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**Levante de Almería CAMP**

## **Feasibility Study**

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Regional Activity Centre*



The drafting of the present Feasibility study has been carried out by the **Regional Ministry of the Environment of Andalusia, Spain** (CMA), under the supervision of the Mediterranean Action Plan of the United Nations Environment Programme / Priority Actions Programme-Regional Activity Centre (**UNEP/PAP-RAC**), and in coordination with the **Ministry of the Environment of Spain** (MMA).

For the coordination and carrying out of the study, the CMA has subscribed a Specific Agreement with the **Regional Development Institute (IDR) of Andalusia**, and has obtained the cooperation of the **Rural Development Group (GDR) of East Almería** for the organisation of the Participation Workshops with socioeconomic and institutional agents of the scope of the project.

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# INTRODUCTION

The Feasibility Study is a proposal from the Kingdom of Spain as Contracting Part of the Barcelona Agreement to start up a CAMP project on the Spanish Mediterranean coast following the recommendations made at the Conference of the Contracting Parties held in Catania where the MAP (MEDU) Secretariat was encouraged to implement the CAMP Projects in course and also those whose implementation has already been decided upon. The selected area for the putting into practice of said project is the emerged and submerged part of the East coast of the province of Almería, being called the CAMP Levante de Almería.

Said Study, in accordance with that laid down in the Reference Terms of the same, includes the following objectives:

- Analysis of the strategies existing in the action area, as well as in the political, legal and institutional context;
- Definition of the CAMP carrying out area;
- Gathering of the information existing on the strategic, political and institutional context;
- Definition of the possible activities from the point of view of the local, regional and national interests;
- Analysis of the international framework in which the CAMP could be developed;
- Evaluation of the possibilities for the start-up of the CAMP; and
- Evaluation of the long-term project sustainability possibilities.

## Methodology

Following the methodology established by the United Nations Environment Programme for the Mediterranean Action Plan (MAP/UNEP), the Feasibility Studies of the “CAMP” projects are the first relevant steps for the carrying out of the same, which helps to define the specific action area, the priority actions to be carried out to be defined, and the needs that will allow the achievement of the defined objectives to be established.

The Feasibility Study is, therefore, an essential step for the appropriate development of a CAMP project, and not simply a formal requirement, as its correct drafting will allow avoiding errors in the formulation and design of the project.

Taking into account said points, as well as the most recent recommendations from MAP-UNEP and from other institutions specialised in the matter, special emphasis has been made on the following aspects of the present Feasibility Study of the CAMP Levante de Almería Project:

- Detailed consideration of the institutional legal context at a European, National and Regional level (Andalusia), where the present CAMP will be carried out, to avoid difficulties when obtaining the defined objectives.
- Exhaustive inventory of the existing information and extension of the same in those cases where this was insufficient.
- Facilitation of the analysis and coordination process right from the initial steps of the project with other planning instruments already existing in the area, in order to avoid overlapping and eventual contradictions or inadequate use of the existing resources.
- Start up of a participative process right from the initial steps of the process, including both the various administrative entities with influence in the reference territory, such as social, economic, scientific and environmental actors related with the same.
- Definition of the technical and social needs for a correct carrying out of the project, including those regarding personnel and the necessary inter-institutional coordination.
- Clear and realistic establishment of the objectives and activities to be carried out in the long-term, and in a sustainability framework.

- Ensure the possibility for the real start-up of the CAMP activities, attempting to avoid by all means this becoming a simple planning theoretical exercise.

Taking into account the previous points, the Study has been divided into four parts:

- Political and institutional context. International, national and regional policies influencing the CAMP action area. Legal framework.
- Proposal of the CAMP carrying out area. Description of the geographical, ecological and socioeconomic context. Identification of problems and social actors.
- Proposal of activities for the CAMP Levante de Almería.
- Reasons for the CAMP. Main reasons in favour of the CAMP Levante de Almería. Description of the main technical, organisational and financial needs.

An executive summary, a specific bibliography, and various document annexes complete the Study.

## **Financing and Drafting**

The financing of the present Feasibility Study has been undertaken by the Junta de Andalucía Regional Ministry of the Environment, which has assigned the technical drafting to the Regional development Sustainable Development Group (IDR), associated R&D Unit of the Higher Council of Scientific Research.

The Regional Ministry of the Environment promoted in this way, and as part of the Feasibility Study, a participation process that has allowed the inclusion in said study of the suggestions and proposals of the local actors from the municipalities of East Almería, and of those responsible for the Local, Regional and National Administration. The participation process has been carried out with the coordination of the IDR, counting on the cooperation of the East Almería Rural Development Group.

The PAP-RAC/UNEP and the Institute of Studies and Cooperation for the Mediterranean Basin have undertaken the coordination expenses.

Once the Feasibility Study has been approved, an Agreement on its carrying out will be signed between the MAP/UNEP and the relevant Spanish Authorities, in this case the Ministry of the Environment of the Kingdom of Spain and the Junta de Andalucía, in order to start the CAMP Levante de Almería.



# **1. GENERAL INSTITUTIONAL AND POLITICAL CONTEXT**

## **1.1. Background on Integrated Coastal Area Management**

### **1.1.1. International and European background**

The Integrated Coastal Area Management in Europe has its main chronological milestone in 1973, when the Council of Europe published its *Resolution 29 on Coastal Zone Protection*, which allowed the setting up of the practical basis for this discipline. Other backgrounds of importance are the *International Seminar on Coastal Zone Resources Management and Development*, organised by the United Nations in 1976, and the *Coastal Activities Report*, published by the Organisation for Economic Co-operation and Development in 1978, the European Commission drafted two reports regarding the *Integrated Coastal Zone Management in the European Community and Guidelines for Integrated Coastal Area Management in Europe*, in which the integrated nature of the policy of Integrated Coastal Area Management is emphasised.

Later on, during the eighties, the Plenary Session of the Conference of the Maritime Regions of the European Economic Community gave rise to the *European Coastal Charter* (1981), an essential reference in this field, which was later followed by the approval of the *First Plan of Action Programme (1982-1985)* of said Charter and the *Coastal Area Impact Pilot Operation*. In May 1983 the *VI European Conference of Ministers Responsible for Regional Planning* of the European Council took place in Torremolinos (Malaga), in which institutional coordination and cooperation was emphasised. The following year, ordered by the Council of Europe, the *European Strategy for Coastal Area Management* was drafted, and, in the same year, the *IV European Interministerial Environment Conference* agreed upon a set of actions related to the coastal areas.

Other supranational initiatives taken during the nineties have been the continuance of the undertaking of the challenge of slowing down the deterioration of the coastal spaces and resources. In 1991, in The Hague, the *European Coastal Conservation Conference* took place, backed by the European Commission and the General Secretariat of the Council of Europe. At the same time, in 1992 and 1994, two *Resolutions of the Council of Europe* were passed regarding European policy on coastal areas, and the need for integrated management of the coastal areas. In 1996 the European Commission started a *Demonstration Programme on Integrated Management of Coastal Zones (1996-1999)*, that gave rise to various publications (European Commission, 1999 and 1999a), and official documents of the Commission of the Parliament and Council of Europe (COM 2000-547), as well as the Report of the Committee of the Regions published in the Official Journal of the European Communities (OJEC 18<sup>th</sup> of May 2001). Apart from this, we should also highlight the *Recommendation of the European Parliament and of the Council concerning the*

*implementation of the Integrated Coastal Management in Europe* (2002/413/CE), published in the Official Journal of the European Communities (OJEC 6<sup>th</sup> of June 2002).

At the same time, in 1999, the *European Environment Agency* published a report on the existing deteriorated conditions in the region and the European coastal resources, highlighting that the member States tasks in cooperation with the regional authorities and inter-regional organisations, should be guided towards the carrying out of a global inventory to determine the main agents, rules and institutions influencing the management of its coastal areas, and the development of strategies to put the Integrated Coastal Area Management into practice.

As can be seen, hardly three decades separate the Council of Europe Resolution (73) 29 on Coastal Zone Protection, and the Recommendation of the European Parliament and the Council of Europe concerning Integrated Coastal Area Management. As consequence of the growing institutional concern in Europe interesting initiatives have arisen, amongst which the *CAMP* projects should be mentioned.

In fact, in the Mediterranean Action Plan context, the *Coastal Area Management Programmes (CAMP Project)* are being carried out since 1989, as experiences demonstrating the application of the integrated management methodology of said areas, advocated by the United Nations Environment Programme . Until 1997, eight *CAMP projects* had been undertaken (one per country) in the Mediterranean basin (Albania, Croatia, Greece, Syria, Tunisia, Turkey, Egypt and Israel), to which another seven projects in Algeria, The Lebanon, Malta, Morocco, Cyprus, Slovenia and Spain have been added.

In **Map 1** are shown the *CAMP* projects already completed, those that are being carried out, and those in preparation. The *CAMP-Spain Levante de Almería*, localised in the East of Almería, is in preparation.

***Map 1. Coastal Area Management Programme (CAMP) projects in the Mediterranean***

A Protocol on ICAM is being prepared by the Barcelona Convention Signing Countries, being Spain one of them. The main objective of this Protocol is to provide a common framework for ICAM for the Mediterranean Region Sea including national and local specifications as well as strengthening regional cooperation.

### ***European policies and regulatory framework***

The European *environmental policy* is one of the most influential for the Integrated Coastal Area Management. The coastal area and the resources can clearly benefit from the abundant regulation on contamination and air quality control, water resources, protected natural spaces and habitats of interest. In fact, the Directives on Integrated Pollution Prevention and Control (96/61), The Water Framework Directive (2000/60/CE), the Environmental Impact Assessment Directive (85/337), the Strategic Environmental Assessment Directive (2001/42/CE), and the Habitats Directive (92/43), amongst others, are essential references for the management of coastal areas and resources.

The reference framework for the protection and improvement of water in the European Union is the *Water Framework Directive* (2000/60/CE), which establishes a series of environmental objectives for both surface and groundwater. The unit of water management is the river basin, although its scope was widened to include groundwater, transition water and coastal water, the last two being of special relevance for Integrated Coastal Area Management. One of the foundations on which the Water Framework Directive is based is that to promote the recovery of the costs of the services related with water, including the environmental costs, a matter of vital importance for the agriculture of the East of Almería. The River Basin Management Plan of each area is the most important element, specifying in each of these plans the proposals to comply with the Directive objectives.

The *Common Agricultural Policy* (PAC) also affects the coastal areas and resources. the evolution of that policy shows an attempt to include a growing environmental modulation to the direct subsidies to the agricultural production. *Agenda 2000* laid down various criteria of interest for Integrated Coastal Area Management, amongst which the inclusion of environmental objectives should be mentioned, considering the farmers as potential managers of the natural resources and landscape.

The *regional and cohesion policy* is also important from the point of view of a supranational integration process. Although the Structural Funds did not have, at the beginning of their implementation, special environmental sensibility, since their Regulation was revised in 1993, a prior environmental assessment of the proposals is required, as well as the participation of the respective environmental administrations within the fund assignment process. Recently, the European Commission has drafted a series of recommendations for the member States to take into account certain requirements regarding the prior environmental assessment, follow up, and impact assessment of the programmes financed by the Structural Funds.

On the other hand, the *fisheries policy* refers to one of the most threatened resources of the coastal areas. For their implementation, we turn, amongst others, to the *Financial Instrument for Fisheries Guidance (FIFG)*, destined to balancing the fisheries effort and the resources, including, at the same time, proposals for the restructuring of the European fleet. The impact of the restructuring of the fishing fleet in region objective 1, such as Andalusia, is being attempted to be mitigated with the *PESCA* Community initiative, which also includes aquaculture.

The *European Transport Policy*, which favours short-distance sea transport as an alternative to the overland transport by road, can also affect the territory of the CAMP project due to the geographical location of Almería between Europe and North Africa. Regarding the *Energy Policy* we should highlight its competitive priorities, safety in the supply, and protection of the environment. For these reasons, the Structural Funds are also aimed to financially support projects linked with the promotion of renewable energies such as solar, wind and biomass energies.

### **1.1.2. The contexts of the coastal policy in Spain and Andalusia**

The institutional declaration published in 1978 defined the coastal policy of the General Administration of the Spanish Central Government in the planning of the region, the rational use of natural resources and the defence of the environment, the administration and defence of the Public Domain being its main objective.

In 1985 the Ministry for Public Works and Urban Development (MOPU) published a report called *Coastal Policy* with the subtitle *1983-1990 Action Plan*, where, for the first time ever, there was institutional criticism of the coastal management situation, such as lack of current legislation, lack of planning, scarcity of investments and inadequate technical-administrative services. With this reasoning the strategic lines for a new coastal management policy in Spain were drafted.

Most of the progress made in the spanish coastal management system during the nineties, was due to this renovating effort, such as the defence of the public character of the sea-land domain, accessibility, and engineering works based on softer technologies, amongst others.

Coinciding with the Spanish Shores Act 22/88, the Institute of the Region and Urban Development (ITUR, 1988) published a study specifically dedicated to the coastal regional policies, in which the 'coastalisation' phenomena in Spain was described, providing a new coastal policy based on regional concepts that required in-depth regulation.

**Chart 1** offers a general vision of the most highlighted aspects in the planning and management of the coastal areas in Spain and Andalusia. The vertical reading of the same provides an idea of the role carried out by each regional level of the Public Administration, whilst a horizontal reading provides information on the various aspects of Integrated Coastal Area Management. It should be stated that, in the three regional levels of the Public Administration, the degree of implementation of Integrated Coastal Area Management has been scarce.

**Chart 1. Coastal area planning and management in Spain and Andalusia**

Aspects	Spain	Autonomous Community of Andalusia	Local scale
Highlighted policies	DPMT (except sea environment), and Ports of General Interest	Protected Natural Spaces and Water Quality.	Urbanism
Specific legislation	Shores Act	Coastal Regional Directives (in various Autonomous Communities), not very efficient.	No
Sectorial legislation	State Ports and Merchant Marine, Water, Protected Natural Spaces, Wild Flora and Fauna, Fishing...	Planning of the Region, Urbanism, Historical Heritage, Protected Natural Spaces, Marinas, Coastal Water, Tourism, Fishing and shell-fishing.	Urban planning
Some public management responsibilities	Public Domain (Sea, Terrestrial, Ports, Hydraulic); Commercial Ports; Public works of General Interest (coastal engineering); Basic legislation on land classes, Protection of the environment, mountains, forestry exploitation; National Parks; defence against sea pollution	Sport and Fishing ports: Public Works of interest of Andalusia; Regulation of the territory and of the coasts, Urban development and housing; Environment Management; Protected Natural Spaces; Health and Safety; Fishing, shell-fishing and aquaculture in inland waters; Agriculture and livestock paths; Control of waste disposal to inland waters; Defence of Historical Heritage.	Urban, health and cleanliness of beaches.
Special administration for ICAM	Yes, Coastal Demarcation (Directorate General of Coasts of the Spanish Ministry for the Environment, 1996)	No	No
Making up in ICAM	No, predominance of engineering	No, predominance of Biology and Architecture, greater professional diversity	No, predominance of architecture
Strategic Instruments ICAM	Not specific for ICAM, they are usually by sector. For the management of the DPMT those operative are the only used	No, specific for ICAM, usually by sectors.	No, they are usually urban or economic.
Economic	Investments directed to productive coastal sectors. Financing in the Directorate General of facilities and infrastructures linked to tourism.	Investments directed to productive coastal sectors. With the exception of water quality, little is invested in the management and recovery of coastal resources.	Investment addressed to productive sectors
Information	Large deficiencies for the coastal system, above all in living resources. There is hardly any on coastal management	The most balanced scale regarding information generated on the coastal areas and their resources, as well as of their management.	Very small on coasts and their management

Participation of social agents	Acceptable in most of the sectors except in Coasts	Acceptable although with important deficiencies in urban development and ports	Weak
ICAM	No	No	No
Implementation of ICAM	Small	Small but growing	Very small

Source: Adapted from Barragán, 1998b.

Since the approval of the Shores Act 22/88 to the present time, and in spite of some significant changes in the administrative organisation and improvement in the management of the Terrestrial/Maritime Public Domain (DPMT), the updated general diagnosis is summarised in **Chart 2**.

**Chart 2. Coastal Área planning and integrated management diagnosis in the General Administration of the Spanish Central Government between 1975 and 2005**

ASPECTS	GENERAL DIAGNOSIS
1. Policies	This is not a priority in the public policies; there is no explicit and well-defined coastal and sea policy; priority given to development over the conservation of resources; no integration of the sector policies; scarce political initiatives for integrated management; no regional political criteria by the Central Government towards the coastal Autonomous Communities is detected; positives changes as from 2004.
2. Regulation	Abundant legislative instruments and dispersion of the same; considerable advances during the period studies; there is a regulation on the DPMT but no specific text for integrated management; insufficient mechanisms to carry out ICAM; the planning of the marine environment is still a pending objective.
3. Responsibilities	Those of the General Administration of the Central Government are very important as the DPMT makes up the 'backbone' of the coastal areas; the distribution carried out by the Constitution obliges the coordination and cooperation with the regional entities; the less relevant role of the local scale in the planning of coastal areas contrasts with its capacity to promote the modification of resources and the transformation of the landscape; considerable responsibility conflicts have been detected in coastal area management.
4. Administration	There is a specific Administration for the coasts of the Central Government that, for the first time in 1996, was assigned to a Ministry for the Environment and not to that linked to the building of equipment and infrastructures; structured from central organisms implemented in the region from peripheral provincial units; the specific on the Coasts is almost the only Administration that does not have member organisms for its management; there are no coastal coordination organisms or any promoting cooperation between the various management regional levels; there are many possibilities from the current institutions for integrated management.
5. Strategies	For a long time the management strategies have been at the service of tourist activities; throughout the eighties very interesting management strategic lines were developed based on the planning of financial resources and personnel, which were weakened during the nineties; It does not exist a well-defined strategy and that has been published for ICAM; The strategic nature instruments for coastal management were not approved by the politicians in office during 1996-2004; the Spanish strategy on biodiversity does not fully recognise the singularity and threats of the coastal areas; the strategic character of the coordination and cooperation between administrations is not recognised in practice; there is no work strategy known linked to specific objectives in the various time horizons.
6. Instruments	The regulations are numerous and of different nature; currently, there is none of a strategic nature specifically designed for the coast, nor of an operative nature; there is no National Programme for Integrated Coastal Area Management; the most effective are linked to various sectors of activity and engineering works; scarce relevance of the voluntary instruments; general criteria is not known for the application of instruments derived from Coast Law

## 1. General institutional and political context

### 1.1. Background on Integrated Coastal Area Management

ASPECTS	GENERAL DIAGNOSIS
	22/88; deficiencies are detected in the use of the usual instruments linked to the DPMT management; political announcement of a 'Directive Plan for the sustainable development of the coast' in 2004
7. Administrators	Remarkable deficiencies in the specific training for the integrated management; the training of the administrators in the Coasts Organisms of the Ministry for the Environment completely biased towards engineering; there is no relationship between the personnel available in the Coast peripheral administrations and their workload; nor between the dimensions and characteristics of the natural heritage, developed human activities, infractions and available human resources; there is no supplementary training institutional policy for the coastal area managers; the intellectual skills for integrated management are not given the appropriate importance; serious deficiencies regarding the university system of our country.
8. Resources	Almost exclusively public; the General Coasts Management (DGC) is the main vehicle for the investments in the DPMT; the amount is still small but is increasing; the destination of said investment is linked to a greater degree to urban environments and to a productive finality rather than an environmental one in natural environments; there is no relationship between the benefits obtained from the coasts and the resources destined for its conservation; its geographical destination is preferably linked to productive purposes; the Mediterranean region has been historically benefited due to the fact that its functional specialisation (tourist services) required considerable investments in the regeneration of beaches; the criteria used by the DGC for the assignment of resources is not publicly known.
9. Information	There is no system gathering coastal information; there have been considerable advances in the obtaining of information regarding the new remote perception technologies; on the one hand there is an acceptable knowledge from the coastal geomorphology and oceanographic point of view, and in a much less way of the living resources; the deficit of information is solved by means of technical assistance; the knowledge of the coastal system has serious deficiencies in the marine environment; the management of the information by means of a Geographical Information System (SIG) still encounters serious difficulties for its implementation, above all in peripheral administrations; the information on the objectives and results of the DGC is as scarce as its public disclosure reduced.
10. Participation	There are no member organisms or forums where the possible solutions to the problems affecting our country's coasts can be discussed; the greater part of the institutions managing resources or responsibilities related to the coastal system have been adopted to the requirements of a democratic and participative society, insofar as member organisms is referred; the DGC is one of the few institutions with acknowledged capacity to act and invest in which said organisms are completely absent.

The Spanish Autonomous Communities, even though with responsibilities on coastal planning and its resources and even environmental management, do not have yet -with only one exception- specific strategies for the coast. In relation with this, Andalusia, as an Autonomous Community, joins in with interesting possibilities for Integrated Coastal Area Management, due to their active policy in the Natural Protected Areas (**Chart 3**).

**Chart 3. Coastal of the planning and management Diagnosis in Andalusia**

Aspects	General Diagnosis
1. Policy	During the nineties, attention signals to the littoral areas started being detected as a reaction to the obvious degradation of some of its resources. There were not explicit and clear coastal and marine policies. There were very little political initiatives for integrated management, except these related to Protected Natural Areas. Tourism related activities were priority number one.
2. Regulation	Abundant and disperse; the advances have been considerable over the past few years, above all in that referred to the quality of coastal water; The Andalusian Coastal Regional Directives are not very effective; there is no specific legislation for ICAM; the marine environment is still not regulated in accordance with its special characteristics (for example, the measurement criteria used to fix the limits of the marine environment of the Natural Protected Areas)
3. Responsibilities	The Junta de Andalucía responsibilities are of extreme importance to ICAM; apart from those of the Coastal planning, it has all those assigned to Natural Protected Areas (terrestrial, transitional, and marine areas); we should also mention those related to the quality of the coastal areas, cultural heritage (including the sub aquatic), aquaculture and shell fishing in inland waters...

Aspects	General Diagnosis
4. Administration	There is no specific Administration for the management of the coasts in Andalusia; there are no coastal coordination organisms; there are interesting possibilities from the current institutions (Coordination Commissions of the Provincial Delegations of Government) for integrated coastal area management.
5. Strategies	During the eighties very interesting management strategic lines were developed, but which were weakened or disappeared during the nineties; those derived from a Natural Protected Areas policy were maintained; currently, there is no well-defined strategy with the exception of Regional Planning; during the nineties the strategies have been followed, to a greater degree, to the service of tourist activities; there is a lack of specific strategies to coordinate action with the Central Government in coastal areas. Over the past few years proposals of a strategic nature linked to the Areas of Community Interest and the Natura 2000 Network of great interest for the terrestrial and inter-tidal coastal areas, but in a lesser way for the marine areas, have been observed.
6. Instruments	These are numerous and of different nature; there are no Regional Programmes for the Integrated Coastal Area Management; those existing are those proposed by the Regional Ministry for the Environment; relative failure of the traditional planning of land uses and failure of those of coastal planning; slowness in the approval of new instruments for the Planning of the Region; significant advances by the instruments related with the quality of the coastal areas and the Natural Protected Areas; concern for the ICAM from the environment administration by means of its strategic instrument: Andalusia Environment Plan 2004-2010.
7. Administrators	There is a reasonable diversity in the academic training of the administrators linked to the coast; considerable deficiencies in the specific training for the integrated coastal area management; an institutional policy regarding this is lacking; the intellectual skills necessary for integrated management are not given appropriate importance; important deficiencies in the university system for the making up of ICAM.
8. Resources	Almost exclusively public; much reduced numbers, except for water quality management (sewage, purification); lack of balance between the benefits obtained from the coast and the resources destined for its protection: coastal tourism versus coastal conservation.
9. Information	A system bringing together information concerning the coasts would be necessary; the knowledge of the coastal system has serious deficiencies in marine environment, nevertheless, there is reasonable knowledge of the living resources in the terrestrial environment; the information on the management objectives and results starts to consolidate a model of relative transparency.
10. Participation	The social and institutional participation in the coastal management process is greater than that of the General Administration of the Central Government, but continues being sectorial; there are no member organisms or discussion forums for the group of problems threatening the coast; the participation of the Central Government in the decision taking processes of autonomic responsibility is very small; there is no application, therefore, of the principle of reciprocity in management by the Autonomous Community.

## **1.2. Strategies and policies influencing the CAMP Levante de Almería environment**

### **1.2.1. Instruments of interest for integrated coastal area management in Spain and Andalusia**

The Indicative Plans for the Uses of the Marine/Terrestrial Public Domain used by the General Coasts Management (DGC) are experiences of the current coastal planning and management system. These were drafted during the second half of the seventies and played a relevant role in the exploitation of the Maritime-Terrestrial Public Domain areas and resources, their main characteristic being the bias towards tourism and leisure.

After the *Coast Action Plan 1993-1997*, mainly focussed on the conservation and recovery of the most tourist beaches in Spain, in 1999, the *National Coast Action Plan 2000-2006* was drafted, but not passed. In 2004 the Government started the drafting of a *Director Plan for Sustainable Coastal Management*.

The above mentioned Director Plan is one of the lines followed by the reorientation of the policy on coasts carried out by the Spanish national Administration from 2004; it also includes nine more lines (delineation of Public Domain, land acquisition for protection of the coastal Public Domain, etc...) among which the support of the integrated and sustainable management of the coast should be highlighted (see also Chapter 3).

Other strategic instruments or plans are the National Sea Rescue Plan and Fight against Pollution, and the Fishery Plan. Additionally, other instruments such as the following below, directly or indirectly affect the coast and its resources: Spanish Strategy for Sustainable Development; Spanish Strategy Plan for the Conservation and Rational Use of Wetlands; the National Forestry Strategy and Spanish Forestry Plan; Strategic Plan for State Ports; Spanish Strategy for the Conservation and Sustainable Use of Biological Diversity; Strategy for the Conservation of Endangered Species; National Action Strategies and Plans Combating Desertification; Priority Action Plans concerning Forestry Hydraulic Restoration; and the Transport Infrastructure Strategic Plan, drafted in December 2004, of importance for the CAMP project scope, as Levante de Almería is a peripheral area with respect to the large economic centres and transport nodes.

Another of the Central Government initiatives of interest for the CAMP project scope is the *AGUA Programme* (Investment Actions to increase the Availability of Hydraulic Resources), which includes actions in the entire Spanish territory affecting all the policies and scopes directly and indirectly linked to the management and sustainable development of water.

In **Chart 4** the instruments of the General Administration of the Central Government affecting the coastal area planning and management in Spain are shown. At the same time, given the Levante de Almería characteristics, the National Action Plan combating Desertification, summarised in **Chart 5**, should be mentioned.

**1. General institutional and political context**  
**1.2. Strategies and policies influencing the CAMP Levante de Almería environment**

**Chart 4. Instruments of the General Administration of the Central Government affecting coastal area planning and management in Spain**

Resource or activity	Strategic planning instruments	Planning and management operative instruments
DPMT	<ul style="list-style-type: none"> <li>National Coast Plan</li> </ul>	<ul style="list-style-type: none"> <li>DPMT boundaries,</li> <li>Reserves and assignments,</li> <li>Authorisations, Concessions, Levies, Rates, Deposits, Redemptions, Penalties.</li> </ul>
Sea fishing resources	<ul style="list-style-type: none"> <li>Fishing Plan</li> </ul>	<ul style="list-style-type: none"> <li>Fishing Protection Area: marine reserves, marine conditioning areas, and marine repopulation areas.</li> <li>Fishing licenses, fishing boats Register, specific registers, Distribution, Transferability, Expiry, Fishing Diary, declaration of landing, transfer Declaration, Inspection.</li> </ul>
Central Government sea and port activities and installations	<ul style="list-style-type: none"> <li>Central Government Strategic Plan</li> <li>Ports and Port Authorities,</li> <li>National Sea Rescue Plan and Fight against Pollution</li> </ul>	<ul style="list-style-type: none"> <li>Works plan,</li> <li>Port space use plan,</li> <li>Special Spatial Planning for port spaces,</li> <li>Assignments, Authorisations, Concessions, Penalties, Police regulation,</li> <li>Environmental Management System.</li> </ul>
Hydraulic Public Domain	<ul style="list-style-type: none"> <li>AGUA Programme</li> <li>National Hydrologic Plan</li> <li>River basin Hydrologic Plan</li> <li>River basin Action Plan</li> </ul>	<ul style="list-style-type: none"> <li>Boundaries of the Hydraulic Public Domain</li> <li>Authorisation, Concession, Penalties,</li> <li>Water Registry.</li> </ul>
Natural protected spaces, wild flora and fauna	<ul style="list-style-type: none"> <li>Spanish Strategic Plan for the Conservation and Rational Use of Wetlands (Ramsar),</li> <li>National Forestry Strategy,</li> <li>Director Plan of the National Parks Network</li> </ul>	<ul style="list-style-type: none"> <li>National Park Network,</li> <li>Natural reserves, Natural Monuments and Protected Spaces,</li> <li>PORN and PRUG</li> <li>Lists and catalogues of ecosystems, fauna and flora species,</li> <li>Areas of Community Interest,</li> <li>Special Bird Protection Area,</li> <li>Natura 2000 Network.</li> </ul>

**Chart 5. Summary of the National Action Plan against Desertification**

<ul style="list-style-type: none"> <li>The confirmation by Spain of the United Nations Convention to Combat Desertification (UNCCD) involves the drafting of a National Action Programme as a central element to combat the same. The Ministry for the Environment has to draft said Programme, in cooperation with the rest of the Ministries involved and the Autonomous Communities, with the active participation of the groups representing the public.</li> <li>In October 1996 the Ministry for the Environment presented a document of principles to the Environment Advisory Council that was accepted. The essential objective of the National Action Plan to Combat Desertification is the contribution to the sustainable development of arid, semiarid and dry sub-humid areas of the national territory, and specifically, the prevention and follow-up of land degradation, the restitution of partially degraded regions, and the recovery of desert areas.</li> <li>Its most important scopes of action are the legislative, institutional and administrative areas. The attempted areas of impact are the modalities for the use of the land, planning of hydraulic resources, the conservation of land, forestry, agricultural activities, and planning of pastures and meadows, the planning and conservation of the wild fauna and flora and other types of biological diversity, and forest fire prevention. At the same time, it attempts to promote the existence of alternative means for the subsistence, research, training and promotion of public awareness.</li> </ul>
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- The specific action plans are the evaluation and follow-up of desertification in Spain; the development of a system of indicators and risks alarms; the inclusion of the affected social sectors in the development of the Programme; and the restoration of the areas affected by desertification.

Another instrument of interest for Integrated Coastal Area Management is the National Plan for Marine Cultures. Created by Law 23/1984 on Marine Cultures, including actions destined to the promotion and development of marine aquaculture, and aimed at reaching specific research, development and innovation objectives in activities related with aquaculture. There are currently eight National Plans that have started, or are in the final planning stage. An example of interest to the CAMP project scope is the final updating of cages for cultures in the open sea.

In the ports, innovations for the improvement of their management have also appeared. The Special Plans for the Planning of the Port Spaces included in the new Law on Ports 1992, attempt to facilitate integration between the port and the city. To the above we should add that they are progressively integrated in their most conflictive scope, that is, the environment, from specific policies and instruments such as the Port Environmental Policy, the Port Environmental Management Systems, the Port Environmental Forum, the Port Environmental Legislative Information System, the Port Environmental Plans and Sustainability indicators of the 'port ecological footprint' type, the Integral Plan of Environmental Actions, or the acceptance of the 'social hinterland' concept, amongst others.

At the same time, the information flow between the port community and the institutions and interested public is increased. Thus, the old *Traffic Reports* published by the ports almost from their very beginning, these days, in the new format of *Technical and Statistical Data*, the *Management Reports* are added annually. Also the monthly publication of the *Ports Magazine* is a communication channel between the various Port Authorities, the Central Government Ports Public Entity, and the user community. Said information, as well as the rotation and appointment of the members of the various member organisms for the decision taking processes, especially the Management Boards, make the public port management system more transparent, participative and open.

On a regional scale, there is, strictly speaking, no Autonomous Community in Spain having any specific instrument for integrated coastal area management. Nevertheless, the regional scale has strategic sectorial instruments affecting the coastal area planning and management (**Chart 6**), or that are of interest for integrated coastal area management (**Chart 7**).

Amongst the Natural Protected Areas instruments the Natural Resources Regulation Plans (PORN) and the Use and Management Governing Plans (PRUG) stand out. Additionally, in the socioeconomic areas of influence of the Natural Parks of Andalusia, the implementation of Sustainable Development Plans commenced in 2001, including Promotion Programmes with respect to the diversification of the local productive systems, aiming at including quality and differentiation specific to said natural spaces as the main element for regional competitiveness, a pioneering activity in the management of sustainable development in the

Spanish territory, promoted by the Regional Ministry for the Environment and the Agency for the Innovation and Development of Andalusia (previously named the Andalusia Promotion Institute).

**Chart 6. Andalusia Autonomous Community instruments affecting coastal area planning and management**

Resource or regulated activity	Strategic or indicative planning instruments	Planning and management operative instruments
Land Uses	<ul style="list-style-type: none"> <li>• Basis, Strategies and Regulation Plan of the Region of Andalusia,</li> <li>• Special Protection Plans for the Physical Environment,</li> <li>• Sub-regional plans for the planning of the region,</li> <li>• Coastal Regional Directives</li> </ul>	<ul style="list-style-type: none"> <li>• Urban planning proposed by the municipality and approved by the Regional Administration.</li> </ul>
Tourism	<ul style="list-style-type: none"> <li>• General Tourism Plan</li> <li>• Senda Plan</li> <li>• Tourism Excellence and Revitalisation Plan</li> <li>• Large cities programme</li> <li>• Tourism Signposting Programme</li> <li>• Tourism Marketing Plan</li> </ul>	<ul style="list-style-type: none"> <li>• Tourism register,</li> <li>• Classification of Hotels and Restaurants,</li> <li>• Tourist inspection, Tourist Municipality,</li> <li>• Preferential Tourist Action Area (Integrated Tourism Action Plan)</li> <li>• Destination re-qualification programmes,</li> <li>• Specific Tourism Programmes,</li> <li>• Declaration of Andalusia National Tourism Interest</li> </ul>
Resources and cultural assets	<ul style="list-style-type: none"> <li>• General Cultural Assets Plan</li> </ul>	<ul style="list-style-type: none"> <li>• Declaration of Assets of Cultural Interest,</li> <li>• General catalogue of the Historical Heritage of Andalusia,</li> <li>• Archaeological Easement Area,</li> <li>• Types of Assets of Cultural Interest: Historical Group, Monument, Archaeological Site, Historical Site...</li> </ul>
Natural Protected Spaces	<ul style="list-style-type: none"> <li>• Natura 2000 Network: Places of Community Interest in Andalusia</li> <li>• Sustainable Development Plan. Promotion Programmes</li> </ul>	<ul style="list-style-type: none"> <li>• Apart from those laid down in National Law 4/1989, Natural Spot, Per-town Park, and Agreed Natural Reserves.</li> <li>• Natural Resources Regulation Plan (PORN) and Use and Management Governing Plans (PRUG).</li> </ul>
Coastal water	<ul style="list-style-type: none"> <li>• Coastal Water Police Plan,</li> <li>• Marine water Quality Programme</li> </ul>	<ul style="list-style-type: none"> <li>• Authorisations of waste disposal, Disposal Levy, Register of authorisations,</li> <li>• Industrial Waste Disposal corrective plans,</li> <li>• Surveillance and Automatic Control Network of Hydraulic Pollution,</li> <li>• Coastal Water Surveillance vessels,</li> <li>• Andalusia Coastal Water Police Plan</li> </ul>
Marinas	<ul style="list-style-type: none"> <li>• Andalusia Port Plan</li> </ul>	

Resource or regulated activity	Strategic or indicative planning instruments	Planning and management operative instruments
Sea Fishing, Shell fishing and Marine Aquaculture	<ul style="list-style-type: none"> <li>Modernisation Plan of the fishing sector 1997-2006 (Reprogramming 2003).</li> </ul>	<ul style="list-style-type: none"> <li>Protected Sea Areas,</li> <li>Fishing Reserves,</li> <li>Artificial Breakers,</li> <li>Marine re-population,</li> <li>Specific Fishing Plans, Licenses, Authorisations, Census</li> </ul>

**Chart 7. Strategic planning instruments in Andalusia of interest for Integrated Management of Coastal Areas**

Plan	Period	Organism
Organic Agriculture Andalusian Plan	2002- 2006	Regional Ministry of Agriculture and Fishery
Andalusian Irrigation Plan	2000- 2006	Regional Ministry of Agriculture and Fishery
Andalusian Agriculture Modernisation Plan	2002- 2006	Regional Ministry of Agriculture and Fishery
Fishing Sector Modernisation Plan in Andalusia	1997- 2006 (reprogramming 2003)	Regional Ministry of Agriculture and Fishery
XXI Century Horizon Economic Plan	2002- 2005	Regional Economy and Tax Ministry
Andalusian Research Plan	2000-2003	Regional Education and Science Ministry
Energy Plan in Andalusia	2003- 2006	Regional Employment and Technological Development Ministry
Emergency Regional Plan in Andalusia		Regional Governing Ministry
Hazardous Waste Management Plan in Andalusia		Regional Ministry of the Environment
Environment Plan in Andalusia	2004-2010	Regional Ministry of the Environment
Andalusian Forestry Plan	2002- 2007	Regional Ministry of the Environment
Plan for the Recovery and Regulation of the Livestock Path Network in Andalusia		Regional Ministry of the Environment
Andalusian Plan for the Conservation of Biodiversity		Regional Ministry of the Environment
INFOCA 2003 Plan		Regional Ministry of the Environment
Waste Management Regional Director Plan	1999- 2008	Regional Ministry of the Environment
Infrastructures Director Plan in Andalusia	1997-2007	Regional Public Works and Transports Ministry
Programme for the Promotion of Renewable Energy Installations		Regional Public Works and Transports Ministry
Basis and Strategies of the Plan for the Regulation of the Territory in Andalusia		Regional Public Works and Transports Ministry

**1. General institutional and political context**  
**1.2. Strategies and policies influencing the CAMP Levante de Almería environment**

Plan	Period	Organism
Andalusian Plan for Housing and Land	2003- 2007	Regional Public Works and Transports Ministry
Prevention Plan against Flooding in Urban River Beds		Regional Public Works and Transports Ministry
General Road Plan in Andalusia	1997-2007	Regional Public Works and Transports Ministry (in advanced stage)
Beach Plan		Regional Tourism and Sports Ministry
I Andalusian Volunteer Plan	2003-2005	Regional Governing Ministry
Emergency Plan Framework Standard and Risk Situations on the Coast		Regional Governing Ministry

Source: Regional Ministry for the Environment, 2003

Amongst the regional strategic instruments of most interest for Integrated Coastal Area Management, the *Environment Plan in Andalusia 2004-2010* should be mentioned, and that was approved by the Government Council in 2004. Said plan is the most important instrument of the environmental policy of the Autonomous Community of Andalusia. The planned investment, more than 5,200 million Euros, is a clear commitment with the environment as it doubles the amount included in the previous Environment Plan. But this Plan additionally presents other innovations, as it underlines the need for the participative nature of the formulation process. It also insists on the active participation of the public to carry out a closer environmental policy, and as a novelty it includes the responsibilities undertaken in the management of intra-community river basins.

Two of the strategic lines of the Environment Plan are of special interest to Integrated Coastal Area Management in Andalusia and in the scope of the CAMP project specifically: the integral management of hydraulic resources and integrated environmental coastal management, within which the environmental management and improvement of the environment quality programmes are included. Amongst the measures laid down for the first of these programmes, the development of an Andalusian strategy for the application of the future European Strategy for Integrated Coastal Area Management; the drafting of a specific regulation for the uses and activities affecting the coast; the implementation of Strategic Environmental Assessment for the general plans of urban planning; the support and configuration of coordination systems and organisms, as well as the promotion of voluntary or contractual agreements to promote the cooperation between the various levels and sectors of the Administration with the coast users and the various socioeconomic factors; the widening of the action margins of the Shores Act 22/88 concerning the management of Protection Easement Areas of the Terrestrial/Maritime Public Domain; and the drafting of a manual to promote 'good practices' on the coast. Amongst the measures of the second programme we should highlight the closer cooperation and improvement of the actions related to the quality of the coastal water.

Regarding town planning management, the Regional Administration, through the Regional Public Works and Transports Ministry, has also considerable control in spite of the fact that

the proposal arises from the Local Administration. In fact, for the coastal areas and resources, what is important is the pressure carried out by the municipalities by means of their planning initiatives drafted in the Urban Planning and General Subsidiary Rule Plans.

Apart from the mentioned instruments, the Junta de Andalucía has created the Coastal Office, firstly for the provinces of Cadiz and Malaga. This is not a new organism but a reinforcement of the technical means available to carry out the control or local police, especially in the Protection Easement Area.

An instrument of interest for the coast, where the Central Government and the Junta de Andalucía are implicated since 1995, is the *National Sewage and Purification Plan*. By means of the same they have earmarked considerable funds in order to comply with Directive 91/271, which required the municipalities with more than 15,000 inhabitants to have equipment for the secondary treatment of waste water. Other specific instruments for the coast and in which the central and regional administrations also participate voluntarily are the Agreements for the Coordination of Actions on the Coast. Most of them have been signed over the past few years, and, apart from reaching agreement on investment in infrastructure and coastal defensive works, they attempt to extend institutional cooperation. One of these documents of a voluntary nature is the *Plan for the Sustainable Development of the Doñana environment*, carried out with the presence of all the Public Administration levels, including the European Union. Said agreement arose as a joint reply to the strong pressures of the real estate development produced on of the most emblematic natural protected areas of the continent.

Although not in the same number as in previous levels, the Local Administration has a series of very useful instruments for coastal management. Amongst those being compulsory are those of an urban nature, that is, the General Planning Plans, Subsidiary Rules, Marking out of the Land and Special Plans. These are precisely linked to the urban development tendency of the entire Spanish coast, where one of the most endemic problems of the protection and conservation of the coast can be found. And it is that a considerable part of the municipal income continues to be linked to construction and real estate uses, such as the Building Licences and Property Tax. This is the reason that explains the race many Town Halls started in order to attract urban developments of this type within their municipalities.

But the municipalities also have another compulsory instrument required by the Shores Act. This is the *Beach Exploitation Plans* that should be sent to the corresponding Coastal Demarcation, in order to be approved before the beginning of the summer season. In these, the services and equipment that each beach will have has to be included, as well as the actions or works to be undertaken to meet the described aims. The municipalities also have some voluntary instruments of great interest for coastal management, such as the drafting of strategic plans, the Local Agenda 21, the blue flags, and the obtaining of an environmental quality guarantee certificate by the Spanish Standardisation and Certification Association, using the *ISO 14.001 standard* in the management of beaches. Up to the moment, these instruments are not generally used although it may be anticipated that the developments of

the Andalusian local entities, as has happened in other European municipalities, end up by including this type of initiative.

The Shores Act 22/88 includes new instruments that can be considered to be an advance for Integrated Coastal Area Management. But insufficiencies are also observed, as specific instruments for the strategic planning of the Spanish coasts are not proposed, there are no incentives encouraging cooperation between the Central Government, the Autonomous Communities and the Town Halls, and the efficient coordination of the instruments of the various administrative areas is uncertain, amongst other significant aspects.

Finally, another matter to be tackled is the varying degree of efficiency of the instruments. On the one hand there are those addressed to the carrying out of infrastructures and coastal defence works, the greater part of these depending on the Central Government. On the other, those aimed at further in-depth planning of the coastal areas, depending on the Autonomous Community and the Andalusian local entities. In the compliance of the corresponding objectives, the efficiency of the former contrasts with the real implementation difficulties of the second, so it could be said that the pressure of tourism and leisure activities has been such on the coastal areas planning and management instruments that this has questioned the town and regional regulation planning system.



## **1.3. Institutional Structure**

### **1.3.1. Distribution of responsibilities between the Central Government, the Autonomous Communities and the Local Administration**

Articles 148 and 149 of the Spanish Constitution of 1978 are the main reference for the distribution of responsibilities between the three basic levels of the Public Administration. The importance of the coastal areas is also included in the Constitution when it mentions, in article 132.2, as governmental public domain assets *those determined by the law, and in any case, the maritime-terrestrial area, the beaches, the regional sea and the natural resources of the economic area and the continental platform.*

The coastal areas, as the geographical space where there are multitude of public uses and economic activities, are directly affected by that distribution of responsibilities. The Central Government and the Autonomous Communities have a greater part of the relevant public functions that can be found on the coast, it being the local power that has fewer responsibilities directly assigned by the constitutional rule. The Statute of Autonomy of the various regional entities acknowledge the possibilities that the Constitution grants them, being result of the process of de-centralisation of the Central Government which has been mentioned. The Organic Law 6/1981, of the 30<sup>th</sup> of December, of the Statute of Autonomy for Andalusia lays down in article 18.8 that the Autonomous Community of Andalusia has exclusive responsibility over the *regional policy: regional and coastal planning, urban development and housing.* At the same time, in this same statute, articles 17.6 and 17.11 mention that the Autonomous Community should carry out the legislation of the Central Government in that regarding the existence of industrial waste and pollutants in the regional water corresponding to the Andalusian coast, as well as sea rescue on said coast.

The Central Administration of the Central Government has a series of important responsibilities in the coastal area, amongst which the determination and protection of the Maritime/Terrestrial Public Domain and the Hydraulic Domain, the coastal and dredging engineering works, commercial ports, national defence, control and safety in sea water, sea fishing in the regional sea, are found, amongst others. In general, it may be said that the Central Government is responsible, in many scopes of the Public Administration, for the approval of the basic planning, while the Autonomous Communities are responsible for the carrying out of the same, and, therefore, of the specification and adaptation to the peculiarities of each region.

Royal Decree 599/1992, of the 5<sup>th</sup> of June, modified the organic structure of the General Coasts Management, at that time detailing its responsibilities in a precise way:

- The determination of the Maritime/Terrestrial Public Domain (DPTM) by means of the demarcation procedure, as well as the adoption of the necessary measures to ensure its integrity and appropriate conservation.
- The management and protection of the DPMT, as well as of its police, and that of the legal easements of its responsibility.
- The carrying out, supervision and control of studies, projects and defence works, protection and conservation of the elements making up the DPMT and, specifically, those of creation, regeneration, and recovery of beaches.
- In general, the exercise of the rest of the responsibilities attributed by the current coastal legislation.

As can be seen, the concept of the coastal administration at that moment was very closely linked to the Maritime/Terrestrial Public Domain, in accordance with the nature of the Shores Act 22/88, passed a few years previously. This Decree also reveals the special interest of the Central Government in one of the coastal environmental units that would receive most attention during the following years in the shape of investment, that is, the beaches. Additionally, the text of the Decree ensured the continuity of a management very closely linked to the coastal engineering works, as corresponded to a General Coasts Management framed within the Public Works and Transport Ministry.

Later, the Royal Decree 1415/2000, of the 21<sup>st</sup> of July, by which the basic organic structure of the Ministry for the Environment is laid down and created in 1996, reproduces the same three sections of the above, adding other aspects of interest, as that concerning the promotion and coordination of plans and programmes for the environmental protection of the marine environment and coastal ecosystems, as well as the environmental follow-up of the activities carried out on the high seas, specifically, in the installations for the exploitation of hydrocarbons, the construction of breakwaters and the mining of marine aggregates.

Within the responsibilities of the Coasts General Manager is the Division for the Protection of the Environment and Marine Ecosystems. From Royal Decree 1477/2004, of the 18<sup>th</sup> of June, we also extract information of interest regarding the current functions of the General Coasts Management, amongst which we could highlight:

- The determination of the DPMT by means of the demarcation procedure, as well as the adoption of the necessary means to ensure its integrity and appropriate conservation.

- The integrated management, in the scope of that laid down in the European directives and in the Spanish regulation, under the protection of the DPMT, as well as its police and legal easements of its responsibility.
- The drafting, carrying out, supervision and control of studies, projects and defence works, protection and conservation of the elements making up the DPMT, and specifically, those of sustainable adaptation of beaches, dune systems and coastal wetlands.
- The coordination with Autonomous Communities, local entities and public or private organisms of the actions and projects contributing to the improvement of sustainability of the coast.

Amongst the responsibilities assigned to the Autonomous Communities, the planning of the coast, the planning of the region and urban development, the management of the Natural Protected Areas, regional harbours, historical heritage, authorisation of uses and activities in Protection Easement Areas, waste disposal to the Maritime/Terrestrial Public Domain can be highlighted; whilst in the Internal Waters, the waste disposal, fishing, aquaculture and shell harvesting is covered. The responsibilities mentioned are just as important for Integrated Coastal Area Management as those of the Central Government, and in some occasions the responsibilities of these two Administrations converge in the same physical space.

Recently, the approval of Royal Decree 2130/2004, of the 29<sup>th</sup> of October, has allowed the transfer of functions and services from the General Administration of the Central Government to the Autonomous Community of Andalusia regarding hydraulic resources and exploitation of the former South Hydrographical Confederation, including the CAMP Levante de Almería project scope. This is a new opportunity to test new formulas and instruments for integrated management in the Andalusian Mediterranean coast.

Lastly, the main responsibility of the Local Entities is linked to the planning and land use management. This responsibility is one of the most important, as from the same the human settlement processes are derived. We cannot forget that the creation of new settlements, or the growth of the existing ones, is the main transformation and degradation vector of the coastal area resources.

