“Climagine” expert meeting

Session 5. Presentation of “Climagine”, an “Imagine” adaptation regarding climate variability issues on coastal zone.

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Plan Bleu

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ADAPTATION OF “IMAGINE” TOWARDS “CLIMAGINE”
"Climagine": a framework for local governance.

“Climagine” & DIVA model should:

- allow to take into account CVC physical and socio-economic impacts on ecosystems and environment.
- participate to the preparation of an ICZM plan in an integrative way and in a participative manner.
PRESENTATION OF DIVA MODEL (OBJECTIVES, SCALE OF APPLICATION,...)
• **What ? DIVA model** *(Dynamic Integrated Vulnerability Assessment)*.  
  The DIVA applications have been useful for identifying hotspots of coastal vulnerability and informing international climate policy negotiations in the frame of the EU-funded DINAS-Coast project.

  ➢ **How?** Co-developed by a number of European coastal research Institutes:
   • Lead by Global Climate Forum (Jochen Hinkel)
   • Main other partners are University of Kiel (Nassos Vafeidis) and University of Southampton (Robert Nicholls)

  ➢ **Recent and current applications:**
  European Environment Agency (EEA), Worldbank, Asian Development Bank, European-funded research projects.

  ➢ **Objectives of the model:**
  It is an integrated, global model of coastal systems that assess biophysical and socio-economic consequences of sea-level rise and socio-economic development taking into account coastal erosion (both direct and indirect), coastal flooding (including rivers), wetland change and salinity Intrusion into deltas and estuaries as well as adaptation in terms of raising dikes and nourishing beaches.

  ➢ **Objective of its use in the project:**
  • Provide an estimation of socio-economic costs due to CVC impacts on coastal zone at local level.
## Overview of coastal impacts and adaptation measures considered by DIVA

<table>
<thead>
<tr>
<th>Impacts</th>
<th>Adaptation measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent submergence</td>
<td>Sea dikes, building codes, land-use planning, managed retreat</td>
</tr>
<tr>
<td>Flooding</td>
<td>Sea dikes, building codes, land-use planning, early warning</td>
</tr>
<tr>
<td>Coastal erosion</td>
<td>Coastal defences, shore and beach nourishment, set-back zones</td>
</tr>
<tr>
<td>Salinity intrusion into surface waters (river)</td>
<td>Salt water intrusion barriers, change in water abstraction</td>
</tr>
<tr>
<td>Salinity intrusion into ground waters</td>
<td>Freshwater injection, change in water abstraction</td>
</tr>
<tr>
<td>Wetland loss and change</td>
<td>Managed realignment, no hard defences, wetland nourishment</td>
</tr>
</tbody>
</table>
PRESENTATION OF THE RELATIONSHIP BETWEEN CLIMAGINE AND DIVA MODEL (INPUT/OUTPUT)
Objective: Develop and implement a participatory method to predict and assess the impact of climate vulnerability on two critical coastal areas and the development of possible futures.

How? A combine approach DIVA/"Climagine"

Results:

1. Assist countries to evaluate the impacts of climate variability and change to their marine and coastal zones,
2. An analysis of the current situation ("Climagine"),
3. Build scenarios and assess consequences of impacts of climate variability and change on socio-economic activities on coastal areas as well as adaptation options."Climagine"),
4. Evaluation of damage costs and potential intervention measures for these scenarios could be done by the DIVA model (PAP / RAC).
WS 1: Understanding of the eco-socio-system.

WS 2: Selection of indicators based on issues and definition of the assumptions for scenarios.

WS 3: Exploration through scenarios.

WS 4: Recommendations and discussion about the results of DIVA model: actions, measures and mechanisms to implement them.

WS 5: Promotion of the results: towards a coastal action plan.
Relationship between DIVA & "Climagine": main inputs and outputs.

"Climagine" approach

Outputs from "Climagine" which could be inputs for DIVA

Outputs from DIVA which could be inputs for "Climagine".

DIVA Model
"Climagine": inputs for DIVA

**WS 1: objective:** Understanding of the eco-socio-system context

**Outputs from "Climagine" (Inputs for DIVA)**

1. A description of the socio-eco-system. In using rich pictures and choremes (based on the DPSIR approach). They help to sum up the real situation as perceived by stakeholders in the shape of a freehand cartoon-type representation.

