But it was proposed during participation process and it also was the second prioritised. Participants exposed that the problem was the quality of water supplied not the price itself. For this measure to be accepted, it is necessary to inform the population about its implementation, about the European legislative context of costs recovering and also involve people in the process.

**Environmental Feasibility:** The implementation of the “cost recovering” principle includes the environmental costs assessment; this measure will involve an environmental improvement.

**Economic, Technical and Financial Feasibility:** This is a measure with economic, technical and financial feasibility. The financing of the “cost recovering” principle implementation can be supported by own technical, human and economic resources of administration.

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Measure 1.2.4. Progress towards the control of the extraction of underground waters

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- 1.2.4.1. Action 1.2.4.1. Update the inventory of water abstraction.
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- 1.2.4.2. Action 1.2.4.2. Make the processing of water abstraction more agile.
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- 1.2.4.3. Action 1.2.4.3. Promotes the installation of water meters at water abstraction points.
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- 1.2.4.4. Action 1.2.4.4. Adopt measures to reinforce the monitoring and periodical control of water abstraction.
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**Social Feasibility:** Participation process, both the specific of the water cycle and the Imagine workshop, gave importance to the control of groundwater abstraction/extraction. This is a measure accepted and



supported by participants of the workshops but it will probably be rejected by people who make irregular water intakes at present time.

**Environmental Feasibility:** The control of groundwater abstraction/extraction is necessary in order to know the current situation and make decisions based on real data.

**Economic, Technical and Financial Feasibility:** It is recommended to evaluate the feasibility of using own technical resources of the administration for the implementation of this action.

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Measure 4.1.2. Incorporates the participatory structure of the CAMP project into the administrative procedures subject to public participation

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4.1.2.1. Action 4.1.2.1. Implement the public participation methodology resulting from the CAMP Project for the monitoring of Hydrological Plans.

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**Social Feasibility:** Water management is quite interesting and priority for society, mainly for the stakeholders. Future participation processes shall take into account the involvement of the society always that the objectives and methodology for inclusion of results will be clear.

**Environmental Feasibility:** One of the benefits of the public participation is the knowledge and learning acquired by participants during the process; that is why in addition to democratize the decisions, they also become educative spaces. The involvement of the society in the decision making has the potential of promoting the knowledge and awareness about environmental problems and their solutions.

**Economic, Technical and Financial Feasibility:** There are methodologies and participation spaces with a very different needs and costs. Public participation can be adapted to the economic characteristics of the moment, especially if already exists any participative experience in the area able to facilitate the implementation of the process. In any case, it is important that the costs of participation will be assumed, totally or partially, by the administrations with competence in the decision making, because it will subsequently encourage their better involvement and responsibility with the final decision making.

## **9.- Lessons learnt**

Throughout the Project, some key questions related to de water cycle in CAMP area have been identified. Below are exposed the most important learning:

- Information related with water resources in the CAMP Levante de Almeria Area is limited and hardly accessible. This fact makes difficult to adopt/make decisions.
- Agriculture is the activity with most water demand, about 75% of the whole demands/total. At the same time, it is the activity with less information about demands and real .... At this point is important to remark that hydrological planning offers information about agricultural demands with a so large scale that it is no applicable to CAMP area.
- Hydrological planning compiles a great amount of information about water resources of the area, although it is information hardly accessible for local population because of its technical character and its large scale that only shows information for the total area of the Andalusian Mediterranean Basin and Segura River Basin, without any local detail of interest for local population.
- Water treatment presents high potential in the area, but there are quite limited actuaciones in hydrological planning so they won't be probably effective.

- It is important to communicate and to inform local population about real quality and price water values in order to avoid wrong interpretations based on subjective evaluations or past problems.
- Governance measures presented in planning are referred to the whole area of the Andalusian Mediterranean Basin, so it is not possible to know their effect in a specific area.
- Pulpí is geographically considered by local population as belonging to **Hydrological** Southern Basin, although **administratively** it belongs to the Segura River Basin Authority. Local population thinks that this fact means difficulties for an integrated water management in the territory.
- In general, it is easy to think that population wouldn't accept an increase in the price of the urban supply of water and that is partially true, but people that have participate in the workshops have shown they would be agree with the increase if it means a quality service and water supply improvement. They think that the price of water is really low compared to other services.
- The space for participation created in the framework of the individual project has permitted to confirm the need of dialog between interested agents as an effective way to reach agreements and to reduce conflict during decision making. In order to a greater implication of society and legitimacy of the results obtained through participation processes, it is necessary that the responsible authority undertakes to the participation process, taking into account its results and explaining their integration or not in the final decision making.



# 7

## *Improvement of the management criteria for Maritime-Terrestrial and Hydraulic Public Domain*

Final report

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## **TABLE OF CONTENTS**

Executive summary

- 1.- Introduction
- 2.- Description of the project
- 3.- Recompilation and synthesis of the information
- 4.- Diagnosis
- 5.- Analysis of the existing problems
- 6.- Results prior to the integration stage
- 7.- Action plan for the post-project phase
- 8.- Economic, social and environmental feasibility of post-project actions
- 9.- Lessons learned

## **INDEX OF ANNEXES**

Annex 7.I Proposals of priorities areas of delimitation

Annex 7.II Proposal acquisition, management and where appropriate restoration of degraded areas

Annex 7.III A200 Proposal

## **LIST OF FIGURES**

*Figure 1: Detail of the flood level at the mouth of the River Antas.*

## **ABBREVIATIONS USED**

AP SDRF: Action Plan of the Sustainable Development Reference Framework of the Levante de Almeria.

CAMP Coastal Areas Management Programme

CL Coastal Law

DEFG Dynamics of Environmental Flows Group

HPD Hydraulic Public Domain

ICZM Integrated Coastal Zone Mediterranean

MTHPD Maritime Terrestrial and Hydraulic Public Domain

MTPD Maritime Terrestrial Public Domain

NOAA National Oceanic and Atmospheric Administration

RDHG River Dynamics and Hydrology Group

REDIAM Andalusian Environmental Information Network (Red de Información Ambiental de Andalucía).

UCO University of Córdoba

UGR University of Granada

WiMMED Watershed Integrated Model in Mediterranean Environments

WL Water Law

## **Executive summary**

This document summarizes the work developed in the project from April 2011 to July 2012 by the team of the Individual Project "Improvement of the management criteria for Maritime-Terrestrial and Hydraulic public domain".

After a brief introduction, the general objectives and the expected results of the project are presented. After that, a description, recompilation and synthesis of the information is exposed. Subsequently, a diagnosis of the present situation and an analysis of the problems identified in relation with the management of the public maritime-terrestrial domain are done. The diagnosis specifically addresses problems and requirements of CAMP area that need to be solved as a prior requirement to establish a strategy for the sustainability of the public domain. With the data sets generated and the final products of the project, a program of post-project actions to mitigate or resolve identifies problems is proposed. This program is complemented with information about the costs (funding) and indicators, so the managers can follow and evaluate the project during its implementation.

Finally, this report includes the "lessons" learned during the project and a list of the appendixes.

### **1.- Introduction**

This individual project entitled "Improvement of the management criteria for Maritime-Terrestrial and Hydraulic public domain" is part of the CAMP Project "Levante de Almería". During the feasibility study that included the participation of the local people and entities, an improvement in the management of the Maritime Terrestrial and Hydraulic Public Domain (MTHPD) was detected to be required for the adequate protection of this area.

Therefore, the main of this individual project is not to ensure the public domain, because it cannot guarantee something that is the responsibility of the Public Administration, accordingly, the main objective of this individual project is to establish, define and improve the criteria used by the managers to protect the public domain. This is in accordance to the Article 20 about the Urban Policy from the Protocol on Integrated Coastal Zone Management in the Mediterranean.

This individual project, has as legal framework the Barcelona Convention, adopted at Barcelona on 16 February 1976, as amended on June 10, 1995, more specifically the seventh protocol, the Protocol on Integrated Coastal Zone Mediterranean (ICZM Protocol) entered into force on 23 March 2011, thus becoming the only binding international instrument on ICZM. In this protocol, the Parties consider that the coastal zones of the Mediterranean Sea are the common natural and cultural heritage of the peoples of the Mediterranean and that they should be preserved and used judiciously for the benefit of present and future generations. It also provides the foundation to stimulate national, regional and local institutional coordination and social participation in order to promote efficient governance of the Integrated Coastal Zone Management in the Mediterranean.

The Maritime Terrestrial Public Domain (MTPD) is initially defined in the Coastal Law of 1969, subsequently superseded by the Coastal Law of 1988 (CL), to "... impose a remedy active against consummate situations of the past ... , "according to the judgment of the Supreme

Court (STF) of February 17, 2004. The Hydraulic Public Domain (HPD) is defined in the Water Law (WL) and its regulations.

The definition of Public Domain is defined, in Article 132 of the Spanish Constitution of 1978:

132.1 The law regulates the legal status of Public Domain and the community, drawing on the principles of inalienable, imprescriptibly and immunity from seizure, and its disaffection.

132.2 They are state Public Domain as determined by the law and in any case, the sea-land area, beaches, territorial waters and natural resources of the economic zone and continental shelf.

132.3 Law shall regulate the State Heritage and National Heritage, administration, protection and preservation.

Accordingly to the Team Leaders criteria, this legislation, currently on force, has the following weaknesses: i) it does not consider the stochastic character of the storm surge due to the stochastic character of the forcing agents; ii) it does not consider the present and future sea level rise (Losada et al., 2011), iii) it does not consider the future morphological changes assuming that the public domain is time-independent; iv) maritime and atmospheric forcings are not consider jointly. This work is presented as a pilot methodology to establish the public domain that improves some of the previous problems and could be adopted by the competent authorities.

Other results of this individual project are in the appendixes: i) Proposal of priority areas to be delimited in the Maritime-Terrestrial and Hydraulic Public Domain; ii) Proposal to acquire, manage and restores priority degraded areas; iii) Proposal for A200.

The scale of this individual project is local and includes the different municipalities included in the CAMP project area. Innovative tools such as models WiMMED and GuadalFORTRAN (free distribution and developed by the authors of the project) have been used. This work has been done by the following research groups: "Dynamics of Environmental Flows", from the University of Granada and "River Dynamics and Hydrology", from the University of Córdoba.

## **2.- Description of the project**

This individual project was oriented to the definition, improvement and implementation of criteria for the integral management of the Maritime-Terrestrial and Hydraulic Public Domain (MTHPD). The management of MTHPD should pay special attention to areas such as river mouths, estuaries, deltas, degraded areas, especially protected areas, etc.

The work of the individual project team has collected recommendations and opinions marked by different stakeholders, who are organized into various bodies formed in a pilot manner for the development of CAMP project.

One of these bodies are the Expert Teams. In CAMP projects that have being developed along the Mediterranean, this figure is formed by a group of consultants specialized in different subjects to achieve a multisectoral vision of problems and develop proposals for solutions. In the CAMP Levante de Almería has changed the composition of this structure and have been invited to participate, the public administration technicians who manage the study objects of this individual projects. The purpose of this amendment is to get multisectoral final proposals

that can be assumed by the administrations, and to facilitate its execution after having participated in its elaboration, creating a sense of "self-construction" of the proposals. This is to enable the resulting proposals to be undertaken by the Coastal Commission, CAMP project decision-making body, composed of local, regional and national governments with competences in the management of the coast and in charge of the adoption of the Sustainable Development Reference Framework. Another advantage of this composition is the ability to facilitate the exchange of experiences and knowledge between scientists and managers and, therefore, have their rigor and support in preparing proposals.

With this aim the Expert Team was formed for this individual project during the formulation phase of the project. The Expert Team is composed of representatives of the different administrations with competence in the Maritime-Terrestrial and Hydraulic Public Domain, and with the scientific sector, that, through regular meetings, contributed to its initial design, defining the results to be obtained and the methodology. During the implementation phase, has continued with its advisory work, making contributions and corrections, contributing their experience to the final results of individual project.

Other bodies that have guided the work of this individual project have been the social participation ones, in particular, the Coastal Council, composed of social actors who work in the CAMP area, that through their participation in meetings and workshops have shown their concerns and perceptions related to the management of the Public Domain.

Together with the previous bodies, press was another source of information for this individual project. It has been collected the related articles that reflect issues of concern to the citizens of CAMP area. The main problems detected by this way meet the concern by citizens of the state of conservation of beaches.

On the other hand, it has also given special attention to the integration of the results of this project with other individual projects of CAMP, through coordination meetings and workshops integration results.

Given the above, and with respect to the technical work developed under the project, the main innovations and contributions were:

- i) To recommend the definition as a whole of some specific areas for the demarcation of the Maritime-Terrestrial Public Domain and Hydraulic, obtained as the sum of forcings maritime (in the case of the shoreline boundary) and terrestrial forcings (rainfall) for the hydraulic public domain. In river mouth areas, the calculation of both public domains as a single boundary, deduced from both forcings. This methodology, which is described in more detail in Annex 7.1 Proposals of priorities areas of delimitation, consists in obtaining the level of elevation with flood wave propagation models (in the case of maritime forcings) and hydrological and hydraulic models (in the case of terrestrial forcings). After carrying out a process to define the areas of Almería, and consultations with the expert, this methodology has been applied to the Antas and Alías rivers mouths, and in Macenas beach too, appreciating, so evident in the case of the mouth of the River Antas the need to consider both forcings together (Figure 1). The use of this



methodology would serve as an improvement in the process of demarcation that is currently performed and the application of Directive 2007/60/EC Flood.

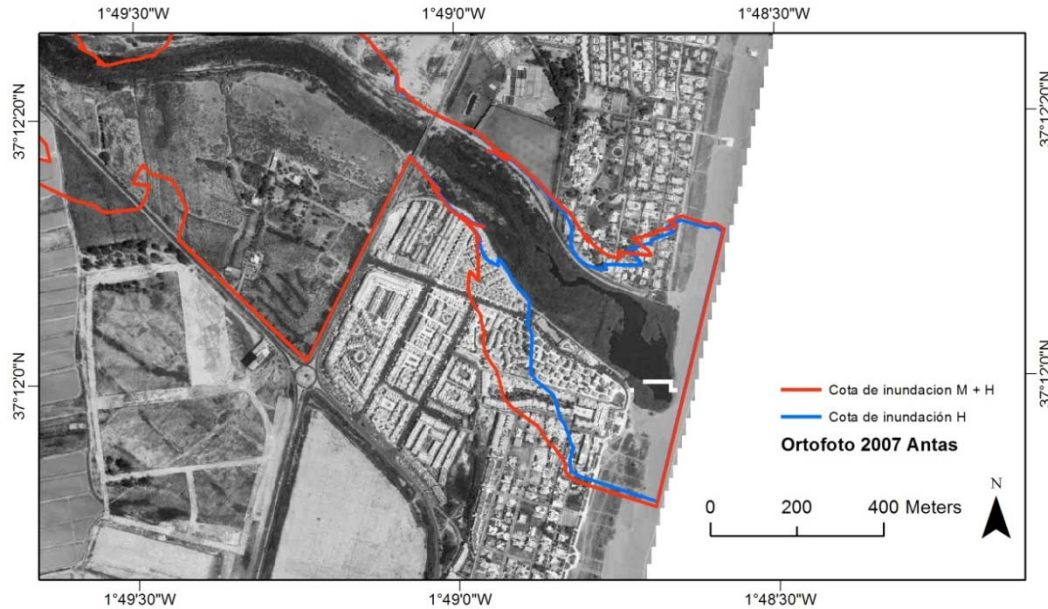


Figure 1: Detail of the flood level at the mouth of the River Antas. (Blue, bound obtained only with hydraulic forcings, red, bound obtained by calculating the forcing together of Hydraulic and Maritime. Orthophoto 2007, "Junta de Andalucía")

- ii) To insist that the public domain area should not be considered constant over time, it can be variable, recommending the effective implementation of Article 12.6 of the Coastal Law concerning boundary review processes, in accordance with geomorphological and sediment transport processes that modifying the topographical configuration of the area. These natural processes are amplified by human activity: extraction of gravel in rivers and beaches, rivers occupancy buildings, poor cleaning riverbeds, etc..
- iii) We propose the use of the tools available today to develop a system for forecasting extreme climate forcings, its consequences, and the guidelines to follow to reduce their impact on the environment. A first step, which is now fully developed for Levante of Almería and provides the forecast of sea states in Almería. This forecast, made in operating mode, is facilitated by using WAVEWATCH III model, fed with data from NOAA.

### **3.- Recompilation and synthesis of the information**

The information compiled in this project comes mainly from public agencies: "Junta de Andalucía", "Puertos del Estado" and "Ministerio de Agricultura, Alimentación y Medio Ambiente". This information was used to propose a methodology that improves the management of the MTHPD and its calculation.

The information compiled can be summarized as:

- Bathymetry of the study zones. Bathymetry down to -150m was provided by the "Dirección General de Costas", and the rest by REDIAM ("Junta de Andalucía"). The information was gathered with the collaboration of the horizontal activity "Sistema de información del Levante de Almería" (SILA). This information is crucial to use wave propagation models.
- Location, boundaries and the quality of the water masses (REDIAM).
- Nautical charts ("Instituto Hidrográfico de la Marina").
- WANA points (years 1996-2011) and tidal gauge of Almería (2006-2011), both from "Puertos del Estado". This information was used to characterize the wave climate and estimate the wave properties at breaking and the storm surge.
- Topography of the zone through DEM of 10x10 and 5x5m resolution ("Junta de Andalucía").
- Aerial photographs from 1956, 1998, 2001, 2004, 2007, 2009 and 2010 ("Junta de Andalucía" and "Centro Nacional de Información Geográfica"). This information was used to study the evolution of the land uses.
- Data from the meteorological stations at the basins of the rivers Antas, Alías, Macenas and Almanzora ("Agencia Estatal de Meteorología").
- Data from the flow station of Cantoria (Almanzora river), 1950-2011. Provided by Red Hidrosur, "Consejería de Medio Ambiente".
- Weather maps from HIPOCAS network containing 44 years of meteorological information.
- Line of delimitation of Maritime-Terrestrial Public Domain

### **4.- Diagnosis**

After the analysis of the information described in the previous item, many inadequate processes were identified: breach of the existing legislation, occupation of Public Domain, dirty river basin areas, scarce maintenance of drainage works, lack of knowledge of key ecological processes, high erosion rates, etc. Those processes also affect other areas of Andalusia that grow through the "construction bubble" and the agriculture. The only area within the CAMP Levante de Almería area that is not affected by these processes is the Natural Park Maritime and Terrestrial Cabo de Gata Níjar.

The first Coastal Law, was named the Coastal Law of April 26, 1969, later repealed by current Coastal Law of July 28, 1988. However, in the "Report on the impact of extensive urbanization in Spain" written by the European Commission, evidenced the lack of effectiveness in the implementation of such legislation, also stresses that it is a rule that is overly complex and there is a lack of coordination between administrations must apply. Together with all this, should be noted that the old owners of the buildings located in the Public Domain are entitled

to compensation in the form of grant for a period of 30 years extendable another 30, which can be rescued by their economic value.

### **5.- Analysis of the existing problems**

During the development of this individual project different problems were identified, some of them also detected by other projects:

- Non compliance with the current legislation into force such as: extraction of gravel in beaches and rivers, occupation with unauthorized buildings in river beds and coastal areas (golf resort in Macenas Beach, El Algarrobico, etc).
- River and short streams basins are not properly cleaned and maintained.
- Consider that the MTHPD delimitation is fixed and time independent.
- Consider in a separate manner the delimitation of the Maritime Terrestrial and Hydraulic Public Domains in areas such as river mouths, estuaries, deltas, etc.
- Erosion risks in coastal areas.
- Amplification of natural phenomena by anthropogenic factors.
- Coastal areas vulnerable to maritime inundation and construction.
- The MTPD is not defined for some areas between Garrucha and Cuevas de Almanzora, which presents erosion problems.

### **6.- Results prior to the integration stage**

The post-project activities are designed to seeking sustainable solutions over time to the problems identified in the previous point. The main post-project actions are:

I. Annual maintenance of the main rivers of the study area: Alías, Antas, Almanzora and Andarax. Maintenance, control and cleaning of the river basins following environmental and efficiency criteria.

II. Facilitate the elimination of infrastructures from the MTHPD declared illegal by sentences.

III. Conclude the delimitation of the MTPD in the stretch of coast Garrucha-Cuevas de Almanzora. i) Accelerate the elaboration of a database from the occupation of the Public Domain. ii) Implement the delimitation of the MTHPD in Google Earth to facilitate the dissemination; iii) Produce the delimitation of the Hydraulic Public Domain downwards the dam of Cuevas de Almanzora.

IV. Improvement of the inter-administrative coordination of the staff which tasks includes the surveillance of Public Domain. With this aim a “coastal inspectors committee” will be formed in order to include homogeneous criteria to compliance with the current legislation into force regarding coastal management. Between the duties of this Committee could be the following: To surveillance the coastal zones with aerial and satellite images, coordination with other Agencies such as Civil Protection, field work to verify irregularities observed previously in aerial images, safeguard the compliance with the Public Domain legislation, to work on control and surveillance of water management or cultural heritage conservationV. To urge the application of the article 23.2 within the Coast Act. This article makes possible to increase to 200m the easement MTHPD protection, accordingly to the existing spatial planning into force.

VI. To increase the real time monitoring network of the rivers Antas, Alías, Almanzora y Andarax. This network will provide real time data of precipitation and river flows jointly with a prevention flooding system for the population. It is also proposed to elaborate and emergency plan with participation of the civil population and to measure with LIDAR the coast every 2 years.

VII. To insist in the using of criteria related to the dynamic and joint nature of MTPD and HPD in order to improve the delimitation processes of Public Domain in areas such as river outlets, deltas or estuaries.

VIII. Develop studies about erosion rates and loss of soils to identify and assess the main erosion processes in rivers basin, their effects on the riverbanks. This would be studied in order to develop an index of possible mitigation actions addressed to solve this processes and its consequences.

IX. To develop research projects to establish a system to forecast flooding and to establish emergency plans in the mouth of the rivers Antax, Alías, Almanzora and Adarax, accordingly to the proposed methodology in this report

X. To promote specific management projects in coastal ecosystems that promote the linking between marine and continental waters to guarantee their environmental, economic and social functions.

XI. To prioritize the elaboration of the HPD delimitation in areas under high agricultural or urbanistic pressure. Furthermore prioritize the identification of occupations.

XII. Installation of warning panels about flooding risks in urban areas with the aim of public awareness raising on the flooding risks and effects. Information about past events will be included: date of the flooding, economical effects and number of deaths. Digital media will also be potentiated: observation through internet, high resolution video cameras, access to the public information through web pages. Dissemination about the location of flooding areas and recommendations to face possible floods accordingly to the Flooding Risks Management Plans..

XIII. Maintenance of drainage infrastructures and revision of the design of those at Cuevas de Almanzora.

## **7.- Action plan for the post-project phase**

The set of proposed actions have been prioritized accordingly to the integration processes within the CAMP Project, This includes: the results of the participation workshops with the Coastal Council; the results from other individual projects and, finally, the results from the technical-administrative integration workshop to develop the Sustainable Development Reference Framework. Previously to the CAMP Project integration processes the list of proposed post-project activities was exposed to the Group of Experts of this individual project, and to those Team Leaders of other individual projects in a lot of coordination meetings and workshops, to reach consensus, modify or improve these proposals. Finally got the definitive program of actions proposed for the post-project phase:

**Action 1.1.4.3. AP SDRF. Research projects to develop a system to forecast flooding, emergency plans and to assess the erosion rates at the rivers Antas, Alías, Almanzora y Andarax.**

They take account of the results of studies being carried out at present by the “Ministerio de Agricultura, Alimentación y Medio Ambiente”, and “Junta de Andalucía” for the transposition of Directive 2007/60/EC Flood, nationally, and include hazard maps, risk maps and management plans against flooding.

Approximate timescale: Immediate.

Competent Public Administrations: “Consejería de Agricultura, Pesca y Medio Ambiente; Ministerio de Agricultura, Alimentación y Medio Ambiente.”

Public Administration responsible for coordination: “Consejería de Agricultura, Pesca y Medio Ambiente”; “Ministerio de Agricultura, Alimentación y Medio Ambiente.”

Selected indicators for the AP SDRF: Number of research projects on the development of a flood forecasting system against total investment in research projects in river water.

Strategic alliances: Research groups from the Universities.

Approximate budget: 100,000 €

**Action 1.2.1.3. AP SDRF. Develop annual plans for maintaining rivers, watercourses and drainage adopting efficiency and environmental criteria.**

Approximate timescale: Immediate and annual regularly.

Competent Public Administrations: “Consejería de Agricultura, Pesca y Medio Ambiente”; “Ministerio de Agricultura, Alimentación y Medio Ambiente.”

Public Administration responsible for coordination: “Consejería de Agricultura, Pesca y Medio Ambiente”; “Ministerio de Agricultura, Alimentación y Medio Ambiente.”

Possible indicators: number of maintenance actions / year; low maintenance Km / total Km; % of river stretches maintained with environmental criteria / total.

Selected indicator for the AP SDRF: % of river stretches maintained with environmental criteria / total.

Strategic alliances: Universities, Specialized companies.

Approximate budget: As a coordination action, it shouldn't involve extraordinary expense.

Action 2.1.3.1. AP SDRF. Make as a priority the demarcation of HPD in those areas under agricultural or urban pressure and the identification of occupations.

Approximate timescale: Immediate.

Competent Public Administrations: “Consejería de Agricultura, Pesca y Medio Ambiente.”

Public Administration responsible for coordination: “Consejería de Agricultura, Pesca y Medio Ambiente.”

Selected indicator for the AP SDRF: number of demarcations of HPD in agricultural areas with higher pressure / total number of demarcations.

Strategic alliances: Research groups from the Universities; “Ministerio de Agricultura, Alimentación y Medio Ambiente”

Approximate budget: As a coordination action, it shouldn't involve extraordinary expense.

**Action 2.1.3.2. AP SDRF. Finish the demarcation of the MTPD land stretch in Garrucha-Cuevas de Almanzora.**

Approximate timescale: Immediate.

Competent Public Administrations: "Ministerio de Agricultura, Alimentación y Medio Ambiente".

Public Administration responsible for coordination: "Ministerio de Agricultura, Alimentación y Medio Ambiente".

Selected indicator for the AP SDRF: In the coastal section of Garrucha-Cuevas de Almanzora, Km of coastline that have not yet the demarcation / total of Km in the coastal stretch.

Strategic alliances: "Consejería de Agricultura, Pesca y Medio Ambiente."

Approximate budget: As a coordination action, it shouldn't involve extraordinary expense.

**Action 2.1.3.3. AP SDRF. To urge the application of Article 23.2 of the Coastal Law that makes it possible the extension to 200 m of the easement MTHPD protection and Article 30 relating to the area of influence of 500 m for residential uses contained in the existing territorial plans. Increase the coordination and involvement of municipalities and provincial governments in carrying out this task.**

Approximate timescale: Immediate.

Competent Public Administrations: "Ministerio de Agricultura, Pesca y Medio Ambiente"; "Consejería de Agricultura, Pesca y Medio Ambiente"; Town Councils.

Public Administration responsible for coordination: "Ministerio de Agricultura, Pesca y Medio Ambiente"; "Consejería de Agricultura, Pesca y Medio Ambiente".

Selected indicator for the AP SDRF: Number of municipalities with outreach efforts the initiative A-200.

Strategic alliances: Environmental associations; Neighborhood associations; Andalusian Mediterranean Basin; Consejería de Agricultura, Pesca y Medio Ambiente, "Secretaría General de Medio Ambiente y Agua", "Junta de Andalucía".

Approximate budget: 6.000 €.

**Action 2.1.3.4. AP SDRF. Continue incorporating criteria related with the joint dynamic nature of HPD and MTPD in mouth areas rivers, estuaries, deltas, etc, to determine the process of demarcation and urban planning.**

Approximate timescale: Immediate.

Competent Public Administrations: "Ministerio de Agricultura, Alimentación y Medio Ambiente; Consejería de Agricultura, Pesca y Medio Ambiente".

Public Administration responsible for coordination: "Ministerio de Agricultura, Alimentación y Medio Ambiente"; "Consejería de Agricultura, Pesca y Medio Ambiente".

Selected indicator for the AP SDRF: Inclusion or not of these criteria to the process of demarcation. The indicator would be a one (1) if dynamic criteria are included in the definition of MHPD, and zero (0) if not included.

Strategic alliances: Universities.

Approximate budget: As coordination action, it shouldn't involve extraordinary expense.

**Action 2.1.3.5. AP SDRF. Promote the removal of buildings, structures, etc, in the MTPD and HPD declared illegal by final judicial decision and also those which are obsolete or are in disuse and lack of existing concession.**

Approximate timescale: Immediate.

Competent Public Administrations: “Consejería de Agricultura, Pesca y Medio Ambiente” in the case of HPD occupation, and “Ministerio de Agricultura, Alimentación y Medio Ambiente” or “Junta de Andalucía” in the case of MPD occupation.

Public Administration responsible for coordination: “Consejería de Agricultura, Pesca y Medio Ambiente” in the case of HPD occupation, and “Ministerio de Agricultura, Alimentación y Medio Ambiente” or “Junta de Andalucía” in the case of MPD occupation.

Selected indicator for the AP SDRF: Number of infrastructure in MHPD classified as illegal, obsolete or unused and without concession, that have been demolished, respect to the total surface disclaimed. The numerical value of the indicator is a real number greater than zero, without an upper limit. A lower value indicates less infrastructure in MHPD.

Strategic alliances: Environmental associations; Neighborhood associations.

Approximate budget: Variable.

**Action 2.2.1.2. AP SDRF. Increase knowledge on the operation of submarine canyons to determine its effects on the spread of marine forcings, as well as ecological processes that occur in them, and their effects on marine species of interest, as in the case of red shrimp in Garrucha Submarine Canyon. To include in public calls this research area.**

Approximate timescale: Short, medium and long term.

Competent Public Administrations: “Ministerio de Agricultura, Alimentación y Medio Ambiente”; “Consejería de Agricultura, Pesca y Medio Ambiente”.

Public Administration responsible for coordination: “Ministerio de Agricultura, Alimentación y Medio Ambiente”; “Consejería de Agricultura, Pesca y Medio Ambiente”.

Selected indicator for the AP SDRF: n<sup>o</sup> research studies in submarine canyons / total investment in I+D projects related with the marine environment of the Alboran Sea.

Strategic alliances: “Consejería de Agricultura, Pesca y Medio Ambiente”; Research groups from universities and other research centers; Fishermen's associations.

Approximate budget: 100.000 €.

## **8.- Economic, social and environmental feasibility of post-project actions**

Here we analyze each of the proposed actions from an economic, social and environmental perspective, and a series of proposals about sources of financing, both public and private that may be requested for each of the actions.

**Action 1.1.4.3. AP SDRF. Research projects to develop a system to forecast flooding and emergency plans, to assess the erosion rates at the rivers Antas, Alías, Almanzora y Andarax.**

This action is inside of the program to promote the I+D in the management of water resources including in public calls this research area.

The flood forecasting system would facilitate the real-time data of precipitation and stream flow, together with a warning system to the population in case of flooding. It would allow to develop a exhaustive emergency plan where even participate the civilian population, and carry out detailed studies to establish and assess the main processes of erosion riverbeds, its effects on the environment and the elaboration of a catalogue of possible measures to mitigate these

erosion processes and their consequences. From the economic point of view, the availability of a flood forecasting system would prevent future disasters of great value even anticipating situations of loss of human victims during the floods. This action provides a great social value to the overall of Almería Levante.

From the environmental point of view, to have this system would allow to protect those areas of flow predicted concentration, where special efforts would be dedicate, knowing previously which would be those areas thanks to this system.

Funding source: "Cuenca Mediterránea Andaluza"; "Consejería de Agricultura, Pesca y Medio Ambiente"; "Secretaría General de Medio Ambiente y Agua"; "Junta de Andalucía".

**Action 1.2.1.3. AP SDRF Develop annual plans for maintaining rivers, watercourses and drainage adopting efficiency and environmental criteria.**

With this action is intended to achieve two objectives on the one hand, the maintenance of the hydraulic characteristics of the channel favouring rainwater drainage for large floods, therefore increasing the security of the population, and, on the other hand, preservation of autochthonous natural areas. From the economic point of view, this action is related to the previous one (avoid economic losses due to floods, including loss of human lives), therefore the social contribution of this action is evident. As for the environmental side, is one of the basic objectives it aims to achieve this action, preserve autochthonous natural spaces.

Funding source: "Cuenca Mediterránea Andaluza"; "Consejería de Agricultura, Pesca y Medio Ambiente"; "Secretaría General de Medio Ambiente y Agua"; "Junta de Andalucía."

**Action 2.1.3.1. AP SDRF Make as a priority the demarcation of HPD in those areas under agricultural or urban pressure and the identification of occupations.**

During the meetings with our Experts Group, they have expressed their concern about the agricultural pressure which is undergoing some major rivers of the province, for example the lower course of the river Almanzora. From the economic point of view, with this action, would boost the demarcation of those areas under urban pressure, releasing those spaces for public use, which, at the same time, would serve to evacuate flood plain. From the environmental point of view is a vital step, would release the channel of those infrastructures that are in the Public Domain. The economic and environmental potential of this action is much higher than the possible social disadvantages that society can appreciate.

Funding source: "Cuenca Mediterránea Andaluza"; "Consejería de Agricultura, Pesca y Medio Ambiente"; "Secretaría General de Medio Ambiente y Agua"; "Junta de Andalucía."

**Action 2.1.3.2. AP SDRF Finish the demarcation of the MTPD land stretch in Garrucha-Cuevas de Almanzora.**

There is a social concern for the protection of the coastline and with the existing legal framework to finalize the demarcation of the MTPD in this area it is needed. From the



environmental point of view, this action would protect those areas of high ecological value as Antas and Almanzora River mouth.

Funding source; “Ministerio de Agricultura, Alimentación y Medio Ambiente”; “Gobierno de España”.

**Action 2.1.3.3. AP SDRF To urge the application of Article 23.2 of the Coastal Law that makes it possible the extension to 200 m of the easement MTPD protection and Article 30 relating to the area of influence of 500 m for residential uses contained in the existing territorial plans. Increase the coordination and involvement of municipalities and provincial governments in carrying out this task.**

It is necessary to raise awareness of the need to respect, protect and manage appropriately the MTPD spaces defined in the Coastal Law, as well as, the easement protection. One of the reached conclusions during the last IMAGINE workshop was: *“What must not happen to achieve the sustainable development: The state administration should not change the current law in the detriment of coastal shoreline protection in order to maintain and improve the coast from the economic, environmental and social point of view (GROUP C)”*. The social character of this action is reflected in the attendance at the workshops and IMAGINE attention, participation and interest shown by all participants and their concern for the protection of MTPD. From the environmental point of view, it is clear that by expanding the easement area MTPD protection would increase the respect to environmental protection.

Funding source: “Cuenca Mediterránea Andaluza”; “Consejería de Agricultura, Pesca y Medio Ambiente”; “Secretaría General de Medio Ambiente y Agua”; “Junta de Andalucía”.

**Action 2.1.3.4. AP SDRF. Continue incorporating criteria related with the joint dynamic nature of HPD and MTPD in mouth areas rivers, estuaries, deltas, etc, to determine the process of demarcation and urban planning.**

With this project has developed a unique methodology that allows obtaining the demarcation of MTHPD, jointly considering maritime and hydraulic forcings, against the unique consideration of the hydraulic forcing. This methodology, should serve as an improvement in the demarcation process which is currently done, should be applied in areas of river mouths, deltas, estuaries, etc. From the economic point of view, this does not constitute any economic investments because the tool to apply this methodology has been developed by the University of Granada for this project; however, the social contribution and especially the environmental contribution is highlighted. The flooding area would be obtained jointly for the MTPD and HPD, as it happens in nature, not like the administrative procedures that are done nowadays.

Funding source: “Ministerio de Agricultura, Alimentación y Medio Ambiente”; “Gobierno de España.”

**Action 2.1.3.5. AP SDRF. Promote the removal of buildings, structures, etc, in the MTPD and HPD declared illegal by final judicial decision and also those which are obsolete or are in disuse and lack of existing concession.**

By legal imperative, all illegal, abandoned or obsolete buildings and that not have a current concession, built on Maritime-Terrestrial or Hydraulic Public Domain, must be removed, especially those with a final judgment. Of all the actions proposed above, it is the most financial contribution, this cost may fall into administration if so decided by the court judgment, however, the financial contribution would be reversed in the form of improvement of the environment, promoting the evacuation flow and improving the natural environment of the rivers or coast. Also have repercussions in society, increasing the hydraulic and environmental character of the river, increasing water infiltration into the ground, reducing the effects of flooding and improving the quality of life of the citizens.

Funding source: "Cuenca Mediterránea Andaluza"; "Consejería de Medio Ambiente"; "Junta de Andalucía".

**Action 2.2.1.2. AP SDRF. Increase knowledge on the operation of submarine canyons to determine its effects on the spread of marine forcings, as well as ecological processes that occur in them, and their effects on marine species of interest, as in the case of red shrimp in Garrucha Submarine Canyon. To include in public calls this research area.**

Submarine canyons affect coastal dynamics such that may condition coastal management, one example is the submarine canyon off the Garrucha port. It is therefore necessary to know its effects, not only on coastal dynamics, but also on the natural environment, fish stocks and species of environmental interest, considering for it the extensive experience and knowledge of fishermen's associations. There are many scientific papers which emphasizes the environmental value of submarine canyons, and at same time, this environmental value means economic value, either as a tourist exploitation of the natural environment or as a fishing resource. Simultaneously, the economic value of this environment means social value.

Funding source: "Ministerio de Agricultura, Alimentación y Medio Ambiente"; "Gobierno de España."

## **9.- Lessons learned**

This project, takes the first step towards improved management of the Public Domain. We used a methodology that complements the weaknesses and problems identified and intend to require authorities to ensure their protection and ensure these spaces need to improve on the current criteria that define the Public Domain, according to the provisions of Article 20 on the Protocol on Integrated Coastal Zone in the Mediterranean.

On the other hand, the sensitization of all stakeholders affected and the need to consider the delimitation as a space that cannot be defined as fixed in time but must be flexible, based on the territorial and morphological transformation and the need to consider integrating of hydraulic and maritime forcings together to determining the public domain is vital for improving the management of this space that is all Spanish.



# 8

## *Conservation of cultural heritage* Final report.

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## **TABLE OF CONTENTS**

Executive summary

- 1.- Introduction
- 2.- Description of the project
- 3.- Compilation and summary of the information
- 4.- Diagnosis
- 5.- Analysis of the existing problems
- 6.- Results prior to the integration stage
- 7.- Action plan for the post-project stage
- 8.- Social, environmental and economic feasibility of post project actions
- 9.- Lessons learnt

## **INDEX OF ANNEXES**

- Annex 8.I. Integrated Inventory of the Cultural Heritage in CAMP area
- Annex 8.II. Interpretation Itinerary of the Cultural Heritage
  - Annex 8.II.a. Cultural Elements integrated into the Interpretation Itinerary on the three timescales
  - Annex 8.II.b. Restoration Cards of the Cultural Elements identified as Priorities
  - Annex 8.II.c. Technical Specifications of the Interpretation Itinerary
  - Annex 8.II.d. Maps of the Interpretation Itinerary
  - Annex 8.II.e. Learning Guide of the Itinerary: Teachers' Book
  - Annex 8.II.f. Learning Guide of the Itinerary: Student Workbook
- Annex 8.III. Report with the Results of the Citizen's Participation Processes
- Annex 8.VI. Decalogue of Good Practices for Conservation of Traditional Architecture and Landscape in "CAMP Levante de Almería" Area
- Annex 8.V. Strategy to promote Private Custody in "CAMP Levante de Almería" Area

## **ABBREVIATIONS USED**

- AP SDRF: Action Plan Sustainable Development Reference Framework
- CAMP: Coastal Area Management Programme
- ICZM: Integrated Coastal Zone Management
- ISLA: Information System of "Levante de Almería"
- RDG: Rural Development Group
- STI: Sustainable Touristic Initiatives

## Executive summary

The current document describes the work carried out over 12 months by the Team of the Individual project "Conservation of the Cultural Heritage" of the CAMP Levante de Almeria project.

Below, the general and specific objectives of the individual project are presented, as well as the final materials through which these objectives have been obtained. The methodology used to achieve the objectives shall also be detailed. It will describe all actions performed on the project, as well as those related to the institutional coordination, the social participation framework, the expert group, the systemic and prospective analysis of sustainability, and finally, the dissemination of results.

Afterwards, the problems identified with regard to the Conservation of Cultural Heritage in the project area will be exposed. These problems have been obtained from the diagnosis of the present conservation status of the Cultural Heritage. This diagnosis, describes the evolution and challenges needed to face the establishment of a conservation strategy; that has to be economically, socially and environmentally sustainable; and has to be included in the Sustainable Development Reference Framework, along with the rest of CAMP's project results.

With the information gathered from the diagnosis and the final materials, a post-project Action Plan is proposed, which aims to provide solutions to the problems detected, supplemented with a detailed financing plan and a set of indicators for monitoring and evaluating its implementation.

Finally, the report contains all the lessons learned during the project development, as well as other aspects that are needed to improve for the Conservation of Cultural Heritage.

## 1.- Introduction

The individual project "Conservation of Cultural Heritage" is part of the Project "CAMP Levante de Almeria". During its feasibility study, which included the participation of local actors, it was found that there was a rich heritage spread through the whole CAMP Area. The heritage left by the different cultures that have settled in this region along the History. Thus, we found, archaeological sites, constructions related to water use and industrial infrastructures that were abandoned after the mining boom in the past. But this entire heritage is threatened nowadays by various causes, like the urban development for tourist and residential use, or agricultural and industrial infrastructure growth. So the project pretends to respond to these problems in order to promote the conservation of the cultural landscape.

Regarding to the legal framework of this individual project, it is based in the Barcelona Convention adopted at Barcelona on 16th February 1976, and amended on June 10th 1995. Specifically, through the Seventh Protocol which implements the Protocol on Integrated Coastal Zone Management in the Mediterranean (hereinafter ICZM Protocol), which enter into force on March 23rd, 2011, becoming the only binding international instrument on ICZM. In it, the Parties consider that the coastal zones of the Mediterranean Sea are *the common natural and cultural heritage of the peoples of the Mediterranean and that they should be preserved and used judiciously for the benefit of present and future generations*. It also provides the basis to stimulate national, regional and local institutional coordination and also social participation in order to promote efficient governance of the integrated management of the Mediterranean coastal zone.

Therefore, the overall objective of the Individual project of Conservation of Cultural Heritage is based on the 13th Article of the ICZM Protocol: **Cultural Heritage**, *considering the preservation in situ of the cultural heritage of coastal zones as the first option before any intervention directed at this heritage*. This article calls for ensuring the conservation and management of cultural heritage, as well as to ensure their long-term preservation, and also guarantee that they are not subject to speculation.

As a specific objective of the project, the enhancement of Cultural Heritage is established within the CAMP Area, agreeing between the social agents the basis for their management and protection.