### 1.3.2. Public Administrations involved in coastal management in Spain and Andalusia.

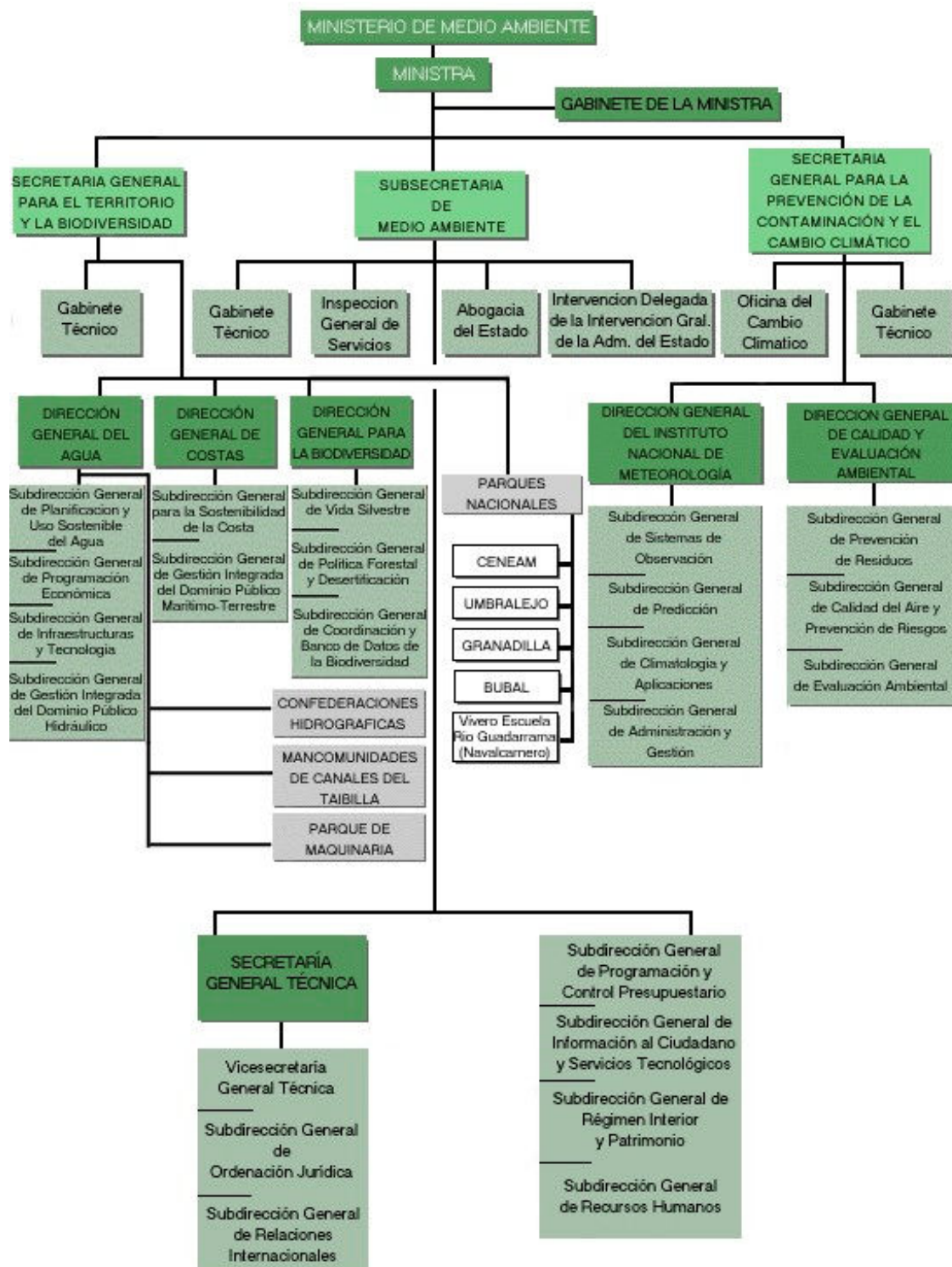
The responsibility for the management of the coastal areas and their resources is distributed between the three basic administrative levels, being a reflection of the distribution of responsibilities between the same. **Chart 8** includes some organisms of importance due to the capacity of intervention and investment, and **Graphic 1** shows the organisational chart of the Ministry for the Environment. The new executive power has various member organisms of interest to Integrated Coastal Area Management, such as the Sectorial Conference for the Environment, the National Water Council, the Council for the Network of National Parks, the Advisory Council for the Environment, and the National Council of Climate, amongst others.

**Chart 8. Administration and management of coastal areas in the General Administration of the Central Government**

Resource or regulated activity	Administration and management entities	Member organisms and personnel for the decision taking process and assessment
Maritime/Terrestrial Public Domain	Central Entity <ul style="list-style-type: none"> <li>General Coasts Management (Ministry for the Environment)</li> </ul>	Central Organism <ul style="list-style-type: none"> <li>Coasts General Manager</li> </ul>
	Peripheral Entity <ul style="list-style-type: none"> <li>Coastal Demarcation</li> <li>Provincial Coastal Services</li> </ul>	Peripheral Organism <ul style="list-style-type: none"> <li>Coastal Demarcation Chief</li> <li>Head of Provincial Coastal Service</li> </ul>
Sea fishing resources	Central Entity <ul style="list-style-type: none"> <li>Sea Fishing General Secretariat</li> </ul>	Central Organism <ul style="list-style-type: none"> <li>National Fishing Council</li> <li>Consultant Organism of the Fishing Sector</li> </ul>
Activities and sea installations and ports of the Central Government, Governmental Port Public Domain	Central Entity <ul style="list-style-type: none"> <li>Central Government Ports Public Entity, Ministry for Promotion</li> <li>Sea Safety Rescue Society, Ministry for Promotion</li> </ul>	Central Organism <ul style="list-style-type: none"> <li>President and Governing Council of the Ports Public Entity</li> <li>President and Management Board of the Sea Safety Rescue Society</li> </ul>
	Peripheral Entity <ul style="list-style-type: none"> <li>Port Authorities</li> <li>Sea Harbour Masters</li> </ul>	Peripheral Organism <ul style="list-style-type: none"> <li>Presidents and Management Boards of the Port Authority</li> <li>Navigation and Port Councils (assessing the Port Authority and Sea Harbour Master)</li> <li>Technical Directors of Port Authority</li> <li>Sea Captains of the Sea Harbour Master</li> </ul>
Hydraulic Public Domain	Central Entity <ul style="list-style-type: none"> <li>Directorate General of Hydraulic Works and Water Quality (Ministry for the Environment)</li> </ul>	Central Organism <ul style="list-style-type: none"> <li>General Director of Water</li> <li>President of the Water National Council (Ministry for the Environment)</li> <li>National Water Council (assessment)</li> </ul>
	Peripheral Entity <ul style="list-style-type: none"> <li>Hydrographical Conferences</li> </ul>	Peripheral Organism (Hydrographical Confederation) <ul style="list-style-type: none"> <li>President, Government Council, User Assembly, Exploitation Council, Water Release Commission, Works Council. Water Council.</li> </ul>

Natural Protected Spaces, wild flora and fauna	Central Entity <ul style="list-style-type: none"> <li>Directorate General for the Conservation of the nature of the Ministry for the Environment</li> </ul>	Central Organism <ul style="list-style-type: none"> <li>General Director</li> <li>Advisory Council of the National Park Network</li> <li>Advisory Council for the Environment</li> <li>Nature Protection National Commission</li> </ul>
	Peripheral Entity <ul style="list-style-type: none"> <li>Natural Protected Spaces (specially National Parks)</li> </ul>	Peripheral Organism <ul style="list-style-type: none"> <li>National Park Management Mixed Commission</li> <li>Foundation, President and Conservation Director of the National Park</li> </ul>

**Graphic 1. Organisational Chart of the Ministry for the Environment**



The Directorate General for Coasts stands out as a specific administration, being the guardianship of the Maritime/Terrestrial Public Domain. The mentioned Directorate General for Coasts does not have a specific organ to facilitate the institutional cooperation and to assure public participation. The organisational model is based in a central organ (D. G. For Coasts) with base in Madrid, that takes the important decisions assisted by the peripheral organs in some specific cases. These peripheral organs are the Coastal Demarcations and the Provincial Coastal Services. Each Coastal Demarcation has assigned a coastal segment; that segment in occasions has a Provincial Coastal Service. Andalusia has two Coastal Demarcations: Andalusia-Mediterranean (in Malaga), and Andalusia-Atlantic (in Cadiz); and four Provincial Coastal Services with base in Huelva, Sevilla, Granada and Almería.

On the other hand, the Central Government Ports Public Entity and the various Port Authorities make up, together with the Rescue and Sea Safety Society, and the Maritime Harbour Masters (Ministry of Development), important references for coastal management. The most important peripheral member organisms are the Administration Boards of the Port Authorities, which have certain autonomy, and the Navigation Councils.

As important for the Integrated coastal area management are the Natural Protected Areas (Advisory Council for the Environment, National Council for the Protection of Nature, National Parks Association), the hydraulic resources (National Council for Water, Users Assembly), or the fishing resources (National Fishing Council, Consultant Committee of the Fishing sector). The organisms mentioned are included in the organisation chart of the Ministry for the Environment and the Ministry of Agriculture, Fishery and Food, respectively.

In the Autonomous Community of Andalusia there is no specific administration for the coasts, in such a way that the management of coastal issues lacks a sole and integrated approach, various regional Ministries being those having repercussion on the same, in issues such as the quality of coastal water and the Natural Protected Areas (Regional Ministry of the Environment); the planning of the region and urban development, and the marinas and fishing ports (Regional Public Works and Transports Ministry); agriculture, fishing, aquaculture and shell fishing in internal waters, (Regional Agriculture and Fishing Ministry), historical heritage (Regional Culture Ministry), and the promotion of tourism (Regional Ministry of Tourism), amongst others.

Each Regional Ministry attempts to bring the Regional Administration closer to the public by means of the corresponding Provincial Delegations. The structure of the member organisms for the decision taking process and assessment is complex, and is based on the creation of Commissions or Provincial Councils. Nevertheless, none of them is specifically dedicated to the treatment and resolution of coastal problems.

On occasions, some of these basic administrative units create specific management instruments, as is the case of the Regional Public Works and Transports Ministry with the Andalusia Ports Public Company (**Chart 9**).

**Chart 9. Objectives and functions of the Andalusia Ports Public Company**

- *The **Andalusia Ports Public Company (EPPA)** is a public legal rights entity dealing with the development and application of the policy of ports and areas of transport of goods of the Andalusian Government, under the management of the Regional Public Works and Transports Ministry; that decides upon the objectives and action directives of the EPPA, carrying out the follow-up of its activity and carrying out, without prejudicing the responsibilities assigned by the regulation, the control of its efficiency in accordance with current legislation.*
- Amongst the **responsibilities** of the EPPA, we find the rights and obligations transferred to the Junta de Andalucía on Marinas and Fishing Ports subject to concession, the rights and obligations on the nautical-sports concessions in the ports directly managed by the same, the direct management of the areas of said ports used by sports vessels and that are not given in concession, and, mainly, the direct management of the New Marinas and Fishing Ports built by the Junta de Andalucía and that have been put in exploitation, as well as the management of goods transport areas.
- In accordance with its Statutes, the detailed **objectives** of the activity of the Public Company of Ports of Andalusia refer to its responsibilities in port issues; regarding the responsibilities in the goods transport areas; and in the planning, promotion, development and management of supplementary services to the activities mentioned in the previous sections, as well as the control of the management of the entities related to the activity of Transport Areas dependent on, or with the participation of, the Andalusia Ports Public Company.
- For the carrying out of its objectives, the Public Company of Ports of Andalusia has various **functions** such as those connected with directly or indirectly managed ports, and those relative to the area of the transport of goods.

The Local Administration usually concentrates its efforts on the looking after of beaches, management of solid waste, urban planning and purification of waste water. Regarding coastal area management, it is very important to highlight the role of the Provincial Delegation of Government and the Community of Municipalities, as they are the administrations located between the regional and municipal levels, and can contribute to the improvement of the municipal areas, carry out technical assessment tasks in the small coastal municipalities, and promote organisation in order to attain the minimum size sufficient for the provision of collective services, amongst other relevant aspects.

On a same coastal space a convergence of several Public Administrations can be found. Therefore, the search for coordination and cooperation between the institutions involved is needed, whatever their regional scale is, taking into account the extremely dynamic nature of

the coastal areas, especially that of the coastal rim, as what happens in an area decisively influences the one next to it. The Shores Act 22/88 recognises this principle when it lays down the Protection Easement Areas of the Maritime/Terrestrial Public Domain. Its management is the responsibility of the Autonomous Community (Regional Ministry of the Environment), while the Maritime/Terrestrial Public Domain is responsibility of the Central Government (Coastal Demarcation of the General Coasts Management of the Ministry for the Environment). But additionally, urban planning responsibility in the essential of the Local Entities directly influences the quality of the landscape, the natural environment and the resources of the Maritime/Terrestrial Public Domain Protection Easement Area.

Another extremely important issue is institutional coordination and cooperation, as integrated coastal area management requires fluid communication channels between the public and institutional agents involved in the decision-taking process. In this respect, Law 30/1992, of the Legal Regime of the Public Administrations and the Common Administration Procedure, opens new possibilities that are more and more used. In said regulation, paths are offered facilitating the cooperation between administrations; above all between the Central Government and the Autonomous Communities, regardless of the sector they belong to, following the principle of institutional loyalty and respect for the responsibilities. In this way, organisms for cooperation, to sign cooperation agreements, and even establish plans or programmes of a binding nature can be created, regulated by the relationships between the various administrations by the basic planning in Local regime matters.

Said cooperation has historical experiences to be considered, as the Sectorial Conferences that this Law defines were designed to improve the relationship between the General Administration of the Central Government and the regional entities, in those issues where there are responsibility interrelationship. This instrument for the relationships between the public institutions can be taken into account as one more possibility to increase the level of understanding and cooperation between the various administrative regional areas.

In the current Public Administration system there are organisms socially designed for the coordination of the government functions in each province: the Government Sub delegations of the Central Government and the Provincial Delegations of the Regional Governing Ministries of the Autonomous Communities. Said entities have been given very interesting cooperation instruments, such as the Technical Assistance Commissions to the Government Sub delegate and the Coordination Provincial Commissions, respectively. Also, in the provincial peripheral management scopes, specific organisms for institutional cooperation could be created in issues related with the coast. To the previous two scales, the local ones can be added, either represented by the Communities of Municipalities, or the Provincial Delegations of Government.



## **1.4. Legal framework of coastal management in Spain and Andalusia**

### **1.4.1. Government planning**

**Chart 10** shows the planning structure of the general Administration of the Central Government for the planning and management of coastal areas, which is characterised by the non-existence of a law specifically designed for coastal management, as the Shores Act 22/88 was specifically designed for the management of the Maritime/Terrestrial Public Domain and not for the coastal area in its widest integrated sense. Articles 1 and 2 of the mentioned Law express the object of the same, referred to the determination, protection, use and policy of the Maritime/Terrestrial Public Domain (DPMT), specially of the sea coast, and its finality, which is to:

- Determine the DPMT and ensure its integrity and appropriate conservation, adopting the necessary protection and restoration measures, if required.
- Guarantee the public use of the sea, its coast and the rest of the DPMT, without any exceptions other than those derived from duly justified public interest reasons.
- Regulate the rational use of these assets in accordance with their nature, purpose and respecting the landscape, environment and historical heritage.
- Achieve and maintain an appropriate level of water and sea coast quality.

The governmental Maritime/Terrestrial Public Domain includes the sea coast and estuaries, the regional seas and continental platform. But in this historical stage of the Spanish coastal management the task is centred, as recommended by the same legal text, on the sea coast. Said task is not easy as it is in this geographical scope where the greatest pressure of human activity is concentrated.

As already mentioned, the Shores Act 22/88 makes up a true milestone in Spanish coastal management. Amongst other reasons because it involves the correction of a series of historical errors, specially when defining and detailing in a more precise way than the 1969 Law on Coasts what the Maritime Terrestrial Public Domain assets are. The mentioned Shores Act is, therefore, very important for Spanish coastal area management. Four reasons justify this statement. The first one because it makes up the basic legislation of the Spanish coast. Secondly, because it identifies the DPMT with the coastal areas of greater

environmental and socioeconomic value: marshes, lagoons, salt marshes, beaches, dunes, islets, regional sea, natural resources of the exclusive economic area, and the continental platform. That is to say, this law affects the most sensitive ecosystems, critical habitats and natural resources of the intertidal and marine geographical scopes. The third reason is based on the fact that from the line separating the DPMT of the private domain the various Easement areas and influence of the private property are measured: transit Easement (6 metres extendable up to 20 metres), protection Easement (100 metres extendable up to 200 metres) and area of influence in non-town lands (500 metres). Fourthly and finally, the Shores Act is an important meeting point for the three basic levels of the Public Administration.

**Chart 10. Planning structure of the General Administration of the Central Government for coastal area planning and management in Spain**

Resources or regulated activity	Most important planning references of instruments
Maritime Terrestrial Public Domain	<ul style="list-style-type: none"> <li>• Law 22/1988 of the 28th of July, the Shores Act</li> <li>• Royal Decree 1471/1989 of the 1st of December by which the general regulation of the Shores Act 22/88 is approved</li> </ul>
Sea fishing resources	<ul style="list-style-type: none"> <li>• Law 3/2001 of the 26th of December on State Sea Fishing</li> </ul>
Sea and port activities and installations of the State, Governmental Port Public Domain	<ul style="list-style-type: none"> <li>• Law 27/1992 of the 24th of December, of the State Ports and the Merchant Marine</li> <li>• Law 62/1997 of the 26th of December, of the modification of Law 27/1992</li> </ul>
Hydraulic Public Domain	<ul style="list-style-type: none"> <li>• Royal Decree of Law 1/2001. Approval of the Adapted Text of the Water Act</li> <li>• Royal Decree 849/1986, of the 11th of April, by which Hydraulic Public Domain Planning is approved</li> <li>• Royal decree 927/1988, of the 29th of July, by which the Regulation of Water and Hydrological Planning Public Administration is approved</li> </ul>
Natural Protected Areas, wild flora and fauna	<ul style="list-style-type: none"> <li>• Law 4/1989 of the 27th of March on the Conservation of Natural Areas and of the Wild Flora and Fauna</li> <li>• Law 41/1997 of the 5th of November on the modification of Law 4/1989</li> <li>• Royal Decree 1803/1999 of the 26th of November by which the National Parks Director Plan is approved</li> </ul>
Land Uses, Urban Planning	<ul style="list-style-type: none"> <li>• Royal Decree 1346/1976, of the 9th of April and Royal decree 1/1992, of the 26th of June, by which the Revised Text of the law on the Land regime and Urban Planning (current draft) is approved.</li> <li>• Royal decree 2159/1978, of the 23rd of June, by which the Regulation of the Planning for the development and application of the Law on the Land and Urban Planning Regime</li> <li>• Law 6/1998 of the 13th of April, on the Land and Valuations Regime</li> </ul>

In spite of all, it should be remembered that said law does not have sufficient mechanisms to carry out integrated coastal management, as it does not define the strategic planning instruments for the DPMT. Neither does it create any member organism guaranteeing public participation, nor does it involve the responsible Administration to act in accordance with specific and known criteria. Even the practice of the management from the legal instrument shows an important lack of the same that are reflected in the non-inclusion of the landscape as a resource, and in the impossibility of including certain biotic criteria to delimit the DPMT.

On the other hand, sectorial planning affecting the coastal areas is very abundant and said planning attributes most of the responsibilities to the national and regional management levels. Apart from the Law on Ports, the Water Act (where the Water Framework Directive is transposed), that on Natural Protected Areas, Sea Fishing, and that on the Land, the Central Government regulates the public functions of great interest for the management of coastal areas, such as the mentioned Law 30/1992 of the Legal Regime of the Public Administrations (modified in 1999) which includes various possibilities for the coordination and cooperation between the public administrations.

Another of the rules approved by the Spanish Parliament is that regulating Sea Fishing (Law 3/2001, of the 26<sup>th</sup> of March), which specifically includes, although from a strictly sectorial perspective, the management of the marine environment. The definition of the spatial nature instruments (Fishing Protection Areas), the creation or redefinition of management instruments (authorisations, census, fishing plans, amongst others), the creation of the control measures and member organisms, the vision of the group of activities linked with fishing (mining, marketing, transformation, research, etc.), outlines this law as a modern tool for the management of important marine resources. In any event, the greater part of the efficiency of said law continues being in the capacity for coordination and cooperation of the General Administration of the Central Government and the Autonomous Communities.

Also in Royal Decree 1302/1986 on Environmental Impact Assessment, that established the Spanish modification to the European Directive 85/337, is a very important legislative reference for the human activities in coastal areas. More important even in this planning when the last modification carried out by means of the Royal Decree 9/2000 is studied. In fact, amongst the criteria for the projects the location of the same is included, the Coastal Areas being explicitly mentioned as geographical areas of environmental sensitivity, and therefore, subject to special attention in accordance with the natural environment load.

Other regulation references of the General Administration of the Central Government are Law 38/1995 on the right to access information regarding environment; the Royal Decree 258/1989 on the disposal of hazardous substances from land to sea; Royal Decree v 2510/1977 on the designing of Straight Base Lines and Law 10/1977 on Regional Seas.

In **Chart 11** the governmental planning approved in 2004, regarding Integrated Coastal Area Management is shown.

**Chart 11. Governmental planning of interest for integrated coastal area management approved in 2004**

- *Royal Decree Law 2/2004, of the 18th of June, by which Law 10/2001 of the 5th of July of the National Hydraulic Plan is modified (BOE-National State Bulletin- n. 148, of the 19.06.04).*
- *Resolution of the 29th of June 2004, of the Congress, by which the publication of the Validation of the Royal Decree-Law 2/2004, of the 18th of June, by which Law 10/2201, of the 5th of July, of the National Hydraulic Plan is modified (BOE -National State Bulletin-n. 160, of the 03.07.04).*
- *Corrections to the Agreement for the Protection of the Mediterranean Sea against Pollution, in Barcelona on the 10th of June 1995 (BOE -National State Bulletin- n. 173, of the 19.07.04).*
- *Royal Decree 2129/2004, of the 29th of October, by which the Royal decree 650/1987 of the 8th of May is modified, by which the regional scopes of the river basin organisms and hydraulic plans are defined (BOE - National State Bulletin- n. 268, of the 06.11.04).*
- *Royal Decree 2130/2004, of the 29th of October, on the transfer of functions and services of the Administration of the State to the Autonomous Community of Andalusia regarding hydraulic resources and exploitations (Hydrographical Confederation of the South) (BOE -National State Bulletin- n. 276, of the 16.11.04).*
- *Royal Decree 2182/2004, of the 12th of December, by which the Centre for the Prevention and Fight against Marine and Coastal Contamination is set up (BOE -National State Bulletin- n. 276, of the 16.11.04).*

### **1.4.2. Regional planning**

Due to the interest in coastal management, Decree 118/1990 on the Regional Directives of the Coast of Andalusia should be mentioned. This planning instrument has 49 articles divided into three main groups: general provisions, specific provision for regional units, and final provisions. The first refer to the extensive action areas: administration coordination, urban planning, tourist or recreational activities, and port infrastructures. The second specifically addresses the various regional units: coastal mountain ranges, cliffs, dunes and sandy areas, boulevards, coastal lagoons, beaches, estuaries and marshes, neritic province and continental platform. The final provisions briefly give guidance on the follow-up of the Directives, of the Follow-up Report and on its Adaptation and Modification. The legal strength of the first two groups is carried out by means of a pre-defined scheme, including Action Lines, Directives, Recommendations and Measures. Nevertheless, in spite of the fact that these Regional Directives of the Coast of Andalusia were approved by means of Decree 118/1990, of the 17<sup>th</sup> of April, its text was never published in the Official Bulletin of the Junta de Andalucía, which gives rise to doubts on the legality of said regulations.

**Chart 12** summarised the current planning structure for the Autonomous Community of Andalusia for coastal area planning and management. As can be seen, there is no lack of sectorial instruments, although there is no integrated management scheme for the coastal areas.

1. General institutional and political context I  
1.4. Legal framework of the coastal management in Spain and Andalusia

**Chart 12. Current regulation structure for the Autonomous Community of Andalusia for coastal area planning and management**

Resource or regulated activity	Planning reference or instruments
Urban development	<ul style="list-style-type: none"> <li>• Law 7/2002, of the 17th of September, on the Urban Planning of Andalusia</li> </ul>
Regional Planning	<ul style="list-style-type: none"> <li>• Law 1/1994, of the 11th of January, on the Planning of the Territory of the Autonomous Community of Andalusia</li> <li>• Decree 77/1994, of the 5th of April, on the responsibilities of the Junta de Andalucía regarding the Planning of the Region and urban development.</li> <li>• Decree 118/1990, of the 17th of April, Regional Directives of the Coast of Andalusia</li> </ul>
Tourism	<ul style="list-style-type: none"> <li>• Law 12/1999, of the 15th of December, on Tourism</li> </ul>
Cultural resources and assets	<ul style="list-style-type: none"> <li>• Law 1/1991, of the 3rd of July, on the Historical Heritage of Andalusia</li> <li>• Decree 4/1993, of the 26th of January, Planning on the Administrative Planning of the Historical Heritage of Andalusia</li> </ul>
Natural Protected Areas, wild flora and fauna	<ul style="list-style-type: none"> <li>• Law 2/1989, of the 18th of July, Inventory of the Natural Protected Spaces of Andalusia</li> <li>• Law 2/1995, of the 1st of June, on the modification of Law 2/1989, Governing Councils of the Natural Parks</li> <li>• Law 8/2003, of the 28th of October, on wild flora and fauna</li> <li>• Decree 95/2003, of the 8th of April, by which the RENPA is regulated</li> </ul>
Coastal Waters	<ul style="list-style-type: none"> <li>• Law 7/1994, of the 18th of May, on Environmental Protection</li> <li>• Decree 14/1996, of the 16th of January, Planning of the Coastal Water Quality</li> </ul>
Marinas	<ul style="list-style-type: none"> <li>• Law 8/1988, of the 2nd of November on the Marinas in Andalusia</li> </ul>
Uses in ZSP, Waste disposal to DPMT	<ul style="list-style-type: none"> <li>• Decree 334/1994 for authorisation of uses and activities in the Protection Easement Area, and waste disposal to the DPMT</li> </ul>
Sea Fishing, Shell fish gathering, Marine Aquaculture	<ul style="list-style-type: none"> <li>• Law 1/2002 on the Planning, Promotion and Control of Sea Fishing, Shell fishing and Marine Aquaculture</li> </ul>

Regarding the Urban Planning and Territory Planning laws, we should highlight that, in the first of them, and in an explicit way, certain measures and cautions are mentioned regarding coastal areas, especially for the Protection Easement Areas and those of DPMT influence, in the sense of destining the land to areas free of use and public enjoyment. On the second, although it is evident that it cannot be catalogued as a sectorial law, it is not, in a strict sense, the most appropriate instrument for integrated coastal area management due to the fact that, from a formal and practical point of view, it only acts on the land area. In any way, it is, together with Natural Protected Areas management, one of the instruments that can influence integrated coastal area management more and better. We should not forget that it creates, in addition, one of the main instruments for the supra-local scale, such as the Sub-regional Plans for the Planning of the Territory.

### **1.4.3. Local planning**

Neither is there in the Spanish legal planning a specific regulation for integrated coastal area management on a local scale. Nevertheless, in other countries, above all in the American continent, the possibility of Coastal Management Municipal Plans is considered. Generally, our municipal rules and regulations are very closely linked to certain town services such as the control of the acoustic contamination, management of solid waste, supply and sanitation of water, amongst others. But integrated management does have an unavoidable interlocutor on a local scale, amongst other reasons because, apart from the responsibilities that the Local

Regime Law assigns to the Town Halls, both the Law on Land and the Shores Act recognise a series of responsibilities linked to land use planning and beaches, respectively.

As a synthesis of that previously mentioned, it may be concluded that in Spain and Andalusia, as in most of the European countries, there is no planning for the integrated coastal area management at a local level. In spite of the fact that this responds to our cultural roots, it would not be contradictory to include our own legal instruments of modern “*management*” (as in United States or in some of the Australian States), above all due to their simplicity, voluntary nature, and capacity to adapt to our administration and responsibility structure and top various physical-natural realities.



## 2. CAMP AREA PROPOSAL

### 2.1. Geographical context

The territory of the CAMP Project Feasibility Study is made up of the eight coastal municipalities of East Andalusia. These municipalities, listed from North to South, are Pulpí, Cuevas del Almanzora, Vera, Garrucha, Mojácar, Carboneras, Níjar and Almería. The area of study includes the totality of these municipal territories and not only their coastal area or the closest part to the sea. At the same time, in spite of the fact that the project refers to their coastal areas, there is special emphasis on the coast and coastline as these include the continental and marine components. In fact, when the coastal areas are analysed in this study the three geographical environments of the coast are taken into account, as shown in **Graphic 2**, that is to say:

- Marine environment. Includes the coastal water in a nautical mile as from the straight base line (**Map 2**).
- Transitional environment. Includes the beach, reef and coastal land areas up to the point reached by the sea at high tide or to the point where the waves of the wildest storms known have reached. The Shores Act 22/88 calls this area the sea shore.
- Terrestrial environment. Includes the area of land towards the land from the sea shore.

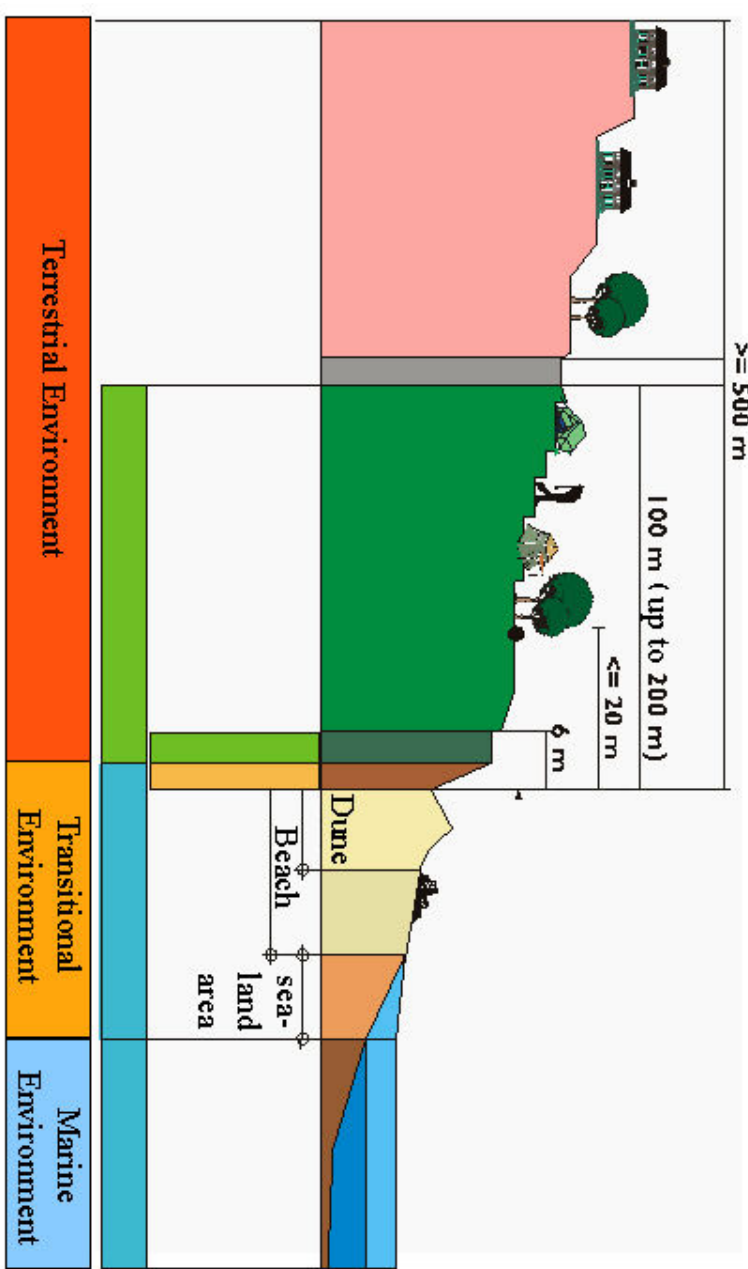
Nevertheless, we should clarify the use of the coast and coastline terms, as they are usually used as synonyms. This is due to the fact that there is a strong influence of Anglo-Saxon literature on integrated coastal area management that has involved a generalised use of coast instead of coastline. Thus, in Spanish legal texts, such as the 1988 Shores Act, the term coast is used to refer to a relatively narrow strip situated at one side and at the other side of the land-sea contact area.

Also in the European Union, within the Demonstration Programme on Integrated Coastal Area Management, the coastline is defined as a variable width strip of land and water depending on the nature of the environment and the management needs. This rarely corresponds to the existing administration and planning units, or to the natural coastal systems, which can extend further than the demarcation line of regional waters, and various kilometres inland.

Nevertheless, geography distinguishes between coast and coastline when it is considered that a coastline is a wider strip than the coast, above all towards the continent, in which there is an interactive contact between nature and the human activities carried out in areas sharing the existence or influence of the sea.

Hence the term coast is usually used to refer to the object of a regulated intervention and the coastline term when it is a geographical area. In spite of this, in this project they are both used, although the term coast is preferably used taking into account the inclusion of the project to an institution such as United Nations that normally uses this term.

Graphic 2. Coastal Environments



## ***Map 2. Maritime Terrestrial Environment***

The geographical environment of the coastline is the marine, transitional and terrestrial environments. The marine and transitional environments are limited to one nautical mile as from the straight base line.

### **Cartographic Sources:**

**Basic cartography:** Digital topographic map of Andalusia 1:100,000. Regional Public Works and Transports Ministry. Junta de Andalucía.

Map 2. Maritime and Terrestrial Territory



The CAMP Project area study has a land surface area of 148,122 ha, resulting from the adding of the surface area of the eight municipalities previously mentioned and a marine part limited to one nautical mile as from the straight base line (**Map 3**). Its physical characteristics are very conditioned as this territory not only is in the most arid area of the Iberian Peninsula, but in the Western Mediterranean, which has a marked differentiating aspect. At the same time, the presence of coastal mountain ranges and river valleys connecting the coastal environment with the inland provides a combination of valley/cliffs at different scales.

The main mountain ranges from the North to the South are those of Aguilón, Almagro and Almagrera, in the municipalities of Pulpí and Cuevas del Almanzora, and the Sierra de Cabrera in the municipalities of Mojácar and Carboneras. Lastly, the Sierra de Cabo de Gata in the municipality of Níjar. Some of the closest mountain ranges to the coast have the peculiarity of having close contact of the slopes with the sea, and although these are not very high, they do have a steep slope.

**Photo 1: Sierra de Cabo de Gata**

Some of the most significant beaches, also from the North to the South, are certain coves of the Sierra de Almagrera, the natural beach of Garrucha (located at the South of the urban artificial beach of the main nucleolus), that of Agua Amarga, that of Monsul and that of the Genoveses in the Natural Park Cabo de Gata-Níjar; and that of Torregarcía to the West of the city of Almería.

The main rivers, also listed from North to South, are the Almanzora, Antas, Aguas and Alías. These rivers have contributed to the formation of hollows such as that of Vera and have also been an essential component in the traditional human settlements, precisely due to the fact of being part of an arid and mountainous area where the flat areas, fertile land and possible presence of water are greatly valued. Nevertheless, the torrential nature of the scarce rainfall in this territory introduces an additional risk factor, when areas likely to be flooded are used for settlements or productive exploitations.

### **Map 3. CAMP Project study area**

The CAMP Levante de Almería study scope includes land and marina areas. The land area includes the municipalities of Pulpí, Cuevas del Almanzora, Vera, Garrucha, Mojácar, Carboneras, Níjar and Almería, of an approximate surface area of 150,000 hectares. The marine area is approximately 71,000 hectares.

#### **Cartographic Sources:**

**Basic cartography:** Digital topographic map of Andalusia 1:100,000. Regional Public Works and Transports Ministry. Junta de Andalucía.

**Plastic shaded:** Digital model of elevations of Andalusia 100 metres. Regional Public Works and Transports Ministry. Junta de Andalucía.

### Map 3. CAMP project study area



The population has used the presence of rivers and closeness to water in two different ways. In the irrigation areas the human settlements have been placed at the foot of the mountains to avoid flooding, also avoiding the construction of houses in the working area. Nevertheless, in the dry areas the standard is different, as the search for water produces a dispersion of the settlements in order to obtain sufficient water supply.

If the traditional settlement system was organised around the water resources, the current one is structured around two main axes, the Mediterranean dual carriageway and the coastal road. In the first axe, which is inland, is where the important settlements of the study area can be found, such as Cuevas del Almanzora, Vera, Níjar and Almería. The coastal road (second axe) connects the tourist development of Pulpí (San Juan de los Terreros), Vera Beach and Mojácar, with the traditional settlements of Carboneras and Garrucha.

The sea has also been a reference point for the settlements: a long time ago of a negative nature due to the danger of the pirates, and currently, of a positive nature, due to the attractiveness for tourism. The most important sea ports are in Almería capital city, Carboneras and Garrucha. Although in the locality of Villaricos (municipality of Cuevas del Almanzora) and in San José (municipality of Níjar) also.

**Photo 2: Agua Amarga**

The total population of the area reached 245,860 inhabitants in 2004, although 72% is concentrated in the municipality of Almería. Nevertheless, this resident population greatly increases during the summer months due to tourism in the area. The highly seasonal nature of tourism during the summer months involves an increase in the rubbish collection services, and a considerable increase in the consumption of water and energy during those months. On the other hand, the predominant nature of the holiday tourism in these municipalities only stimulates construction, whilst the traditional tourism of hotels includes multiple services and products (trips, tourist guides, restaurants, gastronomy and sale of local products) that allow a greater degree of production levels for the local economic development.

In this way, the promoters of either tourism variations have a different attitude with respect to the region. The tourism promotion companies greatly depend on the quality of the environment in the long term, as the viability of their businesses depend on the same. Nevertheless, those of holiday tourism are essential of real estate, and therefore, search for the maximisation of profit in the short term by means of the sale of built houses.

With respect to tourism, we should highlight that the protected areas are an essential attractive point of this territory. The high ecological and landscape value of many areas of the Levante de Almería coastal area have been the reason for the existence of various protection instruments, from the Natural Park of Cabo de Gata-Níjar, declared a natural protected space in 1987, to the Seabeds of Levante de Almería, declared Specially Protected Areas of Mediterranean Importance (ZEPI (SPAMI)), located all along the coast of the municipalities of the North area of the scope of the study, that is to say, Pulpí, Cuevas del Almanzora, Vera, Garrucha and Mojácar.

Many of the coastal mountain ranges, some of them close to the coast and others further inland, have been proposed as Natura 2000 sites of community interest (LIC(SCI)). Amongst these, from North to South, the following can be found, Sierra del Alto de Almagro, Almagrera, de los Pinos and del Aguilón mountain ranges, Sierra de Cabrera-Bédar, la Serreta de Cabo de Gata, la Sierra Alhamilla and the Gádor and Énix Mountain Ranges, almost outside the scope of the study, being part of the municipality of Almería.

In spite of its ecological wealth, the land of the area is not very appropriate for agricultural activity in 61% of its extension, as it is made up by pastures, mountains, fallow fields, esparto grass field and non-productive areas. Depending on this and having a mild climate, intensive agriculture in green houses has been increasing, as it does not need high agricultural quality land, but extensions of land at a low price to which large amount of water, labour and agro-chemical products have to be added. The availability of land of low agricultural quality has also encouraged the appearance of intensive livestock, above all of pigs, in the northern municipalities of Pulpí, which has almost 70% of the pig herds of the area, and Cuevas del

Almanzora, both as an extension of the pig herd activity of Huércal-Overa, adjacent to the same, although located outside the scope of the study.

All these intensive activities related to agriculture, livestock and construction have been brought to the area by investors, mainly from outside Almería, who found a comparative advantage in the low prices of the land as compared with other more populated areas. This fact has been supported by the local population that then saw the opportunity of selling their land, devalued by the crisis of traditional agriculture and livestock. This was also looked upon favourably by the Town Halls themselves that found, in this way, a source of liquidity for the municipal treasury, more and more under demand for new services to the resident population, and above all, the visiting population.

Nevertheless, the lack of environmental sustainability of these intensive processes is encouraging sectors of the population, and regional and national public organisms and from the European Union, to plan new sustainable development alternatives. The problem is that conflicts arise between local interests from the population and some Town Halls. The risk of public as well as institutional conflict creates the need to draft regional agreements helping to outline common strategic objectives in order to decrease the threat of possible conflicts.



## **2.2. Environmental Context**

### **2.2.1. The natural environment**

#### **2.2.1.1. Terrestrial Natural Environment**

##### ***Climatology***

Apart from its condition of being a coastal area, the main aspect characterising the Levante de Almería municipalities is their climatology, and more specifically, the lack of rain, giving an extreme situation of aridity as a result. This climatic characteristic determines in a large way natural areas such as vegetation, social, such as settlements, or economic, such as agricultural production or tourism (**Map 4**).

The lack of rainfall is shown by the fact that a large part of the area has an annual rainfall of less than 200mm (litres per square metre), the entire southern part of Cabo de Gata, and an extensive area around the River Almanzora estuary being below this level of rainfall. To this rate of rainfall the fact that they are torrential has to be added, which results in a small storage capacity, both by natural means (low level of infiltration and land storage and living beings) and of man-induced constructions (reservoirs or barrages).

Solar radiation is very high due to the latitude of the area and as well as a consequence of the high number of sun hours, caused by the orographic system effect on the masses of water providing clouds and rainfall in the rest of areas in this latitude. The gap between the water received by rainfall and that evaporated as a consequence of solar radiation is evaluated in the potential evapo-transpiration index. This index shows that in Levante de Almería up to a third of the rainfall received evaporates, indicating a structural hydraulic deficiency in the area. The very low rainfall is compensated to a degree by the high level of relative humidity, with a monthly average of between 72% and 76%, an aspect that is clearly taken advantage of by certain species of vegetation that have adapted themselves to these circumstances by taking the greater part of the water necessary for growth from the air.

The thermal conditions can be considered as mild, with average temperatures of between 15°C and 22°C. The monthly distribution is typically Mediterranean, with minimums in the winter months and maximums in the summer. The harshness of the climate is made worse by the wind conditions, with breezes of between 10 and 20 km/hour for two thirds of the year, with an average of between 2 and 3 days of gales a month. Additionally, the wind produces a drying effect which contributes to accentuating the aridity of the area.

The meteorological conditions are also responsible for the biological diversity and economic potential of the area. The high number of sun hours that contributes so much to accentuating aridity, is, on the other hand, a source of energy that explains the high agricultural productivity

in the irrigation areas and providing interesting opportunities for energy exploitation. This has also, together with the landscape and beaches, been one of the main tourist attractions in the area.



#### ***Map 4. Annual average rainfall***

Levante de Almería is one of the most arid areas of Andalusia, with an average annual rainfall of 300 mm in the greater part of the scope of the study. Higher levels of rainfall are only to be found around the Sierra Alhamilla and Campos de Níjar area, where the annual rainfall ranges from 400 to 500 mm.

#### **Cartographic Sources:**

**Basic cartography:** *Digital topographic map of Andalusia 1:100,000. Regional Public Works and Transports Ministry. Junta de Andalucía.*

**Map 4.** Annual average rainfall



Wind also provides a double and opposed element as an eroding agent, contributing to aridity on the one hand, but historically allowing energy exploitation, such as the windmills, and on the other hand, that today is being promoted by the air generators. It is also currently associated with practices of sports, more and more valued by the population.

These climatic conditions make the development of vegetation, animal or human communities very difficult, and thus the living beings inhabiting this region on many occasions need to plan strategies to survive dry periods, torrential rains, or gales of the area.

### ***Geology and relief***

Other components of the natural environment on which the ecosystems depend and that characterise Levante de Almería are the geology and relief. The differences in the soil composition and its relief make the vegetation species, infiltration of the land, or the occupation for human uses vary.

In the area, although there are not very high points, the region is divided and subdivided by various elevations and mountain ranges. The orographic distribution in Levante de Almería is different from the rest of the province and is dominated by a southeast-northeast orientation, which follows the coastal mountain ranges of Cabo de Gata, Cabrera, Almagrera and el Aguilón. The inland areas contact the alignment dominating the provincial orography that has a West-East orientation, being transition between the parallel and coastal formations. Sierra Almagro is an isolated element.

The landscape of the region provokes, in addition to a high level of subdivision, the presence of steep slopes that condition the occupation strategies, a steep mountainside-valley, and the configuration of a hydrographical system characterised by its little hierarchy, which, together with the torrential nature of the rainfall, causes the frequent presence of flooding in the region.

Apart from the mountainous areas of this region, there are, amongst the various mountain ranges, plains and valleys where the greater part of the economic production is located. These topographic areas are the Llano de El Saltador, located between the municipalities of Huércal-Overa, Pulpí and Cuevas del Almanzora, the Depresión de Vera and los Campos de Níjar. The rest of the spaces with flat topography are small and related to an extensive network of watercourses and river beds that flow towards the sea slopes of the coastal mountain ranges.

In historical terms, the configuration of the relief has contributed, and explains, the opening to the outside world by using the sea, and the relative isolation of a large part of this territory which is framed in the internal area of the Betica Mountain ranges, that go from Cadiz to the Balearic Islands, and within these, the complexes of Nevado-Filábride, Alpujárride and Maláguide.

The Nevado-Filábride complex is the continuation of Sierra Nevada and the Sierra de los Filabres slopes, and is made up by a group of formations characterised by a high degree of metamorphosis. A large part of this complex is covered by neogenour-quaternary sediments. The Alpujárride complex is represented by two outcrops, one heading East-West as a continuation of Sierra Alhamilla, fragmented to the West of Carboneras and in some points of the Serreta de Cabo de Gata. The other is mainly represented in the Southeast of Mojácar and in Sierras Almagrera, de los Pinos and del Aguilón. The Maláguide complex is hardly represented in small outcrop in Sierra de Cabo de Gata.

Apart from the Betica units, the area is made up by volcanic units and continental post-orogenic units. Between Cabo de Gata and Vera one of the most important volcanic areas in Spain is found, both for the diversity of litho logic types as well by the duration in time of volcanic processes. The formation of this volcanic complex was produced throughout four emission stages that took place between 12 and 17 million years ago, a geological time interval in which all the coastline was located next to Sierra de Filabres, in such a way that the sea invaded the coastal hollows of Vera, Tabernas, Sorbas, Níjar and Almería. In this marine environment, and favoured by the weakness of some of the large tectonic faults of the area, such as the huge Carboneras fault or that of the Serreta de Cabo de Gata, the deep magma rose to the surface generating numerous volcanic formations, most of them submarine. This peculiar geological formation caused the formation of one of the most singular fossil volcanic complexes in Europe.

As axis of this volcanic region we find the Sierra de Cabo de Gata, making up the most significant volcanic formation in the Iberian Peninsula, reaching 193 metres in el Fraile at its highest point. The rest of the volcanic formations are relatively isolated, such as those of Hoyazo de Níjar and those of the East of Vera, which are related to those existing in Mazarrón and Cartagena, in the region of Murcia. The continental post-orogenic units mainly occupy the depressed areas of this entire region, filling the river beds of variable magnitude, both due to its extension and the strength of the sediments, located between the marine environment and land area.

## Hydrology

Water, or rather the lack of the same, is a factor limiting human activity and the development of animal and vegetation species. In Almería, as already commented, the hydraulic resources are especially scarce both due to the small annual rainfall as well as to the high consumption of water due to human activities. The increase of the hydraulic demand in the region is due to the creation of new intensive irrigation areas, which have duplicated the irrigation areas in less than ten years, and the increase of residential and hotel tourism.

The East of Almería, apart from having a very limited rainfall, has an outstanding spatial and temporary variation of the amounts collected. This process causes the rivers to have a very irregular flow, with prolonged droughts and flooding that can even be very destructive. This makes the available surface hydraulic resources very small, even though there have been

attempts to increase these by means of the rivers Tajo-Segura transfer, the Cuevas del Almanzora reservoir or the Carboneras desalinator.

The groundwater resources are important and strategic, although present serious problems of overexploitation with a progressive exhaustion of the aquifers and an increase in salinity, making them useless in some cases. Some aquifers present contamination indexes of nitrates that make them unsuitable for human consumption.

The Andalusian Mediterranean Basin, until 2005 called the Hydrographical Basin of the South of Spain, occupies the largest area of the region. The coastal area of Pulpí and part of that of Cuevas del Almanzora belong to the river Segura Basin.

In spite of the irregularity of the river basins in the Southwest of Spain, there are some rivers of local importance, such as Almanzora River in the North of the province of Almería, the Andarax River flowing to the nearby area of the city of Almería, and of less flow, the rivers Aguas, Alias and Antas, and the Morales watercourse.

Regarding the groundwater resources, in the Campo de Níjar an aquifer is to be found occupying an approximate area of 160 km<sup>2</sup> with a complicated hydro-geological problem derived from the scarcity of the resource and its quality. In this same sector, there are some small aquifers with limited resources and recovery problems. In the basin of the Almanzora River there are numerous small much subdivided aquifer units, highlighting, within this territory, the Pulpí aquifer, which has contributed to the increase in agricultural production.

Although the hydrological resources are very few, we should highlight that the efficiency of the irrigation areas is one of the highest in Spain, and the consumption is, with certain limitations, attempting to adapt itself to the circumstances of the region. The re-use of waste water and the increase of the production of resources by means of bringing in water from other basins, as well as from the desalinisation of the sea water, contributing, together with moderation in consumption, to mitigate the scarcity of this resource.

### **Vegetation**

The climatological and geological aspects determine the remainder of the natural resources of the area to a great degree. The extreme environmental conditions described favour the presence of species exclusive to this region and of a wide variety of ecosystems. The action of mankind is, perhaps, after these two aspects, the most important cause for the current confrontation between the vegetation and animal communities. Since the Neolithic era, human beings have varied the vegetation present in the region. The selection of some species, the exploitation of others, and the import and extinction of a large number of them determines the current natural environment.