2. An identification of main drivers and priority issues for action by local / national stakeholders on sectors they chose: agriculture, fisheries, cities, ..... In using the territorial and environmental shared diagnosis which led to consensus within the community of stakeholders.
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An illustration of a rich picture

An illustration of a detailed choreme

WS 2: objective: Selection of indicators based on issues and definition of the assumptions behind the scenarios.

**Outputs** from "Climagine" (Inputs for DIVA)

1. A selection of indicators * (+/- 15) within the list proposed by the local team based on the issues already selected and proposed in WS 1. With a belt of sustainability for each indicator.

2. Highlighting possible cartographic and geographic data which could be exploited and modelled through the model.
   e.g: On land uses, population (population projections), physical coastal data ...

3. The scenario assumptions and pathways.
   Dimensions (e.g: increasing of national population) ➔ key variables (density of population) ➔ indicator of pressure (density of population in coastal areas).

*Physical indicators*: SLR/ effects on river / erosion / loss of wetlands / flooding / salinity intrusion.

**Indicators about social consequences of physical impacts**: People living in the coastal floodplains / People actually flooded / Forced Migration

**Indicators on economic consequences expressed in terms of damage costs and costs of adaptation**: about land loss / saltwater intrusion in river deltas and estuaries / flooding / migration.
WS 3: objective: Exploration through scenarios

 Outputs from "Climagine" (Inputs for DIVA)

- Offer a framework for discussions from scenarios (trend or “business as usual” scenarios and alternative scenarios) generated by DIVA (for the chosen Horizon year).

- The local team and stakeholders define their scenarios.
**WS 4: Objective:** Recommendations and discussion about the results

**Outputs from "Climagine"**

- Results of the scenarios (Maps / Graphs / Data tables) offers by the model DIVA will be presented and discussed to the stakeholders.
- The "Climagine" WS 4 will provide a structure for stakeholders discussions and sets the first priorities for an action plan.

<table>
<thead>
<tr>
<th>Priority</th>
<th>Actions</th>
<th>Measures to take</th>
</tr>
</thead>
</table>
| 1        | Adaptation to erosion impacts| - Dikes building  
- Beaches nourishment |
| 2        | .....                        | - .....                       |


“Climagine”‘s key features provide tools:

- To consider a coastal zone approach in its entirety (territorial waters and both land and sea) considering morphological and socio-economic aspects.

- To focus on ICZM issues related to climate variability impacts and an harmonization with other relevant plans and policies,

- To encourage a participatory approach and respect local stakeholders as experts within their own area, and so a stakeholder involvement in the preparation and implementation of a coastal action plan.

- To encourage a high level of approval and local political support (because of the presence of local legal representatives in the stakeholder panel)

- To examine the present and future through indicators and scenarios

- To provide inputs for a model named DIVA.

These features will allow Sibenik-Knin County to participate in a global process for the elaboration of a national ICZM effort.
Localisation of Sibenik-Knin County

Sibenik, harbour, city and river mouth.
Elements of context about Sibenik-Knin County and coastal zone:

- The county covers 3000 km² and includes 242 islands and 2 national parks.
- A coastal zone interface, with the Krka river. The coastal part is rocky.

- Natural and cultural heritages:
  - olive growing, building of wooden ships, ...
  - monasteries, …

- Local economy based on:
  - Fishing, shellfish growing, yachting (islands & coast),
  - Agriculture (fruits) and cattle-breeding (hinterland),
  - Tourism.

- Tourist area:
  - on the coast (17 destinations, especially with a lot of diving places),
  - on islands (10 destinations),
  - on the hinterland (3 destinations)

We will try to measure the real costs of climate change on these activities and areas.
Potential risks regarding climate change in this area:

- flooding due to SLR in the mouth of the Krta river,
- Salinity intrusion into the estuary,
- an increase sea temperature (damage for marine biodiversity),
- change in rainfall patterns (impact on river debit),
- an increase of unemployment of temporary jobs/ seasonal workers.

...
THANK YOU FOR YOUR ATTENTION

- Coming: Discussion and Session 6 -