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DIAGNOSTICS ON ADAPTATION TO CLIMATE CHANGE IN COASTAL AREAS

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Region	(ISLAND) CYPRUS
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### Introduction

This questionnaire was developed by Regione Lazio for MAREMED Project, diagnosis phase, theme: Adaptation to Climate Change (ACC) in Coastal Areas.

It is addressed to Maremed partners and Mediterranean public administrations directly involved in coastal zone management.

MAREMED – Maritime Regions cooperation for Mediterranean, is a project started in 2010 and co-funded by the MED Programme, that involves 15 partners among Regions and local administrations from France, Italy, Spain, Greece and Cyprus together with the Conference of Peripheral Maritime Regions (CPMR)

The project is dealing with the following themes: maritime policy governance, the integrated management of coastal and maritime areas, fisheries, climate change adaptation in coastal areas, efforts to reduce pollution and data management.

Its objective is to develop tools for enhancing and coordinating regional, European and Mediterranean policies on these six thematic strategies.

In the first work phase (the present one), an overview of the policies implemented and their governance by the project partners will be carried out. In the second phase the partners will identify pilot coastal zones where they will promote transnational management initiatives and share operational tools in order to aid the decision-making process for the six thematic strategies.

This questionnaire took inspiration from two works already started during BEACHMED-e project and Coastance project (MED programme).

During the Obsemedi sub-project of Beachmed-e - whose aim was to realize a feasibility study to set up a Mediterranean Interregional Observatory for coastal zone management -, the results led to the realisation of a list of about 40 public structures operating in coastal zone management and the publication of the activities and tools necessary to deal with the problem.

Coastance questionnaire, developed by Département de l'Hérault, coordinator of component 3 "Coastal Risk: Submersion and erosion" led to the comprehension of the state of the art of the activities linked to Mediterranean coastal risks and submersion management and forecasting. Eight public Administrations coming from Italy, France, Spain, Greece, Cyprus and Slovenia took part in this work.

Regione Lazio, Maremed ACC theme coordinator, is now requested to take a step ahead: to understand and encourage the development of tools and methods to counter the problem of climate change adaptation in coastal areas.

"...Floods are natural phenomena which cannot be prevented. However, some human activities (such as increasing human settlements and economic assets in floodplains and the reduction of the natural water retention by land use) and climate change contribute to an increase in the likelihood and adverse impacts of flood events..."

*EU flood directive 2007/60/CE*

"White paper" on Adapting to climate change ([http://www.medregions.com/pub/doc\\_travail/gt/66\\_en.pdf](http://www.medregions.com/pub/doc_travail/gt/66_en.pdf)) suggest the integration of climate change issues for the implementation of the Floods Directive 2007/60/CE. "...Full implementation of this Directive by the EU Member States will help increase resilience and facilitate adaptation efforts.... (COM(2009) 147, p. 11)"

This work must consider European flood directive as the point of reference to regulates the problem of flood risk evaluation, taking into account climate change adaptation in coastal area. This

directive states in a specific way the need to consider climate change effects during the evaluation flood risks future scenarios.

Eventually, we have a regulation explaining how to assess and manage flood risks in coastal areas and the European Commission fixes clear deadlines for Member States to comply with the requirements of the flood directive.

This directive, approved by most Mediterranean Member States ([http://ec.europa.eu/environment/water/flood\\_risk/timetable.htm](http://ec.europa.eu/environment/water/flood_risk/timetable.htm)), is reference point chosen by Regione Lazio for the development of this questionnaire.

### Main Objectives of the questionnaire

- Understanding the knowledge level of the "flood directive" effectively demonstrated by the Maremed partners, and especially understanding the real capability of Mediterranean administrations to meet the milestones proposed by the European Commission.
- Research of tools and methods currently available to address the problem of risk map elaboration, also collecting some experiences and suggestions coming from MAREMED partners for the next financial programme (2013 - 2020).