According to phytosociology, Levante de Almería is located in a sector of the Almería section of the Murcia-Almería province, having a climatic vegetation dominated by bushes able to withstand temperature and rain fall conditions typical of a semi-arid region, such as the mastic tree, blackthorn, kermes oak, *periploca laevigata* (milkweed family), wild jujube or dwarf fan palm. In the higher areas, corresponding to the coastal mountain ranges of these bushes, the presence of Holm oak forests is added.

Nevertheless, the vegetation of the area has historically had small Mediterranean forests with various make ups, amongst which the cork oak forests (existing in Sierra Cabrera in the XVIII century) or the pinewoods with a variation of the Aleppo pine (*Pinus halepensis* Miller) existing in the same period in the Sierra de Almagro. Currently, the human activities relegate the natural vegetation to certain mountainous areas (coastal mountain ranges) and to the areas where intensive agriculture or the advance of the urban development is not possible (protected spaces) or not advisable (floodable areas and of steep slopes).

In spite of this human pressure, the region has very rich flora, made up by more than 1,200 species, amongst which various endemisms should be highlighted, providing it with an exceptional botanic singularity. The greater part of the species present has a great capacity for acclimatisation to a very dry environment. The plants present very varied adaptations, existing plants such as the dwarf fan palm or wild jujube that have very sturdy and deep roots. Some of them, such as the wild asparagus or the cape gorse, have small leaves to reduce transpiration and save water; others spend the drier periods in the shape of seeds, bulbs or rhizomes waiting for the rainy season; and others have specialised tissue for the storage of large amounts of water for their supply when rainfall is scarce.

**Photo 3: Dwarf Fan Palm**

Amongst the tree formations we can highlight the remains of old Mediterranean forests, such as those existing in certain points of Sierra Cabrera summits, where there are still disperse elements, counting with a high biodiversity and high ecological value. In other areas of the Bajo Almanzora there are also remainders of old pinewoods of a variation of the Aleppo pine (*Pinus halepensis* Miller), amongst which we can highlight those of the North-western area of Sierra Almagrera and the pine tree forest located in Sierra de los Pinos, in Cuevas del Almanzora, in which the ecological structure of what the first pine tree forests of the region were is well preserved.

The bushy and semi-bushy trees are very important in the area and are distributed depending on edaphic, climatic or altitude factors, as well as on the degree of anthropisation. Amongst this type of bushes we can find the kermes oak, dwarf fan palm, mastic tree and broom. But where biodiversity increases and the most important elements of the Levante de Almería vegetation are found is in the smaller sized shrubs. In these a wide number of endemic species, and in danger of extinction, can be found.

The communities of small-sized shrubs very much depend on the substrate where they are, and although the greater part of the region is covered by esparto and alfa grassy areas, there is a large number of vegetation associations. The esparto and alfa grassy areas are found making up mosaics with *anthyllis cytisoides* (a drought deciduous shrub), rosemary bushes or *genista umbellata*. In these communities, endemisms such as the purple stonecrop or the Almería white rockrose can be found; medicinal plants such as purple phlomis, marjoram or rosemary; and rare species in the Iberian flora such as the *caralluma europaea* and the broomrape. In the areas with crops and their environments, soil very rich in nitrogen due to the use of fertilisers can be found, which has promoted the invasion of various nitrophile shrubs of low biological diversity.

**Photo 4: Esparto Grass**

Other habitats of importance in this region are those located in rocky and cliff areas that, in spite of having very little vegetation coverage, house important communities of endemic or very rare plants. The watercourses are another unique ecosystem in which the existing communities depend on the degree of humidity and salinity of the soil; and although the most representative species is the oleander, other species can be found such as tamarix, bramble bushes, jujubes, bulrushes or broom.

The flooded areas, in spite of being very scarce in the East of Almería, are well represented in this scope, there being protected areas of this type such as the Salt mines of Cabo de Gata or river Antas. These ecosystems are very rich in vegetation and animal species that find refuge in the same against the extreme conditions of dryness of the environment.

### **Fauna**

The area has a great biodiversity of animal species, especially ornithological. Amongst the mammals we can highlight those of medium and small size, such as genet, weasels, foxes, dormice, shrews, hedgehogs, rats and mice. The bigger sized mammals are not very abundant in the area mainly due to the strong anthropisation of the region. Currently, only the wild boar is found, whose population is increasing due to the lack of natural predators. The reptiles have a large diversity of ecosystems resulting in a large number of snakes, small lizards, skinks, geckos and lizards. The presence of amphibians is restricted to watercourses, rivers and lagoons, there being species such as the toad and common frog, or the spadefoot toad. The most abundant and widespread group of land vertebrates in Levante de Almería is that of the birds. The variety of ecosystems makes the inclusion of such varied species in this region such as ducks, seagulls or flamingos together with the steppe birds such as the black-bellied sand grouse or stone curlew.

The areas of pine trees, Holm oak trees and bushes have sedentary species such as the green woodpecker or common blackbirds, and nesting birds such as the turtledoves, great spotted cuckoo or the scops owl. Other species arrive in the wintertime, such as the chaffinch, stonechat, whinchat or the redstart. Amongst the steppe species, apart from the black-bellied sand grouse and the stone curlew, the following can be highlighted, such as collared pratincoles, red-capped larks, crested larks, Dupont's larks, black-eared wheatears, little bustards and partridges.

Amongst the lagoon ecosystems, we can highlight the salt mines of Cabo de Gata, where we can see more than a hundred species throughout the entire year. Amongst all, the rose-coloured flamingo can be highlighted, having counted more than two thousand specimens towards the end of August. Other birds resting in the salt mines during their migrations are avocets, black-winged stilts, dunlins, grey-headed wagtails and little egrets. In the East of Almería the marine species have considerable populations, both in biodiversity and number of specimens. Amongst other species present we can highlight shags, Audouin gulls, razorbills, puffins, terns, shearwaters and storm petrels.



### **2.2.1.2. Intertidal area**

In accordance with the Spanish beaches catalogue of the Ministry of the Environment (**Chart 13**), there are a total of eighty beaches in the Levante de Almería area. The growth or erosion of the beaches is determined, apart from the marine and coastal dynamisms, by the action that are carried out in the land environment as these can be of influence in the supply of sediment to beaches by means of rivers or variation of coastal currents.

In the coastal physical environment study we can adopt a wide variety of methodological approximations. In this sense, the studies related to coast engineering projects have focused on the assessment of the projected works on the coastal line or active area of reefs, with the objective of establishing an economic or environmental viability of the work. In other cases, the characterisation has been carried out to determine the genesis and potential evolution in the long term of a coastal system, both temporary and spatial.

Some disciplines, such as morphodynamic, are placed in the analysis of mid term processes (1 to 10 years) with scientific interest as well as interest for the application to management due to the analytical and prognosis nature of the results of these characterisations. In general, the morphodynamic studies of beaches allow establishing a typology of the same, depending on a series of dynamic and morphological-sedimentological parameters. In this way, the beaches can be classified within a spectrum that ranges from the greatest energy dispersion to the most reflective. The usual nomenclature places them in the dissipative and the reflective domains, going through a series of intermediate types.

The importance of this classification is that apart from providing a description, it also includes evolution parameters that can be of help in the estimation of the potential development of the beach sedimentation system. Additionally, and depending on the classification, we can interpret whether the system is in an erosive or transitory growth stage, thus offering valuable information for the characterisation of the condition of the coastal resistance.

**Chart 13. Levante de Almería Beaches**

Municipalities	Name	
Almería	La Fabriquilla	El Perdigal
	La Almadraba	Costacabana
	Las Salinas	El Bobar
	San Miguel de Cabo Gata	Nueva Almería
	Las Amoladeras	San Miguel / Zapillo
	Torregarcía	Las Olas
	Retamar	San Telmo
	El Toyo	La Garrofa
Carboneras	El Algarrobico	Los Cocones
	La Galera	Las Martinicas
	El Lancón	Los Muertos
Cuevas del Almanzora	Pozo del Esparto	Peñón Cortado
	Cala Panizo	Cala Invencible
	Cabezo Negro	Cala de los Dolores
	El Calón	Villaricos
	Cala Cristal	Fábrica del Duro
	Embarcadero Viejo	Quitapellejos/Palomares
Garrucha	Garrucha	
Mojácar	Marina de la Torre	Cueva del Lobo
	La Rumina	Castillo de Macenas
	El Descargador	El Sombrero
	El Cantal	Las Granatillas
Níjar	Agua Amarga	San José
	Cala de Enmedio	Los Genoveses
	Cala del Plomo	Los Amarillos
	Cala San Pedro	Cala Príncipe
	Las Negras	Cala Chica
	Cala del Cuervo	Cala Barronal
	Playazo Rodalquilar	Cala de Mónsul
	Cala de la Polacra	Media Luna
	Cala del Carnaje	Cala Carbón
	Isleta del Moro	Cala Rajá
	Los Escullos	Cala Arena
	El Esparto	Ancón de Cabo Gata
	Cala Higuera	
Pulpí	Cala Cerrada	Mar Serena
	La Carolina	S. Juan Terreros
	Cala Cuartel	La Entrevista
	Cala de la Tía Antonia	Los Nardos
	Mar Rabiosa	
Vera	El Playazo	Las Marinas
	Puerto Rey	

Source: Ministry of the Environment, 2004.

#### Photo 5: Intertidal area

*The dissipative beaches are characterised by a very gentle slope, the formation of one or various parallel barriers to the coastline in the surf area and the adaptation of high levels of energy that is dispersed over large areas where the dominant breakers are of the spilling over type. It is a stable profile and its presence can be associated with well-adjusted coasts or those in equilibrium. The sediments of this type of beaches are well classified and have abundant fine sand.*

In the reflective beaches the slopes are accentuated (hence their nomenclature, as they reflect the wave energy) and rough sediments and classified by very violent and turbulent breakers. There is usually a big steep incline on these beaches dissipating (or reflecting) the greater part of the energy of the waves. Their domains are also stable where the provision of sediment is not frequent but the existing ones are re-used in a closed circuit.

Between both extremes we find a series of categories known as intermediate that are subdivided into four, depending upon whether they tend to be dissipative or reflective. This segment is the most critical regarding beach stability (and coastline) insofar as the dynamisms of these environments make them very unstable and with potentially low resilience. The sensitivity of these beaches is high and their balance vulnerable. In this type of beaches (when they tend to be reflective it is even more critical) the provision of sediment is frequent, the swell is considerably dissipated by natural mechanisms (such as after-storm barriers produced by the erosion of the sub area beach) and drifting is non-existent or at least very low. When these conditions are not present the beaches tend to be irreversibly erosive with unforeseeable periods of recovery.

In this way, we can establish a morphodynamic typology of the Levante de Almería beaches, in accordance with the exposure to East or West winds. On the one hand, there are the southern beaches of Torregarcía, to the East of the city of Almería, Monsul to the South of San José and Agua Amarga, opposite the town of the same name. On the other hand, the most northern beaches, such as that of Garrucha (to the South of the urban artificial beach of the main city) and some coves of the coastal part of Sierra Almagrera.

### **Torregarcía Beach**

This is a narrow beach, with a stepped slope showing a series of berms from previous storms. The profile does not show characteristics of being in an erosion stage although the sediments are not very classified and apparently very dependent on supply produced by the rainfall more than from the coastal drift. The breakers are very pronounced on the typical step of the semi-reflexive beaches. This type of beach is dynamic but not extremely sensitive if the rainfall supply is stable. As negative actions we should highlight the regulation of the basin or the cancellation of the drift from the East.

#### **Photo 6: Torregarcía Beach**

*Breakers and typical waves in low energy (< 50 cm.)*

*Outline in May 2005. Looking towards Cabo de Gata*

### **Monsul Beach**

The Monsul beach is bordered by groups of volcanic rock with high exposure to the Levante wind waves. That is why, and due to the abundant provision by the erosion of the fine volcanic material, the beach is well developed and a large dune has been formed in the direction of the dominating wind. The active beach has a width of 125 metres and an average slope due to the accumulation of sediment on the beach due to the wind. It is an intermediate beach but with a healthy sediment provision. Nevertheless, the dune is of the climbing type and thus it may not be available in the event of storms to repair the submerged beach. As negative activities we recommend not interfering in the retro-feeding processes of the dune beach, and the not carrying out of any activities that may seal the nearby land.

**Photo 7: Monsul Beach**

*Chaotic and very slanted breakers, powerful coastal drift towards the North under these wave conditions (from the South)*

*Outline in May 2005. Clear wind accumulation on the emerged beach and wave notch.*

**Agua Amarga Beach**

The semi-urban beach of Agua Amarga has a profile of 30 metres in width where rock flanks have fitted the fine sediments in a cove type of system that, due to the exposure to the southeast, is a little more protected from the storms and favours sedimentation. The coastline is transversally flanked by a constructive berm that indicates acceptable recovery without any apparent erosion symptoms.

**Photo 8: Agua Amarga Beach**

*Negative activities:* This beach is surrounded by an incipient and untidy housing development. Perhaps the location of the promenade may be negative, as it would increase the sediment transfer problems by means of the already distorted system that should be taken into account.

**Garrucha Natural Beach**

In the most northern sector, there are alternating urban beaches (completely artificial with forced sand provision) and natural beaches, in those places where there is very little housing development pressure. The South beach of Garrucha is of this second type. There is a sector where in a natural state there would have been supplies from the drift from the north of the river Almanzora estuary and to the south by the Aguas river; the beaches are seriously affected by the interruption produced by the Garrucha port. The beaches to the North, artificial and produced by regeneration, are held by a terminal dike to prevent the loss of the beach and also the supply of the beach downstream. These beaches are in a clear morphodynamic state by which the sharp angled breakers violently transport the scarce sediments.

This beach is in an irreversible degeneration process, there being outcrops of old rock substratum. The activities that continue sealing the sediment flow will be harmful (extension of the road, construction of car parks, etc.) there being a potential risk of the large nearby hotels planning regeneration, that would involve more terminal dikes and would extend the erosion problem towards the Mojácar coast.

**Photo 9: Garrucha Beach**

### ***Almagrera Mountain Range Coves***

Finally, to the north of the Almanzora mouth there is a section of coast characterised by a geological domination of argillaceous rocks that make the sandy beaches and large deposits

disappear. In the same energy conditions geology causes the beaches to be small and with limited sediment provisions and drifts that do not usually exceed the limits of the engagement. These beaches are usually reflective with large sized sediments and long gradient slopes. They are very dynamic transversally but stable if the sediments do not leave the system, which is not very probable if they are left in a natural condition. The abrupt slope of the nearby cliffs makes housing developments difficult and this will not have any affect if placed on the rock. The negative activities are related with the development of infrastructure (to provide accesses, for example) given that some of the provisions are from short and sloping streams. The cleaning of some formations of posidonia remains that have accumulated on the coastline is also not very recommendable.

**Photo 10: Almagrera Mountain Range Coves**

### **2.2.1.3. Marine Environment**

Levante de Almería has one of the best preserved marine areas in the Mediterranean, housing a large variety of ecosystems that have been acknowledged and protected by various protection instruments, as already mentioned. The Almería coast has a high level of biodiversity, with more than a thousand species of submarine fauna and flora and contamination indexes lower than those of the greater part of the Mediterranean. This biological wealth is due, mainly, to the confluence of Atlantic and Mediterranean marine currents on these coasts that move in opposite directions. Amongst other general characteristics we could highlight the great visibility of their water, reaching more than 25 metres in the Cabo de Gata coast.

In Levante de Almería three types of the sea beds can be found, each with their own characteristics: rocky, sandy and *Posidonia oceanica* sea grass meadows. Various communities of marine fauna and flora can be found in these, adapted to the various light conditions, depth and waves. The rocky bed is usually well represented in the area and usually coincides with submarine prolongations of the various mountain ranges and coastal rock formations. The algae vegetation cover is usually very dense, above all in not very deep areas due to the abundant provision of solar light, providing housing and food for various species of annelid worms, crustaceans, molluscs, starfish, sea urchins, anemone or madrepores. Various fish frequent this type of habitat, above all black scorpion fish, groupers, conger eels, Peter fish, and brown meagres and, at less depth, rainbow wrasses, cardinalfish, shi drum, two banded seabreams, tompot blennies, damselfishes or red mullet, inhabitants of cracks, caves and other dark areas.

The sandy bottom is the most abundant in the Almería coast. They are located on limy substrates and are made up by fine sand from the shore, reaching 20 or 30 metres in depth. These do not have algae communities, although they are sometimes colonised by phanerogam plants, amongst which the *Cymodocea nodosa* can be highlighted. They have specialised fauna communities and are very important, economically speaking, for coastal fishing. Beneath the sand we can find donax clams and striped venus of the clam family, and other bivalve molluscs, that usually make up large banks and are commercially exploited. Various species of invertebrates are also represented in this habitat, such as the great sand star and others belonging to the *Astropecten* family, amongst the echinoderms, crustacean such as the sand crab and the hermit crabs, or molluscs such as cuttlefish and octopus.

Amongst the most representative ichthyofauna of this seabed, flat fish such as the sole, camouflaging itself with the sand, and spotted weevers can be found. Other frequent species in the area are the wrasse fish, mullet, striped sea bream and marbled electric ray.

The *Posidonia oceanica* sea grass meadows make up one of the most singular seabeds on the Almería Coast. This marine phanerogam is a superior plant with rhizomes, leaves that can measure up to a metre, flowers and a radicular system as if it were a land plant. These submarine meadows, commonly called seaweed beds, have been decimated over the past few decades, mainly by trawling, although they still occupy large areas on sandy substratum, sometimes also on rocks. For their normal development they need abundant sunlight and thus they can be found in surface waters, not being abundant below 20 metres in depth.

From the ecological point of view, they are of extraordinary value, acting on the environment that surrounds them in numerous ways. On the one hand, they positively contribute to the oxygenation of the marine water and even to its cleaning, trapping the sediment particles that are in suspension. On the other hand, their rhizomes encourage the fixing of the sandy substratum where they are located, together with their capacity to soften the impact of the waves, influencing the decrease of the erosion processes in coastal areas.

Photo 11: Coastal area

Another of the characteristics of this endemic community of the Mediterranean is its capacity to house rich and extensive fauna and flora, reaching very high indexes of biodiversity. Amongst the macroscopic algae present in this habitat the green ones can be highlighted – such as the sea lettuce, as well as the brown and the red ones, the latter with a coral aspect as consequence of their high calcium content. Protected by these sea grass meadows there are multitude of crustaceans, molluscs such as cephalopods or sea hare, equinoderms such as red stars, sea cucumber and marine worms.

Fish are widely represented in this habitat, being used by many species not only as a feeding and nesting area, but as an egg-laying area and growing up of their young fish. Some of the most representative species are the sea bass, grey mullet and wrasse fish. The presence of sea horses is surprising, who hold the *Posidonia oceanica* leaves with their tail. Other fish that frequent these sea grass meadows are those belonging to the sparids family and of a gregarious character that feed on algae, molluscs and other small fish. The following belong to this family: gilthead breams, red porgies, striped sea bream, blue spotted bream, sea bream, saddled bream and Spanish sea bream, all very highly regarded at a culinary level.

Apart from the rest, there are multitude of species that live in deeper waters, above all in the zooplankton and phytoplankton, making up the basis for the food chain of the sea, as well as jellyfish. Although mainly of a pelagic nature, we should highlight the concentrations in large numbers of bullet mackerel, white tuna and tuna, which are produced in some periods of the year, coinciding with their migrations and that have been traditionally captured by means of the Arabic or almadraba fishing equipment, being an important resource for the Almería fishing industry.

Amongst the marine reptiles we can highlight the loggerhead turtle whose population and Mediterranean reproduction colonies are frankly on the decrease. This endangered and protected species is an indirect victim of the dredge fishing nets, sea-line and other types of fishing equipment, as the leatherback turtle, which is not very frequent on the Almería coasts. These testudines usually die due to the obstructions produced by eating plastic bags,

mistaken for jellyfish that make up their diet. Within the mammals, the sighting of pilot whales and other whales or of the striped dolphins that are trapped in the previously mentioned nets is frequent.

The beauty and variety of the marine seabed, as well as the transparency of the water and climatic conditions, make Levante de Almería one of the most important areas of the Andalusian coast for the practice of scuba diving. Amongst the submarine landscapes of the East, we can highlight, due to their beauty, the seabeds surrounding Isla Negra and Isla de Terreros near San Juan de los Terreros (Pulpí).

Especially beautiful and very rich biologically speaking, is that made up by the marine seabeds of Cabo de Gata, declared as a marine reserve. Some of the coastal points such as the Cala del Plomo, Agua Amarga, Cala de San Pedro, El Playazo de Rodalquilar, La Isleta del Moro, Los Escullos, Cala Higuera or el Corralete offer the diver very attractive seabeds which can be accessed from the beach line or points near the coast. The dominating landscape is usually made up by twisting submarine corridors of rocks and volcanic defiles, adorned by multicoloured sponges and carpets of *Posidonia oceanica* sea grass meadows.

#### **2.2.1.4 The protected natural spaces**

As has been shown, Levante de Almería has a natural environment with areas of a high ecological and landscape value, amongst which the Cabo de Gata-Níjar Natural Park can be highlighted, declared as a protected area in 1987.

Apart from this Natural Park, as shown in **Chart 14**, in the CAMP Project territory there are another three natural spaces belonging to the Andalusia Protected Areas Network (RENPA); twelve Natura 2000 Special Conservation Areas/ Sites of Community Interest (ZEC (SCA) /LIC (SCI)); two Special Protection Areas for Birds (ZEPA (SPA)); one wetland protected area by the Ramsar agreement; one Reserve of the Biosphere; one Marine Reserve at Cabo de Gata-Níjar; and two Specially Protected Areas of Mediterranean Importance (ZEPIM (SPAMI)), as well as numerous areas included within the Special Protection Plan for the Physical Environment and Catalogue of the Province of Almería.

**Chart 14. Levante de Almería protected areas protection instruments**

Protected Areas	Protection Instruments	Municipalities
Cabo de Gata-Níjar	Cabo de Gata-Níjar Natural Park	Almería; Carboneras; Níjar
	ZEC (SCA) / LIC (SCI)	Almería; Carboneras; Mojácar; Níjar
	ZEPA (SPA)	Almería; Carboneras; Mojácar; Níjar
	ZEPIM (SPAMI)	Almería; Carboneras; Níjar
	Ramsar (Cabo de Gata Salt Mines)	Almería
	Reserve of the Biosphere	Almería; Carboneras; Níjar
	Cabo de Gata-Níjar Marine reserve	Almería; Carboneras; Níjar
Cabo de Gata Cliffs	Coastal complex of environmental interest. Special Plan for the Protection of the Physical environment and Catalogue of the province of Almería	Níjar
Cabo de Gata-Los Genoveses	Exceptional coastal complex. Special Plan Special Plan for the Protection of Physical Environment and Catalogue of the province of Almería.	Níjar
Cabo de Gata Dunes	Exceptional coastal complex. Special Plan for the Protection of Physical Environment and Catalogue of the province of Almería.	Níjar
Serrata de Cabo de Gata	Exceptional coastal complex. Special Plan for the Protection of Physical Environment and Catalogue of the province of Almería.	Níjar
Cabo de Gata Salt Mines	Transformed marshes. Special Plan for the Protection of Physical Environment and Catalogue of the province of Almería.	Almería
Sierra de Cabo de Gata	Exceptional natural area. Special Plan for the Protection of Physical Environment and Catalogue of the province of Almería.	Níjar
Playa de Los Escullos	Coastal complex of environment interest. Special Plan for the Protection of Physical Environment and Catalogue of the province of Almería.	Níjar
Vega Baja Andarax	Singular agricultural complex. Special Plan for the Protection of Physical Environment and Catalogue of the province of Almería.	Almería
Sierra de Alhamilla	Natural Area	Almería
	ZEC (SCA) / LIC (SCI)	Almería
	ZEPA (SPA)	Almería
	Mountain complex of environmental interest. Special Plan for the Protection of Physical Environment and Catalogue of the province of Almería.	Níjar and Almería
Almería-Aguadulce Cliffs	Outstanding area. Special Plan for the Protection of Physical Environment and Catalogue of the province of Almería.	Almería
San Andrés Island	Natural Monument	Carboneras
	ZEC (SCA) / LIC (SCI)	Carboneras
Algarrobo Beach	Coastal complex of environment interest. Special Plan for the Protection of Physical Environment and Catalogue of the province of Almería	Carboneras

## 2. CAMP area proposal

### 2.2. Environmental context

Protected Areas	Protection Instruments	Municipalities
Terreros and Negra Islands	Natural Monument	Pulpí
Reona Cove	Coastal complex of environmental interest. Special Plan for the Protection of Physical Environment and Catalogue of the province of Almería	Pulpí
Seabed of the East of Almería	ZEPIM (SPAMI)	Carboneras; Cuevas del Almanzora; Garrucha; Mojácar; Pulpí; Vera
	ZEC (SCA) / LIC (SCI)	Carboneras; Cuevas del Almanzora; Garrucha; Mojácar; Pulpí; Vera
Arejos watercourse	ZEC (SCA) / LIC (SCI)	Pulpí
Almagrera, de los Pinos and el Aguilón Mountain range	ZEC (SCA) / LIC (SCI)	Cuevas del Almanzora; Pulpí
Sierra de Almagrera	Mountain complex of environmental interest. Special Plan for the Protection of Physical Environment and Catalogue of the province of Almería	Cuevas del Almanzora
Sierra de Almagrera Cliff	Coastal complex of environmental interest. .Special Plan for the Protection of Physical Environment and Catalogue of the province of Almería	Cuevas del Almanzora
Sierra del Alto de Almagro	ZEC (SCA) / LIC (SCI)	Cuevas del Almanzora
Sierra de Almagro	Mountain complex of environmental interest. Special Plan for the Protection of Physical Environment and Catalogue of the province of Almería	Cuevas del Almanzora
Antas river	ZEC (SCA) / LIC (SCI)	Garrucha; Vera
Sierra de Cabrera-Bédar	ZEC (SCA) / LIC (SCI)	Carboneras; Mojácar
Sierra Cabrera	Mountain complex of environment interest. Special Plan for the Protection of Physical Environment and Catalogue of the province of Almería	Carboneras; Mojácar
Sierra Cabrera Cliff	Coastal complex of environmental interest. .Special Plan for the Protection of Physical Environment and Catalogue of the province of Almería	Mojacar
Mojacar Lagoon	Transformed wet area. Special Plan for the Protection of Physical Environment and Catalogue of the province of Almería	Mojacar
La Serreta de Cabo de Gata	ZEC (SCA) / LIC (SCI)	Níjar
Gergal, Tabernas and Sur de Alhamilla watercourse	ZEC (SCA) / LIC (SCI)	Almería; Níjar
Gádor Énix mountain ranges	ZEC (SCA) / LIC (SCI)	Almería

Source: Regional Ministry for the Environment y Regional Public Works and Transports Ministry.

A good part of the land wealth and most of the seabeds within the scope of study are thus protected by various protection instruments, that gives an idea of the natural wealth of the region, and that, together with the landscape contrasts and ecosystems, make this area an objective of nature tourism (**Map 5**).

The main aspects of the most relevant protected natural spaces nowadays are shown next.

### ***Cabo de Gata-Níjar Natural Park***

The Cabo de Gata-Níjar marine/terrestrial Natural Park has a surface of 49,696ha., of which 37,570ha. are terrestrial and 12,126ha. marine. It was declared Natural Park in 1987, thus becoming the first protected area in Andalusia with these features. The main characteristics of this Natural Park are its semiarid climatology and its volcanic origin, with high ecological and landscape value. It was recognised in 1997 as a Biosphere Reserve by the UNESCO.

Other protection instruments of Cabo de Gata-Níjar, apart from those mentioned – Natural Park, Biosphere Reserve -, are those of the Special Protection Area for birds (ZEPA (SPA)) and Site of Community Interest (LIC(SCI)). The Cabo de Gata salt mines, in the municipality of Almería, are included in the List of Wetlands of International Importance by the Ramsar Agreement, and the coastal strip is protected by the instrument Marine Reserve by the Ministry of Agriculture, Fishery and Food, since 1995. This reserve establishes five integral reserve areas: Cabo de Gata, Morrón de Genoveses, Punta de Loma Pelada, Punta de la Polacra and Punta de la Media Naranja, in which all types of fishing is forbidden, as well as extraction of fauna or flora and sub aquatic activities. This protection instrument attempts to safeguard the marine phanerogam sea grass meadows. On the other hand, the same coastal strip is part of the Specially Protected Areas of Mediterranean Importance (ZEPIM (SPAMI)) of the Barcelona Convention (1976).



### ***Map 5. Protected Areas***

Levante de Almería has various instruments for the protection of the natural environment, such as a Natural Park, twelve Areas of Community Interest, and two Special Areas for the Conservation of Birds. A protected area by the Ramsar Agreement, a Biosphere Reserve, a marine reserve and two Especially Protected Areas of Importance to the Mediterranean.

#### **Cartographic Sources:**

##### **Basic cartography:**

. Digital topographic map of Andalusia 1:100,000. Regional Public Works and Transports Ministry. Junta de Andalucía.

. Protected Natural Areas Network. Regional Ministry for the Environment. Junta de Andalucía, 2005.

**Map 5.** Protected areas



### ***Sierra Alhamilla Natural Area***

Sierra Alhamilla is part of the most western Betica Mountain Range and acts as lungs, oxygenating the surrounding barren wasteland. An important point in the settling of the Cultures of the Millares and of the Argar, it had considerable Islamic influence, currently visible in its anthropological and landscape aspects. To all this we should add its great value as a refuge for multitude of animals and plants that have found in this oasis an appropriate area to survive the rigor and hostility of the surrounding environment. Its importance is based on the index of naturalness of the area, its character of forest island within a semiarid context, housing numerous situations of ecotone amongst the Betico and Murcia-Almería vegetation landscape, situations that make this area an important spot for the speciation phenomena to occur. It also outstands due to the bird communities, amongst which the birds of prey, both those nesting and those migrating, and amongst these, those preferring forests, that are very few and far between in the province. In general, its mountain foot is exceptionally relevant area for populations of steppe birds, its nature being of special interest as a support corridor for the small migrations of the trumpeter finch in autumn-winter and spring-summer, between the coastline and the semi-arid areas in the interior. Apart from its condition of Natural Area, Sierra Alhamilla is an Special Protection Area for Birds (ZEPA (SPA)) and it is found in the proposal for Areas of Community Interest (ACI) of the Natura 2000 network.

### ***San Andrés Island***

San Andrés Island is an islet of volcanic origin located in the municipality of Carboneras, with a maximum height of 13 metres above the sea level, although its bed does not exceed 10 metres in depth. It is separated from the Peninsula by a submerged isthmus at an approximate distance of 350 metres from the Southwest of the Puntica beach, located in the fishing quarter of said town. Protected by the Natural Monument and Area of Community Interest instruments, it is a natural element of great geographical and biotic value. Apart from the richness of its seabeds this island is the usual nesting spot for species such as yellow-legged gulls and storm petrels.

### ***Terreros Island and Negra Island***

This ACI is made up of two islets of a volcanic nature near the coast of Pulpí, against the San Juan de los Terreros town, making up the enclave for the reproduction of species such as storm petrels and Cory's shearwater, marine birds whose population is in decline in the Mediterranean. This is an important natural space due to the cliffs and breakers present.

### ***Levante de Almería Seabed***

Between the municipalities of Carboneras and Pulpí one of the largest and best preserved *Posidonia oceanica* sea grass meadows of the Spanish coast can be found. This natural space, protected as Area of Community Interest and Area Specially Protected of Importance to the Mediterranean occupies an extensive area, which at some points exceeds 3 km in width, and goes from the coastline itself to 30 metres in depth. The excellent conservation conditions of the meadow and rock bed surrounding Isla de Terreros, and the small barrier reef of *Posidonia* located opposite El Calón. The presence of these formations enriches, in a qualitative and quantitative way, the fish community in the area, finding in the same species catalogued as endangered within the Mediterranean.

### **Arejos Watercourse**

Arejos watercourse is a small delta wetland located to the North of the municipality of Pulpí, in the limit of the Region of Murcia. Its importance is based on the riverbank and salt marshes that can be found in the mouth of the watercourse.

### **Almagrera, de los Pinos and el Aguilón Mountain Ranges**

The pre-coastal mountain range area where the influence of the East cyclonic types softens its semiarid net character, including typical elements of eastern bio-geographical regions. Of little superficial relevance, this system made up of five reliefs in chain (Cuerda de las Palomas, Sierra del Aguilón, Sierra de los Pinos, Sierra del Castillarico and Sierra Almagrera), and is parallel with the coast, including a spectacular cliff in the last of the reliefs mentioned. The diversity of the geological resources and its abrupt topography determine, together with the absence of accesses, its high degree of wilderness. The most significant landscape of the region are the variations of Aleppo pine (*Pinus halepensis* Miller) formations in the shady areas of the De los Pinos and El Castillarico mountain ranges. The communities of milk weeds in the sunny areas of Aguilón, los Pinos and Almagrera; the abundant jujubes at the foot of the Aguilón and Almagrera mountain ranges; the substitution bushes (esparto grassy area and thyme bushes, salt steppes) and rocky communities. This landscape is a refuge for one of the best populations of the spur thighed tortoise. Next to it, elements of undoubted value in the European context such as hedgehog and the eyed lizard make up a fauna catalogue with a wide variety of reptiles, steppe birds and a splendid community of invertebrates.

### **Sierra del Alto de Almagro**

This mountain range, very similar botanically and physio-graphically speaking to the Almagrera, de los Pinos and el Aguilón mountain ranges, is a small system with great relief affected by a climatology proper of the semiarid environments of the Southwest of the Peninsula, which is softened by the East cyclonic types. The lithological diversity and climatic peculiarities are added to its abrupt topography to make up a unique vegetation landscape in which some of the finest communities of a variation of Aleppo pine (*Pinus halepensis* Miller),

milk weeds and wild jujube, as well as their succession bushes, specially linked to the gypsum substratum, house an exceptional floral community, with multiple endemic elements where the gramineae, cistacea and legumes are the differentiating elements in the landscape. Hunting ground for the Bonelli's eagle, the described landscape houses one of the most extensive and very vital communities of spur thighed tortoise. Next to it, there is an outstanding community of reptiles, a splendid catalogue of birds and a hardly started inventory of invertebrates making up the fauna description of the area.

### ***Antas river***

The river Antas flows into the sea to the North of Garrucha, in the municipality of Vera. It occupies an extension of floodable areas that maintain permanent water throughout the year, although its volume depends on the rainfall of the area. The soil, on sedimented areas of quaternary origin, has high dynamism from the geomorphologic point of view. The most abundant vegetation species are the wild reeds, there also being reed beds and bulrushes. The tamarisk is located on the outer end of the border vegetation, making up small forests. Amongst the halophyte vegetation we can highlight the presence of the glasswort, colonising a large part of the water shores.

### ***Sierra de Cabrera-Bédar***

This mountain range is one of the areas of greater diversity (the floral catalogue has more than 1,000 species) in the Iberian Peninsula, after the Sierra Nevada massif, and, therefore, of continental Europe. This diversity is due to the fact that in this place very different geological material is found: volcanic rocks, gypsum, limestone and schist; that contribute to the formation of vegetation formations of great interest due to their endemic nature in many cases. We should highlight the fragility of the flora and vegetation on gypsum and volcanic rock against human action.

From the fauna point of view, we can highlight the presence of the spur thighed tortoise with original populations. At the same time, the presence of steppe birds gives it national interest, due to the scarceness of similar habitats in the Spanish peninsula. On the other hand, the high number of trees favours the settlement of nesting birds of prey such as golden eagles, Bonelli's eagles and peregrine falcons. We should highlight, lastly, the presence of land mammals, such as the hedgehog and the weasel, represented by the endemic subspecies of the Iberian Southeast (*Mustela nivalis iberica*).

### ***La Serreta de Cabo de Gata***

This small mountain range is a small mountain alignment acting as natural limit between the volcanic context of Sierra de Cabo de Gata and the sedimentary environment of the Almería

river basin. Of an exceptional geological value, it represents a milestone providing the interpretation and analysis of the evolution of the coastline. The lithological variety (volcanic material, limestone, gypsum, old beaches and sedimentary fillings) favours a vegetation landscape, homogeneous from the aesthetic point of view given the extension occupied by the esparto grassy area, although with a wide floral diversity associated with the diversity of substratum mentioned. In the fauna community, the steppe birds and the invertebrates should be highlighted.

### ***Gergal, Tabernas and Sur de Alhamilla watercourses***

This is an area localised in the intra-mountain area defined by the reliefs of Sierra de Gádor, Sierra Nevada, Sierra de Filabres and Sierra Alhamilla. Such a location conditions its rainfall, and thus this region only occasionally benefits from the autumn rainfall associated with the East cyclonic types (cold front phenomena). The dominant material, Miocene marl and sedimentary fillings are of diverse types, but contribute to increasing the climatic aridity generating situations of edaphic desert. The nature of the described climate/edaphic conditions makes this region a true biological laboratory that has encouraged, throughout history, outstanding speciation processes. A large number of endemic elements configure unique habitats in the European continent, making up a singular landscape in which the erosive shapes associated to the runoff processes are of special relevance. The draining beds in this area act as true biotic communication routes and house the scarce and brackish water springs that are present in this desert context. The oasis effect determined by said springs become of undoubted landscape relevance and is historical support of a perfectly adapted fauna community in which small mammals, reptiles, steppe birds and invertebrates are the main characters.

### ***Sierras de Gádor y Énix***

The Gádor and Énix mountain ranges are in the confluence of the Betica and Murcia-Almería chorologic provinces. The bordering effect provides them with a wide diversity insofar as vegetation communities and species is concerned (almost two thousand catalogued species). This high diversity has caused the inclusion of this area in the Andalusian proposal for Areas of Community Interest.

## ***2.2.2. Cultural Heritage***

*Cultural heritage* includes the material nature manifestations as well as immaterial or symbolic. The interaction of these two aspects makes the cultural heritage dynamic, discontinuous transformation by humans, in accordance with the interests at each moment of time. The aspects related to the preservation of cultural identity are of special relevance as in these the differentiation and identity of the region is shown. That is why the revaluation of the

cultural importance is so important, as a strategic axis of local economic development. The CAMP project scope has a rich cultural heritage, of which we could highlight the archaeological, historical, artistic and monumental, industrial and mining, and the ethnographic aspects.

The archaeological legacy, fruit of the various cultures that have existed in the region, is very important in the area, there being a large number of catalogued archaeological sites, covering a wide timescale scope, including the sites of the Palaeolithic period (La Zájara I and II Caves, in Cuevas del Almanzora); Mesolithic period; Neolithic period (first agricultural culture, belonging to the Almería Culture, in the lower part of river Aguas); the metal age (societies belonging to the Culture of Los Millares, Culture of El Argar and Phoenician colonisations); Iberian and Romans, Visigoths, and the Andalusí period in which, apart from an important architectonic legacy, such as the surveillance-defensive towers, we should mention the innovations in agriculture and water management.

Photo 12: San Juan de los Terreros Castle



In the occupation of the coast, the military defences implemented in the eighteenth century, during the reign of Carlos III have played a major role; all along the coast various different buildings can be found, such as castles, fortified towers and watch towers. From North to South we can find the San Juan en Terreros, Villaricos, Mojácar, Jesús Nazareno in Garrucha, Macenas and Carboneras castles, the Mesa Roldán Tower, San Pedro, San Ramón in Playazo de Rodalquilar and San Felipe in Escollos castles. Also various watch towers complete this heritage: el Sombrerico, El Rayo, Los Lobos, Cala Higuera and Vela Blanca.

There is also a wide representation of the historical, artistic and monumental heritage in the municipalities of the areas, demonstrated by the existence of churches, castles, hermitages, sculptures or paintings. In a non-strictly coastal location, we should also highlight the Huércal-Overa and la Ballabona towers and the Vantage Point of Níjar, as well as the Santa Bárbara and Cuevas de Almanzora castles.

The exploitation of mines, some of them since olden times, involved the development of installations that today are historical heritage of interest. Since the nineteenth century the province of Almería underwent the development of a relatively important mining industry, in which two stages can be differentiated, one of them, between 1820 and 1890, where lead mining was the main activity; and the other one, between 1890 and 1930, in which iron mining should be highlighted. Nevertheless, other minerals such as gold, zinc, copper and sulphur were exploited, although they did not reach to the social and economic importance reached by the lead and iron mining industry.

The foundries also involved the construction of architectonic complexes such as the factories or the housing for the engineers and families of the employees, as well as of the exploitation systems, such as the mining railway, the aerial cables and steam engines. Of the remains of this past, today making up industrial archaeology, numerous examples can be found in various municipalities of the scope, amongst which Cuevas del Almanzora, Pulpí, Garrucha and Níjar can be highlighted.

**Photo 13: Mining heritage**



Finally, the ethnographic heritage is made up by cultural manifestations of an immaterial and material nature. Within the first, the activities, procedures, customs, uses and beliefs can be found; the second are those made up by the physical manifestation of the former, that is, the areas constructed and personal property.

Water management and use, both for irrigation and consumption, has been an essential element in the configuration of the area habitat due to the aridity of the same. The various solutions in order to adapt the environment for the best exploitation of this resource, some of them inherited from the Spanish-Muslims, have remained as elements of a great interpretative value of this culture and of the rural landscape. Amongst these manifestations we can find the various techniques for the collection, channelling and storage of water, such as the water wheels, wells, fountains, mines, pools, tanks, irrigation ditches, dams, sluices and cuttings.

Agriculture, being the main activity of the inhabitants, has also encouraged the construction of devices for the transformation of basic products, such as the mills and the olive oil mills. The region has the two types of flour mills that are present in the Southeast of the peninsula. On

the one hand, the water mills, greatly developed and very frequent in the Eastern area of the region, related to the culture of water and its use as a source of energy. On the other hand, the windmills, that took advantage of the energy potential provided by the wind in the region. Amongst the former we can highlight the set of the Water Mills in Huebro (Níjar) and the mills in River Aguas (Mojácar), whilst the windmills are found, above all, in the part belonging to the Cabo de Gata-Níjar Natural Park. This heritage is part of the collective memory and of the landscape.

The traditional house in this area has functional features and adaptation to the environment that makes them have a high ethnographic and architectonic value. In fact, many of the traditional constructive solutions are a model of bioclimatic architecture. The elaboration and spreading of architectonic practices in accordance with the traditional architecture contributes to the conservation of the landscape and regional identity, as well as to the saving in energy, and therefore, to the protection of the environment.

On the other hand, the past societies have used various plants both for the manufacture of utensils as well as for human consumption (cooking, medicinal, hygienic), amongst which we can highlight thyme, fennel and rosemary, for their cooking and medicinal properties; as well as esparto grass, to generate a type of specific craftsmanship for the manufacturing of farming elements.

In this sense, we should also include the work cultures referred to the traditional methods for producing and transforming the resources obtained from the region: agricultural tasks, fishing, livestock farming and mining. Some of them have disappeared, and those that are still present have undergone considerable transformation, although there are still manifestations that should be kept as part of the collective memory, that have given rise to projects, such as the Ethnographic Museum of Vera or the future house-cave in Cuevas del Almanzora.

Lastly, in Levante de Almería the Mediterranean diet has peculiarities that are present by means of a multitude of cooking specialties, many of them of a Spanish-Muslim origin. The quality of the products used in cooking and their validity at home contributes to the value in the local gastronomy. Lastly, the festivals, traditions and popular costumes and oral tradition are part of the symbolic universe of the culture. The various festivals held in the region have gone through, and go through, various periods. Some of them were no longer held, and in some cases have been recovered, such as the 'Moros y Cristianos' Festival (Moors and Christians) in Mojácar. But the greater part is still present, for some time past, such as 'Día de la Vieja' (Day of the Old Woman) or the Fairs and Patron Saint Festivals of the various towns and cities.

## 2.3. Socioeconomic context

### 2.3.1. Demography and population

#### 2.3.1.1. Population system

In the eight regional municipalities of the CAMP Levante de Almería there were 245,860 inhabitants in 2004. The municipality of Almería has 72% of the total inhabitants, whilst the rest of municipalities, with the exception of Níjar (21,306 inhabitants) and Cuevas del Almanzora (11,001 inhabitants) have less than 7,500 inhabitants (**Chart 15**). The density of population is higher than the provincial density (64 inhab/ Km<sup>2</sup>) and the density of the Autonomous Community of Andalusia, around 87 inhab/Km<sup>2</sup>.

**Chart 15. Municipal population of Levante de Almería**

Municipality	Population in 2004	Extension in km2	Density of Population
Almería	177,681	295	602
Carboneras	7,100	95	74
Cuevas del Almanzora	11,001	263	41
Garrucha	6,525	8	815
Mojácar	5,375	72	75
Níjar	21,306	601	35
Pulpí	7,368	96	76
Vera	9,504	58	163
<b>Total</b>	<b>245,860</b>	<b>1488</b>	<b>165</b>

Source: Statistics Institute of Andalusia (IEA). Inhabitants Census, 2004.

The population system of Levante de Almería is based on the existence of a system of urban settlements of secondary rural nuclei, tourist developments and disseminated areas (**Chart 16**). This network of nuclei of population is basically divided into two areas: inland and coastal. The inland area is around the A-7 dual carriageway, along the N-340 main road, on which the greater entity nuclei in the scope of study can be found, such as Almería, Níjar, Vera and Cuevas del Almanzora. This area also connects Almería with the East of Spain, having important productive and commercial connections. The coastal area (ALP-118 road) connects the traditional main nuclei of Carboneras and Garrucha, as well as the tourist complexes of Mojácar, Vera and Pulpí, some of them recently developed and also in full expansion. (**Map 6**).

The development of road infrastructures and the most relevant production activities of the region (intensive agriculture and tourism) have involved an important alteration in the

traditional population tendencies, basically oriented to the availability of the scarcest resource: water.



**Map 6. CAMP Levante de Almería Municipalities**

The various population nuclei of the Levante de Almería municipalities are to be found around two roads of importance: the A-7 dual carriageway, connecting the municipalities of Almería, Níjar, Vera and Cuevas del Almanzora, and the coastal road ALP-118 connecting the municipalities of Carboneras y Garrucha, and the tourist complexes of Mojácar-Costa, Vera-Playa and San Juan de los Terreros in Pulpí.

**Cartographic sources:**

**Basic cartography:** Digital topographic map of Andalusia 1:100,000. Regional Public Works and Transports Ministry. Junta de Andalucía.

**Map 6.** CAMP Levante de Almería municipalities



**Chart 16. Population settlements**

Municipality	Population in 2003	Number of settlements	Percentage of population in main settlement	Percentage of population in other settlements	Percentage of disseminated population
Almería	176,727	17	87	8	5
Carboneras	6,996	11	85	12	3
Cuevas del Almanzora	10,695	22	46	42.5	11.5
Garrucha	6,123	1	99	0	1
Mojácar	5,959	19	23	70	7
Níjar	20,810	36	10	65	25
Pulpí	7,353	13	50	44	6
Vera	8,717	5	73	17	10
<b>Total</b>	<b>243,380</b>	<b>124</b>	<b>76</b>	<b>17</b>	<b>7</b>

Source: INE and SIMA, 2003.

In general terms, 76% of the population lives in urban areas, 17% in secondary rural settlements and tourist complexes, and the remaining 7% in disseminated areas. This high degree of concentration of the population in the main settlements is due to the considerable demographic weight of the city of Almería, where 87% of the population in the municipality and 63% of the total population of the region live.

The disseminated population is mainly in the municipalities of Níjar, Cuevas del Almanzora and Vera. In the first two cases, this situation is related to the importance of agriculture, and in the case of Vera, would seem to be connected with the new trends of a more specialised tourism, that is, residential tourism.

The population in secondary settlements has experienced considerable growth connected to two activities competing for the use of the land in the Andalusian coast and transforming the same; these are intensive agriculture and tourist activities. A very illustrative case is the growth of population connected with intensive agriculture, in the municipality of Níjar, where the secondary settlement of Campohermoso has a higher population than the municipal capital, and additionally, continues growing strongly. In fact, the population of these settlements has increased by 25% going from 4,801 inhabitants in 2000 to 6,381 four years later, whilst the municipal capital has only increased at a rate of 4%, going from 2,128 inhabitants in 2000 to 2,545 in 2004.

Apart from the increase in population of the agriculture-related settlements, the Levante de Almería coast residential nuclei have also considerably increased. This urban development process of the coast is of special importance in the area of the CAMP project, since the urban development pressure is causing considerable impact on the marine and coastal environment.

In the coastal strip of the municipalities of Pulpí, Cuevas del Almanzora, Vera and Mojácar, next to the ALP-118 road, a group of urban developments characterised by a regular structure of roads and blocks of houses, whether detached or semi-detached, or flats, in accordance with the modern construction trends have spread. As an example, we could mention the Mojácar-Playa case, whose population considerably exceeds that of the municipal capital, and, additionally, continues growing. Specifically, in 2004, there were 4,086 inhabitants in Mojácar-Playa, whilst in the municipal capital of Mojácar there were only 1,578 inhabitants. At the same time, other coastal tourist complexes in an expansion stage can be found, such as Las Marinas and Puerto Rey in Vera, Villaricos in Cuevas del Almanzora, and San Juan de los Terreros in Pulpí.

**Photo 14: New constructions in the area**

The pressure on the coast is much more intense in the summer due to the massive arrival of visitors, reaching the conventional tourist establishments and tourist urban developments, which occupy the greater part of the coast. In the case of the municipality of Mojácar it is estimated that the population reaches approximately 30,000 during the months of July and August, compared with the census of 5,500. This increase of human pressure on the region causes an increased deterioration in the natural resources and environmental conditions, as well as the congestion of the water, purifying, waste and transport infrastructure.

