



PAP/RAC of UNEP/MAP

Report of the

Workshop on Land cover monitoring for coastal zone planning and management

(26-27 May 2023 in Split)

Child Project 2.1

Author: PAP/RAC

Split, September 2023



2.1
Mediterranean
Coastal Zones Climate
Resilience Water Security
and Habitat Protection



UN
environment
programme



Mediterranean
Action Plan
Barcelona
Convention



REPORT of the Workshop on Land cover monitoring for coastal zone planning and management

Venue, participation and objectives

1. The workshop was held on 26-27 May within the framework of child project 2.1. of the GEF MedProgramme. It focused on the updated methodology and preliminary analyses of the Lebanese coastline's Land Cover Change candidate indicator. The workshop was attended by the expert team responsible for upgrading the methodology for land cover change assessment, representatives from the Lebanese government, Lebanese involved experts and PAP/RAC experts. A complete list of participants is attached as Annex I.
2. The workshop aimed to achieve three objectives: present and discuss the latest methodology update for calculating the land cover change (LCC) indicator; explore its potentials for coastal planning and management; and discuss its use for the update of the ICZM National Strategy and ICZM Draft Law in Lebanon. The detailed agenda can be found in Annex II.

Agenda item 1: Introduction to CCI25 with selected examples

3. Mr Marko Prem, PAP/RAC Deputy Director, introduced the Common Candidate Indicator, its background in ecosystem approach (EcAp) and work done so far related to the development of Good Environmental Status (GES) assessment. The CCI25 makes part of the Ecological Objective (EO8) Coastal ecosystems and landscapes and focuses on land cover change. The primary objective of this indicator is to maintain ecosystem integrity and natural dynamics of coastal area. Therefore, the key issue is urbanisation and its impacts. Mr Prem presented the principal land cover classes, along with reporting and assessment for the indicator. Generally, the increase in protected areas would be characterised as positive, and the increase in built-up areas as negative. However, the GES, which will enable more objective assessment, is still to be defined.
4. Mr Antonio Morić-Španić, one of the experts assisting PAP/RAC in updating the LCC methodology for the indicator calculation and assessment, presented an overview of the open-source data available for the indicator calculation. He presented the main providers of the open-source data, comparing Copernicus data with ESRI Land Cover and ESA World Cover. Mr Morić-Španić emphasised that the data sources need to be validated by responsible institutions or data providers. He explained that quality assurance involves a selection of a percentage of points where the derived information is checked against „ground

truth“-usually ancillary information like official maps, cadastre, but also field verification. The presenter also provided an overview of the analysed different open-source data for coastline and elevation. He recommended official national data as the first choice for the administrative units and protected areas. The latter can also be checked in the World Database on Protected Areas (WDPA), which has been identified as the most exhaustive and suitable for this topic. WDPA is managed by the UNEP World Conservation Monitoring Centre and is being updated on a monthly basis.

5. Mr Frane Gilić from the GIS-DSS Lab (University of Split) explained the calculations of the CCI25 for the whole coastal zone of the Adriatic Sea, carried out by the application of the NEAT assessment tool for GES for the Coast and hydrography EOs. The project used a free and open-source Q-GIS software and all needed freely available data. The presentation focused on the data preparation and final output data. The discussion mainly focused on harmonising input data and other challenges within the main topic.
6. Ms Samah Termos from the CNRS (Remote Sensing Centre, National Council for Scientific Research, Beirut) presented preliminary calculations for the Lebanese coastal zone. She compared the data for built-up, agricultural, forest and semi-natural areas, water bodies and wetlands for 2015 and 2020. She discussed the uncertainties within the data and presented the second monitoring calculations.

Agenda item 2: ICZM Status and prospects

7. Mr Marko Prem introduced the Quality Status Report (QSR), the methodology for its development and its role in understanding the Mediterranean marine and coastal environment status. He explained the core structure of the 2023 Med QSR, focusing on Common Indicators 15 (“Location and extent of the habitats potentially impacted by hydrographic alterations”), 16 (“Length of coastline subject to physical disturbance due to the influence of human-made structures”) and 25 (“Land cover change”). The final part of the presentation was devoted to presenting initial ideas on establishing the GES criteria for the land cover change. Starting from the ecological objective defined as the natural coastal area dynamics maintained and coastal ecosystems and landscapes preserved, the initial idea for GES was proposed as: Linear coastal, in particular low-lying development, minimised, with perpendicular development being in balance with integrity and diversity of coastal ecosystems and landscapes. Additional ideas were presented within general thematic concepts in landscape ecology and the ICZM Protocol provisions.