To achieve these objectives, this Project produces a variety of Final Materials that are listed below:

- ✓ Integrated inventory of Cultural Heritage in CAMP area.
- ✓ Interpretation itinerary of Cultural Heritage.
  - Specifications.
  - Cards of the cultural elements that can be rehabilitated.
  - Elements and cultural landscapes of the Itinerary.
- ✓ Workbook of the interpretation itinerary for the teachers and students.
- ✓ Participatory Processes Report.
- ✓ Decalogue of good practices, for the conservation and rehabilitation of traditional architecture.
- ✓ Strategy to promote Private Custody in CAMP Levante de Almeria area.

## **2.- Description of the project**

The work carried out by the team leader has followed the guidelines set by involved stakeholders. These stakeholder, have been organized as pilot bodies during the development of the CAMP.

One of these bodies is the expert group. In the CAMP Projects that have been developed along the Mediterranean, this body is integrated by a group of consultants that are specialized in different subjects, in order to achieve a multidisciplinary view of the problems and to develop proposals for the solutions.

In the “CAMP Levante de Almeria” the mentioned structure of the expert group has been changed, inviting to participate, together with the scientific sector, the public administration technicians who are involved in the management of any part of the individual projects. The purpose of this amendment is to get multidisciplinary final proposals that are acceptable by the Government, as well as to facilitate the execution of the proposals. This way, the Government itself has participated in making the proposals, and has a “feeling of property” of them. This approach pretends that the Coastal Commission can undertake the resulting proposals. This Commission is the CAMP decision-making body, and is composed by 21 Governments at the local, regional and national level, with skills in the management of the coast, and responsible of the Sustainable Development Reference Framework implementation. Another advantage of this structure of the expert group is the possibility of exchange of experiences and knowledge between scientists and managers. It is therefore interesting to have the support of the expert group to elaborate the proposals.

With this purpose, the expert group was established for this specific individual project during the formulation stage of CAMP project. Representatives of the Government at different levels form the Expert group. These representatives have competence in the Heritage, such as the Regional Ministry of Culture, local authorities, the University of Almeria or the Teacher’s Centre. Through regular meetings, the expert group, contributed to the initial design of the current individual project by defining the results to be obtained and the methodology to be followed. During the implementation phase of the project, they have been advising on the individual project, making contributions and corrections, and bringing their experience to the final results of the individual project.

Other bodies of the CAMP that have guided the work in this individual project, have been the social participation actors; such as the Coastal Council, who are social actors that work in the CAMP area; and the citizenship, who through meetings and participation workshops, have shown concerns and perceptions related to Cultural Heritage. On the other hand, there is the Coastal Forum, which is the general population, and is managed through an Internet application developed on the website of the

“CAMP Levante de Almería” [www.camplevantedealmeria.com](http://www.camplevantedealmeria.com). It has been used to provide feedback and participation in various open issues proposed by the individual project Team. Additionally, in the case of this individual project, workshops have also been held, open to the public participation, which shall be described later in this document.

Taking all the above into account, the Project's initial work was to search and collect inventories and itineraries of the Cultural Heritage existing in the “CAMP Levante de Almería” area. In order to do this, various administrations were contacted, as well as organizations and associations, with the aim of requesting the information available. All this compilation was completed with publications on websites and documents from libraries. These documents were studied, analyzed and integrated into a single inventory of Cultural Heritage. This inventory, which is one of the final materials, has been called *Integrated Inventory of Cultural Heritage in the CAMP Area*.

Once the *Integrated Inventory* was finished, a methodology was made to select the heritage properties that would be part of the final interpretation itinerary. So a *Methodology of Evaluation Criteria* was developed with the contribution of the expert group, who evaluated different aspects that should be taken into account for each of the cultural properties collected, for their integration into the Interpretive Itinerary, as e.g. representativeness or accessibility. Once this system was applied, a shortlist of 185 cultural properties was obtained. After this work and pre-selection, field trips were made, visiting each of the cultural properties, to obtain data for later geo-referencing, take pictures and analyze accessibility and suitability for their integration into the itinerary.

Citizen participation is one of the main axis of the project, so the selection of the cultural properties which would be part of the *Interpretation Itinerary* was subject to public consultation. This was made through the Coastal Forum using the project website of “CAMP Levante de Almería” as an instrument. For this, a survey was created and published in the Coastal Forum; so that interested users could vote the items that they believe that could be integrated in the *Itinerary*. Additionally, they could contribute with non-inventoried items and other relevant observations. Participation data, as well as the results are integrated into the *participation report*.

For the development of *the interpretation itinerary of the Cultural Heritage*, the first step was to propose three pre-designs of the Itinerary, which consisted on three different modalities depending on the route to follow and the type of elements in it.

Proposed itinerary models were:

*Model of Itinerary I "Thematic Itineraries"*, that would perform different independent itineraries focused on particular topics such as heritage related with water use, productive activities, industrial, religious, geo-resources and folklore.

*Model of Itinerary II, "Tree Type Itinerary"*, which would consist in a communication route between the municipalities, which would serve as the backbone of the CAMP Area, connecting major urban centres, and from them, starting alternative routes to those cultural elements of interest.

*Model of Itinerary III, "Inter-core Itinerary"*, this model of itinerary connect major urban centres of each municipality, and from them, different routes would be leaving, starting and ending in the town centre, understanding this as the cultural centre of each municipality.

These three pre-designs were discussed with the expert group, and it was concluded that the *interpretation itinerary* should be a model that should integrate aspects of the three proposals developed, being a broad itinerary.

Parallel to the implementation of the aforementioned survey, and continuing with the participative axis, three participatory workshops were organized and conducted, that took place on December 17th, 2011



in Rodalquilar, Níjar. These workshops were made for the social agents, governments and citizens interested in Cultural Heritage. The main aim was to develop a *Decalogue of Good Practices for the Conservation and Rehabilitation of Traditional Architecture* in the CAMP Area, agree the design of the *Interpretation Itinerary of Cultural Heritage*, and the identification of the *Keys to the enhancement of the Public Use and Tourism Infrastructures*. The analysis of participation and the results are listed in the *Participation Report*.

The dynamics used to elaborate the *Decalogue of Good Practices for the Conservation and Rehabilitation of Traditional Architecture* was a conference technique, in which each working group sought a solution to a specific problem, exposing it afterwards to the rest of the groups. Previously, with the help of the expert group, the definition of traditional architecture was explained, and the problems and challenges to face were highlighted.

To create the *Decalogue of Good Practices*, the Coastal Forum conducted a survey, in order to give greater participation to persons interested that were unable to attend the workshop. The results in the Forum finished the first final material of the project, the *Decalogue of Good Practices for the Conservation and Rehabilitation of Traditional Architecture in the CAMP Area*.

With the conclusions of the participation workshop on the *Interpretation Itinerary*, the final selection of cultural properties that would be part of the itinerary was closed. They were classified into three categories according to the priorities of restoration.

- Product: Cultural property suitable for public use. Tourism in the short term; it is already put into value so it can be part of the route from the beginning.
- Resource: Cultural property that requires actions in medium term to put it into value (available for visits but not adequate or enough safe).
- Good: Cultural property of great interest but not available for visits currently, which requires relevant actions to be put it into value.

Following this classification, a selection of priority elements was performed, to develop cards of restoration, enhancement and management methodology.

All this led to set the *Interpretation Itinerary of the Cultural Heritage in the CAMP area* in three temporal phases of execution. Shapefiles of the itinerary have been developed, which contain the cultural properties as well as the cultural landscapes. They are available in the Information System of "Levante de Almeria" which is in the CAMP project website. Complementing the itinerary, a *specification document* was performed, which describes different aspects of the technical characteristics of each itinerary, as well as the cultural properties that they comprise, and a *Workbook for the teacher and student* that shall support reading and knowing the elements of interest.

The participation process in this individual project included a conference, which objective was to promote private custody of cultural heritage in CAMP Levante de Almería area. So, on February 18th was held a day of exchange of experiences called: "*Private Custody Planning: an alternative for the conservation of Cultural Heritage and Landscape in Levante de Almeria*". During the conference, the theoretical basis of private custody was exposed, as well as a panel of experiences, ending with a role-play workshop. After this day, a document explaining step by step the *Keys for the Implementation of a Strategy for Cultural Heritage Private Custody in CAMP area* was produced.

### **3.- Compilation and summary of the information**

As it was mentioned in paragraph 1 of this report, during the first phase of the individual project, existing inventories and itineraries were searched and compiled, in order to create an integrated inventory of all the cultural properties. The sources were:

- Database of Heritage Property in Andalusia. Regional Ministry of Culture.
- General Catalogue of Andalusia Historical Heritage. Regional Ministry of Culture.
- Atlas of Intangible Heritage of Andalusia. Regional Ministry of Culture.
- Register of Landscapes of Cultural Interest. Regional Ministry of Culture.
- Cultural Spaces Network. Sets and cultural enclaves. Regional Ministry of Culture.
- Mining Inventory. Regional Ministry of Environment.
- Cultural Resources of the Spatial Plan of Almeria. Regional Ministry of Public Works and Housing.
- Cultural Resource of the Spatial Plan of the Agglomeration of Almeria. Regional Ministry of Public Works and Housing.
- Heritage Inventory of eight General Plans of Municipal Urban Planning
- Cattle trails and associated places. Regional Ministry of Environment.
- Public Mountains. Forest Heritage. Regional Ministry of Environment.
- Inventories of geo-resources of Andalusia. Regional Ministry of Environment.
- Routes and Itineraries of Almeria. Almeria Levante Rural Development Group (RDG).
- Heritage and Tourist Guide of Almeria. Almeria Levante RDG.
- Tourist Routes of Nijar County. Nijar City Council.
- The Wind and Water in the construction of a cultural landscape. Regional Ministry of Culture and Regional Ministry of Environment.
- The heritage of artisanal fisheries in the natural park of Cabo de Gata. Almeria Levante RDG.
- Itinerary of geo-tourism. Alhamilla Counties and Levante of Almería. Cooperation Group "Geo-diversity: sustainable rural solution."
- Network of itineraries of scenic and recreational interest. Spatial Plan of Almeria. Department of the Regional Ministry of Public Works and Housing.

For the participation workshop the "Development of the Decalogue of Good Practices for the Conservation of Traditional Architecture", a compilation of existing decalogue on this subject was made. This compilation, served to the working groups as a base to work and choose the proposals to the challenges they faced. The list of the decalogue or recommendations that were compiled and used, is:

- Good practices in the rehabilitation of folk architecture. Braiding diversity. ASAM. Bulletin n.13.
- Decalogue for the protection and promotion of architecture and landscape. The Urbanism in the Alpujarra and Sierra Nevada. Garcia de los Reyes, Associate Architects, SL, 2006.
- Principles of Sustainable Heritage Tourism. Lorton Consulting.
- Commonwealth Heritage management principles. Department of Sustainability, Environment, Water, Population and Communities. Australian Government.
- Architecture and Historical Centre. José María Gómez Aracil. Director of the Office of Rehabilitation of the Historic Centre. City of Malaga.
- Manual of Environmental Good Practices. Perera Morales, Jacqueline; Marquez Rodriguez, Dulce. Journal of Architecture and Engineering, vol. 2, n. 2, August 2008, pp. 1-24.
- Decalogue of Good Practices in Tourism Accessibility. Destinations and Cultural and Natural Resources. Ministry of Industry, Tourism and Trade, Government of Spain.
- Proposal for the Conservation of the traditional architecture of Merindades. Rural Development Association Merindades Centre, 2003.
- Decalogue IESA Cohesion Forum of Rural Territories, CSIC, 2011.

- Actions to be taken for the conservation of traditional architecture and cultural globalization. Benito Martin, Felix, 2005.
- Decalogue in defence of cultural and natural heritage. Regional Civic Engagement Encounter with Cultural and Natural Heritage, Provincial Municipality of Cusco, 2008.
- Good Practice Guide: Intervention on architecture of Sierras of Béjar and Francia (Salamanca). Braiding Public Project Diversity. Association of Mountain Agriculture from Salamanca.
- Good practice for the historic preservation of educational institutions. Carmen Guerrero Rodriguez, a high school teacher and a PhD in Educational Sciences.
- Recent changes in architecture, urbanism and landscape in the region of La Alpujarra. Espinar Luis Antonio Moreno and Jose Manuel Lopez Osorio, University of Granada.
- Traditional Mediterranean Architecture. Ecole d'Avignon, Col.legi d'Aparelladors i Arquitectes Tècnics Barcelona, École des arts et métiers traditionnels of Tétouan, 2002.

It was also collected the legislation applicable in the conservation of cultural heritage, at the national, European and international level, which could be interesting for the project, especially for the definition of concepts related to cultural landscape and cultural heritage:

- Convention for the Protection of the World Cultural and Natural Heritage. General Conference of United Nations Educational, Scientific and Cultural Organization at its 17th session, Paris from 17th October to 21st November 1972.
- Convention for the Safeguarding of Intangible Heritage. General Conference of United Nations Educational, Scientific and Cultural Organization at its 32nd session, Paris from September 29th to October 17th, 2003.
- European Landscape Convention of the Council of Europe, Florence October 20th, 2000.
- Protocol on Integrated Coastal Zone Management in the Mediterranean.
- Council Directive 92/43/EEC of 21st May 1992 on the conservation of natural habitats and of wild fauna and flora.
- Law 16/1985 of June 25th, of the Spanish Historical Heritage.
- Law 2/1989, of 18th July, approving the Inventory of Protected Natural Spaces of Andalusia and establishing additional measures for their protection.
- Law 2/1992 of June 15th, Forest of Andalusia.
- Law 1/1994, of 11th January, Spatial Planning of the Autonomous Community of Andalusia.
- Law 14/2007 of November 26th, the Historical Heritage of Andalusia.
- Law 42/2007 of December 13th, Natural Heritage and Biodiversity
- Spatial Plan of Andalusia, approved by Decree 206/2006, of 28th November
- Spatial Plan of Almeria, approved by Decree 26/2009 of 3rd February.
- Proposal of Spatial Plan of the urban agglomeration of Almeria, approved by Decree 351/2011, of 29th November.
- Decree 32/1993, of 16th March, which approves the Regulation of archaeological activities.
- Decree 19/1995 of 7th February, approving the Regulation on the Protection and Promotion of Historical Heritage of Andalusia.
- Regulation of trails, approved by Decree 155/1998, of 21st July.
- Proposal for a regional strategy on Integrated Coastal Zone Management.
- Tourism Promotion Plan of Levante of Almeria.

#### **4.- Diagnosis**

The CAMP area has a lot of cultural elements, as it has been proved through the initial inventory work. Many of these cultural assets are integrated into catalogues. There are databases that have been developed by the Governments, and information from foundations and associations whose objectives are to know and conserve the cultural heritage.

The common framework of the cultural assets that are located in the CAMP area is the result of the people's legacy on these lands. The resulting elements are characteristics of this area, such as cisterns or wells in Nijar region, or the remains of old mines for mineral extraction as those found in Sierra Almagrera. Many of these elements are not large infrastructure that can serve as a strong tourist or teaching attraction to the area, with the exception of the great defensive buildings (castles and towers) located near the waterfront. This is the reason why its maintenance and enhancement has been very limited over time.

Within the vast cultural legacy located in "Levante de Almería", there are elements that are the result of the border location of this coast. These elements have been defensive infrastructures until the seventeenth century, or defensive batteries, castles, towers, etc. Another responsible of the cultural heritage is the productive activity developed in the area. Regarding to this, industrial heritage has a great importance. It is associated to mining, furnaces, foundries, docks, mines, which are also spread between the coastal mountains and the seaside. Other reason of the configuration of the landscape has been the adaptation of the man to the arid climate. High temperatures, low rainfall and the lack of continuous watercourses through the year characterize it. So in order to survive, man had developed ingenious ways to collect and store rainwater, like cisterns or wells. They configure the cultural framework, through which the conditions of hardness for men along history are known.

Part of this heritage is threatened for various reasons, mainly related to changes in land use. This has led to the abandonment of traditional uses on behalf of new techniques and more modern technologies. It has also led to migratory movements of people to urban centres, especially in times of scarcity and economic crisis.

It was found that a large number of important cultural assets from Almería, Nijar and Carboneras, inside the Natural Park of Cabo de Gata, have been recovered and put into value as tourism and teaching resources. These are mainly related to traditional techniques of obtaining and using natural resources. In the other municipalities in the CAMP area, a low degree of recovery of cultural property is detected, with a few exceptions. On one hand, the elements that are located in urban centres, especially those who have a religious and/or defensive nature, are in good condition. On the other hand, there are assets that are very striking, and have been reused after restoration as a museums or visitor centres (Castle of las Escobetas, Terreros' Castle, Castillo of Marquis of los Velez).

The lack of institutional coordination and the low public awareness of cultural heritage distributed across the CAMP area, are other reasons of the deterioration detected in the cultural properties.

It has not been found a common story of the legacy of man over this territory, among the literature, routes, and different sources.

#### **5.- Analysis of the existing problems**

The problems identified in relation to the conservation of cultural heritage have been collected from the Expert group and citizen participation processes during the project:

1. Low degree of conservation of cultural elements that are not very striking, which are not in good condition because of the trend on the area of abandoning traditional activities.
2. Low level of public awareness about the importance of preserving the cultural heritage of the area, so that the problems of theft and other offenses against the cultural heritage are common.
3. There is a big problem in the management and rehabilitation of the cultural elements of private property.
4. There are not initiatives of private custody of the cultural heritage between the associations, authorities and owners.
5. There is a lack of law to protect cultural landscapes and intangible property.
6. There is no financial support to private owners to rehabilitate cultural property.
7. There is little infrastructure of access and cultural information of historical significance in the context of the "Levante", even being many of these items internationally recognized.
8. There is low public awareness and absence of an association network that can become a tool for the conservation of cultural heritage.
- 9.

There is a lack of institutional coordination that has resulted in a large number of cultural assets that are not duly protected and restored.

## 6.- Results prior to the integration stage

After the initial work, a series of actions resulting from the participatory processes were proposed, and they intended to solve the problems detected. These actions were selected for the Sustainable Development Reference Framework as follow:

Restoration, rehabilitation and implementation of the cultural elements identified as priorities. In order to achieve this, restoration cards were made of each of the selected items. Each card is a brief description of each cultural element, as well as the actions to be followed in conducting each restoration process.

- Restoration and enhancement as a museum of the Mill of Argamason.
- Rehabilitation of the Tower of the Alums.
- Connecting and conditioning of the greenway from Lucainena to Aguamarga pier.
- Access Improvement and enhancement of Fuente Alamo Deposit.
- Action to prevent deterioration of the buildings of the miners of The Arteal.
- Enhancement of the Complex Mine of Jaravia as an interpretation space of the underground heritage.
- Restoration of the Well and Salting Industry of Torregarcia.
- Restoration of Fernan Perez's Aqueduct.

Enhancement of the interpretation trail as a tourism product: editing the specifications and workbooks.

- Carry out advertising campaigns and spreading the itinerary to administrations, tourism enterprises and public and private organizations: The purpose of this project would be hiring an advertising and marketing company from the area for campaigning broadcast of the route and its application for Mobile, at the regional and national level, and in different media (radio, magazines, web...), in order to bring it to as many people as possible.

- Creation of software applications for mobile devices: The purpose of this project is to design and develop a mobile application of the interpretation trail for smart phones, which could be downloaded for free via the CAMP website by any user, and which could serve as a virtual guide to interpret the area's cultural heritage of CAMP area.
- Writing and editing a guide of the interpretation itinerary based on the specifications: layout, editing and printing of the guide of the interpretation itinerary with different sections of the route to make.
- Review and approval of the learning guide itinerary (Workbook) within the School Course Schedule: The workbook should be reviewed by the Teacher's Centre, the Regional Department of Education and the University of Almeria, in order to validate and incorporate it into schedules of schools.

Promote the introduction of private custody initiatives of the natural and cultural heritage.

- Promotion of Private Custody Strategy of "Levante de Almeria" to implement private custody initiatives of natural and cultural heritage in the CAMP area: This would be made through an entity whose aim would be to encourage and promote such strategies among associations, councils and owners and be part of "Red Insulas de Andalucia".
- Realisation of training courses for specialization in Private Custody Strategies: Courses that had as the first order to awareness and sensitize about the conservation of cultural heritage, and as a second order to train those parts involved in this type of strategy, such as associations, owners and technicians.

Creation and integration of infrastructure networks of tourism and public use, at Regional, National and International level, which serve as a tourist and educational attraction: The purpose of this project would be the development of a software tool to serve, first to users to know the existence of infrastructure for public use and tourism, and on the other hand, to serve to government managers for planning new actions. This tool would be a database and mapping of all existing facilities: museums, interpretation centres, exhibition halls, viewers, camping areas, information spots, trails, greenways ... Above all, it is important to identify gaps and not duplicate these facilities, creating a coherent network and sustainable infrastructure focused on tourism.

Good practices for the preservation of traditional architecture and cultural landscape.

- Incorporation to the education system and training of subjects related to traditional architecture: Documenting traditional knowledge on architecture for transmission not only orally, by including this subject in school programming and training cycles.
- Establish a prioritization system through indicators, to arrive in time to recover priority cultural properties: It would consist in creating a system of indicators that allow prioritizing which cultural elements from an inventory, are necessary to recover or restore for its maintenance.
- Develop municipal regulations to establish a system of accountability, inspections and sanctions regime of traditional architecture: Promote among relevant institutions a set of responsibilities, inspections and sanctions regime of crimes against traditional architecture, binding on the initiatives related to elements of traditional architecture.
- Workshops and promotion of traditional building techniques using local materials: Workshops for students and technicians of subjects related to construction, in order to know the type of traditional architectural techniques and traditional materials of the "Levante".

- Promote and encourage owners to occupy, use, recover and activate the traditional architectural elements, and promote business in unique buildings to stop the deterioration: Tax and/or grants for initiatives in cultural elements of traditional architecture, and whose purpose, among others, is to protect the element.

## **7.- Action plan for the post-project stage**

The following actions have been prioritized according to the integration process of the project; for instance, it has been taken into account the contribution of the participatory workshops of the Coastal Council, the results of other Individual projects and finally, the workshop of administrative and technical integration for the development of the Sustainable Development Reference Framework .

### **Action 2.1.4.1. PA SDRF: Develop an action plan to restore and rehabilitate the cultural elements identified as priorities in the CAMP results as part of the interpretation itinerary.**

- Approximate timescale: 1-8.
  - Competent Public Administrations: Regional Ministry of Agriculture, Fisheries and Environment; Regional Ministry of Culture and Sports; Regional Ministry of Tourism and Commerce; Provincial Government of Almeria; RDG Levante.
  - Public Administration responsible for coordination: RDG Levante.
  - Selected indicator for the AP SDRF: Action plan developed.
  - Strategic alliances: Various.
  -
- 1. Restoration and enhancement of the mill of Argamason as a museum.**
    - Approximate timescale: 3.
    - Competent Public Administrations: RDG Levante; Regional Ministry of Agriculture, Fisheries and Environment; Regional Ministry of Tourism and Trade; Regional Ministry of Culture and Sports.
    - Public Administration responsible for coordination: RDG Levante.
    - Selected indicator for the AP SDRF: Number of items restored for conservation/total items identified as priorities.
    - Strategic Alliances: City of Carboneras, Tourist Board, and Association of Friends of the Park.
  - 2. Restoration of the well and salting factory of Torregarcia.**
    - Approximate timescale: 1.
    - Competent Public Administrations: Regional Ministry of Agriculture, Fisheries and Environment; Regional Ministry of Tourism and Commerce; Regional Ministry of Culture.
    - Public Administration responsible for coordination: Regional Ministry of Agriculture, Fisheries and Environment.
    - Selected indicator for the AP SDRF: Number of items restored for conservation/total items identified as priorities.
    - Strategic Alliances: Irrigators Community and City of Almeria.
  - 3. Rehabilitation of Tower of Alums.**
    - Approximate timescale: 5.
    - Competent Public Administrations: RDG Levante; Regional Ministry of Agriculture, Fisheries and Environment; Regional Ministry of Tourism and Trade; Regional Ministry of Culture.
    - Public Administration responsible for coordination: RDG Levante.
    - Selected indicator for the AP SDRF: Number of items restored for preservation/total items identified as priorities.
    - Strategic Alliances: City hall of Nijar, Tourist Board and Friends of the Natural Park Association.

**4. Connecting and conditioning of the greenway from Lucainena to Aguamarga pier.**

- Approximate timescale: 3.
- Competent Public Administrations: GDR Levante; Regional Ministry of Agriculture, Fisheries and Environment; Regional Ministry of Tourism and Trade; Regional Ministry of Culture; Provincial Government of Almería.
- Public Administration responsible for coordination: GDR Levante.
- Selected indicator for the AP SDRF: Number of items restored for conservation/total items identified as priorities.
- Strategic Alliances: City hall of Níjar; Tourist Board; Friends of the Railroad Association; Association of Friends of the Natural Park.

**5. Access Improvement and enhancement of Fuente Alamo Deposit.**

- Approximate timescale: 2.
- Competent Public Administrations: RDG Levante; Regional Ministry of Tourism and Commerce; Regional Ministry of Culture and Sports; Provincial Government of Almería.
- Public Administration responsible for coordination: RDG Levante.
- Selected indicator for the AP SDRF: Number of items restored for conservation/total items identified as priorities.
- Strategic Alliances: City hall of Cuevas de Almanzora and Tourist Board.

**6. Enhancement of the Mine Complex of Jaravia as the interpretation space of the underground heritage.**

- Approximate timescale: 8.
- Competent Public Administrations: RDG Levante; Regional Ministry of Agriculture, Fisheries and Environment; Regional Ministry of Tourism and Trade; Regional Ministry of Culture and Sports.
- Public Administration responsible for coordination: RDG Levante.
- Selected indicator for the AP SDRF: Number of items restored for preservation/total items identified as priorities.
- Strategic Alliances: City hall of Pulpi; Tourist Board.

**7. Restoration of Fernan Perez's Aqueduct.**

- Approximate timescale: 8.
- Competent Public Administrations: RDG Levante; Regional Ministry of Agriculture, Fisheries and Environment; Regional Ministry of Tourism and Trade; Regional Ministry of Culture and Sports.
- Public Administration responsible for coordination: GDR Levante.
- Selected indicator for the AP SDRF: Number of items restored for conservation/total items identified as priorities.
- Strategic Alliances: City hall of Níjar; Tourist Board; Association of Friends of the Natural Park.

**8. Action to prevent deterioration of the buildings of the miners The Arteal.**

- Approximate timescale: 5.
- Competent Public Administrations: RDG Levante; Regional Ministry of Tourism and Commerce; Regional Ministry of Culture.
- Public Administration responsible for coordination: RDG Levante.
- Selected indicator for the AP SDRF: Number of items restored for conservation/total items identified as priorities.
- Strategic Alliances: City hall of Cuevas de Almanzora; Tourist Board.



### **9. Rehabilitation and conditioning of the Tower of San Miguel for the School of Traditional Fishing Cabo de Gata.**

This action has been proposed from the Individual project Good Practice in Fisheries Production Activities.

- Approximate timescale: 1.
- Competent Public Administrations: Regional Ministry of Agriculture, Fisheries and Environment; Regional Ministry of Tourism and Commerce; Regional Ministry of Culture.
- Public Administration responsible for coordination: Regional Ministry of Agriculture, Fisheries and Environment.
- Selected indicator for the AP SDRF: Number of items restored for conservation/total items identified as priorities.
- Strategic Alliances: Association of Fishermen of Cabo de Gata, Almería City Council.

### **10. Restoration and enhancement of the Hydraulic Complex of Reservoir Isabel II.**

The Expert group of this Individual project proposed this action. Currently, the project of restoration and enhancement of the entire Hydraulic Complex has been drafted and budgeted for an amount of 3,000,000 € from the Infrastructure Service of the Delegation in Almeria of the Regional Ministry of Agriculture, Fisheries and Environment.

- Approximate timescale: 3.
- Competent Public Administrations: RDG Levante; Regional Ministry of Agriculture, Fisheries and Environment; Regional Ministry of Tourism, Trade and Regional Ministry of Culture.
- Public Administration responsible for coordination: Regional Ministry of Agriculture, Fisheries and Environment.
- Selected indicator for the AP SDRF: Number of items restored for conservation/total items identified as priorities.
- Strategic Alliances: City hall of Nijar; Tourist Board; Association of Friends of the Natural Park.

#### **Action 2.1.4.2. AP SDRF: Promote the development of municipal laws that are respectful with the local architectural style.**

- Approximate timescale: 1.
- Competent Public Administrations: Councils; Regional Ministry of Culture and Sports.
- Public Administration responsible for coordination: Councils.
- Selected indicator for the AP SDRF: Number of approved laws compared to the possible total (8).
- Strategic Alliances: Provincial Government of Almeria, Almeria Architects Association.

#### **Action 3.1.2.1.1 AP SDRF: Perform advertising campaigns and dissemination of the Itinerary (government, companies and public and private agencies).**

- Approximate timescale: 1.
- Competent Public Administrations: RDG Levante; Regional Ministry of Agriculture, Fisheries and Environment; Regional Ministry of Tourism and Trade; Regional Ministry of Culture and Sports; Regional Ministry of Education.
- Public Administration responsible for coordination: Regional Ministry of Tourism and Trade; Regional Ministry of Culture and Sports.
- Indicator/s possible: Number of entities comprising the itinerary within their tourism planning, environmental and/or cultural number of advertising campaigns and popularization efforts.

- Selected indicator for the AP SDRF: Number and broadcast advertising campaigns undertaken.
- Strategic Alliances: Business tourism in the region.

**Action 3.1.2.1.2 AP SDRF: Creation of mobile applications with the Interpretive Itinerary.**

- Approximate timescale: 1.
- Competent Public Administrations: RDG Levante; Regional Ministry of Agriculture, Fisheries and Environment; Regional Ministry of Tourism and Trade; Regional Ministry of Culture and Sports; Regional Ministry of Education.
- Public Administration responsible for coordination: Regional Ministry of Tourism and Trade; Regional Ministry of Culture and Sports.
- Indicator/s possible: Accomplished/Not accomplished and then, number of application downloads; Creating computer application.
- Selected indicator for the AP SDRF: Creating computer application.
- Strategic Alliances: Business in the area.

**Action 3.1.2.1.3 AP SDRF: Editing and printing of the Interpretation Itinerary Guide.**

- Approximate timescale: 1.
- Competent Public Administrations: GDR Levante; Regional Ministry of Agriculture, Fisheries and Environment; Regional Ministry of Tourism and Trade; Regional Ministry of Culture and Sports; Regional Ministry of Education.
- Public Administration responsible for coordination: Regional Ministry of Tourism and Trade; Regional Ministry of Culture and Sports.
- Indicator/s possible: Number of printed guides in a year; Number of guides distributed annually.
- Selected indicator for the AP SDRF: Number of guides distributed annually.
- Strategic Alliances: Business in the area.

**Action 3.1.2.1.4 AP SDRF: Review and approval of the Learning Guide of the Itinerary within the Programming of the School Year.**

- Approximate timescale: 2.
- Competent Public Administrations: Regional Ministry of Culture and Sports; Regional Ministry of Education.
- Public Administration responsible for coordination: Regional Ministry of Education. University of Almeria.
- Selected indicator for the AP SDRF: Number of centres using the guide/total number of centres in the province of Almeria.
- Strategic Alliances: Teacher's Centre of Almeria.

**Action 3.1.3.3. AP SDRF: Support the protection of traditional fishing in the coast of Almeria under the frame of "Ethnological Interest Activity" according to Law 14/2007.**

This action has been proposed from the Individual project of Good Practices in Fishing Productive Activities.

- Approximate timescale: 1

- Competent Public Administrations: RDG Levante; Regional Ministry of Agriculture, Fisheries and Environment; Regional Ministry of Tourism and Trade; Regional Ministry of Culture and Sports.
- Public Administration responsible for coordination: Regional Ministry of Culture and Sports.
- Selected indicator for the AP SDRF: to make a Statement of Ethnological Interest.
- Strategic Alliances: Fishermen Associations.

**Action 4.1.1.3. AP SDRF: Include among the functions of the Technical Secretariat the promotion of a Private Custody Strategy in “Levante de Almeria” to promote the implementation of private custody initiatives for the natural and cultural heritage in the CAMP Area.**

- Approximate timescale: 1
- Competent Public Administrations: Regional Ministry of Agriculture, Fisheries and Environment; Regional Ministry of Culture and Sports.
- Public Administration responsible for coordination: Regional Ministry of Agriculture, Fisheries and Environment.
- Selected indicator for the AP SDRF: Number of private custody initiatives implemented.
- Strategic Alliances: Associations of “Levante de Almeria”; Red islands; Biodiversity Foundation.

**Action 4.2.3.4. AP SDRF: Training course related to "Specialization on Initiatives in Private Custody Strategy".**

- Approximate timescale: 1
- Competent Public Administrations: Regional Ministry of Agriculture, Fisheries and Environment; Regional Ministry of Culture and Sports.
- Public Administration responsible for coordination: Regional Ministry of Agriculture, Fisheries and Environment.
- Possible indicators: Number of course participants, number of training activities on this subject.
- Selected indicator for the AP SDRF: Number of training activities on this subject.
- Strategic Alliances: Associations of Almeria; Red islands and Biodiversity Foundation.

**Action 4.2.4.2. AP SDRF: Provide a training course to the teachers on the Cultural Heritage Itinerary in CAMP Area, through the Teacher Centres, tourism stakeholders and upper schools of tourism.**

- Approximate timescale: 1
- Competent Public Administrations: Regional Ministry of Agriculture, Fisheries and Environment; Regional Ministry of Tourism and Commerce; Regional Ministry of Culture and Sports; Regional Ministry of Education.
- Responsible for coordinating the action: Regional Ministry of Education.
- Selected indicator for the AP SDRF: Number of trainees.
- Strategic Alliances: Associations and Companies of “Levante de Almeria”.

## **8.- Social, environmental and economic feasibility of post project actions**

Next, each of the proposed actions is analyzed from an economic, social and environmental perspective, as well as a series of proposals on funding sources, both public and private, that can be requested for each of the actions.

**Action 2.1.4.1. AP SDRF: Develop an action plan to restore and rehabilitate the cultural elements identified as priorities in the results of the CAMP project (cultural itinerary):**

1. Restoration and enhancement of the Mill of Argamason as a museum.
2. Restoration of the Well and Salting Industry of Torregarcia.
3. Rehabilitation of the Tower of the Alums.
4. Connecting and conditioning of the greenway from Lucainena to Aguamarga pier.
5. Access Improvement and enhancement of Fuente Alamo Deposit.
6. Enhancement of the Complex Mine of Jaravia as the interpretive space of the underground heritage.
7. Restoration of Fernan Perez's Aqueduct.
8. Action to prevent deterioration of the buildings miners of The Ardeal.
9. Rehabilitation and conditioning of the Tower of San Miguel for the School of Traditional Fishing in Cabo de Gata.
10. Restoration and enhancement of Hydraulic Complex of Reservoir Isabel II.

The restoration and rehabilitation of the cultural elements that have been identified as priorities, will mean on the one hand, that each of the elements which are subject of intervention, have assigned an economic batch, which will directly affect the local economy. On the other hand, the restoration and rehabilitation of the elements must be accompanied by a plan of use and management that is intended to give economic profits in the short and in the long term.

From a social perspective, the restoration of a cultural element will bring in the short-term: employment growth of specific professionals who are needed to perform each specific action. In a longer term, the enhancement of the element should serve as an incentive to increase the number of visitors that can reach the site, and therefore serve as a new local economic engine that allows a new activity centred within the CAMP priority sectors such as the tourism, and cultural tourism specifically, tourist-educational, catering trade and hotel management and/or museum.

From a strictly environmental perspective, the most influential aspect is related to the visual impact, because the restoration of the elements will improve the perception of the landscape in a positive way by removing those elements perceptually ruinous. The restoration actions of certain cultural elements such as mining complexes or reservoir Isabel II, must be accompanied by an environmental improvement project to prevent environmental degradation and make the place attractive to visitors.

Funding Source: Funding FEADER, 1% of the Cultural Heritage Law 1985 (which establishes that the 1% of the investment in public works should go to the recovery and enhancement of cultural heritage), ITS Levante Almería of the Regional Department of Tourism and Commerce, Regional Ministry of Agriculture, Fisheries and Environment, Almería Provincial Council and Regional Ministry of Culture and Sports.

**Action 2.1.4.2. AP SDRF: Promote the development of municipal laws respectful with the local architectural style.**

The development of this kind of laws implies that a particular type of architecture should be protected, associated to the location, and therefore with characteristics, technical and very specific building materials, which can lead to specialization within the field of professionals, dedicated to this type building. And on the other hand, the preservation of traditional architecture can be the purpose of incentives and assistance from the public and private sector for preparation and conservation, which would be a form of financing for individuals and the authorities responsible for such management.

This type of ordinance is a commitment to constructive conservation techniques in new construction, as well as in the conservation of old infrastructure, which lead to maintain the identity of the urban landscape and place. All this implies that the place is more attractive for tourists, and that there is more impact on the city's economy through new services such as tourism, education and training. The conservation of a particular type of construction can be demanded by individuals and therefore exported, representing an economic incentive and social recognition.

The conservation of traditional urban physiography is encouraged, being the main result of the traditional landscape maintenance, taking into account those actions that could involve visual impact. On the other hand, maintaining infrastructures that prevent land degradation is also encouraged, such as maintaining terraces systems in new areas of agricultural and urban expansion.

Funding Source: Coordination action specific to each municipality that does not carry over to the resource expenditure of each municipality.

**Action 3.1.2.1.1 AP SDRF: Perform advertising campaigns and dissemination of the Itinerary (governments, companies and public and private agencies).**

The hiring of advertising campaigns and dissemination of the Itinerary must have as its primary goal the increasing of the potential users of it; which means a higher number of tourists and visitors demanding and consuming services in the region; and which would bring direct economic benefit on those private and public sectors that offer certain services to such visitor.

The broadcast advertising will assume the arrival of more visitors, so local businesses and individuals can create or improve new ways of work related to this; for example guides-interpreters who can offer specialized itineraries so that they can be hired, and potential users could require it.

From a purely environmental perspective, advertising campaigns will have a low impact, but can take advantage of advertising and outreach campaigns to introduce environmental education messages in the context of "Levante de Almeria" (water saving, recycling, etc.).

Funding Source: STI Levante Almeriense of the Regional Ministry of Trade and Tourism and Regional Ministry of Culture and Sports.

**Action 3.1.2.1.2 AP SDRF: Creation of interpretation trail applications for mobile devices.**

Creating such applications would involve a new visitor model, for which autonomy and independence when making a visit to the Itinerary would be an objective. Moreover, these applications allow multiple economic possibilities, as the creation of a website where you can download the application and also provide a platform on which conduct regular updates. On the other hand, it should serve as an advertising platform on which companies can offer products and services directly from the users of the application.

The development of this type of application would lead to a better understanding of the place and also to an improvement of the accessibility. All this, plus advertising efficiency, would lead to an increase in visitors and therefore, to an increase in the demand for the services offered from all economic sectors, and thus, better employment.

The environmental impact in creating such applications will have a reduced use of paper compared to making printed guides or maps. That would result in a savings of this resource.

Funding Source: STI Levante Almeriense of the Department of Tourism and Commerce of the Government of Andalusia.

#### **Action 3.1.2.1.3. AP SDRF: Editing and printing of the Interpretive Itinerary Guide.**

This guide contains all the information concerning the Itinerary, both the logistics and information to move through it, as everything about the history, uses and value of the Cultural Heritage.

The Interpretation Guide of the Itinerary in print, is the essential complement to the launch of the route, being a support for those interested in the route independently, and for companies or organizations that use the route for their work.

It will therefore be a tool to complement the objective of preserving Cultural Heritage, because it contains aspects regarding awareness and information. It is one of the axes of the guide, the enhancement of the natural environment, to understand and value the Cultural Heritage.

Funding sources: Funding FEADER, STI Levante Almeriense, Regional Ministry of Tourism and Commerce, Regional Ministry of Culture and Sport and Tourism Council of Almeria.

#### **Action 3.1.2.1.4 AP SDRF: Review and approval of the Workbook of the Interpretation Itinerary within the Programming of the School.**

It would be necessary to review the workbook by agencies such as the Teacher's Centre, the Department of Education, and the University of Almeria, in order to validate it and incorporate it into the schedules of schools.

The aim of the guide is the acquisition, by the students, of knowledge about the Cultural Heritage in the eight municipalities of the "Levante of Almeria", as well as educational values and habits that help the enhancement of that heritage. With this purpose, we propose a series of activities, supplementary teaching resources and assessments, adaptive depending on the planning of the person who guides.

The focus of the guide is transverse, not thus ascribing to one area of knowledge, but by integrating several of them, acquiring an interdisciplinary nature. Although the nature of the proposed topic is socio-cultural, can address other competencies related to knowledge of the natural environment, geography, linguistic communication, arts education, etc. Being the material also adaptable to different educational levels.

Funding Source: Own resources of the Regional Ministry of Education of the Government of Andalusia.

**Action 3.1.3.3. AP SDRF: Support the protection of the traditional fishing in the coast of Almeria under the frame of "Ethnological Interest Activity" according to Law 14/2007.**

The objective of cataloguing the traditional fishing in the coast of Almeria under this figure is to give it recognition as place, construction or installation linked to ways of life, culture, and ways of production activities within the community of Andalusia.

Any brand, distinction or cataloguing of the item in question provides added value. In this case the added value lies in becoming a heritage in itself, capable of generating an associated tourism industry, such as guided tours, accommodation, restaurants, events, etc. In addition to this cataloguing, it would be an association with the obligation to protect and conserve the landscape features, natural and architectural characteristic of artisanal fisheries.

Funding Source: Capital of the Regional Ministry of Culture and Sport.

**Action 4.1.1.3. AP SDRF: Include among the functions of the Technical Secretariat that would coordinate the post-project phase, the promotion of a Private Custody Strategy of "Levante de Almeria" to promote the implementation of private custody initiatives of natural and cultural heritage in the area CAMP.**

The objective of Private Custody Initiatives is the conservation of nature, cultural heritage and landscape of the eastern coast of Almeria, for it, is essential to have an entity that promotes, encourages, and supports individuals, owners and associations to implement this type of strategies.

These initiatives would get, by consensus, the creation of an association network, powerful enough to be one of the main actors in the conservation, demand for the specialty in private custody, protect the cultural and natural heritage, as well as the ability to generate employment and promote tourism in relation to the assets of the "Levante".

Funding Source: Regional Ministry of Agriculture, Fisheries and Environment and Regional Ministry of Culture and Sports.

**Action 4.2.3.4. AP SDRF: Training course related to "Specialization in Initiatives in Private Custody Strategy"**

Due to the large amount of natural and cultural heritage in the "Levante de Almeria" that are private properties, and being identified the need of conservation and difficulties in this, private custody strategies may be the ideal tools to diversify the management model.

It is important for the implementation of these initiatives, that the actors involved in them, have received training in this area, to know what it is, how it works, who is involved and the keys to his success.

Funding Source: Regional Ministry of Agriculture, Fisheries and Environment.

**Action 4.2.4.2. AP SDRF: Provide a training course on the Cultural Heritage Itinerary in the CAMP Area, to teachers through the Teachers Centre, tourism stakeholders and high schools of tourism.**

The launch of the itinerary must involve a process of information and training for professionals who would perform activities on this like teachers, tour operators, tour guides, or in general, agents who add value to that route. These professionals can be offered from different economic sectors within the CAMP Area, so it would create a new professional specialization in the field and thereby benefit positively on employment. This initiative must contain some items that are dedicated to environmental education, to raise awareness and educate potential users of the route on issues related to the environment.