On the other hand, the urban development pressure on the coast is going to continue increasing, as the building of numerous housing developments is planned, amongst which the tourist and leisure complexes of El Toyo is an outstanding example, located between the city of Almería and the Cabo de Gata-Níjar Natural Park, venue for the 2005 Mediterranean Games. In fact, Levante de Almería still has one of the lowest urban development densities on the coast when compared to the Costa del Sol in Malaga (**Map 7**).

***Map 7. Degree of coastal urban development***

In spite of the increase of urban development pressure on the Levante de Almería coast over the past few years, and the forecasts for this to continue growing over the next few years, the scope of the study also considers a low urban development density on the coast when compared to other areas on the Andalusian coast, such as, for example, Costa del Sol.

**Cartographic sources:**

**Basic cartography:** Digital topographic map of Andalusia 1:100.000. Regional Public Works and Transports Ministry. Junta de Andalucía.

**Plastic shading:** Digital model of 100 metres elevations in Andalusia. Regional Public Works and Transports Ministry. Junta de Andalucía.

**Map 7.** Degree of coastal urban development



### 2.3.1.2. Demographic evolution since the 50's

The population in the scope of the study has undergone, in general terms, a very positive evolution since the 50's. In fact, the total population has duplicated and has gone from 115,798 inhabitants halfway through the Twentieth Century to 243,380 inhabitants in 2003 (Chart 17).

**Chart 17. Demographic evolution of Levante de Almería since the 50's**

Municipalities	2003 n. of inhabitants	2001 n. of inhabitants	1991 n. of inhabitants	1981 n. of inhabitants	1970 n. of inhabitants	1960 n. of inhabitants	1950 n. of inhabitants	Growth in population 1950-2001 %
Almería	176,727	166,328	155,120	140,745	114,298	86,680	75,861	119
Carboneras	6,996	6,823	5,703	4,102	3,051	3,090	3,717	84
Cuevas del Almanzora	10,695	10,517	9,167	8,450	7,795	9,377	11,344	-7
Garrucha	6,123	5,514	4,382	3,265	3,042	2,781	3,532	56
Mojácar	5,959	4,291	3,539	1,576	1,686	2,335	3,144	36
Níjar	20,810	17,824	12,554	11,023	11,213	11,709	10,557	69
Pulpí	7,353	6,908	4,578	3,836	3,655	3,126	2,955	134
Vera	8,717	7,664	5,823	5,341	4,909	4,992	4,688	63
<b>Total CAMP</b>	<b>243,380</b>	<b>225,869</b>	<b>200,866</b>	<b>178,338</b>	<b>149,649</b>	<b>124,090</b>	<b>115,798</b>	<b>111</b>

Source: Population census and Municipal census 2003

Nevertheless, the behaviour of the municipalities is different depending upon the economic dynamism of each of the same. In Almería, Níjar, Pulpí and Vera the population increase has been constant. The positive evolution of Almería is related to the rendering of public and private services supplied by the capital, and also with the economic dynamism associated with intensive agriculture. From 1950 to 1981 the municipality of Níjar has experienced a slight growth as a consequence of its proximity to this regional centre. Nevertheless, as from 1960, the rate of population increase has notably increased directly linked to the expansion of crops cultivated under plastic. In the same way, up to the 80's the population of Pulpí and Vera was stable, and from that time underwent a very positive evolution, due, amongst other reasons, to the development of tourism in the case of Vera, and the development of intensive open air agriculture in the case of Pulpí.

The municipalities mostly affected by the population loss between 1950 and 1970 have been Carboneras, Cuevas del Almanzora and Mojácar. There was a considerable emigration process to the outside in these municipalities at that time. As from the 80's, this group of municipalities began to notably recover population thanks to the return of many emigrants, to the greater economic dynamism related with tourism, as well as with other productive

activities, such as the Carboneras thermal power station, built between 1980-1984, or the cement manufacturer of this same municipality.

On the other hand, the demographic growth of the eight municipalities included in the CAMP project has greatly influenced the returning emigration, as well as the arrival of foreign population, whose growth has been accentuated throughout all the region of the study, above all, due to the demand for workers in intensive agriculture (**Chart 18**).

**Chart 18. Foreign population in Levante de Almería according to the Inhabitants census**

Municipalities	Total population in 2004 n. of inhabitants	Total foreign population n. of inhabitants		Percentage of foreign population against total population (2004)
		1996	2004	
Almería	177,681	1,490	10,178	5.7
Carboneras	7,100	85	564	7.9
Cuevas del Almanzora	11,001	121	1,519	13.8
Garrucha	6,525	73	970	14.8
Mojácar	5,375	2,064	2,582	48
Níjar	21,306	395	4,771	22.39
Pulpí	7,368	116	1,966	26.68
Vera	9,504	90	1,589	16.7
<b>Total</b>	<b>245,860</b>	<b>4,434</b>	<b>24,139</b>	<b>9.8</b>

Source: SIMA

The municipalities where the foreign importance is most significant are Mojácar, where more than half of the resident population is foreign, followed by Pulpí and Níjar with percentages around 25%. The reasons that have encouraged this population to settle down in this area are very diverse. In the case of Mojácar, almost all the foreigners are members of the European Union (above all British and senior citizens), that come to this area to spend holidays that quite often become a permanent stay. This group is in fact residential tourism, and usually stay in isolated houses or specialised housing developments, far from the coastline looking for slopes and foot of mountains of the coastal mountain ranges. The main reason for this type of foreigners is the quality of life of this region.

**Chart 19. Origin of the foreign population in Levante de Almería in accordance with the Inhabitant census**

Municipality	Total foreign population	African population (%)	American population (%)	European population (%)	Asian population (%)
Almería	10,178	32	44	19	4
Carboneras	564	33.3	13	53	
Cuevas del Almanzora	1,519	10	58	32	0.20

Garrucha	970	11	44	43.5	2
Mojácar	2,582	0.50	12	85	2
Níjar	4,771	58	7	35	0.04
Pulpí	1,966	18	58	24	0.05
Vera	1,589	3	50	46	0.50
<b>Total</b>	<b>24,139</b>	<b>6,947</b>	<b>8,466</b>	<b>8,240</b>	<b>478</b>

In the cases of Pulpí and Níjar, most of the foreigners are young people looking for employment in the agricultural sector. In Níjar, most of the work immigrants come from North Africa, above all from Morocco. This group is growing considerably. In fact, the foreign population in the municipality of Níjar has multiplied by 12 since 1996. This rate of increase is connected with the development of intensive agriculture that requires a great deal of labour for the harvesting of crops, as well as for the handling and packing of fruit and vegetable products. In Pulpí, the same as is happening in Cuevas del Almanzora, the majority of the immigrant population is from Latin-American, specifically Ecuadorians, who also work in intensive agriculture whose main crop is lettuce, which alternates, depending on the season, with melon and watermelon.

In the case of the worker immigrants, the settling process is very different from those of the residential tourists. The former usually live in disseminated areas, sometimes in very poor conditions, close to the places of work, or in rented flats in the towns, and also in provisional lodgings provisionally set up for this purpose. On the other hand, the residential tourists with a higher income level are located, as previously mentioned, in detached houses in the coastal mountain ranges.

## 2.3.2. Main productive activities

### 2.3.2.1. Introduction

Over the past 20 years Levante de Almería has undergone considerable demographic, landscape, cultural and economic changes due, largely, to the development model the region has experienced. In this sense, **Chart 20** shows the evolution of employment in the main economic sectors in the region in the 1991-2001 period. As can be seen, agriculture has increased employment by 67% in the period studied. This is a reflection of the sector intensification process, mainly by means of fruit and vegetable products in greenhouses that have become the true engine of the economic activity, both in the region subject to the study, as well as in the province. At the same time, we should highlight the decrease in industrial employment in 22% in the period studied, as well as the outstanding increase in the service sector related to the auxiliary activities of agriculture and tourism.

The intensive agriculture in greenhouses started its rapid growth in West Almería and spread, in the 90's, to the East area, mainly in Níjar. Further to the North, in Pulpí and Cuevas de

Almanzora, another type of intensive agriculture, open air, has been developed over the past few years. The economic importance of these activities is shown in the fruit and vegetable production in the province of Almería that reached 1,281 million euros, the production of the region of study representing 25% of the provincial production. On the other hand, we should add that agricultural activity is the main consumer of water in the province of Almería (90%), an aspect that should be taken into account when analysing the sector from the sustainable development perspective.

**Chart 20. Evolution of the employed population by sectors in the period E 1991-2001**

Municipalities	Agriculture, livestock and fishing		Industry		Construction		Services	
	1991	2001	1991	2001	1991	2001	1991	2001
Almería	4,105	6,247	6,456	4,620	7,005	7,836	34,831	46,396
Carboneras	423	626	444	552	364	377	549	1,073
Cuevas del Almanzora	1,209	1,518	427	342	667	742	1,170	1,989
Garrucha	251	279	137	123	364	466	802	1,223
Mojácar	88	60	87	71	229	172	1,014	1,193
Níjar	2,039	5,282	557	533	576	684	1,060	2,321
Pulpí	1,271	1,945	140	170	250	421	485	912
Vera	462	482	250	233	314	491	1,030	2,026
<b>Total</b>	<b>9,848</b>	<b>16,439</b>	<b>8,498</b>	<b>6,644</b>	<b>9,769</b>	<b>11,189</b>	<b>40,941</b>	<b>57,133</b>

Source: INE .Population and Housing Census; 1991, 2001.

**Photo 15: Níjar Greenhouse area**

At the same time, these activities demand materials related to the production and marketing of fruit and vegetable products that have allowed the development of a complex system of industrial and business relationships that has favoured the production of intermediate and services goods, such as machinery, seed production, agrochemicals and irrigation systems. This sector, according to date from the Institute of Socioeconomic Studies of the Mediterranean Caja Rural Savings Bank (2001), invoices more than 1,000 million euros (marketing excluded), mainly located in West Almería.

Livestock activity is important in the North area due to the influence of the nearby municipality of Huércal-Overa, which concentrates a large number of intensive pig farms. In this sense, over the past few years, the expansion of pig farms has reached Pulpí and Cuevas del Almanzora. The main characteristics of this production are the family nature of the exploitations, the absence of vertical integration in production, and the fact that the activities with greater added value are found in Murcia (transformation of meat products). Another of the characteristics that should be highlighted is the environmental impact of the farms originated by the liquid manure and release of odours.

On the other hand, the Almería fishing sector is not very relevant compared to the Andalusian and the national. In the region of the study the Almería and Garrucha ports can be highlighted. The fishing activity, with the exception of the Carboneras port, is centred on coastal and craft fishing in the nearby fishing grounds, such as the Alboran Sea or the Moroccan fishing ground. The fact of having a small fleet prevents the majority of the Almería boats from fishing in other areas such as the Atlantic platform or other fishing grounds further away.

At the same time, the industrial sector, smaller than that of the intensive agriculture compared with the employed population, is characterised by the concentration of the greater part of the companies in the manufacturing industry, where the metal and agricultural industries can be highlighted. The majority profile of the companies of the sector is that of small and medium companies with few employees. Nevertheless, in the area of study there are also various companies with high turnover employing more than one hundred employees, also being responsible for the greater environmental impacts. This is the case of the Endesa Thermal Power Station, located on the coastal strip of Carboneras, supplying electricity to a large part of Andalusia and the East of Spain, a cement manufacturing company located in Carboneras and a chemical industry of pharmaceutical products in Villaricos.

A sector that has more relevance in the area of study is the tourist sector, mainly the sun-and-beach tourism, mainly located in the municipalities of Mojácar and Vera. Nevertheless, the presence of the Cabo de Gata-Níjar Natural Park favours the development of nature tourism. This type of tourism is mainly located in secondary settlements in the Natural Park, especially in San José. Another aspect to be considered is the organisation in Almería of the 2005 Mediterranean Games, an event with important economic and urban development repercussions, with considerable investment in infrastructures (building of hotels, equipment and accesses).

The building sector is, therefore, connected to the expansion of second homes, the investment projects of the various public administrations, and mainly the increase in the tourist sector. The building activity is mainly located in Almería and in the urban nucleus of Mojácar, Vera and Garrucha. In accordance with the data of the Population Census in 2001, only 12% of the working population in the region works in the building sector. Nevertheless, this figure does not show the real employment generated in the area, as many building companies working in the region of study have their main headquarters outside the same.

Lastly, the service sector employs 62% of the population in the region, although if the city of Almería is excluded, the population employed in this sector is reduced to 40%, a figure similar to the population employed in the primary sector. Regarding the distribution of employment by sub sectors, the commercial sector can be highlighted, an activity providing employment to 27% of the population in the region, which, at the same time, is located in the capital (75% of the sub sector). Far behind (14% of the total of the service sector) is the public administrations sub sector, which, the same as the above, is concentrated in the capital (88% of the sub sector). Lastly, hotel activities represent 8% of the total employment of the region.

In short, the productive and employment structure in the CAMP project region is supported in the intensive agriculture as an economic engine, the construction activity and the service sector, the latter related to the agriculture auxiliary industry as well as with the provincial capital of Almería, which is a commercial attraction point for the entire region. Finally, although of a lesser economic importance, we should mention the tourism sector, a service activity becoming more important in the region of study. These two activities are the main competitors of the land.

### 2.3.2.2. Agriculture

In Levante de Almería, 61% of the land is made up of land with scarce or null agricultural uses, as these are pastures, mountains (most of which cannot be used for forestry uses), wasteland, esparto grasslands and non-productive land, (**Chart 21**). This has not prevented the development of intensive agriculture in the area.

**Chart 21. Distribution of the land in accordance to the agricultural uses (ha)**

Municipalities	Agricultural land			Non-agricultural land
	Fallow and other land	Herbal crops	Wood crops	
Almería	3,108	3,950	42	16,771
Carboneras	961	52	47	8,071
Cuevas del Almanzora	2,698	3,889	1,773	15,917
Garrucha	297	44	16	201
Mojácar	1,443	60	227	5,324
Níjar	15,720	9,116	1,176	30,458
Pulpí	2,042	2,238	952	2,690
Vera	1,159	383	345	2716
<b>Total</b>	<b>27,428</b>	<b>19,732</b>	<b>4,578</b>	<b>82,148</b>
<b>Percentage</b>	<b>39%</b>			<b>61%</b>

Source: Regional Agriculture and Fishing Ministry, 2003

The municipalities have different agricultural uses depending on the surface and type of crop:

- Municipalities with an intensive agriculture in greenhouse: Almería and Níjar.
- Municipalities in the North area characterised by a high concentration of open-air intensive irrigation agriculture: Cuevas del Almanzora and Pulpí.
- Municipalities with a small number of hectares dedicated to agriculture, compared to the former and that, at the same time, have a certain balance between irrigation and non-irrigation crops. These municipalities are Carboneras, Mojácar, Garrucha and Vera. In this case, agriculture plays a secondary role in the economic activity in favour of some other activities such as tourism, fishing or industry.

In the first and second group of municipalities agriculture is very important in the scope of the study, both from an economic point of view and the environmental impacts it causes.



### **Map 8. Agricultural Areas**

Levante de Almería land is characterised by the little use for certain agricultural crops. Nevertheless, this fact is compensated by the introduction of forced crops with a high consumption of water, fertilizers and work in some of the municipalities of the area of the study.

#### **Cartographic sources:**

##### **Basic cartography:**

*Digital topographic map of Andalusia 1:100,000. Regional Public Works and Transports Ministry. Junta de Andalucía.*

*Map of Soil Coverage and Use, 1999.*

**Plastic shading:** *100 metre digital model of elevations in Andalusia. Regional Public Works and Transports Ministry. Junta de Andalucía.*

**Map 8.        Agricultural areas**



Photo 16: Pulpí greenhouses

**Chart 22** shows the importance of irrigation herbaceous crops in the area. It is important to highlight that the intensive irrigation agriculture carried out in the municipalities involves high needs for water in a region where the water demand exceeds the refreshing of the aquifers by rainfall, thus becoming a very scarce resource. In spite of this limitation, the development of this type of agriculture has increased over the past few decades, together with the increase in the demand for water from the tourist, industrial and urban supply sectors. All this has resulted in a total increase of the water demands in Levante de Almería that has resulted in the over exploitation of the coastal aquifer systems.

**Chart 22** Type of crops in the scope of the study (ha)

Municipalities	Herbaceous irrigation	Non-irrigation Herbaceous	Irrigation Trees	Non-irrigation Trees	Total
Almería	3,858	92	8	30	3,988
Carboneras	38	14	8	39	99
Cuevas del Almanzora	3,697	192	420	72	4,381

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Garrucha	32	12	5	9	58
Mojácar	35	25	56	170	286
Níjar	6,605	2,502	241	728	10,076
Pulpí	2,223	15	715	73	3,026
Vera	311	72	296	20	699
Percentage (%)	74,29%	12,93%	7,73%	5,05%	100,00%

Source: Regional Agriculture and Fishing Ministry, 2003

The large extractions of groundwater and uncontrolled pumping of water has, on many occasions, caused the displacement of fresh underground water from the coast by salt water, breaking the existing equilibrium in the coastal aquifers, and deteriorating the quality of groundwater by means of salinisation processes that, under extreme conditions, cause marine intrusion problems with the subsequent loss of the use of the aquifer, in many cases, this being an irreversible loss.

This situation has encouraged the beginning of a modernisation process in some agricultural exploitations of the region that has involved, amongst other actions, using the drip irrigation system, the piping of a large part of the supply network and the construction of flow regulation tanks.

Nevertheless, and in spite of the improvements carried out, the lack of water to satisfy the existing demand continues being one of the main reasons for social, economic and environmental conflicts within the scope of the study. Therefore, the promotion of alternatives to increase efficiency in the use of water, by means of the modernisation of systems and the orientation of the agricultural crops towards production means with water requirements in accordance with the characteristics of the environment, seems to be more necessary to orientate the existing agricultural model to long term sustainable production means.

The main irrigation crops are lettuce, grown in the open air in Pulpí and Cuevas del Almanzora, and greenhouse tomato in the municipalities of Níjar and Almería. Regarding the irrigation of tree crops we should highlight citric fruits. Although the extension of this type of crops is less than that of the herbaceous, we should highlight the existence of more than 300 hectares of orange and lemon trees in Cuevas del Almanzora and more than 400 hectares in Pulpí.

On the other hand, the non-irrigation crops (mainly almond trees, olive trees and cereals) are of little importance in this region, although there are small productions sold in local markets or restaurants and hotels of the region, above all for those who have a traditional cuisine and local gastronomy.

The greater part of the agricultural exploitations has less than 5 ha, although their size varies from North to South (**Chart 23**). Thus, in the North area, Vera and Pulpí, the exploitations are bigger than 5 hectares, whilst in the South area, Almería and Níjar, these are only 5% and 10% respectively.

Finally, as the fruit and vegetable production in the region has been increasing, own commercialisation networks have arisen, allowing the increase of the added value of the sector. Thus, 50% of the products are marketed internationally, mainly in the European Union. For those, the farmers usually form groups such as cooperatives and agricultural

transformation societies, although there are also less relevant mercantile companies. These associations provide marketing, supplies and technical assistance services, establishing close cooperation links that allow the carrying out of strict follow-up of the agricultural production. Once the production leaves the shared marketing centres, in part it reaches the distributors and wholesalers, usually with premises to store and handle the goods before being sent to their final destination.

**Chart 23. Size of the exploitations**

Municipalities	Agricultural exploitations with a surface between 0.1 and 5 hectares	Agricultural exploitations with a surface between 5 and 10 hectares	Agricultural exploitations with a surface between 10 and 20 hectares	Agricultural exploitations with a surface between 20 and 50 hectares	Agricultural exploitations with a surface of more than 50 hectares
Almería	1,345	44	14	4	9
Carboneras	53	13	18	4	5
Cuevas del Almanzora	629	136	88	46	25
Garrucha	5	2	1	0	2
Mojácar	67	11	3	3	3
Níjar	1,774	159	82	37	51
Pulpí	291	43	41	15	22
Vera	98	27	10	13	8
<b>Total</b>	<b>4,262</b>	<b>435</b>	<b>257</b>	<b>122</b>	<b>125</b>
<b>Percentage</b>	<b>81,95%</b>	<b>8,36%</b>	<b>4,94%</b>	<b>2,35%</b>	<b>2,40%</b>

Source: Regional Agriculture and Fishing Ministry, 2003.

### ***The greenhouse crops***

Greenhouse intensive agriculture in the province of Almería is one of the most evident demonstrations of the agricultural change that this region has undergone over the past few decades. Its arousal was due thanks to, since the sixties, various production factors that intervene in this type of agriculture (Ferraro, 2000):

- The microclimate that makes it ideal for fruit and vegetable crops: very mild, small temperature changes between day and night, high level of sunlight and infrequent frosts.
- The existing groundwater resources.
- The availability of abundant low quality land for the cultivation of fruit and other species, but apt for horticulture. This low quality kept them out of production for many years and determined that the purchase price be relatively low at the beginning of the intensive activities.
- The sanding up techniques.
- The lack of production alternatives.

- Low capital/work relationship in the agricultural exploitations.

All these factors at the same time facilitated the appearance of the intensive agricultural model of Almería. Its consolidation has required a permanent evolution of the production and marketing systems to maintain the profitability level of the exploitations. In this way, innovations have been included that have improved productivity and the quality of the products.

In fact, intensive agriculture makes up a complex and dynamic technological and institutional system, concentrating large amounts of water, workers and agrochemical products of various types on artificial land, all this protected by a polyethylene cover. The use of a greenhouse allows having earlier crops and the obtaining of crops before those obtained in other areas of Spain or Andalusia, and offering the products during the winter months without having to use heating systems as is done in other countries. Additionally, it improves the performance and quality of the products, extends the life cycle of the plants, and up to two or three crops are obtained in a year. The production systems of this type of agriculture are more similar to an industrial production system than to traditional agriculture, with high content of intermediate consumption, a large number of workers and a more and more sophisticated technology. The protection of the greenhouse allows cultivating a wide range of fruit and vegetables, although the majority of the production is concentrated on eight products: watermelons, melons, cucumbers, aubergines, tomatoes, courgettes, peppers and green beans.

The massive expansion of intensive agriculture in Níjar and Almería started in the mid-Eighties and at the beginning of the Nineties, originated by the success of intensive agriculture in this region, as well as by the increasing expectations in quantity and quality of the water resources in the East. In this respect, in the municipality of Almería, in 1985 the estimate was 579 hectares of greenhouses (Sanjuán Estrada, 2004), mainly located in the nearby areas of Venta Gaspar, El Alquíán and La Cañada de San Urbano, located in the central part of the Almería municipality, north of the airport. Almost a decade later, in 1994, the greenhouse surface reached 1,274 hectares, reaching 1,653 hectares at the end of the Nineties and 2,251 hectares in 2003, going from 4% of the area of the municipality at the beginning of the Nineties to 8.5% in 2003.

Intensive agriculture in the municipality of Níjar has also undergone a similar growth over the last two decades. In this respect, whilst in 1984 the estimate was 575 hectares of greenhouses, mainly distributed around the towns of San Isidro and Campohermoso, in 1995 the area of greenhouses grew to 2,182 hectares, reaching Ruescas and Barranquete. This evolution continues, in such a way that in 2003, 3,639 hectares of greenhouse were reached in this municipality, that means going from 3.6% of the total area of the municipality to the current 6.1%.

An aspect that should be highlighted is the region protection role taken by the Natural Park against the expansion of greenhouses (**Map 9**). In this respect, when the Cabo de Gata area was declared a Natural Park in 1987, there was no pressure on the areas of land that had hardly been cultivated due to the lack of water and the low profitability of the non-irrigation crops. In the PORN approved in 1994, the presence of some existing greenhouses was admitted, and some areas of the protected area were classified for agricultural uses,

Nowadays there is great pressure by the farmers to reduce the protection of a large area of the Natural Park, a decrease opposed by the tourist businesses and environmentalist groups. The Cabo de Gata-Níjar Natural Park PORN includes an approximate surface of 591 hectares for the installation of greenhouses in areas environmentally classified as intensive agricultural areas (D3 protection level), whilst the real area of greenhouses is 177.6 hectares (**Chart 24**), representing 30% of the total planned area for intensive greenhouse agriculture.

**Chart 24. Distribution of the surface dedicated to intensive agriculture in the Cabo de Gata-Níjar Natural Park**

Municipalities	Area	Planned area (ha)	Area of Greenhouses (ha)	Greenhouse surface (% of the total)
Almería	Mazarrulleque	45.9	42.75	93.14%
	Pujaira-Cabo	95.96	10	10.42%
Níjar	Los Martínez	58.28	25	42.9%
	El Jálí	180.33	10	5.5%
	El Caballón	109.76	30	27.33%
	Los Murcias	11.38	11.38	100%
Carboneras	Argamasón	77.92	48.5	62.24%
	El Albadinar	11.88	89.80	0%
<b>Total</b>		<b>591.41</b>	<b>177.63</b>	<b>30.04%</b>

Source: Drafted from data from the Regional Ministry for the Environment. 2003.

In summary, the relevance of this modality of agriculture is based on the high income it generates and on the environmental and landscape impact generated. Nevertheless, the income does not compensate the environmental impacts generated, and according to recent estimates, the evolution of the performance internal rates of the greenhouses in Almería is decreasing, as can be seen in **Chart 25**.

**Chart 25. Evolution of the performance internal rates (TIR) in the greenhouses of Almería**

Concept	90/91 campaign	93/94 Campaign	98/99 Campaign
Investment	18,150,000	24,850,000	40,000,000
Current expenses	2,920,000	3,410,000	4,250,000
Income	6,050,000	7,000,000	6,720,000
TIR	16.5%	3.3%	2.1%

Source: López Gálvez et al, 2000.

The impact derived from intensive irrigation agriculture such as the high consumption of water or the contamination by the use of phytosanitary products and fertilizers, those derived from the use and maintenance of the greenhouses have to be added, as well as the impact on the landscape. The massive use of greenhouses in the region has become a considerable source of waste, such as plastic, vegetal and phytosanitary containers that are very difficult to degrade.

The waste of this agriculture is abandoned in watercourses, irrigation channels or near the greenhouses, causing atmospheric pollution problems in the case of indiscriminate burning of containers and plastics that also pollute the surface water (irrigation ditches, lagoons) and underground aquifers. At the same time, the soil is polluted and vegetation communities altered, as a consequence of the indiscriminate appearance of uncontrolled dumps, seriously affecting the landscape.

### **Map 9. Greenhouse areas**

Greenhouses are very important in the municipalities of Almería and Níjar. At the same time over the past two decades these have been the municipalities experiencing greater growth of this type of agriculture in the scope of the study.

#### **Cartographic sources:**

##### ***Basic cartography:***

. *Digital topographic map of Andalusia 1:100.000. Regional Public Works and Transports Ministry. Junta de Andalucía.*

. *Map of Soil Coverage and Use, 1999.*

**Map 9.** Greenhouse areas



### *The open-air irrigation agriculture*

In the northern part of the area of study, the type of intensive agriculture is open air or semi protected (micro tunnels or windbreaker netting), mainly specialised in the cultivation of lettuce, both in Pulpí as well as in Cuevas del Almanzora. The fact that the greenhouses have not become widespread in this area is due to the fact that the exploitations in this region are bigger than those in the Níjar area, and to the scale economy; the farmers prefer open-air agriculture on large farms. Nevertheless, there is a clear tendency towards a sustainable increase in the building of greenhouses, and in general, of the irrigation surface (**Map 10**).

We should also add that the construction of the Cueva de Lamanzora reservoir has made an outstanding contribution to the development of this crop, with such a demand for water in a basin where aridity is the most important feature of the same. Nevertheless, we should also consider another element in the configuration of this model of irrigation. We refer to lagoons that are used to supplement the reservoir water, or the distribution network of the Irrigation Communities, as well as by the supply of well water or the Tajo-Segura water transfer.

The main environmental effects of these intensive agricultural practices on the environment, apart from the overexploitation of the aquifers, are related to the treatment of the crops with phytosanitary products and fertilizers. Due to their large extension, this impact is of vital importance in the case of the horticultural crops, and more specifically in the case of lettuce.

The phytosanitary products usually used are plaguicides, to combat the parasites and illnesses of the plants, and herbicides to prevent the growing of certain undesirable species. The application of this type of product has serious problems of soil and water contamination due to their persistence and that of their metabolites, as well as to their toxicity.

After the application of phytosanitary products in the crops, part of them is transferred to the soil, where they stay. The persistence of these products and their metabolites in the soil have very negative effects on the micro fauna and flora communities of the soil, causing disequilibrium in the trophic chain due to their immediate toxicity or due to bioaccumulation processes. At the same time, they affect the texture of the soil increasing their permeability, increasing the risk of contamination of the groundwater and favouring the erosion and soil degrading processes.

At the same time, one of the biggest problems of the use of phytosanitary products in the scope of the study takes place when, in lixivate processes, these products percolate the groundwater and reach aquifers or rivers, polluting these.

On the other hand, the uncontrolled use of fertilizers, such as chemical products providing the necessary nutrients for the growing of plants, causes soil salinisation and the contamination of water by nitrogenised and phosphated ions. The nitrates and nitrites, diluted in the soil solution, are absorbed by this, and when the water supply increases and exceeds the retention capacity of the soil, the nitrogenised ions and phosphates are taken from the soil, by means of the irrigation water or rainfall, to surface or under ground rivers, a fact generating serious eutrophisation processes in the aquifers of the scope of the study.

**Map 10. Irrigation areas**

Most irrigation agriculture is located in the municipalities of the North of Levante de Almería, which are Pulpí, Cuevas del Almanzora, Vera and Mojácar. The cultivation of lettuce is the most widespread activity.

**Cartographic sources:**

**Basic cartography:**

. Digital topographic map of Andalusia 1:100.000. Regional Public Works and Transports Ministry. Junta de Andalucía.

. Map of Soil Coverage and Use, 1999.

**Map 10.**      **Irrigation areas**



### ***Organic agriculture***

As an alternative to intensive agriculture, some integrated and organic agriculture initiatives are being carried out, although very few and far between. In 2003, according to the data of the Regional Ministry for the Environment of the Junta de Andalucía, 529 hectares destined to organic agriculture were accounted for. Almost all the organic agriculture surface of Levante de Almería is concentrated in the municipality Níjar, which has 450 hectares of this type of agriculture, and, to a lesser degree, in that of Almería, with less than 80 hectares.

Most of the organic agricultural exploitations are of a horticultural nature, that substitute the conventional intensive horticultural use of these exploitations, which, as mentioned before, caused serious problems in waste and vegetable products disposal, as well as in the elimination of the artificial substratum waste (rock wool), unsolved for the moment. The organic agricultural exploitations provide products such as tomatoes, cherry tomatoes, aubergines or courgettes. Some of them also market their own products, which increases the local added value.

### ***The agricultural auxiliary industry***

The economic importance of intensive agriculture is not limited to the agricultural importance, but, supported on this sector, a group of industrial and service activities have arisen, enriching the productive system and making up a paradigmatic example of a local production system of the 'cluster' type.

Amongst the activities making up this cluster we should highlight the handling and marketing of the horticultural production and transport, providing 58.6% of the added value and 73% of employment in the cluster. Also part of the financial system linked with the cluster we have the construction of greenhouses, as well as the building sector activities. In fact, the strictly industrial activities are only 7.5% of the added value of the auxiliary industry.

There is a high degree of heterogeneity in the origin of the industrial supplies as the variables encouraging the purchase of certain products do not only correspond to the proximity or price, justified, in many cases, by the inexistence of the product in the province, tradition or the suppliers diversification policy. Nevertheless, the chains generated by the commercial activity have strong effects (on income and employment) on the productive system group as many companies (mainly those in the carton and plastic containers and packaging, machinery and transport sector) have been set up to meet the demands of the intermediate consumption of the handling and marketing companies.

Throughout time the companies have been undergoing great changes both in organisation as well as in the processes related to the handling. Thus, these companies have been gradually mechanising their production stages, such as the classification (by size and colour), banding, and internal transport of merchandise, amongst others.

That is why the importance of the industrial activity around the intensive agriculture should not be exaggerated, as the industry installed is not of a great technological complexity, has scarce entry barriers, its products are mainly non-differential and has significant scale economies, the price being the most determining factor for competitiveness.

The mentioned features introduce certain weakness in the system, as, although the industrial activities generate added value and employment in the province, and cooperate in the creation of an industrial climate as well as in technological learning processes that can generate mechanisms for the setting up of new activities of inclusion of production innovations, not all the benefits in the expansion of the local productive system are reverted, they do not usually carry out the most qualified activities (R&D and strategic planning) in the province, and could change their location depending on the evolution of the market.

There are many small-sized companies in the system, although in the relevant activities (handling, marketing of vegetables, transport and financial system) companies of a considerable size also participate, and others (IT services) are consolidating themselves as medium-sized companies.

The complexity and wide range of activities carried out by this auxiliary industry has favoured the project for the creation of a specific business-industrial estate, to be used as excellent productive area where the training, research and development activities for the local innovation (R&DI) and joint marketing of the sector companies is grouped together. Currently, the building of the Innovation and Technology Park of Almería is being projected.

### **2.3.2.3. Livestock**

Livestock is a deeply rooted economic activity in certain municipalities of the scope of the study. This activity has evolved from survival livestock breeding integrated with traditional agriculture to a livestock more dependent on fodder and specific crops for this activity.

Since the late Eighties, livestock has undergone considerable growth in the number of animals and a decrease in the number of livestock breeders, in an attempt to make the livestock exploitations more profitable by means of making them bigger. In this respect, from 1989 to 1999, the number of animals doubled in the municipalities in the scope of the study, going from almost 15,250 to 34,500 animals. **(Chart 26)**. The biggest increase was in the pig herds,

which almost multiplied the number of pigs by three. Considerable growth was also experienced by the ovine (153%) and poultry exploitations (94%).

Currently, the municipality with the biggest volume of animals in the scope of the study is Pulpí, followed by Cuevas del Almanzora, Níjar, Almería and Vera. Other municipalities such as Garrucha, Mojácar and Carboneras have very small numbers.

**Chart 26. Evolution of livestock between 1989 and 1999 (animals)**

Municipalities	Bovine		Ovine		Goats		Pigs		Poultry		Total	
	1989	1999	1989	1999	1989	1999	1989	1999	1989	1999	1989	1999
Almería	602	1,050	121	198	132	69	99	213	132	322	1,086	1,852
Carboneras	0	0	3	8	27	76	59	20	6	1	95	105
Cuevas del Almanzora	203	148	364	611	218	284	1,239	5,707	44	35	2,068	6,785
Garrucha	0	0	0	130	0	36	0	267	0	0	0	433
Mojácar	0	2	71	51	41	122	36	51	1	0	149	226
Níjar	187	52	1,582	2,127	554	437	2,116	1,205	544	1,232	4,983	5,053
Pulpí	0	42	182	631	125	97	5,701	18,032	126	170	6,134	18,972
Vera	16	0	310	296	246	145	103	768	52	1	727	1,210
<b>Total</b>	<b>1,008</b>	<b>1,294</b>	<b>2,633</b>	<b>4,052</b>	<b>1,343</b>	<b>1,266</b>	<b>9,353</b>	<b>26,263</b>	<b>905</b>	<b>1,761</b>	<b>15,242</b>	<b>34,636</b>

Source: SIMA, 2005

The pig livestock is the most extended in the scope of the study. In accordance with the livestock census of 1999, in the municipality of Pulpí the pig herds were the most popular, with almost 70,000 heads (**Chart 27**). After this municipality, Cuevas del Almanzora, Vera and Níjar, with a number higher than 3,600 heads.

The greater part of the pig exploitations belong to large producers, but also to family exploitations that normally work together an integrated system with other companies. The integration system consists, on the one hand, of the provision of newly born animals and enough food by the large company, and on the other in the looking after and fattening of the animals by the farmers. Then, the company collects and transports the animals to their own abattoirs, usually located in Murcia, thus the greater part of the added value derived from the transformation and commercialisation of these products is outside the region.

In accordance with the Directory of Establishments with economic activity in Andalusia, in 2003 there were only three abattoirs: two of them for the slaughtering of the cattle and meat preservation, located in the municipalities of Pulpí and Almería; and the third, located in Almería, for the slaughter of poultry.

**Chart 27. Type of livestock (heads), 1999**

Municipalities	Bovine	Ovine	Goats	Pigs	Poultry	Horses
Almería	1,438	1,976	691	761	40,523	88
Carboneras	0	77	762	42	50	6
Cuevas del Almanzora	208	6,113	2,849	1,890	5,052	20
Garrucha	0	1,299	356	1,303	10	0
Mojácar	4	514	1,217	103	0	3
Níjar	67	21,273	4,378	3,609	82,715	36
Pulpí	105	6,306	969	69,225	17,630	20

Vera	0	2,961	1,451	3,685	50	9
<b>Total</b>	<b>1,822</b>	<b>40,519</b>	<b>12,673</b>	<b>97,631</b>	<b>146,030</b>	<b>182</b>

Source: Livestock Census in 1999. SIMA, 2005

The pig herds have a great potential to diversify the production system of these municipalities as they have certain competitive advantages, such as the availability of qualified personnel, a viability demonstrated by successful examples nearby (such as those in Huércal-Overa) and a real and constant demand.

Nevertheless, the environmental impact of the pig exploitations is very high. The main polluting agent is the liquid manure effluent, the liquid stage of the manure consisting of droppings, urine and bedding, which requires appropriate environmental management. In fact, the liquid manure effluent disposal to the river beds increases the consumption of oxygen of the water, favouring anaerobic decomposition and causing problems of eutrophication, which in an extreme case can give rise to the disappearance of aquatic species. Additionally, the water is no longer fit for human consumption. In the cases where these are disposed of directly into the soil, these block the pores of the land causing run-offs and puddles.

Another of the problems caused by this type of exploitation is the release of strong odour due to the decomposition of the droppings, which can cause considerable discomfort to nearby towns. At the same time, in the case of exploitations with a large number of animals, considerable amounts of ammonia and methane are released to the atmosphere.

Therefore, the carrying out of said activity requires measures to reduce or eliminate said impact, by means of installations for the treatment and purification of the liquid manure effluent, control of waste disposal, as well as compliance with the health conditions established to avoid the transmission of illnesses and release of pathogen agents.

On the other hand, the hygiene-health requirement of the exploitations of the goat herds over the past few decades, together with the requirement for pasture that these animals need for their feeding, has been translated into an increase in the sheep as opposed to the goats, which is better controlled in agricultural areas and is more profitable for the farmers. The sheep herds reach their highest numbers in the municipality of Níjar, with more than half of the heads of sheep in the scope of the study. It is also of importance in the municipalities of Cuevas del Almanzora, Pulpí and Vera. The profitability of this type of exploitation is based on the sale of meat to intermediaries, who undertake its marketing especially in the markets of Baza, Murcia and Catalonia.

The goat sector is of importance in the municipality of Níjar, having almost the third part of all the heads, as well as in the municipalities of Cuevas del Almanzora, Vera and Mojácar. A high number of goat exploitations are family businesses, with less than 200 heads per exploitation, the profits of these exploitations being based on the sales of milk to large milk companies. The

marketing of the milk is carried out through a cooperative located in the nearby municipality of Taberno.

The price of goat milk varies depending on the months of the year and the fat content, thus the profits obtained by the farmers in the sale of the milk vary, and the carrying out of this activity becomes unprofitable. Nevertheless, both the small size of the exploitations and the manual milking still carried out are resources to be taken into account in order to make this activity profitable, by means of the promotion of agro-tourist practices, as well as the manual production of food products for their sale.

Regarding the horse sector, we should highlight that although it hardly exceeds 180 heads in the scope of the study, over the past few years private companies have carried out successful experiments related to the renting of horses as a supplementary activity to the tourist stays. At the same time, the fact that this activity has on occasions been carried out by hotel owners, shows that these initiatives, apart from being economically viable, produce profitable synergy effects between both sectors.

### ***Livestock in Cabo de Gata-Níjar Natural Park***

Within the Natural Park, the livestock exploitations are small in size, with less than 250 heads. The farmers usually hire the pastures, although need to supplement the diet for the cattle with alfalfa, barley, straw and sunflower. At the same time, the animals have to be slaughtered at an early age as the harshness of the environmental conditions causes considerable attrition in the cattle. This factor is added to the previous ones when reducing the profitability of this type of exploitation. Nevertheless, livestock production in the protected natural area provides certain competitive advantages than can be used when designing a marketing strategy of the products of the scope of the study, amongst which, that of being classified as organic. In this respect, an effort should be carried out to provide these municipalities with the necessary means for the transformation and marketing of their products in the region. At the same time, it would be advisable to improve the marketing and communication channels of the local livestock products by means of quality certificates reinforcing the image of quality associated with the protected natural area, in order to take local advantage of the added value that differentiated and quality products have for the consumers.

### ***Livestock transformation industry***

The livestock transformation industry or the meat industry has a small percentage of the total industries in the scope of the study. This is partly due to the existence of a local production system around the intensive pig farms in the nearby region of Huércal-Overa. In any event, the meat industry transformation sub sector in the scope of the study represents a very small percentage of the pig potential of the province.

From the carrying out of this activity a series of changes in the environment have to be considered. These are, mainly, the consumption of water in the processing and cleaning processes, the disposal of waste water with a high organic content and blood effluents, that have to be stored in tanks, as well as the contracting of an authorised handling company to transport them and carry out a specific follow-up. With respect to waste disposal, the European Health regulation obliges this type of industry to dispose waste by means of purification. As a consequence, the industrial premises should have the appropriate equipment such as, for example homogenisation systems or activated sludge treatment plants.

#### **2.3.2.4. Fishery**

Andalusia has a long fishing tradition. Of the more than 875 km of coast in Andalusia, Almería has 226 km, the fishing activity being centred on the coast and traditional fishing in nearby fishing grounds, such as that of the Alboran Sea or Moroccan fishing grounds. The fact of having a small-sized fleet prevents most of the Almería boats from fishing in other areas such as the Atlantic platform or grounds further away (**Map 11**).

The fleet fishing on the Almería coast, especially that of the port of Almería, is very modern, above all due to the aid of the Andalusian Fishing Sector Modernisation Plan, promoted by the Regional Agriculture and Fishing Ministry in 1996 and re-programmed until 2006. This Plan has provided an important renovation of the fleet, which has contributed to a decrease in the number of sailors needed for the fishing activity. The result of this technological modernisation has been a large size fleet, having the high use of fuel as a negative aspect.

The prohibition of fishing in Moroccan waters as from 1999 has involved a considerable decrease of the fleet essentially dedicated to purse seining (anchovy and sardines), trawling and long line fishing (red tuna fish and sword fish). At the same time, the difficulty in accessing the nearby fishing grounds and the decrease of the real value of the fish, as a consequence of the liberalisation process of the markets, have had, as a consequence, the loss of the economic importance and capacity for generating local employment of the fishing activity of Levante de Almería.

The most frequent fishing modalities in the scope of the study are the following:

- Trawling. This modality can be carried out both by boats only weighing a few tonnes as well as by heavier boats, and is used for fishing species living near the seabed. Depth trawling is the most used in the area as the blue-and-red shrimp is fished. This fishing modality is one of the most devastating due to the rich biodiversity living on the seabed amongst which breeding areas should be highlighted, essential for the future fishing industry. At the same time, the trawler fleets have high energy costs, as they are those consuming most fuel, making it in a highly polluting fishing method.
- Long line fishing. This fishing modality is the one used for fishing swordfish and the red tuna, and is very aggressive for some marine birds, reptiles and fish.

- Purse seining. This is used for the fishing of large number of fish swimming in banks, such as sardines, mackerel and anchovies.
- Small fishing equipment. Used by boats of less than 12 metres in length. The most frequent ones are dredge fishing, trammel net fishing, basket trap fishing, gill net fishing, outrigger fishing, and small purse seining.



### **Map 11. Ports and Fishing Grounds**

Levante de Almería has various commercial, fishing ports and marinas, located in the municipalities of Cuevas del Almanzora, Garrucha, Carboneras, Níjar and Almería. The fishing activity is carried out in the fishing grounds nearest to the coast such as, for example, that of the Alboran Sea and the Moroccan fishing grounds.

#### **Cartographic sources:**

##### **Basic cartography:**

*Digital topographic map of Andalusia 1:100.000. Regional Public Works and Transports Ministry. Junta de Andalucía.*

**Plastic shading:** *Digital model of elevations of Andalusia 100 metres Regional Public Works and Transports Ministry. Junta de Andalucía.*

**Map 11.** Ports and Fishing grounds



Photo 17: “Palangre” fishing boat

The scope of study has the following fishing port infrastructure: Ports of Almería, Carboneras, Garrucha and Villaricos, as well as a minor base in La Isleta del Moro in Cabo de Gata-Níjar Natural Park, which, although maintaining the activity of its fleet, does not have a fishing refuge. Fishing is carried out by authorised boats that have their moorings in the ports of Almería or Carboneras. Additionally, the San José marina is also where some smaller fishing boats dedicated to traditional fishing are moored. The fleets of each of the mentioned ports are specialised in the use of various fishing methods (**Chart 28**).

The Port of Almería, due to its large capacity, consists of almost half of the fishing fleet of the scope of the study. The most popular method is trawling and the estimated direct employment generated by the Almería port is about 1,100 jobs.

The Carboneras fleet is specialised in long-line surface fishing, mainly fishing swordfish. The long-line fleet of this municipality covers a multitude of Mediterranean fishing grounds. For this reason, this species is both sold in Carboneras fish market as well as in other Mediterranean coastal towns, such as Calpe, Vinaroz and Altea, in the province of Alicante, San Pedro del Pinatar and Cartagena in Murcia, Portocolom in Mallorca and Las Palmas de Gran Canaria. The Carboneras fleet is estimated to be 712 sailors, of which more than 60% work in the long-line modality.

**Chart 28. Characterisation of fishing in East, 2003**

Port	Types of fishing	Number of boats	Estimated crew
Almería	Trawling	60	472
	Purse seining	35	404
	Dredge fishing	4	11
	Long-line surface fishing	7	89
	Small fishing equipment	37	137
	Subtotal	143	1.113
Carboneras	Trawling	6	51
	Purse seining	16	176
	Long-line surface fishing	33	447
	Small fishing equipment	11	38
	Subtotal	66	712
Garrucha	Trawling	36	297
	Purse seining	4	36
	Long-line surface fishing	11	105
	Dredge fishing	21	56
	Small fishing equipment	15	42
	Subtotal	87	536
Villaricos (Cuevas del Almanzora)	Trawling	1	
	Small fishing equipment	8	
	Subtotal	9	Not available
<b>Total</b>		<b>305</b>	<b>2.361</b>

Source: Agriculture and Fishery Development. Regional Agriculture and Fishing Ministry, 2004

In Garrucha port the most popular is the trawler fleet, that fishes blue-and-red shrimp, a highly sought-after species in the area due to its high price in the market, as well as dredge fishing and traditional fishing modalities. The greater part of the fleet fishes in fishing grounds of the Alboran Sea, near Carboneras, opposite Mesa Roldan, which allows the boats to return home in the same day. Fishing is a traditional activity in this locality, with strong social ties. In fact, Garrucha has had a fishing port since the Thirties, and it currently generates around 550 direct jobs. Additionally, going together with this activity there is a wide range of restaurants with a sustained demand, above all during the months of summer.

The Villaricos la Isleta del Moro ports has a fleet made up by family boats where traditional fishing is the most popular. These boats completely depend on the condition of the fishing grounds, and their capacity to react to the exhaustion of the fishing grounds is very low. Nevertheless, this type of fishing has a high social and ethnographic content recommending its conservation and maintenance.

Photo 18: Garrucha Harbour

In Cabo de Gata there is a marine reserve area where a small number of traditional fishing boats are authorised to fish although, in spite of having their mooring in the ports of Almería, Carboneras and Garrucha, usually moor on the Natural Park beaches. At the same time, there are many small boats distributed throughout the Natural Park coast, with a mainly sports nature, or used by retired fishermen, the fish is used for their own consumption or supplementary family support. This type of boat is mainly found in the Port of San José, Las Negras and the Los Escullos pier. All these are also moored on the beach except those of the Port of San José, where mooring buoys are rented.

### **Aquaculture**

There are various aquaculture companies in the scope of the study, above all in the municipality of Carboneras. Apart from the marine aquaculture practices in cages, there are some exploitation farms in the area dedicated to the breeding of young fish for other exploitations or fattening fish farms in tanks. The impacts of marine aquaculture are mainly derived from the concentration of a large number of individuals in a small space: emission of organic waste, release of diluted nutrients, use of antibiotics, spreading of illnesses, etc. The impacts of the fish farms and the installations for breeding young fish are due to the direct discharge of effluents to the sea, with the subsequent eutrophication of the discharge areas, the appearance of undesirable species and the disappearance of endemic species. We should

also highlight that this type of activity conflicts with other coastal production activities: fishing, leisure, industrial and navigation activities, amongst others.

### 2.3.2.5. Industrial activity

The industrial activity in the municipalities of Levante de Almería is characterised, in general terms, by having little importance compared to other sectors such as the service, building, agriculture and fishing sectors. At the same time, from 1991 to 2001 shows a marked slowdown in the evolution of the employed population in industry, which has been reduced to 22% in the municipalities in the scope of the study (**Chart 29**). Nevertheless, some of these municipalities have a very different dynamism, such as, for example, Carboneras and Pulpí, which increased their employed population in industry by more than 20% in that same period.

**Chart 29. Evolution of the population employed in industry**

Municipalities	Evolution between 1991 and 2001
Almería	-28.44%
Carboneras	24.32%
Cuevas del Almanzora	-19.91%
Garrucha	-10.22%
Mojácar	-18.39%
Níjar	-4.31%
Pulpí	21.43%
Vera	-6.80%
<b>Total</b>	<b>-21.82%</b>

Source: INE: Population and Housing census of 2001

The importance of the industrial sector in Carboneras can also be seen in the evolution of the consumption of electricity by sectors (**Chart 30**), which is a good indication of the municipal productive activity. In 2003 the industrial consumption of Carboneras (130,729 Mw/h) and Cuevas del Almanzora (48,000 Mw/h) were the highest in all the municipalities in the scope of the study, making up, in the case of Carboneras, more than half of the total industrial consumption.

