



Capitalization projects 2012
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Axe 2: Protection of the environment and promotion of a sustainable territorial development
Objective 2.4: Prevention and fight against natural risks

Deliverable 3.1/A: Promoters Partner's Reports

Best Practice 10:

“DIVA model”

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REGIONE LIGURIA

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1 INTRODUCTION

1.1 The COASTGAP Project Objectives

The Coastal Governance and Adaptation Policies in the Mediterranean Project (COASTGAP) is an initiative co-funded by the European MED Programme developed by a consortium of 15 partners: Regione Lazio (IT), Regione Emilia Romagna (IT), Department de l'Hérault (FR), Region of East Macedonia Thrace (GR), Region of Crete (GR), Regione Toscana (IT), Regione Liguria (IT), Ministry of Communication and Work (CY), CETMEF (FR), Universidad Pablo de Olavide de Sevilla (ES), FEPORTS (ES), Christian-Albrechts University Kiel (GE), Split-Dalmatia Country Regional Dev. Ag. RERA (HR), Dubrovnik County Regional Development Agency DUNEA (HR), Universidad Autónoma de Barcelona (ES).

COASTGAP main aim is to feed future actions and strategies for the next programming period 2014-2020 in relation to the pressing problem of Mediterranean coastal zone adaptation to climate change effects. This aim will be achieved through the capitalisation of 12 Best Practices produced by nine European Projects (COASTANCE, MAREMED, SHAPE, MEDGOVERNANCE, PEGASO, SHIFT, RESMAR, COMPASS and THESEUS). The Best Practices that COASTGAP will capitalise are: 1) the Guidelines for the environmental impacts of coastal protection works and plans, 2) the SICELL littoral cells management system, 3) the Bologna Charter, 4) the Methodology for ICZM Protocol Art.8 "setback zone" implementation, 5) the Regional Strategic Plan-Paper Intention, 6) the PEGASO Spatial Data Infrastructure and Geoportal for ICZM, 7) the Risk Model COFLERMAP-Coastal Flood Erosion Map, 8) the Integrated Quality Model for the development of sustainable routes, 9) the Coastal Observatory, 10) the DIVA Model, 11) the Webcam Network, and 12) the Decision Support System.

1.2 Purpose and Scope of the present Deliverable

The present deliverable constitutes the first step for the Best Practices Capitalisation Process of the COASTGAP Project, and its goal is to set up a relationship between the Promoting Partners (PP) of the Best Practices (BPs) and the Partners Interested in their adoption (or Adopting Partners (AP)), and introduce each BP to the AP through a report produced by the PP. Each PP (Regione Lazio, Regione Emilia-Romagna, Regione Toscana, Regione Liguria, Region of East Macedonia Thrace, Universidad Pablo de Olavide de Sevilla, CETMEF, Christian-Albrechts University Kiel) has analysed its respective BP in order to verify its level of development/efficiency and its technical transferability, with special consideration to the aim of the Project.

As a result of the BP analyses, each PP has produced a report -which is the basis for the present Deliverable 3.1/A: *Promoters Partner's Report*-, in which a brief description of the capitalised practices is provided as well as information from preliminary COASTGAP documents on the BP and a Capitalization Roadmap with the main activities and expected outputs is presented. In some cases a capitalisation timetable is also presented.

Each PP has also produced for this report a *Key Points' Table*, designed to compile information on the administrative, technical, scientific and practical issues needed to analyse the transferability of each BP, highlighting the required adaptation measures for the suitable capitalisation of the BP, that will be of paramount importance for the coming 3.1/B Interested Partners Report.

When appropriate, an Annex has been introduced with additional information on the Best Practice.

2 BP N.10 – "Diva Model" (PROMOTER PARTNER: CHRISTIAN-ALBRECHTS UNIVERSITY KIEL)



2.1 Frame of the win-win process (from preliminary COASGAP Roadmap document (Ferrara Steering Committee)).

BP to capitalise	PP-BPs	AP-BPs	Type of activities to set up	Results	Indicators of success
COMPASS (FP7): DIVA model and database	P13 CAU Kiel	P1 Lazio Region P2 Emilia-Romagna Region	<ol style="list-style-type: none"> 1. Training activity on methods for integrated assessment of coastal impacts; 2. Application of DIVA at the Mediterranean scale; 3. Explore data availability and compare with other impact assessment models; 4. Transfer and communication of results to coastal administrations; 5. Promotion of the main indicators used (in particular those related to cost-effectiveness of adaptation) for supporting coastal adaptation policies at regional and national level. 	Raising awareness of MED decision makers regarding future coastal risks and associated costs	<ol style="list-style-type: none"> 1. Number of administrative acts and organisations taking into consideration the results of the model; 2. Letters of interest for using the results of the model

2.3 Short description of the "Diva Model"

The DIVA model is a global integrated model of coastal systems that assesses biophysical and socio-economic impacts of sea-level rise and socio-economic development (Hinkel and Klein 2009). The model operates on a linear representation of the world's coastline, which comprises 12,148 linear segments and associates about 100 physical, ecological and socio-economic parameters with each of these segments (Vafeidis et al. 2008).