8. Ms Marina Marković (PAP/RAC) presented environmental assessments for land-sea planning, using the case of Montenegro. She presented the use of vulnerability studies for the preparation of coastal plans and strategies, highlighting the methodology and the practical implementation during the preparation of the Coastal Spatial Plan and ICZM Strategy in Montenegro. Overall, environmental vulnerability was achieved by aggregating across the environmental components. These results can be combined with the attractiveness assessment in order to reach the optimal compromises and obtain suitability maps. Finally, she presented the methodology for land-sea interactions that can be used in different strategic and planning processes, particularly in MSP. She illustrated the methodology potential by showing the obtained results.
9. Mr Ivan Sekovski (PAP/RAC) presented the potential use of the Land Cover Change assessment outputs in the Coastal management plan for Boka Kotorska Bay. The Plan is being developed through the GEF MedProgramme's Child Project 2.1 and supported by the GEF SCCF Project. Some background on the Plan area was introduced, along with the priority themes the Plan covers. One of the themes is spatial development, to which land cover change assessment provides essential inputs. The first outputs of the assessment indicated areas within the Bay that are prone to coastal flooding, i.e. areas within the Low Elevation Coastal Zone (<5m asl, LECZ). In addition, outputs of LCC assessments can indicate the modality of urban growth - whether it is linear or patchy, whether it occurs close to the protected areas, whether there are any green corridors, etc. With higher resolution, recent open-source data can detect more "green areas", which is essential for flood management. Finally, with higher resolution, it is easier to detect the degraded areas (especially after forest fires), which could be suitable for restoration and afforestation.
10. Mr Gojko Berlengi, a spatial planner, presented a brief history of spatial planning in Croatia, reflecting on sustainable spatial development. He described Croatia's national planning system, key institutions, and most important legal documents, including selected topics from the Spatial Development Strategy (2017). He illustrated the horizontal planning structure with the County and municipal spatial plans. Mr Berlengi emphasised that the designation of construction areas is the most important instrument of spatial development control and proposed the construction area built-up ratio to be used as its primary indicator. He presented the approach, methodology and indicators developed and used to prepare the Coastal plans for two Croatian regions. In particular, he emphasised the methodology to assess the sustainability of spatial development. The presenter emphasised housing affordability for families and real-estate development in the coastal zone. A comparison between the booming rental apartments for tourists and the stagnant hotel offer was graphically illustrated. Mr Berlengi demonstrated the use of EU Copernicus Urban Atlas data to analyse

the availability of public green spaces for the city of Split. He concluded by pointing out some changes on the national level in Croatia – environmental protection is recently being attached to the Ministry of the Economy so that the new Ministry is of economy and sustainable development.

11. In the following presentation, Mr Ali Ramadan, Director General of Urban Planning in Lebanon, presented the planning of Lebanese coastal space considering historic development and current challenges and opportunities. He addressed the definition of the coastal zone and focused on a narrow coastal corridor with an altitude between 0 and 50m, including the 100m strip sea to land. The coast comprises sandy or pebble beaches and rocky micro-cliffs, while the dune ecosystems nearly disappeared, except in the south of Sour. Mr Ramadan summoned up the initial master plans of the coastal areas by DGU (General Directorate of Urban Planning) in the early 1960s when the first goal was to set Master plans for the main cities Beirut, Tripoli, Saida, etc. up to the general Master plan implemented in the early 1970s. Today's key challenges were presented, along with DGU interventions in two major directions: 60% of the Lebanese territories were unclassified areas without master plans; diminishing the exploitation factors of the coastal areas took a lot of effort, and the exploitation factors were reduced from 40% superficial and 80% total to 25%-50%. Building law violations leading to encroachments on the maritime public domain are out of the hands of DGU, as building law enforcement is the prerogative of the Ministry of Interior and the general directorate of transport. The coast continuity is being obstructed. Lebanon is turning to be a petroleum country, and it is a big question of how to remain at least on today's environmental level. Mr Ramadan also talked about the exploitation of the coast for new real estate constructions, seen by many as a "safe depot" of money, especially after the economic crisis in Lebanon began. As he said, the opportunities lie in using new technologies, especially remote sensing imagery, that bring higher resolutions, better analyses and better land use planning. Mr Ramadan also emphasised adopting the ICZM law could become a new start, emphasising the importance of designing and enforcing some land policy instruments.