This fact can be explained, amongst other causes, by the presence in both municipalities of large companies such as the Endesa Almería Coastal Thermal Power Station, the Interpanel manufacturing company of plasterboard panels and the cement manufacturer Holcim, in Carboneras, or the DMS-Deretil subsidiary in Cuevas del Almanzora.

In the municipalities of Níjar, Almería, Pulpí and Vera the consumption is much lower, being less, in all the cases, than 20,000 Mw/h. Garrucha and Mojácar have the lowest industrial consumption of electricity.

**Chart 30. Consumption of electricity by sectors (Mw/h), 2003**

Municipalities	Agriculture	Industry	Commerce-Services	Residence	Administration and Public Services	Rest	Total municipal
Almería	14,640	9,854	151,680	205,571	80,370	7,484	469,599
Carboneras	1,218	130,729	4,416	980	18,893	15,354	171,590
Cuevas del Almanzora	9,616	48,235	6,633	9,250	11,644	16,129	101,507
Garrucha	395	199	5,889	6,886	1,207	347	14,923
Mojácar	1,142	679	21,958	16,430	2,879	3,053	46,141
Níjar	33,562	19,393	19,288	22,599	6,092	4,610	105,544
Pulpí	22,885	2,349	8,040	9,214	6,057	387	48,932
Vera	1,852	1,266	19,128	19,310	4,231	1,073	46,860
<b>Total sectors</b>	<b>85,310</b>	<b>212,704</b>	<b>237,032</b>	<b>290,240</b>	<b>131,373</b>	<b>48,437</b>	<b>1,005,096</b>
<b>% sectors</b>	<b>8.48</b>	<b>21.16</b>	<b>23.58</b>	<b>28.87</b>	<b>13.1</b>	<b>4.81</b>	<b>100</b>

Source: Andalusia Statistics Institute, 2003

In the industrial sector various activity sub sectors can be differentiated and of different importance in the scope of the study. In accordance with the Directory of Establishments with Economic Activity in Andalusia, in 2003, the number of industrial premises exceeded 13,800, of which approximately 99% correspond to the manufacturing industry. The activities related to the mining industry and the basic industry is almost 0.4% of the total of companies of that year (Chart 31).

**Chart 31. Number of industrial premises in Levante de Almería**

Municipalities	Mining industry	Manufacturing industry	Basic industry	Total
Almería	10	9,404	13	9,427
Carboneras	2	399	7	408
Cuevas del Almanzora	3	651	2	656
Garrucha	0	451	0	451
Mojácar	2	612	0	614
Níjar	1	1,175	6	1,182
Pulpí	1	426	2	429
Vera	2	671	4	677
<b>Total</b>	<b>21</b>	<b>13,789</b>	<b>34</b>	<b>13,844</b>
<b>%</b>	<b>0.15</b>	<b>99.6</b>	<b>0.25</b>	<b>100</b>

Source: Directory of Establishments with Economic Activity in Andalusia, 2003

Practically half the premises of the mining industry are located in the municipality of Almería, the other half being spread out over the rest of the municipalities of the scope of the study, except in Garrucha. The material extracted is of various natures: clay and kaolin, gravel and sand, gypsum, stones for construction, slates and iron minerals, amongst others. Although the premises dedicated to this mining activity are a small percentage of the total, the exploitation of these materials causes important alterations in the landscape and the natural resources

present in the area. The greater part of them is mainly derived from the mining of the first layers of the land, which is translated into a definite loss of the organic soil, destruction of the vegetation and impoverishment of the soil. At the same time, it pollutes aquifers and river basins, there are emissions of dust and particles in suspension, together with a high degree of visual impact.

The basic industry in the scope of the study is made up by companies dedicated to the collection, purification and distribution of water; distribution of electricity; as well as the production of thermal energy, gas and other types of energy. These companies are located in the municipalities of Carboneras, Cuevas del Almanzora, Níjar, Pulpí and Vera, although mostly are in the city of Almería. As mining industries, a large percentage of these are SME's with less than 19 employees, although a good part of them have between 20 and 50 employees. Only the Almería Endesa Coastal Thermal Power Station in Carboneras has more than a hundred employees.

The manufacturing industry is present in the eight municipalities of Levante de Almería, although, as in the rest, they are more frequent in Almería where more than half of them are based, fruit of the great demand of products generated to supply the needs of the provincial capital population (**Chart 32**).

**Chart 32. Number of premises in the manufacturing industry, 2003**

Municipality /Sector	Almería	Carbonera	Cuevas del Almanzora	Garrucha	Mojácar	Níjar	Pulpí	Vera	Total per sector	total % per sector
Food and agricultural industry	58	8	7	7	1	25	8	7	121	15.96
Confectioning, leather and shoe textile industry	40	0	1	0	1	3	1	1	47	6.2
Wood and cork industry	30	3	5	4	4	10	0	3	60	7.91
Paper and graphic arts industry	59	0	4	4	9	3	0	4	83	10.94
Chemical industry	10	0	2	0	0	3	1	0	16	2.11
Rubber and plastic material industry	8	0	0	0	0	1	0	0	9	1.18
Manufacturing of non-metal mineral products	23	7	15	3	6	22	3	8	87	11.47
Metallurgy and manufacturing of metal products	67	6	14	1	1	27	11	7	134	17.67
Manufacturing of machinery, electric, electronic and optical equipment industry	57	2	1	4	0	3	1	5	73	9.63
Manufacture of transport material	16	4	4	6	1	3	1	1	33	4.35
Other manufacturing industries	81	2	1	2	2	5	0	2	95	12.58
% of the municipal total	59	4.3	7.1	4.1	3.3	13.8	3.4	5	-	100
Total per municipality	449	32	54	31	25	105	26	38	758	-

*Source: Directory of Establishments with Economic Activity in Andalusia, 2003*

This is a very heterogeneous industry made up by a variety of productive activities, amongst which, in accordance with the number of companies, we can highlight the following: the metallurgy and manufacturing of other metal products (17.67%), food and agriculture industry (15.96%), other manufacturing industries dedicated to the manufacture of furniture, jewellery and imitation jewellery (12.58%), manufacturing of non-metal mineral products (11.47%) and the paper and graphic arts industry (10.94%).

In general, we can state that the manufacturing industry has a much diversified business basis and with certain spatial distribution in the municipalities of the region, although almost 60% of the manufacturing premises are based in the provincial capital, Nijar has 14% of this type of premises.

One of the main weaknesses of the business basis is the low technological level of some of the premises. At the same time the small capacity of adaptation of the companies to the changing needs of the market have a negative effect on their competitiveness, sometimes due to insufficient information and training of the business people, and the little territorial offer available with advanced services for the support of small and medium enterprises.

### *The energy industry*

In 2003 there were seventeen premises related to the production and distribution of electric, thermal, gas and other types of energy within the scope of the study. Of these premises, nine of them, located in the municipalities of Almería, Carboneras, Cuevas del Almanzora and Nijar, were involved in the distribution of electricity, and six of them of the production of other energies. The two other are a gas production and distribution of company in Almería, and the Coast Thermal Power Station in Carboneras (**Chart 33**). The number of total employees of these companies is less than 20 employees, with the exception of the Almería Coast Thermal Power Station that has more than one hundred.

**Chart 33. Number of premises of the energy industry, 2003**

Activity	Municipalities	Number of premises	Number of premises per activity	Number of employees
Distribution of electricity	Almería	4	9	From 6 to 19
	Carboneras	1		From 6 to 19
	Cuevas del Almanzora	1		From 0 to 5
	Nijar	3		From 0 to 5
Thermal energy production	Carboneras	1	1	100 and more
Gas production; distribution of gas fuel by urban conduits, except gas ducts	Almería	1	1	From 0 to 5
Production of other energies	Almería	1	6	With no known employment
	Carboneras	5		5

Total		17	17	-
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Source: Directory of Premises with Economic Activity in Andalusia, 2003

The Almería Coast Thermal Power Station belonging to the Endesa group, started working in 1984 with two groups of powdered coal that produced 550 Mw at full load. In the late Nineties the power installed was doubled to 1,144 Mw, increasing the plant generation capacity and becoming the biggest production centre of electricity in Andalusia. The increase in the power capacity installed in the power station has caused many complaints and demonstrations by the local population and environmental groups, which have alleged considerable environmental impact derived from the power station activity and its extension.

The type of coal used as fuel in the power station is high-heat power bituminous coal that contributes to considerably reducing SO<sub>2</sub> emissions. Nevertheless, the main perturbations on the environment generated by the power station are a consequence of the burning of the coal, giving rise to releases to the atmosphere of gases contributing to the greenhouse effect, such as NO<sub>x</sub>, CO and CO<sub>2</sub>, as well as dust, and to a lesser degree, heavy metals and organic matter. The dust released and the greater part of the polluting gas and the atmospheric transformation products return to the land via rainfall and dry depositions, impoverishing the quality of the soil, above all in the nearby areas of the power station. At the same time, the chemical properties of the soil can change due to the acid rain, mainly due to the deposition of NO<sub>x</sub> and, to a lesser degree, SO<sub>2</sub> that also affects the groundwater and also the surface water. Another problem of this type of power station is the cooling requirements, as they need to release part of their total thermal power, using, for this purpose, considerable amounts of water that is returned to the marine environment after undergoing a significant thermal change, which can negatively affect the coastal ecosystems. In order not to damage the ecosystems there are usually two levels to be complied with, for the temperature change not to exceed 3°C under any circumstances, and for the total temperature of the water not to reach 30°C at any moment.

When the use of renewable energies is considered in the scope of the study, the greater part of the solar applications in the home sector are limited to the electricity supply of isolated houses with flat solar panels, marketed and installed by small-sized companies.

In the province of Almería there are three companies dedicated to the assembly of large installations of renewable energy connected to the mains, highlighting, amongst them, eight electricity installations of small agricultural exploitations in Sorbas, Lubrín, Tahal and Nacimiento; a photovoltaic plant of Sevillana of the Endesa group installed in María, and the wind farm located in Enix.

On the other hand in the area, as long as there is public and political agreement, offshore wind generators could be installed, as there is a certain potential in these areas.

### **Metallurgy and manufacturing of other metal products**

The metal transformation industry is mainly made up by metal carpentries most of them dedicated to supplying the construction sector, as well as by companies dedicated to the manufacturing of locks and metal fittings, metal structures, die forging and wire production, amongst others. Half of these companies are concentrated in the municipality of Almería (**Chart 34**). The rest is dispersed amongst the rest of municipalities of the scope of the study, the greater number of them being in Níjar due, amongst other reasons, to the great demand for metal structures for the use of greenhouses in agriculture. The metal transformation industry is also important due to its potential for development and generation of employment in the coastal municipalities of Garrucha and Carboneras, where various naval construction and boat repair and maintenance industries are located. Regarding the number of employees in this type of companies, we should highlight that in no case does this exceed 50 employees.

The main environmental impact derived from this type of activity is related to the noise and vibration produced by the machinery in the workshops. In order to correct this, the premises should have noise and vibration insulation systems in order not to exceed the levels of noise emission. Another main negative effect of these companies is the generation of solid waste (mainly, the cuttings resulting from the transformation and handling of the metal), that have to be stored until collected by a specialised company.

**Chart 34. Number of premises of the manufacturing industry, 2003**

Activity	Municipalities	Number of premises	Number of premises per activity	Number of employees
Manufacturing of knives and cutlery, tools and ironmongery	Níjar	2	2	From 0 to 5
Manufacture of metal carpentry	Almería	1	71	From 0 to 5
	Almería	35		107
	Carboneras	2		From 6 to 19
	Cuevas del Almanzora	8		32
	Garrucha	1		From 0 to 5
	Níjar	13		19
	Pulpí	5		23
	Vera	6		22
Manufacture of locks and metal fittings; cisterns, large tanks and metal containers; radiators and boilers for central heating	Almería	1	7	From 0 to 5
	Níjar	5		From 6 to 49
	Cuevas del Almanzora	1		From 6 to 19

(Continued)

Activity	Municipality	Number of premises	Number of premises per activity	Number of employees
Manufacture of metal structures and parts; hand tools; wire products; metal products	Almería	7	18	From 0 to 19
	Carboneras	3		From 20 to 49
	Cuevas del Almanzora	4		From 6 to 49
	Níjar	4		From 6 to 49
Forging, stamping and drawing of metal; powder metallurgy; general mechanical engineering; metal treatment and plating	Almería	13	25	From 0 to 40
	Carboneras	1		From 0 to 5
	Cuevas del Almanzora	1		From 6 to 19
	Mojácar	1		From 0 to 5
	Níjar	3		From 0 to 5
	Pulpí	6		36
<b>TOTAL</b>		<b>134</b>	<b>134</b>	

Source: Directory of Establishments with Economic Activity in Andalusia, 2003

### The food and agriculture industry

The latest data available from the directory of industrial establishments in Andalusia indicates that in 2003 there were 121 food and agriculture companies in the area of study. As can be seen in **Chart 35**, the manufacturing sub sector of other food products consists of 71% of the industrial establishments. This is because the chapter heading includes a wide variety of activities, such as baking of bread and bread products, to the manufacture of sweets (pasta, tarts, cakes, pastries, biscuits or pizzas), both fresh as well as of long durability, as well as the production and refining of sugar, manufacture of confectionary products, food pasta and other products, such as tea or coffee. As is logical the municipalities with a higher population are those with more establishments (Almería and Níjar).

**Chart 35. Number of industrial establishments in the food and agriculture sector**

Activity	Almería	Carboneras	Cuevas del Almanzora	Garrucha	Mojácar	Níjar	Pulpí	Vera	Total	%
Food industry	4		1			5	3	1	14	11.57
Fish	1	2		1					4	3.3
Preparation and conservation of fruits, vegetables	3					3		1	7	5.78
Fat and oil			1						1	0.82
Dairy products	3					1		1	5	4.13
Milling and starch							1		1	0.82
Fodder						1	2		3	2.48
Manufacture of other food products	47	6	5	6	1	15	2	4	86	71.1
<b>Total</b>	<b>58</b>	<b>8</b>	<b>7</b>	<b>7</b>	<b>1</b>	<b>25</b>	<b>8</b>	<b>7</b>	<b>121</b>	<b>100</b>

Source: Directory of Establishments with Economic Activity in Andalusia, 2003

Regarding the impact on the environment of the manufacturing sub sector of other food products, we should highlight that this is very small, as the technology used, mainly electric ovens, hardly generates any impact on the environment. On the other hand, the small size of the sub sector of the preparation and preservation of fruit and vegetable contrasts with the great importance of the fruit and vegetable sector in the region. This fact demonstrates the low level of local transformation.

### *The manufacturing of non-metallic mineral products*

In the scope of this study there are a great number of establishments dedicated to the manufacturing of non-metallic mineral products, most of them related to construction. The growth of this sector is directly linked with the urban development expansion process that the region has been going through over the past years, and that requires large volumes of construction materials. In this respect, we should highlight that in 2003 there were 80 establishments dedicated to the manufacture of construction materials, such as cement, plaster, concrete, bricks, tiles or glass, amongst others (**Chart 36**).

The biggest number of companies is those dedicated to the manufacturing of freshly mixed concrete, concrete elements for construction, other concrete, plaster and cement products, with 35 establishments spread throughout all the municipalities of Levante de Almería. Next, with 25 establishments, those companies cutting, carving and finishing stone also present in all the municipalities of the scope of the study. Apart from these establishments, there are five companies dedicated to the manufacturing of plaster for construction; nine to the manufacture of bricks, tiles, construction products and non-refractory ceramic products; three to the manufacture of glass and a cement factory.

**Chart 36. Number of industrial establishments for the manufacture of non-metallic mineral products**

Activity	Municipalities	Number of establishments	Number of establishments per activity	Number of employees
Cutting, carving and finishing stone	Almería	9	25	48
	Cuevas del Almanzora	4		De 6 to 19
	Garrucha	2		From 6 to 19
	Mojácar	2		From 20 to 49
	Níjar	4		From 6 to 19
	Pulpí	1		From 0 to 5
	Vera	3		From 6 to 19
Manufacturing of domestic use and decoration ceramic articles	Níjar	5	5	12
Manufacturing of cement	Carboneras	1	1	100 and more
Manufacturing of plaster elements for construction	Almería	2	3	From 0 to 5
	Carboneras	1		From 20 to 49

(Continuation)

	Municipalities	Number of establishments		Number of employees
Manufacturing of fresh concrete, concrete elements for construction and other concrete products, plaster and cement	Almería	6	35	From 20 to 49
	Carboneras	4		From 0 to 49
	Cuevas del Almanzora	6		From 6 to 19
	Garrucha	1		From 0 to 5
	Mojácar	4		From 6 to 19
	Níjar	9		From 6 to 19
	Pulpí	2		From 0 to 19
	Vera	4		From 6 to 49
Manufacturing of bricks, tiles, products for construction and non refractory ceramic products	Almería	1	9	From 6 to 19
	Cuevas del Almanzora	4		From 0 to 5
	Níjar	1		From 6 to 19
	Vera	1		From 20 to 49
Manufacturing of flat glass and other types of glass	Almería	3	3	From 0 to 19
<b>Total</b>	-	<b>80</b>	<b>80</b>	-

Source: Directory of Establishments with Economic Activity in Andalusia, 2003

The manufacturing of material for construction generates considerable impact on the environment, which is of special importance in those areas of the scope of the study where the bigger companies are located. This is the case of Carboneras, where there is a plasterboard factory and a cement factory. The environmental impact of these types of industries is the production of large amounts of dust and particles in suspension, which can discomfort the population and deteriorate the land in the nearby areas as its composition is altered. Another important effect derived from these activities is the emission of CO<sub>2</sub>, NO<sub>x</sub> and SO<sub>2</sub>, gases contributing to the greenhouse effect. At the same time, during the obtaining of cement and plaster, considerable levels of noise and waste are generated.

The companies dedicated to the manufacturing of domestic use and decorative ceramic products are not so many, but are of vital importance in the municipality of Níjar, having various types of colours, techniques and formats. In 2003 there were five establishments in this municipality. Over the past few decades, this sector has experienced considerable growth, supplying the demand of domestic use ceramic products. There is a great demand for products for the transport and storage of water, due to the scarcity of springs and other water sources in the region.

**Photo 19: Quarry**



Currently, the greater numbers of establishments present in Níjar are the traditional pottery workshops, where you can see how the products are made. The production of ceramic is basically for decorative and tourist use, the most frequent being the glassy recipients from Níjar made using the local “china do” technique, stamping each product with the identity stamp of Níjar ceramic.

Nevertheless, a great part of these traditional establishments have been disappearing due to various factors, such as the rudimentary techniques used and the competition of other more economical industrial products. Another of the main obstacles preventing the development of this activity is its family nature, rejecting the idea of employed staff, due to the small business volume or not to divulge techniques developed by the family.

***Pharmaceutical chemical industry***

In the chemical industry a number of establishments specialised in the manufacturing of pharmaceutical raw material and of antibiotics can be highlighted, located in the municipalities of Almería, Cuevas del Almanzora and Níjar. In fact, the chemical sector becomes of importance in Cuevas del Almanzora, where a subsidiary of the multinational DSM is located, mainly dedicated to the chemical industry and derived products, and that it is currently the world leading company in the semi-synthetic antibiotics segment.

From the setting up of this company in the Sixties, the impact derived from its activity on marine water, as it is located near the coastline, and the quality of life of the nearby areas of population have provoked a large number of social conflicts. Nevertheless, since halfway through the Nineties, many measures have been taken that have eliminated, compensated or minimised some of these impacts.

Currently, the main impact derived from this type of activity refers to the deterioration of the quality of the air, due to the emission of volatile organic compounds, solvents or inorganic gases, and to the deterioration of marine and groundwater due to the generation of little biodegradable industrial effluents and with a high saline content. At the same time, another of the greater impacts derived from this type of industrial activity is the generation of waste water with high concentrations of nitrogen which is a highly polluting element when found in large proportions.

### 2.3.2.6. Tourism

The tourism sector in the scope of the study is a relatively recent phenomenon compared to tourism in other points of Almería coast (Roquetas de Mar, Almerimar, Aguadulce). The loss of the possible benefits derived from the delay of the tourist activity has been compensated by the conservation of a large part of the coastal area in such a way that the landscape and environmental deterioration that a large part of the Mediterranean coast has suffered has been limited. This fact, together with the declaration of the various protection elements in the scope of the Levante de Almería CAMP project, has encouraged the tourist offer to have, apart from the traditional sun and beach tourism, another type of tourism, that of nature.

In accordance with the diagnosis of Andalusia General Plan Tourism, Levante de Almería is one of the new emerging coastal areas with respect to tourism. Not that tourism was not present, but the growth of the same is in line with the new patterns of a tourist demand, more demanding and interested by diversified and quality products and services.

**Chart 37** shows the considerable increase in the bed availability during 1988-2003. As shown, from 4,643 beds in 1988 there are now 15,889, that is, the area of study has experienced a growth of 242%. Nevertheless, not all the municipalities have had the same increase. In this respect, that registering the greatest increase in hotel beds is that of Vera, increasing by more than 16 in the period mentioned. At the same time, the offer of beds has increased by more than four in the municipalities of Níjar and Mojácar, and by more than two in the municipality of Cuevas del Almanzora. The smaller increases are in Almería and Carboneras, municipalities in which the most important economic activity is not tourism. At the same time, in 2003 the offer of hotel beds was concentrated in the municipality of Mojácar (**Map 12**) that, as has been pointed out, is the main tourism base of Levante de Almería Coast, with 52% of the hotel beds in the scope of the study.

Currently, Mojácar has a tourist offer characterised by a medium-high quality (3 and 4 star hotels, National Parador, quality restaurants and luxury housing developments). In this respect, of a total of 8,214 hotel beds and apartments-hotels, 3,144 are four-star hotels.

**Chart 37. Beds (accommodation) in Levante de Almería. Period 1988-2003.**

Municipalities	Number of beds in apartments		Number of beds in hotels		Number of beds in hotel-apartments		Number of beds in pensions		Total beds		Increase % (1988-2003)	% of the total 2003
	1988	2003	1988	2003	1988	2003	1988	2003	1988	2003		
Almería	120	24	1,225	1,767	0	0	575	368	1,920	2,159	12.45	13.59
Carboneras	236	236	31	103	0	0	140	265	407	604	48.40	3.80
Cuevas del Almanzora	0	112	0	33	0	0	92	173	92	318	245.65	2.00
Garrucha	0	0	156	168	0	0	64	253	220	421	91.36	2.65
Mojácar	0	2,901	1,279	4,427	0	550	230	336	1,509	8,214	444.33	51.70
Níjar	52	93	16	429	12	59	153	746	233	1,327	469.53	8.35
Pulpí	0	91	0	58	0	0	117	119	117	268	129.06	1.69
Vera	0	1,118	0	659	0	758	145	43	145	2,578	1,677.93	16.23
<b>Total</b>	<b>408</b>	<b>4,575</b>	<b>2,707</b>	<b>7,644</b>	<b>12</b>	<b>1,367</b>	<b>1,516</b>	<b>2,303</b>	<b>4,643</b>	<b>15,889</b>	<b>242.21</b>	<b>100.00</b>

Source: IEA. SIMA 2003

Another municipality having an important hotel infrastructure is Vera, having 16% of the hotel beds in the scope of the study. On the coast of the municipality we could highlight the presence of a naturist complex that has encouraged the creation of various naturist installations in the area. At the same time, an aspect to be highlighted is the existence of 2,159 hotel beds in the municipality of Almería, as it is the provincial capital and the tourist offer is that of beach and sun.

One of the tourism features in the scope of the study is its seasonality, which implies a generation of income concentrated in the summer months, together with a considerable increase in the consumption of water and energy during the summer months, as well as the increase in the waste collection services, amongst other aspects.

On the other hand, we should highlight the presence of vacational tourism, different from the previous one, as the stays are not in specialised establishments, but in non-registered apartments or houses, either their own property or rented. Prolonged stays of this type of tourism can be carried out without tourism consumption, strictly speaking, that is to say, without contracting transport, hotel or food in professional establishments. These vacational holidays are very different from the tourist ones, as, strictly speaking, due to the consumption structure the presence of tourist complexes is not essential or not even necessary. The vacational nuclei are pre-existing areas that have been adapting to this type of demand or specific urban developments that sometimes co-exist with the traditional tourist bases, in such a way that there are conflicts due to the different quality requirements of one and the other type of activities.

### **Map 12. Tourism**

The offer of beds is concentrated in Mojácar, which is the municipality with the biggest tourist activity in Levante de Almería. More than half of the tourist beds are those of hotels.

#### **Cartographic sources:**

##### **Basic cartography:**

*Digital topographic map of Andalusia 1:100.000. Regional Public Works and Transports Ministry. Junta de Andalucía.*

**Plastic shading:** *Digital model of elevations of Andalusia 100 metres. Regional Public Works and Transports Ministry. Junta de Andalucía.*

**Map 12.** Tourism



We can reach an approximation to the vacational tourism infrastructure from the Housing and Population Census data. The types of houses used by vacational tourism are *not their main residence*, including secondary and empty houses. In **Chart 38** the number of main residences and non-main residences in the area of study is included. As can be seen, Mojácar can be highlighted with 71.3% of non-main residences, which shows the importance of the municipality for this type of tourism. At the same time, we should highlight Pulpí and Vera with a percentage of around 60%. This data is a reflection of the urban dynamism concentrated in the municipalities of the Northern area, mainly located in the coastal areas of Mojácar-Playa, Vera-Playa and San Juan de los Terreros in Pulpí, apart from other small settlements and coastal developments. The southern area of the scope of the study is not influenced by these dynamisms as it is protected by the Cabo de Gata-Níjar Natural Park, which involves a higher degree of surveillance of the urban development regulations.

**Chart 38. Number of “main” and “non main” residences**

Municipalities	Main	Non main (1)	Percentage of non main residences of the total	Total
Almería	53,930	24,692	31.4%	78.622
Carboneras	2,179	966	30.7%	3.145
Cuevas del Almanzora	3,529	2,350	40.0%	5.879
Garrucha	1,784	1,589	47.1%	3.373
Mojácar	1,813	4,498	71.3%	6.311
Níjar	5,956	3,228	35.1%	9.184
Pulpí	2,011	2,917	59.2%	4.928
Vera	2,372	3,334	58.4%	5.706
<b>Total</b>	<b>73,574</b>	<b>43,574</b>	<b>37.2%</b>	<b>11.7148</b>
<b>Percentage</b>	<b>62.8%</b>	<b>37.2%</b>	<b>--</b>	<b>100%</b>

(1) The number of non main residences includes the secondary ones, empty ones and the rest of the non main ones.

Source: INE. Population and Housing Census, 2001.

For the moment the distribution of this vacational tourism model has not reached a saturation point or continuous occupation levels, which are frequent in other Mediterranean coastal areas, both in Andalusia, Murcia and Levante, and thus there is still time to carry out a regulation of the coast safeguarding sections of the coast with special values, or the promotion of a model guaranteeing a different attractiveness for the coast of Levante de Almería.

Natural aspects such as the orography, water distribution network or heritage (mining, archaeological remains, historical defence buildings, peculiar ecosystems, etc.), can help to configure a different tourism model. The maintenance of the real estate activity is possible with far reaching regulation models that do not involve an excessive consumption of local resources next to the coastline, as they are scarce and impossible to renew. The change in the regulation physical models is imposed as a sustainability requirement for the tourist activities around the coast.

Lastly, another type of tourism present in the scope of the study should be mentioned. This is residential tourism, one of the most frequent ways to use and enjoy the tourist areas. Its main activities are, on the one hand, the duration of the stays, that can become permanent, and on the other hand, the type of houses, that are usually isolated or in a specialised urban developments. Its location guidelines are also different, as the slopes and foot of mountains of the coastal mountain ranges with good views of the coast area or high value landscape icons, with isolated and not dense models are usually preferred over the coastline. This type of tourism is practiced by European Union citizens, mainly British, who show little inclination to socially integrate in their residential destinations. This tourism model is located on the coastal slopes of Mojácar and on Sierra Cabrera slopes, although it is extending further to the North of the scope of the study.

In short, the existence of various tourism types (traditional, vacational and residential), with their special and different characteristics, explains the relative specialisation of the construction sector and the tendency to split into three that is evident in coastal municipalities where these activities are found. At the same time, although not yet continuous, a tendency towards the same is seen, thus a territorial regulation guaranteeing the presence of scenic values such as, for example, the existence of non-urban coastal areas, spaces of interest and well preserved heritage areas.

### **2.3.3. Infrastructures**

#### **Road infrastructures**

The situation of the road infrastructures of the area of the study is right at the southeast end of the Iberian Peninsula, and therefore, at a considerable distance from the main Andalusian population centres and the rest of the country. The main access route by road is the Mediterranean Dual carriageway A7 (N-340) (E-15), connecting Almería capital city with the rest of the Spanish Levant towards the North and with the Mediterranean coast to Malaga towards the Southwest (**Map 13**).

On the other hand, Almería capital city is connected to Granada and the centre of Spain by the South A-92. Another important communication route is the N-340 road connecting Tabernas and the A-92 with the centre of the area of study, near Mojácar, in Los Gallardos.

The greatest deficiencies are found in the local roads and are not due to being insufficient in the degree of infrastructure but to their quality; for example, the road infrastructures are sufficient, but the surfacing, signposting and layout of the roads do not meet the needs of the population in many cases.

There is a railway connection project between Almería with the Spanish Levant as part of the future High Speed network through the Campo de Níjar area. Currently, its route is being studied by the Ministry of Development. This line is being designed to link Almería with the Mediterranean corridor guaranteeing the movement of the population of the area with the nearby areas, as well as the arrival and departure of foreign visitors. At the same time, it will contribute to the considerable goods transport movement.

### ***Airport infrastructure***

Almería airport is one of the main infrastructures with a tourist potential in the scope of the study and in the province of Almería. Located at only 9 kilometres to the east of the capital city, 500 metres from the coast on the Gulf of Almería, to the South of Sierra Alhamilla. From Almería, access to the airport is by the AL-12 road. From this point, the road continues towards Níjar, with only one lane per direction. There are, at the same time, accesses from the A-7 Mediterranean dual carriageway.

The airport has a runway with a maximum capacity of 26 aircraft movements an hour, the aircraft parking area has room for eleven planes. The passenger terminal building, refurbished in 1995, has a capacity of 1,300 passengers an hour, and in August 2002, the new airfreight terminal building started operation. Currently, there are flights to Madrid, Barcelona, Melilla, Palma de Mallorca, as well as various cities in Germany and the United Kingdom. The number of passengers rose from 484,494 in 1992 to 831,000 in 2004, the year when a total of 15,049 aircraft used the airport.

### ***Port infrastructures***

Currently, the main port installations in the scope of the study are located in Almería capital city, Carboneras and Garrucha, although there are others in San José and Villaricos. The most important port by the volume of activity is the Almería Port, managed since 1992 by the Almería-Motril Port Authority. The main activity of the port is commercial, although fishing and sports activities are carried out, the latter carried out by means of a concession to the Club de Mar Almería.

The volume of merchandise in the Almería Port in 2003 reached more than a million tonnes. The main cargos of merchandise are solid bulk, with a movement of 596,663 Tm, representing 46.9% of the total, mainly of plaster, cement, clinker, fertilizers and perlite. The volume of

general cargo in that same year was 517,743 Tm, that is, 40.7% of the total movements. Additionally, the movement of ships dedicated to Ro-Ro transport was (372,732 Tm), fertilizer in sacks (63,068 Tm), rolls of paper (35,518 Tm) and blocked marble (29,409 Tm).

With respect to passengers, 1,093,800 travellers in 2003 were accounted for, following the increasing tendency over the past few years. These results and future expectations are largely due to the improvement experienced by the communications by road of the province of Almería with the outside, the availability of a greater number of ships covering the Almería-Melilla and Almería-Nador lines available to the population, and to the new line with Algeria, which has contributed to improving and favouring the transit of passengers and goods to and from North Africa. At the same time 52 cruisers docked in the Port of Almería with a total of 14,510 passengers in 2003.



### **Map 13. Infrastructures**

Amongst the energy infrastructures the Almería Coastal Thermal Power Station located in Carboneras should be highlighted. The electric energy produced by this power station is distributed by means of three 400 kV lines, towards Murcia and Granada, and by means of another three of 132 kV, crossing the area of the scope of this study.

#### **Cartographic sources:**

##### **Basic cartography:**

*Digital topographic map of Andalusia 1:100.000. Regional Public Works and Transports Ministry. Junta de Andalucía.*

**Plastic shading:** *Digital model of elevations of Andalusia 100 metres. Regional Public Works and Transports Ministry. Junta de Andalucía.*

**Map 13.** Infrastructures



The Port of Carboneras includes the installations of the Hisalba Port, currently Holcim España SA, and the port of Pucarsa, currently Endesa Generación SA. The Holcim installations were opened in 1977 as an exporting port for the cement produced at their factory. The Pucarsa Port was opened in 1982, as an entry point for the coal for the Carboneras Thermal Power Station. Both are private ports, in an administration concession regime, and their control is carried out by the Port Authority of Almería-Motril since 1992.

A total of 3,548,947 Tm of mainly coal reached the Endesa Port in 2003. Nevertheless, other solid bulk cargos such as marble chips, clinker, and bentonite were also loaded. On the other hand, Holcim España, SA had a total of 1,275,542 Tm in their installations in 2003. The biggest component in this volume has been cement, with a total of 1,219,717 Tm.

There is a small fishing port in Carboneras managed by the Andalusia Ports Public Company. These premises have a fish market, port office, ship-owners premises, slipway, local shops, travel lift and workshops, amongst others. The Garrucha port, also managed by the Andalusia Ports Public Company, has commercial, sports and fishing activities. Its commercial dock has a length of 258 metres and a depth of 9 metres.

The Villaricos ports, the same as the two before, is managed by the Andalusia Ports Public Company. It has sports and fishing installations, the latter with a fishing dock of 15 metres. Lastly, there is a marina in San José also managed by the Andalusia Ports Public Company although the Club Náutico de San José is the concessionaire.

In summary, the area subject of the study has a series of port installations appropriate for commercial, fishing and sports sea traffic, and at the same time are located throughout the area of study.

### ***Energy infrastructures***

As already mentioned, there is a thermal power station in the scope of the study located in Carboneras, on the coastline. This installation, belonging to Endesa, is made up of two generators having a total power of 1,144 MW. The fuel used comes from South Africa and Colombia. The energy produced is distributed by means of 440 kV towards Murcia and a third, also 400 kV, towards Granada. At the same time there are three 132 kV lines crossing the scope of the study. The improvement of the electricity distribution networks is planned by means of the reinforcement with a double 400 kV circuit of the Carboneras (Coast)-Huéneja-Tajo and the Benahadux-Carboneras (Coast) connection, at 220 kV.

On the other hand, there is a fuel thermal power station located in Almería in the El Zapillo area, whose premises have been abandoned and are in ruin originating environmental risks,

as the asbestos thermal insulation is breaking up, and spreading to inhabited areas due to the action of the wind and rain.

Currently, Almería is not connected to the national network of gas ducts. Nevertheless, the “Electricity and gas sectors planning. Development of transport networks 2002-2011” document, of the Ministry of Economy (2002), includes the proposal of basic gas and electricity network infrastructures to be carried out before 2011. Said document includes a direct gas connection with Algeria with the entrance point in Almería. This project is planned for 2007 and will provide the Spanish gas system with an initial flow of 250,000 m<sup>3</sup>/h. Its carrying out is subject to the construction of the Almería - Transversal axis and Barcelona-French border gas ducts. This also depends on the approval of the capacity reserve programme for the Spanish market proposed by the promoters, and to the existence of transport pre-contracts.

In the same line, as a priority action the 2003-2006 Andalusia Energy Plan includes the building of the Lorca-Almería gas duct with the provision of 72 bars that, at the same time, would be connected with the Cartagena-Lorca gas duct. The arrival of gas to the province would facilitate the installation of SOL-GAS hybrid plants (even biomass), thus promoting a more efficient, sustainable and de-centralised model.

Near the area of the study, in the municipality of Tabernas, the Almería Solar Platform (PSA) is located, belonging to the Energy, Environmental and Technology Research Centre (CIEMAT), being the biggest research, development and testing centre in Europe dedicated to solar concentration technologies. Thus over the next few years an increase in the implementation of this type of energy in the scope of the study can be expected.

Lastly, regarding wind energy, and in spite of there not being currently any aero generator parks, there are two areas of a high wind potential in the area of the study, in keeping with the Andalusia Energy Plan 2003-2006. One of them, on the northern side of the coast (Vera-Costa), with a potential of more than 30 Mw and towards the South, in Campo de Níjar, with a potential of 80 Mw.

At the same time, the area has an enormous potential for the installation of offshore wind energy, always provided public and institutional consensus on this activity is reached.

### ***Water and environmental infrastructures***

As has already been mentioned, one of the main problems faced by the scope of the study is the lack of rainfall characterising the climatological conditions of this region. At the same time, the agricultural development of the region has caused an increase in the demand of the

hydraulic resources, which has at the same time encouraged the construction of hydraulic infrastructures for the distribution of hydraulic resources mainly for irrigation purposes.

In this respect, we should highlight the Almanzora reservoir, opened in 1986 for the regulation of the water provided by the river, as well as to be used as mid point storage for the volume of water from the Tajo-Segura and Guadiana Menor transfers. With a capacity of 168 Hm<sup>3</sup> its average provision does not exceed 20 Hm<sup>3</sup> due to the prolonged periods of drought and to the limitations of the regulation possibilities. The height and size of the reservoir makes it one of the biggest dams in Spain, a qualification that does not correspond to its regulation possibilities and defining its over dimensioning. The stagnation of the water and the lack of renovation due to the absence of new water inflow increase the concentrations of sulphate and salts. These salinity levels are a limit for the irrigation of certain crops and the high concentration of sulphates, even after being treated, prevents the water from having sufficient quality to be classified as potable for general distribution.

Another of the hydraulic infrastructures that should be taken into account is the Tajo Segura transfer, which, although outside the scope of the study, has repercussions within the same. The Cuevas del Almanzora reservoir, as well as that of Benínar, the latter also being outside the scope of the study, were built with the expectation that they would regulate the water coming from the Tajo-Segura transfer together with that of other basins.

The distribution of water in the first stage of the transfer provided Valle del Almanzora with a maximum of 15 Hm<sup>3</sup> in order to be used for crop irrigation (**Map 14**). The global planned provision for the second stage provides Almería with a transfer volume of 200 Hm<sup>3</sup>. Nevertheless, the resources transferred to the Andalusian Mediterranean Basin reach 7 Hm<sup>3</sup>, which is exclusively used for crop irrigation in the area of El Salvador de Huércal-Overa. The resistance of the population of the river basin providing the water, the aspirations of the irrigation crop farmers in the Eastern area, together with environmental issues, put forward serious doubts as to whether the possibility of increases in the supply to transfer to the second stage will ever reach the province of Almería.

On the other hand, over the past few years, the Public Administration has developed various actions to plan the hydraulic policy in the river basins of the region subject of the study. These initiatives are those proposals for the South Basin Hydrologic Plan, the actions that the Junta de Andalucía establishes for Almería, by means of the various programming documents, local initiatives that public and private entities have developed in the region, as well as the Priority Hydraulic Action Global Plan for Almería, the latter being the responsibility of the Central Government together with the AGUA Programme.

### **Map 14. Hydraulic infrastructures**

The agricultural development model of the area has required an increase in the demand of hydraulic resources that has required the construction of hydraulic infrastructures for the water supply, specially destined to irrigation crops.

#### **Cartographic sources:**

##### **Basic cartography:**

*Digital topographic map of Andalusia 1:100.000. Regional Public Works and Transports Ministry. Junta de Andalucía.*

**Plastic shading:** *Digital model of elevations of Andalusia 100 metres. Regional Public Works and Transports Ministry. Junta de Andalucía.*

**Map 14.**      **Hydraulic infrastructures**



The South Basin Hydraulic Plan, passed by the Royal Decree 1664/1998 in accordance with the mandate and the objectives of the Water Act of 1985, included a series of actions to be carried out as a result of the diagnosis of the hydraulic problems present in the basin. This plan highlights that the problems referred to the scarcity of water in units IV (Adra-Almería and Campo de Níjar) and V (Antas-Almanzora), units where the scope of the study is located (**Map 15**).

On the other hand, the guideline of the hydraulic policy of the Junta de Andalucía in the area is found in the Declaration of General Interest of the Andalusian Community, in the modernisation of the irrigation areas of the Andarax and Almanzora areas, the Director Infrastructures Plan 1997-2007 (PDIA) and the Plan for the Regulation of the Region of Andalusia (1998).

The actions related to the modernisation of the irrigation areas involve the Irrigation Communities with the support of the Regional Ministry of Agriculture. Also, three general aid lines are established, by the autonomic and central Administrations, aimed at the modernisation of the irrigation areas and saving water.

The Andalusia Director Plan of Infrastructures of 1997-2007 highlights the need to carry out a special coordination effort between the various administrations with respect to the hydraulic infrastructures. In the area of the study the need for external provisions by means of desalination of sea water for the low Andarax area, the transfers between the Guadiana Menor and the Almanzora river basin is indicated.

The Plan for the Regulation of the Region of Andalusia (1998) establishes as objectives the development of a management policy oriented to containing the demand and the encouragement of a hydraulic infrastructure policy destined to solve the still present needs, in spite of the improvement in water management.

The local initiatives are related to improved management and optimisation of the uses of water. Thus, the improvements of the urban supply derived from the management of supplying companies in the scope of the study, has involved an important advance over the past few years, with positive results in the re-use of purified water and in the saving of this resource. This has been carried out by means of actions such as the installation of individual water meters, the management of distribution networks, and localisation of leaks, block tariffication, as well as public awareness. At the same time, we should highlight the achievements reached in water management for agriculture in the Irrigation Communities with the use of water saving techniques in plots, such as drip irrigation.

On the other hand, the “Global Plan for Priority Hydraulic Actions in the Province of Almería” (Almería Plan), passed on by Royal Decree-Law 9/1998 provides the central government with

the total or partial responsibility in the financing of a series of hydraulic works to improve the hydraulic situation in the province of Almería. This plan includes actions such as the channelling of the final section of river Andarax, the connections of the Negratín with the Almanzora, and those of the Cuevas reservoir with West Almería.



***Map 15. The CAMP Project and the hydraulic areas of the Andalusian Mediterranean Basin***

Within the Andalusian Mediterranean Basin, Levante de Almería is part of the hydraulic area of Sierra Filabres-Estancias, Sierra de Gador-Filabres, as well as a small surface of that of Sierra Nevada.

**Cartographic sources:**

***Basic cartography:***

*Digital topographic map of Andalusia 1:100.000. Regional Public Works and Transports Ministry. Junta de Andalucía.*

**Map 15.** The CAMP Project and the hydraulic areas of the Andalusian Mediterranean Basin



Another of the actions planned in the Almería Plan has been the building of a desalination plant in the urban area of Carboneras. The desalination plant currently in operation has a capacity of production of 42 cubic hectometres of desalted water, and its function is to satisfy the structural deficit of water. All the municipalities of Levante de Almería have one or various water purifying plants in operation (**Chart 39**), which are adequate for the population permanently living in the municipalities of the area. Nevertheless, these services are not able to fully cover the needs of the summer population, specifically that living on the coast, giving rise to the fact that the water purifying system is sometimes insufficient.

**Chart 39. Network of purifying plants in the municipalities of Levante de Almería**

Municipalities	Waste water Purification Stations (EDAR)	Purifying system
Almería	- Almería - Retamar - Cabo de Gata	Tertiary process using ozone
Carboneras	Carboneras	Lagooning
	El Argamasón	Decantation-Digestion+Bacteria Bed
	El Saltador	Decantation-Digestion+Bacteria Bed
	El Llano de Don Antonio	Decantation-Digestion+Bacteria Bed
Cuevas del Almanzora	Cuevas del Almanzora. Supplies Cuevas del Almanzora, El Realengo, La Portilla, El Martinete, El Morro and Jucaini	Lagooning-CBR
	Palomares-Villaricos	Lagooning-CBR
	Las Herrerías	Green filter
	Guazamara	Decantation-Digestion+Bacteria Bed
	Los Lobos	Decantation-Digestion+Bacteria Bed
Garrucha	Garrucha-Mojacar-Turre	Lagooning
Mojácar	Garrucha-Mojacar-Turre	Lagooning
	Sopalmo	Decantation-Digestion
Níjar	El Viso (Níjar, San Isidro and Campohermoso)	Soft treatment
	El Barranquete	
	Fernán Pérez	
	Los Albaricoques	
	San José	
Pulpí	Pulpí (supplies Pulpí, Estación, El Convoy, El Pozo, la Higuera and la Fuente).	Lagooning
	Jaravia	Lagooning + Peat Beds
	Terreros	Decantation-Digestion
Vera	Vera. Supplies Vera, Las Marinas, Puerto Rey, Vera Golf and Vera Playa)	Lagooning

On the other hand in 2004 the Ministry of Environment started the AGUA Programme (Actions for the Management and Use of Water), which materialises the re-orientation of the policy on

water by means of specific actions designed to guarantee the availability and quality of water in Spain, although it initially deals with the Mediterranean coastal basins.

The objective of the AGUA Programme in the province of Almería is to reach a volume of water of 189 Hm<sup>3</sup>/year. For this, actions aimed at increasing the availability of hydraulic resources in the area, such as, for example, the desalination plants in Níjar, Bajo Almanzora and the second stage of the Carboneras desalination plant. At the same time, the programme includes actions addressed to the improvement of the management of hydraulic resources, such as the re-use of waste water in Almería; the connection of the Cuevas del Almanzora-West Almería (North Sector) dam; the conduits in the irrigation area of the reservoir of Cuevas del Almanzora; as well as the South Mouth Tunnel conduit of El Saltador-Camino del Cerro Minado (Almanzora).

The solid wastes of the municipalities of Levante de Almería are treated in the Níjar transfer Plant, providing service to the municipalities of Níjar, Carboneras and Almería, and in the transfer Plant in Vera, covering the needs of the rest of the municipalities of the scope of the study. Once the waste is compacted and crushed it is taken to the recovery and composting plant in Almería, covering the needs of Almería, Carboneras and Níjar. The municipalities of Mojácar, Pulpí, Cuevas del Almanzora, Garrucha and Vera are, amongst others, within the Almanzora-Levante Agreement for the collection and treatment of solid urban waste and treatment, after going through the Vera transfer plant, of the waste in the recovery and composting plant in Albox.

#### **2.3.4. The urban situation**

In an arid and mountainous area such as Levante de Almería, the hydraulic network provides excellent opportunities for the traditional human settlements: relatively flat areas, fertile land, and possible presence of water. Also, and for the same reasons, it includes certain levels of risk in the settling or exploitation of floodable areas. The traditional way of avoiding the risks of flooding is the location of the settlements at the foot of the mountains next to the hydraulic network and the non-existence of residential buildings in the irrigation working areas connected to the hydraulic network.

Nevertheless, in the non-irrigation areas, the patterns for the settlements are the opposite, spreading in order to guarantee sufficient resources, taking into account the randomness and irregularity of the hydraulic supply. These patterns of traditional settlements, due to defensive and production reasons, and deeply marked by the changes of irrigation/non-irrigation, are in serious crisis, due to the abandonment of the agriculture production strategy, and to the attraction of the coast and the new social values of the market.

The new settlements, stimulated by the differing value of their late occupation of the area, ignore or disregard the limits recognised by the traditional model. The pressure on the coast line, on basins and floodable areas, and later, on the slopes, are new settlement patterns, making up a scenario of multiple environmental and territorial implications, showing the inexistence of a model optimising the use of natural resources and guaranteeing the maintenance of the identity of space, safety, viability and sustainability.

This new system of settlements is characterised by imbalance between the private exploitation and the funds and public infrastructures that should be used as support. This is an urban model, exploiting and using the land that generates quantitative and qualitative deficit of funds and social equipment, as well as numerous disequilibrium and imbalance putting its own viability at risk.

In the group of new uses that are simultaneously present in the current stage of the transformation of the land and urbanisation, we can find, on the other hand, different reasons that should be properly understood. On the one hand there are tourist activities and on the other the real estate business. Although they may share sections in the regional and economic structure, it is simple to differentiate the tourist activities from the strictly real estate ones, due to the relationship with the use of natural resources and the generation of profit. These are not confronted reasons, strictly speaking, or at least they are not so until there is a restriction of resources and some activities or others that have to be opted for.

The relationship between the consumption of regional resources and the generation of wealth and employment is clearly favourable to the tourist activities due to the productive activities that are directly connected with tourism, (building, furniture, linen and upholstery, restaurants, trips, guides, car rental, amongst others), which generate greater levels of income and employment in the tourist areas, when these activities are provided by local companies.

On the other hand, the real estate activities (purchase of land, urban development and building of vacation houses) only balances its results account in the high demand segments, that is, those with more quality requirements and less condescending with the disequilibrium and deficits produced in the transformations for low and medium segments (problems with water supply, destruction of the landscape, deficit of equipment and services, road congestion, amongst others).

In the scope of Levante de Almería the real estate activities are continued being encouraged by the alignment of the local population with the real estate strategy. This alignment is caused by the mentality dominated by small landowners that have seen their land lose value due to the collapsing of agricultural activity, and that now see an opportunity to obtain income by selling land or by participating in their promotion. This alignment is demonstrated in the increase in land transaction that has taken place over the last few years, causing a considerable increase in the price of rural areas expecting to become urban.

One of the most evident effects of this process is the weakening of the big national or regional political parties by a wide proliferation of independent candidatures generating volatility of the governments of the municipalities, or political turncoats, all these being symptoms of the presence of worrying elements in the institutional organisation of the region.