DIVA is driven by climatic and socio-economic scenarios. The climatic scenarios consist of the variables temperature change and sea-level rise. The socio-economic scenarios consist of the variables land-use class, coastal population growth and GDP growth. The impact assessment comprises a number of modules (e.g. relative sea-level rise, flooding, indirect erosion, wetland change) representing physical processes and economic costs as described in Hinkel and Klein (2009). Flooding and submergence of coastal zones is caused by mean sea-level rise and extreme events, as well as vertical land movement. For long-term coastal erosion due to sea-level rise, the impacts of direct and indirect effects are assessed.

The model is initiated in the base year (1995) and runs in five-year time steps, where new input from climate scenarios is introduced and adaptation decisions are re-evaluated. One important innovation introduced by DIVA is the explicit incorporation of a range of adaptation options; impacts do not only depend on the selected climatic and socio-economic scenarios but also on the selected adaptation strategy. Possible adaptation strategies in the DIVA model are building of sea and river dikes; and sand nourishments for tidal basins, beaches and wetlands. Choosing no adaptation, the DIVA tool calculates the maintaining costs of existing dikes. A more detailed description of the DIVA model and database can be found in Vafeidis et al. (2008), Hinkel and Klein (2009), Hinkel et al. (2010), and Hinkel et al. (2012).

During the EU FP7 COMPASS project, an updated version of the DIVA database, specifically for the European Union coastal nations has been developed. This new database, the Euro-DIVA database will serve as the basis for the customisation of the application and downscaling of DIVA for the EU Mediterranean region.

a) Using DIVA for the Adopting Partners

Applying the DIVA model for the Lazio and Emilia-Romagna regions will require a series of steps for downscaling DIVA to be applied at sub-national scale. The envisaged steps for this activity would be the following:

- Step 1: Development of a more detailed coastal typology for the regions. This would include the use of more detailed data on coastal physical characteristics and processes but also on social and economic development. We envisage a more detailed and spatially refined coastline segmentation (the data model used in DIVA).
- Step 2: Update of the DIVA database using improved data that have been developed in recent years (e.g. elevation, wetlands etc.) but also information from partners regarding various local/national parameters (e.g. costs of nourishment, location of dikes, dike-building costs etc.)
- Step 3: Performing a number of DIVA runs for different socio-economic and adaptation scenarios in order to identify policy priorities, with the horizon of year 2100

- Step 4: Downscaling and evaluating DIVA: Comparison with larger-scale models (e.g. COFLERMap)

Once the results have been downscaled and evaluated, we will explore the potential for their adoption, by the coastal administrations of the regions, as a basis for formulating long-term policies regarding adaptation to sea-level rise. This will be achieved through a series of meetings with officials from the coastal administrations of Lazio and Emilia-Romagna. However, we envisage to initiate further activities with coastal administrations from other regions, provided that time and resources allow for such activities

2.4 Roadmap for capitalisation of "Diva Model"

Roadmap Phase	Phase description	Working procedures Technical and dissemination tools	Project Deliverables	End of phase development
Dissemination	The potential of downscaling DIVA for the APs is evaluated and requirements for further development (database & model) in the context of this application are assessed	The dissemination phase document will be produced by CAU describing the DIVA model and database as well as the actions needed to be undertaken for the application of the model. A 'key points' table will be produced by CAU and sent to Aps. This table will be used as the basis for understanding and analyzing the BP customization activity for each AP.	Report on DIVA Model & 'Key points' table Deliverable 3.1/A	December 2013
Customization	The AP-BP agree on the potential transferability of the BP and propose the required actions for the implementation of the BP The PP (CAU) will guide this phase by exchanging information with each AP (Lazio, RER) on the actual BP adoption level (key points table).	Lazio and RER will provide feedback on the DIVA report and the 'key points' table, in the form of feedback reports. These reports will be merged in a single publication.	Feedback reports WP3 3.1/B (RER, Lazio) Report summarizing the feedback reports - 3.1/B	2nd SC Valencia, March 2014
Technical Adoption	The AP-BP are expected to deliver technical acts appropriate for the BP internal administrative receiving/adoption at different levels (full adoption and implementation, partial adoption, declaration of interest for future adoption, declaration of interest for encompassing the principles, etc.)	Lazio and RER will evaluate the model results and decide on the level of BP adoption. They will produce technical acts describing the procedures of adoption/capitalization phase. These technical acts will be combined in a single publication, the book of technical acts.	Technical acts (RER, Lazio) Book of technical acts - 3.1/C	3rd SC Montpellier, June 2014
Capitalisation	According to the level of adoption established during the previous phase, the DIVA results will be adopted through formal Administrative Acts by Lazio and RER (Administrative Acts WP2-Ph2.4/A)	RER and Lazio will concretize the capitalization procedures with the formal adoption of 3 internal Administrative Acts receiving the BP.	Administrative Acts - 4/A (RER, Lazio) 1 book of administrative acts - 2.4/A	Final Meeting Rome, October 2014
BPs Mainstreaming	The capitalized BP will be subjected to a process of logical and technical streamline (organization by function, typology, etc), essential to organize and set up a consistent toolbox of operational instruments for the MED coastal-maritime planning which the Joint Action Plan will be founded on.	The BPs "tailor-made" toolbox feeds the frame of the Joint Action Plan to concretize priority initiatives on MED coastal areas to face CC effects and coastal risks at MED basin scale. The application of DIVA will represent the unified methodology adopted by MED coastal administrations to inform future coastal adaptation policies to SLR at MED level	1 Joint Action Plan on MED CC - 4.1	EU meeting Brussels, December 2014