Agenda item 3: Discussion on GES assessment criteria

12. Ms Daria Povh Škugor and Ms Martina Baučić moderated the discussion on key inputs for establishing GES and instruments needed to direct development towards sustainability. The questions raised in the discussion covered various space needs: the environmental need with its particular characteristics and problems (e.g. biodiversity, identifying high-value ecosystems, fragmentation, climate change impacts and consequences); the socio-economic needs with its attributes (population density, various uses of specific areas, historical land

cover change, relations with elevation, carrying capacity etc.); and the need for space for safety (risk related to LECZ, needs for space for retreat), and for urban greenery (risk related to human health).

Agenda item 4: Interpretation of land cover change CCI25 baseline and monitoring data for coastal zone planning and management

13. The following day, Mr Frane Gilić presented an introduction to the indicator's baseline and data, focusing on outputs for the coasts of the Adriatic Sea. The presenter brought up numerous new information derived from the calculation of the indicator, such as the smallest built-up area is to be found in Bosnia and Herzegovina, in Croatia, 56% of the coastal area (within the first 10km from the sea) is under some kind of nature protection. Also, Mr Gilić highlighted the differences between Copernicus and ESA - with over 20% discrepancy related to the data for built-up areas. The discussion followed, principally over the time frame for reporting (every six years): Mr Ramadan noticed it could be more beneficial for the municipalities to have more actual data with which they might be sooner alerted and have more time for planning and implementing measures. Mr Prem replied that CCI25 could give states a useful general overview, and the states can conduct monitoring and implement measures towards achieving GES even on a shorter time scale.
14. The next presentation brought insights from the analysis of Ms Samah Termos of land cover change along the Lebanese coast in the belts of 300m, 1000m and 10km from 2020-2021 and 2015-2020. She introduced all the selected sources and data characteristics and presented the methodology used. She emphasised a slight increase in protected areas in the coastal zone, particularly in the first 300m. Ms Termos showed the change according to governorates, districts, and the LECZ calculations. She emphasised that 58.7% of the whole coastal zone within 0-300m (in Lebanon 79.74 km²) lies in LECZ. In comparison - as we previously heard from Mr Gilić - the calculation for the coasts of the Adriatic Sea, the same measurement using this methodology inside 4900km² of the narrow coastal belt (0-300m) defined 17% LECZ. In addition, in 2020, 48.5% of LECZ has been built up. In only five years, since 2015, built-up area in LECZ increased by 11.8%, with significant differences from one governorate to another.
15. In the discussion following the presentations, Ms Martina Baučić emphasised the challenges of using open-source data for monitoring. She noted the importance of UN-GGIM in addressing global challenges regarding the use of geospatial information. As Ms Baučić stated, the main concern is the possibility of misuse and misrepresentation of data since the

data sources became openly available to everyone. The presenter sees the solution in realising an effective standard framework for data quality and assurance mechanisms for open-source data.

16. Further on, Mr Morić-Španić presented challenges in interpreting the CCI25 baseline and monitoring data for the GES assessment, with the primary objective of monitoring the processes related to land cover change - to maintain the natural dynamics of coastal areas and to preserve coastal ecosystems and landscapes. Mr Morić-Španić discussed the visualisation and statistical analysis of the selected CCI25 parameters within the baseline date of built-up areas in different coastal belts in correspondence to monitoring data (changes observed from 2012 to 2018). The presenter then offered a broad spectrum of questions opened for discussion, such as how we can clearly define GES for CCI25, for which target groups of society are these measurements relevant, which data and trends are the most suitable for achieving the GES, which form of presentation of the results would be most appropriate in the context of attaining GES, etc.