Demographic and sociological mobility complicates the situation, due to the loss of the relative influence of the local population with respect to the new settlers, who not only do not share this strategy, but fight against it openly.

There is an adjustment mechanism in operation that shows a curious paradox: the result of the real estate transformation is the progressive rooting of the new population whose interests are contrary to those of the real estates, being more concerned with the quality of life associated with the maintenance of a landscape identity, and openly faced with a way of transforming the region that causes more malfunctioning than opportunities, and has curiously stimulated their purchase decisions. Additionally, their economic instinct advises them to keep a certain degree of exclusiveness in their initial investment, and hope that the excess of the current disequilibrium is carried out by public investment, and not by means of the recovery of economy appreciated in a new urban development growth cycle.

The risk of a social break in the light of this is evident, such as the presence of new opportunities for regional qualification as a consequence of the greater social 'porosity' related to the new settlers.

The processes generated in the area are consequence of a new situation backed by the real estate promoters. This new demand is based on a series of factors, such as the following:

- The differential value of a Mediterranean area, of an attractive landscape, good climate and scarce urban occupation, an effect reinforced by the area environment icon –Cabo de Gata-Níjar Natural Park- and by the coastal reliefs that limited occupation up until not very long ago.
- The exhaustion of nearby tourist areas that have been occupied over the last few decades (Murcia, Alicante and Costa del Sol in Malaga).
- The reinforcement of demand, in which there are at least three types of components. The demand for national purchases, oriented towards residential as they consider the purchase as a refuge for their capital. Next to this, we find the residential tourism of European old-age pensioners with prolonged periods of stay. At the same time, the demand of the conventional tourism is also present, attracted by the climatological advantages and the increase of sports facilities, such as the golf courses.

- The new area opportunities, exclusively based on public investment, that is to say, accessibility and expectations of water availability.

All these factors generate a situation that is demonstrated by the arrival of land developers to the coastal municipalities, and represent a constant fact in the Almerian economic history: outside agents connect the local natural resources with the exterior, although now with the worst ways of exploitation, as the product or service is sold in non-local circuits and the maintenance costs, the infrastructural debt, and the loss of landscape and identity references are locally internalised. The effect of this process is difficult to control by the local public, that has accumulated certain conscience of ostracisms, and that now receives the private economic offers trusting that the general public will bear the costs of the model quality improvement.

The Local Corporations, stressed by a bad financial design of the public economy, act with the same logic as the landowner, accepting the opportunities of obtaining income by means of urban development agreements, receiving the building license taxes, obtaining of exploitations, land or cash at the same time as it promotes a long-term debt of the higher administrations (regional, governmental and European).

In this way, the institutional conflict around the regulation of the region that is about to come not only obeys the preferences of the Town Halls with respect to the model to be followed, to the regulation philosophy that should be adopted, or to the support in social segments with opposed priorities, but has, above all, a financial component that arises from the need of the Town Halls to obtain short term liquidity in spite of decapitalisation, to cover the growing extension of the services that have to be provided.

### ***Public action in the regulation of the area***

The public intervention in the regulation of the region is made up of multiple actions. On the one hand, the sectorial Administrations operate defined by specific responsibilities (coasts, river basins, roads, ports) and that intervene in the area by means of the effect of their own regional or governmental legislations. These sectorial legislations usually establish parameters that are projected in the area regardless of the physical and material conditions of each place. Additionally, their effect is transmitted to the urban planning and to regional planning, as these should reflect said legal parameters in their documentation. But, apart from conditioning the physical regulation, the sectorial administrations intervene in the evaluation of the land, limiting it when placed outside the market (domain of public land), or increasing them when provided with accessibility or attractiveness.

Additionally there are other actions that search, with different values, for the preservation of specific areas of the region. The maintenance of collectively appreciated values is sought by means of these conservation actions, but, in contrast with sectorial administrations that act on

public domain, these act on private land, and with some effects that are real 'regulation models' with one sole objective.

In this sense, we can highlight environmental, agricultural or production regulations. Insofar as they are a consequence of legislation that should be compulsorily complied with, they are fixed references for the physical regulation of the areas: in Levante de Almería we should highlight the following regulations: areas protected by the Special Plan for the Protection of the Physical Environment of the province of Almería, Protected Natural Areas, Places of Community Interest of the Natura 2000 Network, Areas of Special protection for Birds, areas of application of the Forestry Law, Assets of Cultural Interest, Archaeological Sites and Livestock Rights-of-Way. The way in which these areas and goods unfold their legal system is usually rigid, thus the only way of integrating this with the regional model is to transfer it as such to the regulation plans.

In this way, a disintegrated set of decisions based on neither transversal nor flexible logic, is indirectly made up in the defining agent of the physical regulation of the area. But these wide areas have heterogeneous features, and are never monolithic scopes, and that is why the best conservation and valuation of the collective resources is never reached with the maintenance of a not very precise preservation system, and that is why, many times of a discretionary application, precisely due to the complexity of situations on which those responsible have to decide. It should also be taken into account that outside the areas affected by these 'protection' provisions there are also abundant environmental, cultural, landscape and heritage values that the public in general should not give up.

Lastly, we should consider the physically regulation planning of the area, that is, the regional regulation plans and the urban planning. The regional regulation plans are regional responsibilities, whilst the urban planning is on a municipal level, although it undergoes the principle of legality, the regulation hierarchy and the approval of member organisms. In a simple way we could say that the regional regulation plans are an expression of the regional territorial policy, whilst the urban planning is of a municipal policy.

In fact, urban planning is a traditional activity of the local organisms, and all the municipalities of Levante de Almería have their urban planning, with their updating mechanisms (modifications and revisions). Currently, there is a generalised revision process as a consequence of the approval of the new Law 7/2002 of the 17th of December, on the Urban Regulation of Andalusia (BOJA n. 154, of the 31st of December 2002).

This process has coincided in the area of study with a new demand cycle, and thus the various municipal General Plans are being drafted at a moment of maximum expectation and are characterised by expansion planning, with large extensions of urban land and a generalised change in the regional model.

The General Municipal Plans, due to their scale and purpose, should favour the balance between the private exploitation and the provision of public equipment in their scope of action, but are unable to bear the costs derived from the change of scale of the settlements in the region scope, costs that become a malfunctioning of the supra-municipal networks (water supply, sewage, roads), in malfunctioning in mobility and access to public services, in generalised losses of landscape and identity invariabilities, and in the undertaking of high levels of risk before various processes of physical base.

On the other hand, the planning of the regulation of the region started in Andalusia with the approval in 1994 of the Law for the Regulation of the Region of Andalusia. This Law foresees the carrying out of a Plan for the Regulation of the Region of Andalusia –regional plan – and of Plans for the Regulation of the Region of a sub regional scope.

For part of the CAMP scope, a Plan for the Regulation of Levante de Almería is being drafted, not including the municipality of Níjar but including, on the other hand, those of Huércal-Overa, Antas, Bédar and Los Gallardos, which, although they do not have any coast, fully belong (the latter three, especially) to a common coastal scope. Although the drafting of this Plan for the Regulation of Levante de Almería has not been concluded, in the current stage for the definition of criteria and objectives there is certain confrontation with the territorial model resulting from the inclusion of proposals of municipalities by means of their General Plans. This is so because the observation scale is different to theirs. The regulation includes the correct unfolding of the networks, systems and supra-municipal elements relevant at a sub regional scale, which is difficult given the determinations of the municipal planning that do not take these matters into consideration as they do not belong to their action scale.

In the light of this, the time sequence of the development of both instruments can favour the agreement or definitely hamper the same. This aspect is subject to being technically adjusted, with a re-dimensioning of the general systems (roads, ports, water cycles, land for supra-municipal funding) and with an agreement on the distribution of costs and benefits of the urban development action. On the other hand, there are more difficulties in the different appreciation of the strategic value of the maintenance of areas, spaces or elements in order to guarantee the physical, environmental and identity functioning of the area.

From the sub regional territorial planning we understand, logically, that the occupation models should not be continuous, not differentiated nor developed, nor ignoring the existence of values that guarantee the quality of the area, including the quality of the urban operations to be undertaken. But from the municipal point of view, conditioned by the factors previously analysed, (financial, social pressure) it is thought that what deserves being protected is already included by the action of the various public powers, and that the rest should be offered to the market of the real estate promotions with no more limitations than the urban obligations.

These are the terms of a conflict that threatens to become more radical and that will be seen over the next few years. A possible institutional conflict due to the lack of agreement on the

destination of the region, its transformation agenda, and the functioning of the resulting models should be added to the social break previously commented between the interests of the local population and those of the new inhabitants.

## **2.4. Environmental impacts of the socioeconomic activities on the coast**

The areas of strong economic dynamism usually group together activities that can have negative effects on the environment. As already mentioned the area of study, is one of the areas of the Andalusian coast where there is a considerable increase in pressure on natural resources. The need for certain resources for the development of some activities has contributed to worsening the environmental situation of the region. To these predatory processes those causing reversible or irreversible damage on the existing nature reserves have to be added.

Human activities, although usually having global effects on the environment, affect the atmosphere, the terrestrial environment, the coast and the marine environment in different ways. Of these four areas the coast is probably the most fragile and that absorbing the effects of the perturbations of the other three.

The coast, defined as the means in which the marine processes affect the land and the terrigenous processes affect the sea, is a natural environment where the dynamism and the balance of the natural processes are in a state of permanent change. Different types of coasts (cliffs, beaches, marshes, coral reefs, etc) are characterised by some common elements and other differential ones.

**Photo 20: Pulpí coast**

Additionally, all the coastal means can be classified depending on resistance to the changes, or more specifically, to their resilience. This last concept is understood as being the potential of withstanding a drastic or irreversible change in its evolution. Therefore, it can be said that the coast in general is a sensitive, vulnerable, natural environment, and of variable resilience determined by the natural dynamism of the processes affecting them and that has originated them.

It is in this context where the anthropic activities should or can be assessed. Some coastal environments are more or less able to support the tension introduced by the anthropic activities. In the same way, depending on the activities, the coastal means can react in various ways that can use up or preserve the natural characteristics of the coastal resilience.

One of the issues that usually receives much attention when the activities on the coast are analysed is the study of the protection measures of the coast line, that is to say, the fixing of the coast line position by means of breakwaters, dikes or other artificial barriers. On many occasions these practices have been compared with coastal management, but they are not truly equivalent.

In general, the coastal protection catalogues that the coast line managers have used have clashed with the difficult task of searching for solutions, (more or less definite), to specific problems of erosion or the shifting of the coast line. The effectiveness of these measures not only have been variable, but also with doubtful results, causing, in some cases, processes that have caused total degeneration of some points or of nearby areas. In any event, the protection issue is usually undertaken by public organisms within the management measures of the Terrestrial Maritime Public Domain, and that is why these are not fully tackled in this document.

It is interesting to highlight the need to become aware of the fact that the protection measures are, and will continue being, the dominant agents in the evolution of the erosion and accretion processes in the coast line, due to direct and massive intervention, in some cases, on the most sensitive part of the coastal system: the breakers and the coast line.

It is important, therefore, to previously recognise what type of coast we are, and in what stage of evolution it is in: and how resilient the environment is. This question does not have a simple reply due to the complexity of the acting variables, but allows a first assessment. The main impacts produced by the production activities in Levante de Almería are explained below.

### ***Agricultural activities***

The great challenge of intensive agriculture is related with the high demands of hydraulic resources and shale that are directly extracted from the coast (whether from watercourses or

beaches) whose function is so determining in the resilience factor of the beaches. By the sediment deposits being eliminated or reduced, the currents generated by the waves will tend towards *cannibalisation* processes that will irreversibly degenerate the coastal system.

Regarding the use of water, it is obvious that the situation of the aquifers should be assessed in a precise way. Not only the salinisation processes that are so common in other areas of the coast, but also due to the alteration of the groundwater level, encouraging an acceleration of the depositing processes of the active beaches and in some cases to subsidence, with the subsequent relative rising of the sea level.

The use of the land by means of flattening small hills, the placing of artificial soil and the use of aggressive chemical products can have long-term effects on this environment that, additionally, can reach the groundwater (decrease in the infiltration, contamination by various types of agrochemical products, etc.).

Apart from the impacts indicated, the various types of solid waste from agriculture should be added: greenhouse plastics, vegetation waste, phytosanitary and fertilizer containers, etc., that are abandoned in watercourses or irrigation channels, and that can reach the beach and the sea in flooding.

### ***Livestock activities***

Although in the scope of the study livestock is not one of the most important economic production sectors, the environmental impact can be considerable if these are not taken into account. As already mentioned, in the municipality of Huércal-Overa, next to that of Pulpí, there is one of the most important areas of the intensive pig livestock industry, negatively influencing the environment.

In the intensive exploitations the most important impacts are those derived from the high concentration of animals in a small area: accumulation of lixiviation of droppings, liquid waste (urine, blood, washing of installations) and accumulation of odour.

The extensive exploitations can produce negative impacts on the vegetation due to grazing. Additionally, greater part of the vegetation in the area has a slow growth that makes the impacts of grazing very persistent, causing the disappearance of some species. In order to avoid the impact of this type of livestock, it is essential to regulate grazing in the area, taking into account the number of animals, the breakdown of the herds and the provision of food in the farms.

### ***Industrial activities***

Some industrial activities of the area of study have an aggressive behaviour on the terrestrial, marine and transitional environment. The main industrial centres of this region are in the municipalities of Almería and Carboneras, that is to say, those in which the effects of contamination are more acute.

The main effects of the industrial activities are related to the emission of atmospheric contaminants, such as gases causing the greenhouse effect, particles in suspension and in a lesser way, volatile organic gases and solvents.

Apart from the problems derived from the decrease in the quality of the air and the effects this has on the living beings, we should highlight soil contamination due to the washing of the air and the solution of the contaminants adhered to the soil. These effects can reach the coastline and modify the environmental situation of a very fragile area.

### ***Fishing activities***

The use of certain fishing equipment and overexploitation of the fishing grounds are the main impacts of fishing. The traditional nature of a large part of the fishing fleet reduces the impact of this activity. Amongst the most harmful fishing equipment is trawling, although its eradication, apart from being complicated, would not stop the destruction of the seabeds.

Regarding fishing activities, aquaculture should be taken into account, as it can have an important impact on the coast if the number of exploitations and their density of fish are not controlled.

### ***Tourist activities***

The impact caused by the tourist activities in the area of study are mainly due to the increase of population in a very specific area, and the need for buildings and infrastructure necessary for this increase in population.

The development model of this area involves a high level of land occupation that, apart from destroying the specific environment of the area occupied, modifies the fragile coastal dynamism, depending on the marine and land ecosystems. Also, the building of roads and infrastructures for the maintenance of this activity causes direct and indirect impacts on the atmosphere, land and water.

Within the tourist activities are some of them are closely related to the coastal area and that are very specific:

- **Bathing activities.** These are, evidently, not very aggressive on the coastal resources although they are usually carried out on beaches or low coasts. One of the great challenges of the adaptation to the demands of the bathers is the demand for services. In natural or semi-natural coasts (as it is the case of most of Levante de Almería coasts), it would be recommendable to restrict the demand for services, such as showers, accesses and others that fix the sediment reserve area, and very efficient in the event of storms in environments with little sediment supply, as in these beaches.
- **Submarine fishing.** As in the previous case, this activity does not tend to be very aggressive on the capacity of the coasts. Nevertheless, and yet again, the potential demand for services (car parks, easy access to boats and/or scuba divers that have limited movements) can generate a demand that may involve an excessive use of the high sensibility areas of the beaches.

- **Submarine archaeology.** Although this type of practice is not usually aggressive with the marine environment, there is an added risk to the preservation of the elements of the Archaeological Heritage (shipwrecks, remains and other elements associated with old industries and exploitations).
- **Marine recreational activities (fishing and sailing).** Apart from the need for the provision of accesses and moorings, the use of sailboats has in many cases caused a requirement to establish strict areas of use that interferes, especially in such natural environments as the Levante de Almería coast, with the idiosyncrasy of a coastal landscape with great nature and quality. Additionally, the access and mooring installations severely interfere with the sediment drift processes, so the effects on the physical means are comparable to, or even more serious than, those of the protection structures previously mentioned.
- **Golf and other activities.** The practice of golf, typical of countries of more northern latitudes, is associated with the existence of large vegetation areas with type of flora needing large amounts of water and very demanding regarding care and maintenance. The lack of water and the general inadequacy of the physical means to this type of landscape make the implementation of the recreational tourism of golf not very recommendable (or theoretically not very sustainable) in these coastal areas. In any case, the distribution of the courses that may be created should be kept at an appropriate distance between these and the active beach areas and the coast in general, in order not to determine the potential mobility of the coastal environment.

Summarising, the problems associated with the coastal activities should mainly consider the precise characterisation of the physical resources, in order to appropriately analyse and diagnose the dynamism of the physical environment; and become fully aware that almost all socioeconomic activities involve the installation (and maintenance) of infrastructures that increase the demand of the users. This is the case of accesses, car parks, moorings, ramps, and potentially, the implementation of residential tourism.

## **2.5. Identification of Actors. Institutional and social participation.**

### **2.5.1. Identified agents**

The integrated management of the Coast of Levante de Almería should involve the public and private institutions intervening in the region, both at national, regional and local levels. At the same time, it is necessary to consider the local actors, as they are those more directly involved in the exploitation and management of the resources of the region subject of the study. Below the main public institutions and the actors related with the management and handling of the Coast of Levante de Almería are described.

#### **2.5.1.1. National public institutions**

##### ***Ministry of Environment:***

The responsibility of the Ministry of Environment in the integrated management of the coast is centred on the determination, regulation and tutorship of the Terrestrial-Marine Public Domain, as well as on the drafting of regulations regarding water and coasts and their application. The entities intervening are the following:

- General Coastal Management, central organism with headquarters in Madrid. The head is the General Coastal Manager.
- Andalusia-Mediterranean Coastal Demarcation, peripheral organism with headquarters in Malaga. Headed by the Coastal Demarcation Chief. There is a provincial office in Almería.
- General Water Management, central organism with headquarters in Madrid. Covers hydraulic public domain.

##### ***Ministry of Development***

The Ministry of Development is responsible, amongst other aspects, for managing and coordinating the responsibilities relative to infrastructures corresponding to the central government (General Network of Roads, Railways, Ports and Airports) as well as the regulation of the marine traffic and its environmental control. In this respect, of special relevance is the presence of the Ports of the State on the Coast of Almería. These ports are managed by the following organisms:

- Ports of the State Public Organism, central organism with headquarters in Madrid. Its responsibilities are the activities and marine and port installations of the State, as well as the State Port Public Domain.
- Almería-Motril Port Authority, peripheral organism with headquarters in Almería.
- General Merchant Marine Management, central organism with headquarters in Madrid). Belongs to the General Transport Secretariat, and its responsibilities are the general regulation of marine navigation and of the Spanish merchant navy, as well as the carrying out of radio-electric, safety and pollution prevention inspections and technical controls.
- Maritime Harbour Masters (Peripheral Organism with headquarters in Almería). Belongs to the General Merchant Marine Management.

### ***Ministry of Agriculture, Fisheries and Food***

- The Ministry of Agriculture, Fisheries and Food is the department of the General Administration of the State responsible for the putting forward and carrying out of the general directives of the central government on agriculture, fishery and food policies.
- General Marine Fishing Secretariat, central organism with headquarters in Madrid. Of special relevance in the scope of this study due to its responsibilities in the regulation of the fishing sector. It has responsibilities for the planning of the marine fishing policy, basic regulation of the fishing sector, aquaculture and commercialisation of fishing products in the scope of the national responsibilities.

## **2.5.1.2. Regional Public Institutions**

### ***Regional Ministry of the Environment***

Amongst other aspects, it belongs to the Regional Ministry for the Environment, the regulation of the management of natural resources of Andalusia as well as the promotion of the appropriate assignment of land uses, and the rational use of natural resources. This organism also has to carry out of the responsibilities of the Autonomous Community regarding water. At the same time, it develops the formulation of basic criteria, programming, planning and development of regulations with respect to conservation and sustainable development. In this sense we should highlight the following organisms belonging to the regional Ministry:

- Andalusian Water Agency. Autonomous belonging to the Regional Ministry of the Environment, with headquarters in Seville, to co-ordinate all the responsibilities of the Junta de Andalucía regarding water.

- Andalusian Mediterranean River Basin. This is the former South Hydrographical Confederation, recently transferred from the Central Administration (Directorate General of Water of the Ministry of the Environment) to the Junta de Andalucía. With headquarters in Malaga, and with responsibilities for the Andalusian Mediterranean coast, the Directorate General of the Andalusian Mediterranean Basin carries out the functions reserved by the Water Act to the river basin organisms.
- Directorate General of Prevention and Environment Quality. This is the organism responsible for coastal waters.
- Directorate General of Participation and Environmental Information. Its functions consist, amongst other aspects, of the drafting of proposals and follow-up of the same in the frame of the policies of the European Union corresponding to the scope of action of the Regional Ministry. It also has as objectives the drafting of its follow-up and the development of agreements, cooperation and with respect to the activity of the Regional Ministry, within its scope of responsibility. Additionally, it is the organism responsible for the Levante de Almería CAMP Project.
- Directorate General of the Protected Natural Spaces and Environmental Services Network. Is responsible for the management of the natural protected areas in Andalusia.
- Cabo de Gata-Níjar Natural Park Office. The management of the Cabo de Gata-Níjar Natural Park is carried out by a Director-Curator.
- Directorate General for the Management of the Environment. Responsible for the development of actions destined to the conservation of the natural heritage and to the regulation of the management of the natural resources in Andalusia in order to promote its rational use. At the same time, it is responsible for the management of the Andalusian Forestry Plan, especially in that regarding the protection of the vegetation cover and the fight against erosion and desertification.
- Provincial Delegation of the Regional Ministry of the Environment. This is the Peripheral Organism of the Regional Ministry of the Environment, with headquarters in Almería.

At the same time, the Regional Ministry of the Environment promotes public participation in the treatment of the natural resources by means of the following organisms:

- Andalusian Council of Environment. This Council has, amongst others, the function of promoting the coordination between the public and private initiative in order to favour the protection of the environment.
- Andalusian Council of Biodiversity. It has as its functions, amongst others, to inform with a compulsory nature of the proposals for laws and projects for regulations affecting the responsibilities of the Autonomous Community of

Andalusia regarding forests, wild flora and fauna and continental hunting and fishing.

- Provincial Councils of Environment, Forestry and Hunting, whose finality is to promote the participation of organisations representing social interests at a provincial level in these issues: hunting, fishing, forestry, flora and fauna and environmental.
- Andalusian Water Council. This is the highest level organism for information questions and assessment of the Junta de Andalucía regarding water. It informs on proposals of laws and projects of decrees regarding water, it formulates initiatives and proposes measures for the best management, use and maintenance of this resource.
- Management Board of the Natural Parks, including a wide presence of various local actors, organisations and entities with interests linked to the respective natural areas.

### ***Regional Public Works and Transports Ministry***

The Regional Public Works and Transports Ministry has the responsibilities given to the Autonomous Community of Andalusia regarding the regulation of the region, urban development, architecture, housing, roads, transports and ports. In this respect, we should highlight the following departments and organisms related with regional policy in the area of Levante de Almería:

- General Secretariat for Regulation of Regional and Urban Planning, central organism with headquarters in Seville. This Secretariat coordinates the activity of the general territorial policy of the Autonomous Community of Andalusia. To this end, it defines and programmes the policy for the regulation of the region, of the coast and or urban planning.
- Provincial Delegation of Public Works and Transports. This is the Peripheral Organism of the Regional Public Works and Transport Ministry, with headquarters in Almería.
- Andalusian Ports Public Company. Public legal rights entity ascribed to the Regional Public Works and Transports Ministry, responsible for the development and application of the port policy, as well as that relative to the goods transport areas of the Andalusian government. It is responsible, in the scope of the study, for the ports of Carboneras, Garrucha, Villaricos and San José.

### ***Regional Agriculture and Fisheries Ministry***

Has, amongst other responsibilities, the regulation and improvement of the agricultural and fishing sectors; the promotion of agricultural and fishing production, their production resources, as well as those with respect to animal and vegetation health; the regulation of agricultural and fishing produce; the regulation and promotion of the agricultural and fishing industries; rural development, its planning, coordination and carrying out of the diversification policies in the rural environment; the improvement of irrigation infrastructures; as well as fishing in inland waters, shell-fishing and aquaculture. For these reasons we should highlight the following departments related to the management of the coast of Levante de Almería:

- Directorate General of Fishing and Aquaculture, central organism with headquarters in Seville, responsible for the prospecting and assessment of the shell-fishing, fishing and aquaculture resources of Andalusia, as well as the planning and development of the Fishing Sector Modernisation Plan.
- Directorate General of Rural Development, central organism with headquarters in Seville responsible for the programming, coordination and follow-up of actions with respect to rural development, paying special attention to the planning of area actions, the promotion of the diversification of activities in the rural world, and the promotion and support of promotional entities and organisations of the rural development.
- Directorate General of Industries and Agro food Promotion. Central organism with headquarters in Seville responsible for the regulation, promotion, modernisation and control of the handling, transformation and marketing premises of agricultural products.
- General Agriculture Production Management, central organism with headquarters in Seville, responsible for the prevention and fight against noxious agents in agriculture, as well as the control of the production defence mechanisms in vegetable crops, and of the premises where these are manufactured.
- Irrigation and General Structure Management responsible for, amongst other aspects, the management, coordination and carrying out of rural infrastructure plans and programmes, with special reference to the transformations into irrigation areas, improvement of irrigation areas and rational use of the water.
- Directorate General of Organic Agriculture. Its function consists, amongst other aspects, of support to the production of organic agriculture and livestock, as well as in the regulation and improvement of the availability and adaptation of the specific means of ecologic production.
- Provincial Delegation of the Regional Agriculture and Fisheries Ministry. This is a Peripheral Organism of the Regional Ministry with headquarters in Almería.
- Agricultural Regional Office (OCA). Its function is to act as a proximity service of the Regional Ministry in the region in aspects related with agriculture and livestock (veterinarian inspections, agricultural extensions, etc.). There are two OCAs with

responsibilities in the scope of the study, that of the Bajo Andarax/Campo de Tabernas, including, amongst others, the municipalities of Almería, Níjar and Carboneras and that of Levante-Bajo Almanzora, including, amongst others, the municipalities of Cuevas del Almanzora, Garrucha, Mojácar, Pulpí and Vera.

- Andalusian Institute for the Agricultural, Fishing and Food and Organic Production Research and Training (IFAPA). Its objective is to contribute to the modernisation of the agricultural, fishery and food sectors in Andalusia, and to the improvement of its competitiveness by means of investigation, innovation, transfer of technology and training of farmers, fishermen, technicians and workers in these sectors.

### ***Regional Ministry of Tourism, Commerce and Sports***

The planning of the tourist policy is the responsibility of the Regional Ministry of Tourism, Commerce and Sports in connection with the Levante de Almería CAMP Project. In this respect, the following departments should be highlighted:

- Directorate General for Tourist Planning and Regulation, central organism with headquarters in Seville. Its functions are, amongst others, the formulation and programming of directives regarding tourist planning, as well as the regulation of the tourist offer in order to reach sustainable development.
- Tourist Provincial Delegation. This is a Peripheral Organism in the province of Almería of the Regional Ministry of Tourism.

### ***Regional Employment Ministry***

The Employment, Local and Technological Development Territorial Units (UTEDLT) are ascribed to the Regional Employment Ministry and their finality is to promote employment, as well as the local and technology development in their scope of action. There are two in the region of the study:

- UTEDLT Carboneras. Its scope of action corresponds to Carboneras and Níjar.
- UTEDLT Huércal-Overa. Its scope of action corresponds, amongst other municipalities, to Cuevas del Almanzora, Pulpí, Mojácar, Garrucha and Vera.

### ***Innovation, Science and Business Regional Ministry***

- The Agency for the Innovation and Development of Andalusia is the regional development agency of the Andalusian Government. Its objective is to contribute to the economic development of Andalusia, providing services to Andalusian companies, to entrepreneurs and to the Junta de Andalucía itself, promoting business spirit, innovation, cooperation in the Science – Company – Technology system.
- Andalusian Energy Agency. Its responsibility is to optimise, in economic and environmental terms, the energy supply of the Autonomous Community of Andalusia.

## **2.5.1.3. Local Public Institutions**

### ***Provincial Delegation of Almería***

The Provincial Delegation has as its objective to ensure the integral and appropriate rendering in the totality of the provincial region of the municipal responsibility services, and to participate in the coordination of the Local Administration with that of the Autonomous Community and that of the central government. We should highlight the following regarding the integrated coastal management:

- Public Works and Environment Area
- Provincial Tourism Committee and Works Area.

### ***Town Halls***

The mayors and the areas of Environment and Local Development of the town halls of the municipalities of the scope of the study, that is Almería, Carboneras, Cuevas del Almanzora, Garrucha, Mojácar, Níjar, Pulpí and Vera will be specially taken into account.

#### ***Association of Levante de Almería Municipalities.***

The objectives of the Association are, amongst others, the promotion of tourism, water supply and sewage, solid waste collection and maintenance, the promotion, revitalisation and rationalisation of the economic and social development of the associated municipalities. Amongst these we can find Carboneras, Cuevas del Almanzora, Garrucha, Mojácar, Pulpí and Vera.

### **2.5.1.4. Other local institutions**

#### ***Association for the Development of the Levante de Almería Region.***

This is the Rural Development Group responsible for managing the Development and Economic Diversification Programme of Rural Areas (PRODER I), the LEADER+ initiative and the PRODER-Andalusia. Its scope of action corresponds to all the municipalities of Levante de Almería with the exception of Almería capital city.

#### ***Irrigation Communities***

- Níjar Irrigation Community.
- “La Alberquilla” Irrigation Community, Mojácar.
- Cuevas del Almanzora Irrigation Community.
- Other Irrigation Communities.

#### ***Guilds and Fishermen’s Associations***

- Fishermen’s’ Guild of Almería.
- Fishermen’s’ Guild of Garrucha.

- Fishermen's' Guild of Carboneras.
- "La Goleta" Association of Fishermen's wives of Levante de Almería.

### ***Farmers Associations***

- Union of Farmers and Cattle-Raisers of Almería (UAGA).
- Union of Small Farmers of Andalusia (UPA-A).
- Association of Young Farmers (ASAJA).
- Other farmers associations.

### ***Cattle-Raiser Associations***

- Group for the Health Defence of the Pig livestock. Pulpí.
- Other cattle-raiser associations.

### ***Business associations and financial entities***

Amongst which the following should be highlighted:

- Asempal, Business Confederation of the Province of Almería.
- Asempal CEA Vera.
- Association of Businessmen of the Coast of Almería (including hotels and restaurants).
- Hotels Association of Almería.
- Association of Businessmen of Tourist Activities in Levante de Almería.
- Association of Businessmen and Shop Owners of Cuevas del Almanzora (ASEMCAL).
- Association of Shop Owners and Businessmen of Vera (ACEVER).
- Those responsible for the management of companies related to the exploitation of the coastal resources (scuba diving, sailing, windsurf schools); Tourism; Commerce; Arts and Crafts; Fishing; Aquaculture; Agriculture; Manufacturing industry; Construction industry.

- Financial entities: Savings Banks (CAJAMAR, CAJASUR, UNICAJA, Caja Granada, El Monte, La Caixa, Caja Madrid, etc.), national banks (BBVA, Banco Santander, Banco Popular, etc.) and other loan entities (Agriculture loan cooperatives, etc.).

### **Green Associations**

- Mediterranean Green group. Its headquarters is in Almería city. It has, amongst other work areas, several related to marine and fishing ecology, fishing grounds, young fish, aquaculture and the protected marine areas.
- Greens in Action - Marine Environment and Coastal Area. This association in cooperation with the Equinoc Veterinarian Centre are carrying out an Almería Marine Fauna Recovery Programme (PROMAR). The objective of this programme is to improve care of the beaching of marine turtles and cetacean species in the province of Almería.
- Cabo de Gata-Níjar Natural Park Friends Association. Integrated in Greens in Action. Its main finality is to preserve the Cabo de Gata, making it compatible with the interests of their inhabitants.
- Environment Volunteers of Levante de Almería (Vera, Natural Park, Almería). Part of the Environmental Volunteers Network of the Andalusian Coast, whose objective is to provide social participation in the protection and conservation of the Andalusian coast, as well as to carry out specific improvement actions for coastal and marine environments.
- Cultural and Nature Association of Levante de Almería.

### **Universities and study and research centres**

- The University of Almería, with headquarters in the municipality of Almería, offers various degrees, amongst which the following can be highlighted due to their link with the CAMP project: Public Management and Administration, Law, Business Studies, Tourism, degrees related with agriculture taught by the Higher Polytechnic College, and Environmental Sciences.
- The Mediterranean Foundation of the University of Almería. The founding members of this entity are public actors, such as the Town Hall of Almería, Delegation of Almería, the Agency for Innovation and Development of Andalusia (previously IFA) and private entities such as business organisations and local companies. One of the objectives sought after is to help in the transfer of University research to companies.
- Institute of Studies and Socioeconomic Projects of the Savings Bank Caja Rural Intermediterranea "Instituto Cajamar", with headquarters in Almería capital city.

This entity attempts, on the one hand, to improve the production environment by means of the carrying out of studies, seminars, publications, etc., and on the other hand, promote the distribution and cultural participation of the members and co-operators of Cajamar and of the public in general, with the organisation of concerts, cultural exchanges and visits to nature workshops.

- Andalusian Economic Study Society (ESECA). Entity promoted by the Savings Bank Caja de Granada. Amongst its priority work lines the analysis of the economic situation of Andalusia is found, as well as the analysis of the real estate market.
- Economic Analysts of Andalusia. Service of studies of the financial entity of the Savings Bank UNICAJA. Its objective is the promotion and development of economic research in Andalusia. It is specialised in economic development and agricultural studies.
- Experimental Station of Arid Areas. Institute of the Higher Council of Scientific Research (CSIC) belonging to the Natural resources Area located in the city of Almería. Its activity is centred, amongst other issues, on the study of landscape, ecosystems and animal and vegetation communities of arid and semiarid areas. The research lines developed deal with conservation of the biodiversity, training and evolution of the land, functioning of the erosion systems, dynamism and vegetation physiology, interactions between organisms and environment.

### ***2.5.2. Participation Process for the Feasibility Study of the CAMP Project***

The process of participation for the preparation of the Feasibility Study of the CAMP project consists of the organisation of two local Actor Workshops and regional institutions. The first, held on the 10th of May 2005 in Mojácar, was based on a work session where all the attendees discussed the main problems affecting the coast of the scope of the study and proposed various action lines.

The objectives of the first Workshop were aimed at the proposal of solutions to existing problems, favour the consensus between the local actors and carry out a common reflection on the coast. The Workshop was attended by inhabitants of the eight municipalities of Levante de Almería. Amongst the attendees to the Workshop there were representatives of almost all the town halls of the municipalities of the area of study, local businesspeople, technicians of various institutions working in the area, trade unions, Chamber of Commerce, Agricultural Regional Offices and CajaSur, represented by the managers of several of their local offices. At the same time, members of the Regional Ministry of Environment and of the Regional Agriculture and Fisheries Ministry of the Junta de Andalucía were also present.

**Photo 21: Workshop held in Mojácar the 10th of May 2005**

One of the parts of the Workshop consisted in becoming acquainted with the desires and hopes that the attendees had on the future of the region, in order to build, as far as possible, a shared vision that can be used as reference for the future action lines of the Levante de Almería CAMP Project.

Amongst the main expectations that the actors have on the region we can highlight the maintenance of an excellent conservation of the beaches and the rest of natural resources, improvement of the quality of life of its inhabitants, as well as the promotion of the tourist attractiveness of the region. The overcoming of the hydraulic deficit was another of the objectives in which most interest was expressed. At the same time, the interest for Levante de Almería to be an example of 'good practices' in the sustainable development of the coast was also highlighted.

Later on, it was agreed that the main problems of the coast of the scope of the study were related with aspects such as water management, urban development institutions, and marine

resources. The problems highlighted on water management made reference to the inadequate treatment of waste water, the bad quality and scarcity of water, and the very little awareness of its management and inadequate current legislation. Regarding urban development, as main problems the urban growth linked to a provision of deficit infrastructures carried out in the area was highlighted. At the same time, attention was drawn to the lack of public participation and the low level of cooperation between institutions, as well as limited municipal financing.

The absence of coordination between the various socioeconomic agents of the region, the lack of dialogue between the administrations and the population, and the lack of sensibility of the public were the main conflicts highlighted regarding the institutions. Regarding the problems related to marine resources, the disappearance of coastal sand areas, the deficiencies and insufficiencies in the treatment of waste, the diffuse contamination channelled by the watercourses, the risk of the disappearance of traditional fishing, the low level environmental education, and the impact of the trawling fishing impoverishing fishing resources were highlighted.

Finally, the attendees proposed measures to solve the problems, such as the carrying out of a study of the real problems of the water cycle and an analysis of the 'good practices', the design of rationalisation measures of this resource, the start-up of awareness campaigns, the promotion of the coordination between town halls, the diversification of the tourist offer, the study of municipal financing sources, and the promotion of public participation in the drafting of the Urban Plans.

**Photo 22: Workshop panel**

At the same time, the creation of a public-private agreement forum for the carrying out of the CAMP Project, the possibility of starting permanent cultural actions, the need to alternate the manual cleaning of beaches with cleaning by machines, the creation of controlled tips, the promotion of recycling and re-use companies, the establishment of aid to the traditional fishermen, the promotion of environmental education, and the creation of protection reefs were proposed, amongst other ideas.

The carrying out of a second workshop was planned for the month of July 2005. This second workshop will be of an institutional nature, as the institutions related with the management of the Levante de Almería coast will be invited. In said workshop there will be a search for a consensus on the possible actions to be carried out in the CAMP Levante de Almería project scope, making special emphasis on the institutional cooperation and coordination aspects, management of sustainable tourism, and public-private agreement.

After the carrying out of each Workshop, a report will be drafted, including the description of the Workshop carried out, the results and the conclusions reached in a consensus. Said reports will be sent to the Workshop attendees, in order that they may carry out the appropriate allegations, modifications or proposals, thus favouring the development of the participation process.

## 3. ACTIVITIES PROPOSAL

### 3.1. CAMP Levante de Almería Activities

The proposal for activities for the CAMP Levante de Almería project is based on the analysis of various types of information: the activities proposed in other Mediterranean CAMP projects; the Levante de Almería territorial plans; the basic directives for planning and management of the SPAMI Eastern Almería Marine Seabed; the re-orientation of the coastal policy of the Ministry of Environment; the measures proposed in the local actors participation workshops and the recommendations derived from the diagnosis. From this information various activities that could be included in the CAMP project are proposed.

#### 3.1.1 Proposed Activities in CAMP projects

The analysis of the actions proposed to be carried out in the CAMP projects of thirteen Mediterranean countries (Albania, Algeria, Croatia, Egypt, Israel, Lebanon, Malta, Tunisia, Turkey, Slovenia, Syria, Cyprus and Greece) shows a great diversity in the identified measures. As it can be seen in **Chart 40**, the group of measures can be grouped around three main contents: Sustainable Development, Social Capital and institutional development, and territorial management Tools. Within each one of these contents a wide variety of aspects included by the integrated coastal management can be found.

Amongst the *sustainable development* activities, urban, tourist and port development measures are included, as well as waste management, the promotion of renewable energies, and environmental impact studies. All the countries include activities in this section. For example, Egypt, on the Fuka-Matrouh coast, preferably influence the conservation of natural and cultural resources, with erosion, desertification and climate change impact studies, as well as an assessment of the tourist load, and the management of hydraulic resources.

The group of thirteen countries considered show, nevertheless, a bigger relative presence of projects with conservationist objectives (twenty seven actions) than urban, tourist and port development projects (seventeen activities).

Amongst the activities relative to the *social capital and institutional development*, those related with the public participation, training and preparation of human resources, coordination of the institutions in coastal management, as well as the use of the legal and economic instruments

in said management are included. The methodology of the CAMP projects strongly places emphasis on these institutional aspects as a condition necessary for the proper development of the coastal management projects.

Finally, within the specific projects on *territorial management tools*, the geographic information system is included as a project in Algeria, Egypt, Israel, Tunisia, Slovenia and Greece.

On the other hand, in the recent meeting of National Focus Points of the PAP-PAM-PNUMA, held in the French city of Nice (12th-15th May 2005), the need to emphasise some aspects that had not received the necessary attention in the carried out CAMPS up to the moment was highlighted. Amongst these aspects the following are of interest for the Levante de Almería case:

- Development of methodologies and specific pilot cases of planning and zoning of the CAMP marine areas.
- Development and application of methodologies for landscape management.
- Strengthening of the public participation real processes.
- Management of coastal hydraulic resources.

Chart 40. Summary of the activities proposed in thirteen CAMP projects

Activities	Albania	Algeria	Croatia	Egypt	Israel	Lebanon	Malta	Tunisia	Turkey	Slovenia	Syria	Cyprus	Greece
<b>Sustainable Development</b>													
<b>PAM Protocols start-up</b>									X				
<b>Coastal and marine areas integrated management</b>	X	X				X	X	X			X	X	
<b>Urban, tourist and port sustainable development</b>													
• Sustainability strategy		X	X		X		X					X	
• Environmental strategic planning				X									
• Tourist load capacity and tourist planning				X		X	X			X		X	X
• Protection of urban areas, urban sustainable development		X				X			X				
• Prospective (development and conservation scenarios)	X								X	X			
• Port installations plan								X					
<b>Conservation and management of natural and cultural resources</b>													
• Erosion and desertification analysis				X	X		X					X	
• Determination and control of coastal pollution		X	X		X								X
• Hydraulic resources and management of hydrographical basins		X		X		X		X		X	X	X	X
• Cultural resources								X					X
• Selection of protected areas (natural, cultural, marine)		X		X		X	X	X		X	X		X
<b>Waste management</b>		X						X					X
<b>Renewable energies</b>													X
<b>Impact studies</b>			X										X
• Climate change impact				X				X		X			
• Submarine environmental impact									X	X			

**Chart 40. Summary of the activities proposed in thirteen CAMP projects**

Activities	Albania	Algeria	Croatia	Egypt	Israel	Lebanon	Malta	Tunisia	Turkey	Slovenia	Syria	Cyprus	Greece
<b>Social Capital and institutional development</b>													
Public participation		X				X	X			X		X	
Training and preparation	X	X					X		X				
Coordination of the coastal management institutions							X			X			
<b>Legal and economic instruments for coastal management</b>													
• Development of legal instruments	X			X									
• Proposals for the use of economic instruments		X			X								
<b>Territorial management tools</b>													
<b>SIG</b>		X		X				X					X
• Teledetection					X					X			

## 3.2. The Levante de Almería territorial plans

In June 2005 there are four territorial plans in the scope of the eight municipalities making up the East Almería CAMP project:

1. Regional Spatial Planning Sub regional Plan for East Almería (being drafted).
2. Sustainable Development Plan for the Natural Park of Cabo de Gata-Níjar and its area of socioeconomic influence (2004).
3. East Almería Endogenous Development Programme. Proder (2002).
4. Plan for the Development of the region of East Almería. Leader + (2002).

The scope of action of these plans does not totally coincide with the CAMP project municipalities (**Chart 41**). All these, with the exception of the Natural Park of Cabo de Gata-Níjar, have a bigger territory as they also consider other inland municipalities closely related to the coastal ones.

**Chart 41. Levante de Almería territorial plans (municipalities surface in ha)**

Municipalities*	CAMP Project feasibility study	Sustainable Development Plan for the Natural Park of Cabo de Gata-Níjar	Regional Spatial Planning Sub regional Plan	Endogenous Development Programme and Leader +
<b>Almería</b>	295	**		
<b>Carboneras</b>	95	95	95	95
<b>Cuevas de Almanzora</b>	263		263	263
<b>Garrucha</b>	8		8	8
<b>Mojácar</b>	72		72	72
<b>Níjar</b>	601	601		601
<b>Pulpí</b>	96		96	96
<b>Vera</b>	58		58	58
Antas			100	100
Bédar			46	46
Los Gallardos			35	35
Huércal-Overa			318	
Taberno				44
Turre			108	108
<b>Total Surface</b>	<b>835</b>	<b>601</b>	<b>841</b>	<b>1.168</b>
Number of municipalities	8	3	11	12
* the municipalities in bold correspond to the CAMP feasibility study				
** The municipality of Almería is considered partially (three nuclei)				

The case of the municipality of Almería is special due to the influence of its capital, which is, at the same time, the capital city of the province. The capital nature of Almería provides it the specific characteristics of a service centre, urban agglomeration and large commercial port that does not coincide with the situation of the rest of municipalities considered in the CAMP feasibility project. This may be the reason why the other territorial plans do not include the city in their scope of study with the exception of the Natural Park Sustainable Development Plan that considers the three nuclei of the municipality of Almería within the protected area, although not the totality of the municipality.

### **3.2.1 Regional Spatial Planning Sub regional Plan for East Almería**

This plan, still being drafted by the Regional Ministry of Public Works and Transport, is carried out within the 1994 Law of Regional Spatial Planning of Andalusia, which laid down that a regional spatial planning at sub regional scale will be drafted. Up to June 2005, the Regional Ministry has still not disclosed the prior studies of the territorial Diagnosis, dated July 2003, which has been the document used for this analysis.

The municipalities included in the Planning Plan are eleven. Of these, six of them are coastal, which coincide with those of the CAMP scope, with the exception of Níjar and Almería. An Urban Agglomeration Sub regional Plan is planned to be carried out in Almería capital city.

The coinciding coastal municipalities are six: Pulpí, Cuevas de Almanzora, Vera, Garrucha, Mojácar and Carboneras. Apart from these municipalities, the Planning Plan includes other five inland municipalities (Huércal-Overa, Antas, Bédar, Turre and Los Gallardos), adjoining the previous and with a very close relationship with them, due to the real estate expansion processes that are taking place from the coast towards the interior. The surface of the territory considered in this plan is 1,199 km<sup>2</sup>.

The territorial diagnosis document is structured in eight sections, each one of them tackling a specific territorial issue, and within each section being two parts. The first deals with the most important aspects of the diagnosis in this issue, and the second one, designing the action lines, called, in this document, 'bases for the planning'.

The titles of the sections show relevant aspects of the diagnosis, as well as the orientation of the actions included in the bases for the planning. These are the following:

1. A polycentric urban system with potential for the structuring of the territory and organisation of the regional facilities.

2. A transport network requiring improvement in order to meet the demands of internal relationship and that plans some uncertainties before the planned large infrastructures of connection with the exterior.
3. A deficient hydraulic balance that aims for a sustainable use of the hydraulic resources, and that should condition the occupation model of the territory.
4. A new model of occupation of the rural space, with accelerated and intense capacity of transformation, requiring criteria to make the development of the various productive activities compatible and plan their respective spaces.
5. Mainly residential tourism with potential to become a base of a tourist model of services and to the identification and promotion of a regional tourist destination.
6. A territory of quality, to protect and increase the value of its resources and landscape, environmental and recreational functions.
7. A scope producing electric energy, that needs to complete the supra-local infrastructure systems.
8. A territory in need of resources to minimise the incidence of natural and technological risks, intensified by the new land occupation patterns.

Some examples of the steps that are planned in each section are the following:

1. Promote the specialisation of each of the subheadings defining the relationship between themselves in terms of being complementary. Thus, Vera, may house supra-local activities such as secondary teaching, and cultural and sport premises of a regional nature. On the other hand, Cuevas de Almazora may be provided with administrative premises and services. Garrucha, nevertheless, would become as a nucleolus of services on the most tourist developed coast.
2. The network of roads should include by-passes for the towns of Pulpí, Vera and Mojácar. The integration of Pulpí with the rest of the region should by means of an alternative to the ALP-118 coastal road.
3. Accelerate the arrival of the water from the transfer from the Negratín reservoir (in the province of Granada) to the Cuevas del Almanzora reservoir (in the province of Almería), at the same time as the restriction of potentially irrigable land and the promotion of waste water treatment for a possible increase in the number of golf courses.
4. Limit the development of greenhouses in the LLano central area, located to the south of the Aguas River as far as the Sierra de Cabrera, which has considerable abandoned arable land and which makes up the view from the Mojácar and Bédar viewpoints, as it can become a preferential area for tourist activities. The definition of the exclusion areas of the pork livestock activity in application of the existing

regulation (RD 324/2000, BOE of the 8<sup>th</sup> of March) and those of preferential localisation, and also draw up waste management plans.

5. The new tourist urban developments should favour services tourism with a sufficient level of facilities and services, instead of a purely housing activity. In this way, a greater implementation of hotel activity would favour reducing the summer season tourism, at the same time as the supplementary installations such as golf courses, moorings, shopping centres and services would qualify the tourist offer. In this respect, the building of tourist, residential and leisure resorts can find appropriate land in central Llano for a correct location, whilst the interior tourism would have to be re-orientated towards the nuclei and disperse towns already existing, avoiding new disperse housing developments in the territory.
6. The landscape as a quality of the territory involves that the physical planning preserves, improves or regenerates very visible areas with a high level of transit, but greatly changed and degraded such as those of Vera and Pulpí, or the tourist areas between Pueblo Indalo and Vera Playa, as well as the inside urban edge of Vera-Playa and Garrucha. The new irrigation agriculture should include landscape criteria preserving outstanding geomorphologic points, watercourse beds and natural reservoirs, guaranteeing the connection of habitats and minimising the visual impact of the talus, as well as the promotion of viewpoints.
7. The supra-local systems of infrastructures of water supply, sewage and energy should be completed by reducing the excessive dependence on fossil fuel with the introduction of cogeneration and renewable energies, above all solar energy.
8. The regulation, and even prohibition of building, productive and public uses in the areas with risk of flooding, such as those of rivers, watercourses and rest of elements concentrating surface runoffs is considered necessary. The regression of the beaches should be limited avoiding sediment traps that prevent the building up the coastline. The presence of buildings, that hold back or make difficult the flow of fine oblique to the coastline, or the building of ports or other elements perpendicular to the coastline preventing the normal movement of sediment along the coast. The technological risks due to the presence of large industries (Cement Factory and Thermal Power Station in Carboneras, Deretil and Yedesa) put forward the convenience of separating the traffic of hazardous goods and the intense traffic of heavy vehicles of the traffic linked to the daily urban and tourist activities.