3 KEY POINTS TABLE FOR BP10 – "Diva Model"

INPUTS	FEEDBACK FROM APs
A. Administrative issues	1
<i>A1 What will be the administrative process to assess the potential of the use of the results from the application of DIVA?</i>	
<i>A2 What will be the administrative process for adopting those results and which type of official document are you going to adopt in order to fully or partly capitalise the DIVA application BP?</i>	
B. Technical/scientific issues	
<p><i>B1 What resources (in terms of technical expertise and equipment) does your Institution have in order to implement the evaluation and assessment process?</i></p> <p><i>We suggest devoting one person, with an in-depth understanding of coastal processes and issues involved in management (e.g. a coastal engineer).</i></p> <p><i>Technical expertise would also involve some basic data analysis and presentation skills; GIS skills would be desirable but not necessary.</i></p>	
<i>B2 What is your current state of background knowledge on the model and which type information/training would be necessary for improving your understanding on DIVA?</i>	
<i>B3 Considering that DIVA is a global model, what do you regard are the needs for implementing DIVA runs and applying the model for your region?</i>	
<i>B4 Have you considered the/possibility of adopting a part of the BP? If so, which level of BP application would be appropriate for you?</i>	
C. Practical issues	

¹ "This table will be completed by the APs during the next phases of the Project".

<p><i>C1 <u>Availability of information on coastal geomorphic types and location of coastal defences:</u> What types of data on those parameters do you have available? Such data would be useful for downscaling DIVA.</i></p>	
<p><i>C2 <u>Surface Elevation:</u> A Digital Elevation Model (DEM) would be needed for the downscaling of DIVA. A resolution of 100x100 m² or better would be required.</i></p>	
<p><i>C3 <u>Flood levels Hazards and Probability:</u> Do records on wave climate data and water levels exist in your region, and are these data of good quality? Would such data be available for our application?</i></p>	
<p><i>C4 <u>Assessment of damages:</u> Does spatial information on socio-economic data exist (e.g, spatial distribution of population/assets)? Are there damage curves, specifically designed (or applicable) for your region, available?</i></p>	
<p><i>C5 <u>Costs for coastal adaptation:</u> Is there information on costs of coastal adaptation (e.g. unit costs for beach nourishment, dike building etc.) for your region? Is there also information from previous years on annual costs for coastal adaptation and damages due to e.g. coastal flooding? If yes, did you compare them with risks of no adaptation?</i></p>	
<p><i>C6 <u>Costs for coastal adaptation:</u> Have any Cost/Benefit analyses of coastal adaptation been carried out in the past and if so what were the results? Are there any assessments on costs of inaction? Is there any assessment of the future costs and of the contribution of socio-economic development to these costs?</i></p>	
<p>D. Other considerations/questions to CAU in order to better understand the level of transferability of DIVA results in your Region.</p>	
<p>INPUTS</p>	<p>FEEDBACK FROM APs</p>
<p>A. Administrative issues</p>	
<p><i>A1 - Do you know/have checked the administrative process to adopt this BP (in coastal planning/management activities) and its concrete feasibility? – please specify in few lines</i></p>	
<p><i>A2 - Did you involve the relevant offices / persons of your institution in charge with the future concrete application of this BP? – please specify in few lines</i></p>	

B. Technical/scientific issues	
B1 - Does your Institution have technical skill and means (tools, staff) to put in practice this BP? – please specify in few lines	
B2 - Do you think to need technical adaptation/integration of the BP due to your territorial/environmental features? Which ones and for which reasons? – please specify	
B3 - Did you check the interest/possibility of adopting a part of the BP instead of the complete BP? – please specify in few lines	
B4 - Have you got actually proper data to feed/run the BP, or part of it, you are adopting? – please specify in few lines	
B5 - Did you identify the best format for the BP in order to easily integrate it into your Institute ordinary set of tools for coastal planning/management? – please specify	
C. Practical issues	
C1 - Do you need translation of the BP documentation?	
C2 - Need of particular conditions for the transfer/uptaking of the BP? (ftp, server settings, webgis, meetings, conference-calls, etc) – please specify in few lines	