Agenda item 5: Coastal zone planning and management - towards National ICZM Strategy and Draft ICZM Law for Lebanon

17. Ms Ana Grgić (University of Split) presented the “Adaptation plan for the Jadro River pilot area” (within Interreg Italy-Croatia ChangeWeCare Project) and “Coastal management plan for the City of Kaštela” (Interreg Co-Evolve Project). Jadro River was analysed in its hydrological basin, according to the current state of waters and the dangers of climate change, along with the current state of urbanisation and the dangers of excessive urbanisation within its two administrative units, municipalities Solin and Klis. The GIS analysis used to identify impervious surfaces revealed that Solin built areas within settlements reach approximately 50% of impervious surfaces, while for Klis, this rate is 13%. Four goals were identified under which a set of measures for each has been developed: preservation and improvement of water and natural environment; strengthening the resilience of built-up areas to climate change; implementing smart management of the Jadro basin; and implementing smart urban management. The measures were developed and proposed in discussion with stakeholders, and the necessity for forming one institution that would develop and lead the integrated approach to Jadro River management has been emphasised. In Kaštela, the project's first step covered investigating the zones exposed to potential flooding in the future by analysing the GIS data and setting the priorities for protection since a part of the city contains cultural heritage inside previously defined zones.

Finally, 613 housing units in the historic centre have been identified as exposed to flooding. Following the overview of the current state, drivers and pressures in correlation with environmental responses and impacts, different urban planning tools were used to define the responses ensembled within the Coastal Management Plan for the city of Kaštela.

18. In the following presentation, Mr Serge Yazigi (American University of Beirut) explained the difference between Master Plans and Detailed Urban Plans, discussing the problems when overlapping both types. The presenter also drew parallels with Plans (both types) in high mountain areas of Lebanon, based on experience in working on the Land Degradation Neutrality Project on mountain landscapes (funded by the GEF and implemented by the UNDP). Mr Yazigi discussed the gaps within planning for the coastal area in Lebanon, mentioning that local plans were made through different periods and using different methodologies. These plans addressed various topics connected to the planning topic, such as problems with urban sprawls, density of population within an area, socio-economic aspects, etc. The discussion evolved with contributions from Mr Ramadan - explaining the contents of Detailed Master Plans, along with examples of details included in different spatial zones. Mr Ramadan proposed creating Detailed Master Plans as well as an Integrative Master Plan with the initiative of the DGU, utilising data from CNRS and with the help of PAP/RAC and UNEP/MAP, explaining the current situation in which a series of local Master Plans were produced by local municipalities („mostly not aware of the national level of urban planning vision“). Mr Faour (CNRS) accentuated the problems in the institutional distribution of competencies at the national level. For example, Mr Faour mentioned that most Lebanese institutions - for unknown reasons - avoid the institution of the Central Administration of Statistics.

Agenda item 6: Lessons learned

19. The concluding discussion begun by Mr Faour shared his latest calculations visualised in the maps for the Lebanese coastal belt of the first 10km to the sea. Mr Faour made a correlation between the Land Surface Temperature in 2022 (within the borders of municipalities, following the suggestion of Mr Manal Nader, University of Balamand) and the Normalized Difference Vegetation Index, proposing an overlapping of these two indices to establish the general overview of Environmental Status. The shown materials originated a vivid discussion, where the participants tried to explain why some areas are marked as poor or of good ES (especially in combination with field experiences). Mr Prem thanked Mr Faour for this very illustrative attempt, mentioning other indices and parameters that should be included in this

robust reporting method – once the whole GES assessment is defined. Mr Adel Yacoub (Ministry of Environment, Lebanon) asked if all the Mediterranean countries would have the resources and capacities to carry out the assessment procedure. Ms Baučić remarked that in reporting GES, not only coloured maps should stand alone for each unit (municipality) – an expert description should be added to each reporting unit. The formula for defining the GES, particularly the criteria/method for its assessment, should not be purely mathematical; it should be more fuzzy and descriptive. Mr Berlengi highlighted the importance of dynamics in spatial changes. We cannot analyse only one year's status; we should also include statistics on the population growth rate. However, such data is rarely available in many Mediterranean countries, in particular for the coastal zones. Ms Povh Škugor pointed out the significance of the analyses for the project activities in Lebanon. She noted that the Draft ICZM law and National ICZM Strategy have been on hold since 2015 and proposed a more intensive communication with the broader public in Lebanon. Ms Povh Škugor responded to Mr Yacoub's question: if there are no experts in the countries to carry out the GIS calculations, the Team from the University of Split can assist to solve this problem. Mr Belamarić (PAP/RAC) mentioned the importance of using vegetation maps as possible indicators of human presence, especially in areas with a high number of invasive species. This is relevant to the hemeroby index, which should be considered alongside other indices.