Funding Source: Regional Ministry of Education and Ministry of Culture and Sports.

## **9.- Lessons learnt**

To encourage the protection of Cultural Heritage in the CAMP area is essential that there is coordination in order to implement projects of cultural heritage.

On the other hand, strengthening awareness campaigns to society about the importance of keeping in good condition the heritage, and requiring the authorities responsible for their protection, must be another objective that should be marked towards the recovery of the heritage that is held.

Create conservation initiatives, enhancement, and diffusion of the Interpretation Itinerary looking for a common story with a specific character and attraction to this area. That can be a first step towards the revival of cultural property and the creation of new economic niches.

It is also important to know the ownership of certain cultural properties to address management projects like Private Strategies, as well as access to public and private incentives.





# 9

## *Marine environment sustainable use* Final report.

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## TABLE OF CONTENTS

Executive summary

- 1.- Introduction
- 2.- Description of the project
- 3.- Compilation and summary of the information
- 4.- Diagnosis
- 5.- Analysis of the existing problems
- 6.- Results prior to the integration stage
- 7.- Action plan for the post-project stage
- 8.- Social, environmental and economic feasibility of post project actions
- 9.- Lessons learnt

## INDEX OF ANNEXES

Annex 9.I. Maps

- Annex 9.I.a. Map of the study area
- Annex 9.I.b. Map of coastal biodiversity
- Annex 9.I.c. Map of marine biodiversity
- Annex 9.I.d. Maps of habitat quality
- Annex 9.I.e. Maps of sensitivity
- Annex 9.I. f. Maps of vulnerability
- Annex 9.I.g. Maps of uses

Annex 9.II. Problems of the traditional fisheries sector

## LIST OF MAPS

*Map 1. CAMP Marine Area.*

*Map 2. Species in the CAMP Marine Area.*

*Map 3. Areas of interest for fishing.*

## LIST OF TABLES

*Table 1. Species used to estimate biodiversity.*

*Table 2. Categories of the Shannon-Wiener Index assigned to each cell in the coastal and marine biodiversity map.*

*Table 3. Values assigned to the species and type of seabed to calculate the presence of habitats.*

*Table 4. List of uses and competent authorities.*

## ABBREVIATIONS USED

AEZ: Aggregate Extraction Zone.

AGAPA: Andalusian Agricultural and Fisheries Management Agency

AP SDRF: Action plan Sustainable Development Reference Framework

CAMP: Coastal Areas Management Programme.

CAPMA: Regional Ministry of Agriculture, Fisheries and the Environment of the Andalusian Regional

FAO: United Nations Food and Agriculture Organisation.

GES: Good Environmental Status Government.

GIS: Geographical Information System.

ICZM: Integrated Coastal Zone Management.

IEO: Spanish Institute of Oceanography.

IUCN: International Union for the Conservation of Nature.

MGET: Marine Geospatial Ecology Tools.

nm: Nautical miles.

REDIAM: Andalusian Environmental Information Network.

RENPA: Network of Protected Natural Spaces in Andalusia.

SCI: Site of Community Interest.

SILA: Levante de Almeria Information System.

SPA: Special Protection Area for Birds.

SPAMI: Specially Protected Area of Mediterranean Importance.

WWPS: Wastewater Pumping Station.

WWTP: Wastewater Treatment Plant.

## Executive summary

This document describes the work done on the Individual Project for the Marine Environment Sustainable Use as part of the CAMP Levante de Almeria project.

The general and specific objectives of the Individual Project are explained below, together with the final products generated in order to achieve them. The methodology used will be detailed, describing all of the actions taken in the project, as well as the actions related to institutional coordination and the public participation framework, Expert Teams, systemic and prospective analysis of sustainability (*Imagine*) and the dissemination of results.

The problems identified in the diagnosis during the performance of this Individual Project will then be listed. This diagnosis describes the evolution and the challenges that must be addressed in order to establish a strategy for sustainable economic, social and environmental conservation which is to be included in the Sustainable Development Reference Framework, together with the rest of the results of the CAMP project.

With the information gathered in the diagnosis and with the final products, a programme of post-project actions is proposed in order to find solutions to the problems detected, complemented by a detailed funding plan and a proposal for monitoring and evaluation indicators in its implementation.

Finally, the report includes the lessons learned during the project as well as other aspects which should be highlighted in order to make the use of the marine environment more sustainable.

## 1.- Introduction

The Individual Project for the Marine Environment Sustainable Use is part of the CAMP Levante de Almeria Project whose legal framework is based on the Barcelona Convention adopted in Barcelona on 16 February 1976 and amended on 10 June 1995. The Convention is implemented through different Protocols, among them the Protocol on Integrated Coastal Zone Management in the Mediterranean (hereinafter, ICZM Protocol), which came into force on 23 March 2011 and which makes the Convention the only internationally binding instruments in the field of ICZM.

Article 10 of the Protocol on Integrated Coastal Zone Management in the Mediterranean, with respect to SPECIFIC COASTAL ECOSYSTEMS, establishes that:

*The Parties shall take measures to protect the characteristics of certain specific coastal ecosystems, as follows:*

*[...]*

### *2. Marine Habitats*

*The Parties, recognising the need to protect marine areas hosting habitats and species of high conservation value, irrespective of their classification as protected areas, shall:*

- 1) Adopt measures to ensure the protection and conservation, through legislation, planning and management of marine and coastal areas, in particular of those hosting habitats and species of high conservation value;*
- 2) Undertake to promote regional and international cooperation for the implementation of common programmes on the protection of marine habitats.*

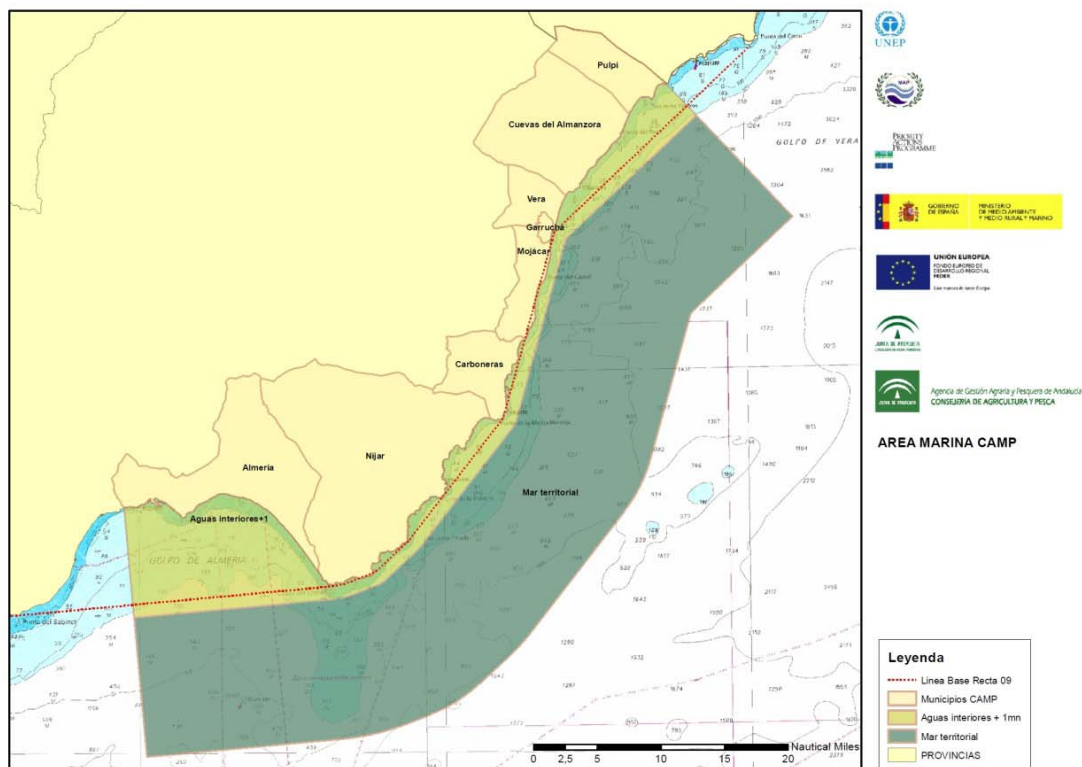
The general objective, then, of this individual project is to facilitate the application of Article 10.2 of the Protocol on Integrated Coastal Zone Management in the Mediterranean in the CAMP Levante de Almeria area through planning proposals for coastal management that will allow its sustainable use and

the conservation of natural resources. This will require the safeguarding of the *representative types of coastal and marine ecosystems of adequate size to ensure their long-term feasibility and to maintain their biological diversity*, in accordance with Article 4.a of the OBJECTIVES of the SPAMI Protocol (Specially Protected Areas of Mediterranean Importance).

The specific objectives of the project were, firstly, to promote the planning of coastal management in the CAMP area with an ecosystemic management focus on the human activities undertaken there and, secondly, to implement the Action Plans of the SPAMI Protocol in the CAMP area.

In order to achieve these objectives, a number of final products were elaborated in the project. These were:

- Integrated cartography.
- Sensitivity maps (diagnosis of compatibility).
- Recommendations for the planning of coastal management in the CAMP area.
- Report on the workshops held between experts and local stakeholders.
- Proposal for the control and monitoring of bio-indicators in the marine environment of the CAMP Levante de Almería area.



Map 1. Marine area of the CAMP Project. For further details, see Annex 9.I.a.

## 2.- Description of the project

The work done by the individual project team followed the recommendations and opinions given by the different agents involved, which were organised in different pilot bodies during the development of the CAMP project.

These bodies included the Expert Teams. These teams, which took part in the CAMP projects that have been run throughout the Mediterranean, comprise a group of consultants specialised in different areas who bring a multisectoral view of the problems in order to propose solutions.

In CAMP Levante de Almeria, the composition of this structure was modified and, as well as the scientific sector, an invitation was also made to the technical experts of the public administrations responsible for the management of the objects of study in the individual projects. The purpose of this modification was to obtain multisectoral final proposals that the administrations involved could take on board, and to facilitate their subsequent implementation, since the administrations had participated in their elaboration, generating a feeling of “ownership” of the proposals. In this way, it is intended to facilitate acceptance of the resulting proposals by the Coastal Commission, the decision-making body of the CAMP project, made up of local, regional and national administrations with competence for coastal management and responsibility for adopting the Sustainable Development Reference Framework. Another advantage of this composition is that it facilitates the exchange of experiences and knowledge between managers and scientists, whose rigour and support strengthen the proposals made.

With this objective in mind, the Expert Team of this particular individual project was set up during the project formulation stage, and it was made up of representatives of the different institutions undertaking activities related to the marine environment, such as the Regional Ministry of Agriculture, Fisheries and the Environment of the Andalusian Regional Government, the IEO and local organisations, among others, such as the universities. Through regular meetings, they contributed to the initial design of this individual project, defining the results to be obtained and the methodology to apply and, during the implementation stage, they have advised the project and made the opportune contributions and corrections, thereby inputting their experience into the final results of the individual project.

Other bodies of the CAMP project which have directed the work under this individual project work have been, firstly, the public participation mechanism, the Coastal Council, which is made up of social stakeholders with activities in the CAMP area and the general public. Through meetings and participation workshops, they have expressed their concerns and perceptions regarding the marine environment. Secondly, the Coastal Forum and society in general, managed through a telematic application developed for the CAMP Levante de Almeria website ([www.camplevantedealmeria.com](http://www.camplevantedealmeria.com)) and which has been used to express opinions and participate in the different questions addressed by the project team.

Taking all of the above into account, the criteria for the analysis defined by the Expert Team were:

- The scope of study;
- The definition of the uses and activities which influence the sustainability of the resources;
- The definition of the environmental aspects and resources to be protected.

#### A) Definition of the scope of the study

In accordance with the Inception Report and the prior Feasibility Study, the marine sector of the CAMP area was delimited as specified by the Water Framework Directive, one nautical mile (nm) out to sea from the straight baseline, although, in order not to lose the ecosystemic perspective, the Expert Team proposed analysing the information as far as the limit of the territorial waters (12 nm). To this end, an analysis was proposed on two different scales:

- An analysis in detail of the coastal strip, up to a depth of 50 metres, where most of the information available about invertebrates, coral and marine phanerogams is concentrated.
- Another more generic analysis in the marine zone, including information available up to the limit of territorial waters.

For the first, a 0.5 nm grid was used, a very common measurement in nautical and professional marine activities. In the second case, and given the low density of existing data, a grid of 2 nm was chosen. In both cases, the recommendations and indicators proposed as a result of the individual project are to be limited to the CAMP area.

#### B) Definition of uses and activities which influence the sustainability of resources

The uses and activities considered in the analysis and selected with the collaboration of the Expert Team were:

##### Coastal infrastructure

This includes port infrastructure, dykes and all types of construction and activity which involve the elimination of habitats.

##### Aquaculture

This activity includes mussel long-lines and rafts, as well as breeding pens. In the evaluation of its impact, strict compliance with environmental regulations is supposed.

##### Underwater conduits

During their installation, underwater conduits cause significant alteration and, to a lesser extent, the elimination of the habitat, but although there is an associated risk of accidents, their area of influence does not extend to other activities, offering subsequent protection with a positive effect.

##### Sea traffic

The impact caused by sea traffic, in ferries (transport of persons) or in merchant shipping in the zone.

##### Industrial fishing

Mainly bottom trawling. This activity is prohibited in the coastal area, and so only the marine part is analysed.

##### Traditional fishing

Trammel, long-lines and towed dredges. This activity is concentrated in the coastal zone, but also in the marine zone on banks or "secos de pesca".

##### Recreational activity

Diving, nautical activities, etc.

##### Discharges

The discharges which are authorised and included in an official register. They may be urban, industrial or agricultural.

##### Location of structures in the high sea

Offshore breeding pens, wind energy facilities, etc.

#### C) Definition of environmental aspects and resources to be protected

The definition of the environmental aspects and the objectives of protection to be used in the analysis were selected with the Expert Team depending on the possible effects which they suffer in the area of interest. They correspond to the qualitative descriptors used to determine the Good Environmental Status (GES) defined in the Marine Strategy Framework Directive and contained in Annex II of Law 41/2010, on the Protection of the Marine Environment, which are:



Descriptor: Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions.

Evaluation: For this descriptor, the presence and proximity of catalogued species and habitats of interest will be valued.

To evaluate this indicator, there will be information about the species which are being monitored for inclusion in a red list of threatened species or their declaration as vulnerable or endangered, according to IUCN criteria.

Descriptor: Exotic species introduced by human activity are present at levels which do not adversely affect the ecosystems.

Descriptor: The populations of all the commercially exploited fish and molluscs are within biologically safe limits, with a population distribution by age and size which shows the good health of the reserves.

Descriptor: All of the elements of the marine food chains, as far as they are known, are present in normal abundance and diversity and at levels which can guarantee the abundance of the species in the long-term and the maintenance of their full reproductive capacity.

Descriptor: The eutrophication caused by human activity is minimised, especially the adverse effects such as the loss of biodiversity, the degradation of ecosystems, harmful algal efflorescence and oxygen deficit in deep waters.

Descriptor: The integrity of the seabed is at a level which guarantees that the structure and functions of the ecosystems are safeguarded and that benthic ecosystems, in particular, do not suffer adverse effects.

Descriptor: The permanent alteration of hydrographic conditions does not adversely affect marine ecosystems.

Descriptor: Concentrations of contaminants are at levels which do not give rise to contamination effects.

Descriptor: The contaminants present in fish and other fisheries products destined for human consumption do not exceed the levels established under community law or other relevant regulations.

Evaluation: Health controls on extractive fishing and aquaculture exist but they are performed independently. Production zones are subject to health controls performed in situ by the Regional Ministry of Agriculture and Fisheries, with sufficient accuracy to be able to identify the origin of the sample which, therefore, allows a spatial analysis of the data, if available. There are health controls which are performed on the quayside for extractive fishing, with the controls identified and localised by FAO area, meeting the regulations on traceability but not allowing the evaluation of this information for the CAMP zone.

Descriptor: The properties and amounts of marine waste are not harmful to the coastal or marine environment.

Evaluation: There are no maps of waste in the marine environment or anything similar which would allow this indicator to be evaluated.

Descriptor: The introduction of energy, including underwater noise, is at levels which do not adversely affect the marine environment.

During the project, the problems of fishing in the fishing towns of the Cabo de Gata Natural Park were analysed and a situation report and proposals for regularisation presented. (Annex 9.II Problems of the traditional fisheries sector).

With respect to the GES descriptors, documents on the initial evaluation, definition of good environmental status and the environmental objectives of Spanish marine strategies can be consulted at the Ministry of Agriculture, Food and the Environment website (<http://www.magrama.gob.es/es/costas/temas/estrategias-marinas>).

### 3.- Compilation and summary of the information

The first action in this project was a review of the information of interest for the individual project, consulting experts who are involved in the project, as well as different inventories of geographic information. The list of information to be gathered was conveyed to the managers of the SILA, who provided a large amount of information. After consulting this information and assessing its representativeness and reliability in the marine area of the CAMP project, the sources of information described below were chosen.

Information of the Regional Ministry of Agriculture, Fisheries and the Environment and other bodies, part of which came from the data-gathering undertaken by AGAPA for IUCN in the MEDRAS project, was used for the taxa the flora and fauna found in the marine area of the CAMP Levante de Almería project.

For the presence of habitats, bionomic mapping and the type of seabed generated by the IEO in the ESPACE Project for the Secretariat General of the Sea was used.

The following table gives the different species used to estimate biodiversity:

Table 1. Species used to estimate biodiversity.

Species	Geometry	Source
<b>Sightings of cetaceans:</b>	Points	CAPMA
<i>Balaenoptera physalus</i>		
<b>Delphinidae</b>		
<i>Delphinus delphis</i>		
<i>Globicephala melas</i>		
<i>Physeter macrocephalus</i>		
<i>Stenella coeruleoalba</i>		
<i>Tursiops truncatus</i>		
<b>Bionomics</b>	Polygons	IEO
<i>Cymodocea nodosa</i>		
Maerl beds		
<i>Posidonea oceanica</i>		
<i>Risoella verruculosa</i>		
<b>Red Book species (Invertebrates)</b>	Points	CAPMA
<b>Populations monitored</b>	Points	CAPMA
<i>Asterina panceri</i>		
<i>Astroides calycularis</i>		
<i>Centrostephenus longispinus</i>		
<i>Charonia lampas</i>		
<i>Dentropoma petraeum</i>		
<i>Patella ferruginea</i>		
<i>Pinna nobilis</i>		
<b>Sightings of turtles:</b>	Points	Digitalisation (*)
<i>Caretta caretta</i>	Points	CAPMA
<b>Seabirds</b>		
Razorbill		
<i>Alcidae</i>		
<i>Calonectris diomedea</i>		
<i>Catharacta skuja</i>		
<i>Fratectula arctica</i>		

<i>Hydrobates pelagicus</i>		
<i>Larus audouinii</i>		
<i>Larus michaellis</i>		
<i>Larus spp</i>		
<i>Laurus fuscus</i>		
<i>Laurus melanocephalus</i>		
<i>Morus bassanus</i>		
<i>Phalacrocorax carbo</i>		
<i>Puffinus spp</i>		
<i>Rissa trydactila</i>		
<i>Sterna sandvicensis</i>		

(\*) This layer is digitalised from an image which appears in the thesis of Ms Ana Cañadas: "Towards conservation of dolphins in the Alborán Sea".

Maps of fishing grounds from the Environmental Information Network (REDIAM) has also been used, complemented by that held on the viewer/server of the Spanish Institute of Oceanography (IEO), as well as the Shellfish Production Zones of the Regional Ministry of Agriculture and Fisheries, delimited under the Order of 18 November 2008 and the correction published on 4 February 2009.

**This was complemented by surveys carried out among traditional fishers in the area which provided information about the main fishing grounds.**

#### 4.- Diagnosis

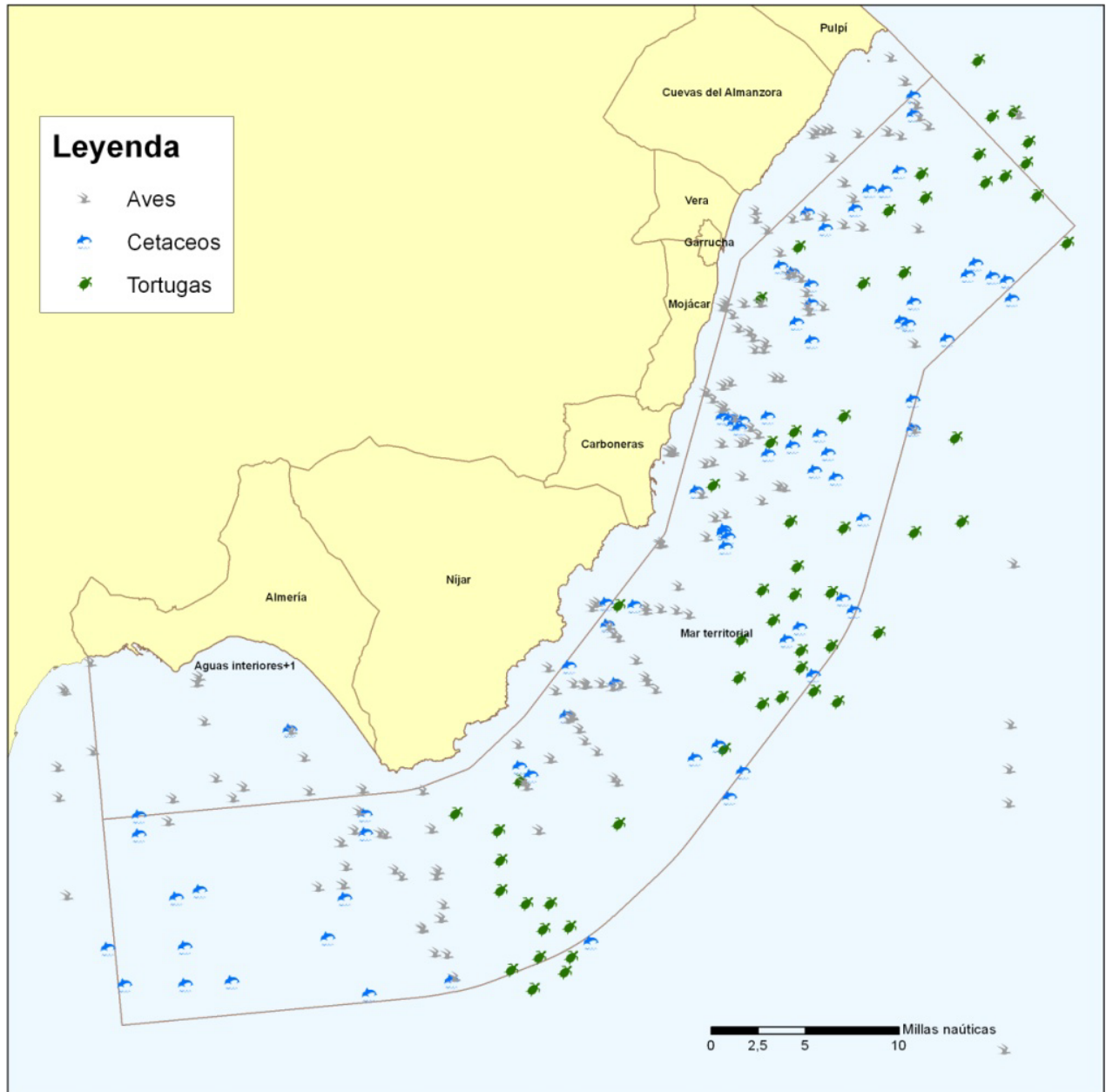
Analysing the information available about species, habitats, fishing grounds, etc, the most relevant recent information about the marine area of the CAMP project was selected.

From this information, different results were obtained:

- 1 Coastal and marine biodiversity
- 2 Areas of interest for fisheries
- 3 The presence of habitats
- 4 Environmentally sensitive areas
- 5 Areas vulnerable to the different Good Environmental Status (GES) descriptors
- 6 Maps of human activities and uses

##### 4.1. Evaluation of biodiversity

Species found in the marine area are shown below:



Map 2. Species in the CAMP marine area.

In order to evaluate the biodiversity of the study zone, the Shannon Index was calculated for each of the above-mentioned cells. “Marine Geospatial Ecology Tools” (MGET), a geo-processing toolbox designed by ARCGIS 10.x was used for this purpose.

MGET is a set of over 250 tools for marine and coastal researchers and GIS analysts who work with spatially explicit ecological and oceanographic data in management or scientific workflows for a variety of tasks, such as the downloading of popular oceanographic data in GIS-compatible formats, the identification of fronts and eddies in satellite images, the construction of statistical models of the habitats from observations of the species and the creation of habitat maps, modelling of biological connectivity by means of hydrodynamic simulation of the dispersion of larvae, and the creation of networks to summarise the fishing effort, CPUE and other statistics. In ArcGIS, MGET appears in the ArcToolbox window.

The tool used is “Calculate Species Diversity Index For Polygons” which, from the polygons which represent zones of interest (in this case, a raster with a cell size of 0.5, 1 and 2 nautical miles) and points which represent observations of the species, calculates a species diversity index for each cell.

The diversity index used is the Shannon-Wiener Index:

$$-\sum_{i=1}^S p_i \ln p_i$$

where:  
**S** – number of species (wealth of species)  
**p<sub>i</sub>** – proportion of individuals of species *i* with respect to the total number of individuals (i.e., the relative abundance of species):

$$\frac{n_i}{N}$$

where:  
**n<sub>i</sub>** – number of individuals of the species *i*  
**N** – number of all of the individuals of all of the species

The calculations are made with the tool using the Vegan package of R statistical analysis software.

The bionomics layer of the Spanish Institute of Oceanography which contained information with polygon geometry has been converted to points in order to integrate this information into the rest of the layers to calculate biodiversity. A grid with a cell size of half a nautical mile for the coastal area and 2 nautical miles for the marine area was created. In the cells which contained the polygon, an internal point was created which was at the smallest mean distance from the sides of the polygon (centroid). Therefore, if the polygon occupied, for example, 10 cells, each cell would have a point to represent the specific species.

When all of the layers had the same geometry, they were unified in just one layer and a biodiversity calculation was made using the toolkit described above for both. The highest value obtained was 2.33.

Once the result had been obtained, it was converted to raster, maintaining the same diversity, size and spread attributes of the source grid, and the biodiversity values were later reclassified into categories from 1 to 4, as shown in the following table.

Biodiversity (H)	Value
0 - 0.5	0
0.5 - 0.75	1
0.75 - 1	2
1 - 1.5	3
1.5 - 2.33	4

Table 2. Categories of the Shannon-Wiener Index assigned to each cell in the coastal and marine biodiversity map.

The results can be found in Annexes 9.I.b, Map of Coastal Biodiversity, and 9.I.c, Map of Marine Biodiversity.

#### 4.2. Presence of habitats

The presence of habitats was calculated on the basis of two IEO layers. Each species and each type of seabed was given a value to reflect its importance:

<b>Bionomics</b>	Value	<b>Seabeds</b>	Value
<i>Posidonea oceanica</i>	4	<i>Sand</i>	1
<i>Cymodocea nodosa</i>	3	<i>Cobbles and Boulders</i>	3
<i>Maërl beds</i>	3	<i>Mud</i>	0.5
<i>Risoella verruculosa</i>	2	<i>Gravel</i>	2
<b>Undifferentiated</b>	2	<i>Rock</i>	4

Table 3. Values assigned to the species and type of seabed to calculate the presence of habitats.

Once each polygon has been given a value, both layers were unified and a weighted mean calculated, giving a weighting of 70% to the bionomic value and 30% to the value of the seabed. This has been done for all of the CAMP Area.

This layer with polygons which already contain data on the presence of habitats (habitats on the seabed) was converted to raster with the same cell sizes as for the biodiversity calculation, in order to be able later to bring together both analyses.

The result can be found in Annex 9.I.d Map of Habitat Quality.

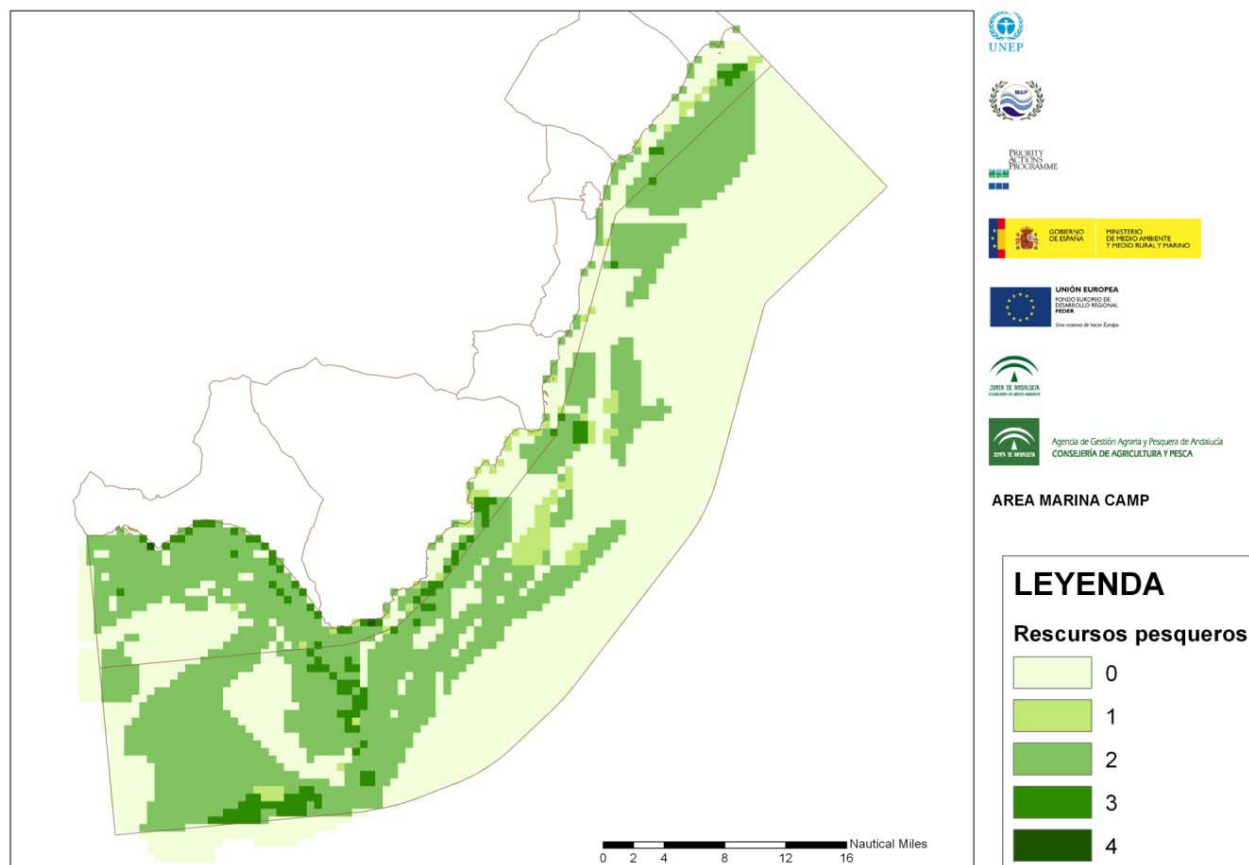
#### 4.3. Interest for fisheries resources

The delimitation of areas of fishing interest was performed using the cartography of the types of seabed generated by the IEO as part of the ESPACE project for the Secretariat General of the Sea, maps of fishing grounds contained in the Environmental Information Network (REDIAM) complemented by the viewer/server of the Spanish Institute of Oceanography (IEO), and the production and protection or improvement zones for bivalve molluscs, gastropod molluscs, tunicates and marine echinoderms of Andalusia, declared by the Regional Ministry of Agriculture and Fisheries, in the Order of 18 November 2008 (rectified in the Correction of Errors of 4 February 2009), and the results of surveys of the traditional fishing sector during the project itself.

<b>Information</b>	<b>Type of Fishery</b>
IEO Fishing Grounds	Traditional
	Trawling
DEA100 Fishing Grounds	Traditional
	Trawling

Production Zones	Traditional shellfishing
Fishery Sector Surveys	Traditional

Superimposing all of these layers of information results in a delimitation of areas from least to most interest for fishing.



Map 4. Areas of interest for fishing.

#### 4.4. Calculation of sensitivity

Environmental sensitivity was calculated through the weighted integration of the three above analyses:

- 70% for the presence of habitats
- 20% for biodiversity
- 10% for the fishery resources of interest.

This method identifies the zones of greater overall environmental quality and, therefore, the zones which are more sensitive to any human activity, both for the coastal strip and the marine area.

The results can be seen in Annex 9.I.e Maps of Sensitivity.

#### 4.5. Calculation of vulnerability

Understanding vulnerability to be the susceptibility of natural, economic and social systems to the impact of a natural or man-made danger, and simplifying it as the susceptibility of natural systems to the impact of a danger induced by human activity, the maps of sensitivity were crossed with the available information on uses and activities, in accordance with the following interaction matrix:

	Coastal infrastructure	Aquaculture	Underwater conduits	Sea traffic	Traditional fishing	Industrial fishing	Recreational activities	Discharges	Structures in the high sea
Coastal biodiversity	4	2	2	2	2	0	2	3	1
Marine biodiversity	3	2	2	2	2	4	1	3	2
Marine resources	3	1	2	1	3	3	2	3	2
Quality of habitats / Integrity	4	2	2	2	2	4	1	3	2

This gives a raster analysis for each activity. See Annex 9.I.f Maps of Vulnerability.

#### 4.6. Uses.

Geographic information has been gathered about uses and administrative responsibilities. This data corresponds to the following groups of parameters considered:

- A. **Protected natural landscapes:** representing all of the protected environmental figures. This group includes the Network of Protected Natural Spaces in Andalusia (RENPA), other environmental figures such as marine reserves and territorial organisation and planning tools for natural resources.
- B. **Fisheries and aquaculture:** describing administrative parameters related to both activities, such as shellfish production zones, *almadraba* tuna fishing, *moruna* nets, quayside markets, purging and dispatch centres, artificial reefs, areas for mussel production and aquaculture facilities.
- C. **Port system:** including both Andalusian Ports and Public Interest State Ports, with the corresponding port zones included in the latter category. Likewise, this group considers the information on safety criteria as established by the Maritime and Port Authorities.
- D. **Discharges:** representing the discharge points located in the terrestrial maritime zone (urban and/or industrial), water policing points defined by the Regional Ministry of the Environment and Waste Water Treatment Plants (WWTP).



- E. Historical heritage:** these are areas defined under the regulations as archaeological zones and archaeological servitude zones located in the maritime space and on land in areas of tidal influence.
- F. Other uses/activities:** this group of parameters includes uses such as intense sea traffic zones, military areas, undersea conduits (cables and gas pipelines) and underwater discharge points, together with their area of influence. Salt works are also represented, reflecting those which are active and/or enjoy environmental protection, as the case may be.

The results can be seen in Annex 9.I.g Maps of Uses.

To facilitate understanding of the analysis, the action zone has been divided into eight sectors:

### **1. From El Palmer Bay to Bobar Beach in Almeria.**

Among the uses are two underwater conduits, one running from the area off the Port of Roquetas de Mar as far as Perdigal Beach and the other running from the city of Almeria (El Jaúl Bajo) and port zones I and II in the Port of Almeria.

Other uses in this sector are the large Military Zone and a zone of intense sea traffic located in the maritime strip off Almeria and the environmental protection figures of the Natura 2000 Network, and the Punta Entinas-Sabinar Seabeds SCI and the Reefs of Roquetas.

As regards the exploitation of marine resources, there is shellfishing activity in Production Zones AND-38 and AND-45.

### **2. From Bobar Beach to the Cabo de Gata Marine Reserve covering the municipalities of Almeria and Níjar.**

There are two undersea conduits off the Perdigal Beach in Almeria. The first is part of an underwater discharge point related to urban activity and its area of influence. There is also a third underwater conduit which begins between Perdigal Beach and Toyo Beach, running parallel to the coast, and which is part of the Medgaz gas pipeline between Almeria and Beni Saf (Algeria).

In the eastern part of the sector, there is a large area with environmental protection which is part of the Cabo de Gata Natural Park and is a Specially Protected Area of Mediterranean Importance (SPAMI) and Biosphere Reserve, as well as the Natura 2000 Network, Cabo de Gata-Níjar (SCI and SPA).

Other uses include the large Military Zone located in the western part of the sector, the artificial reefs at Perdigal-Amoladeras and Cabo de Gata, an aggregate extraction zone in the eastern area, together with the marine reserve and an intense sea traffic zone off the coast.

There are also wastewater treatment plants: the Retamar WWTP and the Cabo de Gata WWTP as well as several urban waste discharge points, and a water policing point to control the waters and sediment.

This sector includes two Bivalve Mollusc Production Zones, AND-39 and AND-40.

### **3. From Cabo de Gata to Punta de la Polacra in the municipality of Níjar.**

Among the uses in this sector, there are two Anchoring Zones off San José and Isleta del Moro, and the Cabo de Gata-Níjar Marine Reserve, specifically, the eastern end of the Cabo de Gata Integrated Reserve, the Punta Loma Pelada Integrated Reserve and the Punta Polacra Integrated Reserve. Furthermore, there are two areas for the use of *moruna* fishing gear, one at Cala Higueras and the other at La Isleta del Moro.

There is a large environmentally-protected area corresponding to the Cabo de Gata Natural Park (which is a Specially Protected Area of Mediterranean Importance (SPAMI) and Biosphere Reserve, as well as the Natura 2000 Network Cabo de Gata-Níjar (SCI and SPA).

These environmentally-protected areas also cover part of the land zone, coexisting with the area regulated under the Special Plan for the Protection of the Physical Environment of the province of Almería on the Cabo de Gata Cliffs.

Other uses include the Los Escullos – El Águila Archaeological Zone, which coincides with the Isleta del Moro anchoring area, and the Morro Genovés – Cala Higuera Archaeological Servitude Zone in the San José anchoring area. There are also three aggregate extraction zones parallel to the coast and, in the western zone, there is the Cabo de Gata artificial reef area. In the eastern part of the maritime strip, there is an intense sea traffic zone.

There is a floating pen facility for fish farming. Shellfishing takes place in the AND-41 and AND-42 Production Zones.

#### **4. From Punta de la Polacra to Punta de la Media Naranja in the municipalities of Níjar and Carboneras.**

The uses in this sector are related to the Anchoring Zone of Cala de San Pedro Beach, and the Cabo de Gata-Níjar Marine Reserve, specifically, the eastern end of the Punta de la Polacra Integrated Reserve and the Punta de la Media Naranja Integrated Reserve. Likewise, close to the latter Integrated Reserve is the Port Zone of the Port of Carboneras and there is an area at Cala de San Pedro for *moruna* fishing.

The entire coastal strip of this sector is included in the Natura 2000 Network: SCI and SPA, including part of the Cabo de Gata Natural Park, which is a Specially Protected Area of Mediterranean Importance (SPAMI) and a Marine Biosphere Reserve. Specifically, the Natural Resource Plan (NRP) of this Natural Park is zoned and involves different degrees of regulation and which gives marine zone A2 protection which is incompatible with the development of fish farming. Furthermore, in the land zone of the Park, the Special Plan for the Protection of the Physical Environment of the province of Almería regulates protection at Cabo de Gata.

Along the coast, there are three Aggregate Extraction Zones and two Archaeological Servitude Zones which coincide with the Anchoring Area.

There are two Bivalve Mollusc Production Zones, AND-42 and AND-43.

#### **5. From Punta de la Media Naranja to Algarrobico Beach, made up of the municipalities of Níjar, Carboneras and Mojácar.**

The uses of the marine strip are related to the port system at the Port of Carboneras (a General State Port), specifically, in zones I and II, the area of influence of an underwater discharge point related to urban activity and located off the Lacón Beach, and a zone of the Cabo de Gata-Níjar Marine Reserve, specifically the Punta de la Media Naranja Integrated Reserve.

Furthermore, part of the sector is included in the Natura 2000 Network: SCI and SPA, including part of the Cabo de Gata Natural Park, which is a Specially Protected Area of Mediterranean Importance (SPAMI) and a Marine Biosphere Reserve. Specifically, the Natural Resource Plan (NRP) of this Natural Park is zoned and involves different degrees of regulation and which confers protection on marine zone A2 and the terrestrial zone which is incompatible with the development of fish farming.

As regards uses and activities in the maritime space, there is the Natura 2000 Network Levante de Almería Sea Beds (SCI) and, close to the fishing port at Carboneras, is the Islote de San Andrés which has also been declared a Site of Community Interest.

Other uses are an Aggregate Extraction Zone which covers the area from Punta de la Media Naranja to the Port of Carboneras and the Carboneras Archaeological Zone off the Los Muertos Beach.

In the terrestrial zone, there is the town of Carboneras with three industrial areas, three wastewater treatment plants: Carboneras WWTP, Carboneras (anaerobic) WWTP and the Llano de Don Antonio WWTP. On the coast, there is a water policing point for the control of discharge quality.

There are three fish farming facilities in the port zone. The AND- 43 Shellfish Production Zone is on this coastline.

#### **6. From Algarrobico Beach to Marina de la Torre Beach comprising the municipalities of Carboneras, Mojácar and Garrucha.**

The uses are restricted to the area of influence of an underwater discharge point with urban waste from GALASA Mojácar (Los Tamices WWPS) located off the Cantal Beach and an anchoring zone on the edge of the sector off the Marina de la Torre Beach.

With regard to the uses and activities undertaken in the maritime space, and in relation to environmental protection figures, there is the Natura 2000 Network Levante de Almeria Sea Beds (SCI) which is also catalogued as a Specially Protected Area of Mediterranean Importance (SPAMI).

Other uses are the C. Del Obispo-Mojácar artificial reefs and a small stretch of archaeological servitude at Río Aguas - Mojácar, on the edge of the sector next to the anchoring area.

In the terrestrial zone of the sector, there are environmental regulations related to the Special Plan for the Protection of the Physical Environment of the province of Almeria in Sierra Cabrera.

There are two type A shellfish production zones on the coast of this sector, AND-43 and AND-44.

#### **7. From Marina de la Torre Beach to the Almagrera Cliffs comprising the municipalities of Mojácar, Garrucha, Vera and Cuevas de Almanzora.**

With regard to the port system, this stretch has three ports: the Port of Garrucha, the Port of La Balsa and the Port of La Esperanza which are managed by and under the responsibility of the Public Agency for the Ports of Andalusia.

Uses are restricted to the areas of influence of two underwater discharge points, with urban waste from the Paseo de Garrucha WWPS and the Villaricos WWPS located next to the Port of Garrucha and off the Port of la Esperanza, respectively. Furthermore, there are two large Anchoring Areas off Garrucha and Vera. There is an area of *moruna* fishing to the east of the Port of la Esperanza.

With respect to the uses and activities undertaken in the maritime space, and in relation to environmental protection figures, there is the Natura 2000 Network Levante de Almeria Sea Bed (SCI), which is also catalogued as a Specially Protected Area of Mediterranean Importance (SPAMI).

Other uses include a large Military Zone at Cuevas de Almanzora, several Aggregate Extraction Zones and an Archaeological Servitude Zone off the Port of La Esperanza and the Port of La Balsa.

There is a tuna fish farm and a type A shellfish production zone on the coast, AND-44.