## EU Flood risk directive 2007/60/EC (Requirements and milestones).

The milestones fixed by the flood directive are reported below:

### PRELIMINARY FLOOD RISK ASSESSMENT

#### Article 4

...4. Member States shall complete the preliminary flood risk assessment by

**22 December 2011.**

### FLOOD HAZARD MAPS AND FLOOD RISK MAPS

#### Article 6

...8. Member States shall ensure that the flood hazard maps and flood risk maps are completed by

**22 December 2013.**

### FLOOD RISK MANAGEMENT PLANS

#### Article 7

...5. Member States shall ensure that flood risk management plans are completed and published by

**22 December 2015.**

The Flood Directive gives Member States some suggestions for the development of flood risk maps. In particular, some detailed information is requested for the elaboration of hazard maps and risk maps.

Some of the main requirements set by the directive are the following:

### FLOOD SCENARIOS...

Flood hazard maps shall cover the geographical areas which could be flooded according to the following scenarios:

- (a) floods with a low probability, or extreme event scenarios;
- (b) floods with a medium probability (likely return period  $\geq 100$  years);
- (c) floods with a high probability, where appropriate

### ELEMENTS TO BE SHOWN...

For each scenario the following elements shall be shown:

- (a) the flood extent;
- (b) water depths or water level, as appropriate;
- (c) where appropriate, the flow velocity or the relevant water flow

### FLOOD SCENARIOS SHOULD BE EXPRESSED IN TERMS OF:

- (a) the indicative number of inhabitants potentially affected;
- (b) type of economic activity of the area potentially affected;
- (c) installations as referred to in Annex I to Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control (1) which might cause accidental pollution in case of flooding and potentially affected protected areas identified in Annex IV(1)(i), (iii) and (v) to Directive 2000/60/EC;
- (d) other information which the Member State considers useful such as the indication of areas where floods with a high content of transported sediments and debris floods can occur and information on other significant sources of pollution.

### FLOOD RISK MANAGEMENT PLAN...shall take into account relevant aspects such as:

...costs and benefits, flood extent and flood conveyance routes and areas which have the potential to retain flood water, such as natural floodplains, the environmental objectives of Article 4 of Directive 2000/60/EC, soil and water management, spatial planning, land use, nature conservation, navigation and port infrastructure.

Flood risk management plans shall address all aspects of flood risk management focusing on prevention, protection, preparedness, including flood forecasts and early warning systems and taking into account the characteristics of the particular river basin or sub-basin.

Flood risk management plans may also include the promotion of sustainable land use practices, improvement of water retention as well as the controlled flooding of certain areas in the case of a flood event.

**The questionnaire:**

**State of the art: inventory of the cooperation projects on adaptation to climate change**

1. *Have you participated in former European programmes on adaptation to climate change in coastal areas?*

yes	
no	√

*If so, could you provide the names of these projects and any links to their websites?*

.....

2. *Could you describe the main Results, Experiences and Best Practices that you identified in these projects?*

.....

**State of the art: inventory of the atlases and databases regarding coastal risks: erosion, submersion, flood**

3. *Have you already acquired information or been informed on floods and submersions which already occurred in the past, and which have significant adverse impact on coastal zones?*

yes	
no	√

*If so, what kind of information do you have in order to describe the characteristics of the floods already occurred in the past?*

.....

4. *Have you already defined a methodology to identify priority areas of risks (erosion, submersion, flood)?*

yes	
no	√

5. *Have you already produced risk maps on coastal areas?*

yes	
no	√

*If so, could you briefly describe the overall methodology that you have adopted to produce risk maps?*

.....

6. Did your risk maps refer to the EU flood directive (2007/60/EC) requirements?

yes	<input type="checkbox"/>
no	<input checked="" type="checkbox"/>

7. Have you produced atlases and/or databases regarding coastal area management?

yes	<input type="checkbox"/>
no	<input checked="" type="checkbox"/>

If so, could you provide the names of these atlases and/or databases (in case of web tools, please specify the link to the web page)?

.....

8. Have you adopted a specific guideline to produce these tools?

yes	<input type="checkbox"/>
no	<input checked="" type="checkbox"/>

If so, do you think your guideline should be shared and adopted by the MAREMED partnership?

.....

9. Could you list some general surveys concerning erosion and submersion events carried out in your Region over the past five years?