### ***3.2.2 The Natural Park of Cabo de Gata-Níjar Sustainable Development Plan***

The Sustainable Development Plan of the socioeconomic area of influence of the Natural Park of Cabo de Gata-Níjar was approved by the Management Board of the Government of the

Junta de Andalucía on the 27<sup>th</sup> of January 2004. The time schedule of the SDP is six years, with which its actions are framed within the current community framework 2000-2006. After the drafting and approval of the Natural Park PORN and PRUG, the Sustainable Development Plan represents the completion of a planning process which started in 1987, at the time of the declaration of the Natural Park.

Its scope of action on the socioeconomic area of influence of the Natural Park, that is to say, the municipalities that have part of their territory within the protected area. In this case these are the municipalities of Carboneras and Níjar and the three nuclei of Cabo de Gata, La Almadraba and Pujaira, of the municipality of Almería.

The municipality with the greatest surface area in the Natural Park is Níjar, with 71% of the protected area, with a great difference over Carboneras (20%) and Almería (9%). It should be clarified, nevertheless, that although the municipality of Carboneras only has 20% of the territory of the Natural Park, the latter covers 83% of its municipal area, whilst the 71% of the protected area belonging to Níjar only covers 45% of the municipal area.

The Sustainable Development Plan (SDP) forms part of a strategy based on the need to combine conservation with socioeconomic development, in keeping with the European Union guidelines and the International Summits in Rio and Johannesburg of increasing the value of the natural areas as important development assets. The sustainable development of the protected areas is, without any doubt whatsoever, a challenge, above all if we take into account the importance and participation of Andalusia in the Natura 2000 Network, to which it contributes with a proposal for Community Place of Interest (LIC) that has 193 places, that is to say, 28% of its territory, being one of the Spanish regions that has a higher percentage of protected area.

Nevertheless, in spite of the importance of the natural protected areas as development assets, a large part of the local population in the various Andalusian areas still consider the declaration of natural protected areas as a hindrance for the carrying out of some ways of life. In fact, the analysis of the social perception on the declaration of Natural Parks in Andalusia still demonstrates the existence of this opinion amongst the local population, which appears to be related to the lack of sufficient information, and also the low level of communication between the various local actors of the important ecological functions carried out by the Natural Parks, and the need to take advantage of the declaration of a natural protected area for the design of sustainable development strategies in rural areas.

The final objective of the SDP is the improvement in the level and quality of life of the population in the influence of the Natural Park in a way that is compatible with environment conservation, and considering the natural protected area as an important asset in the local economic development as laid down in Law 2/1989, by which the Inventory of Natural Protected Areas in Andalusia was approved and additional steps for their protection are established.

In order to reach this final objective, the SDP includes specific objectives such as the improvement of the productive exploitations and business activities linked to the sustainable use of the Natural Park resources, in this way attempting to provide employment opportunities and local population income related to the protected area.

The SDP should also search for the taking advantage of the opportunities generated by the nearby economic dynamism or that has incidence on said territories, attempting, at the same time, the identification of environmental risks and impacts of the activities taking place in said areas.

In this way, the Sustainable Development Plan for the Natural Park of Cabo de Gata-Níjar and its area of socioeconomic influence is structured around seven action programmes, each one of which is detailed in different lines of action that carry out a series of actions and specific steps that complete the SDP.

*Programme 1*, relative to the valuation of the natural heritage includes three lines of action: environmental education, conservation and valuation of natural resources, and management of the natural environment.

For the achievement of *Programme 2*, on the valuation of cultural heritage, another three lines of action are included, referred to the cataloguing and inventory of cultural heritage, the recovery and management of said heritage, and the intervention and management of the same.

*Programme 3*, on the promotion of the local production system, includes the lines of diversification of local production, improvement in marketing and business management, and improvement in the territorial offer of services supporting production.

*Programme 4* (human resources training and promotion of research and development) includes two action lines: the adaptation of the human resources training offer to the needs of the local production system, and the promotion for sustainable development and local innovation.

*Programme 5*, dealing with the improvement of the basic infrastructures and facilities, including lines of action for the improvement of the production infrastructures and new information and communication technologies, improvement of road, energy and environmental infrastructures, as well as the improvement of the public use facilities and the improvement of the social facilities and services.

*Programme 6* (improvement of the institutional development management) includes the lines of action for the improvement of territorial and urban planning, improvement of the institutional coordination and the strategic management for sustainable development.

Finally, *Programme 7*, referred to the promotion of the revitalising and social participation, including the lines of action for the promotion of the local entrepreneur culture, promoting of associations and local participation, promotion of the integration of women and integration of immigrants in the socioeconomic scope.

Some of the proposed measures affecting specific coastal issues are the following:

#### **Programme 1. Valuation of the Natural Environment**

- Evaluation of the function of the artificial reefs existing in the coastal area of Cabo de Gata, to study the possible installation of new reefs in such a way to have the function of regeneration of the fishing banks and avoiding the use of unauthorised fishing practices.
- Control of disposal to the Maritime-Terrestrial Public Domain of the aquaculture installations of the Natural Park and of other productive activities that generated waste disposal to the coast.
- Increase of the coastal surveillance in the maritime-terrestrial area of the natural Park, preventing illegal fishing and illegal camping on the beaches.
- Surveillance, control and strict application of the regulation regarding the prohibition of submarine fishing.
- Creation of training courses for the environment agents on the possible impact on the Natural Park maritime area.
- Provision of the appropriate means to the environment agents for the protection, control and surveillance of the marine resources.
- Improvement of the coordination of the environment agents in the maritime area, studying the possibility to define a specific region.
- Increase of the numbers of wardens responsible for the surveillance and control of the Natural Park towards the maritime means, as well as towards the visitors (seasonal massification and illegal camping) and the construction of second residences and illegal greenhouses.

- Informative campaign amongst the visitors on the importance and value of the Natural Park regarding the richness of the marine environment, volcanic and geological richness, peculiarity of the desert landscape and floral richness.

## **Programme 2. Valuation of the Cultural Heritage**

- Promotion of agreements between the Culture Regional Ministry and Rural development Groups, Town Halls and private entities, for the conservation and recovery of the cultural heritage, especially that related to the salt mines, water (underground tanks, mills and ditches) and mining.
- Support for the setting up of a permanent exhibition in some of the fishing nuclei on the traditional fishing culture.
- Recovery of the existing fortifications on the coast for their use as landscape interpretation centres (for example, Los Escullos Castle).

## **Programme 3. Promotion of the Local Production System**

- Promotion of the speciality tourism linked to submarine tourism, geo-tourism, phyto-tourism, and scientific tourism (conventions, congresses, research and third cycle educational practices).
- Institutional support for the modernisation of the Natural Park fishing sector.
- Distribution amongst the companies and industries in the Natural Park of the good environmental practices edited by the Regional Ministry of Environment, mainly those referring to the sectors of aquaculture, port installations, greenhouse intensive agriculture, ceramic product sector, tourist sector and industrial estates.

## **Programme 4. Human resources Training and Promotion of Research, development and Innovation**

- Adaptation of the local training offer to the demand of the business sector, reinforcing the professional training in fishing, agriculture, livestock farming and hospitality.
- Design of courses for the diversification of the activities of the fishing professionals and the inclusion of young people in the agricultural activity.
- Signing of an agreement between the fishing fraternities and university departments for the study of the conservation of the marine resources of the area.
- Design and implementation of a regional Geographic Information System and its promotion between the area businesses.

### **Programme 5. Improvement of the Basic Infrastructures and Facilities**

- Design of three types of roads as 'landscape lanes': the ALP-118 coastal road, the tracks inside the Natural Park, and the old mining railway tracks (Lucainena to Agua Amarga, from Bédar to Garrucha and that from Herrerías to Villaricos).
- Improvement of the access roads to the Natural Park from the North area, without changing the nature of landscape lane of the ALP-118 coastal road, destined for tourist and recreational traffic.
- Improvement of the fishing facilities in the ports and moorings of the Natural Park.
- Conservation, improvement and extension of the public use installations and facilities, as well as those maritime-terrestrial public domain areas that support the coastal recreational uses.
- Promotion of the implementation of an environmental management system in port installations.
- Promotion on the beaches with traffic congestion problems, the use of other alternative means to cars (for example, bicycles, bus service and car parks in San José).

### **Programme 6. Improvement of the Institutional Development Management**

- Appointment of a Technical Unit for the coordination and promotion of SDP, integrated in the Gerencia Provincial de Almería de la Agencia de Innovación y Desarrollo de Andalucía (the previous Institute for the Promotion of Andalusia).
- Cooperation between the Innovation and Development Agency and the various local development entities in the territory: Association for the Development of East Almería, Employment Territorial Unit, Local and Technological Development, Employment and Local development Agents, and others, to efficiently adapt the actions to the SDP strategy.

### **Programme 7. Promotion of Revitalisation and Social Participation**

- Promotion and information of the successful activities in the natural protected areas by means of workshops and visits of businesspeople.
- Creation of an annual contest for business projects of young population.
- Support for the carrying out of joint activities between public and private actors, related with the information or action in favour of sustainable development.
- Promotion of the cultural volunteering of the elderly population and their participation in the information of the cultural heritage amongst their neighbours.

### **3.2.3 East Almería Endogenous Development Programme**

This Programme was approved in the Convocatoria del Programa Operativo para el Desarrollo y Diversificación Económica de Zonas Rurales (PRODER) in Andalucía 2000-2006, being responsible for the same the Association for the development of the East Almería Region, founded in November 1996 by two local consortiums, a town hall, the association of businesspeople and shop keepers of two municipalities, a green group, and a sports association. Later on, other members became part of this Rural Development Group, amongst which there are a fishing fraternity, three irrigation communities, two groups for the health defence of the pig cattle, an agricultural cooperative, trade unions and private members. This variety of members is a good example of public-private cooperation that it is instrumented by means of a technical office with a professional management team at the head of the same.

The Programme includes thirteen municipalities, two more than the Regional Spatial Planning Sub regional Plan, as it includes Níjar and Taberno. Níjar is one of the eight municipalities considered in the CAMP Project. Of these thirteen municipalities, seven are coastal: Pulpí, Cuevas de Almanzora, Vera, Garrucha, Mojácar, Carboneras and Níjar, whilst the inland municipalities adjoining the previous ones are Taberno, Huércal-Overa, Antas, Bédar, Los Gallardos and Turre.

The general objective of the Programme is the promotion of the endogenous development and the economic diversification of the East Almería Region by means of the financial support to projects and initiatives of promoters and entrepreneurs contributing to the same. To achieve said general objective, the development strategy includes six strategic axes, which are referred to in the four large scopes of action of the Endogenous Development Programme:

Axis A: Productive valuation and local economic diversification.

Axis B: Protection and improvement of the heritage and environment.

Axis C: Improvement of infrastructures and facilities.

Axis D: Socioeconomic revitalisation.

These four strategic axes are broken down in eight lines of action.

In axis A, production valuation and local economic diversification, the lines of action included are for the valuation of endogenous products, of the rural environment, and that of promotion, improvement and economic diversification in the agricultural, arts and crafts and rural tourism sectors.

Axis B, protection and improvement of the natural and cultural heritage, a line of action for the prospect ion and improvement of the heritage and environment is included.

Axis C, which deals with infrastructures and facilities, includes two lines of action, that of development and improvement of the infrastructures related to agricultural production, and that of improvement in infrastructures and facilities in non-agricultural rural areas.

Finally, in axis D, socioeconomic revitalisation, three lines of action are included: that of economic revitalisation, that of promotion of cooperation strategies for the sustainable rural development and that of functioning of the Rural Development Group.

At the same time, in each action line various activities are proposed, attempting to obtain cooperation in the achievement of the objectives that are planned for each one of them.

The activities proposed in the Endogenous Development Programme that have a direct relationship with coastal issues are scarce, including in the same as a territory of cultural interest and source of fishing resources.

The activities expressly mentioning coastal issues are the following:

#### **Line of action 2. Promotion, improvement and local economic diversification**

- Promotion of the productive diversification in the fishing sector and promotion of aquaculture.

#### **Line of action 3. Protection and improvement of the heritage and environment**

- Research on the situation of the fishing banks in the region.
- Campaigns for the awareness and information amongst fishermen/women of the importance of the prairies of posidonia and other marine resources to guarantee the continuity of their activity.
- Carrying out of volunteering campaigns amongst the local population for the cleaning of coastal landscape and public mountains.
- Carrying out environmental awareness campaigns amongst the various productive sectors, mainly, fishing, agriculture and livestock farmers.
- Cooperation agreements amongst the fishermen associations and research centres for the study and follow-up of the biological cycles of the marketable species.

- Active participation in the actions of the Sustainable Development Plan for the Natural Park of Gata-Níjar and their socioeconomic influence area.
- Promotion of the fishing culture by means of the creation of fishing museums, marine workshops, sea interpretation centre, etc.

**Line of action 5. Improvement of infrastructures and facilities in non-agricultural rural areas.**

- Support for the creation of a network of cultural facilities (fishing museum, eco-museums, archaeological and traditional trades museums).

**Line of action 6. Economic revitalisation**

- Promotion of business activities amongst the fishermen and women.

**Line of action 7. Promotion of cooperation for rural sustainable development**

- Carrying out of cooperation activities with the entities and actors involved in the carrying out of the Sustainable Development Plan of the Natural Park of Cabo de Gata-Níjar.

**3.2.4 Development Plan of the East Almería Region (Leader +)**

This Plan, presented to the LEADER + tender of the European Union, is a supplement to the Endogenous Development Plan of the Region of East Almería that attempts to enrich the strategy of rural development providing it with innovative, experimental, thematic, quality, and integrated planning. The Development Plan of the East Almería Region has a period of time of six years, specifically from 2001 to 2006.

The Development Plan is supplemented by the Cooperation Project and the commitment for the participation in the Joint Cooperation Actions that are summoned by the Regional Ministry of Agriculture and Fishery of the Junta de Andalucía, and its integration in the network of the rest of the rural development groups. All this attempts a putting into common of technical and human resources and financial know-how, by means of thematic guidelines shared by the various territories making up the Cooperation Group, or that integrate the rural development group network, together with the territories identified in each cooperation action.

The intervention proposal for the rural development of the region attempts to include the necessary management, social and institutional technological innovations, in order to build a territorial environment favouring said changes, and increase the competitiveness of the region

productive system, in a sustainable way in an especially vulnerable physical means and with a considerable deficit in hydraulic resources.

The development strategy has as agglutinant aspects the use of the latest knowledge and technologies in order to increase the competitiveness of the region products and services, valuing the natural, social and territorial resources; promoting emerging activities that take into account the social, environmental concern and the gender and youth perspective.

In this region, as a peripheral area, the use of the latest knowledge and technologies can contribute outstandingly to the reduction of the relative disadvantages due to the physical distance of the cultural and productive information centres.

The quality in the rural environment, as the essential base to increase differentiation and competitiveness of the local products and production processes, should also be included in the group of cultural and environmental heritage resources. This valuation of the natural and cultural heritage in its group allows the increase of the quality of life in the rural areas, thus increasing the attractive points of the East Almería Region. In this respect, the Rural Development Association of the East Almería Region actively cooperates with the Sustainable Development Plan of the Natural Park of Cabo de Gata-Níjar.

The Development Plan Strategy dedicates, therefore, special attention to the creation of an institutional environment that improves the capacity of the organisation and participation of the social and economic agents of the region, and, in general, of the group of the local general public. For this it is necessary to promote the positive valuation of the rural resources, the social articulation, the promotion of the associations and the participation of the public in general, as well as the development of the social economy, territorial identity and the feeling of belonging by the region population.



### **3.3. Basic planning and management of the directives of the SPAMI Eastern Almería Sea Beds**

The Specially Protected Areas of the Mediterranean Importance (SPAMI) of the Eastern Almería Sea Bed was approved in November 2001 in the XII Ordinary Meeting of the contracting parts of the agreement of Barcelona.

In Annex I of the Protocol on the Areas Especially Protected and the Biological Diversity of the Mediterranean of the Barcelona Agreement, it is established that, in order to be included in the ZAPIM list, a protected area has to have development plan. Hence the Regional Ministry of Environment of the Junta de Andalucía, in cooperation with the Eco-development Association, has drafted a series of management and planning of basic directives of the SPAMI Eastern Almería Sea Beds, with a validity of eight years that have the consideration of a Development Plan.

The area declared as SPAMI is part of the proposal of Areas of Community Interest (LIC) drafted by the Junta de Andalucía. Its high strategic value is based on the presence of the largest and best preserved prairies of *Posidonia* of the Andalusian coast, as well as of the Isles of San Juan de los Terreros and Isla Negra, declared Natural Monuments by virtue of the Decree 226/2001, of the 2<sup>nd</sup> of October.

The scope of application of the Development Plan is a stretch of territory parallel to the coast with a surface of 6,316 ha. It is a submerged area, with the exception of two islets, San Juan de los Terreros with 1.5 ha and Isla Negra with 0.9 ha.

In the Basic Directives some measures that can be of interest for the CAMP project are found. These are the following:

- The Regional Ministry of Environment will promote the drafting of a database on data on endangered fauna species present in the area. For the nesting birds periodical census and population follow-ups will be carried out.
- The space managing organism, in cooperation with the competent Administrations regarding fishing, will carry out a detailed statistical follow-up of the fishing activity within the area and the incidence of the professional and sport fishing activities on the marine ecosystems.

- Urge the competent authorities for the declaration of a Fish Reserve in the area.
- Establish a maximum amount of people a day for the guided practice of scuba diving with autonomous mask in the area. This public use limit should be agreed upon with the companies dedicated to this activity.
- Activities such as submarine and surface guided itineraries, sail cruises, sailing with glass-bottom boats and didactic observation mini-submarines will be promoted, for a better knowledge and information of the natural, landscape and eco-cultural values of the SPAMI.
- In order to carry out sporting activities the sports groups should apply for permission to scuba dive, sail and fish.
- The Administration managing the area will establish the routes and the scuba diving areas by means of signs and a surveillance and control service.
- Establishment of guided submarine routes by qualified monitors showing the area values, and guaranteeing that the natural communities are not affected.
- Design of routes on the islets to observe the existing unique ornithological communities.
- Carrying out of follow-up tasks of the effects of the tourist and recreational uses within the SEPIM, and specifically that of autonomous mask scuba diving, boat mooring and visits to the beaches.
- Follow-up of the waste disposal points on the coast of the SPAMI area.

### **3.4 Spanish Ministry of the Environment Coasts Policy Reorientation**

The Spanish Shores Act 22/88 was specially designed for the management of the Terrestrial Public Domain, and not from a point of view of integrated management of the coastal areas. In fact, we have had to wait to halfway through 2004 to find a decisive reorientation of the coastal policy in Spain, which includes the promotion of integrated and sustainable management of the coast; the promotion of the integrated and sustainable management of the coast; the start-up of the drafting of a Director Plan for the sustainability of the coast; the completion of a demarcation plan of the Spanish coast; the conservation and recovery of the marine biodiversity; the cooperation with the town halls and drafting teams of the urban instruments, mainly the General Plans, in order to achieve an integrated urban action; the protection of the Terrestrial Maritime Public Domain (DPMT) and of its biodiversity by means of the purchase of land; the drafting of a programme for the maintenance and conservation of the coast; the inclusion of a system of management indicators of the DPMT and the establishment of a cooperation strategy of the Autonomous Communities regarding marinas.

At the same time, the Ministry of the Environment has presented all the coastal Autonomous Communities a framework Agreement model that establishes the cooperation bases for the integrated coastal management, whose compliance and management will be carried out by the Bilateral Mixed Commissions, in which the active participation of the Local Administrations and the social agents involved is planned. This cooperation framework should harmonise, by mutual agreement, the application of the environmental legislation, both regional and national, specifically regarding the environmental assessment procedures of the various actions.

This important change in the coastal policy of the General Administration of the Nation of Spain has come together with the institutional reorganisation of the Ministry of the Environment, having created the General Secretariat for the Territory and Biodiversity, in order to facilitate the coordination of the main thematic areas (water, coasts, forestry areas, biodiversity and protected areas). In this way, to the traditional functions of the Coasts General Management, regarding the defence, protection and conservation of the beaches, as well as the construction of promenades and coastal paths, important actions for the conservation of the natural environment have been added, exceeding the preceding idea that the tourist public work in urban areas.



### 3.5. Diagnosis recommendations

The CAMP Levante de Almería project area diagnosis includes the institutional, environmental and socioeconomic context, the environmental impacts of the economic activities, as well as the identification of local actors.

Of the institutional context analysis we give importance to the promotion of the institutional coordination between the various levels of the territorial and sectorial public administrations with responsibilities in coastal management; the technical training of human resources for the integrated management of the coastal areas; the strengthening of the territorial information and management tools based on a Geographical Information System (SIG); the creation of a platform linking the offer and demand of available technical knowledge for the research and development for local innovation (R+D+i) in this field, and the institutionalisation of the public participation on coastal issues.

The knowledge on the coastal system is mainly lacking on the marine environment, so it would be necessary to gather this information together, and achieve the proposal for appropriate planning, delimitation of areas and management. Nevertheless, there is reasonable knowledge on the living resources in the terrestrial environment.

On the other hand, the considerable deterioration of the landscape in some areas of the CAMP territory and the lack of instruments that allow preventing this in a consistent way, advises to obtain such instruments as soon as possible.

The information on the objectives and the results of coastal management starts to consolidate a model of relative transparency. As a consequence, the need for a system joining the information regarding the coast is planned. In the same way, the social and institutional participation in the coastal management process is still reduced. For this reason, we have to promote collegiate organisms or debate forums for the various problems threatening the coast, in which all the organisms with responsibility for the same should be included.

As sufficiently repeated, in this area the underground hydraulic resources have overexploitation problems with a progressive running out of the aquifers and an increase of salinity, reaching, in some cases, the extent of become useless. In spite of their strategic importance we do not know the situation of the aquifers, that is why it is necessary to undertake a specific study of the capacities of the aquifers for which the simulation models based on the systems dynamism, and their representation by means of a Geographical Information System, can be used as instruments. On the other hand, the uncontrolled use of fertilisers, being chemical products providing the necessary nutrients for the development of the plants, causes salinisation of the land, and the contamination of water by nitrogenised and

phosphated ions. The nitrates and nitrites, diluted in the land solution, are absorbed by the same, and when the water intake increases and exceeds the land retention capacity, the nitrogenised ions and the phosphates are removed from the land with irrigation or rainfall water to surface and underground water courses, fact that generates serious eutrophisation problems in the aquifers in the field of study.

The lack of water to meet the existing demand of agriculture continues being one of the main reasons for social, economic and environmental conflicts in the scope of study. Therefore, the promotion of alternatives in order to increase irrigation water efficiency, by means of the modernisation of the systems and orientation of the current agricultural crops towards production with hydraulic requirements more in accordance with the environment, it seems more and more necessary to orient the existing agricultural model towards a more sustainable production in the long run.

The consolidation of a settling model based on the occupation of the coast and the foot of the mountains of the coastal mountain ranges without taking into account the hydraulic deficit and the high pressure on the natural resources, puts the sustainability of the territory in a difficult situation. Hence, the need to reach agreements with the organisms with responsibilities for land, housing estates, building companies, local population, businesspeople and financing entities in order to promote sustainable urban development and building. The development of building techniques that include sustainability elements, already started in other areas of Spain, is, at the same time, an inclusion of frontier production innovations, with capacity to promote a cluster of business and employment of great importance and future influence in the territory.

At the same time, it is necessary to carry out studies on the capacity of the local fish banks to support the activity of the fleet fishing in them, and determine the load capacity and captures that can be made, establishing measures to protect the marine natural resources and the sustainability of the fishing activity in the area. The conservation of the marine natural resources is very important, as, apart from the fishing sector, the conservation of the beaches depends on the same, one of the most important tourist resources in Levante de Almería.

The resident population increases in an outstanding way during the months of summer due to the visits of tourists to the area, and, in some areas, the infrastructures and facilities present large deficits with respect with this population. Hence, the need to carry out a study on the capacity of the tourist load of a territory that establishes an amount of seasonal population, the offer of tourist premises, (hotels, guest houses, apartments, vacational tourism houses) and the provision of infrastructures and basic facilities.

### 3.6. Measures proposed in the local actors Participation Workshops

As mentioned, the local actors Participation Workshops are part of the activities carried out in the Feasibility Study of the CAMP Levante de Almería.

The summoning to the attendees of the first Participation Project was carried out by the Rural Development Group of East Almería, that invited the local actors whose activity is linked to the coast, such as the mayors of the eight municipalities, fishermen, local businesspeople, Administration technicians, University lecturers, development agents, Green groups, diving schools, financing entities, port authority technicians, real estate promoters, technicians from the Agricultural Regional Offices and secondary school teachers, amongst others. There were also technicians from various institutions of the area, such as trade unions, Agricultural Regional Offices and Chamber of Commerce, as well as representatives from the Regional Ministry of Environment of the Junta de Andalucía and from the PAP-PAM-PNUMA. A total of 53 people attended this first Workshop.

The objectives of the Workshop were the following: propose solutions to the existing problems on the coast; favour the agreement between the territory actors; and carry out a common reflection on the possible measures to be carried out in the CAMP Levante de Almería.

After the first round of problems with all the attendees, four working groups were formed, for each one of them to tackle a block of problems. In each work group a person to chair the meeting was provided, facilitating the attendees the order and hierarchy of the ideas that came up. The work groups were the following:

Group 1. Problems and measures related with water.

Group 2. Problems and measures related with urban development.

Group 3. Problems and measures related with institutions.

Group 4 Problems and measures related with the sea.

The members making up **Group 1 Measures on water** highlighted the possibility of carrying out the following:

- A study on the real problems of the water cycle.
- An analysis of the 'good practices' carried out in municipalities with water scarcity problems.

- The design of rationalisation measures of this resource.
- The start-up of awareness campaigns for the population in general, and specially addressed to the young population.

**Group 2 Measures on urban development** considered the need to:

- Promote coordination amongst town halls.
- Diversification of the tourist offer.
- Study of the possible alternative sources for financing the Town Halls.
- Facilitate general public participation in the drafting of Urban Plans by means of the creation by the Town Halls of web pages and their commitment to reply to all the suggestions.

**Group 3 Measures on institutions** highlighted the possibility of:

- Create a public-private agreement forum for the carrying out of the CAMP, after the prior identification of the territory agents that could be part of the same.
- Start-up of permanent cultural actions by means of the creation of museums and organising talks, university workshops.

**Group 4 Measures on marine resources** highlighted, amongst others, the need to:

- Alternate the manual cleaning of beaches with automatic, to decrease the impact on certain plants of the coastal sand dunes.
- Creation of protection reefs.
- Creation of controlled tips.
- Promotion of recycling and re-use companies.
- Establishment of help for the traditional fishermen.
- Promotion of environmental education.

The valuation of the work session by the attendees highlighted the participation obtained as a positive aspect, the ease of reaching group conclusions, as well as the pleasant experience of getting to know people from various municipalities and their opinion on a common problem. Nevertheless, as negative aspects they highlighted the lack of time for the group work together, and the lack of concretion in the mentioned measures.

This first Workshop was the basis, together with the diagnosis recommendations and the orientation of the territorial plans of Levante de Almería for the Regional Development Institute team, of drafting the technical proposal of activities for the CAMP Project, as well as the

institutional design of the mechanisms for its carrying out, and a list of singular projects. This proposal was presented to a Second Participation Workshop in which this was discussed and the activities to be carried out were agreed upon.

The second CAMP project participation Workshop, held in Carboneras on the 20th of July 2005, had 22 attendees, mainly technicians and those responsible for the Provincial Delegations of the Regional Ministries of the Junta de Andalucía, as well as a mayor, civil servants and local technicians, together with those responsible for the promotion of the project from the Regional Ministry of Environment of the Junta de Andalucía, from the Ministry of Environment and from the United Nations.

In the first place, the attendees were presented the general scheme of the project. Once agreed upon by the workshop attendees, a detailed proposal of the activities was collectively discussed. Said discussion allowed the improvement of the initial technical proposal.

The general scheme agreed upon in the Workshop was structured in three transversal axis and various singular projects. The transversal axes were the following:

A-1. Institutional Coordination and Social Participation.

A-2. Information and Environmental Education.

A-3. Training.

The eight singular projects resulting from the discussion were those below:

1. Methodology for the evaluation of heritage in urban actions.
2. Study of the load capacity of the production activities of the territory.
3. Conservation and tourist use of the Cultural Heritage (archaeological, architectonic, landscape, ethnographic, etc.).
4. Sustainable management of hydraulic resources: load capacity of the aquifers and prospective simulation of the water consumption by means of systems dynamic models. Integrated study of water management, coast and biodiversity.
5. Determination of areas and planning of the marine environment.
6. Creation and application of methodologies and landscape management tools.

**3. CAMP Levante de Almeria activities**  
**3.6. Measures proposed in the local actors Participation Workshops**

7. Evaluation of the purchase and recuperation of land by the Administration as a management tool.
8. Evaluation of the fishing resources and sustainable practices.

The Workshop was chaired by the Regional Development Institute (IDR), which positively evaluated the carrying out of the Workshop due to the excellent work atmosphere in which it developed, and the value of the attendees contributions, which have allowed an important improvement in the initial technical proposal of the CAMP project activities.

The IDR has drafted two reports on both Workshops that have been sent to the attendees as recognition of the work carried out.



### 3.7. Institutional mechanisms and activities proposed

The CAMP project activities detailed below are based on the analysis of the actions proposed in other Mediterranean CAMP projects; the territorial plans of East Almería; the basic directives of planning and management of the SPAMI Eastern Almería Sea Beds; the recommendations derived from the diagnosis, the reorientation of the Coasts Policy of the Ministry of Environment, and the proposals drafted by the public and private actors of the territory by means of the participation process promoted in this feasibility study.

The participation process for the preparation of the Feasibility Study, as previously indicated, has included the organisation of two Participation Workshops of local actors and territorial institutions, held in May and July 2005. In the second Workshop an agreement was reached on the organisational structure of the CAMP project, as well as the institutional design of the mechanisms for its carrying out and a list of singular projects.

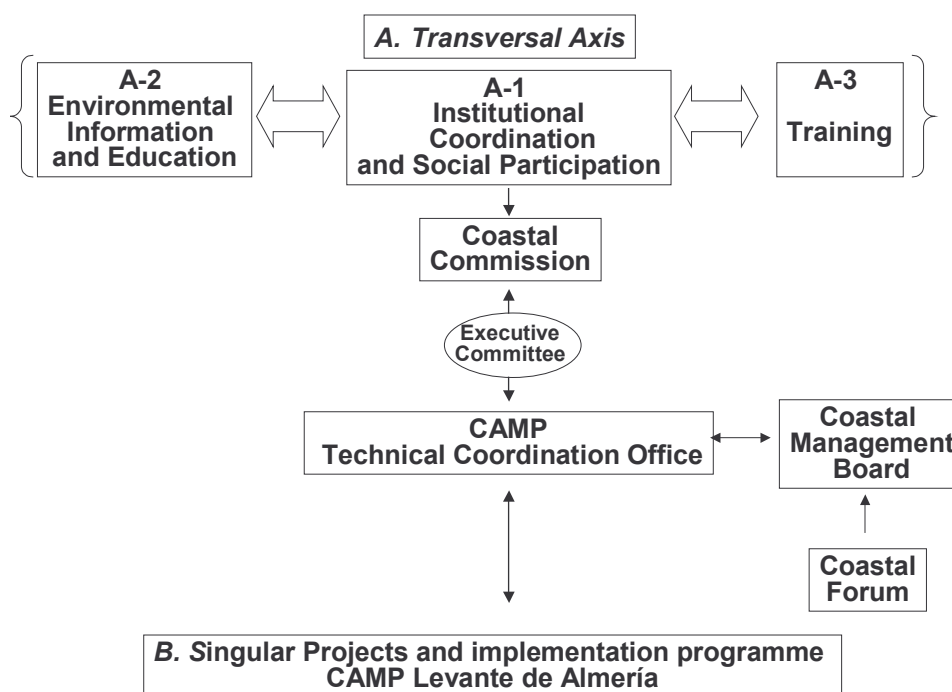
Specifically, the CAMP Levante de Almería project has been organised in a similar way to the actions of the other CAMP Projects of the Mediterranean countries, in order to maintain coherence with them. In this way, it is organised around three transversal axes (A.1. Institutional Coordination and Social Participation, A.2. Environmental Information and Education, and A.3. Training) and a group of singular projects, that attempt to tackle some of the main problems presented by the sustainable development of the coastal municipalities in the CAMP area.

Consequently, the organisational structure is made up by the Coastal Commission, whose purpose is to group together the various Administrations with responsibilities in the CAMP area. Within this *Commission* an Executive Committee will be created, made up by representatives of the MAP/UNEP, Ministry of Environment, Junta de Andalucía and Local Administration that will be responsible for the functions for the promotion of the creation of the CAMP Levante de Almería Project Coordination Technical Office, and of the Coastal Forum. The Coastal Council is made up as the consulting organisms for the various local actors, and the Coastal Forum is created to extend to all the civil society the participation searched regarding the CAMP project actions.

The following diagramme (**Graphic 3**) summarises the contents and organisational structure of the CAMP Project as a result of the putting into common practice carried out by means of the participation processes.



**Graphic 3. Contents and organisation structure of the CAMP Levante de Almería.**



**Chart 42** shows the activities proposed in the CAMP Levante de Almería project grouped into Transversal Axis and Singular Projects.

Below the contents of the Transversal Axis and of the aspects of the singular projects is shown, specifying its general planning, the general objectives, the operative objectives and the specific proposal of activities.

Chart 42. Institutional mechanisms and activities proposed in the CAMP Levante de Almería project

<b>A. TRANSVERSAL AXIS</b>
<b>A.1 Institutional Coordination and Social Participation</b>
A.1.1 Levante de Almería Coastal Commission (Executive Committee)
A.1.2 Technical Coordination Office
A.1.3 Coastal Management Board
<b>A.2 Environmental Information and Education</b>
<ul style="list-style-type: none"> <li>- A.2.1 Systematic and prospective analysis of the CAMP area sustainability</li> <li>- A.2.2 Information of the good practices in productive activities</li> <li>- A.2.3 Stimulation of a real estate demand in keeping with the environment</li> <li>- A.2.4 Promotion of the active participation in the urban planning processes</li> <li>- A.2.5 Establishment and information of a data base and Web page with information of interest from the various Administrations</li> <li>- A.2.6 Coordination of the CAMP project with the Local Agenda 21 and other projects and sustainable proposals in the area</li> <li>- A.2.7 Beach and marine environment user awareness campaigns</li> <li>- A.2.8 Promotion of Environmental Volunteering for the manual cleaning of beaches and marine environment</li> <li>- A.2.9 Promotion of the collective public transport</li> </ul>
<b>A.3 Training</b>
<ul style="list-style-type: none"> <li>- A.3.1 Basic training in coastal ecosystems and processes</li> <li>- A.3.2 Training in territory planning and integrated coastal management</li> <li>- A.3.3 Clean production training courses</li> <li>- A.3.4 Training in actors' participation techniques, negotiation techniques and communication</li> <li>- A.3.5 Training in Geographical Information Systems</li> </ul>
<b>B. SINGULAR PROJECTS</b>
B.0 CAMP implementation and reference framework-
<b>B.1 Sustainable Management of Hydraulic Resources</b>
<ul style="list-style-type: none"> <li>- Application of systems dynamic models for the prospective simulation of the load capacity of the aquifers</li> <li>- Integrated study of water management, coast and biodiversity</li> </ul>
-B.2 Protection of the Marine Environment (zoning and planning of marine resources)
-B.3 Inclusion of sustainable practices in the local productive activities
<ul style="list-style-type: none"> <li>- Study of the area tourist load capacity, both of the activities on land and at sea, and in the public use facilities of the Maritime-Terrestrial Public Domain Area.</li> <li>- Evaluation of the fishing resources</li> </ul>
- B.4 Valuation of the cultural heritage and landscape
<ul style="list-style-type: none"> <li>- Methodology for the valuation of heritage in urban areas</li> <li>- Creation and application of methodologies and landscape management tools</li> <li>- Conservation and tourist use of the cultural heritage</li> </ul>
- B.5 Improvement in the Protection of the Maritime-Terrestrial Public Domain (Study and evaluation of the purchase and recuperation of the land by the Administration as a management tool)

## **A. Transversal action axis**

### ***A-1. Institutional coordination and social participation.***

The management of the coast requires considerable institutional coordination efforts both from the horizontal point of view, amongst the various Regional Ministries of Andalusia (Environment, Tourism, Employment, Agriculture and Fishery or Innovation, Science and Businesses) and from the vertical point of view, amongst the various territorial administrations and national, regional and local actors, both public and private.

When the institutions are mentioned it should be clarified that these not only refer to public organisms, but to the set of rules, organisations, social rules and attitude of the population.

In this way, amongst the rules that are considered both the formal (rules, Laws, Constitution) and the informal ones (tradition, conduct patterns, habits) are included, whilst when referring to the organisations we should include the Public Administration, the companies and the civil associations, such as fishermen fraternities, green, and neighbourhood associations.

That is to say, the institutions include those aspects of social life that facilitate the coordination of human action in the territory. Hence the importance of the institutions in the sustainable development as the participation of the general public in the development processes requires a minimum degree of organisation of the population that allows public-private agreements involving the population with its development, and not to leave it only in the hands of public intervention.

Thus, institutional development, understood as previously described, is considered to be an essential dimension of sustainable development, together with social development, economic development and environmental development.

The integrated management of the coastal areas, this being a specific aspect of sustainable development, participates in four aspects of the same. That is why institutional development constitutes an essential aspect of the same that should receive special attention, not only economic but human effort also. Hence the need to establish the Technical Coordination Office, responsible for the promotion of institutional agreements.

At the same time, the integrated coastal management processes require general public participation and high-level institutional coordination. Nevertheless, the existence of public forums in Spain on coastal issues in the various management administrative levels is not very frequent. For this reason, the CAMP project includes the creation of a Coastal Commission and of a Coastal Council for the Levante de Almería to be a pilot experience for the rest of

Andalusia and Spain. These types of initiatives include some of the structural elements of the Integrated Management of Coastal Areas, that is, institutional coordination, public participation and distribution of the information, amongst other substantial aspects.

On the coast of Almería there is a considerable convergence of Public Administration, whether national, regional or local. Hence, the CAMP project includes a series of institutional mechanisms destined to improve the coordination and cooperation between the institutions involved, as well as with the users. This is the Coastal Commission, within which an Executive Committee will be organised, the Technical Coordination Office, and the Coastal Council.

The **Commission of the Levante de Almería Coastal Area** has as its objective the meeting of the various administrations acting on the coast, and the proposal of coordination actions and to be responsible for compatibility of the public interventions in the area. Given its public institutions nature, it is the Junta de Andalucía Government Council that is responsible for its creation by Decree. Within it an **Executive Committee** will be created, made up by representatives of the MAP/UNEP, Ministry of Environment, Junta de Andalucía and Local Administration, whose function being the promotion of the creation of the CAMP Levante de Almería Technical Coordination Office, the Coastal Council and the Coastal Forum.

The **Technical Coordination Office** is created as a tool to facilitate the inclusion of various public and private actors in the CAMP project activities. Its start-up is considered essential, at least during the two years of its being carried out.

The **Coastal Council** is created as a consulting organism of a public-private mixed nature made up by various Administration actors of the private initiative related with the coast.

The **Coastal Forum** is planned as an informal meeting place open to the general public in order to promote participation. As one of its tasks, the Coastal Council will undertake promotion and information of this Forum.

### General objectives to which an answer is given

- Reinforce the coordination mechanisms between the various Administrations and the private agents in the area.
- Be a pilot experience for the application of the 'Recommendation on the application of Integrated Coastal Area Management in Europe'.

### Operative objectives

- Provides information to the users on certain coastal projects.
- Allows a more detailed definition of the problems, conflicts and possible strategies related with the coast.
- Creates communication channels and meeting forums to reach to agreements on possible conflicts between the users of resources, or between the users and the public administration.

### Proposal of activities

- A.1.1. Start-up of the Coastal Commission (Executive committee)
- .A.1.2. Creation of a CAMP Project Technical Coordination Office
- A.1.3. Start-up of the Coastal Council.

Once the proposal of activities has been described, the contents and functioning of the same, as well as the expected results and the estimated cost will be described.

#### A.1.1. Commission of the Levante de Almería Coastal Area

The Commission of the Levante de Almería Coastal Area (or Coastal Commission, as the formal organism for the coordination of public organisms, should have regular meetings twice a year, and an extra meeting as long as the issue to be dealt with so requires, at the request of the MAP/UNEP, Ministry of the Environment or Regional Ministry of the Environment.

Within this Commission an **Executive Committee** will be created, made up by representatives of the MAP/UNEP, Ministry of the Environment, Junta de Andalucía and Local Administration.

### Integrating organisms

The Coastal Commission should be integrated by representatives of the following institutions:

- Town Halls from the CAMP area.
- Municipalities Association.
- Diputación Provincial.
- Provincial Delegations of the Regional Ministries of the Junta de Andalucía with more relationship with the coast.

- Coasts General Management of the Ministry of Environment
- MAP/UNEP

The sessions of this Commission can be attended, as consultants, by the technical experts that may be considered appropriate, depending on the issues to be dealt with. At the same time the Coastal Commission may invite the respective specific entities (Andalusian Water Agency, for example), to their sessions depending on the issues to be dealt with.

## Functions

The Coastal Commission will have, amongst others, the following functions:

- Drafting of its own functioning regulation.
- Coordination and prioritising of the public actions in the CAMP area.
- Establishment of action lines within the CAMP project.
- Promotion of agreements between the various Administrations.
- After the initial stage of the CAMP project, approval of the annual action programme, as well as of the follow-up reports.
- Search for supplementary financial resources for the CAMP project activities.
- Promotion of the cooperation with the Town Halls in the drafting of the urban instruments.

## Results

Increase of the coordination and cooperation between the public institutions with responsibility in coastal issues.

## Approximate cost

The cost of promoting the creation of the Coastal Commission is included in the Technical Coordination Office estimate. Nevertheless, the cost of the logistics of the summoning and the development of the same is estimated at 20,000 euros.

### A.1.2 Technical Coordination Office

In order to carry out its function of promoting agreements between the actors and the supervision of the singular projects, the office should have personnel experienced in sustainable development and territorial planning. In the same way, it will have scientific and technical assessment from research centres to promote the participation and public-private harmonising processes included in the CAMP project, as well as any other aspects that may be considered relevant by the coordination office.

The Technical Coordination Office should play a role of facilitating the creation and functioning of both the Coastal Commission and the Coastal Council. Due to its exclusive function of support to the CAMP project, it should have full-time qualified personnel, at least for the two years of the duration of the pilot project.

### Activities of the Technical Coordination Office

The Technical Coordination Office should carry out, amongst others, the following activities:

- Promotion, coordination and management of the CAMP project actions.
- Support and coordination to the institutional mechanisms included in the CAMP project Coastal Commission and Coastal Council.
- Preparation of the procedure and functioning rules of the entities planned in the CAMP project (Coastal Commission and Coastal Council).
- Carrying out of the Commission and Coastal Council Technical Secretariat functions.
- Information on the CAMP project by means of the drafting of press releases, brochures, leaflets...
- Creation and maintenance of a CAMP project WEB page.
- Drafting of the CAMP project follow-up reports.
- Rendering of services by means of a SIG and teledetection tool to the town halls and other public and private actors.
- Follow-up and evaluation of the singular projects.

### Results

The main result expected with the start-up of this activity is the increase in the coordination and cooperation between Public Administrations with responsibilities for coastal issues. At the same time, the activities developed by the Office will allow the reaching of conclusions on the best practices for integrated coastal management.

### Approximate cost

The approximate cost of the Technical Coordination Office is of 493,000 euros. This amount is broken down in the following concepts:

<i>Concept</i>	<i>euros</i>
<i>General coordination</i>	<i>268,000</i>

<i>Communication</i>	<i>30,000</i>
<i>Territorial Management SIG tool</i>	<i>90,000</i>
<i>Support to teledetection systems (ERS/RAC)</i>	<i>15,000</i>
<i>Scientific and technical assistance</i>	<i>90,000</i>
<b><i>Technical Coordination Office Total</i></b>	<b><i>493,000</i></b>

### A.1.3. Coastal Council

The Coastal Council is a consulting organism, for the participation of the various public and private actors.

#### Integrating organisms

The Coastal Council, an organism of a public-private nature, may have the presence of the representatives of the following institutions:

- Coastal Commission entities.
- East Almería Rural Development Group.
- Business and Union associations.
- Agricultural and fishing organisations.
- Neighbourhood associations.
- Green Groups.
- Other economic and social agents of the CAMP area.

#### Functions

Amongst the functions that the Coastal Forum should carry out the following can be mentioned:

- Promotion and information of a **Coastal Forum** open to the participation of the local population. In this Forum the general public should participate, independently from the fact that they are integrated in the institutions present in the Coastal Council.

**3. Activities Proposal**  
**3.7. Institutional mechanisms and activities proposed**

- Debate the relevant aspects on territorial and CAMP project sustainable development.
- Promote and channel suggestions and queries of the local population relative to CAMP project activities by means of the Coastal Forum and the project WEB page.
- Take specific recommendations, suggestions and proposals to the Coastal Commission, both own and from the Coastal Forum.
- Creation of Work Groups on coastal specific issues.

## Results

The main results of this activity are the improvement of the active participation of the population in the conservation and improvement of the coast, as well as the generation of social agreement regarding the CAMP project actions.

## Approximate cost

The cost of promoting the creation of the Coastal Council and Forum is estimated around **22,000 euros**.

## *A2. Environmental information and education*

The environmental information and education aims at the population becoming aware of the environmental problems, creating in the same a predisposition, motivation, responsibility and commitment to individually and collectively work in the search of solutions. At the same time, it is the promotion of clear awareness of the interdependence between land and sea. Basically, it has as final objective the creation in the individual groups, and in the society, new patterns of behaviour and ethical responsibilities towards the environment.

The environmental information and education in the coastal sustainable development in the CAMP Levante de Almería scope of action includes the construction of future scenarios, the measurement of the advance of sustainability, the improvement in the access to the information on coastal management, the stimulation of the most sustainable behaviour patterns the environmental volunteering related with the coast, as well as the promotion of collective public transport.

### **General objectives to which an answer is given**

- Make the population aware of the environmental problems that affect the coast.
- Create in the individuals, groups and in the coast population, new behaviour patterns and ethical responsibility towards the environment.

### **Operational objectives**

- Improve the knowledge on the sustainability processes.
- Improve the environmental behaviour of the beach users.
- Favour the environmentally-friendly production activities.

- Guidance on responsible consumption guidelines.
- Improve the access to the information related to integrated coastal management.
- Create environmental awareness by means of altruistic initiatives of entities and people in the conservation of the coast.

#### **Proposal of activities**

- A.2.1. Systemic and prospective analysis of the CAMP area sustainability.
- A.2.2. Information of the good practices in productive activities.
- A.2.3. Stimulation of a real estate demand in keeping with the environment.
- A.2.4. Promotion of the active participation in the urban planning processes.
- A.2.5. Establishment and information of a database and Web page with information of interest from the various Administrations.
- A.2.6. Coordination of the CAMP project with the Local Agenda 21 and other projects and sustainable proposals in the area.
- A.2.7. Beach and marine environment user awareness campaigns.
- A.2.8. Promotion of Environmental Volunteering for the manual cleaning of beaches and marine environment.
- A.2.9. Promotion of collective public transport.

Once the list of proposed activities has been presented, their contents, cooperating organisms, expected results and the estimate cost will be described.

### **A.2.1 Systemic and prospective analysis of the CAMP area sustainability.**

The systemic analysis allows the simplification of the reality from most important elements taking into account each element's dynamics, as well as its interactions and relationships.

The methodology of the systems dynamics identifies the problems, generates a dynamic hypothesis that explains the problem, constructs a system simulation model with the causes of the problem, and verifies the correct functioning of the model reproducing the real behaviour of the variables. Lastly, it models and verifies the alternative policies that may solve the problem, at the same time as proposing the ways of putting the solution into practice.

The prospective analysis consists of the application of an integrating, dynamic and open methodology that explains the possible futures, so-called *futuribles*, not only by the data of the past but mainly by taking into account the future evolution of the quantitative variables, and, above all, of the qualitative ones, as well as the behaviour of the actors involved, in such a way that the uncertainty is reduced, the present action is oriented and provides mechanisms that guide towards the acceptable, convenient or desired future. This type of analysis allows reflection on the future starting from a systematic approach.

As an application proposal of this approach in the CAMP Levante de Almería project, the sustainability key indicators will be identified, as well as the desirable scenarios of the environment in a medium and long term. This information will help the authorities and politicians in the management of the coastal area sustainable development.

This activity will have the technical support of the United Nations by means of the Blue Plan Regional Activities Centre (BP/RAC).

### **Cooperating organisms**

Blue Plan Regional Activities Centre (BP/RAC).

### **Results**

An improvement in the knowledge of the process towards sustainability, as well as of the CAMP project future possibilities.

### **Approximate cost**

3. Activities Proposal  
3.7. Institutional mechanisms and activities proposed

This activity is valued at **45,000 euros** that will be provided by means of the technical support of the BP/RAC.

### A.2.2. Information on the good practices in production activities

The various agents involved in the sectors with greater impact on the Levante de Almería coast do not always show sufficient awareness on the environmental behaviour of their production activities, thus the information on the existing good practices codes of the productive activities in the CAMP project area, such as urbanisms, agriculture, livestock farming, fishing and industry is necessary.