#### **8. From the Almagrera Cliffs zone, in the municipality of Cuevas de Almanzora, to Cala Cerrada in the municipality of Pulpí.**

The uses in the marine strip are related to the areas of influence of an underwater discharge point with urban discharges from the Mar Serena Wastewater Pumping Station (WWPS) off Cala Cuartel. There are

also zones related to *moruna* fishing and its area of influence off the Almagrera Cliffs and the La Carolina Beach.

With respect to the uses and activities undertaken in the maritime space, there are four Aggregate Extraction Zones (AEZ) along the coast, all coinciding with the Military Zone (MZ), which covers the greater part of the marine strip of the sector and which is environmentally-protected as a Site of Community Importance, the Levante de Almería Sea Beds (SCI), which is also a Specially Protected Area of Mediterranean Importance (SPAMI).

The terrestrial space includes an environmentally-regulated area related to the Special Plan for the Protection of the Physical Environment of the province of Almería at the Almagrera Cliffs and Cala Reona.

Finally, there are several discharge points on the coast related to urban and industrial activity and there is a type A shellfish production zone, AND-44.

The uses and the administrations related to those different uses are shown in the following table:

PARAMETERS		ORGANISATIONS/ADMINISTRATIONS INVOLVED
BASIC PLAN	Administrative limits, towns	Regional Ministry of Agriculture, Fisheries and the Environment. Andalusian Institute of Statistics and Cartography
	Road network	Directorate General of Infrastructure. Regional Ministry of Infrastructure and Housing
	Hydrographic network	Ministry of Agriculture, Food and the Environment (MAGRAMA). Directorate General of Water Environmental and Water Agency. Regional Ministry of Agriculture, Fisheries and the Environment
	Industrial Zones	Local Councils
	Beaches of Interest	Secretariat General of Tourism. Regional Ministry of Tourism and Trade.
	Maritime Terrestrial Public Domain	Ministry of Agriculture, Food and the Environment (MAGRAMA). Directorate General of Sustainability of the Coast and Sea. Provincial Coast Service (AL). Regional Ministry of Agriculture, Fisheries and the Environment.
RENPA	Natural Parks	Ministry of Agriculture, Food and the Environment Regional Ministry of Agriculture, Fisheries and the Environment.
	National Park	
	Natural Landscape/ Natural Monument	
	NATURA 2000 NETWORK SPA	Ministry of Agriculture, Food and the Environment, (MAGRAMA). Directorate General of Sustainability of the Coast and Sea.
	NATURA 2000 NETWORK SCI	Regional Ministry of Agriculture, Fisheries and the Environment.
	Biosphere Reserves	Ministry of Agriculture, Food and the Environment, (MAGRAMA). Directorate General of Sustainability of the Coast and Sea.
	Marine Reserves	Ministry of Agriculture, Food and the Environment, (MAGRAMA).
Specific Plan for the Protection of the Physical Environment	Directorate General of Urban Planning. Regional Ministry of Agriculture, Fisheries and the Environment.	

PARAMETERS		ORGANISATIONS/ADMINISTRATIONS INVOLVED	
FISHING AND AQUACULTURE	Bivalve molluscs production zones	Ministry of Agriculture, Food and the Environment, (MAGRAMA). Directorate General of Fisheries and Aquaculture (DGPA). Regional Ministry of Agriculture, Fisheries and the Environment	
	Almadraba tuna fishing		
	Moruna fishing		
	Aquaculture facilities		
	Mussel breeding areas		
	Guadalquivir Fishing Reserve		
	Artificial reefs	Directorate General of Fisheries and Aquaculture. Regional Ministry of Agriculture, Fisheries and the Environment. Local Councils, Ministry of Agriculture, Food and the Environment, (MAGRAMA).	
PORT SYSTEM	Andalusian Ports	Regional Ministry of Infrastructure and Housing. Public Agency for the Ports of Andalucía.	
	PORT ZONES	ZONE I	Port Authorities. State Ports. Ministry of Infrastructure
		ZONE II	
	Anchoring areas	Navy Hydrographic Institute (IHM). Ministry of Defence. Ministry of Infrastructure. Secretariat General of Transport. Directorate General of the Merchant Navy. Maritime Authorities.	
Navigation Channels	Navy Hydrographic Institute (IHM). Ministry of Defence. Ministry of Infrastructure. Secretariat General of Transport. Directorate General of the Merchant Navy. Maritime Authorities.		
HISTORICAL HERITAGE	Archaeological and servitude zones	Underwater Archaeology Centre. Institute for the Historical Heritage. Regional Ministry of Culture and Sport	
	Points of Archaeological Interest		

	PARAMETERS	ORGANISATIONS/ADMINISTRATIONS INVOLVED
<b>OTHER ZONES</b>	Military Zones	Navy. Ministry of Defence
	DST	Navy Hydrographic Institute (IHM). Ministry of Defence. Ministry of Infrastructure. Secretariat General of Transport.
	Intense sea traffic zones	Ministry of Infrastructure. Secretariat General of Transport. Directorate General of the Merchant Navy. Maritime Authorities.
	Underwater conduits	Regional Ministry of Infrastructure and Housing
	Aggregate extraction zones	Ministry of Agriculture, Food and the Environment (MAGRAMA). Directorate General of Sustainability of the Coast and Sea. Almeria Provincial Service Regional Ministry of Agriculture, Fisheries and the Environment
	Navigation channel	
	Subregional Territorial Spatial Organisation Plans (POTA)	Secretariat General of Territorial Planning. Regional Ministry of Agriculture, Fisheries and the Environment.
	General Town Plan (PGOU)	Local Council
	Underwater Discharge Points	Regional Ministry of Agriculture, Fisheries and the Environment, Directorate General of Prevention and Environmental Quality.
	Fishing grounds	Ministry of Agriculture, Food and the Environment (MAGRAMA). Directorate General of Fishing Resources and Agriculture (DGPA). Regional Ministry of Agriculture, Fisheries and the Environment

Table 3. List of uses and competent authorities.

### 5.- Analysis of the existing problems

The problems found in the study area during the Individual Project were:

- The need to work more deeply on the GES descriptors of the DMEM, through the marine strategy monitoring programmes.
- The need to establish integrated management of the marine environment through appropriate administrative coordination.
- The need adequately to regulate the areas of the Natura 2000 Network which do not have a management plan.
- The need adequately to regulate fishing activities in Cabo de Gata

## **6.- Results prior to the integration stage**

After the initial work, a number of actions were proposed in order to solve the problems detected and to address the results of the analysis made. Among these actions, the following were selected for the Sustainable Development Reference Framework:

To establish an efficient methodology for the definition of environmental sensitivity in the marine environment by means of thematic cartography.

The establishment of these levels of sensitivity and the management measures applied will help to:

1. Redefine and/or update the Reserve Areas and the Sites of Community Importance.
2. Drive the gathering of information about the marine environment in order to have reliable, accurate data about the descriptors of the Marine Strategy Framework Directive as part of the marine strategy monitoring programmes.
3. Promote the extension of the Water Policing Points in such a way that they cover the coastline more evenly and, especially, the SCIs.
4. Promote a project to establish a Network of Wireless Sensors, similar to the eSapiens Project in Doñana, taking advantage of infrastructure which already exists on the coast, such as Bathing Areas, Reefs, Aquaculture Areas, Underwater Cables, etc., for the location of the sensors.
5. Establish a Marine Commission to draw up a General Maritime Organisation Plan. The commission would include representatives of all of the Administrations, Ministries, Regional Ministries and Local Councils (Infrastructure, Agriculture, Fisheries and Environment, Defence, Culture, etc.), professional associations and productive sectors (fisheries, hotel associations, ecological tourism, diving clubs, etc.) and representatives of society in general (ecological organisations, neighbours' associations, etc.)

Taking levels of environmental sensitivity as a criterion, a different type of management would be developed in each of these and the following management tools may be established for the different uses in the area:

### ***Level I ("high sensitivity"):***

1. Regulation of all professional and recreational activities in the zone.
  - a. Evaluate the incompatibility of the vulnerability of these areas with the unrestricted anchoring of vessels.
  - b. Evaluate the incompatibility of the vulnerability of these areas with recreational fishing methods from boats, from the shore or under water.
  - c. Evaluate the incompatibility of vulnerability these areas with professional fisheries and aquaculture.
2. Evaluate the incompatibility of the vulnerability of these areas with aggregate extraction, the construction of piers or jetties, breakwaters and marinas.
3. Limit the cleaning of beaches and coastal areas (managed, controlled cleaning).
4. Evaluate the incompatibility of the vulnerability of these areas with beach "regeneration" activities.
5. Control of organic and chemical waste discharged into the sea.
6. Control, monitoring and management of exotic and/or invasive species.



### **Level II (“medium sensitivity”)**

1. Regulation of access and anchorage of professional fishing vessels (SLSEPA and Electronic Logbook).
2. Regulation and establishment of anchoring buoys for recreational sailing activities (diving, pleasure boating, angling, etc.).
3. Evaluate the incompatibility of the vulnerability of these areas with the trawl fishing (bottom trawling and towed dredges).
4. Integrated aquaculture regulations.

### **Level III (“low sensitivity”)**

1. Regulation of professional and recreational activities.

Together with this measure, there will be public information campaigns to encourage the consumption of local fishery products. Sustainability certificates will also be promoted in agriculture and fishing (Global-GAP, Friends of the Sea)

Finally, a Monitoring Plan should be designed and implemented using the same methodology in order to verify that the different zones with the established sensitivity levels have maintained the same status, and if not, to change their level. The possible indicators which could be used in the monitoring would be:

- The presence of invasive species such as *Caulerpa racemosa*.
- The level of the catch of target commercial species (for example, the red mullet).
- Reduction in the density of *Posidonia oceanica* meadows.

## **7.- Action plan for the post-project stage**

The following actions have been prioritised in accordance with the process of integration of the CAMP project, that is to say, the contributions of the participation workshops of the Coastal Council (Imagine), the results of the rest of the individual projects and, finally, the technical and administrative integration workshops have been taken into account in the elaboration of the Sustainable Development Reference Framework.

The proposals which the Individual Project on the Marine Environment Sustainable Use contributed to the Sustainable Development Reference Framework were:

### **Action 2.2.1.1. AP SDRF. Design and performance of projects to monitor invasive and/or exotic species**

*Approximate timescale:* From the first year.

*Competent public administration:* Ministry of Agriculture, Food and the Environment; Regional Ministry of Agriculture, Fisheries and the Environment; Local Councils.

*Public Administration responsible for coordination:* Ministry of Agriculture, Food and the Environment.

*Indicator(s) selected for the AP SDRF:* Number of projects formulated on the subject.

*Strategic alliances:* Ecological Associations, diving clubs, Fishers’ Guilds, angling clubs.

### **Action 2.2.1.3. AP SDRF. Design and execution of projects to establish a Network of Wireless Sensors located on coastal infrastructure such as reefs, fish farming areas, underwater cables, etc.**

*Approximate timescale:* Medium term.

*Competent public administration:* Ministry of Agriculture, Food and the Environment; Regional Ministry of Agriculture, Fisheries and the Environment; Local Councils.

*Public Administration responsible for coordination:* Regional Ministry of Agriculture, Fisheries and the Environment.

*Indicator(s) selected for the AP SDRF:* Number of projects elaborated on the subject.

*Strategic alliances:* Regional Ministry of Agriculture, Fisheries and the Environment.

**Action 2.2.1.4. AP SDRF. Support for the installation of Remote On-Board Stations (Green Boxes) on fishing vessels in order to facilitate monitoring of the fishing effort and to ensure traceability of fishery products.**

*Approximate timescale:* From the second year onwards.

*Competent public administration:* Ministry of Agriculture, Food and the Environment; Regional Ministry of Agriculture, Fisheries and the Environment.

*Public Administration responsible for coordination:* Regional Ministry of Agriculture, Fisheries and the Environment.

*Indicator(s) selected for the AP SDRF:* Percentage of vessels with Green Boxes.

*Strategic alliances:* Local development organisations, universities, fishers' guilds and associations of boat owners.

**Action 2.2.2.1. AP SDRF. Update the delimitation of Reserve Areas and spaces forming part of the Natura 2000 Network (Sites of Community Importance) on the basis of the results of the LIFE Posidonia project.**

*Approximate timescale:* Second year.

*Competent public administration:* Ministry of Agriculture, Food and the Environment; Regional Ministry of Agriculture, Fisheries and the Environment.

*Public Administration responsible for coordination:* Ministry of Agriculture, Food and the Environment.

*Possible indicators:* Number of new or expanded SCIs; number of NRP and Management Plans updated as a result of LIFE Posidonia.

*Indicator(s) selected for the AP SDRF:* Number of NRP and Management Plans updated as a result of LIFE Posidonia.

*Strategic alliances:* Local development organisations, fishers' guilds and boat owners associations, diving clubs, angling clubs, universities, ecological associations, HSRC (Higher Scientific Research Council).

**Action 2.2.2.3. AP SDRF. Analyse the expansion of Water Policing Points so as to cover the coastline more evenly, especially in Sites of Community Importance**

*Approximate timescale:* From the second year onwards.

*Competent public administration:* Ministry of Agriculture, Food and the Environment, Regional Ministry of Health; Regional Ministry of Agriculture, Fisheries and the Environment; Local Councils.

*Public Administration responsible for coordination:* Ministry of Agriculture, Food and the Environment.

*Indicator(s) selected for the AP SDRF:* Number of control points with significant results.

*Strategic alliances:* Provincial Council, Universities, Research Centres, Ecological Associations.

**Action 2.2.3.1. AP SDRF. Performance of planning projects in the marine environment using the results of the CAMP Project as guiding technical criteria (maps of the sensitivity of the marine environment) through which the following recommendations are established:**

In areas identified as being highly sensitive:

1. Regulation of all professional and recreational activities in the zone.

Regulation of the unrestricted anchoring of vessels.

Regulation of recreational fishing methods from boats, land and underwater.

Regulation of professional fishing methods and aquaculture.

2. Limits the extraction of aggregates, construction of jetties, breakwaters and marinas.

3. Limits cleaning of beaches and coastal areas (managed, control cleaning).

4. Limit the “regeneration” of beaches.

5. Control of organic and chemical waste discharged into the sea.

6. Control, monitoring and management of exotic and/or invasive species.

In zones identified as being of medium sensitivity:

7. Regulation of access and anchorage by professional fishing vessels (SLSEPA and Electronic Logbook).

8. Regulation and establishment of anchorage buoys for pleasure boating activities (diving, pleasure boating, angling, etc).

9. Regulation of trawl fishing gear (bottom trawling and dredging).

10. Regulation of integrated aquaculture.

11. Control of organic and chemical waste discharged into the sea.

12. Control, monitoring and management of exotic and/or invasive species.

In areas identified as being of low sensitivity:

13. Regulation of professional and recreational activities.

14. Control of organic and chemical waste discharged into the sea.

15. Control, monitoring and management of exotic and/or invasive species.

*Approximate timescale:* From the second year.

*Competent public administration:* Ministry of Infrastructure; Ministry of Agriculture, Food and the Environment; Regional Ministry of Infrastructure and Housing; Regional Ministry of Agriculture, Fisheries and the Environment; Local Councils.

*Public Administration responsible for coordination:* Ministry of Agriculture, Food and the Environment y Regional Ministry of Agriculture, Fisheries and the Environment.

*Indicator(s) selected for the AP SDRF:* Number of planning projects which takes these technical criteria into account as a percentage of the total.

*Strategic alliances:* Fishers' guilds, aquaculture associations and companies, ecological organisations.

## **8.- Social, environmental and economic feasibility of post project actions**

### **Action 2.2.1.1. AP SDRF. Design and execution of monitoring projects for invasive and/or exotic species.**

**Social feasibility:** The effects of invasive species on marine ecosystems have a direct impact on coastal fishing due to the deterioration of benthic communities. Furthermore, as in the case of *Caulerpa racemosa*, which negatively affects the *Posidonia oceanica* meadows, as a result of the disappearance of these ecosystems, they also cause the degradation of beaches, since they reduce the double effect of abundant shoals of fish and the meadows themselves in containing the tides. The capacity of these phanerogams to retain solids in suspension also disappears, causing greater turbidity in the water. Both of these factors affect the quality of beaches with leisure uses (sun and sand tourism, diving, etc.) and, consequently, the main economic driver of the zone.

To ensure the greater efficacy of the results of the projects, cooperation agreements must be made with fishers, diving clubs and other professionals of the sea so that they report the presence of these species and that their practices reduce the risk of dispersion.

**Environmental feasibility:** According to the IUCN, after the loss of habitats, invasive species represent the second greatest threat to biodiversity on a global scale (the greatest threat on islands) and one of the main generators of global change. In some parts of North America with a Mediterranean climate, it is estimated that 20% of the plant species today growing wild have been introduced. However, this proportion can rise to as much as 50% in some areas of islands like New Zealand.

It is calculated that the damage caused by invasive species come to over \$1.4 trillion a year, or 5% of the world economy.

Within the framework of international initiatives, in 2004, the then Regional Ministry of the Environment launched the Andalusian Programme for the Control of Exotic Invasive Species with the objective of managing exotic species which are either really or potentially invasive and which really or potentially endanger ecosystems or the health or economic well-being of the human population. To achieve this objective, the Programme designed four lines of work:

- Direct control and eradication of the population in the natural environment.
- Prevention of new entries into well conserved ecosystems through monitoring and early detection.
- Recuperation of damaged ecosystems and habitats.
- Publicising the actions and raising public awareness.

The elimination of an invasive population from the natural environment can cause an impact on the native community if there is insufficient knowledge about that natural environment (e.g., the presence of endangered species) or if it is not done with the appropriate technical resources and at the right moment.

Furthermore, the invasive species could disperse, modify its behaviour, change its growth rate or capture rate in response to the surroundings and the control of its population by the manager.

**Economic feasibility:** Within the Andalusian Programme for the Control of Exotic Invasive Species, since global transport and commerce cause a continuous increase in the number of new introductions of exotic species, and considering that demand is growing and resources are limited, it is critical to select actions objectively and to optimise the environmental cost-benefit balance. To do so, new proposals for action (and also those which are already under way) are subjected to a multi-criteria evaluation of the environmental costs and benefits.

**Action 2.2.1.4. AP SDRF. Support for the installation of Remote On-Board Stations (Green Boxes) on fishing vessels in order to facilitate monitoring of the fishing effort and ensure the traceability of fishery products.**

**Social feasibility:** Decree 64/2012, of 13 March, which regulates the working day and timetables of shellfishing and professional fishing and the system for the location and monitoring of Andalusian fishing vessels (SLSEPA), culminated the implementation of a satellite location system for fishing vessels which contributes to the good management of fisheries, and also serves as a warning and location tool in protocols for emergencies and rescue at sea. The establishment of this system allows monitoring of the activities of fishing vessels, thereby contributing to the functions of vigilance, control and inspection.

**Environmental feasibility:** The SLSEPA allows information to be gathered about the fishing effort of all kinds made by the fleet and, furthermore, provides information in real-time about the area of interaction of fishing activities, warning of cases of illegal fishing and bringing a valuable tool to marine resource management, helping to guarantee rational, responsible exploitation.

**Economic feasibility:** This system has, from its very beginning, been funded entirely by the regional authorities, designing and installing the different models of Remote Station (Green Boxes) on professional fishing vessels, equipping and bringing into service the SLSEPA Control Centre and launching the system's Technical Assistance Service.

The entire traditional fishing fleet in Andalusia has now been integrated into the SLSEPA system.

Over the next two years, joint funding through the European Fisheries Fund (EFF) will allow the rest of the fleet (trawling and purse seine) to join the system.

**Action 2.2.2.1. AP SDRF. Update the delimitation of the Reserve Areas and spaces of the Natura 2000 Network (Sites of Community Importance) on the basis of the results of the LIFE Posidonia Project**

**Social feasibility:** A large part of human activities at sea or on the coast, including inland activities, have a highly negative impact on the marine ecosystem. Marine meadows are one of the most seriously affected habitats, since they are enormously fragile and sensitive and due also to their proximity to the coast, a space where innumerable aggressive human activities take place, whose impact on the environment must be evaluated and minimised before they are undertaken.

Discharge points and underwater cables, trawling and other fishing methods, anchoring on meadows, the extraction of aggregates, the regeneration of beaches, mass seasonal tourism on the coast, direct discharges and run-off, coastal constructions (ports, yachting marinas, breakwaters, etc.) and aquaculture facilities are human activities with a direct impact on *Posidonia oceanica* meadows.

The routine operations of merchant shipping, fishing vessels and pleasure boats, both in port and on the high sea, activities such as agriculture, construction and industry, human presence in coastal zones, especially areas of coastal tourism, works and construction on the coast and inland, the overfishing of certain commercial species, the discharge of brine from desalination plants through underwater discharge pipelines and a long list of human activities which are generating greenhouse gas emissions all give rise to toxic and contaminant discharges which can modify the natural course of marine currents in the area and coastal sedimentation processes, cause the reduction or disappearance of species and thereby produce a domino effect on the food chain, bring about localised changes in the salinity of the sea, modifying the optimum conditions for the presence and growth of marine meadows, and they therefore constitutes human activities with an indirect impact on the meadows.

The consequent reduction in biodiversity due to the disappearance of the meadows affects activities such as tourism, angling, traditional and industrial fishing, underwater fishing and recreational diving, thereby causing significant economic losses as a result of the disappearance of areas suitable for diving, of available fishery resources and/or the partial or total reduction of the width of the beaches.

Economic estimates have concluded that marine meadows generate an annual economic value of between €12,000 and €16,000 per hectare, which is up to ten times greater than the value attributed to tropical forests and three times as much as coral reefs.

**Environmental feasibility:** *P. oceanica* meadows are an indicator of the high environmental quality of the coastal environment, playing an important ecological role as a breeding, reproduction and resting area for commercial coastal species, making them, furthermore, a feeding ground for other commercial marine species.

Their importance as an essential factor to guarantee a healthy, productive future for the coast must be taken very much into account when planning coastal management. Due to their high sensitivity to changes in physical, chemical and biological conditions, they can give “warnings” about the negative effects of activities which take place in their surroundings, and they are therefore excellent biological indicators of the good state of health of coastal waters.

The annual growth of the leaves and the growth of epiphyte algae is the basis of a very high level of secondary production in situ and in other detritivore communities, supporting complex feeding networks from the beach to the bathyal zone.

A 1 km wide *P. oceanica* meadow can accumulate some 125 kg of leaves per metre of coastline per year, mostly in autumn. These leaves accumulate on the beaches, protecting the coastline from erosive storms in autumn and spring, they supply conchiferous sand, from the silica and skeletons and the carbonates of dead epiphytes. When deposited on the beach, they act as starters for the formation of dunes.

Part of the organic material produced by the meadows is captured in the long term in very old biogenic reefs which tend to form at their base. The remains of the leaves, rhizomes and roots which accumulate in the clumps of plants are resistant to degradation, as they are very rich in lignin and tannin.

Clumps of *P. oceanica* are CO<sub>2</sub> traps whose importance depends on the spread and the height of the plant. It is calculated that for clumps of between 1 m and 4 m, the amount of organic carbon sequestered can be from 40 to 160 kg/m<sup>2</sup>.

*P. oceanica* meadows increase the transparency of the water because they trap particles in suspension and reduce resuspension, oxygenating the surrounding water during the day.

Due to the combined action of retention and production of sediments and the accumulation of leaves on the coast, the meadows help to reduce beach erosion. This type of habitat supports a very complex, diverse community and is the natural breeding ground for several commercial species of fish.

**Economic feasibility:** The LIFE+ Project 09 NAT/ES/000534 Conservation of the *Posidonia oceanica* meadows on the Andalusian Mediterranean coast (Life Posidonia Andalusia) contains, in Action A1, the mapping of *Posidonia oceanica* meadows on the Andalusian Mediterranean coast. The areas where it is planned to undertake this action have been declared Sites of Community Importance (SCI) and comprise the stretches of coast and surface areas details below. The area covered in the study will be the coastal strip between the coastline and the contour line marking a depth of 40 m in those spaces, in various zones which together come to a total of 17,116 hectares.

Name of the space	Province	Area (Has)
Maro Cerro Gordo Cliffs	Malaga-Granada	596
Punta Entinas-Sabinar Sea Bed	Almeria	1,950
Roquetas de Mar Reefs	Almeria	205
Cabo de Gata-Níjar	Almeria	8,050
Islote de San Andrés	Almeria	36
Levante de Almeria Sea Beds	Almeria	6,315

The objectives of the proposed study are:

- I. Detailed mapping of the distribution of *Posidonia oceanica* in the Sites of Community Importance (SCIs) where the species has been found to be present.
- II. Quantitative characterisation of the coverage of *Posidonia oceanica* in the SCIs.
- III. Qualitative assessment of the current status of the *Posidonia oceanica* meadows in the SCIs.
- IV. Mapping of the upper and lower limits of the *Posidonia oceanica* meadows in the areas selected.
- V. Qualitative mapping of the types of seabed in the areas selected.
- VI. Identification and mapping of the morphological elements in those areas.
- VII. Mapping of other phanerogam species associated with *Posidonia oceanica* in the areas selected.
- VIII. Representation of the results in standardised GIS format (Geographical Information System).

The mapping of the marine phanerogam meadows in the proposed areas is to be performed using echo-acoustic geophysical techniques with subsequent confirmation of the results obtained through visual information captured by submarine video. This will be done using a very high resolution Side Scan Sonar system which gives a complete image of the seabed in the same system of coordinates as the rest of the study (UTM Zone 30 and Datum European 1950 projection). The nature and characterisation of the status of the meadows will be performed on the basis of observation with a closed circuit video camera. Furthermore, there will be a review and location on the maps of obstacles and existing services, as well as other relevant morphological elements (blocks, discharge points, morphological structures, etc...).

The video equipment will provide geo-referenced video transects which will be recorded in digital format with on-board closed-circuit equipment. Video transects will be made depending on the observations of sonar records in order correctly to identify the distribution of *Posidonia oceanica* and its status, as well as to identify other types of seabed and meadows and the obstacles, artefacts, conduits, etc., which might appear on the sonar records. The transects will be analysed mainly from the biological point of view in order to evaluate the distribution of biocenosis of existing species and the bionomic characterisation of the seabed in the study area.

Though a certain amount of knowledge already exists regarding the general location of these meadows, this is simply approximate descriptive information which requires new, more profound studies using the latest technology to facilitate the integrated study of the natural environment.

There are several advantages of having updated cartography of the *Posidonia* meadows in Andalusia. This type of study has already been initiated partially in some places such as the Cabo de Gata Natural Park, Maro-Cerro Gordo Natural Landscape and some other very specific coastal spaces. This work is generally related to environmental impact studies for maritime construction projects.

One of the most important aspects to take into account when evaluating the status of the phanerogam meadows in the territory is to obtain comprehensive knowledge of the historical evolution of the meadows. To this end, it is necessary to establish an initial status based on detailed cartography. By comparing successive cartographies of the same region over time, it is possible accurately to predict its evolution over time, considering markers such as the position of the limits of the meadow and the growth or reduction of the surface area colonised. From this, we can research the biological and

environmental factors which affect its evolution, aspects which are decisive in order to establish appropriate management plans and corrective measures where these are necessary.

As a result of the research with side scan sonar, a geo-referenced digital sonographic mosaic will be generated with all of the scans made, grouped by parcel on a 1:1 scale. The different regions and elements from the sonar images will be identified on the resulting mosaic for each one of the zones, for the following purposes:

- I. To produce a map with the cartography of the *Posidonia oceanica* meadows and to determine their status in all of the occupied area in the different spaces selected.
- II. To identify the morphological and biological elements found in those areas so that they may be included in the cartography.
- III. Comparison of the cartography obtained with previous cartographies in order to analyse its historical evolution.

**Action 2.2.1.3. AP SDRF. Design and execution of projects to establish a Network of Wireless Sensors located on coastal infrastructure such as reefs, aquaculture areas, underwater cables, etc.**

**Action 2.2.2.3. AP SDRF. Analyse the extension of Water Policing Points so that they cover the coast more evenly, especially in Sites of Community Importance**

**Social feasibility:** Prior knowledge of the different uses and activities which coincide in the coastal zone and which could be the origin of marine contamination is of vital importance for the planning and management of the quality of coastal waters. Accurate static and dynamic characterisation of these factors over time and in-depth knowledge can condition the administrative efficiency of the measures taken, the success of the management and the social cost involved.

The relationship between the economic structure of the municipalities of the CAMP Area and the quality of coastal water should be understood in terms of mutual dependence. That is, it is necessary to determine not only to what extent the uses of the space and the economic activities which take place there can affect the quality of coastal waters, but also the inverse relationship: to what extent do the uses of the space and the economic activities depend on water quality.

All of the uses and economic activities, under normal conditions and for their possible development, involve a certain quality requirement of coastal waters, or they involve the potential degradation of water quality, or both. In the case of the Protected Natural Landscapes (PNL) which depend directly on the quality of the sea water for their conservation, this environmental, social and, not infrequently, economic point is of transcendental importance.

For its part, the use of beaches as spa resorts, through the infrastructure constructed and their health-sanitary quality, and although this reinforces the "tourism" activities already contemplated, could be used as an indirect indicator of use as spas by the resident population in these municipalities.

On the basis of the uses/activities which have a possible relationship with water quality, the coastal space is characterised socially and economically. Consequently, no use/activity has greater social or economic value than any other. This aspect depends, in turn, on very dynamic variables which change over time and space, which makes the analysis of this kind even more complex: productive structure, added value of the activities, population active in each activity, etc. Therefore, in this case, for example, fisheries have no greater socio-economic value than intensive agriculture, or tourism more than residential use.

**Environmental feasibility:** The coast of Almería has two seaboard, one facing east and the other facing south. The point of inflection between these two seaboard is Cabo de Gata, which has been declared a Natural Park due to its exceptional value. The marine meadows of *Posidonia oceanica* from Cabo de Gata southwards are deteriorating, whereas those from this point towards Murcia form an almost



complete meadow of incalculable value. The coast of Almeria has three zones which have been proposed as Sites of Community Importance in the Natura 2000 Network.

**Economic feasibility:** The main objective of the Water Policing Plan of the Andalusian Coastline is to control water quality and aquatic sediments on the coast of the region and in the tidal influence zone. The Water Policing Plan carries out an annual survey of water quality along the whole coastline of Andalusia as well as in the most important rivers in the region.

The Plan has laid down a number of significant points for sampling water and sediment, both on the coast and in estuaries. In the case of the waters, the frequency of sampling depends on the zone being studied, and is quarterly in areas which require greater control, and annual or six-monthly in other areas. Aquatic sediments are sampled at all of the points annually.

The parameters analysed in the water are: pH, salinity, conductivity, dissolved oxygen, solids in suspension, CDO, oil and grease, detergents, silicates, chlorophyll *a*, cyanides, phenols, ammonia, nitrates, nitrites, phosphates, fluorides, chromium, copper, cadmium, lead, nickel, zinc, manganese, arsenic, mercury and organophosphate and organochloride pesticides and other substances considered under current legislation to be hazardous.

The fine fraction of the sediment (<63 microns) is analysed for chromium, copper, silver, iron, cadmium, lead, nickel, zinc, manganese, arsenic, mercury, tin and total and oxidisable organic carbon, aluminium, lithium, TBT, SHAPs, SCB7, CB52, CB153, CB180, lindane, HCB, pp'-DDE, pp'-DDT, nitrogen and phosphorus.

Information and communication technologies offer solutions ranging from small scale networks to complex coastal observation systems, for real-time monitoring of these ecosystems. Among the small scale networks, the WSNs (Wireless Sensor Networks) offer a very attractive solution since they are very easy to deploy, operate and redeploy, and they have a low cost. There are also more complex observation systems which use the appropriate electronics to support the necessary oceanographic instrumentation.

The design, implementation and deployment of a WSN for oceanographic applications brings new challenges not seen in land-based systems, since the impact of the network of sensors on the marine environment limits and conditions its development.

The distribution of marine infrastructure allows the distribution of sensors to control a greater surface of the water bodies in the CAMP Area, minimising their impact on the environment.

#### **Action 2.2.3.1. AP SDRF. Performance of planning projects in the marine environment using the results of the CAMP Project as guiding technical criteria (maps of the sensitivity of the marine environment).**

The marine environment has historically been a place for different uses and human activities and has been a driver of economic, social and cultural development. Traditional activities such as fishing and transport have been joined by more modern uses such as aquaculture, the exploitation of mineral and hydrocarbon resources and tourism, as well as being used as a sink for all manner of waste and discharges. All of these activities generate increasing pressure on the environment, endangering its conservation.

The maps of the pressures reflect the uses which take place in the project area, and are the starting point for a future analysis of the conflicts and competition for the use of the space by the different activities.

The sensitivity maps contain essential information to determine, on the basis of superimposed layers of geo-referenced information, the environmental sensitivity of a given area with respect to a contaminant threat from a land-based or maritime source. Furthermore:

- These maps provide an instant message and do not require very much specialised knowledge in order to understand that message. The information they contain is sufficient to give them value, and is compacted to avoid confusion.
- The symbols used are appropriate and do not create conflict or distort the message.
- The scale on which they are designed is appropriate to the accuracy inherent to the dataset. They include a location map to show the relationship between one subarea and the area as a whole.

These maps will be of fundamental importance in the elaboration of measures to protect the environment in these coastal areas, including diagnosis, monitoring and the creation of forecasting models.

The environmental sensitivity maps contain basic information about coastal components, as well as geophysical, geomorphological, hydrodynamic, meteorological and oceanographic information. They indicate conservation and recreational areas and coastal urban settlements. Their production is of great importance to the study of the environment, in the analysis of possible modifications in the area and the probable consequences that those modifications will bring. They are a powerful tool which can guide us in modifying the environment in which we live, minimising any possible damage.

#### **9.- Lessons learned**

When considering an integrated management strategy for coastal zones, it is essential to have data available that will allow the greatest possible knowledge of the environment in the area of action, which is essential in order to determine the maximum level of sustainable development and in order to establish criteria and the necessary levels of protection for those areas of singular ecological value which could be affected by the different activities.



10

*Dissemination of good practices  
in productive activities*

Final report



# 10.1

## *Dissemination of good practices in the fishing sector*

Final report

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## **TABLE OF CONTENTS**

Executive Summary

1.- Introduction

2.- Description of the project

3.- Compilation and summary of the information

4.- Diagnosis

5.- Analysis of the existing problems

6.- Results prior to the integration stage

7. – Action plan for the post-project stage

8. - Economic, social and environmental feasibility of post-project actions

9. - Lessons learned

## **INDEX OF ANNEXES**

Annex 10.1.I Survey performed on the fishing sector

Annex 10.1.II Informative materials: Training Workshop Poster and Brochure summarising the contents of the First Training Workshop

## **LIST OF FIGURES**

*Figure 1: Temporal decrease (2005-2010) in the number of fishing boats*

*Figure 2: Fleet structure per port (2010)*

*Figure 3: Tonnage per fishing method and home port (2010)*

*Figure 4: Catch percentage per fishing method in the CAMP ports (2009)*

*Figure 5: Evolution of reported catch at Almeria port*

*Figure 6: Evolution of reported catch at Carboneras port*

*Figure 7: Evolution of reported catch per port (Garrucha)*

*Figure 8: Average first sale prices at fish market (euro/kg) at Almeria port: 1985-2010.*

*Figure 9: Average first sale prices at fish market (euro/kg) at Carboneras port: 1985-2010.*

*Figure 10: Average first sale prices at fish market (euro/kg) at Garrucha port: 1985-2010.*

## **LIST OF TABLES**

*Table 1: Most important topics to be discussed at the Dissemination of Good Practices Workshops.*

*Table 2: Features of the Workshops on Good Environmental Practices in the Fishing Sector.*

## **ABBREVIATIONS USED**

ADAMEC: the Artisan Fishing Shipowners' Association of Catalonia

AP SDRF: Action Plan Sustainable Development Reference Framework

CAMP: Coastal Area Management Programme

CAPMA: Department of Agriculture, Fishing and Environment. Andalusian Government

CFP: Common Fisheries Policy

FDG: Fishing Development Group

GT: Gross Tonnage

RAC/CP: Regional Activity Centre for Cleaner Production

RAC/SPA: Regional Activity Centre for Specially Protected Areas

SDRF: Sustainable Development Reference Framework for

SEO: Spanish Oceanography Institute

SILA: Levante de Almería Information System:

## **Executive summary**

This report aims to provide insight into the activities that have been performed relating to the **Dissemination of Good Practices in the Fishing Sector**, which forms part of CAMP Levante de Almería's Dissemination of Good Practices in Production Activities Individual Project.

Once a description of the activities that have been performed has been provided, a diagnosis of the current fishing situation in the CAMP area will be made. Such diagnosis was prepared using the material compiled and information taken from the activities included in this project, and is accompanied by an analysis of the main issues that currently affect fishing in the Almería region of the Levante area.

Finally, a timeline for post-project activities is offered, aimed at solving the main problems detected within the framework of this activity. In addition, a compilation of potential sources of funding is included, along with a proposal of indicators for monitoring and assessment of implementation. Such activities aim to make fishing compatible with the conservation of resources, such as the ecosystems the resources are found in, always with a view to long-term feasibility.

Finally, this document contains the lessons learned during the course of the project.

### **1.- Introduction**

The Dissemination of Good Practices to the Fishing Sector activity, included in the 'Dissemination of Good Practices in Production Activities' Individual Project, is based on the Barcelona Convention. Its aim is to guarantee the sustainability of the CAMP Area in accordance with that established in Article 9.1 on ECONOMIC ACTIVITIES of the Protocol on Integrated Coastal Zone Management in the Mediterranean.

The feasibility study shed light on the huge significance of the fishing tradition in the region, which as well as forming part of the area's cultural heritage, has a significant social and economic impact in specific parts of the Almería area of Levante and an environmental impact resulting from fishing conducted on the resource. However, due to the different issues affecting this activity, the fishing sector has reached a critical juncture. Therefore, the CAMP project aims to foster the implementation of Good Practices that will help to maintain this activity in the future, in both an economic and environmentally sustainable fashion.

In order to achieve such aims, a series of activities, which are detailed below, have been developed:

- ✓ Surveys conducted on the fishing sector to design Good Practice training specifically adapted to the region.
- ✓ Ongoing meetings with fishers, their representatives and member from the Team of Experts linked to the project.
- ✓ Design and implementation of Dissemination of Good Practices Workshops in the Fishing Sector aimed at artisan fishing and the arts of trawling, seine fishing and longline fishing.
- ✓ Furthermore, we have participated in the creation of reading material for the CAMP project awareness activities, in particular the Responsible Consumption Teaching Strategies Course.

With regard to the main final products resulting from such activities, we must highlight the informative materials from the Training Workshops and the report herein, which include the conclusions reached during the Training Workshops.

### **2.- Description of the project**

The Dissemination of Good Practices to the Fishing Sector Individual Project has been developed following the opinions and recommendations of the different agents involved in the CAMP project.

Thus, the Team of Experts linked to the project has had a very important role to play. Such team, formed by members of the Regional Government of Andalusia's Provincial Delegation of Agriculture and Fisheries and the Almeria area of Levante's Fishing Development Group, have worked together on different issues relating to the methodology to be followed during the project, as well as discovering the main issues currently affecting the fishing sector and putting forward viable solutions for such issues. Throughout the development of the project, several meetings were held by the experts.

The role of the Coastal Council, the project's advisory body composed of 46 regional bodies, has been of immense value, discerning its vision of the fishing sector through suggestions made at the different Imagine Workshops, which are therefore considered the basis of the Council's social participation. Meanwhile, thanks to the Coastal Forum, different individuals have offered their opinion via the project's internet platform or during the Training Workshops, and comments and proposals were also collected that helped to point the project's development in the right direction.

Another source of information was found in the CAMP project's complementary Individual Projects. Synergies were established through organisational meetings where issues common to the projects were described and the most appropriate method of jointly combating such issues was identified.

It was therefore necessary to bring the project's criteria in line with the Marine Environment's Individual Project, as it provided the scope for analysing the project. The CAMP Levante de Almería project's area includes the emerged areas in the municipalities of Pulpi, Cuevas del Almanzora, Vera, Garrucha, Mojacar, Carboneras, Nijar and Almeria, the coastal waters adjacent to such municipalities that are protected by the Water Framework Directive (including inland waters, which are the responsibility of the regional government, and offshore waters, which are responsibility of the State. This management margin excludes the portion of the fleet that works outside of these limits. However, this activity includes all fleets from Levante, regardless of where they fish, given that their activity has a direct impact on the CAMP area.

The second step when implementing the activity involved creating a work plan:

- The region was visited on several occasions in order to analyse the fishing activity in the CAMP area, in order to complement the literature that was compiled and analysed. Prior to the visits, organisations likely to show interest in the individual project were provided with information relating thereto, in order to get them involved in the participatory processes. Once this informative activity was performed, individual interviews with the organisations that showed interest and the fishers and their representatives were arranged. To carry out these interviews, which were held in March, June and September 2011, a survey drafted for the project was provided. Such survey is attached as Appendix I to the report herein.

The aims of such meetings were: 1) increase the media coverage of the Dissemination of Good Practices in the Fishing Sector Workshops; 2) insist upon the public participation of the agents linked to the fishing sector within the CAMP project's scope; 3) contribute to identifying the issues detected per sector to develop the diagnosis of the fishing sector in the Almeria area of Levante.

- Based on the analysis of the information compiled during the first meetings and interviews, a definitive work plan was implemented. A conclusion was reached that the methodology would focus on Training Workshops, organised as open workshops, and the main issues to be discussed were described, based on the topics that were of most interest to the sector.

A summary table of the issues selected can be found below:

Technical strategies to increase first-sale price and reduce the number of middle men.	Interactions with other uses of the coast: pollution of fishing grounds.	Biological behaviour and interactions between species of interest to the fishing sector.
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Diversification of the sector: fishing tourism. Transformation to small scale. Selecting the appropriate methods.

Improve marketing of local products.	Joint management concepts and possibilities.	Regulation of closed seasons.
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Table 1: Most important topics to be discussed at the Dissemination of Good Practices Workshops

Once the technical plan was designed, a poster was created to create awareness for the project among the interested parties. The poster is attached as Appendix II to the report herein.

- Three different Training Workshops were held on Good Practices in the Fishing Sector. All three workshops were of open participation and provided a space for debate at the end of the presentations, where all the attendees posed questions and made comments on fishing in the Almeria area of Levante.

A summary of the Workshops is provided below:

The **First Training Workshops on Good Practices in the Fishing Sector** took place on 16 and 17 June 2011 in the towns of Cabo de Gata and Garrucha, respectively. A total of 35 participants attended the conferences.

The aim of these Workshops -the first talks on the agenda on the subject of traditional fishing boats- was to promote an exchange of experiences between various fishing communities, as well as providing an overview of the effects of climate change on marine ecosystems. Two experts on Sustainable Fisheries from Fundación Lonxanet, a Galician group that works with artisan fishing communities and organisations, were invited; and a representative of the *Regional Activity Centre for Specially Protected Area (RAC/SPAs)* also attended.

The following topics were covered:

- Climate change and fishing.
- Joint Management of fishing reserves.
- Fishing tourism.
- Commercialisation.

The **Second Training Workshops on Good Practices in the Fishing Sector** took place on 23 and 24 September 2011, in the towns of Cabo de Gata and Garrucha, respectively. A total of 25 participants attended the workshops.