20. Mr Prem thanked all the participants and declared the workshop closed on May 27th at 14:00.

Annex I

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Annex II

Agenda of the workshop

Friday, 26 May 2023

9:00 - 09:10	Welcome message (by Marko Prem, PAP/RAC Deputy Director and Martina Baučić, GIS-DSS Lab, Faculty of Civil Engineering, Architecture and Geodesy of Split - FCEAG).
	1. Introduction to CCI25, selected examples
09:10 - 09:30	Introducing Common Candidate Indicator 25 on land cover change (by Marko Prem, PAP/RAC Deputy Director).
09:30 - 10:00	Overview of open source data for Calculation of Common Candidate Indicator 25 (by Antonio Morić-Španić, PINUS NIGRA).
10:00 - 10:30	Introducing examples - Calculation of Common Candidate Indicator 25 - Adriatic sea countries (by Frane Gilić, GIS-DSS Lab, FCEAG).
10:30 - 11:00	Introducing examples - Calculation of Common Candidate Indicator 25 - Lebanon (by Samah Termos, Remote Sensing Center, Lebanese National Council for Scientific Research)
11:00 - 11:30	Coffee break.
	2. ICZM Status and prospects
11:30 - 12:00	Presentation of the Quality Status Report and first insights on establishing the Good Environmental State (GES) criteria (by Marko Prem, PAP/RAC Deputy Director)
12:00 - 12:30	Experiences from Montenegro with the reflections on environmental criteria (by Marina Marković and Ivan Sekovski, PAP/RAC)
12:30 - 13:00	Experiences from Croatia with the reflections on sustainable spatial development (by Gojko Berlengi, spatial planner)

13:00 – 13:30	<p>Planning the use of the coastal space in Lebanon – challenges and opportunities (by Ali Ramadan, Head of the Studies Service Directorate General of Urban Planning; Ministry of Public Works and Transport of Lebanon)</p>
13:30 – 14:30	Lunch break
	3. Discussion: country specificities for CCI25 in the light of establishing GES assessment criteria
14:30 – 16:30	<p>Discussion on key inputs for the establishment of GES and on instruments needed to direct development towards sustainability (moderated by Daria Povh Skugor and Martina Baučić)</p>
<u>Saturday, 27 May 2023</u>	
	1. Interpretation of land cover change CCI 25 baseline and monitoring data for coastal zone planning and management
09:00 – 09:30	<p>CCI 25 quantitative baseline and monitoring data - Adriatic sea countries (by Frane Gilić, GIS-DSS Lab, FCEAG).</p>
9:30-10:00	<p>CCI 25 visualisation by maps - Lebanon (by Samah Termos, Remote Sensing Center, Lebanese National Council For Scientific Research)</p>
10:00 – 10:30	<p>Discussion: challenges of using open-source data for monitoring purposes (moderation by Martina Baučić GIS-DSS Lab, FCEAG).</p>
10:30 - 11:00	<p>Discussion: challenges of interpretation of CCI 25 baseline and monitoring data towards achieving GES (by Antonio Morić-Španić, PINUS NIGRA).</p>
11:00 – 11:30	Coffee break.

2. Coastal zone planning and management – towards National ICZM Strategy and Draft ICZM Law for Lebanon

11:30 – 12:00 Inspiration from the local level – Coastal Plans for Kaštela and the Jadro river (by Ana Grgić, Faculty of Civil Engineering, Architecture and Geodesy of Split)

12:30 – 13:00 Opportunities for sustainable spatial development in Lebanon (by Serge Yazigi, spatial planner, American University of Beirut)

3. Wrap-up – lessons learned

13:00 – 14:00 Conclusions from the workshop.