Regarding urban development, it is recommendable to include the improvement of accessibility, the creation of green belts, and the projection of sustainable architectonic groups from the energy point of view.

The decrease in environmental pollution requires the direct participation of the Public Administration, by means of the promotion of 'greener' buildings, providing tax relief, promoting the purchase of environmental goods and services, installing solar panels in public buildings, etc. In Barcelona, for example, a local regulation obliges the housing development promoters to install solar panels for water heating.

The introduction of new terms such as bioclimatic architecture, sustainable urban development or bio building demonstrates the interest in sustainability. In this respect, it is recommendable to be aware that sustainable architecture should take into account the ecosystem where it is placed, the energy systems promoting energy saving, the construction materials, recycling, waste re-use and mobility.

In this respect, the selection of good practices in the thematic areas of urban, housing and territorial development should be mentioned, included in the II Spanish Catalogue of good practices published by the Habitat Agenda (Cities in favour of a more sustainable future).

On the other hand, the development of intensive agriculture in the CAMP territory requires the continued practice of soil fertilisation, use of nitrogenised fertilisers, large amounts of water, etc. It is necessary to encourage more farmers to use crop systems that are compatible with the conservation of the environment in the integrated coastal management scope of action. In this line, the distribution of a guide orienting the farmers on more appropriate agricultural practices, including criteria for the conservation of the environment as well as aspects related with food health, which can contribute to use by the farmers of a more sustainable production model. We should add that there are already good practices codes in intensive agriculture, as well as in other agricultural models.

At the same time, in the CAMP Levante de Almería project area a series of industrial activities are carried out, in which we should take into account integrated coastal management. The

information between the industrial establishments of the coast of the good production practices will contribute in the process towards sustainability in the CAMP area.

In summary, the promotion of good practices in production activities (urban development, agriculture, livestock, industry, etc.) either by the information of existing codes of practice, or by the drafting of others in consensus with the parties involved will allow progress in coastal integral management in a territory such as that of Levante de Almería.

### **Cooperating Organisms**

Agricultural Regional Offices, Town Halls, Regional Ministry of Environment and Technical Coordination Office.

### **Results**

Improvement in the environmental behaviour of the main production activities in the CAMP Levante de Almería project area.

### **Approximate cost**

This activity is valued at **20,000 euros**.

### **A.2.3. Stimulus of a real estate demanding with environment**

The objective of this activity is the promotion of informed consumption, in such a way that the general public demands more sustainable buildings. In this respect, a more informed real estate demand is promoted, so the builders, architects and promoters can include sustainability criteria to building, both in technology as design and material, as it is preferable to use raw material found geographically in the vicinity in order to avoid transport, and that once placed they do not use more energy than that necessary. It is also convenient for the consumers to be demanding in water consumption, recycling and re-use of waste and grey waters).

The stimulus of this informed demand can be carried put by means of the carrying out of advertising campaigns in various communication media, publishing of informative brochures, etc.

#### **Cooperating organisms**

Town Halls, Technical Coordination Office, Regional Ministry of Environment and Regional Ministry of Public Works and Transport.

#### **Results**

Improvement in the design and construction of buildings in the area by means of the promotion of an environmentally responsible real state demand.

#### **Approximate cost**

This activity is valued at **10,000 euros**.

#### **A.2.4. Promotion of active participation in the urban planning processes.**

The objective of this activity is the promotion of the participation of the general public in urban planning by means of information and awareness campaigns for the development of participation processes.

In the regulation documents on urban planning it is established that the drafting of the urban documents should be carried out in such a way that it counts on the opinion of the affected population throughout the drafting process. Nevertheless, in practice, what happens is that by means of the mechanisms for public exposure, and the reception of suggestions and allegations, the opinions and pulse taking of most of the general public regarding the desired urban model are not included. These are very imperfect and not very efficient mechanisms, and that are generally useful to those who have specific interests, as it is the case with the land owners, or those who are affected by the changes proposed in the urban plan.

On the other hand, from the European Union more importance is given to 'all' the social and economic agents in the definition and management of the urban problems. It can be mentioned, for example, the *Urban* programme of intervention for the regeneration of neighbourhoods in crisis that considers as an essential factor for the cohesion of the financing funds, the existence of a wide network of social organisations of all types, coherent with the project objectives, providing in-depth and real knowledge of the problems to the initial planning, supporting the development of the project and guaranteeing the continuity of its impact in the long term.

In the European documents on urban policies, the participation is repeated as one of the transversal axis of all the planning: 'Towards an urban policy' (European Union, 1997); the Initiative of Urban Exchange, lead by The United Kingdom, Austria, Germany and Finland, giving special importance to participation; the community position 'Action Framework for Sustainable Urban Development' (1999) including the *governing* and general public participation as action lines.

For these reasons, the CAMP Levante de Almería project includes the promotion of social participation in the urban planning processes within the scope of the study. With this purpose in mind, information campaigns will be carried out on the needs to start general public participation mechanisms addressed to both the instances where the urban planning was traditionally carried out and to the general public. In a special way the mechanisms facilitating the participation of the general public will be started (Forums, Workshops, extension of the plan consultation timetable, itinerating exhibitions, questionnaires, Web pages) that become efficient instruments for urban planning.

#### **Cooperating Organisms**

Town Halls and Technical Coordination Office

#### **Results**

Improvement of sustainability of urban development in the area based on social consensus.

**Approximate cost**

This activity is valued at **10,000 euros**.

#### **A.2.5. Establishment and information of a database and Web page with information of the interest from the various Administrations.**

The creation of a database with the information existing in the various Administrations with responsibility in the Levante de Almería Coastal area has as its objective the putting into common and information of the studies, reports and data that can be of interest for the various institutions intervening in the coastal management. In this way, there is a contribution to the improvement of the knowledge in the field of integrated coastal management, which facilitates the access to the information for the decision taking process in the CAMP Levante de Almería project.

On the other hand, the latest information technologies can facilitate the appropriate mechanisms for the objectives of this activity. In this respect, the designing of a Web page is important, where the disperse information existing in the various Administrations can be uploaded, so that those responsible for integrated coastal management can have access to said information.

#### **Cooperating organism**

Technical Coordination Office.

#### **Results**

Improvement of the relevant information for integrated coastal management.

#### **Approximate cost**

This activity is valued at **20,000 euros**.

#### **A.2.6. Coordination of the CAMP Project with the Local Agenda 21 and other projects and sustainable proposals in the area.**

The objective of this activity is the coordination of the Project with other initiatives that share the same objectives as that of the integrated coastal management, specifically the Local Agenda 21.

The Local Agenda 21 are plans that are based on the reintegration, with sustainable criteria, of environmental, economic and social policies of the municipalities, and that arise from participation and decision taking in agreement of the politicians, economic and social agents involved and the general public of the municipality.

In this respect, they share, to a great degree, the same objectives as the CAMP project in the encouragement of the local authorities to start a dialogue with their citizens, with the local organisations and other institutions to develop a participative process and draft a sustainability strategy.

#### **Cooperating organisms**

Town Halls, Diputación Provincial de Almería and Technical Coordination Office.

#### **Results**

Improvement of the institutional coordination in the integrated coastal management scope. At the same time, contribution to the sustainability objectives, both in the CAMP Levante de Almería project as well as in those of the Local Agenda 21.

#### **Approximate cost.**

This activity is valued at **6,000 euros**.

### **A.2.7. beach and marine environment user awareness campaigns**

The awareness campaigns are focused on bringing closer to both the seasonal and permanent users of the coast the processes affecting the physical environment, the problems associated with the use of the coastal resources, the management resources available and desirable from the institutional and legislative point of view, as well as the instrumental one of the existing plans. The knowledge of the physical environment, and above all, of which are the natural processes in the coastal environment, and how they function, is an essential step to reach a principle of co-responsibility in the management.

In the same way, we should take into account the diversity of the marine environment users, such as divers, sports fishermen, water sports users, as the various activities can have repercussions on the beaches.

For the awareness on how the physical resources of the coast function, programmes can be followed, that not only highlight the dangers of the bathing activity, but attempting to help the users understand the mechanisms where the danger is. From this platform we can additionally plan the beach stability issue, as the degree of dynamism of the same can be related with the potential erosion, and consequently, will make the beach users aware and informed that the beach system cannot be changed in an impugned way.

The development of an environmental awareness programme amongst the beach users can be carried out by means of impact campaigns in key areas, where a population different from that of users with specific concerns is identified, and where basic information programmes are put into practice for the stable and seasonal resident population.

### **Cooperating organisms**

Technical Coordination Office, Regional Ministry of the Environment and Town Halls.

### **Results**

Improvement in the environmental behaviour of the beach and marine environment users.

### **Approximate cost**

This activity is valued at **10,000 euros**.

### **A.2.8. Promotion of environmental volunteering for the manual cleaning of beaches and marine environment**

On the coastal areas the action of the users is more apparent, and therefore, the human activities can be more harmful to the terrestrial and marine environments. There is a great deal of aggression suffered by the beaches and the sea, that, due to their characteristics, are largely hidden.

The cleaning of the sea flotsam, such as algae and animal remains, as well as organic jetsam and inorganic waste coming from the sea and from the visitors should be carried out by means of the manual cleaning combined, in certain cases, with mechanised means. This type of activity carried out by volunteers contributes to improving the environmental education of the population, and to promote collective action habits that help to solve many of the problems of the territory.

On the other hand, there are many who consider the submerged areas as ideal areas to dispose of the rubbish and waste that, as these are not visible, cannot be detected, causing in this way negative changes of an anthropic nature in the marine ecosystem. For this, the sea needs to be looked after by all, and the commitment to contribute to its conservation in an active way.

The conservation of nature and natural protected areas largely depends on the actions of the Administrations, but also require the cooperation and participation of people carrying out volunteering actions in benefit of the environment. In this respect, there are already various initiatives developed by the Regional Ministry of Environment. It is an attempt to promote the altruistic participation of people and entities committed to the conservation of our coast, provide quality technical information, and promote respect for the environment, making the practice of diving in not only a low environmental impact activity, but a conservation commitment between the users and the sea.

The cleaning of marine beds as a massive participation activity should be carried out following a predetermined programme and counting on volunteering initiatives that are currently being carried out by public and private organisms in the CAMP Levante de Almería area.

### **Cooperating organisms**

Regional Ministry of Environment, Town Halls and Regional Ministry of Tourism, Commerce and Sports.

### **Results**

Improvement in beach and marine beds cleaning, as well as increased environmental awareness of the population participating in the cleaning tasks.

### **Approximate cost**

This activity is valued at **10,000 euros**.

#### **A.2.9. Promotion of collective public transport**

The promotion of collective public transport has as its objective the achievement of a more sustainable environment by means of the de-congestion of private motorised traffic, the decrease of gas releases, acoustic contamination produced by the road traffic, as well as to provide greater guarantees in the equality of opportunities for the access of mobility of special groups such as children, elderly, women and people with scarce resources.

The collective transport that should be considered is mainly the bus (urban and inter-urban), including the integration and coordination between the various transport models. In the same way, the coastal areas have an added problem during summer which is the high concentration of vehicles on the coast, with the subsequent consequences of road congestion and contamination.

For these reasons, the promotion of collective public transport is essential in the Levante de Almería coastal area by means of the carrying out of advertising campaigns for the use of this type of transport, awareness of the population, and development of mechanisms for the integration of collective transport, such as inter-model season tickets and reduced tariffs.

#### **Cooperating organisms**

Public Transport Companies, Town Halls and Regional Ministry of Public Works and Transports.

#### **Results**

Improvement in the CAMP Levante de Almería area sustainability by means of the decrease of the private motorised traffic.

#### **Approximate cost**

This activity is valued at **8,000 euros**.

### ***A3. Training***

The impact of human activities on the coastal resources and their cultures are complex and present difficulties to predict their actions following simple cause-effect models. At the same time, decisions are frequently taken without sufficient information or comprehension of the problems, and there are frequent conflicts when assigning resources and taking action decisions. Thus, the terms change, complexity, uncertainty and conflict are in the centre of resource and environment management and are responsible for the appearance of problems and opportunities which the analyst, planners, managers, politicians and part of the society have to face.

In this line of thought, those responsible for the management of coastal areas should facilitate the cooperation between ecology and production activity. Nevertheless, there is as yet no trained technical body in Spain with experience in Coastal Area Integrated Management, in spite of the European Commission recommendation (1999) in the conclusions to its Coastal Areas Integrated Management Demonstration Programme, of the convenience of having people knowing the principles of coastal areas integrated management that can promote said processes.

The training in integrated coastal management should include in the CAMP Levante de Almería project scope training programmes of both general principles and the basic aspects, (physical-natural phenomena conditioning management) for the local actors and those responsible in territorial management, mechanisms that allow the improvement of the environmental behaviour of the reproduction activity, as well as techniques and tools facilitating integrated coastal management.

#### **General objectives to which an answer is given**

- Facilitate the development of integrated coastal management processes in the territory by means of training in information and techniques provided by these processes.
- Improvement of the production activity behaviour with the terrestrial and marine ecosystems by means of the training of a critical mass of public and private actors in clean production.
- Extension of the knowledge of those responsible for the coasts in coastal areas integrated management.

#### **Operational Objectives**

- Extend the knowledge of those responsible for the planning and management of the territory, as well as of the actors involved in the local economic development, both in the principles of integrated coastal management, as well as in the dynamics of the physical-natural phenomena that condition said management.
- Facilitate the co-responsibility of the public and private actors in coastal management.
- Train in techniques and tools that facilitate integrated coastal management.
- Training in clean production techniques to improve the environmental behaviour of the main production activities.

#### **Proposal of activities**

- A.3.1. Basic training in coastal ecosystems and processes.
- A.3.2. Training in territory planning and integrated coastal management.
- A.3.3. Clean production training courses.
- A.3.4. Training in actors' participation techniques, negotiation techniques and communication.
- A.3.5. Training in Geographical Information Systems.

### A.3.1 Basic training in coastal ecosystems and processes

The purpose of these training courses is for the trainees to learn about the physical-natural phenomena and processes that take place on the coast. This type of knowledge will allow those responsible for territorial policies that affect the coastal areas to intervene respecting said processes.

In the training programmes destined to the coast users, specific issues on coastal dynamics can be developed, necessary for the comprehension of key aspects of coastal management.

User training should be available to all those interested. These basic training programmes should tackle the following issues:

- Geological evolution of the coast.
- Functioning of the physical system of the coast.
- Biological and ecological environment.
- Socioeconomic elements.
- Management frames at various levels.

In this basic programme the factors participating in all the fields above mentioned should be included. Thus, for example, in the physical means characterisation framework, emphasis will be made on the morphodynamic classifications of the beaches, how to measure, with simple techniques, the parameters involved; or in the case of socioeconomic factors, the introduction of concepts such as load capacity, acceptable limit of the changes and resilience.

The Town Halls, with the cooperation of the Regional Ministry of the Environment, can lead these specific programmes, promoting various activities of the type of workshops or events or variable duration, integrated or not in the educational programmes of primary schools and secondary education schools. But these can also be carried out outside the education scope, by means of popular activities during the summer.

The programmes designed for the awareness of the local actors should be cantered on the planning of co-responsibility and focus the issue previously mentioned at a higher level. In this respect, emphasis should be made on the methodological issues and analysis techniques that allow the local actors to evaluate the coastal environment conditions, before deciding for, or against, the institutional managers. The attendants should be introduced to relatively complex

tools such as the creation of sensibility indexes, questionnaire methods, notions on geometrics, and basic functioning of geographical information systems.

## **Trainees**

This course is addressed to the local actors, both managers and users of the coast, interested in becoming acquainted with the coastal ecosystems and processes related to integrated coastal management.

## **Cooperating organisms**

Technical Coordination Office, Town Halls and Regional Ministry of Environment.

## **Results**

Improvement in the decision taking process affecting integrated coastal management by means of a deeper knowledge of the basic aspects of the ecosystems and physical-natural processes affecting the coast.

## **Approximate cost**

This activity is valued at **20,000 euros**.

### **A.3.2. Training in territory planning and integrated coastal management**

The characteristics of the coastal problems affecting the coast justify the need for the application of intervention in the territory in an orderly way. This is explained by various reasons, such as, for example, the fragility of the ecosystems present in the CAMP Project area (Natural Park and SPAMI, LICs, etc.), the importance derived from its public nature, its transcendence as a scarce asset, its poly-functional nature, as well as the social and economic dynamism present in the territory (urban development, agriculture, industry, etc.)

A regulation and management of the coastal area taking into account the previous issues should be carried out from a wide and integrating approach, not only attempting to plan the territory or manage the natural resources, but, additionally, having as objectives the promotion of the development and conservation of the territory.

At the same time, in the coastal areas there are various instrumental models or planning models. In fact, the effect that any initiative of an integrated nature is implemented does not involve the appearance of other more conventional planning instruments. Consequently, it should not be strange that economic, infrastructures, natural protected areas or urban development plans coexist in more or less harmony in the territory.

For these reasons, the CAMP Levante de Almería project includes the carrying out of a training programme in territory planning and integrated coastal management, with the objective of training in the aspects related with territorial planning and integrated coastal management.

The theme should be focused on the analysis of the institutions, legal framework, territory planning, territorial planning instruments, the physical environment and the coast engineering implications. It should also emphasise on the integration of the management practices within the Integrated coastal management framework.

In this way, the technicians involved in coastal management will understand the functioning of the natural environment, and will be trained in territory management issues, with special emphasis on points such as territory planning, urban planning and sectorial affect on the coastal plans.

#### **Trainees**

This course is addressed to the current and future coastal managers.

#### **Cooperating organisms**

Technical Coordination Office and Regional Ministry of Environment. The course would be taught by experts of a university level experienced in these issues.

#### **Results**

Improvement in the decision taking process affecting integrated coastal management by means of a deeper knowledge on the key aspects in territorial planning related with the planning and management of the coast.

**Approximate cost**

This activity is valued at **22,000 euros**.

### **A.3.3. Clean Production Training Courses**

The objective of the training courses on clean production is to generate and consolidate a critical mass of public and private actors that produce in a more environmentally-friendly way, and that promote the use of these techniques in order to minimise the impact on the environment, and improve the competitiveness of the companies in the CAMP Levante de Almería project scope.

The training courses on clean production contribute to the improvement of environmental efficiency and profitability of the industrial activities developed in the CAMP project area, by means of the training of those responsible for the industries in cleaner techniques and production methods, (environmental management systems, eco-efficiency, origin minimisation techniques, alternatives for pollution prevention, volunteer initiatives and programmes).

This training programme will count on the support of the United Nations by means of the technical support of the Centre for Companies and Environment (CEMA), with headquarters in Barcelona, also called the Centre for Initiatives for Clean Production (CP-RAC). This centre was appointed by the Contracting Parts of the Agreement of Barcelona in 1996 as the Regional Centre for Clean Production of the Mediterranean Action Plan.

#### **Trainees**

The training courses on clean production are addressed to both those responsible for industrial activities carried out in the CAMP project scope, (businesspeople, those responsible for production and quality, research centres, etc.) as well as to the actors involved in coastal management: those responsible for both the marine and terrestrial environment areas of the Public Administration, local development agents, technicians from associations, green groups, etc.).

#### **Cooperating organisms**

Centre for the Company and Environment (CEMA), Regional Activity Centre of the Mediterranean Action Plan.

#### **Results**

An improvement in the environmental behaviour of the production system in the CAMP Levante de Almería project scope by means of the application of clean production techniques.

### Approximate cost

This activity is valued at **7,000 euros**.

#### **A.3.4. Training in actors participation, negotiation and communication**

The objective of this training programme is the training of the attendees in a group of techniques addressed to facilitate coastal management, and specifically, in the aspects related to the participation, negotiation and communication processes.

The training programmes in participation processes combine the introduction of various groups of techniques and exercises, (related with the participation attitudes, methods and instruments, knowledge on planning, facilitation and training of groups), with the idea of facilitating consensus and institutional cooperation, (public and private), in the management of the coastal resources.

The negotiation can be defined as the action of discussing common matters between two or more parts in order to reach to an agreement. Effective negotiations are the means to avoid confrontation and conflicts, to solve the tensions produced between the actors intervening in a territory. The training in negotiation techniques predisposes and facilitates the trainees to take the most recommendable attitude in an opposed interests situation, having to be in relation with the correct reading of the circumstances and adapt to them, as opposed to somebody who always have the same in different negotiations.

Communication reaches its objectives when planning in a global strategy framework. It is necessary to clearly define the objectives, determine the various groups of participants, formulate the messages, and chose the channels carefully, and follow-up and exchange information. The group action of multiple means, using various communication channels, in coordination and with mutual support criteria, allows the obtaining of excellent results.

The human element is an essential factor in the application of communication for integrated coastal management. Communication can favour them whether following experimental or new methods, especially at the moment of changes in the way of thinking on the territory.

#### **Trainees**

This course is addressed to the agents involved in both coast management and in the socioeconomic development of the territory.

#### **Cooperating organisms**

Technical Coordination Office. The training programme will be taught by professionals experienced in the fields of participation, negotiation and communication.

#### **Results**

An improvement in the institutional coordination and public-private cooperation in integrated coastal management by means of the application of participation, negotiation and communication techniques and processes.

#### **Approximate cost**

This activity is valued at **24,000 euros**.

### **A.3.5. Training in Geographical Information Systems**

This training programme attempts to train in the use of the Geographical Information Systems that may be provided by the Technical Coordination Office, both to the users of this service and to the managers themselves in order to improve the efficiency of the SIG tool.

The access of local agents to the information of the SIG tool allows some minimum knowledge on its functioning that requires a learning process. The CAMP Levante de Almería includes a SIG training programme aimed at the local actors as users of this service. In this way, the knowledge of this tool is significantly improved at technological, scientific and social levels. At the same time it contributes to taking advantage of the SIG products and services in such a way that the analytical, documental, management or communicative functions of this type of systems are optimised.

#### **Trainees**

This course is addressed to SIG service managers and users.

#### **Cooperating organisms**

Technical Coordination Office. The training programme will be taught by professionals expert in SIG.

#### **Results**

An improvement in the efficiency of the Geographical Information System by means of a greater knowledge of this tool, both by the managers and users.

#### **Approximate cost**

This activity is valued at **22,000 euros**.

### **B. Sustainable development singular projects**

In the singular projects, the actions that attempt to support integrated coastal management providing specific information on those territorial aspects that are of greater incidence in the

degradation of the environment are included. These are the problems generated by the badly-designed urban actions, the massification of residential tourism on the coast, overexploitation of the aquifers, the low level conservation of the archaeological resources, the lack of an exhaustive knowledge of the marine environment as well as the need to have useful tools for landscape management.

At the same time, the singular projects can be used as support to the decision taking processes of the Coastal Commission Executive Committee, or of the Technical Coordination Office, to mention a few examples.

The diagnosis carried out on the area of study point out that the main coast sustainability problems are mainly referred to the lack of hydraulic resources, to the degradation of the marine environment, and the impact of the production activities, specially fishing and tourism linked to the construction and urban development, which are generating a degradation of the landscape, and in general, a loss of the local heritage value.

That is why the singular projects are structured around five sustainable development aspects:

- Sustainable development of the hydraulic resources.
- Protection of the marine environment.
- The inclusion of sustainable practices in the local production activities (above all tourism and fishing).
- The valuation of the cultural heritage and of the landscape.
- The improvement of the protection of the Maritime Terrestrial Public Domain.

The start-up of these projects will be organised around an CAMP Levante de Almería project implementation programme (B.O). This programme will establish the steps to be followed in the carrying out of each of the singular projects.

### ***B.1. Sustainable Management of Hydraulic Resources***

The traditional hydraulic deficit of the area of study has increased over the last twenty years as a consequence of the economic growth model based on the two activities that use more water. These are, on the one hand, residential and hotel sun and beach tourism and, on the other, the creation of new intensive irrigation crops.

Against much reduced surface hydraulic resources, due to the semiarid climatic characteristics of the area, the underground resources are important and are, in this respect, a strategic aspect. Nevertheless, the aquifers present a level of overexploitation that has generated the running out of many wells, the increase of water salinity, and even index of contamination of nitrates that make this water unsuitable for human consumption.

The lack of recent studies of the area aquifers recommends their immediate carrying out in order to avoid reaching a collapse situation, and increase the dependence on external, private and public transfers, with respect to water transfer. That is why, counting on simulation models based on the systems' dynamics, contributes to forecasting the future situation if the current tendency continues, and to consequently define the possible existing alternatives.

The application of the systems dynamic models is an essential tool for the necessary simulations regarding the consumption of water and the load capacity of the aquifers. This methodology allows the contribution to the simulation of various scenarios, taking into account the starting conditions and the various uses and actions that are introduced in this model, which will allow a more sustainable management of the hydraulic resources.

The possibility of the Geographical Information System showing the results of the simulations carried out by means of the application of the systems dynamics adds additional interest to this type of tool applied to integrated coastal management.

On the other hand, the hydraulic resources and the coast have very important natural environments that undergo intensive human use, given they are the support of a wide variety of socioeconomic functions: they provide physical space, produce resources and absorb undesirable products. At the same time, there is a strong relationship between the inland areas and the coast as the economic activities on coastal areas benefit from resources coming from inland, for example water, and at the same time, the coastal areas provide space for the setting up of industrial and tourist activities, which also finally benefit the inland areas.

This close relationship between these two geographical areas and, above all, administrative areas, makes the steps taken in one of them to deeply influence the other. This is why it is essential to have a shared and integrated management of these two areas. A key element in this integration would be the Water Directive (with its corresponding transposition by the

modification of the Water Act). By virtue of this, the Hydrographical Demarcations will manage the continental surface, subterranean, coastal and transition water.

### General objectives to which an answer is given

- Carry out integrated and sustainable management of the hydraulic resources within the framework of the Water Act and Community Directives.
- Re-planning of the uses of the hydraulic resources in Levante de Almería.

### Operational objectives

- Put a halt to the overexploitation of the aquifers.
- Improvement of waste water treatment.
- Improvement of the knowledge of the water-coast-biodiversity relationships.
- Provision of directives for a sustainable use of the water.

### Proposal of activities

- B.1.1 Application of systems dynamic models for the prospective simulation of the load capacity of the aquifers.
- B.1.2 Integrated study of water management, coast and biodiversity.

### Approximate cost

This block of activities is valued at **90,000 euros**, distributed as follows:

Concept	euros
Application of system dynamics models for the prospective simulation of the load capacity of the aquifers.	60,000
Integrated study of water management, coast and biodiversity taking	30,000

3. Activities Proposal  
3.7. Institutional mechanisms and activities proposed

as reference the New Text of the Water Act.	
<b>Sustainable management of hydraulic resources total</b>	<b>90,000</b>

## ***B-2 Protection of the Marine Environment***

The marine environment should be considered not only as a space to be protected, but as a scope where a diversity of activities is carried out, generating added value to the economy and that is necessary for the maintenance of the population (fishing, aquaculture, tourist activities, etc.). Nevertheless, in certain situations, the marine environment resources undergo overexploitation and some activities with environmental incidences that negatively influence the health of the ecosystems are carried out.

For these reasons, integrated coastal area management includes a holistic perspective of sustainable development taking the hypothesis that the ordered development requires a long-term vision of the activities that are carried out in the marine environment, both economic and those of conservation of ecosystems.

This long-term vision requires regulation of the marine area guaranteeing the development of activities in a sustainable way reconciling conservation and exploitation of the resources by means of limiting areas and regulating the marine environment, including the uses and regulations that should be complied with.

The objective of the limitation of areas and regulation of the marine environment is the definition of limits and rules for the sustainable use and exploitation of the natural resources of the marine environment, ensuring its long-term conservation at the same time as allowing sustainable exploitation.

The limitation of areas of the marine area requires the prior carrying out of a series of studies providing data, and also the necessary elements that allow the definition of the orientations of the limitation of areas and their uses. These studies should take into account, amongst others, the changes in the uses of the sea over the past few years, the physical-natural characteristics of the marine environment, bathymetry, risk areas, and pressure of the population.

In summary, the delimitation of areas and regulation of the marine environment will allow the definition of limits and rules for a sustainable use, ensure an appropriate follow-up to the carrying out and management of the use measures that are adopted, the development of ecologic restoration works where necessary and feasible, as well as the conservation of the natural heritage by maintaining the essential ecological processes in an integral way that allow the guaranteeing of the feasibility of the species and existing diversity by means of the sustainable exploitation of the resources.

### **General objective to which an answer is given**

- Establish the basis for sustainable development of marine resources.

### **Operational Objectives**

- Greater knowledge of the marine environment.

- Definition of limits and rules of sustainable use and exploitation of the marine environment.

### Proposal of activities

- B.2.1 Delimitation of areas and regulation of the marine environment.

### Approximate cost

This activity is valued at **60,000 euros**.

### *B3. Inclusion of sustainable practices in the local productive activities.*

The production activities that are having more influence on coastal management are tourism, with the real estate activity that goes together with the same, and fishing. The promotion of sustainable tourist activities in Levante de Almería should favour a joint vision identifying the coast as a high quality tourist destination, with a planning of space that takes advantage of the singularities and own resources. The tourist offer should have, apart from the traditional sun and beach tourism, another type of tourism such as that of nature, taking advantage of the fact that it is one of the new emerging coastal areas regarding tourism.

The inclusion of the totality of the territory as tourist product, and not only the coastal strip, is one of the requirements of sustainable tourism, that attempts to respect all the coastal sections that have not yet been altered by housing developments.

In the same way, the architectonic types and urban development modalities should use traditional models that are more in agreement with the landscape of the area. At the same time, we should give priority to the hotel uses and the supplementary offers, such as cultural or sports activities or the carrying out of conventions, before the residential developments for second homes.

Hence the need to carry out a study of the area tourist load capacity, both of the land activities and those in the sea, and in the public use facilities in the Maritime-terrestrial Public Domain Area.

The second aspect deals with the potential of sustainable fishing. Fishing as an extractive activity linked to the biological resources of the coast bases its sustainable nature in the capacity of coordinating the captures and the replacement. The loss of habitats for the fish, the increasing pollution of the water, the changes in its cloudiness, salinity, temperature and load of sediments, added to the unsustainable capture practices, overexploitation of the fishing banks and the application of the new Sea International Law that has modified the jurisdiction of the water and its resources.

That is why the carrying out of an evaluation of the fishing resources is planned, in order to be provided with a real base of knowledge that allows reaching agreements with the fishermen fraternities for the carrying out of more sustainable capture practices.

### General objectives to which an answer is given

- Increase of the sustainable economic activity of the area.
- Favour service tourism against a purely real estate activity.
- Overcome the sun and beach tourism specialisation.
- Saving in the land consumption.

### Operational objectives

- Diversification of the tourist offer.
- Strengthening of the tourism productive links.
- Knowledge of the existing fishing resources.
- Adjustment of the fishing effort to the existing resources.

### Action proposals

- B.3.1 Study of the area tourist load capacity, both of the activities on land and at sea, and in the public use facilities of the Maritime-Terrestrial Public Domain Area.
- B.3.2 Evaluation of the fishing resources.

### Approximate cost

The estimated cost of the two action proposals to promote a sustainable production in the CAMP area reaches **70,000 euros**, broken down as follows:

<i>Concept</i>	<i>euros</i>
- Study of the area tourist load capacity(sea and land activities) and in the public use facilities of the Maritime-terrestrial Public Domain Area	50,000
- Evaluation of the fishing resources	20,000
<b>Total for the inclusion of the sustainable practices in local productive activities</b>	<b>70,000</b>

### 3. Activities Proposal

#### 3.7. Institutional mechanisms and activities proposed

#### ***B4. Valuation of the cultural heritage and landscape***

In Levante de Almería, a spectacular increase of the threats to landscape is taking place, which obliges the establishment of agreements and actions that avoid the degradation and loss of this heritage. In order to carry out an appropriate management of the same, it is necessary to establish a series of tools contributing to its maintenance, or rational and sustainable transformation.

Together with the landscape values, Levante de Almería has a widespread heritage, being the result of the various cultures that have settled in the territory, there being a large number of catalogued archaeological, ethnographic and historic-artistic sites that are from a wide range of historical moments.

One of the factors intervening in the devaluation of the cultural heritage and landscape in Levante de Almería is the urban planning linked to the tourist activities.

Currently, the urban land territorial decisions are being taken from partial perspectives, without responding to a common system, and sometimes in a conflictive way without promoting the joint reflection on them.

In general terms, the planning of the urban methodology does not take into account the devaluation of essential elements of the territorial structure, such as the loss of heritage, identity or landscape.

The drafting of a methodology for the evaluation of the territory capital, as proposed in this singular project, implies a conceptual innovative task that extends the classic concepts of urban planning (global costs of the urban transformation, repercussion on the new growth sectors, participation of the general public in the added value generated by the urban action, establishment of a procedure to obtain and manage the general systems), in order to counter balance the double deficit planned by this approach.

Any methodology of territorial capital valuation should include these values (natural, cultural or landscape) to the series of decisions based on a cost-profit analysis. It is the correction of the calculation of the urban added values (monetary calculation), with the loss of value that are produced in the mechanisms for the obtaining of said added values, in order to avoid the accountancy concept errors which are frequent. It is important to know that urban transformation usually destroys the territorial capital historically accumulated, without this devaluation having effects on the calculation of the costs for the transformation operations.

This requires a calculation methodology of these values and its transformation in accountable units equivalent to the urban use units.

On the other hand, apart from being enjoyed, the landscape should be managed. The European Convention of the Landscape establishes that landscape management includes the actions addressed to its maintenance, with a sustainable development perspective, in order to guide and harmonise the transformations induced in the same by the social, economic and environmental changes.

Amongst the possible tools for management, some institutional and other technical tools can be found. Amongst the institutions the establishment of guidelines for landscape adaptation and the land uses can be mentioned, or the territorial agreements that favour the protection and sustainable exploitation of the landscape.

The technical tools refer to, for example, the landscape-environmental characterisation of the area of study and its division in territorial units, the use of Geographic Information Systems and 3-D simulations of the planned actions, as well as the design of restoration measures and landscape correction.

Apart from these, as previously mentioned, the landscape should be included as variable in the territory planning instruments, urban planning, as well as in management and environmental assessment.

On the other hand, the conservation and the tourist use of the cultural heritage are should be carried out in a coordinated way, both between the Administrations and territorially. Amongst the actions that should be included in this activity the study and analysis of the status of the current conservation of the archaeological heritage, amongst others, a study of the historical evolution of this heritage and a maintenance and recovery plan of the same.

### **General objective to which an answer has been given**

- Build in a consensus way integrated management of the Levante de Almería coastal areas that guides the urban and territorial planning decisions.

### **Operational objectives**

- Mitigate the existing conflicts from the urban transformations (the risk of a social break between the local born population and the new settlers, as well as the differences in criteria between the Town Halls and Regional Administration).

- Designing of landscape management tools.
- Inclusion of cultural heritage as a development asset.

### Action proposals

- B.4.1 methodology for the valuation of heritage in urban actions.
- B.4.2 Creation and application of methodologies and landscape management tools.
- B.4.3 Conservation and tourist use of the cultural heritage.

### Approximate cost

The estimated cost of the three action proposals reaches **165,000 euros**, broken down in the following way:

Concept	euros
<i>Heritage valuation methodology in urban actions</i>	<i>90,000</i>
<i>Creation and application of landscape management methodologies and tools</i>	<i>35,000</i>
<i>Conservation and tourist use of the cultural heritage</i>	<i>40,000</i>
<b><i>Total Cultural heritage and landscape valuation</i></b>	<b><i>165,000</i></b>

### ***B5. Improvement of the Maritime-Terrestrial Public Domain and right of way area***

The protection of the maritime-terrestrial public domain includes the defence of the integrity and of the general use purposes to which it is destined, the preservation of its characteristics and natural elements, as well as the prevention of the harmful consequences of construction works and installations, as laid down by the Spanish Shores Act 22/88. For this purpose, the territory adjoining this public domain will be subject to the limitations and rights of way included in the same Law, with the exception of the land expressly declared of interest for national security and defence. (Articles 20 and 21). In chapter two the legal rights of way and the limits to which the property is subject are included, and therefore, the carrying out of works and installations.

A way of contributing to the protection of the maritime-terrestrial public domain is by means the purchase of land in areas of rights of way and protection and adjoining properties, with the objective of its inclusion in the maritime-terrestrial domain.

The purpose of this type of action is to ensure the enjoyment of all the population of the maritime-terrestrial domain, the conservation and protection of the biodiversity and that of its areas of rights of way, as well as to control and moderate the urban processes and other activities that are carried out on the coast.

On the other hand, the Ministry of the Environment, by means of the Coasts General Management, has recently implemented a programme for the purchase of land in rights of way areas of the maritime-terrestrial public domain in order to promote the protection and management policies of coastal areas in cooperation with territorial entities and organisations.

The CAMP Levante de Almería project includes the support to this initiative from the Ministry by means of the study and evaluation of the purchase and rescue of the land by the Administration as a management tool.

#### **General objective to which an answer has been given**

- Contribute to the maintenance of biodiversity on the coast by means of the application of integrated management instruments.
- Control and moderate the urban processes.

#### **Operational objectives**

- Ensure the enjoyment by the general public of the maritime terrestrial public domain.
- Identification of the degraded territories in the right of way areas.
- Development of integrated coastal management tools.

### **Proposal of activities**

- B.5.1 Study and evaluation of the purchase and recuperation of the land by the Administration as a management tool.

### **Approximate cost**

This activity is valued at **25,000 euros**.

### **Results integration**

Lastly, once the horizontal activities destined to the increase of institutional coordination and public-private cooperation, environmental information and education, as well as training, and once the singular projects basically destined are finalised, the improvement of the knowledge on the aspects related with the CAMP area integrated coastal management, a final report will be drafted which will assess the results reached by this pilot project, and will highlight possible recommendations on the integrated management of the coast. At the same time, said report will go together with an annex with information obtained in the CAMP project.

### **CAMP project general estimate**

The estimate (in Euros) of the CAMP Levante de Almería project activities is shown in Chapter 4.6.

## **4. CAMP LEVANTE DE ALMERÍA JUSTIFICATION**

### **4.1 Compatibility of the proposal of the CAMP Levante de Almería with the justification objectives and elements of the CAMP projects**

The objectives and activities proposed for the CAMP Levante de Almería are fully compatible with the objectives set for the CAMP projects, as it would contribute to the application of a sustainable model of development in the area; it would assess the current situation, the tendencies and possible future scenarios of the territorial structure and the interactions between development and environment; it would reinforce the sustainability and compatibility with the conservation of the natural and cultural resources of the main economic sectors of the area; it would contribute to the conservation and appropriate management of the natural and cultural resources; it would strengthen the coordination mechanisms between Administrations and local socioeconomic agents; it would increase the public awareness and participation in the policies and conservation activities and sustainable use of the resources; and it would improve the training of the managing teams of the area, of the various socioeconomic agents and of the local population, facilitating with this the achievement of the Project objectives, at the same time as promoting the initiatives related with the conservation and sustainability.

### **4.2 Relevance of the CAMP area and high institutional implication with the project**

On the other hand, the *relevance of the chosen area* is clear, having to highlight the important urban and vacational and residential tourism pressure; the large extension of the intensive agriculture since the 80s; the existence of numerous problems of residues and contamination of the environment; the strong conflict between the uses of the territory and of the natural resources; the insufficient coordination of activities between the Public Administrations themselves and with the various socioeconomic agents; and the lack of sufficient regulation in the uses of the marine environment; all this in an environment where the presence of highly valuable very fragile natural areas can be highlighted, there being two Specially Protected Areas of Mediterranean Importance (SPAMI/ZEPIM).

There is, additionally, an interest that goes further than the local and national scope regarding the results expected from the CAMP project, as it is a pioneering project in Spain and in the European Union, which may become a point of reference in the application of the *Recommendation of the European Parliament and of the Council on the application of the Integrated Management in Coastal Areas in Europe (2002/413/CE)*.

At the same time, there is an explicit political will for the implementation of the integrated management in the coastal areas in general, and specifically of the CAMP Levante de Almería project, expressed at a local, regional and national level. At a national level, this was expressed by means of the reorientation of its Coasts Policy by the Spanish Ministry of Environment since June 2004, which now includes the promotion of the integrated and sustainable management of the coasts; as well as in the request for the start-up of a CAMP project in Spain by the same Ministry. At a regional level this is shown in Area 6 of the Andalusian Plan of Environment 2004-2010 "Integrated Environmental Coastal Management"; it is also shown in the non Law Proposal in May 2005 in which the Andalusian Parliament urges the Junta Government to promote an Andalusian project of integrated coastal area management. At a local level the will is widely shown in the public participation meeting and in the strong implication of the Town Halls, County Councils and peripheral organisms of the Junta de Andalucía, among others, in the initial phase of this CAMP Levante de Almería project.

In summary, the implementation of the CAMP in East Almería is justified by the following circumstances:

- 1) Complexity of the institutional framework and of the responsibilities distributed amongst the various Administrations.
- 2) Important number of plans and sectorial programmes with incidence in the scope. Both factors imply the need for a new instrument, not of a similar nature as the previous one, but one exercising a coordinating action of the Administrations and their instruments for planning and programming.
- 3) Finally we should highlight the opportunity to include public participation in the decision taking process of the Administration, without restricting it to the regulated processes present in the sectorial planning, but as a continuous process of reciprocal communication between the Administration and the general public.

### **4.3 Potential contribution of the Mediterranean Action Plan**

Apart from the main contribution in the follow-up and guidance that would be carried out by the Mediterranean Action Plan (MAP) by means of the PAP/RAC, the MAP will actively participate in the carrying out of the CAMP project by means of the support of other RACs in various aspects such as:

- The start-up of a “Systemic and Prospective Analysis of Sustainability of the CAMP area” (BP-RAC);
- Its contribution to the follow-up of the SPAMI/ZEPIM Cabo de Gata-Níjar and Marine Seabeds of East Almería (SPA-RAC);
- The support to the plans and clean production courses (CP-RAC);
- The support for the establishment of a SIG and follow-up and control systems for the area (INFO-RAC);
- And the support for the consolidation of a system of follow-up of coastal marine pollutants and the establishment of an action plan to minimise its presence and effects (MEDPOL).

### **4.4 Evaluation of the institutional and professional capacity of the national and local experts for the development of the project**

In the institutional scope there is a legal and administrative framework, both at a national level as well as regional level, which perfectly allow undertaking the drafting and start-up of the proposed CAMP project. The Directorate General of Coasts of the Spanish Ministry of the Environment as well as the Council of the Regional Ministry of the Junta de Andalucía, would assure the essential of its carrying out, aided by the Local Administrations and the own assessment of the MAP, that of some individual experts and of the Technical Office that would be set up for the CAMP project.

There is, in this respect, sufficient professional capacity and experience by the national and local experts for the development of the project, counting on the external support of the various RACs.

#### **4.5 Needs regarding awareness, education and training**

In spite of the efforts made by the various Administrations and the associational movement, the awareness regarding environment and the sustainable development is still low in the area, not having yet become convinced of the importance of the inclusion of sustainability as territorial competitiveness criteria. On the other hand, the training and qualification of the technical personnel, both in the public and private sector, is insufficient to promote or carry out the planned sustainable development actions. These reasons explain the presence of some of the transversal axis of the CAMP Levante de Almería project.

## 4.6 Estimated budget (€)

<b>A. HORIZONTAL ACTIVITIES</b>		<b>769,000</b>
<b>A.1 Institutional Coordination and Participation</b>		<b>535,000</b>
- A.1.1 Levante de Almería Coastal Commission	20,000	
- A.1.2 Technical Coordination Office	493,000	
- General Coordination	268,000	
- Communication	30,000	
- SIG Territorial Management Tool	90,000	
- (ERS/RAC) remote detection support systems	15,000	
- Scientific and technical support	90,000	
- A.1.3 Coastal Management Board	22,000	
<b>A.2 Environmental Information and Education</b>		<b>139,000</b>
- A.2.1 Systematic analysis perspectives of and CAMP area sustainability	45,000	
- A.2.2 Dissemination of good practice in production activities	20,000	
- A.2.3 Stimulate an environmentally exacting housing demand	10,000	
- A.2.4 Promote active participation in urban planning processes	10,000	
- A.2.5 Establishment and dissemination of a database and Web page with information of interest from the various administrations	20,000	
- A.2.6 Coordination of the CAMP Project with the Local Agendas 21 and other sustainable projects and proposals in the area	6,000	
- A.2.7 Environmental awareness campaigns to beach and marine users	10,000	
- A.2.8 Promote environmental volunteers for the manual cleaning up of the beaches and marine seabeds	10,000	
- A.2.9 Promote the use of public transport	8,000	
<b>A.3 Training</b>		<b>95,000</b>
- A.3.1 Basic qualifications in ecosystems and coastal processes	20,000	
- A.3.2 Qualifications in Land Planning and Integrated Coastal Area Management	22,000	
- A.3.3 Training Courses on Clean Production	7,000	
- A.3.4 Qualifications in participation of technical actors and negotiation and communications techniques	24,000	
- A.3.5 Qualifications in Geographical Information Systems	22,000	
<b>B. SINGULAR PROJECTS</b>		<b>450,000</b>
B.0 Reference framework and CAMP implementation	20,000	
B.1 Sustainable management of hydraulic resources	90,000	
- Application of dynamic models of systems for the simulation of prospecting the aquifer load capacity	60,000	
- Integrated study of water, coastal and biodiversity management	30,000	
B.2 Protection of marine resources (zoning and planning of marine resources)	60,000	
B.3 Incorporation of sustainable practices in local production activities	70,000	
- Study of the tourist load capacity of the area (land and sea activities) in the public use facilities in the Maritime-Terrestrial Public Domain Area	50,000	
- Evaluation of fishery resources	20,000	
B.4 Valuation of cultural and landscape heritage	165,000	
- Methodology for the valuation of heritage in urban developments	90,000	
- Creation and application of landscape methodologies and management tools	35,000	
- Conservation and tourist use of cultural heritage	40,000	
B.5 Improvement in protection of Maritime, Terrestrial and Hydraulic Public Domain (evaluation of the purchase and recovery of land by the Administration as a management tool. Improvement and recovery of the occupation of public riverbeds)	25,000	
<b>INTEGRATION OF RESULTS</b> (drafting of final document, databases, future activities proposals, presentation of final results, etc. )	20,000	

<b>TOTAL ESTIMATED BUDGET</b>	<b>1,219,000</b>
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<b>Financing Organisms</b>	<b>Financing Planned (€)</b>
• <b>Ministry of the Environment (MMA)</b>	<b>700,000</b>
• <b>Environment Management Board (CMA) Junta de Andalucía</b>	<b>300,000</b>
• <b>Priority Actions Programme / Regional Activity Centre (PAP/RAC)</b>	<b>219,000</b>

## **4.7 Organisation of the work and institutional agreements**

The structural organisation of the CAMP Levante de Almería will be as follows (see diagrams in chapter 3.2.):

- A) Orientation and Follow-up of the CAMP.** The Mediterranean Action Plan Coordination Unit (MAP) will carry out these functions by means of the PAP-RAC/UNEP in close cooperation with the Spanish Ministry of Environment and the Regional Ministry of Environment of the Junta de Andalucía. For the follow-up of the CAMP Levante de Almería progresses, the PAP-RAC/UNEP will appoint an independent expert appointed in agreement with the MMA and the CMA.
- B) Coastal Commission.** A Coastal Commission will be set up at the highest constitutional degree of the project components, in order to bring together the various Administrations with responsibilities relative to the CAMP project and provide the compatibility of their actions. The members of this commission may delegate in whoever they consider appropriate to be represented. Once this Commission is set up, the **Executive Committee** will be set up, made up by representatives of MAP/UNEP, the Ministry of Environment, the Junta de Andalucía and the Local Administration which will have the functions to promote the creation of the Technical Coordination Office, the Coastal Council and the Coastal Forum, described below.
- C) Technical Coordination Office.** This office should have full time staff, specifically contracted for this project in order to ensure the correct functioning of the Technical Office. It will be based in a place to be decided upon by the Executive Committee.

- D) Coastal Council.** This will be made up as a social participation entity, with the presence of various local socioeconomic agents, both public and private. The Council will also promote a **Coastal Forum**, of an open nature, in order to guarantee the participation of the local population throughout the entire carrying out of the CAMP project.
- E) Work teams.** Interdisciplinary work teams will be made up for each of the main work lines. The external experts will be appointed by the Coastal Commission with the approval of the Coordination Committee.
- F) Institutional agreements.** Following that laid down by the MAP-UNEP, an Agreement will be signed between the MAP, the Spanish Ministry of Environment and the Government of the Junta de Andalucía, in which the Reference Terms of the CAMP project will be specified.

## 4.8 Summary of the Calendar of Activities

The calendar followed by the CAMP Levante de Almería project is determined by the MAP, and the agendas of the National and Regional Governments. Below the tasks and dates both carried out and to be carried out are listed:

TASKS ALREADY CARRIED OUT	DATES
Initial contacts between MMA and CMA concerning CAMP	September 2004
Meeting of all parties at CMA and initial visit to the CAMP Levante de Almería area of study	17-18 February 2005
Commencement of the Feasibility Study	1 March 2005
Town Mayors information meeting	19 April 2005
First Participation Workshop	10 May 2005
Second Participation Workshop	20 July 2005

TASKS PLANNED	DATES											
	Year	2005		2006				2007				2008
	Quarter	III	IV	I	II	III	IV	I	II	III	IV	I
Approval of Agreement Text and attached Terms of Reference		<b>X</b>										
Third Participation Workshop			<b>X</b>									
Signing of Agreement and Terms of Reference			<b>X</b>									
CAMP Start-up			<b>X</b>									
Activities Terms of Reference				<b>X</b>								
Carrying out of Activities				<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	
Integration of Results												<b>X</b>
Post-project Activities Proposal												<b>X</b>
Presentation of Results												<b>X</b>

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