The aim of these workshops-which were the closing event of the programme focusing on artisan fishing- was to promote an exchange of experiences between various fishing communities with regards to fishery management. To do so, we heard of the experience of a Catalan fisher, who, in addition to working as a fisher, is the President of the Artisan Fishing Shipowners' Association of Catalonia (ADAMEC) and President of the Mediterranean Platform for Artisan Fishers. The second block was introduced by specialists of the CP/RAC, who explained the fisheries management changes that are being implemented in other areas of Andalusia, using Conil de la Frontera as an example.

The following topics were covered:

- Management of fishing reserves in Andalusia.
- Sustainable fishing certificates and networks.
- Artisan fishing in the CFP.
- The catch: CPUE and biology of the main species of interest.

During this event, copies of the brochure summarising the contents of the First Workshops were handed out, which can be found in Appendix II to this report.

The **Third Training Workshop on Good Practices in the Fishing Sector**. These talks, primarily discussing the arts of trawling, seine fishing and longline fishing, were given on 3 and 4 November 2011 in the towns of Carboneras and Almeria, respectively. A total of 31 participants attended the

workshops.

These Workshops, which came at the end of the activity, had several objectives. These include dissemination of the contents of the current CFP reform, knowledge exchange between the scientific world and the fishing sector, presentation of different best practice actions seeking to improve resource management by reducing fuel consumption to a minimum and diversification (fishing tourism) as well as marketing of fish products.

In short, the following topics were discussed:

- Current status of the Dissemination of Good Practices activity.
  - Key points of the reform of the Common Fisheries Policy (CFP) and the impact thereof on the Fishing Sector
  - Red prawn population status in the area (presentation of studies conducted by the Spanish Oceanography Institute - IEO).
  - Responsible actions for sustainable fishing.
- Finally, the report was prepared for the SDRF containing a series of proposed actions for the post-project stage, all of which derived from the opinions collected in the various Training Workshops held and from participation encouraged as part of the Individual Project.

TRAINING WORKSHOPS ON GOOD ENVIRONMENTAL PRACTICES IN THE FISHING SECTOR				
Date	Timetable	Duration (hours)	Contents	Team of educators
16-06-11 (Cabo de Gata)	17:30 – 20:30	3	Introduction to the CAMP Project	Ms. Lucía Martínez Posse - Regional Activity Centre for Cleaner Production within the Mediterranean Action Plan (RAC/CP) Mr. Daniel Cebrián Menchero - Regional Activity Centre for Cleaner Production within the Mediterranean Action Plan (RAC/CP) Mr. Juan M. López Blanco – Fundación Lonxanet and Ms. Elena Vázquez Portela – Fundación Lonxanet
17-06-11 (Garrucha)			Climate change and fishing. Joint management of marine protected areas where fishing is prohibited. Diversification of the sector: fishing tourism. Direct commercialisation.	
23-09-2011 (Cabo de Gata)	17:30 – 20:30	3	Summary of the 1st Workshop. Introduction to joint management of Fishing Reserves in Andalusia (Conil de la Frontera). Sustainable fishing certificates and catch	Ms. Lucía Martínez Posse - Regional Activity Centre for Cleaner Production within the Mediterranean Action Plan (RAC/CP) Mr. Ramón Tarridas - Artisanal fisher. President of the Artisan Fishing Shipowners' Association of Catalonia (ADAMEC) and President of the Mediterranean Platform for Artisan Fishers.
24-09-11 (Garrucha)			The Fishing Management Plan in the Maresme area (Catalonia). Mediterranean Platform of Artisanal Fishers and CFP reform.	
3-11-11 (Carboneras)	18:30 – 20:30	2	Final report regarding the Dissemination of Good Practices in the Fishing Sector activity	Ms. Lucía Martínez Posse - Regional Activity Centre for Cleaner Production within the Mediterranean Action Plan (RAC/CP)
4-11-11 (Almería)			Key points from the reform of the Common Fisheries Policy (CFP) and the impact thereof on the Fishing Sector Responsible actions for sustainable fishing Red prawn population status. Discussion, questions and analysis of the action proposals in the Almería area of Levante.	

Table 2: Features of the Training Workshops on Good Environmental Practices in the Fishing Sector.

### 3.- Compilation and summary of the information

#### 3.1. Sources of information

Several sources were used for the bibliographic process, among which we can highlight the Provincial Delegation of the Department of Agriculture, Fisheries and the Environment of the Regional Government of Andalusia (especially on the subject of legislation and regulations), the Fisheries Development Group of the Almería area of Levante (with its strategic action plan, among other

documents) and the Spanish Institute of Oceanography of Malaga (which participated in the collection of biological studies conducted in the area).

Two other sources of information we used were the websites of the Department of Agriculture, Fisheries and the Environment of Andalusia and the Ministry of Agriculture, Food and the Environment. In these two sources, articles and projects of great documentary value, as well as many catch reports and data about first sales, the value added to fishing or marketing, can be found. These two spaces also have interesting socio-economic analyses and data on the structure and characteristics of fishing fleets. In addition, the port visits, individual interviews with fishers and their representatives, the meetings held at the Delegation of Agriculture, Fisheries and the Environment and with the experts from the Fisheries Development Group or the Training Workshops conducted provided, through their opportunities for debate, the most reliable, up-to-date, practical and complete sources of information.

### **3.2. Main documents consulted.**

Below there is a list of the main reports included in the activity's documentation (in alphabetical order by title):

- Catch analysis by mode and sales data per year and port.
- Socio-economic analysis of fisheries per port.
- Marine protected areas as a fishing management tool.
- Elements for the sustainable management of live marine resources.
- Good Practice Guide for Sustainable Mediterranean Fisheries.
- Socio-economic indicators of the Andalusian fishing sector.
- Galician artisan fishing and marketing issues: Is Lonxanet.com an alternative?
- Common Fisheries Policy (CFP) Reform.
- The closed season as a management tool. 4th Meeting of the Scientific Forum on Spanish Fishing in the Mediterranean.
- Marine protected areas as an instrument of environmental policy.
- Associations, marketing and the paradigm shift.
- Current fisheries legislation and regulations.
- Improved efficiency and sustainability of, and revenues from, the Catalan trawling fishing fleet.
- Strategic Plan for the GDP Eastern Almeria fishing zone.
- Andalusian Fishing Production, 2010.
- Project guide for fishing tourism activities: Proyecto Sagital (The Sagital Project).

The majority of the information used to develop this activity is included in the Almeria area of Levante Information System, which is stored on the CAMP project's corporate website [www.camplevantedealmeria.com](http://www.camplevantedealmeria.com).

## **4.- Diagnosis**

Before we begin to analyse the current situation of fishing, let us first put the sector into context:

The first chart shows the total number of boats registered in the three ports in the CAMP area, representing trawling, seine fishing, longline and artisan fishing. A sustained decrease is observed in all ports between 2005 and 2010, as a result of the fleet scrapping and reduction policies applied and the sector's low profitability in recent years.

Variation in size of fishing fleet (2005-2010)<sup>1</sup>

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<sup>1</sup> Figure translation: Fleet size 2005; Fleet size 2010

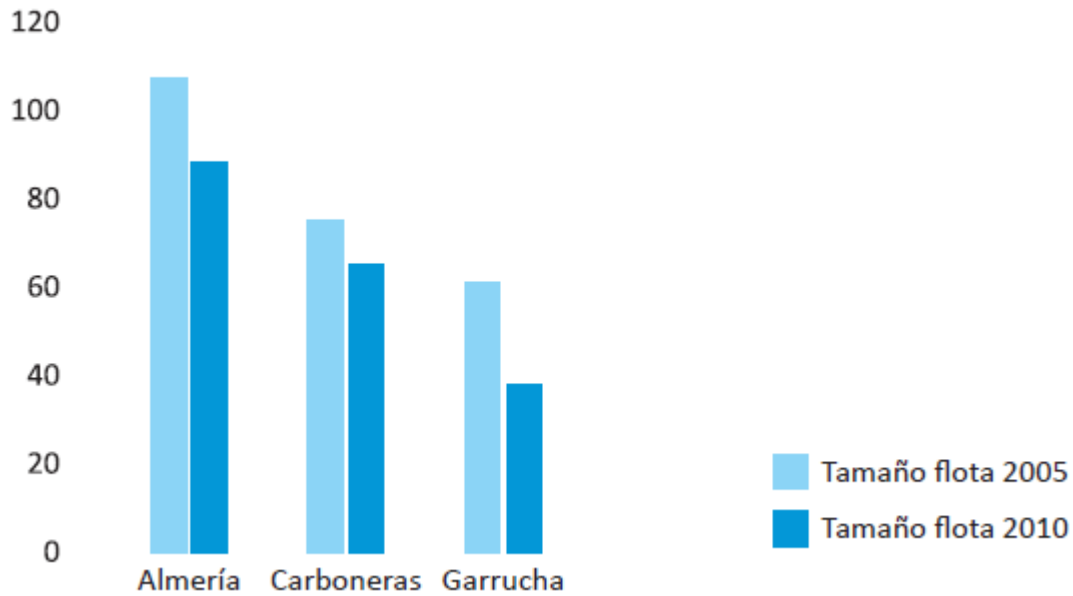


Fig. 1: Temporal decrease (2005-2010) in the number of fishing boats. Source: CAPMA.

It is also noted that the port of Almería is the one with the largest total fleet size of the 3 ports, followed by the port of Carboneras and Garrucha port, with fewer boats.

An analysis of the internal structure of each fleet, according to data disclosed by the Delegation of Agriculture, Fisheries and the Environment, and updated as of December 2010, shows that there is a dominant mode in each of the ports (depending the number of boats within it), namely, trawling in Almería, surface longline in Carboneras and in Garrucha, trammel fishing.

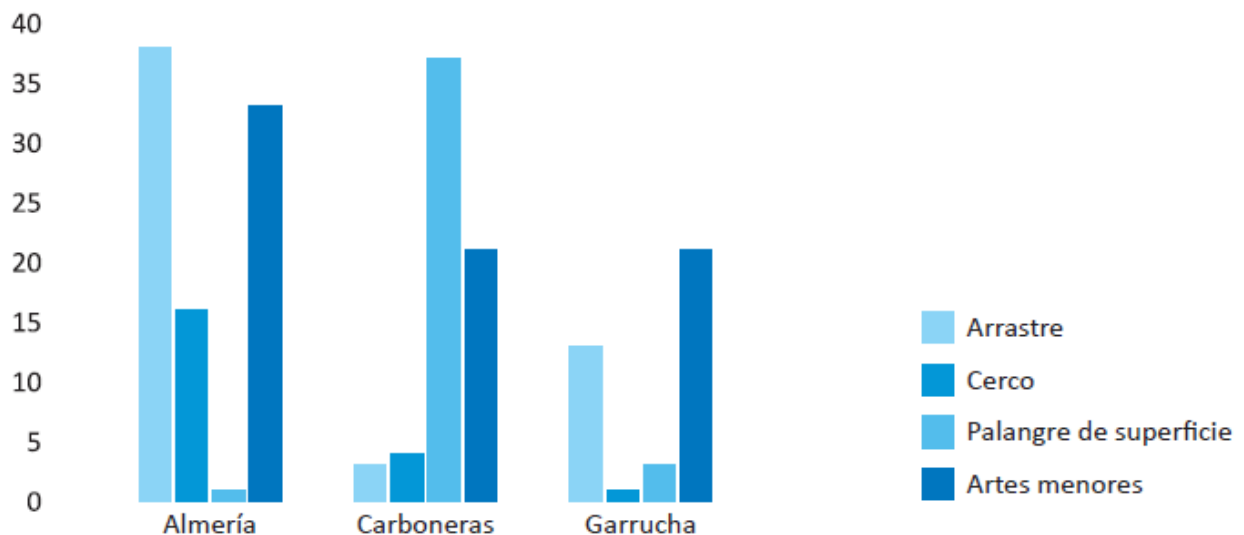


Fig. 2: Fleet structure per port (2010). Source: CAPMA.<sup>2</sup>

From these data, the fleet registered in the Levante area in 2010 consists of 39.27% trammel fishing, 28.27% trawling, 21.47% longline and 10.99% seine fishing.

<sup>2</sup> Figure translation: Trawling, Seine fishing, Longline fishing, Artisan fishing

However, the total number of boats, in itself, is not a revealing piece of data as regards how much pressure each method exerts on the environment. Therefore, it is necessary to estimate the fishing activity taking place. Hence, since there is no data on the actual number of hours of activity, for this purpose, the tonnage (GT) or internal volume of the active vessels in 2010 is shown below.

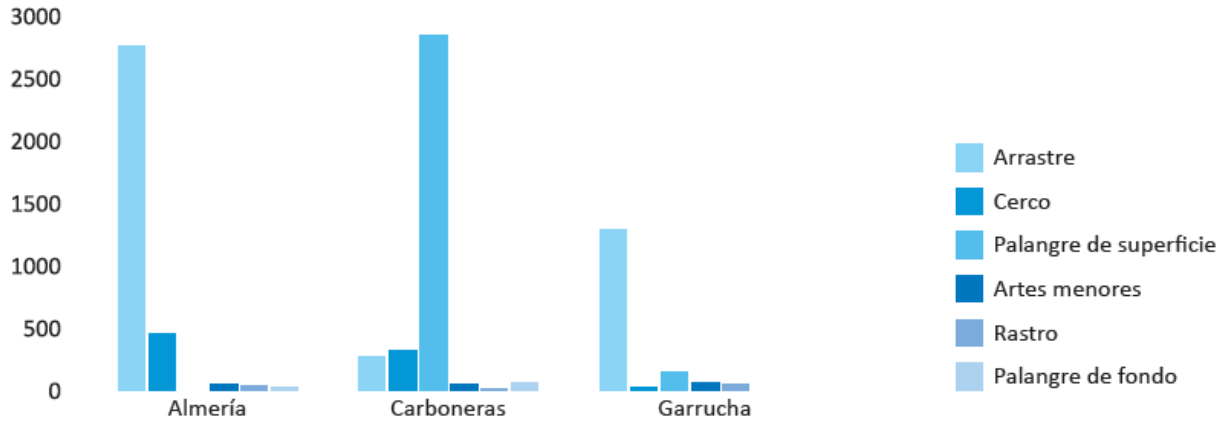


Fig. 3: GT per fishing method and home port (2010) Source: Department of Agriculture, Fisheries and the Environment<sup>3</sup>.

We must highlight the low representation of trammel fishing. Despite the fact that this method has the largest percentage in number of boats, they are smaller in size and consequently have a lower catch potential.

In Almeria and Carboneras, trawling and longline fishing, respectively, remain the most widely practiced methods. In Garrucha, however, trawling has become the method with the highest GT figure.

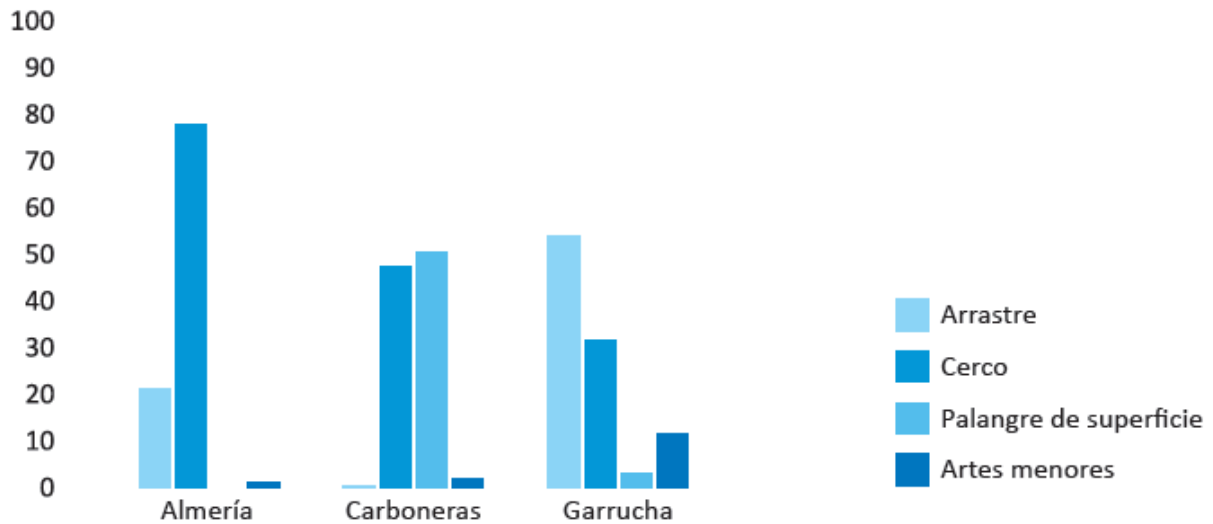


Fig. 4: Catch percentage per fishing method in the CAMP ports (2009). Source: Department of Agriculture, Fisheries and the Environment.<sup>4</sup>

<sup>3</sup> Figure translation: Trawling, Seine fishing, Longline fishing, Artisan fishing, Rake, Bottom set longline

<sup>4</sup> Figure translation: Trawling, Seine fishing, Longline fishing, Artisan fishing

If we look at the reported catch percentage for each method compared to the total catch figure at each port, in 2009 in this case, the methods hauling in the greatest volumes are seine fishing in Almería, longline and seine fishing in Carboneras and trawling in Garrucha.

After outlining the main features of the fishing structure in the CAMP area, an assessment is made of the sector's current status. To do this, we must discern the features that define and affect it: environmental, economic and social factors. These three qualities are of a markedly different nature and involve apparently opposing interests in the short term. Yet they are closely linked to each other and the situation of each one affects the others.

#### **4.1. Environmental aspect**

In the interviews conducted, most of the sector representatives expressed their concern about the decrease in catches seen in recent years. At some ports, this decrease has been felt more intensely for certain species, such as the red prawn in Garrucha, on which much of the fleet is economically dependent.

However, it is not only the abundance of these resources that is important, but also the population structure, their interactions with other species and the environmental stability of the setting in which they are distributed. In this regard, the interviews conducted also found widespread concern about contamination in coastal waters and fishing grounds, due to the presence of underwater outlets and industrial and urban waste dumping (which becomes worse in summer).

#### **4.2. Economic aspect**

The system currently used for selling fresh fish at Dutch auctions held in the fish markets prevents the possibility of reflecting overall consumer price increases or increases in on-board expenses experienced by the sector in recent years in the first sale price. Consequently, fishers' salaries and purchasing power have decreased, as fishers tend to mitigate the low prices in fish markets through strategies designed to increase catch volumes, thus encouraging overfishing.

This low financial returns situation has been unanimously identified by all the individuals interviewed as the main problem relating to fishing at this time.

#### **4.3. Social aspect**

Throughout the meetings, widespread concern has been voiced for the drop in employment linked to fishing activity, both directly and indirectly. There also a lack of new generations taking over the trade, which endangers the future of this activity. Furthermore, the following issues were discovered:

- Lack of dialogue and associationism between the different types of fishers.
- Limited information exchange between fishers, authorities and the scientific community.
- Low involvement of fishers in decision-making.
- Lack of entrepreneurial ideas in the sector and low participation in proposing activities.

### **5.- Analysis of the existing problems**

As a result of the drop in catch volumes, price stagnation and increased expenses arising from this activity in the Almería area of Levante have led, on one hand, to a gradual desertion of fishing activities, with the subsequent financial losses and the loss in cultural heritage and, on the other, increased efforts by the vessels that do remain to haul in greater catch volumes and offset the low prices, thus encouraging overfishing.

However, the sector's issues are not just of a local nature. The current setting for fishers derives, to a great extent, from the Common Fisheries Policy (CFP) Reform from 2002, which imposed a management policy that the European Commission itself has acknowledged as a failure.

To return to the regional situation, based on the prior diagnosis, a series of issues have been detected in the Almeria area of Levante, which are grouped below according to their nature.

### 5.1. Environmental issues

The future of commercial fishing depends directly on the conservation of the marine environment. This activity exploits live, varying and finite, albeit renewable, resources so bringing populations close to their maximum yield levels should be one of the main goals of fishery management.

As stated in the diagnosis, there is a widespread perception that certain types of catch have decreased. To analyse this, past trends in total reported catch (tonnes) at the 3 fishing ports in the CAMP area from 2006 to 2010 are shown below.

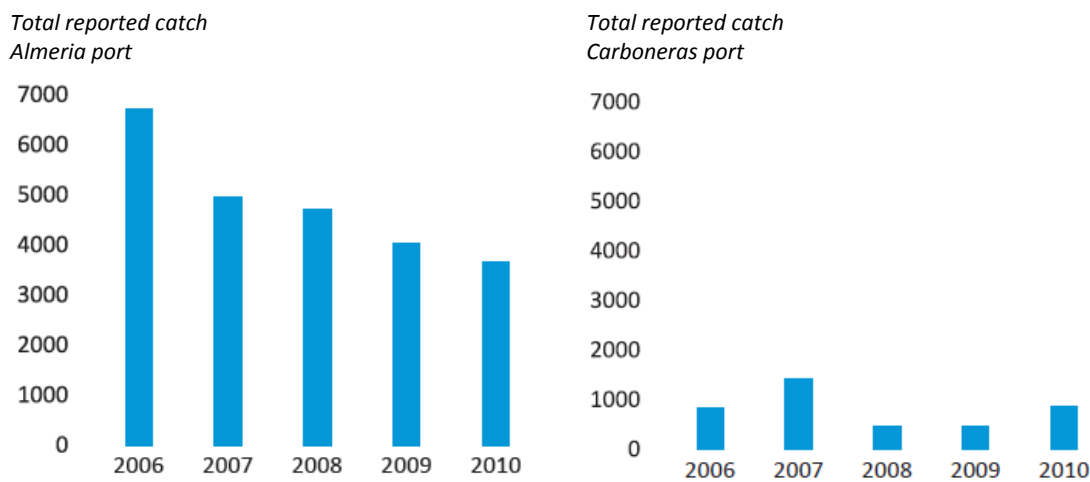


Fig. 5 and 6: Trends in reported catch per port (Almeria and Carboneras) Source: CAPMA.

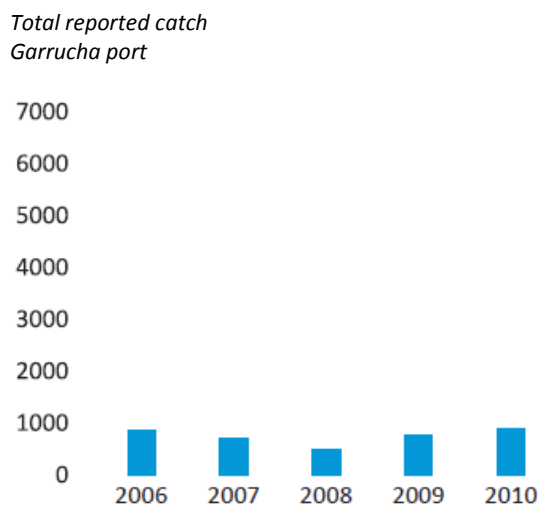


Fig. 7: Trends in reported catch per port (Garrucha). Source: CAPMA.

The graphs above represent the gross catch turnover. They do not include the fishing activity effort associated with the catch, as the data required to show this is not available (such as the number of boats or fishing hours invested).

Analysing catch per port:



- In the case of **Almería**, a sharp, constant, decline can be seen since 2006. We must keep in mind that the fleet at this port dropped by almost 20 vessels between 2005 and 2010, so the catch per vessel would continue to show a drop, although less intense.
- In **Carboneras**, where the port lost 10 registered vessels from 2006 to 2010, the lowest reported catch volumes were seen in 2008 and 2009, when the hauls of frigate mackerel, chub mackerel and horse mackerel dropped sharply. In 2010, the total catch volume recovered, due mainly to the increase in swordfish and frigate mackerel hauls.
- Finally, in **Garrucha** this downward trend was seen until 2008, when the reported catch volume increased, mainly due to the frigate and horse mackerel catches. This port registered the greatest drop in the fleet, with a difference of 23 boats between 2005-2010.

If we look at the species with the greatest financial impact, either due to their high price at fish markets or because of the volume of the catch, a drop in the catch at the Almería port can be seen in the period assessed for monkfish, red prawn, striped red mullet and sardines, with only hake captures showing positive trends. In Carboneras, the hauls of both tuna and red prawn also dropped between 2006 and 2010, but in this case, frigate mackerel and swordfish increased. In Garrucha, the sharpest drop in catch was clearly red prawn. However, other resources such as soldier striped shrimp and frigate mackerel registered significant increases in haul volumes.

As regards the condition of the marine environment, occasional contamination processes due to industrial or urban waste dumping could have an impact on the equilibrium of marine ecosystems. Despite this, the representatives of government authorities consulted consider that, as the industrial presence in this area is low, dumping through underwater outlets has a low impact.

On the other hand, one fact that does have an impact on marine productivity is the decrease in sediment deposited in the sea, which reduces the flow of nutrients between continental and marine waters.

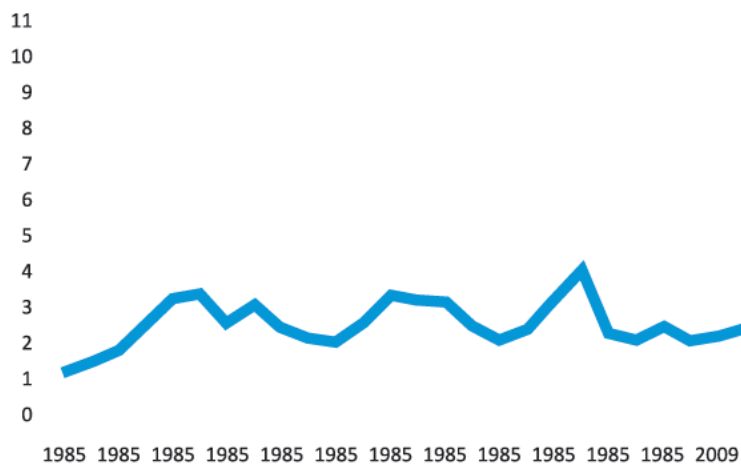
## **5.2. Economic issues**

The stagnation of first sale prices for fresh fish is compounded by the drop in demand for these products on the market. The change in consumption habits among consumers due to the overall crisis situation experienced in Spain has led consumers to purchase frozen or imported fish, which has a much lower market price.

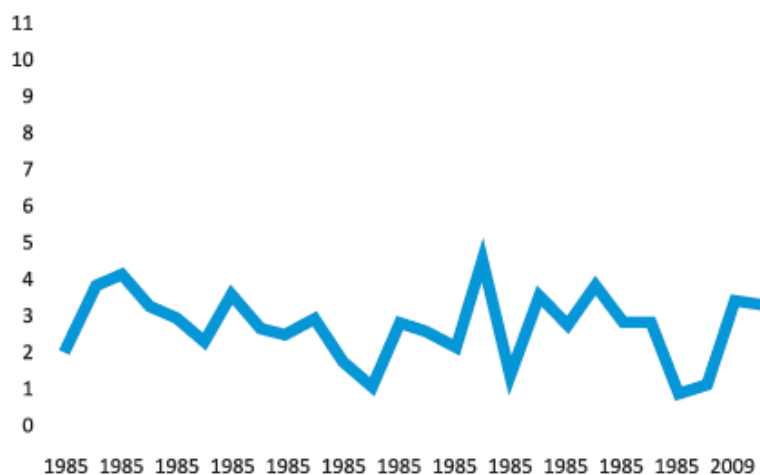
At the same time, the cost of conducting fishing activities has increased. In 2010, the fuel expense in the Andalusian fishing sector was 17.2% of revenue and 35.3% of total operating costs. On-board expenses in compliance with regulations imposed in the Mediterranean also led to a significant increase in expenses in recent years.

The trends for average prices/kg from 1985-2010 are shown below.

Annual trend of average first sale price (euro/kg)  
Almeria port



Annual trend of average first sale price(euro/kg)  
Carboneras port



Annual trend of average first sale price(euro/kg)  
Garrucha port

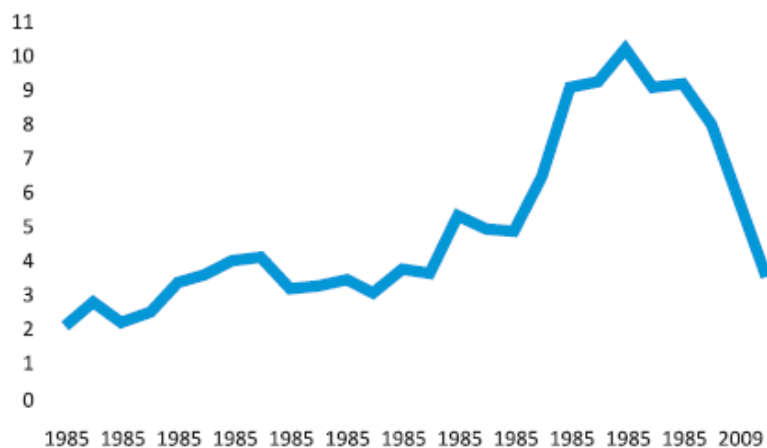


Fig. 8, 9 and 10: Average first sale prices at fish market (euro/kg) per port (Almeria, Carboneras and Garrucha). 1985-2010.  
Source: CAPMA.

### **5.3. Social issues**

Fishing is a commercial activity that generates a significant amount of employment, both directly and indirectly. The drop in the number of boats and the decline in volume of certain catches have a knock-on effect on the social structure of the towns that depend on such activity, as is the case in Carboneras, with more than 20% of the working population linked to the fishing sector.

According to data from the 2010 Andalusian Fisheries Production Report (Regional Government of Andalusia, CAPMA, Fishing and Aquaculture Collection), there are 22,583 jobs linked to the fishing sector in Andalusia. Analysing the data from the aforementioned report, a drop in direct employment is observed between 2009-2010 in the province of Almería, which previously stood at 18.65%; Almería is the Andalusian province that has experienced the least growth. This fact is a direct result of the reduction in both the number of boats and in the number of sailors per boat. This is particularly relevant in Carboneras, where the ratio of crew members/vessel in the longline fleet went from 9.4 in 2009 to 6.7 in 2010.

However, in addition to the low financial returns, there is a second aspect that has led new generations to cease to renew the fishing fleet. The series of courses needed in order to earn the required qualifications for sailing professional fishing vessels have discouraged younger generations from taking over family businesses, thus endangering the future of this activity.

Another important social factor that is decisive for the current situation of the fishing sector is the character inherent to fishers. The conservative mentality of the fishing sector, which is generally reluctant to accept innovation and change, has led the adoption of more sustainable practices to be viewed with mistrust, as there is uncertainty involved in the outcome thereof.

In addition, the lack of cohesiveness perceived among the different fishing methods has led to an absence of associationism within the fishing sector that thwarts joint decision-making and discourages the proposing of individual initiatives. Moreover, the lack of institutional coordination and limited dialogue between fishers, managers, administration and the scientific community is a further obstacle.

### **5.4. Issues specific to each port or fishing area**

Some of the issues that the fishing sector has highlighted during the meetings that have been held are described below. Not all are directly linked to Good Practices, but we considered listing them in the final report relevant.

#### **Almería port**

- There is a resale venue in the vicinity of the fishing port that retains about 80% of the buyers in the area. The products sold in this venue come from other fish markets and may have lower prices, in addition to competing with the Almería Fish Market by opening at more convenient hours for customers.

#### **Cabo de Gata fishing village**

- The census on boats that fish in the Reserve's waters is not up to date.
- Indicators of direct sales to the consumer.
- Lack of a mooring area or fishing harbour in the area to prevent fishers from running their boats aground on the beach.
- There are no toilets or fresh water points on the beaches, affecting the quality of life of the fishers from this area.

#### **Carboneras port**

- The use of the port area in this town is limited. Part of the sector considers that a project should be implemented to reactivate the port.

- The existence of nets piled up on the floors of certain fishing grounds in this area has been described. The possibility that these nets might continue catching fish, thereby causing unintended catches, has spurred numerous sector representatives to suggest they be removed.
- The Carboneras Association of Fishers and the CARBOPESCA cooperative have expressed their objection to the individual distribution of red tuna catch quotas and the establishment of temporary swordfish fishing bans, based on the socio-economic damage they would cause.
- Finally, the suspicion regarding fishing activities with drift nets in Morocco is an issue of concern to fishers in this area.

#### **Garrucha port**

- Artisanal fishers from this port state they have no access to ice for half of the day. This causes problems in maintaining their catch fresh until the auction.
- A 50% drop in red-prawn catches is reported with regard to previous years, which directly impacts the trawling fishing sector.

#### **6. - Results prior to the integration stage**

After the initial work done, a series of actions was proposed as a result of the findings of the analysis and open participation processes, which aimed to offer solutions to the issues detected.

However, as described above, one of the main problems regarding fishing today is its limited profitability, and this problem (fostered to a great extent by the reform of the Common Fisheries Policy in 2002) is difficult to solve locally. In the course of the Individual Project, through the Dissemination of Good Practices Workshops, we have endeavoured to shift the focus of the fishers' work so that they include the Good practices taught in their daily work. However, when proposing post-project activities that help increase their profitability, are of real interest to the sector and have not been implemented previously in the area, we have faced difficulties caused by this type of management regionally.

Commercial fishing is a complex system that is affected by factors of a wide-ranging nature. The aspects that characterise it are closely linked, so any actions proposed cannot be related specifically to improving one of the issues detailed. These actions, some of which are put forward by the sector itself and others supported by only some of its members, seek to harmonise economic activities conducted in the coastal region with the conservation of resources and ecosystems, with long-term feasibility a constant goal.

Below is the list of post-project actions proposed for the SDRF through the Dissemination of Good Practices in the Fishing Sector activity. We can see that some of these measures focus on projects that combine fishing and tourism. These have been direct proposals by the fishing sector, conceived as an additional source of income that could ease the situation of low profitability, and therefore by no means aim to change the activity in the sector, but rather serve as a complement to fishing.

- Promote the legal framework to foster fishing tourism by means of boats adapted for tourist visits linked to fishing and visits to ports and fishing markets.
- Knowledge transfer workshops between scientists and fishers.
- Promotion of a legal framework for the unloading and sale of fish caught via artisan fishing at a specific point of the Cabo de Gata Natural Park, Nijar.
- Support the development of projects that foster direct sales in the fishing sector.
- Design of a project to launch an Artisan Fishing School for the CAMP area.
- Inclusion of Cabo de Gata in the FDG management.

In addition to the actions directly proposed in the Dissemination of Good Practices in the Fishing Sector activity, other actions have been identified in this project in relation to other individual CAMP projects with which synergies have been created and which are considered important to foster and support. These are:

- **Individual Project for Sustainable Use of the Marine Environment:**

- Fostering the installation of Remote On-board Systems (EREs in Spanish) on artisan fishing boats.
- Fostering sustainable fishery certifications (Friends of the Sea, MSC, etc.).
- Promoting projects that prompt marine water deposits to combine with continental water deposits.

- **Individual Project for Improvement of the Land-Sea and Hydraulic Public Domain:**

- Increasing knowledge about how underwater canyons work.

## **7. - Action plan for the post-project stage**

The following actions have been prioritised in accordance with the project's integration process. In other words, the contributions made through Coastal Council open workshops, the findings from the other Individual projects and, finally, the technical-governmental integration workshop for drafting the SDRF.

### **Action 3.1.3.1. AP SDRF. Fostering tourism activities linked to fish markets in ports (For example: Garrucha port)**

- Approximate timescale: the recommended time-frame for development of the activity should be the first or second year after this proposal is made.
- Competent Public Administrations: Ministry of Development, Department of Agriculture, Fisheries and the Environment, Department of Tourism and Trade and Department of Culture and Sport.
- Public Administration responsible for coordination: the activity should be coordinated by the Department of Agriculture, Fisheries and the Environment in conjunction with the Department of Culture and Sport.
- Possible indicators: *Progress over time of the number of activities contracted*. Number of fish markets with tourism activities.
- Indicator selected for the AP SDRF: Number of fish markets with tourism activities. Strategic alliances: due to the prior experience that the Almeria area of Levante FDG technicians have in activities of this kind, this entity is proposed to act as the main collaborating agency in the management.

### **Action 3.1.3.2. AP SDRF. Fostering the legal framework fishing tourism activities in order to encourage the creation of tourism routes linked to fishing and fish farm activities.**

- Approximate timescale: The time-frame for developing the activity shall be defined by the deadline for receiving approval to carry out the activity and by the type of modifications to be made in the boats. Despite these initial obstacles, it is recommended that the bureaucratic procedures begin immediately after this project is approved, as it is considered to be vital support for fishing in the area to be sustainable.
- Competent Public Administrations: Ministry of Development, Department of Agriculture, Fisheries and the Environment, Department of Tourism and Trade, Department of Culture and Sport and, in the case of Cabo de Gata, the Directorate General of the Natural Park.
- Public Administration responsible for coordination: the ultimate responsibility for accomplishing this proposal lies with the Ministry of Development, and therefore this body is considered to be the most appropriate to coordinate the activity.

- Possible indicators: *Number of boats included in fishing tourism/total number of boats* and *Trends in the number of tourists performing this activity*. Number of fishing tourism projects launched.
- Indicator selected for the AP SDRF: Number of fishing tourism projects launched.
- Strategic alliances: the fishing tourism activity could receive advisory services from the Almeria area of Levante FDG technicians, who have ample experience in fishing diversification matters, and by Fundación Andanatura, which is responsible for organising the first fishing tourism pilot tests performed in Andalusia.

**Action 3.1.3.4. AP SDRF. Supporting the development of projects for arranged sales of fish from the Cabo de Gata -Nijar Natural Park for online commercialisation.**

- Approximate timescale: the recommended time-frame for implementation of direct and declared sales projects is one year as of approval of the projects.
- Competent Public Administrations: the organisation in charge of issuing the product label (Association of Producers or the Fishers' Association, where applicable) and the Department of Agriculture, Fisheries and the Environment.
- Public Administration responsible for coordination: Department of Agriculture, Fisheries and the Environment.
- Possible indicators: *Number of new direct sale initiatives/current number of projects of this kind* and *average direct sale product price/average auction product price*. Number of new direct sale initiatives launched.
- Indicator selected for the AP SDRF: Number of new direct sale initiatives launched.
- Strategic alliances: Fundación Lonxanet, based in A Coruña, is proposed as the main advisory body for this type of initiative, due to its vast experience in managing similar actions. In addition, the Organisation of Fishery Producers can be considered an alternative and a benchmark for the province, as it has launched online activities with its "Del barco a la mesa" ("From the Boat to the Table") project. Business associations.

**Action 3.1.3.5. AP SDRF. Design and implement a project to launch an Artisan Fishing School for the CAMP area.**

- Approximate timescale: the proposed time-frame for the activity is 2-3 years following approval, depending on the different refurbishing needs or new construction of the selected facilities.
- Competent Public Administrations: Ministry of Defence, Department of Tourism and Trade, Department of Agriculture, Fisheries and the Environment and the Department of Culture and Sport.
- Public Administration responsible for coordination: again, the activity should be coordinated by the Department of Agriculture, Fisheries and the Environment in conjunction with the Department of Culture and Sport.
- Possible indicators: *Annual trends in the number of visitors to the facilities*. Project implemented.
- Indicator selected for the AP SDRF: Project implemented.
- Strategic alliances: the Garrucha City Council is proposed, as 'Nautarum', the fishing and marine life interpretation centre, is located in this town, representing a similar local experience.

**Action 4.3.1.3. AP SDRF. Holding a two-way knowledge transfer workshop between scientists and fishers.**

- Approximate timescale: this activity is amongst the most important ones put forward. Due to its impact on the conduct of the fishing sector, fostering potential implementation of best fishing

practices, the time-frame for implementation should be established as during the first year after approval of the project.

- Competent Public Administrations: Department of Agriculture, Fisheries and the Environment, Department of the Economy, Innovation, Science and Employment and Department of Culture and Sport.
- Public Administration responsible for coordination: the Department of Agriculture, Fisheries and the Environment, whose technicians have been the main local agents to foster the proposal of this project.
- Possible indicators: *Number of participants/number of parties invited and number of positive assessments/number of negative assessments*. Number of workshops held.
- Indicator selected for the AP SDRF: Number of workshops held.
- Strategic alliances: FDG technicians and the Almeria area of Levante Fishers' Associations are proposed to manage this activity. The involvement of the CAMP project technicians is also proposed, acting as collaborators due to their prior experience in social participation dynamics and their knowledge about the main issues relating to fishing in the region.

#### **8. - Economic, social and environmental feasibility of post-project activities**

This section assesses the economic, social and environmental benefits of the actions included in the SDRF, and the potential sources of funding in existence are also analysed.

##### **Action 3.1.3.1. AP SDRF. Fostering tourism activities linked to fish markets in ports (For example: Garrucha port)**

Marine tourism activities (activity packages, occasional tours of port facilities, guided tours, etc.), provided they are championed by the sector itself, bolster the sustainability of fishing as a business as they represent a potential source of additional income for fishers. At the same time, they foster an appreciation for heritage by educating residents and tourists about fishing culture and offer an alternative for direct and indirect job creation, with numerous businesses that could derive from this activity, such as hospitality, training and cuisine-related establishments. In turn, they further diversify the non-residential tourism supply and, by increasing fishers' net profits, could help reduce the rate of fishing of the resources in the area.

Therefore, the benefits related to launching tourism activities linked to fishing are numerous, including bolstering the sustainability of the sector, raising appreciation for fishing heritage, creating jobs and protecting the marine environment.

##### **Action 3.1.3.2. AP SDRF. Fostering the legal framework for fishing tourism activities in order to encourage the creation of tourism routes linked to fishing and fish farm activities.**

Fishing tourism, a diversification activity based on conducting tours for tourists on board a fishing boat, sharing a day of work with fishers, is not currently regulated by law. However, despite initial obstacles, such as adapting boats to comply with safety regulations for passenger vessels or possible obstacles to registration on the third list (registration for fishing vessels), many experiences of this kind have already been launched in other places in Spain and other countries such as Italy.

The CAMP project aims to foster this activity in the Almeria area of Levante based on the benefits that it could generate in the area. As with the previous activity proposed, the benefits worth highlighting are the raising of appreciation for fishing heritage, bolstering the economic sustainability of the sector, diversification of the non-residential tourism options, protection of the environment (by increasing their net profits, fishers could reduce the volumes caught in the area) and the creation of direct and indirect

employment. Therefore, provided it is championed by the sector itself, this activity could mitigate the issues of a lack of economic and environmental sustainability relating to fishing.

**Action 3.1.3.4. AP SDRF. Supporting the development of projects for arranged sales of fish from the Cabo de Gata -Nijar Natural Park for online commercialisation.**

One of the main issues of fishing is its commercialisation system. Fishers cannot reflect the increase in expenses deriving from their activities in the price of the fish. The difference between the value of a product at its first sale at the fish market and the final price to the consumer is quite high. If the chain of intermediaries is eliminated (either through direct sale or online sales), fishers can sell their catches at a fairer price and consumers can be sure they are purchasing fresh local products.

In addition, artisan fishers that run their boats aground in the Cabo de Gata area constitute a fishing population that should be protected and appreciated once again given that, in addition to performing low impact commercial fishing, they are one of the main tourist attractions in the area and are part of the cultural heritage of the Almeria area of Levante.

However, fishing in Cabo de Gata must be legalised, since it continues to be conducted, in some cases, under legislation that is currently not in force, with evidence of unreported sales directly to consumers. Thus, legal direct sale projects (with the issuance of the label and declaration of the catch) would eliminate this problem and also provide economic benefits, by constituting an alternative path that is independent from the market price listed by the daily auction at the fish market.