10. Some general surveys concerning erosion and submersion events in Cyprus carried out over the past years are as followed: [Department of Public Works \(Mr Iasonas Sofos\)](#)

*Larnaca District:*

- a. *Oroklini – Larnaca region*
- b. *Pervolia – Kiti – Zygi region*

*Paphos District*

- a. *Geroskypou bay*
- b. *Polis Chrysochous*

*Nicosia district:*

- a. *Kato Pyrgos – Pegeia region*

**Note: The Land and Survey Department is the appropriate department which deals with the coastline evolution.**

**Cartographic and morphological data**

11. Have you already acquired morphological data describing your coastal zone? *Department of Public Works (Mr Iasonas Sofos)*

√	Shoreline acquisition?
	Equilibrium beach section acquisition?
√	Erosion trend?
√	Sand grain size?
√	<del>Chemical</del> and Physical characteristics of sediments?
	Sand Dune acquisition?
	Other.....

12. What kind of tools do you use for coastal monitoring? *Department of Public Works (Mr Iasonas Sofos)*

	Webcam
√	Topobathimetric measurement
√	Satellite images
	Lidar
	Other.....

13. Have you developed common cartographies together with your neighbour region? *Department of Environment*

yes	
no	√

14. Have you collected information evaluating the subsidence phenomenon along your coast? *Department of Environment*

yes	
no	√

**Meteorological and wave climate data, climate change effects.**

15. Have you collected information on high tide level in your region? *Department of Public Works (Mr Iasonas Sofos)*

yes	√
no	

16. Have you collected information evaluating sea level evolution of your Region in the medium/long term (100÷200/500 years)? *Department of Public Works (Mr Iasonas Sofos)*

yes	
no	√

17. Have you collected information evaluating offshore meteorological characteristics (wind speed, wind direction, atmospheric pressure, water and air temperature, ...) along your coasts? *Oceanographic Centre of the University of Cyprus*

yes	√
no	

*If so, could you specify the period of time the data collected refers to?*

	<5 years
√	5÷20 years
	>20 years

18. Have you collected information evaluating offshore (about -100 m) wave characteristics (Wave height H, Wave period T and main direction) along your coasts? *Oceanographic Centre of the University of Cyprus*

yes	√
no	

*If so, could you specify the period of time the data collected refers to?*

	<5 years
√	5÷20 years
	>20 years



19. Have you collected information evaluating nearshore (about -20 m) wave characteristics (Wave height  $H$ , Wave period  $T$  and main direction) along your coasts? *Oceanographic Centre of the University of Cyprus*

yes	√
no	

If so, could you specify the period of time the data collected refers to?

	<5 years
√	5÷20 years
	>20 years

### Social economic data, exposed values

1. Have you already developed land use maps for your coastal area? *Department of Environment*

yes	√
no	

If so, please indicate a reference below, or the website of publication.

[http://www.moi.gov.cy/moi/tph/tph.nsf/index\\_gr/index\\_gr?OpenDocument](http://www.moi.gov.cy/moi/tph/tph.nsf/index_gr/index_gr?OpenDocument)

2. Have you already assigned economic values to your coastal area? *Department of Environment*

yes	√
no	

If so, could you briefly describe the methodology adopted to evaluate the economic values of your coastal area?

*For the valuation of the economic benefits use is made of the differences in the productivity of the housing and agricultural sectors attributed to the coastal environment. This is a particular application of the more widely used economic appraisal technique of considering 'with' and 'without' situations.*

### Future scenarios

3. Are there any key studies containing future scenarios for your area with a focus on: from the part of *Oceanographic Centre Cyprus*

√	Climate change
	Changes in population size

	<i>Population dynamics</i>
	<i>Economic evolution</i>
	<i>Land use changes</i>
	<i>Spatial planning</i>
✓	<i>Other.....</i>

4. *Could you list some interventions in your Region concerning adaptation measures to climate change in coastal areas, realised over the past 10 years? We don't have.*

*Measures on adaptation to climate change in coastal areas have not been taken until now. Please find attached a policy "Country Overview and Assessment".*

5. *Could you identify problems that hinder the development of risk maps in coastal zones (budget; technical competences; technical tools; lack of data or lack of shared data...)?*

*Please find attached a policy "Country Overview and Assessment".*

6. *What would you suggest to the European Regional Development Fund (ERDF) for the next financial program (2013-2020)?*

*From the 2<sup>nd</sup> semester of 2011 Department of Environment has started to structure the National Plan on Adaptation to Climate Change.*