The proposal for this activity is based, as already described, on the initiative taken from the Almeria Producers Organisation (Almeria port) through their project entitled 'From the boat to the table'. Since the CAMP project, it is considered that this experience should be taken as a benchmark when implementing similar systems in the Almeria area of Levante.

**Action 3.1.3.5. AP SDRF. Design and implement a project to launch an Artisan Fishing School for the CAMP area.**

The establishment of an Artisan Fishing School -understood as a fair or gallery displaying fishing tackle and explaining and disseminating the fishing reality and activity in the CAMP area- would entail, in addition to encouraging the spread of marine culture within society, avoiding the loss of fishing cultural heritage, a possible source of extra income for fishers and promote cultural, and even gastronomic tourism in these towns (with activities such as cooking workshops, etc.).

If it were to be implemented in the Cabo de Gata - Nijar Natural Park (the site within such that is proposed by the sector is the Torre de Defensa in San Miguel de Cabo de Gata) there could be a display set up inside with old fishing gear of historical value, which are currently deteriorating on the beach; also, a fenced area could be set up within the facilities for fishers to leave their gear there, thus eliminating the current problem generated by the stands occupying public space.

In summary, the main benefits of the implementation of this activity would be:

- Protection and dissemination of fishing cultural heritage.
- Possible increased purchasing power for the sector.
- Possibilities of generating new jobs.
- Clearing occupied public maritime-terrestrial space.



**Action 4.3.1.3. AP SDRF. Holding a two-way knowledge transfer workshop between scientists and fishers.**

Fishers -who are highly dependent on the state of resources- have empirical knowledge accumulated throughout their professional lives; however, their coming together and engaging in dialogue as well as the exchange of knowledge between them and the scientific community -who have theoretical knowledge and greater objective assessment capability- would benefit both sectors and, consequently, the fisheries management of the Almeria area of Levante.

The main objective of this activity -most of the fishers surveyed having expressed an interest- is encouraging the coming together of the two communities in order to address the lack of existing dialogue and favour the implementation of best practices in the fisheries sector, under the assumption that so as to protect the resource, prior knowledge of such is required. To such end, we propose the implementation of participatory Expert Technical Workshops, where they can disseminate and discuss the results of studies conducted in the CAMP area among fishers, researchers and any association or individual concerned.

**The funding sources identified for the proposed actions are:**

- **EFF:** The European Fisheries Fund provides the fisheries industry (marine and inland fisheries, aquaculture, processing and marketing) with funding in order to be more robust in economic terms as well as ecologically sustainable. These aids, applicable throughout European Union territory and granted by the Directorate-General for Maritime Affairs and Fisheries and the European Commission, has financed projects based on strategic plans and operational programmes developed by national authorities, within a scope of action that is summed up in 5 priority axes.

Eligible actions must conform to the plans included in one of its priority axes and applications shall be made to the Fund within the period set out, which is by 31 December 2013. From this date on, a further period will be opened within the new European Maritime and Fisheries Fund (EMFF) covering the period between 2014 and 2020.

The grant offered is non refundable and has a maximum value of 75% of the total project budget, and no other aid may be received from other EU financial instruments for any expenses funded by the EFF.

- **FDG and Priority Axis 4 (sustainable development in fishing areas):** FDG collaborates with Regional Government of Andalusia's Department of Agriculture, Fisheries in the management and implementation of axis 4 of the 2007-2013 European Fisheries Fund.

Individuals or legal entities -public or private- conducting an activity or making an investment within the fishing area that is within the scope of FDG Carboneras and Garrucha municipalities) are eligible to apply to the relevant Fund, provided that the action contributes to meeting the objectives under the Strategic Plan. Priority shall be given to projects from parties performing work related to the fisheries sector or belonging to a fisher's family unit. The deadline for applications will be open until 30 June 2013 and the maximum allowable amount will be 60% of the total investment in productive projects, which may reach up to 100% in the case of a non-productive activity of public or collective interest.

- **Fundación Biodiversidad:** Fundación Biodiversidad periodically awards grants by calling a tender to enable biodiversity, climate change and sustainable development activities to be conducted. This year -2012- the tender deadline was on 31 July. It is, however, advisable, from the Individual Project, to review the future Tender notices that may be announced from this entity.

- **LIFE + Projects:** The LIFE + programme co-finances projects that contribute to the development and implementation of environmental policies and laws, provided that the projects submitted for funding do not meet the criteria set by or receive assistance from other financial entities, such as the European Fisheries Fund. In this case, the funded projects can be proposed by agents, as well as public or private entities or institutions.

This grant can be awarded for a maximum of 50% of the total project's budget and applications must be submitted by 26 September 2012. It would make sense to review future invitations that may be take place.

## **9. - Lessons learned**

The main difficulties encountered in the implementation of the Dissemination of Good Practices in the Fishing Sector activity have been:

- Low attendance to some of the Dissemination of Good Practices Workshops conducted. Not only by players from the fisheries sector, but also from administration bodies and associations that were to take part.
- The fishers that attended generally showed little interest in the activities proposed for the post-project stage, except for some exceptions such as the artisan fishers from the Cabo de Gata-Níjar Natural Park.

Despite this, the team behind the Individual Project considers the workshop's level of dissemination was high and that this lack of interest may be due to low social awareness hindering public participation. Therefore, the measure proposed to mitigate these problems is to intensify efforts concerning training, awareness-raising and knowledge promotion.

Another recommendation from the Individual Project includes extending the CAMP's maritime area. Currently, it is limited to the existing part that stretches one nautical mile from the coast beyond the straight baseline. However, part of the area's fleet operates outside these limits. Therefore, it is proposed that the area be extended as far as 12 nautical miles, corresponding to the territorial sea.

The final suggestion is to incorporate at least one fisher related to this Individual Project into the Group of Experts. The fisheries sector has been represented within this Group of Experts by a technical expert from the management and another from the FDG. In addition, it is believed that the presence of a direct representative of the sector would have enriched the working group, providing a comprehensive view of the issues and facilitating the proposed actions to overcome these problems.



## 10.2

### *Dissemination of good practices in the agricultural sector*

Final Report

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## TABLE OF CONTENTS

Executive summary

1. Introduction
2. Description of the project
3. Compilation and summary of the information
4. Diagnosis
5. Analysis of the existing problems
6. Results prior to the integration stage
7. Action plan for the post-project stage
8. Economic, social and environmental feasibility of the post-project actions
9. Lessons learned

## INDEX OF ANNEXES

Annex 10.2.I Diagnosis of the Agricultural Sector in the Levante de Almeria coastal area.  
Annex 10.2.II Informative pamphlet about the workshops: Environmental situation and challenges for the agricultural sector in the Almeria area of Levante: Water footprint management and sustainable production.

## TABLE OF FIGURES

*Figure 1 Percentage of the CAMP Project area occupied by diverse agricultural systems.*

## LIST OF TABLES

*Table 1: Characteristics of the 'Workshops: Environmental situation and challenges for the agricultural sector in the Almeria area of Levante.*

*Table 2. Water consumption for irrigation in different agricultural systems*

## ABBREVIATIONS USED

AP SDRF: Action Plan Sustainable Development Reference Framework.

CAMP – Coastal Areas Management Programme

CP/RAC - Cleaner Production Regional Activity Centre under the Mediterranean Action Plan

COEXPHAL - Coordinator for Almeria's Horticultural Product Export Organisations.

COAG – Coordinator for Farmer and Livestock Breeder Organisations.

FIAPA - Foundation for Agricultural Research in the Province of Almeria.

GDP – Gross Domestic Product

IFAPA – Andalusian Agricultural, Fishing, Foodstuffs and Ecological Production Research and Training Institute.

SEPRONA – Nature Protection Service of the Spanish Civil Guard.

CIP – Competitiveness and Innovation Framework Programme.

## **Executive summary { XE "1.- Socioeconomic inheritance of the Levante de Almería" }**

This report aims to provide insight into the activities performed relating to Dissemination of Good Practices to the Agricultural Sector, which forms part of the CAMP Levante de Almería Individual project on Dissemination of Good Practices in Productive Activities.

After listing the general and specific objectives of this activity, a description will be provided of the activities implemented and the products developed. The diagnosis of the agricultural sector in the CAMP area -attached as Appendix I- is summarised below. It was prepared using the material compiled and the information collected from the activities included in this project, and is accompanied by an analysis of the main issues that currently affect agriculture in the Almería region of the Levante area.

Finally, a timeline for post-project activities is provided, aimed at solving the main problems detected within the framework of this activity. In addition, a compilation of potential sources of funding is included, along with a proposal for monitoring and implementation assessment indicators.

The end of this document contains the lessons learned during the course of the project.

## **1.- Introduction { XE "2.- Strategic goals for achieving sustainability on the Levante de Almería coast." }**

The Dissemination of Good Practices to the Agricultural Sector activity, included in the 'Dissemination of Good Practices in Productive Activities' Individual project, is based on the Barcelona Convention. Its aim is to guarantee the sustainability of the CAMP area in accordance with that established in Article 9.1 on economic activities of the Protocol on Integrated Coastal Zone Management in the Mediterranean.

Historically, agricultural activities have shaped the appearance of the scenery of the coastal zone in many ways. In recent decades, the traditional extensive agricultural model has gradually been replaced by intensive agriculture practices, having a tremendous impact in economic, environmental and social terms. In the mid- to long-term, it is to be expected that this sector will remain as one of the driving economic forces in the zone, making an analysis of agricultural activities necessary in terms of sustainability of all kinds. The aim of this individual project is to prepare an inventory of the main points that distinguish this sustainability and the spread of this information to the sector.

To reach this goal, a series of activities have been implemented, the results of which are summarised in the diagnosis:

- Analysis of the data available in existing studies via the internet, written press or in unpublished reports by entities involved in the study;
- Interviews with technical experts, farmers and numerous public bodies regarding the application of traditional and new techniques;
- Visits to key production companies;
- Design and implementation of two Dissemination of Good Practices to the Agricultural Sector Workshops focusing on greenhouse agriculture, open-air vegetable production and waste management.

The Diagnosis of the Agricultural Sector in the Almeria coastal area of Levante is included as Annex 10.2.I and the informative pamphlet about the Workshops: Environmental situation and challenges for the agricultural sector in the Almeria area of Levante. Water footprint management and sustainable production as Annex 10.2.II.

## **2.- Description of the project**

The work done by the Dissemination of Good Practices in Agricultural Sector activity team has followed the recommendations and opinions set by the different agents involved through the social participation and administrative coordination bodies created as a pilot during the development of the CAMP project.

The Expert Group for the Dissemination of Good Practices in Productive Activities Individual project is composed of members of the scientific community, professionals from the main production sectors in the Almeria region of Levante and experts from the competent administrative bodies. Thus, realistic, creative, viable and achievable proposals were sought for the post-project stage. This has been an innovation in the CAMP Levante de Almeria project, since in previous CAMP projects the expert groups comprised a single group made up of the technical experts and consultants in charge of each Individual project.

One of the problems detected during the Feasibility Study and also during the course of the CAMP Levante de Almeria project was excessive sectoring; in other words, a limited view of the territory as a whole, which led to tension and counter-productive actions among the different activities. This had the collateral effect of causing further damage to the environment. The cross-sector perspective of this team of experts has entailed a break with that trend from the past and has allowed more enriching contributions to be made.

In relation to the Dissemination of Good Practices in Agricultural Sector, the Experts Group participated in the methodological design of the activities during the formulation of the project. In the implementation stage, they collaborated in conducting the diagnosis and proposing the post-project activities to be done. To this end, they met four times during the course of the CAMP Levante de Almeria project.

Other CAMP project bodies that have influenced the work in this individual project are the Coastal Council, composed of social agents who perform activities in the CAMP area, and the Coastal Commission, through the expert delegates appointed by each administrative body. At their meetings and participation seminars, these two bodies have expressed their concerns and views regarding the agricultural sector, which have been noted and taken into consideration by the team in charge of this activity. Finally, there is the Coastal Forum, which is open to all citizens and in this case, expressed its opinion during the work workshops.

Within this framework for action, the main task of the team in charge of the Dissemination of Good Practices in Agricultural Sector activities has consisted of conducting a Diagnosis of the Agricultural Sector in the Almeria coastal area of Levante (Annex 10.2.I). The goal of this work was to create a territorial inventory of the different farming systems and a description of the common practices in relation to the main determining factors for the environmental impact of this sector. Based on these descriptions and the knowledge and know-how of the team in charge and the entities that were consulted, proposals were made to mitigate the issues found concerning the near future.

The diagnosis was made within a very tight time frame. Therefore, data was gathered mainly from documented studies, supplemented by data provided by experts from some of the regional production companies. The team responsible for this activity is aware that some of these data may be insufficient to allow generalisations to be made, and therefore they have endeavoured to highlight trends that are as consensus-based as possible in order to detect the issues to be resolved.

After preparing the first draft version of the diagnosis during the period elapsing from November 2011 to March 2012, the document was presented to the Expert Group of the Dissemination of Good Practices Individual project in order to obtain feedback and suggestions. Subsequently, it was presented to the rest of the teams in charge of other CAMP Levante de Almería individual projects at coordination meetings in drawing up the Sustainable Development Reference Framework, including the contributions of each.

With the aim of submitting the diagnosis conclusions for opinions and assessments by the various actors in the sector and to receive their proposals for the post-project stage, Workshops and Training Seminars were arranged, in conjunction with the Regional Activity Centre for Cleaner Production within the Mediterranean Action Plan (CP/RAC), which were entitled: 'Environmental Situation and Challenges for the Agricultural Sector in the Almería Area of Levante: Water Footprint Management and Sustainable Production'. These events took place on 22 and 23 May 2012 in Campohermoso and in Rodalquilar (Níjar), respectively, in order to profit from the synergy created with the Activities Programme commemorating the 15th Anniversary of the Cabo de Gata–Níjar Natural Park and Biosphere Reserve, which had scheduled workshops on ecological agriculture within the setting of this Protected Natural Area. Thus, the Natural Park Management agreed to expand the length and content of the Workshops. The workshops' programme is attached as Annex 10.2.II. There were 47 participants at the event. Information about this activity was spread by email by the Technical Coastal Office, addressed to Technical Delegates on the Coastal Commission, members of the production sector of the Coastal Council, members of the scientific community, communities of irrigators and key agents in the farming sector. The team in charge of this activity (Fundación CAJAMAR and COEXPHAL) also participated actively in spreading the information through its own professional contacts, namely technical experts and managers of the farming companies and cooperatives that regularly work with these entities. Finally, COAG, the professional farming organisation that is an active member of the Coastal Council, also collaborated in publicising the event by inviting its contacts.

It is worth noting that the participants included numerous sector representatives, and that both the attendees and speakers participated in the discussions regarding the future challenges of agriculture in the Almería Area of Levante, offering reflections that have enriched the diagnosis and post-project stage proposals.

In Table 1, the features of this training and participation activity are detailed.

The proposals resulting from these workshops are contained in chapter 6 herein.

Once the Workshops conclusions were included, the diagnosis and initial post-project proposals were presented and submitted for debate at the Findings Integration Workshop for the Sustainable Development Reference Framework, held on 28 May 2012 in Almería, in which members of the different CAMP Levante de Almería teams of experts, Technical Delegates from the Coastal Commission and Coastal Council observers participated.



Date	Timetable	Duration (hours)	Contents	Team of educators
23-05-12	09:30 – 18:30	9	<p>CAMP Levante de Almeria presentation Agricultural Sector Diagnosis presentation</p> <p>Round table: Agriculture in Almeria facing environmental challenges: forward-thinking initiatives.</p> <p>Waste management - phytosanitary packaging. Water footprint management.</p> <p>Participatory session: Challenges for a sustainable future in Levante agriculture. Calculating the water footprint: Methods and tools for ascertaining actual water consumption and developing strategies to reduce consumption.</p>	<p>Mr. Jan van der Blom. Coordinator of the COEXPHAL Production Techniques Department. Mr. Antonio Marhuenda. PRIMAFLOR Production Manager. Mr. Antonio Ufarte. Manager of CESP – ALBAIDA. Mr. Santiago Bonachela Castaño. Chair of the Plant Production Dept. University of Almeria. Mr. Adrià Giménez. Project Manager. Regional Activity Centre for Cleaner Production within the Mediterranean Action Plan (CP/RAC). Mr. Victorino Martínez Puras. Director of Development and Communication at SIGFITO Envases S.L. Mr. Jan van der Blom. Coordinator of the COEXPHAL Production Techniques Department and Mr. Adrià Giménez (CP/RAC). Mr. Peter Penning. Chairman of Antea GROUP. Mr. Douwe Algra. Manager of the Antea GROUP Security and Environment Division:</p>
24-05-12	09:00 – 15:30	7	<p>Guided tour of the ecological production farm in the area. The 'Ecos del Tajo' (Echoes of the Tagus River) Project. Ecological agriculture as a development model in the Tagus River basin. Round table: Towards sustainable agriculture through integrated and ecological production in the Almeria area of Levante.</p>	<p>Mr. Francisco Belmonte. Manager of BIOSABOR. Mr. Alejandro Martínez. CEDER Caparra. Mr. Antonio García Padilla. Chairman of COPROHNIJAR. Mr. Alejo Salado Gil. Manager of Bio Sol de Portocarrero. Mr. José Requena Nieto. Agriculture Councillor for the Nijar City Council.</p>

Table 1: Characteristics of 'Work seminars: Environmental situation and challenges for the agricultural sector in the Almeria area of Levante'.

### 3.- Compilation and summary of the information

A summary of how the information needed to prepare the Diagnosis of the Agricultural Sector in the CAMP area was gathered is contained below.

#### 1. Analysis of the territory

##### 1.1 Distribution of the different agriculture systems:

- Queries made on the Institute of Statistics and Cartography of Andalusia website (<http://www.juntadeandalucia.es/institutodeestadisticaycartografia/sima/index.htm>)

- Data attained in Céspedes A. J., García García M. C., Pérez Parra J.J., Cuadrado Gómez I.M. 'Caracterización de la explotación hortícola protegida de Almería' (2009). FIAPA, Fundación Cajamar. 177 pp
- These data were verified through queries to technical experts at the fruit and vegetable production companies in each zone. Mainly, PRIMAFLO, KERNELL BIO, AGRUPALMERIA, PARQUE NATURAL SAT, COPROHNIJAR SCA and EUROSOL SAT.

#### 1.2 Agricultural practices: Quality standards and certification

- Queries on regulations and surface areas to the certification company AGROCOLOR SL.
- Meeting at the Agriculture Department with the Service Manager and technical experts in charge of Plant Health and Integrated Production.
- Existing regulation on Integrated Production, GLOBAL-GAP protocol, and UNE standard 155,000.

#### 1.3 Ecological Agriculture.

- Queries on regulations and surface areas to the certification company AGROCOLOR SL.
- Meeting with the Head of Ecological Agriculture at the Almeria branch of the Government of the Region of Andalusia's Agriculture and Fisheries Department.
- Queries on the Ecological Production Information System in Andalusia SIPEA website.(<https://ws128.juntadeandalucia.es/agriculturaypesca/roae/>)
- Tour and interview with the technical expert in charge of the KERNELL BIO estates in the Cortijo del Fraile site.
- Queries to technical experts from three cooperatives that market ecological vegetable products.

### 2. Social assessment of Agriculture in the Almeria area of the Levante coast.

The basis for the social assessment of agriculture was the information gathered during several socio-economic studies by Fundación CAJAMAR and the University of Almeria. These data were prepared by adapting them specifically to the geographic area encompassed in the CAMP project.

### 3. Description of current status

#### 3.1 Agricultural waste management

- Interviews with technical experts at the production companies in each zone to detect the focus points. Mainly, AGRUPALMERIA, PARQUE NATURAL SAT, COPROHNIJAR SCA and EUROSOL SAT.
- Interviews with the manager of the company ALBAIDA SA, which is responsible for storing and recycling organic waste material produced in the greenhouses.
- Consultation with the company SIGFITO agro-envases SL, which is responsible for handling and recycling phytosanitary product packaging.

#### 3.2 Use and handling of phytosanitary products

- Survey on the use of phytosanitary products conducted with technical experts at the fruit and vegetable production companies in each zone. Mainly, PRIMAFLO, AGRUPALMERIA, PARQUE NATURAL SAT and COPROHNIJAR SCA.
- Preparation of internal data about biological control and the use of tomato plant pollinators attained from the COEXPHAL Production Techniques Department.
- Queries regarding the regulations on approved active substances in Integrated and Ecological Agriculture Production (<http://www.juntadeandalucia.es/agriculturaypesca/portal/areas-tematicas/agricultura/sanidad-vegetal/produccion-integrada/index.html>) (<http://www.juntadeandalucia.es/agriculturaypesca/portal/areas-tematicas/produccion-ecologica/index.html>)
- Queries about legislation regarding the use of phytosanitary products on the Spanish Ministry of Agriculture, Foodstuffs and the Environment's website

(<http://www.magrama.gob.es/es/agricultura/temas/medios-deproduccion/productos-fitosanitarios/fitos.asp>)

- Queries to:
  - The technical expert responsible for pesticide waste analysis at the COEXPHAL Laboratory.
  - Numerous technical books, including: De Liñan y Vicente, C., 1997: *Farmacología Vegetal. Ed. Agrotécnicas S.L.*, Madrid. (This publication describes the residual effect that most active substances currently used have on the environment)

### 3.3 Use and handling of nitrogen and water

- Survey on the use of nitrogen and water conducted with technical experts at the fruit and vegetable production companies in each zone. Mainly, PRIMAFLOR, KERNELL BIO, AGRUPALMERIA, PARQUE NATURAL SAT and COPROHNIJAR SCA.
- Consultation on the regulations regarding the use of nitrogen in vulnerable areas, on the Department of Agriculture and Fisheries website.  
([http://www.juntadeandalucia.es/agriculturaypesca/cocow/cumplir\\_vulnerables.html](http://www.juntadeandalucia.es/agriculturaypesca/cocow/cumplir_vulnerables.html)).
- Consultation of bibliographic sources on the use of nitrogen, contained in the diagnosis (Annex 10.2.I).
- Tour, in company of the managing technical expert, of the farms of the company PRIMAFLOR S.A., in Pulpi.
- Tour, in company of the managing technical expert, of the EUROGOLD greenhouse of the company S.A.T. EUROSOL in Nijar
- Tour, in company of the managing technical expert, of several greenhouses of the company S.A.T. PARQUE NATURAL in Nijar
- Tour, in company of the managing technical expert, of several greenhouses that are using the WISE-irrisystem irrigation system.
- Data from Dr. Alberto Pardossi (University of Pisa, Italy), presented at a technical workshop in Almeria on 9 February 2012. The data cited are available at:  
<http://www.euphoros.wur.nl/NR/rdonlyres/FF27AE41-038D-41D1-BEEF-B2CEB534E7B4/145966/Deliverable21EuphorosPublishableYrrep32011.pdf>

## 4.- Diagnosis

Intensive agriculture in the area under study in the CAMP project experienced sharp growth in the '80s and '90s, remaining relatively stable regarding surface area in the last decade. Undoubtedly, this is the main driving force of the economy in the area and it can be expected that this will remain the case in the mid- to long-term future. In order to guarantee the feasibility of the agricultural system in upcoming decades, it is essential that progress be made in terms of sustainability, preventing a build-up of environmental and social problems.

Regarding the environmental impact, there are three main factors to note:

- Use of phytosanitary products.
- Use of water and fertilisers for irrigation.
- Waste management.

The Diagnosis of the Agricultural Sector in the Almeria coastal area of Levante, which is attached herein as **Appendix I**, focused mainly on these technical issues, as regards both the description of the current situation and the inventory of experience-based progress, with a view of optimising resources and

reducing environmental impact. The final outcome is the result of the contact made with a wide range of technical experts, farmers and researchers.

#### **4.1. Introduction**

As a highly profitable activity, intensive fruit and vegetable agricultural can be considered the most relevant driving force of the region's economy, especially since the sharp decline in construction as of 2008. The situation today is the result of stormy developments that took place primarily in the last two decades of the 20th century. Undoubtedly, this development has led to economic prosperity in a region that was formerly one of the poorest in Europe, despite the fact that certain key issues for sustainability were initially ignored. Some highly relevant progress has been made in this regard in the last decade, particularly in relation to rural sanitation and use of phytosanitary products. However, there is still a lot of work to be done to optimise the use of several numerous resources to ensure the long-term survival of the sector.

It is estimated that agriculture, along with the services related to it, generates approximately 40% of the GDP of the CAMP Project area. In the medium to long term, forecasts do not show that other economic sectors will be able to offer alternatives to this economic activity. Agriculture covers approximately 11.2% of the total area of the Almeria part of Levante: 4.3% greenhouses and 6.9% open-air crops.

To water the crops, a volume of water equal to 40.5% of the rainfall in the area is consumed. There is potential for reducing the water volume in both greenhouses and open-air crops by modernising the irrigation systems. According to estimates, these savings could reach up to 30% of total consumption. However, in order to reach this percentage, investments must be made that are not currently within reach for most farms. Along with the reduction in water volume, nitrogen use could also be optimised significantly. Approximately 30% of the fertiliser used is lost as water is leached into the subsoil, leading to the eutrophication of the wells. Thus, financial losses are generated due to excessive spending on fertilisers, in addition to creating an environmental problem.

The use of phytosanitary products has dropped considerably in recent years due to the spread of the use of beneficial organisms for pollination and pest control. At the same time, most of the pesticides with significant residual effects have been taken off the market because of changes in legislation and demand by the main buyers of products from Almeria. The use of agrichemicals for soil disinfection has also dropped considerably. Therefore, contamination in aquifers due to phytosanitary products is minimal at present.

In general, considerable progress has been made in rural sanitation, both through ordinances passed by city councils and actions implemented by the Department of Agriculture, Fisheries and the Environment, as well as by the producers themselves. Although most agricultural waste can be recycled, including all the plastic, a significant percentage of it still ends up in municipal dumping grounds. This includes inert substrate and part of the plant waste, for example, which is hard to separate from the twine used for trellising the plants.

Regarding soil use, the agricultural model in Almeria offers certain clear advantages compared to agriculture in other areas of Spain. In a relatively limited space, it offers employment and profits to large numbers of people, enabling large parts of the province to be left alone as nature zones.

The most relevant features of the diagnosis performed are summarised below.

## 4.2. Territorial and socio-economic analysis

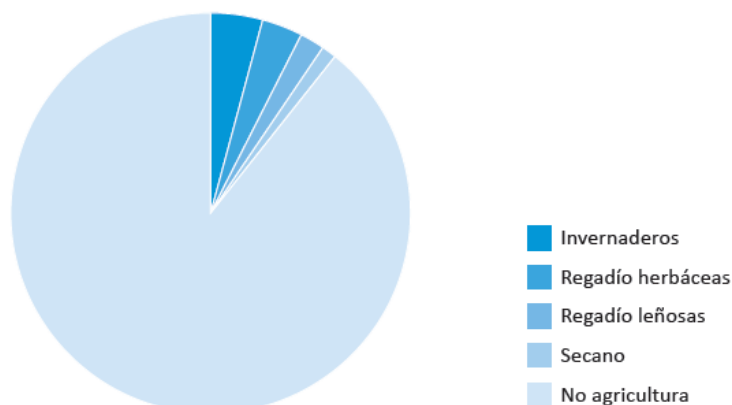


Gráfico 1. Porcentaje de la superficie del área de proyecto CAMP ocupado por diferentes sistemas de agricultura.

Figure 1 Percentage of the CAMP Project area occupied by diverse agricultural systems (Greenhouses, irrigated herbaceous crops, irrigated woody crops, unirrigated crops, non-agricultural)

The total surface area of the eight municipalities included in the CAMP project study area is 148,710 hectares, approximately 11% (16,482 ha) of which is devoted to agriculture (Graph 1). 69% of this farmed area consists of greenhouses (6,352 ha) and open-air herbaceous crops, especially lettuce (nearly 5,000 ha). The greenhouse-covered area in the Almeria region of Levante has not experienced significant changes in the last ten years. Due to the current situation in the agricultural sector, major changes are not expected in the greenhouse area, although a modernisation of the existing farms is expected.

Due primarily to the high profits generated by fruit and vegetable agricultural under plastic, agriculture can be considered the most relevant driving force of the region's economy, especially since the sharp decline in the construction sector from 2008 on.

The fruit and vegetable agricultural sector consists mainly of family businesses. On average, the mean surface area of fruit and vegetable production farms is 1.81 ha, where 44% of the work is done by farmers and their families. The vast majority (80%) of the 56% of paid labourers are foreign residents.

There is a clear trend towards increasing the average area of farms. From 1999 to 2009, the area per farm grew by 20%. Due to increasing professionalism and the narrow margins that farmers have to work with, this increase in scale is expected to continue to rise more sharply in the near future. Regarding labour, an increase is expected in the percentage of domestic wage-earners given that, as a result of the crisis in construction and subsequent rising unemployment, the lack of alternatives will be increasingly severe.

## 4.3. Environmental impact

### 4.3.1. Use of phytosanitary products

In both the fruit and vegetable greenhouses and in the open-air vegetable crops, the use of phytosanitary products has changed drastically in recent years. Firstly, this reduction is the consequence

of the widespread use of beneficial organisms for crop pollination and pest control by releasing insects and mites, which are natural enemies of pests. At the same time, many phytosanitary products have been removed from the market as a result of new European regulations. However, the potential presence of pesticide waste products continues to be a concern among European consumers. For this reason, the major supermarket chains, which are the main customers of the region's fruit and vegetable products, have set standards regarding pesticide use that are much stricter than those established by law, demanding fruits and vegetables that are free of virtually any trace of residue.

Since the mid-'90s, bumblebees have been introduced to pollinate the flowers in 100% of the tomato crops. Thus, the use of pesticides is strongly reduced, limited to phytosanitary products that are compatible with these pollinators. The reduction in the use of pesticides has been marked even further by the sharp increase in the application of biological control (in other words, pest control using predators and parasites that are natural enemies of pest insects and mites). During the 2011-2012 growing season, approximately 50% of the greenhouses used biological control. The success observed in the use of biological control ensures that the application of this technique will rise significantly.

In open-air herbaceous crops and irrigated woody crops holding diverse quality standard certifications, there are similar requirements to those required for greenhouse crops. However, to date, widespread biological control has not been applied in these crops.

#### 4.3.2. Water use

Table 2 shows an estimate of actual water consumption in the different agricultural systems in the area. We can see that the greatest amount of water is dedicated to greenhouse crops, followed by open-air herbaceous and woody crops. While agriculture occupies approximately 11% of the total area of the zone, the volume of water applied in irrigation, increased with precipitation on this area, is equal to 38.7% of the total precipitation in the zone.

For greenhouse fruit and vegetable crops, water represents approximately 2.5% of production costs. For open-air fruits and vegetables, this percentage is considerably higher, ranging from 15 to 18%.

Agricultural systems		Average consumption per ha (m <sup>3</sup> )	Total area (ha)	Total consumption (m <sup>3</sup> )
<b>Greenhouses*</b>		5,200	6,352	33,030,400
<b>Open-air crops**</b>	<b>herbaceous</b>	5,800	4,984	28,907,200
<b>Woody crops (citrus and olive groves)</b>		7,000	3,346	23,422,000
<b>Unirrigated crops</b>			1,800	
<b>Total agriculture</b>			16,482	85,359,600

Table 2. Water consumption for irrigation in different agricultural systems

\*Total annual consumption for greenhouse irrigation is 5,700 m<sup>3</sup>/ha. The volume of rainwater that is used, which comes to approximately 500 m<sup>3</sup> on average is subtracted from this amount.

\*\*For open-air herbaceous crops, an average consumption of approximately 5,800 m<sup>3</sup>/ha/year has been estimated, considering that on average just under 2 crop cycles are produced per year on the same land.

#### 4.2.3. Fertiliser use

Fertiliser consumption represents a significant expense for greenhouse crops, approximately 7% of the total production cost. In open-air herbaceous crops, this percentage is around 4%.

Several of the most important agricultural sectors in the Almeria area of Levante are classified as vulnerable due to nitrate pollution from farm-related sources. In these areas, the maximum number of Nitrogen (N) units applicable to the crop per expected production unit for tomatoes cannot surpass 12 kg per tonne produced. Estimating that approximately 15 kg/m<sup>2</sup> are produced in a long tomato cycle, the rate of 1,800 kg N/ha cannot be exceeded. The data provided in the diagnosis show that, on average, 733 kg/N per ha are consumed by a tomato crop from August to June using the combined fertilising irrigation technique. The nitrogen added through manure must be added to this amount. According to studies conducted by the Fundación Cajamar Experimental Station, manure provides approximately 400 kg of Nitrogen per ha / year. Thus, the total amount, ranging from 1,100 to 1,200 kg N/ha, is well under the maximum amount of 1,800 kg N/ha.

In open-air herbaceous crops (lettuce, Chinese cabbage, broccoli, etc.), the use of Nitrogen has been observed to exceed the threshold set by the regulation on many occasions. The addition of manure in lettuce crops must not exceed 50 kg of N per unit produced. Producing 4.5 Kg/m<sup>2</sup> of lettuce per crop cycle, this means a maximum amount of 225 kg N/ha added. This amount is equal to or exceeded by the usual application of 200-300 kg N/ha through manure bed covering, in addition to the usual addition of fertilisers in irrigation. In an ecological lettuce crop, approximately 15,000 kg/ha per crop cycle of bed fertiliser is applied.

In crops in irrigated areas, the greatest loss of Nitrogen occurs through the leaching of nitrates unused by the crop and dragged by irrigation water to surface aquifers. Subsequently, this accumulated excess of nitrates may lead to contamination of aquifers where the water for human consumption is extracted or to eutrophication of coastal waters.

#### 4.3.4. Irrigation water and fertiliser savings.

To economise on the use of water and nutritional resources, there are two key factors: a. using irrigation equipment that wastes as little water as possible through evaporation and run-off; b. measuring the plants' needs at any given time and adjusting watering based on these needs. In both regards, important progress has been seen in new techniques that enable the production of optimal harvests, with highly significant water and nutrient savings. These savings can come to 30% for water and, probably, in excess of 30% for fertilisers.

Optimising irrigation equipment means, firstly, installing drip mechanisms that offer more even results. While there is normally a 20% difference in the amount of water currently given off by drip irrigation, depending on the exact position in the system, there are systems in which this difference is reduced to under 5%. In general, these are pressure-compensating no-drain drip systems that feature drip lines that always stay full and emit the same amount of water, even when there are minor pressure differences along the length of the drip line.

For open-air crops, drip tapes are used, buried 8 cm below the surface, which carry the water directly to the roots of the plants, thus preventing surface evaporation. The use of buried drip systems is now being implemented in most open-air crops, economising approximately 20% on water compared to surface drip systems.

To adjust the watering rate, modern systems use probes that continually record the presence and conductivity of the water at different depths, in order to ensure that irrigation water does not go beyond the area where the root systems are. The probes use a wireless system to organise the irrigation

from the heads, featuring very short bursts at close intervals. Compared to more common systems, water savings come to 30% and 40% can be saved on fertiliser. We have already seen some highly positive experiences in greenhouses on a small number of estates spanning this area in the last two years. Likewise, the main producers of open-air crops have managed to reduce costs quite significantly using new watering techniques on a considerable amount of land. The only factor that hinders widespread implementation of the use of these systems is the major investment involved, which, at present, is only profitable for large farms.

Approximately 5% of the greenhouses use bagged substrate as the basis for their crops. For the most part, run-off water is not recirculated, and thus a large amount of water and nutrients is wasted. However, several companies do collect run-off water to tap it back into the watering system. Savings through the reuse of run-off water and nutrients come to a total of 25% for water, 40 % nitrogen, 24% phosphorous and 11% potassium. Currently, these savings represent a value of € 1,500 to € 2,000 per ha. Evidently, these are sufficiently high values to make implementing these techniques on as large a scale as possible one of our goals.

In order to recirculate run-off water, an adequate collection system is needed, levelling slopes that prevent collection using gravity and creating a separate pool for storage, which can be tapped to dose the water back into the system. Besides the investment in this infrastructure, there are two factors that hinder water recirculation: 1. The need to disinfect the water to prevent the spread of diseases in the soil; 2. The accumulation of 'bad salts', i.e., salts that cannot be assimilated by plants. These include, above all, Sodium Chloride (NaCl), which means that a good source of high quality water must be available. Well water in the Almeria area of Levante is mostly unfit for this purpose, and therefore it is necessary to use desalinated water or rainwater.

#### **4.3.5. Irrigation water and fertiliser savings in ecological agriculture**

Given that the use of water and fertilisers has a direct impact on the environment, it is recommended that saving on these resources be defined as a priority in Ecological Agriculture standards. Therefore, it is recommended to allow the option of growing in organic substrates, enabling run-off water to be collected and recirculated.

#### **4.3.6. Waste management**

Great progress has been made in the last 15 years regarding the management of agricultural waste. The prohibition to burn waste is worth highlighting, and billows of smoke are only occasionally observed in this zone. Waste removal in containers and controls over illegal dumping have also notably improved the appearance of the agricultural scenery. However, it must be noted that there is still much work to be done to reach a situation of maximum sustainability, namely, fruit and vegetable agricultural in which all the consumables are easily degradable or recyclable.

The main waste products generated in intensive agriculture are:

- The plastic used as roofing and flooring.
- Metal for the greenhouse structure.
- Plant waste.
- Agrichemical and fertiliser packaging.
- Non-recyclable materials, such as mineral-based inert substrates.

As the price of petroleum -the raw material for manufacturing plastic- has risen steeply in recent years, recycling has become profitable enough to ensure that it is properly collected. The metal from the greenhouse structures is also satisfactorily recycled when the structures are torn down for refurbishing.



Removal of plant waste is mandatory, and illegal dumping is penalised under municipal ordinances and also by the Regional Government of Andalusia's Department of Agriculture, Fisheries and the Environment, for phytosanitary reasons. Most plant waste is composted. However, the composting process is hindered by the lack of uniformity in the waste from the containers. Plastic twine, in particular, used for trellising plants, is quite hard to eliminate, thus generating a high rate of rejection. Furthermore, the profitability of composting is strongly affected by the low prices for compost on the market.

Agrichemical and fertiliser packages and the trays used in the seedbeds generate a large volume of waste that is highly persistent and highly visible in the environment. Most phytosanitary product packaging is recycled by the company SIGFITO agro-envases S.L. However, approximately 75% of the agricultural packages are not covered by this initiative, such as fertiliser drums. Therefore, there are many packages for which recycling costs are not covered.

There is still a significant volume of waste that cannot be recycled, ending up in municipal dumping grounds. This includes inert substrates, such as rockwool and perlite, and the fraction of plant waste that cannot be separated from contaminating elements.

#### **4.3.7. Agricultural waste recycling**

As mentioned in the section above, despite considerable improvements made in the last decade, there are still several bottlenecks that require urgent attention. On the one hand, composting of plant waste is greatly hindered by the presence of non-organic contaminants such as twine and other trash. Therefore, a large percentage of plant waste ends up in municipal dumping grounds. There are several options to mitigate this problem:

- Promoting the use of biodegradable twine in short cycle crops.
- For long cycle tomato crops, where tests with biodegradable twine have not shown positive results, the separation of plant material from plastic compounds must be encouraged. To this end, the difference in container management costs could be increased, making it considerably more economical to deliver uniform, properly separated waste.

The recycling system for phytosanitary product packaging through SIGFITO is relatively effective, although we must point out that only 55% of the packages covered by this initiative are recycled. Besides phytosanitary product packages, there are numerous other product packages that are not covered under this plan. The expenses for recycling these packages are not covered and these products are not picked up at SIGFITO pick-up points. Many of these packages end up in municipal dumping grounds.

In Spain, it is currently not possible to recycle inert crop substrates such as rockwool or perlite. These materials generate large volumes of waste that also end up in municipal dumping grounds. Since 2001, the environmental impact of substrates has been fiscally penalised. The VAT rates for inert substrates have risen from 8 to 21%, whereas this increase was not applied to organic substrates.

#### **4.3.8. Positive impact: CO<sub>2</sub> absorption and habitat diversification**

In addition to the factors mentioned above that could represent the negative impact of intensive agricultural on the environment, this agricultural system also has highly positive features. The plant mass generated under plastic absorbs a quantity of carbon dioxide (CO<sub>2</sub>) equal to capturing this gas in a forest of young trees. Thus, a landscape with primarily desert flora has become a sink for CO<sub>2</sub>, one of the gases 'responsible' for global warming. In this regard, the greenhouses of Almeria contrast quite positively with the greenhouses in Central Europe, where significant amounts of energy are consumed in providing the required amount of heating, with the subsequent CO<sub>2</sub> emissions.

While it is certain that greenhouses offer a relatively poor landscape in ecological terms, certain elements in the system do provide habitats that can enrich the area. This is the case, for example, of the irrigation pools that form spots of water in a characteristically dry zone. When these pools are properly managed, they can provide uncommon aquatic flora and fauna. In the vicinity of the pools, insects such as dragonflies and damselflies flourish, and the relatively abundant bird life found wintering in the area is also noteworthy. This includes a wide range of tern, heron, duck and wader species, which are commonly found among plastic-covered crops.

#### **4.4. Agricultural practices: Quality Standards and Certification; Ecological Agriculture**

European consumers are particularly sensitive about the healthiness of the food they consume. This forces fruit and vegetable producers that want to export their produce to implement quality standards that certify these practices. The main quality standard that is certified in agricultural companies in the province of Almería is Spanish UNE Standard 155000, while the GLOBAL-GAP protocol and Integrated Production standard are also quite widespread. The goals of these three standards are similar, their main difference lying in the geographic scope of each. While the GLOBAL-GAP protocol was conceived as an initiative by a group of European supermarkets and applied internationally, the UNE standard is defined nationally within Spain. Integrated Production was defined and implemented by the Regional Government of Andalusia. Around half of the crops grown in greenhouses and open-air crops are certified under one or more of these standards. Just under 5% of greenhouse crops and approximately 7% of open-air ones are implemented and certified as ecological agriculture.

The different quality labels have all been created mainly from a food safety perspective. Therefore, the main focus is on limiting the use of phytosanitary products, encouraging or forcing farmers to use biological pest control. There are few specific regulations about other aspects that influence environmental impact, such as a rational use of water and nutrients, or recycling agricultural waste. Ecological agriculture has strict rules regarding the type of consumables that can be used for pest control and for fertilising, prohibiting synthesised chemical products. However, there are no special rules about the amount of nitrogen that can be applied, for example, or the recycling of waste beyond the general legislation.

#### **5.- Analysis of the existing problems**

As a result of the work done for the diagnosis, the following problematic issues have been found as regards sustainability:

- **Irrigation.** The equipment and methods used for irrigation show room for improvement, allowing for potential savings of approximately 30% in water, and the percentage of fertilisers is likely to be higher.
- **Waste management.** Regarding waste management, we have found that there is a large percentage of waste that cannot be recycled which, therefore, generates significant volumes that end up in municipal dumping grounds. These problems stem from:
  - Containers with mixed types of waste, hindering recycling of each of the materials separately;
  - Agricultural consumables that are not 'intended' for recycling;
  - For some recycled products, specifically compost, market prices are very low, discouraging the possibility of investing in the recycling process.

- **Production Quality Certifications.** Approximately 50% of farms are certified under a production process quality standard (UNE 155000, GLOBAL-GAP and Integrated Production). 5% of greenhouse crops and 7% of open-air crops are certified under ecological agriculture standards. None of these certifications has water or fertiliser savings measures or a more detailed waste management policy defined as priorities, and therefore the certified companies are not encouraged to make an additional effort in these areas.
- **Issues related to the landscape.** Regarding the impact on the landscape, the following aspects are worth noting:
  - Despite the fact that the degree of recycling of the plastic greenhouse roofs is relatively satisfactory, abandoned greenhouses are an issue. These are greenhouses with decaying plastic reduced to shreds, which is scattered by the wind, creating visual pollution over large expanses in the vicinity.
  - The concentration of greenhouses creates an uninterrupted surface area that completely dominates the countryside in the production zone. For several reasons, it would be beneficial to break up this predominance over the landscape by placing semi-natural plantings in the spaces between the plastic-covered farmlands. These fields would not only improve the visual impact, but would also act as phytosanitary barriers, offering shelter to beneficial organisms and acting as traps for pest insects and mites.
    - One of the positive features of agriculture, which enriches the biodiversity of the area, is the presence of irrigation pools, providing uncommon habitats in the desert climate of the Almeria region of Levante.

## 6.- Results prior to the integration stage

The proposals for post-project stage activities are described in section 7 herein below. They were prepared at the same time as the diagnosis. The proposals made by the different participants in the workshops and debates held within the framework of this individual project have also been added. The following proposals, specifically, have been added:

- Fostering R&D projects to implement integrated energy solutions linked to farms by including this line of research in the different applicable tender notice.
- Several measures for improving the management of agricultural waste:
  - Developing a protocol for waste collection planning at waste management companies;
  - Including the use of plant waste as livestock feed in integrated ecological agriculture manuals.
  - Encouraging programmes that foster individual composting using one's own waste;
  - Supporting research projects related to the use of plant waste for biogas or biofuel production by including this line of research in the different applicable tender notice.
  - Fostering measures for managing waste from micro-desalination plants.
- Setting up collaboration agreements with agricultural associations to foster the launch of agri-tourism trails.

## **7.- Action plan for the post-project stage**

Based on the diagnosis made and the contributions by the participants of the integration meetings and workshops, the following actions are proposed for the post-project stage:

**Action 3.1.1.1. AP SDRF. Design and creation of incentives for the implementation of technology aimed at water and nitrogen consumption reduction and efficiency on intensive agricultural crops, aimed at:**

1. Encouraging the collection of rainwater on greenhouse roofs.
2. Fostering the use of probes to measure water requirements in the greenhouse.
3. Fostering automated water and fertiliser dosing depending on the water and nutrients gauged in the soil in real time.
4. Fostering soil and leaf sample nutrient analyses at key stages for all crops.
5. Improving the uniformity of irrigation systems.
6. Reusing run-off water from the substrate in greenhouse crops, to be tapped back into the same crop or for use on crops outside the greenhouse.
7. Seeking technical solutions for disinfecting run-off water.
8. Developing protocols regarding soil cleansing to eliminate 'bad salts'.

**Approximate timescale:** Year 5.

**Competent Public Administrations:** Department of Economy, Innovation, Science and Employment.

**Public Administration responsible for coordination:** Department of Agriculture, Fisheries and the Environment.

**Possible indicators:**

- Percentage of greenhouses with rainwater collection installations;
- Manual on optimal irrigation and soil management and monitoring;
- Number of dissemination activities performed on the manual.
- Existence of a log at farms, with data on water and fertiliser consumption;
- Decrease in water and nutrient consumption per production unit;
- Inclusion of new rules about water and fertiliser use in production quality regulations;
- Existence of soil nutrient and/or leaf sample analyses results saved at each farm;
- Inclusion of new rules about conducting nutrient analyses on soil and/or leaf samples in production quality regulations;
- Percentage of greenhouses with appropriate drip systems;
- Inclusion of rules about drip system quality in production quality regulations;
- Existence of a structure for run-off water collection and reuse in greenhouses with crops in substrate;
- Inclusion of new rules about water recirculation in crops in substrate in production quality regulations;
- Manual about run-off water disinfection;
- The number of new criteria added to certified production quality standards.

**Indicators selected for the AP SDRF:**

- Percentage of greenhouses with rainwater collection installations;
- Manual prepared about optimal watering and soil management and monitoring;
- Number of dissemination activities performed on the manual.
- The number of new criteria added to certified production quality standards.

**Strategic alliances:** Agricultural Organisations; Certification Entities; Universities; Andalusian Agricultural and Fishing Research and Training Institute (IFAPA).

**Action 3.1.1.2. AP SDRF. Fostering R&D projects to implement integrated energy solutions linked to farms by including this line of research in the different applicable tender notice.**

**Approximate timescale:** Year 5.

**Competent Public Administrations:** Department of Economy, Innovation, Science and Employment; Department of Agriculture, Fisheries and the Environment.

Public Administration responsible for coordination : Department of Economy, Innovation, Science and Employment.

**Strategic alliances:** Agricultural Organisations; Universities; Andalusian Agricultural and Fishing Research and Training Institute (IFAPA); Tabernas Solar Platform.

**Possible indicators:**

- No. of facilities installed;
- Power rating of the electricity produced;
- Number of public tenders within the line of research included.

**Indicator selected for the AP SDRF:**

- Number of public tenders within the line of research included

**Action 3.1.1.3. AP SDRF. Preparing and disseminating a technical manual of best practices for the integration of greenhouses into the countryside by planting stands of trees and hedges for visual and phytosanitary purposes**

**Approximate timescale:** Year 2.

**Competent Public Administrations:** Department of Agriculture, Fisheries and the Environment.

Public Administration responsible for coordination: Department of Agriculture, Fisheries and the Environment.

**Strategic alliances:** Agricultural Organisations; Universities; Andalusian Agricultural and Fishing Research and Training Institute (IFAPA);

**Possible indicators:**

- Planting design manual;
- Availability of native or semi-native plant species for the plantings;
- Planting area in linear metres;
- Technical manual prepared regarding integration of greenhouses into countryside;
- Number of dissemination activities performed;
- Number of informative activities performed relating to this topic.

**Indicators selected for the AP SDRF:**

- Technical manual prepared regarding integration of greenhouses into countryside;
- Number of dissemination activities performed;
- Number of informative activities performed relating to this topic.

**Action 3.1.1.4. AP SDRF. Adopting measures for improving the management of agricultural waste aimed at:**

1. Encouraging correct separation of different types of waste generated through agriculture:
  - Varying the price that farmers pay according to the uniformity of the waste generated;
  - Developing a protocol for waste collection planning at waste management companies;
  - Inclusion of new rules about waste separation in production quality regulations
2. Encouraging recycling of consumables:
  - Seeking new uses for waste that is not currently recyclable;
  - Including the recycling cost in the purchase price of diverse products.
3. Plant waste management:

- Including the use of plant waste as livestock feed in integrated ecological agriculture manuals;
  - Encouraging programmes that foster individual composting using one's own waste;
  - Supporting research projects related to the use of plant waste for biogas or biofuel production by including this line of research in the different applicable tender notices.
4. Developing guidelines for fostering the reuse of packaging from agricultural consumables:
- Expanding the SIGFITO programme to non-phytosanitary product packages (nutritional, phytofortifiers, bumblebee nest boxes, etc.).
  - Increasing the number of packaging collection points.
5. Launching a campaign for the collection and elimination of old pesticides in storage.
6. Fostering measures for managing waste from micro-desalination plants.

**Approximate timescale:** Year 5.

**Competent Public Administrations:** Department of Agriculture, Fisheries and the Environment, Department of the Economy, Innovation, Science and Employment.

Public Administration responsible for coordination: Department of Agriculture, Fisheries and the Environment.

**Strategic alliances:** Agricultural Organisations; Certification Entities; Universities; Andalusian Agricultural and Fishing Research and Training Institute (IFAPA); SEPRONA.

**Possible indicators:**

- Percentage of waste recycled;
- Technical manual prepared for the management and recycling of each type of waste;
- Volume of plant waste used for livestock feeding, compost and biofuel;
- Percentage of agricultural consumable packages recycled;
- Number of agricultural packaging collection points;
- Quantity of expired phytosanitary product packages collected;
- Lack of expired phytosanitary product packages at farms;
- Existence of a collection system for waste from micro-desalination plants;
- Number of informative activities conducted regarding the collection of expired phytosanitary product packages and improvements in management of waste from micro-desalination plants.

**Indicators selected for the AP SDRF:**

- Percentage of waste recycled;
- Technical manual prepared for the management and recycling of each type of waste;
- Volume of plant waste used for livestock feeding, compost and biofuel;
- Percentage of agricultural consumable packages reused;
- Number of agricultural packaging collection points;
- Number of informative activities conducted regarding the collection of expired phytosanitary product packages and improvements in management of waste from micro-desalination plants.

**Action 3.1.1.5. AP SDRF. Setting up collaboration agreements with agricultural associations to foster the launch of agri-tourism trails.**

**Approximate timescale:** Year 2.

**Competent Public Administrations:** Department of Tourism and Trade, Department of Culture and Sport.

Public Administration responsible for coordination: Department of Tourism and Trade

**Strategic alliances:** Agricultural Organisations

**Possible indicators:**

- Number of collaboration agreements signed;
- Number of farms equipped to welcome (groups of) visitors;
- Documents with information about agri-tourism options available in hard- and electronic-copy form;

- Number of visitors received at participating farms.

**Indicator selected for the AP SDRF:**

- Number of collaboration agreements signed.

**Action 3.1.1.6 AP SDRF. Preparing and disseminating a technical manual of best practices for achieving and maintaining stable aquatic plant environment in irrigation pools.**

**Approximate timescale:** Year 2.

**Competent Public Administrations:** Department of Agriculture, Fisheries and the Environment.

Public Administration responsible for coordination: Department of Agriculture, Fisheries and the Environment.

**Strategic alliances:** Agricultural Organisations; University of Almeria

**Possible indicators:**

- Manual on irrigation pool management
- Percentage of pools with balanced underwater vegetation.

**Indicators selected for the AP SDRF:**

- Manual prepared on irrigation pool management

**Action 4.3.1.1. AP SDRF. Organising and holding a series of workshops for the 'Application of best practices and sustainable production in the agricultural sector'.**

**Approximate timescale:** Year 2.

**Competent Public Administrations:** Department of Agriculture, Fisheries and the Environment, Department of Education.

Public Administration responsible for coordination: Department of Agriculture, Fisheries and the Environment.

**Strategic alliances:** Agricultural Organisations

**Possible indicators:**

- Number of workshops organised and number of participants in each;
- Presentations given.

**Indicator selected for the AP SDRF:**

- Number of workshops organised.

## **8.- Economic, social and environmental feasibility of the post-project actions**

Several of the measures proposed in section 6 refer to measures that can provide direct or indirect profits to fruit and vegetable producers in the short or mid-to-long term. Specifically, these are the points mentioned in section 3.1.1.1, which could be implemented within a 5-year period as they are highly feasible. Implementation depends on the optimisation of experimental techniques and the publication of finding in several media channels. To this end, it is essential that close collaboration between the administration and the production sector can be ensured.

The proposals presented represent significant changes in the production systems, in many cases, requiring major efforts to be made by producers as regards both investments and training. With the aim of speeding up the implementation of the required measures, it would be appropriate to launch a 'Commission for Sustainability in Agriculture' (CoSA) tasked with coordinating the activities with the entities involved and publishing the necessary information through statements, courses and workshops. The Department of Agriculture and parties in charge of Environmental issues, as well as the fruit and

vegetable production sector, through HORTYFRUTA, COEXPHAL, Fundación CAJAMAR, COAG, ASAJA, UPA and other agencies, for example, must be represented within the CoSA.

The initiatives proposed could be co-funded by European Funds such as the Competitiveness and Innovation Framework Programme (CIP), the European Agricultural Fund for Regional Development or the Seventh Framework Programme for Technological Development and Innovation. The implementation of ecological footprint labels would not represent terribly high costs for farmers and the administration, but it would, in turn, represent greater income and therefore, an incentive for farmers. Another option would be using Operational Funds to finance the infrastructures needed to provide savings in irrigation water.



## **9.- Lessons learned**

The environmental, financial and social impact of agriculture is such a vast field that the available resources in this CAMP project are insufficient to provide us with a full picture of the subject. Therefore, much of the numerical data about technical issues must be interpreted as estimated impressions that set trends. Large-scale surveys and tours of a greater number of farms and other companies would have undoubtedly provided more conclusive findings and a wider range of possible solutions. It is important for this diagnosis to be used as the basis for continuing with this work. However, the collaboration at every level from individuals and entities in preparing the diagnosis shows that the sector itself considers that it is highly important for the production system to be capable of innovating in order to achieve a degree of sustainability that guarantees the long-term persistence of agriculture.

Good examples of accomplishments in terms of sustainability can be seen in relation to plant health and rural sanitation. The mass implementation of biological pest control was possible because of the direct advantages it entails in a technical sense. Likewise, rural sanitation has improved because farmers became convinced that illegal dumping grounds are sources of diseases and pests that can directly damage their crops. In sum, it is essential that any change proposed be sustainable on its own, offering advantages that offset the financial efforts required to achieve the goals.



# 10.3

## *Dissemination of good Practices in the Tourism Sector*

Final report

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## **TABLE OF CONTENTS**

Executive Summary

1.- Introduction

2.- Description of the project

3.- Compilation and summary of the information

4.- Diagnosis

5.- Analysis of the existing problems

6.- Results prior to the integration stage

7 – Action plan for the post-project stage

8 - Economic, social and environmental feasibility of post-project actions

9 - Lessons learned

## **INDEX OF ANNEXES**

Annex 10.3.I Good Environmental Practices in Tourism Sector Conference Programme.

## **LIST OF FIGURES**

*Figure 1. The evolution of tourism resources in the CAMP area between 1988 and 2010 (number of places).*

*Figure 2. Tourism resources in the CAMP area and Almería per establishment type in 2010 (%).*

*Figure 3. The importance of tourism resources in the CAMP area with regards to total provincial resources per establishment type in 1988 and 2010 (%).*

*Figure 4. The evolution of tourism resources in the CAMP area per municipality between 1988 and 2010 (number of places).*

*Figure 5. Average daily expenditure in € per visitor according to tourism sectors.*

*Figure 6. Average stay per tourism sector.*

*Figure 7. No. of people staying in hotels in the province of Almeria.*

*Figure 8. Hotel occupancy rate per month in the province of Almeria, years 1999, 2005 and 2011 (%).*

## **LIST OF TABLES**

*Table 1. Meetings with the tourism sector and attendees.*

*Table 2. Features of the Best Environmental Practices in the Tourism Sector Conferences.*

*Table 3. Tourism resources in the CAMP area per municipality between 1988 and 2010 (number of places).*

*Table 4. Location of housing stock in the CAMP area in 2001.*

*Table 5. Surface area dedicated to urban areas, infrastructures and industries in the municipalities of the CAMP area, province of Almeria and Andalusia, in hectares, between 1999 and 2007.*

## **ABBREVIATIONS USED**

AP SDRF: Action Plan Sustainable Development Reference Framework

CAMP: Coastal Area Management Programme

EAFRD: European Agricultural Fund for Rural Development

EFF: European Fisheries Fund

EU: European Union

EUROSTAT: Body tasked with providing the statistics for the European Commission.

FAAM: Almeria Federation of Associations of People with Disabilities.

FORAN: Andalusian Self-employment Fund

IEA: Institute of Statistics and Cartography of Andalusia

ICZM: Integrated Coastal Zone Management

IUCN: International Union for the Conservation of Nature

RAC-CP: Regional Activity Centre for Cleaner Production within the Mediterranean Action Plan

SMBs: Small and Medium-sized businesses

## Executive summary

This report aims to provide an insight into the activities that have been conducted relating to the Dissemination of good practices in the tourism sector, which forms part of CAMP Levante de Almería's Dissemination of Good Practices in Productive Activities Individual Project.

After listing the general and specific objectives proposed in the Inception Report, a description will be provided of the activities that were finally implemented and the products that were developed. Subsequently, a diagnosis of the situation of the tourism sector in the CAMP area will be provided<sup>1</sup>. Performing this diagnosis did not initially form part of the Individual Project's technical specification, but throughout the implementation of CAMP it has become obvious that we needed to update the information compiled in the Feasibility Study relating to the tourism sector's position and the issues it faced with regards to its economic and environmental sustainability, with a view to being able to propose coherent post-project actions for the different production actions.

Subsequently, the main issues detected and the different post-project actions and the feasibility thereof are listed. The report concludes with a description of the lessons learned while this activity was being implemented.

## 1.- Introduction

The dissemination of good practices in the Tourism Sector activity is part of the 'Dissemination of Good Practices in Productive Activities' Individual Project. Throughout the CAMP Levante de Almería Feasibility Study, which included the participation of local agents, a mixed tourism model was discovered in the CAMP area where traditional, holiday and residential tourism converge, which was, therefore, deeply linked to the building sector, with a trend towards extensive land use. Compared to the rest of Andalusia, in 2005 the tourism sector in the Almeria area of Levante was still emerging and required resources, infrastructures and quality services, in which there was still room for action through regional zoning and land use planning.

On the one hand, the environmental problems discovered were therefore linked to the activities planned by the Cultural Heritage Conservation and Landscape Valuation individual projects. On the other, however, they had to be addressed through the dissemination of good environmental practices in the sector itself.

The general aim of the Dissemination of Good Practices Individual Project is to make progress with regards to compliance with the Protocol on Integrated Coastal Zone Management in the Mediterranean (hereinafter the ICZM Protocol) within the context of the Barcelona Convention, which sets forth -in article 9.1- that with regards to economic activities, the Parties must comply with the following, among other things:

- *Ensure that, in the different economic activities, the use of natural resources is reduced to a minimum and the needs of future generations are taken into consideration;*
- *Promote best practice codes among public authorities, economic actors and non-governmental organisations.*

Therefore, the dissemination of good practices in the Tourism Sector is intended to promote best practices in the sector, making the most of the prior experience of the Mediterranean Action Plan's Regional Activity Centre for Cleaner Production (CP/RAC). To achieve this, the following activities have been implemented:

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<sup>1</sup> The CAMP area is made up of the municipalities of Almeria, Nijar, Carboneras, Mojacar, Garrucha, Vera, Cuevas del Almanzora and Pulpi and the coastal waters adjacent to such municipalities that are protected by the Water Framework Directive.

- Meetings with key players in the tourism sector to discover the opinions of the sector with regards to the current issues and to propose issues to solve them.
- “Dissemination of Good Environmental Practices in the Tourism Sector” Conferences.

## 2.- Description of the project

The work performed by the team in charge of this activity has followed the recommendations and opinions highlighted by the different players involved, which were organised on a trial basis in the following bodies throughout the implementation of the CAMP: Team of Experts, the Coastal Council and the Coastal Committee (via Technical Delegates).

Throughout the CAMP Levante de Almería formulation stage, a team of experts was formed for each individual project. Since the Dissemination of Good Environmental Practices in the Tourism Sector is embedded in the Dissemination of Good Practices in Productive Activities Individual Project, it has shared the Team of Experts with the activities relating to the fishing and agriculture sectors. Therefore, it brings together experts from the Department of Agriculture, Fishing and Environment and the Department of Tourism and Trade as well as professionals from the production sectors and members of the scientific-technical community. This has enabled this Team of Experts to have a comprehensive insight into the production activities in the area and the possible synergies or incompatibilities that may arise between them, although it has meant that, in order to ensure the functioning thereof, the number of experts from each sector is lower than in other Teams of Experts. Nonetheless, the advantage of this team's make-up is being able to facilitate the exchange of experiences and knowledge between managers and scientists from different production sectors and, therefore, when realistic proposals are developed they feature the rigour of and are endorsed by such members of the team.

During the formulation stage, the Team of Experts for the Dissemination of Good Practices in Productive Activities Individual Project contributed to the initial design process for this individual project's activities and, during the implementation stage, assessed the different work teams that have performed the activities aimed at each sector, making appropriate corrections and contributions, thus ensuring their experience plays a part in the final outcomes.

Furthermore, the Coastal Council, composed of social actors that conduct their activities in the CAMP area, has had an influence on this activity through meetings and participatory workshops, in which the latter have put forward their concerns and perceptions relating to the tourism sector.

The Dissemination of Good Practices in Productive Activities Individual Project had initially only planned to hold a handful of Dissemination of Good Practices Conferences with hotel SMEs, which were to be based on the Best Practice Guide for Hotels provided by the CP/RAC. However, in order to draw up a Sustainable Development Reference Framework, knowledge of the sector's growth since the Feasibility Study and its current challenges was required. Therefore, three open meetings were also held to which key players from the tourism sector were invited.

Taking all of the above into account, the Dissemination of Good Practices in the Tourism Sector was organised in the following way:

- On **8 and 9 May 2012**, the management team held a series of **meetings and interviews with key players from the tourism sector in order to assess it**. Therefore, prior to the visits, the most relevant and/or representative organisations, associations, experts and professionals from the sector were identified and invited to participate. The aims of these meetings were to: a) gather the opinions in the sector with regards to current issues and their strategic proposals to solve them, guaranteeing the economic and environmental sustainability of the sector in the medium

and long term; b) increase the visibility of the *Dissemination of Good Environmental Practices for the Tourism Sector* Conference; c) make public the Almeria area of Levante Cultural and Landscape Heritage Trail, developed within the framework of the Cultural Heritage Conservation Individual Project and gather their opinion relating to the proposals to use such trail to boost the tourism sector in the Almeria area of Levante.

The team in charge of the Dissemination of Good Practices in the Tourism Sector held interviews with players from public institutions, representatives from local tourism offices, technical bureaus from town councils, but also agents from the special interest groups and the business world. The meetings held and attendees are described in Table 1. Furthermore, the meeting timetable is attached as **Appendix I**.

Meeting/interview	Attendees
<b>8 May Almeria.</b>	<p>Head of the Conservation of Historical Heritage Department of the Provincial Delegation for Culture.</p> <p>Head of the Tourism Service of the Provincial Delegation for Tourism and Trade.</p> <p>Representative of the Andalusian Rural Accommodation Network.</p> <p>Representative of the Tourism Board of the Almeria Council.</p> <p>Representative of the Almeria area of Levante Tourism Business Owners' Association.</p> <p>Expert from the Tourism Department of Almeria Council (and Almeria Municipal Tourism Business).</p> <p>Consultant responsible for the socio-economic study for the CAMP Levante de Almería Sustainable Development Reference Framework.</p>
<b>9 May Vera.</b>	<p>Representative of the Mojacar Tourism Office.</p> <p>Representative of the Almeria area of Levante Shopkeepers' Association.</p> <p>Tourism Expert from the Vera Council.</p> <p>Student of the Tourism Activities Professional Training Module at the Cuevas del Almanzora Institute.</p> <p>Two experts from the Almeria area of Levante Rural Development Group.</p>
<b>9 May Campohermoso.</b>	<p>Interview with the representative of the Natural Park Business Owners' Association and the Andalusian Natural Park Brand Licensee Association Federation.</p>
<b>9 May Campohermoso.</b>	<p>Representative of the Asociación Gata Verde (the Green Gata Cape Association).</p> <p>Member of the Carboneras Tourism Council.</p>

*Table 1 Meetings with the tourism sector and attendees.*

The topics covered by the attendees have been included both in the diagnosis and section 5 of the report herein.

- On **24 May 2012** a **Best Environmental Practices in the Tourism Sector Conference**, intended for those public and private agents that, either directly or indirectly, form part of the tourism sector: hotel managers, restaurateurs, public administration experts, tourism business associations and active tourism companies. The aim of these Conferences was to show the most important players in the sector an alternative tourism management model, such as sustainable tourism. A total of 19 people took part in these conferences. The Conferences' programmes are attached as **Appendix II**. These conferences were designed to be inclusive, and the attendees could also make their opinions known, as with the previous meetings, regarding the situation in the sector relating to economic and environmental sustainability and make proposals for the future. In table three the features of these informative conferences is detailed.



BEST ENVIRONMENTAL PRACTICES IN THE TOURISM SECTOR CONFERENCES.				
Date	Timetable	Duration (hours)	Contents	Speakers
24-05-12	17:00 – 21:00	4	<p>Best environmental practices in hotel establishments: energy saving, water and waste management,</p> <p>The concept of sustainable tourism: from a global to a local approach. Tourism and enhancing its surroundings.</p> <p>Planning an environmentally sustainable tourism activity.</p>	<p>Mr. Francisco Segura, Architect, Association of Architects of Malaga.</p> <p>Mr. Andrés Alcántara, Manager of Institutional Relations for the International Union for Conservation of Nature's Mediterranean Cooperation Centre.</p> <p>Mr. Carlo Perlli, Researcher, CRENoS, University of Cagliari and University of Sassari, Italy.</p>

Table 2: Features of the Dissemination of Good Environmental Practices in the Tourism Sector Conferences.

### 3.- Compilation and summary of the information

In order to prepare for the conferences, as well as to develop a series of proposals for the post-project stage, a literature review was performed, which alongside the opinions provided by the team of experts and the sector's key players themselves, has provided an up-to-date vision of the tourism sector in Almeria area of Levante.

#### 3.1. Sources of information

For this literature review process, we first searched the tourist sector's regulatory framework. Relevant sources for best practices in the sector and previous experiences of moving towards a more sustainable model were identified. Finally, the socio-economic analysis documents drawn up throughout the CAMP Project and the minutes from the workshops and opening meetings that the agents from the sector have had, in which their opinions, ideas and improvement proposals are provided.

#### 3.2. Main documents consulted.

Below, the most relevant documents and regulations that have been used are listed, some of which can be found on the project's website, in the Almeria area of Levante information system:

- Protocol on Integrated Coastal Zone Management in the Mediterranean. Barcelona Convention.
- Biodiversity: My hotel in action. A guide towards the sustainable use of biological resources. UICN.
- Best practices in hotels. CAR/PL.
- European Charter for Sustainable Tourism.
- Sustainable Development in the Alboran Sea. 2010. UICN.
- CAMP Levante de Almería project Feasibility Study. 2005.
- Minutes from the Dissemination of Good Practices in Productive Activities Individual Project Team of Experts' meetings.
- Socio-economic analysis of the development model in the CAMP Levante Almeria area. 2012.
- Report on the Training Workshops on the methodology of alternative scenarios and environmental management tools for hotel structures, held in M'diq, Morocco, 23 October 2008. LIFE Project: Destination.
- List of project proposed by the Almeria area of Levante Municipality Association.
- Accessibility and Sustainability in the CAMP Levante de Almería. 2011. FAAM (Almeria Federation of Associations of People with Disabilities).
- Survey for tourism sectors in Andalusia. Analysis of coastal tourism. 2010. Department of Tourism and Trade.
- Survey on the Tourism Situation of Andalusia (STSA). 2011.

#### Regulation:

- Tourism Act 12/1999, of 15 December.
- Decree 20/2002, of 29 January, regarding Tourism in a Rural Setting and Active Tourism, revoked Decree 94/1995, of 4 April, regarding the regulation of accommodation in Andalusian rural homes.
- Official Gazette of the Andalusian Regional Government no. 209 of 25/10/2011, the purpose of which was to approve the features of tourist apartments and establish the characteristics and aspects thereof.
- Decree 158/2002, of 28 May, regarding Tourist Municipality.

- Decree 70/2006, of 21 March, which modified Decree 158/2002 of 28 May, regarding Tourist Municipality.
- Decree 164/2003, of 17 June, regarding the regulation of tourist camp sites.
- Decree 194/2010, of 20 April, regarding tourist apartment establishments.
- Decree 251/2005, of 22 November, which regulates the awarding of Tourist Interest status in Andalusia.
- Order of 9 November 2006, which set forth the Andalusian Sustainable Tourism Strategy and established the measures for the implementation thereof.
- Decree 261/2007, of 16 October, which approved the 2008-2011 General Plan for Sustainable Tourism in Andalusia.
- Decree 43/2008, of 12 February, which regulates the implementation and operating conditions for golf courses in Andalusia. Modified by Decree-Law 3/2009, of 22 December, which amended various laws in order for the implementation of Directive 2006/123/EC in Andalusia.
- Decree 47/2004, of 10 February, regarding hotel establishments.
- Decree 492/2008, of 11 November, amending Decree 47/2004 regarding hotel establishments.

#### **4.- Diagnosis**

The diagnosis herein is an approximation of the situation of the tourism sector in the Almeria area of Levante extrapolated from the CAMP Levante de Almería Feasibility Study, which contained a description of the tourism sector, the socio-economic analysis of the CAMP area development model implemented throughout the project, the statistical data provided by the Department of Tourism and Trade and the empiric reality revealed by the professionals and agents themselves from the sector in the various open forums that have been held (Imagine Workshops, Meetings with key players from the Tourism Sector and *Dissemination of Good Environmental Practices in the Tourism Sector* Conferences). Furthermore, more specific searches have been performed to delve deeper into the ideas that arose in such debates.

##### **4.1 Tourism resources**

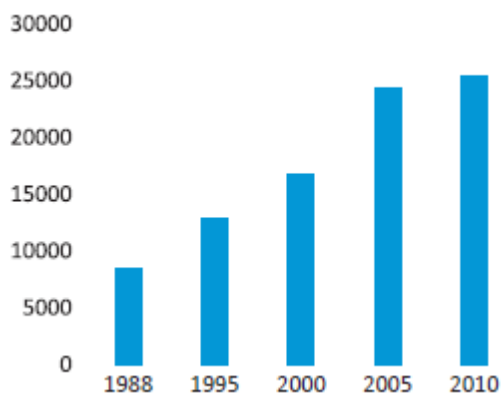
The tourism sector on the Almeria area of Levante coast has only relatively recently emerged, when compared to other coastal areas in Almeria or Andalusia. It is one of the important economic growth and regional development strengthening activities in the CAMP area. The late incorporation of this area into the tourism sector, due to the lack of transport infrastructures, meant that the area reached the last decade of the 20th Century with a relatively undeveloped coastline, thus limiting the deterioration of the landscape and environment that a good part of the Mediterranean coast had undergone. This, in conjunction with the declaration of the various conservation schemes in the CAMP Levante de Almería area, has meant that tourism is able to provide, as well as the traditional sun and sand tourism, another type of tourism: nature. However, this type of tourism is limited to the Gata Cape Natural Park in Nijar.

Nonetheless, socio-economic analysis of the CAMP area's development model highlights that, over recent years, the area has wholeheartedly committed to the intense urban-tourism construction activity that has taken place in the Mediterranean areas, repeating some of the features of other tourist destinations on the Spanish coast. So far, such construction activity has, however, not reached neither the saturation nor continuous occupancy levels that are common in other nearby coastal areas (Murcia, Costa del Sol, Region of Valencia).

### Regulated tourism resources:

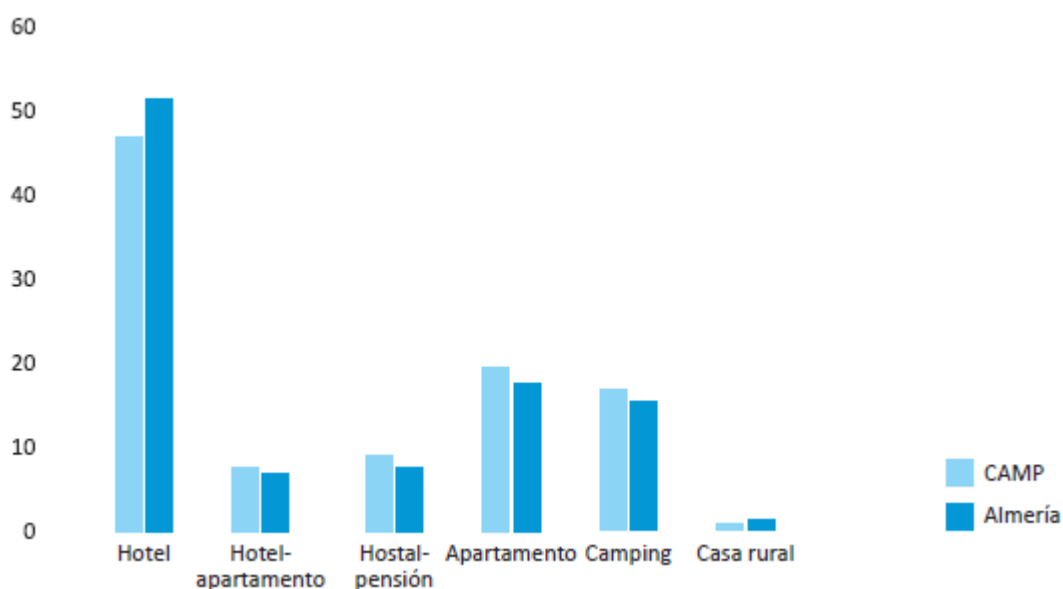
Regulated tourism resources reflects the noteworthy dynamism of the sector over the last two decades. Therefore, the number of places provided in the CAMP area establishments has grown uninterruptedly between 1988 and 2010, tripling from 8,485 to 25,355 (Figure 1). The highest number of places corresponds to hotels (46.8%), apartments (19.4%) and camp sites (16.8%), with this distribution being similar to the tourism resources in the province as a whole (Figure 2).

Figure 1 The evolution of tourism resources in the CAMP area between 1988 and 2010 (number of places).



Source: IEA (various years).

Figure 2 Tourism resources in the CAMP area and Almería according to establishment type in 2010 (%). Source: IEA (various years). Author's own work.<sup>2</sup>

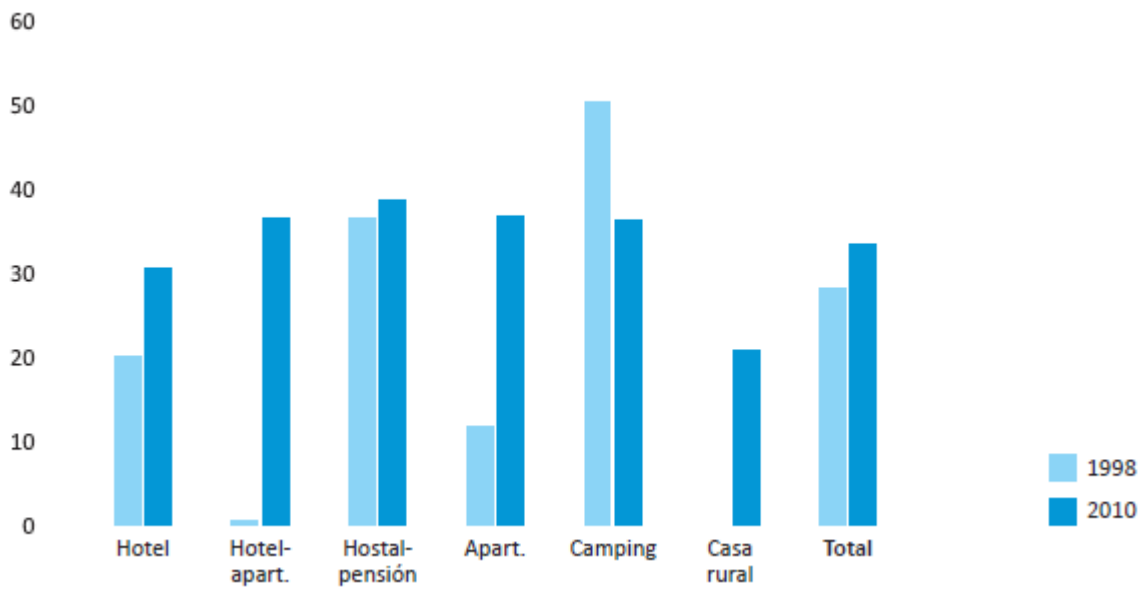


The percentage of hotel resources in the CAMP area in relation to the total available in the province has grown over the last two decades, increasing from 41.3% in 1988 to 49.4% in 2010. However, a significant change has taken place in the composition of this resource over this period (Figure 3); apartment hotel have gained so much importance that they have gone from being practically non-existent to

<sup>2</sup> Figure translation: Hotel, Aparthotel, Guesthouses, Apartments, Camping, Rural Accommodation

experiencing spectacular growth and representing 54.1% of the province's total; apartments have grown from 17.6% to 54.3%; and rural accommodation have also gained significant importance and now represent 30.8% of the province's total. Meanwhile, camping has become less prevalent, falling from 74.3% to 53.6%.

Figure 3 The importance of resources in the CAMP area with regards to total provincial resources according to establishment type in 1988 and 2010 (%). Source: IEA (various years). Author's own work.<sup>3</sup>



At an individual level, tourism resources have grown in all municipalities in the CAMP area between 1988 and 2010, with the biggest increases taking place in Nijar (857%), Cuevas del Almanzora (643%) and Mojacar (307%) (Figure 4). Currently, the leading examples of the sector are Mojacar, which with 9,386 accommodation places that comprise 37% of the tourist resources available in the CAMP area, the capital, which with 5,780 places represents 22.8%, Nijar, which with 4,000 places represents 15.8% and Vera, which with 3,792 places represents 15%, although in 1998 it represented more than twice its current figure (32.2%). The breakdown by establishment type highlights the dominance of Mojacar and the capital in terms of hotel places, of Vera in terms of apartment hotels, of Mojacar in apartments and of Nijar in camp sites and rural accommodation (Table 3).

<sup>3</sup> Figure translation: Hotel, Aparthotel, Guesthouses, Apartments, Camping, Rural accommodation, Total.

Figure 4 The evolution of tourism resources in the CAMP area per municipality between 1988 and 2010 (number of places).  
Source: IEA (various years). Author's own work.

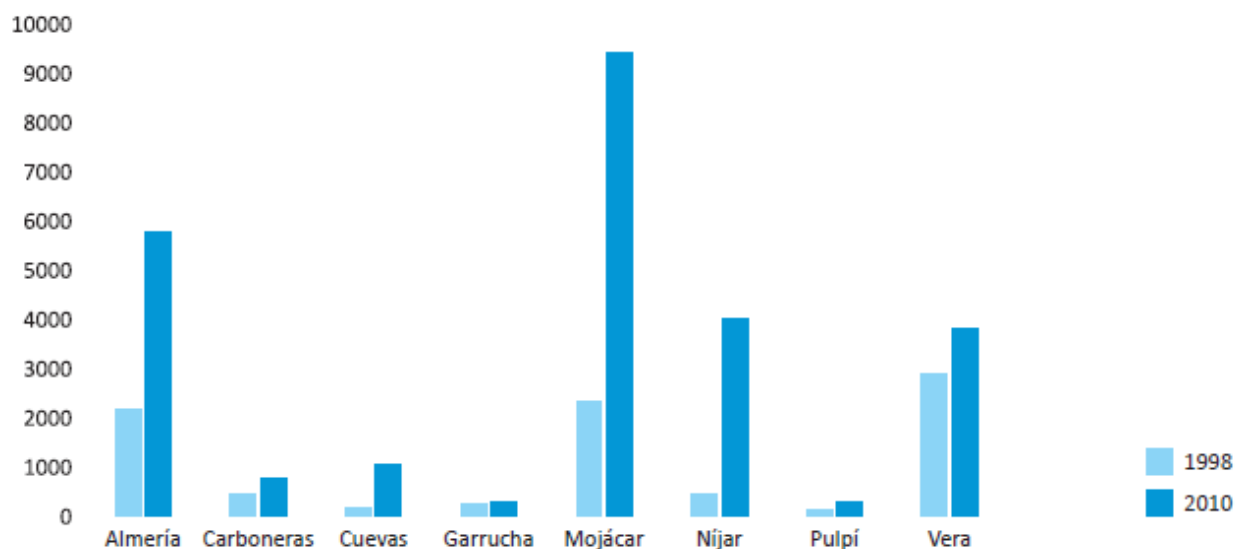


Table 3 Tourism resources in the CAMP area per establishment type and municipality in 2010 (number of places).

Municipality	Hotel	Apartment hotel	Hostels and B&Bs	Apartments	Camping	Rural accommodation	Total
Almería	4,758	0	291	24	707	0	5,780
Carboneras	259	0	281	241	0	0	781
Cuevas	33	0	212	339	464	0	1,048
Garrucha	12	0	254	0	0	0	266
Mojácar	4,519	672	321	2,611	1,234	29	9,386
Nijar	752	182	725	324	1,852	165	4,000
Pulpí	92	0	119	91	0	0	302
Vera	1,429	1,039	36	1,288	0	0	3,792
CAMP Total	11,854	1,893	2,239	4,918	4,257	194	25,355

Source: IEA (2011). Author's own work.

### Unregulated tourism resources:

The increase, however, in regulated resources only reflects a part of the development of the accommodation capacity since real estate activity linked to second homes has undergone spectacular growth in the CAMP area. Alongside the arrival of tourists that have notably increased the regulated resources, there has been an increase in demand for second homes for residents of other European countries (mainly British), who come because of the pleasant weather and the affordable prices. Therefore, the building of apartments and urban developments intended for these foreign residents and also as second homes for Spanish nationals has recently caused an intense expansion of the real estate activity. Therefore, second and holiday homes have become key aspects of the make-up and functioning of this tourist destination.

The supply of potential-tourist-use dwellings has been estimated using the available data (from the 2001 census on existing second homes in the area) at around 125,000 places<sup>4</sup>. If this is compared with the 25,350 of regulated places, it detracts from the limited importance of the regulated tourist supply in terms of the area's total resources (less than 20%). The potential-tourist-use housing is found mainly on the coast and increasingly in some inland enclaves adjacent to unique landscapes or natural areas. Mojacar is the residential nucleus par excellence and this is backed up by being located in the municipality with the largest number of potential-tourist-use housing and has the highest percentage of second homes in terms of the provincial total (72%). Mojacar is followed by Pulpi with 59.2%, Vera with 57.6% and Garrucha with 47.1%. (Table 4).

Table 4 Housing stock situation in the CAMP area in 2001.

	Main	Second	Empty Second homes	Totals	Second home %
Almeria	53,930	12,127	9,744	75,801	28.9
Carboneras	2,179	286	680	3,145	30.7
Cuevas	3,529	921	1,372	5,822	39.4
Garrucha	1,784	1,135	453	3,372	47.1
Mojacar	1,813	3,339	1,135	6,287	71.2
Nijar	5,956	1,149	1,822	8,927	33.3
Pulpi	2,011	2,803	113	4,927	59.2
Vera	2,372	2,604	619	5,595	57.6
CAMP Total	73,574	24,364	15,938	113,876	35.4

Source: IEA (various years). Author's own work.

The data from the 2011 housing census is still unavailable, which means it is not possible to make a comparison with the recent evolution of such data. It is, however, possible to analyse the surface area dedicate to developed areas, infrastructures and industries in the area's municipalities between 1999 and 2007 (Table 5).

<sup>4</sup> The most frequent estimates place the volume of potential-tourist-use housing using the data from the last population and housing census, which was carried out in 2001. The census broke down the housing stock into principal and non-principal dwellings and the latter into second homes and empty second homes. These data are then used to estimate potential-tourist-use housing based on the total number of second homes and a percentage of the empty homes, which tends to lie somewhere between 50 and 80%. Furthermore, recent studies on occupancy rates of homes in coastal areas with a greater second-home prevalence have shown that there are on average 3.6 people staying in tourist housing. If we apply this methodology to the total number of second homes in the CAMP area in 2001 (24,364 second homes and 15,298 empty second homes), the figure we obtain is a residential accommodation supply of around 125,000 places.

Table 5 Surface area dedicated to urban areas, infrastructures and industries in the municipalities of the CAMP area, province of Almeria and Andalusia, in hectares, between 1999 and 2007.

	1999	2007	Hectare variation	Variation %
Almeria	1,689.64	3,107.58	1,417.94	83.92
Carboneras	255.50	287.47	31.97	12.51
Cuevas del Almanzora	287.75	907.09	619.34	215.24
Garrucha	91.13	186.59	95.46	104.75
Mojacar	296.43	621.01	324.58	109.50
Nijar	925.38	2,020.95	1,095.57	118.39
Pulpi	219.05	760.06	541.01	246.98
Vera	171.14	1,070.88	899.74	525.73
CAMP Region	3,936.02	8,961.63	5,025.61	127.68
Province	9,471.33	22,499.35	13,028.02	137.55
Andalusia	129,628.93	237,297.81	107,668.88	83.06

Source: Institute of Statistics and Cartography of Andalusia, Andalusian Multi-regional Information System (SIMA is its Spanish acronym).

As we can see, use of these types of land, in all municipalities except for Carboneras, has experienced growth higher than the average in Andalusia. Vera (525.73%), Pulpi (246.98%) and Cuevas del Almanzora (215.24%) all stand out in the upper part of the selection. Therefore, we are able to infer that that number of potential-tourist-use houses has grown considerably since 2001, lowering even further the percentage of regulated tourism resources in terms of the provincial total tourism resources.

#### 4.2 Tourism demand

The tourism sector highlights that the predominant sector in the CAMP area is coastal tourism (sun and sand). Statistical data supplied by the Institute of Statistics and Cartography of Andalusia and the Department of Tourism and Trade provide a breakdown of the coastal in Andalusia, which is provided below:

- 62% of tourists that visit Andalusia head for the coast; 60% of the visitors are domestic tourists and the remaining 40% foreign visitors.
- This tourism segment is **predominantly seasonal**, since 68% of visits take place between April and September. This seasonality is less dramatic when it comes to foreign tourists.
- **Average stays last 10.6 days.** Domestic tourists stay an average of 9.4 days while foreign tourists stay an average of 12.5 days.
- The **average coastal tourism daily expenditure is €51.80/day**, noticeably lower than the average expenditure per day when considering all sectors (cultural, sports, business, rural, etc., which was €60.40/day in 2010).
- 51.3% of coastal tourists are female.
- 33.9% fall between the ages of 45 and 64.
- 57.9% are in paid employment and 25.4% are retired.
- 45.1% of foreign coastal tourists are employed in highly qualified jobs, 7.7% more than domestic tourists.
- 75.3% of tourists that visit the Andalusian coast plan their trips themselves, in other words, they do not book their trips through travel agents.

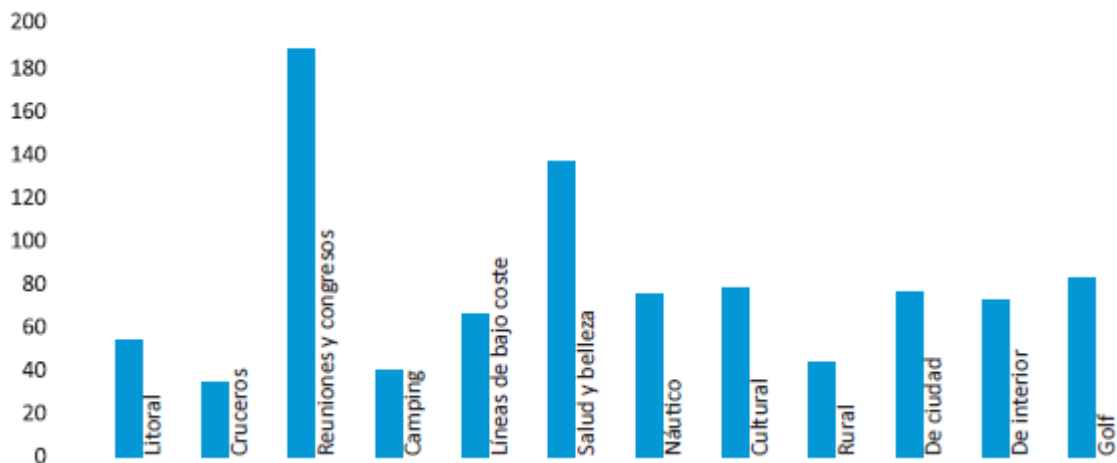


- In 2010, **40.6% of tourists visiting the coast stated they had used the internet to check, reserve or purchase some tourist service**, 6% more than in 2009. Among foreign tourists, this percentage increases to 50.6%; for domestic tourists, it drops to 35%.
- With regards to information sources, 57.6% use their own previous experience to plan their trip, 29.7% refer to the experience of friends and family. The remaining sources (travel agents, pamphlets, adverts, internet, etc.) are used more by foreign tourists than domestic ones.
- 55.6% of tourists visit the coast with their partner and 27% with family members, regardless of where they are from.
- Average group size has dropped from 2.3 people in 2009 to 2 people in 2010.
- With regards to their interests, **76.5% of coastal tourists state they enjoy and use the beach, 24.3% also enjoy watching the wildlife, 19.2% shopping and 17.8% visiting monuments and museums. Complementary activities have increased with regards to their 2009 levels.**

Source: Survey for tourism sectors in Andalusia. 2010. IEA.

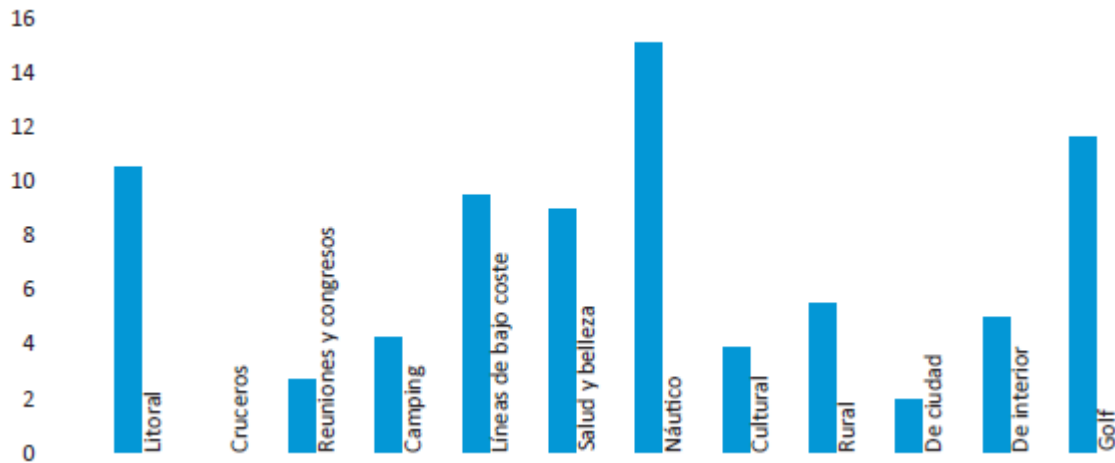
The average daily expenditure and average stay data for the tourism sectors are compared below, according to analysis provided by the Department of Tourism and Trade. Coastal tourism leaves behind less added value than other tourism sectors, such as cultural, congresses, inland (wildlife) or health and beauty.

Figure 5. Average daily expenditure per visitor in € according to tourism sectors.<sup>5</sup> Source: IEA. Survey for tourism sectors in Andalusia. Author's own work.



<sup>5</sup> Coast, Cruises, Meetings and conferences, Camping, Low cost airlines, Health and beauty, Nautical tourism, Cultural tourism, Rural tourism, City tourism, Inland tourism, Golf

Figure 6. Average stay according to tourism sectors. Source: IEA. Survey for tourism sectors in Andalusia and author's own work.<sup>6</sup>



As stated by the sector itself, tourism took off towards the end of the 1960s, with the opening of the Almeria airport. The advances to boost tourism in Almeria included stepping out from the shadow of the Costa del Sol and using the name 'Costa de Almería' (Almeria Coast), which created more awareness at a European level. However, at this time the evolution of tourism in the province was mainly focused in the Poniente (western) area of Almeria (with the exception of the Mojacar area).

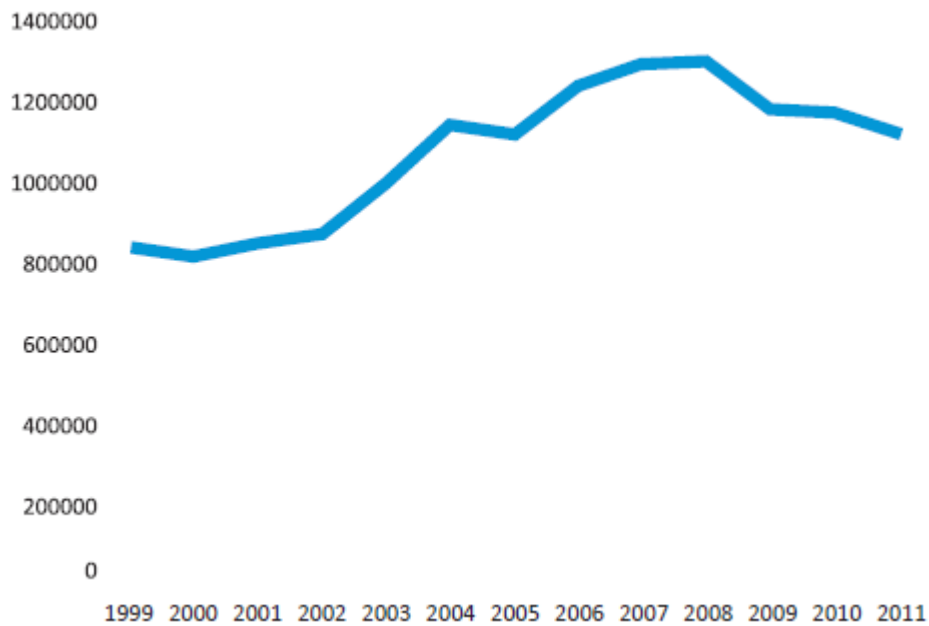
The growth in the number of hotel users between 1999 and 2011 in the province of Almeria bears testament to the increasing tourist demand. In the province of Almeria<sup>7</sup>, the number of people staying in hotels has increased by 34%, a rate of growth that is on par with the growth in tourism resources. Furthermore, the data from the Survey on the Tourism Situation of Andalusia with regards to Almeria in 2011 reveal that:

- The average stay in the province of Almeria was 8.4 days.
- Average daily expenditure per visitor was €46.99/day, noticeably lower than the average daily expenditure per visitor in Andalusia as a whole, which was €64.46/day in 2011.
- The province was rated the third best in Andalusia, with a score of 8.1/10.

<sup>6</sup> Coast, Cruises, Meetings and conferences, Camping, Low cost airlines, Health and beauty, Nautical tourism, Cultural tourism, Rural tourism, City tourism, Inland tourism, Golf

<sup>7</sup> No data are available for tourist demand at a local level.

Figure 7. No. of people staying in hotels in the province of Almeria. Source: IEA and author's own work..

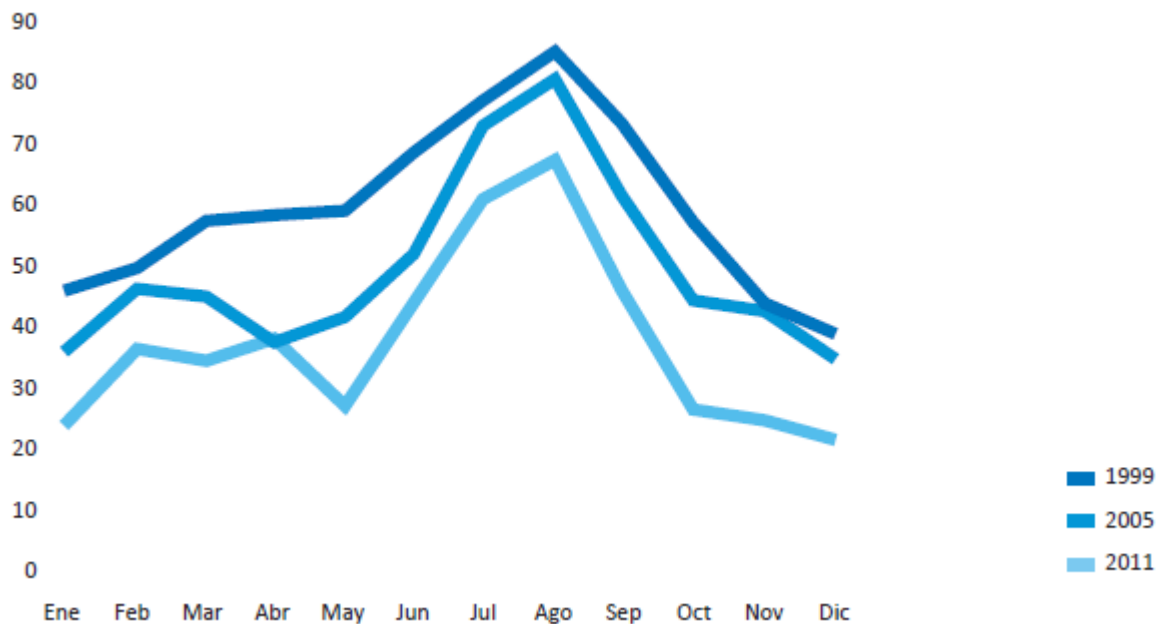


If during the early stages of tourism in the CAMP area it was based on the proximity of the tourists, boosted by people from the region thanks to their acquaintances, it quickly evolved towards more of a mass-tourism model. Nonetheless, it failed to record the figures achieved by other provinces in Andalusia. These were families visiting the area, in search of the sun and sand, staying for 15 days, and coming from abroad thanks to the existing airline connections between the Almeria airport and countries such as England, Belgium and Germany. Domestic tourism also stands out, in particular that involving tourists that live no more than four hours away from the area.

The sector highlights the activity's seasonality, despite the presence of a Natural Park, the appeal of which does not depend on the time of year. In fact, tourism at the Natural Park differs a little in comparison with the remaining tourist activity in the CAMP area because it attracts tourists with a certain level of awareness and curiosity with regards to the local wildlife, landscapes and fauna.

Figure 8 shows the hotel occupancy rates per month in 1999, 2005 and 2011 in the province of Almeria, clearly demonstrating the seasonality of tourism in the area.

Figure 8. Hotel occupancy rate per month in the province of Almeria, years 1999, 2005 and 2011 (%).Source: IEA and author's own work.<sup>8</sup>



#### 4.3. The area's potential

The Almeria area of Levante's weather conditions, with an average annual temperature of 19° and 320 days of sun per year according to the Spanish Meteorological Agency, represent a magnificent opportunity to attract tourists seeking mild temperatures on the coast at any time of year. Therefore, the tourism sector on the coast of Almeria has grown because of the sun and sand, as have the other Spanish coastal areas.

Nonetheless, the coast of Almeria differs from other Spanish coasts because its late inclusion in tourism and residential development -for different reasons- alongside the regional conservation schemes, has meant that the striking beauty of coastal landscapes, such as the Gata Cape Natural Park in Nijar, and the coastlines of Sierra Cabrera and Sierra Almagrera have been protected. Today, these locations are tourist attractions that distinguish the area from other Mediterranean destinations. The involvement of this coastal community in its own sustainability, should this actually happen, could lead to it becoming a medium- and long-term attraction if a clear effort is made to support sustainable tourism.

Concurrently, the area has a rich tangible -mining, and archaeological remains, historical defensive architecture, etc.- and intangible cultural heritage -traditions, cuisine, folklore, etc.- that could help to establish a different tourism model that is higher in quality and added value and is less affected by the time of year.

Despite the CAMP area only being composed of eight municipalities, the nature of tourism varies quite substantially between north and south. The south (Almeria, Nijar, Carboneras) is attempting to

<sup>8</sup> Figure translation: January, February, March, April, May, June, July, August, September, October, November, December

implement a tourism model based on the natural wealth of the Gata Cape's Natural Park, Geopark and Biosphere Reserve, and this is where rural and active tourism initiatives are to be found. The city of Almeria is trying to promote cultural and cruise tourism.

The north (Vera, Pulpi, Cuevas de Almanzora, Mojacar and Garrucha) is too far from this resource to make the most of it and focuses more on its weather and beaches.

Other tourism resources in the area that have not been investigated at great length, but which could be established as possible means of making the destination more attractive and profitable, include agritourism and fishing tourism, in conjunction with culinary tourism, which also contribute to the diversification and financial strengthening of other production sectors such as fishing and agriculture.

Finally, according to data provided by the Almeria Federation of Associations of People with Disabilities, accessibility is becoming increasingly important as a tool that adds value to tourist destinations. 14.5% of the EU's population of working age (16 to 64) have some type of disability, 20% of those between 60 and 64 have a serious disability and 17.1% have a moderate disability, 4 out of 10 people between the ages of 75 and 79 and 6 out of 10 people older than 85 years of age in Spain have some form of disability. These are also groups that are going to grow in size in the coming years. If we have a closer look at this data, which is provided by the European Commission, there are 100 million people who would travel more if tourist destinations were more easily accessed (including tourist establishments and complementary resources). The European Commission has calculated this data based on estimates of the existence of 37 million disabled people (non-enlarged EU) and including their families. This group includes people with some form of disability and the elderly. According to Eurostat, 51% of these people do not have employment responsibilities and would therefore remove the issue of seasonality from the equation.

The main challenge this diagnosis highlights is the diversification of both tourism resources and tourism demand for the CAMP area municipalities. The current model is based solely on one of the region's resources, the beach, and consequently attracts only one type of tourist. Diversification, for example, developing more activities aside from the region's cultural and natural wealth and the particularities thereof, is essential if we are to achieve the economic sustainability of the sector.

## **5.- Analysis of the existing problems**

The analysis of the issues identified is based on three principles: the economic and environmental sustainability of the tourism development model itself, coordination between the tourism agents and the relationship between the production segments.

### **5.1. A tourism development model that is both economically and environmentally unsustainable**

In general terms, mass tourism has shown itself to have a significant impact on the environment: development of natural areas, whether it is integrated or not in the landscape, excessive use of water, problems related to waste processing, pollution of water by liquid waste, destruction of historic monuments, air pollution due to the use of vehicles, changes to the landscape to favour leisure activities such as golf, etc. Interestingly, one of the factors that favour tourism taking root in an area, i.e. its landscape, tends to be particularly susceptible to growth thereof.

The tourism model in the Almeria area of Levante has mainly been based on the mass coastal tourism sector. Over the last decade, housing offer has also excelled, spurred on by the financial and economic

circumstances. Only in the Gata Cape Natural Park - Nijar area, due to the restrictions imposed upon urban development given the existence of this conservation scheme, has an attempt been made to develop a tourism model geared more towards nature and sustainability.

A feature of residential tourism is its **resource-intensive consumption** (land, water, electricity). The real estate bubble also encouraged insufficient planning of infrastructures and services linked to the new developments, which has led to the current lack of infrastructure that, given the seasonality of the sector, causes **saturation** and **overcrowding** during the periods of greater occupancy (issues relating to mobility, water supply and treatment, noise, waste, etc.).

Furthermore, it gives rise to the phenomenon of anticompetitive behaviour between unregulated (potential-tourist-use dwellings) and regulated (tourist establishment) resources. Residential tourism has barely any benefits for the region on a social (employment) or economic (expenditure per tourist/day) level once the initial investment has been made, but the landscape resources used are never recovered. Furthermore, as the public administration does not count these dwellings as tourist accommodation, the money they generate is not subject to tax control. This prevents balanced growth in the region since it is not accounted for and does not incorporate economic value derived from an activity that directly benefits from its resources and prevents it from being sustainable. There are no legal entities that are adapted to facilitate the leasing of residential dwellings that are currently used as unregulated tourist accommodation.

According to the World Tourism Organisation, the principles that define sustainable tourism are:

- Protecting the natural and cultural resources for their continued use in the future, while also creating benefits;
- Planning and managing tourism development so that it does not generate serious environmental or socio-cultural problems;
- Maintaining and improving the quality of the environment;
- Endeavouring to maintain the visitors' high level of satisfaction and the destination retains its prestige and commercial potential and;
- Distributing the profits from tourism evenly throughout society.

Based on this series of principles and once the opinions of the region's different actions were gathered, they recognised the particular potential that the Almeria area of Levante has to comply with a sustainable tourism development model, not only on an economic level, but also on a social and most importantly an environmental level.

The presence of the Natural Park, low development density, a coastline with fresh air, the variety and quality of primary production, the climate and the boom in the population's concern with regards to the environment mean that this region has a unique opportunity to become a benchmark for sustainable tourism on the Spanish coast.

The managers' lack of knowledge regarding Sustainable Tourism has made planning and establishing clear leadership hard.

## **5.2. Coordination issues between main tourism players**

The challenge of driving tourism towards sustainability brings with it problems that must be resolved before developing these types of policy. The sector's strategic vision, the management itself and the planning of the activity must all be improved.

Planning of the tourism sector in the CAMP area has been lacking. Furthermore, coordination and collaboration between the players is also lacking and inefficient, and the activity is not properly managed.

The development of tourism lies in the hands of various players: Department of Tourism and Trade, Provincial Council (Tourism Board), Almeria area of Levante Municipality Association, Town Councils, private sector, etc.. The lack of organisation between the players means that the sector's initiatives are implemented in a piecemeal fashion, often ending up in useless reproduction of products and actions and incoherent implementation thereof. This situation can also be put down to the lack of leadership and strategic vision in the sector. The activity is planned in the short term, not with an overall long-term vision.

In order to illustrate this problem, we could use the example of the Levante coastal trails. Various trails have been designed to visit this coast; however, when it comes to advising customers, hotel owners seem unable to provide an answer because they do not know the trails there are, or the best trails available or which the most suited to the customer's needs may be.

Despite the numerous landscapes and cultural, natural, agricultural, fishing, etc. resources in the Almeria area of Levante, the region does not make the most out of them in order to diversify the options available to tourists and there is no regional background text that lends substance to the visit, enabling us to offer a high quality tourist product that covers the various sectors for which demand exists. The lack of organisation and leadership within the sector only serves to exacerbate this situation.

The Department of Tourism and Trade approved the Andalusian Sustainable Tourism Strategy in 2006. The Department has promoted the introduction of Sustainable Tourism Initiatives because of this Strategy. The aim of these initiatives is to create tourism products or improve the existing ones, increase competitiveness in the local tourism industry, create, maintain and improve the tourist area and implement environmental management systems and tools. They are characterised by the fact that they are both formulated and required by the region, with public and private sectors reaching agreement in terms of the content. Two initiatives within the CAMP Levante de Almería area have been introduced. We have been unable to refer to these two initiatives because they are currently being assessed; therefore it has not been possible to evaluate their level of success and whether they meet sustainability criteria.

## **5.3 The relationship between production sectors**

Hardly any form of relationship exists between the tourism sector and other production sectors in terms of taking advantage of opportunities to collaborate and alliances. In fact, it is quite the opposite, with conflicts and competition for land arising. The tourism sector feels that the area's main production sector -intensive agriculture- has a damaging effect on its activity because of its impact on the landscapes. Promoting tourism products that take advantage of this peculiarity of the province of Almeria is not something that has been considered in any great detail.

The development model that has been adopted has had serious repercussions with regards to the use of the land, and has, on occasion, caused the performance of traditional activities, such as fishing, difficult. We refer to fishing as it has been affected by the impact on marine ecosystems caused by the shielding of the coast, regulation of the channels and the construction of docks and ports.

The tourism sector is also critical of the pollution caused by industrial activity (electricity, cement), which it also feels is harmful to tourism.

To this we must add a certain concern that has been voiced by various players in the north area (Vera-Pulpi) relating to the latent and repeated harm caused by the media with regards to the Palomares accident. This event is brought up year upon year in the general media, which shackles an area that could have a unique opportunity in eastern Spain due to the special features of its ecosystems.

## **6.- Results prior to the integration stage**

The actions suggested below are ideas and proposals that arose during the meetings with the key tourism players in the CAMP area, and the aim of such actions is to solve the issues listed in the previous section:

1- Identifying and defining a narrative for the area that puts the area on the map, differentiating and enhancing it by means of attractive complementary offerings that can be adapted to the different sectors for which there is demand. The Almeria area of Levante's Landscape and Cultural Heritage Trail was developed by the team responsible for the Cultural Heritage Conservation Individual Project. This team has selected, in a participatory fashion, a series of cultural elements and landscapes that characterise the region and that may serve as starting point for telling this narrative.

2- Creating, promoting and consolidating the 'Almeria area of Levante' brand. A brand that sets apart a tourism product that is committed to sustainability and quality, respects the identity of the region in which the activity is conducted: its cuisine, agricultural and fishing production, its natural resources, its landscape and cultural heritage, while simultaneously making the most of the area's potential to attract visitors.

3- Creating a mechanism for strategic planning, horizontal management and tourism sector organisation with a view to (environmental, social and economic) sustainability. This body's aim could be:

- Sustainable tourism planning, organisation and promotion activities, both at the Gata Cape Natural Park - Nijar, and the rest of the CAMP area. The Natural Park is of great importance in the struggle against seasonality in the area.
- Showcasing the region's assets by promoting the local products and the area's cuisine in order to encourage a win-win situation through the collaboration between agriculture, fishing and tourism.
- Promoting projects that complement production activities to provide the visitors with alternatives to leisure activities, such as agritourism and fishing tourism.

4- Creating a training programme for green entrepreneurship in the CAMP area with the collaboration of the Regional Activity Centre for Cleaner Production within the Mediterranean Action Plan, in order to promote the creation of businesses that have an environmental impact.



5- Creating a tourist certificate in order to catalogue, organise and regulate the disparity between regulated and unregulated accommodation in the area.

6- Implementing regional quality standards or marks for hotels that apply environmental measures to both the internal management of the hotel and the complementary tourism products offered to its customers (European Charter for Sustainable Tourism and others).

The issues linked to land-use planning have been dealt with extensively in the Landscape Valuation Individual Project, which has developed a methodology to assess the region's vulnerability to each production activity; residential use is one of the issues that has been dealt with and the subject of various proposals. Therefore, this individual project has not dealt with this issue that stems from the tourism sector.

### **7.- Action plan for the post-project stage**

The aforementioned proposals have been combined with the results from other individual projects, the contributions from the Coastal Council's open workshops and finally, the technical-governmental integration workshop to develop the Sustainable Development Reference Framework. The following actions for the post-project stage have been prioritised thanks to the work performed by this team.

#### **Action 3.1.2.1. AP SDRF. Promoting the CAMP area by defining a narrative, encouraging the launch of a trail that represents the cultural heritage resulting from the CAMP Project.**

A sustainable tourism model must attempt to strengthen this activity by respecting the tourist area's traditions, resources and heritage. This activity will enable this tourist destination to be placed on the map using the region's peculiarities, reflected in the landscapes and cultural heritage and the community's commitment to sustainability, to lure in the visitors. We believe it essential to base this narrative on the Almeria area of Levante's Landscape and Cultural Heritage Trail, which was developed within the context of the CAMP Levante de Almería project and with participation of the community. Specific measures to implement this are detailed in the Cultural Heritage Conservation Individual Project's Final Report and are as follows:

Holding advertising campaigns and spreading the word about the trail (Public and Private Bodies, Administrations and Companies).

Creating applications for mobile devices.

Publishing and printing an Interpretive Guide for the Trail.

Revising and approving the Trail's Didactic Guide within the School Syllabus.

Approximate timescale: Years 1 and 2, maintaining the marketing strategy over the long term.

Competent Public Administrations. Department of Tourism and Trade, Department of Culture and Sport, Department of Agriculture, Fishing and Environment, Department of Education, Tourism Board of the Provincial Council, Town Councils, Almeria area of Levante Municipality Association.

Public Administration responsible for coordination: Provincial Tourism Board/Department of Tourism and Trade.

Possible indicators : Level of compliance with measures covered by this activity; % of visitors that know the narrative once they have visited the region;

Selected indicator for the AP SDRF: Redacting of the narrative.

Strategic alliances: Almeria area of Levante Municipality Association, Almeria area of Levante Rural Development Group, Almeria area of Levante Tourism Business Owners' Associations, Teacher Training Centres, FACUA, Neighbourhood Associations.

**Action 3.1.2.2. AP SDRF. Fostering the creation of civil and tourist leasing regulations in order to promote the reconversion of empty dwellings into accommodation.**

The potential-tourist-use housing stock that is used as an unregulated resource must be regulated, organised by administrations skilled in terms of tourism and housing.

Approximate timescale: Years 1 and 2.

Competent Public Administrations. Department of Tourism and Commerce, Department of Development and Housing.

Public Administration responsible for coordination: Department of Tourism and Trade.

Selected indicator for the AP SDRF: Establishment of such regulatory framework.

Strategic alliances: The area's councils.

**Action 3.1.2.3. AP SDRF. Encouraging the development of a Plan to combat unregulated tourism.**

Once the regulatory framework has been established, promoting the regulation of residential dwellings used by tourists that are not regulated, in other words, establishing a plan to bring this economic activity to the surface, including in the framework the highest number of potential-tourist-use dwellings.

Approximate timescale: Year 3 to 10

Competent Public Administrations: Department of Tourism and Trade, Department of Development and Housing, Department of Economy, Innovation, Science and Employment.

Public Administration responsible for coordination: Department of Tourism.

Possible indicators: % of potential-tourist-use dwellings included; Plan to combat unregulated tourism that has been redacted.

Selected indicator for the AP SDRF: Plan to combat unregulated tourism that has been drafted.

Strategic alliances: The area's developers.

**Action 3.1.2.4. AP SDRF. Supporting the implementation of projects that promote tourist activities by showcasing the area's artisan crafts (needle grass, pottery, rag rugs, etc.).**

This activity includes fostering entrepreneurial initiatives that are based on showcasing these products.

Approximate timescale: Years 2-10

Competent Public Administrations: Department of Economy, Innovation, Science and Employment, Department of Tourism and Trade, Department of Culture and Sport.

Public Administration responsible for coordination: Department of Economy, Innovation, Science and Employment.

Possible indicators: No. of successfully implemented projects; No. of projects implemented regarding this issue.

Selected indicator for the AP SDRF: No. of projects implemented regarding this issue.

Strategic alliances: Rural Development Group, Town Councils, Business Owners' Associations included in the Andalusian Natural Park Brand Licensee Association Federation.

**Action 3.2.2.1. AP SDRF. Prioritising and encouraging business projects that include off-season tourist activities in order to break away from seasonality (agritourism, fishing tourism, among others)**

In order for the sector to break away from seasonality, it must diversify, seek sectors that are not affected by the time of year, such as accessible tourism, nature tourism, health tourism, event tourism, cultural tourism, etc. Such diversification comes about due entrepreneurial initiatives supported by public administrations.

Illustrative timeframe: Years 2-10

Competent Public Administrations: Department of Agriculture, Fishing and Environment, Department of Tourism and Trade, Department of Economy, Innovation, Science and Employment, Department of Development, Department of Agriculture, Food and Environment.

Public Administration responsible for coordination: Department of Tourism and Trade.

Selected indicator for the AP SDRF: No. of business projects implemented.

Strategic alliances: Almeria area of Levante Rural Development Group and Fishing Development Group.

**Action 3.2.2.2. AP SDRF. Organise events to promote local products and Almeria cuisine in order to encourage collaboration between the agriculture, tourism and fishing sectors.**

This activity will create synergy between the local production sectors and will encourage responsible consumption initiatives to be launched in the tourism sector, such as the 'KM 0' initiative, which showcases local products.

Approximate timescale: Years 1-10

Competent Public Administrations: Department of Tourism and Trade, Department of Agriculture, Fishing and Environment, Tourism Board of the Provincial Council, Town Councils.

Public Administration responsible for coordination: Department of Tourism and Trade / Tourism Board of the Provincial Council

Possible indicators: No. of promotional events organised; Events' success, measured in no. of collaboration initiatives undertaken.

Selected indicator for the AP SDRF: No. of promotional events organised.

Strategic alliances: No. of promotional events organised.

**Action 4.2.1.3. AP SDRF. Training course relating to green entrepreneurship.**

The aforementioned activities must be backed up by training activities for that encourage green entrepreneurship. This training must be aimed at entrepreneurs, business owners and university and vocational, technical and local development students

Approximate timescale: Year 1

Competent Public Administrations: Department of Agriculture, Fishing and the Environment, Department of Economy, Innovation, Science and Employment, Department of Education.

Public Administration responsible for coordination: Department of Economy, Innovation, Science and Employment.

Possible indicators: Number of participants on the training course; Score achieved in assessment questionnaire; Number of training activities performed relating to this topic.

Selected indicator for the AP SDRF: Number of training activities performed relating to this topic.

Strategic alliances: University of Almeria; Syndicates.

**8 - Economic, social and environmental feasibility of post-project actions**

**Action 3.1.2.1. AP SDRF. Promoting the CAMP area by defining a narrative, encouraging the launch of a trail that represents the landscape and cultural heritage resulting from the CAMP Project.**

Promoting the Almeria area of Levante through a unique narrative based on its cultural peculiarities, its unique landscapes and its push for sustainability may contribute to make this tourist destination stand out in the market, which without doubt would have a positive effect on the area's economy, provided that it goes hand-in-hand with a real commitment by the sector to environmental sustainability. Concurrently, this activity would improve organisation within the sector itself and between competent administrations, avoiding duplicate projects and resources being spread thinly. From an environmental point of view, supporting a narrative based on the landscape and cultural heritage would imply promoting the protection and improvement of thereof and contribute to it being showcased and respected by the local community.

Each of the activities that revolve around this measure also includes social, economic and environmental benefits for the regions. These can be found below<sup>9</sup>:

Hold advertising campaigns and spread the word about the trail (Public and Private Bodies, Administrations and Companies).

The main aim of advertising campaigns for the trail must be to increase the number of users thereof, which would involve a greater number of tourists and visitors requiring and consuming services in the region, yielding a direct economic benefit for the private and public sectors that provide this type of visitor with specific services.

Advertising should entice more visitors to the area, therefore local businesses and private companies can create or improve new work areas linked thereto. For example, they can offer themselves as guides-interpretors who are specialists on the trail to be contracted by possible users who require such services.

From a purely environmental perspective, advertising campaigns are going to have a limited impact, although we can use them to present educational messages about the environment with regards to the Almeria area of Levante (saving water, waste separation, etc.).

Source of funding: The Department of Tourism and Trade and Department of Culture and Sport's Almeria area of Levante Sustainable Tourism Initiative.

Create applications about the interpretive trail for mobile devices.

Creating this type of application would also involve a new type of visitor, whose independence and autonomy take precedence when visiting the trail. Furthermore, these applications create several financial opportunities, such as creating a website where the application can be downloaded from and that also serves as a platform for regular updates meanwhile serving as an advertising platform on which the companies can offer their products and services directly to the application's users.

Developing this type of application would entail greater awareness of the area and improvements in accessibility, which when combined with efficient advertising would involve an increase in the number of visitors and therefore an increase in the demand for services provided by all economic sectors, therefore driving employment.

The environmental impact of creating this type of application is mainly linked to a reduction in the use of paper normally used for printed guides or maps. This would also entail a saving in this resource.

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<sup>9</sup> Taken from the Cultural Heritage Conservation Individual Project's Final Report

Source of funding: Almeria area of Levante Sustainable Tourism Initiative from the Regional Government of Andalusia's Department of Tourism and Trade.

#### Drafting and publishing of an Interpretive Guide for the Trail.

This guide contains information relating to the trail, including both logistical features and information for following the trail and information regarding the history, value and use of cultural heritage.

The printed edition of the trail's interpretive Guide is an essential complement to the trail launch, providing support to people interested in following the trail on their own and for businesses and organisations that include the trail in their work and advertising.

It will therefore be a tool to complement the aim of protecting the cultural heritage, thanks to features thereof that raise awareness and provide information, as well as protecting the region in which these cultural elements are located, since one of the core ideas behind the guide is to showcase the natural surroundings so that people understand and value cultural heritage.

Source of funding: EAFRD Funding, Almeria area of Levante Sustainable Tourism Initiative, Department of Tourism and Trade, Department of Culture and Sport and the Almeria Tourism Board.

#### Revising and approving the Trail's Didactic Guide within the School Syllabus.

The didactic guide would need to be revised by the competent bodies, such as the Teacher Training Centre, Department of Education and the University of Almeria, with the aim of validating and including it within the schools' syllabi regarding the protection of cultural heritage.

The aim of the guide is for the students to acquire knowledge about Cultural Heritage in the eight municipalities of the Almeria area of Levante, as well as educational values and skills that help to showcase such heritage. With this in mind, a series of activities, complementary teaching resources and assessments are proposed, which can be adapted depending on how the guide is planned.

The guide has a transversal approach, that is to say, it is not attached to one area of knowledge alone, but incorporates several of them, thus acquiring an interdisciplinary nature. Although the topic proposed is socio-cultural in nature, other skills related to the awareness of the natural environment, geography, linguistic communication, arts and crafts, etc. can be covered. This material can also be adapted to different educational levels.

Source of funding: The Regional Government of Andalusia's Department of Education's own resources.

#### **Action 3.1.2.2. AP SDRF. Fostering the creation of civil and tourist leasing regulations in order to promote the reconversion of empty dwellings into accommodation.**

As has been described throughout the diagnosis, the tourism sector in the CAMP area features a significant residential component. However, these potential-tourist-use dwellings (apartments, second homes) form an informal economy that competes with and undercuts the prices of the regulated sector, which is subject to greater costs. Regulation by a legal entity of the leasing of such accommodation to tourists that may bring this resource into the formal economy so as to generate income for local and regional administrations has been requested by the sector's players themselves. The construction sector, which has empty housing stock, could use this as a way of emerging from the crisis. The social benefit generated by legalising this resource is obvious.

Since it is an activity to encourage regulation, the resources required for the application thereof are the same required for other institutional coordination activities: monitoring and promotion by a technical secretariat and implementation by experts from competent administrations.

**Action 3.1.2.3. AP SDRF. Encouraging the development of a Plan to combat unregulated tourism.**

The previous measure would make no sense if we did not also to support the development of a Plan to combat unregulated tourism. The main line of action thereof would be the inspection and sanctioning by competent administrations, complemented by measures that benefit the accommodation regulated by the new legal entity.

The social feasibility of this measure lies, as with the previous measure, in the existing support for it in the tourism sector and competent administrations that currently state the necessity of such measure.

Its economic feasibility is based on the costs stemming from applying the Plan being offset by the revenue generated by legalising this tourist resource.

Possible sources of funding: It is a function that the public administration must undertake and should therefore not incur excessive costs, or if so, it must be funded by the Regional Government of Andalusia, with the Department of Tourism being legally required to fund the measure.

**Action 3.1.2.4. AP SDRF. Supporting the implementation of projects that promote tourist activities by showcasing the area's artisan crafts (needle grass, pottery, rag rugs, etc.).**

Sustainable tourism should be increasingly geared towards providing products that not only respect, but also favour the conservation of the characteristics that make the region stand out.

Showcasing artisan products through tourism initiatives has benefits for both the tourism sector, which discovers a complementary resource that strengthens the area by supporting the peculiarities thereof, and the artisans themselves, who are given a commercial reason to continue performing such activity, thus protecting intangible cultural heritage (old trades). Thus, promoting this type of business initiative has clear social impact that is the creation of jobs, and another less obvious but no less important impact, which is that it prevents cultural heritage from being lost and makes the region unique, thus making it stand out from other regions.

Possible sources of funding: Sustainable Tourism Initiatives and Tourism Subsidies from the Department of Tourism and Trade. Business Activity Development Programmes, FORAN Andalusian Self-employment Fund, Business Creation and Innovation Incentive Programme, under the Department of Economy, Innovation, Science and Employment. 2007 - 2013 Rural Development Programme (managed by the Almeria area of Levante's Rural Development Group), European Agricultural Fund for Rural Development EAFRD.

**Action 3.2.2.1. AP SDRF. Prioritising and encouraging business projects that include off-season tourist activities in order to break away from seasonality (agritourism, fishing tourism, among others)**

The measures that tend to reduce the seasonality of the tourism sector have a clear socio-economic profitability; jobs are kept and there is economic activity throughout the year, which contributes to making tourism investments profitable and keep people in these areas during periods when the influx of visitors is low. Furthermore, the impact is also felt in the community because it generates revenue for the administrations stemming from taxes levied on economic activity and consumption.

Business projects that include agritourism or fishing tourism foster the diversification of the production sectors, which therefore involves, in the case of fishing, various social, economic and also environmental benefits by reducing the pressure on fishing grounds.

In short, these initiatives promote the application of best environmental practices by production sectors that open their doors to visitors and discover that such activities are a means of creating awareness regarding environmentally friendly production methods and improve how the sector and its products are viewed by customers.

Possible sources of funding: Rural Development Programme 2007-2013, (RDG), European Agricultural Fund for Rural Development EAFRD, European Fisheries Fund (EFF), EU Competitiveness and Innovation Framework Programme, EU Research and Technological Development Framework Programme, Business Activity Development Programmes, FORAN Andalusian Self-employment Fund, Business Creation and Innovation Incentive Programme, attached to the Department of Economy, Innovation, Science and Employment.

**Action 3.2.2.2. AP SDRF. Organising events to promote local products and Almeria cuisine in order to encourage collaboration between the agriculture, tourism and fishing sectors.**

Promoting the use of local products in the tourism sector encourages responsible consumption and sustainable production, reducing, for example, the production sectors' carbon footprint. In economic terms, the investment required to organise this type of event is recovered due to the immediate impact they have on the local economy, and therefore, the region's economic activity.

In social terms, these initiatives help to showcase the local cuisine and maintain traditional production activities, strengthening the region's peculiarities and the community's sense of belonging.

Possible sources of funding: Department of Tourism and Trade's Sustainable Tourism Initiatives.

**Action 4.2.1.3. AP SDRF. Training course relating to Green Entrepreneurship.**

Training of entrepreneurs and administrations that support them is always seen as form of investment by the administrations, because their profits are measured in terms of the innovation and competitiveness of the economic activity and the creation of jobs. Since this measure is geared towards creating business initiatives that are committed to the region and view environmental sustainability as a differentiating feature -and thus an advantage in the market- such profitability can also be viewed in environmental terms. The creation of a 'green' business fabric will also enable the Almeria area of Levante to be positioned as a sustainable tourism destination, which will have a positive impact on the sector in the medium and long term.

Possible sources of funding: Regional Activity Centre for Cleaner Production within the Mediterranean Action Plan Funding, Business Creation and Innovation Incentive Programme and subsidies for Professional Training for Employment, attached to the Department of Economy, Innovation, Science and Employment.

## **9.- Lessons learned**

Developing the Dissemination of Good Practices in the Tourism Sector activities would have improved noticeably if we had planned, from the beginning of the CAMP Levante de Almería project's formulation stage and during the implementation stage, for local specialist consultants to perform analyses, focusing more on the characteristics of existing tourist demand in the CAMP area and the changes that have

taken place over the last decade. The assessment herein has attempted to come up with an approximation that is as trustworthy as possible, however we lack data regarding local demand.

Furthermore, improving the planning of the Dissemination of Good Practices in the Tourism Sector activities is considered appropriate, since the conferences have not had the desired impact due to the dates they were held on and perhaps the format used.

Finally, we believe it necessary to assess the make-up of the Team of Experts, with a view for it to better represent the tourism sector.