Developing socio-economic scenarios - Exploratory Scenario Approach

Belgium Expert Couplet

W.P 3.3 Establishing future visions

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ABBREVIATIONS

MDK	Maritieme Dienstverlening en Kust / Agency for Maritime and Coastal Services
MI	Maritime Institute

GLOSSERY OF TERMS

Adaptation	An adjustment in natural or human systems in response to actual or expected climatic stimuli of their effects, which moderates harm or exploits beneficial opportunities (IPCC 2007b)
Vulnerability	The degree to which a system is susceptible to, and unable to cope with, the adverse effects of climate change, including climate variability and extremes (IPCC 2007b)
Adaptive capacity	The ability or potential of a human or natural system to respond successfully to climate variability and change (IPCC 2007a)
Maladaptation	Business-as-usual developments which, by overlooking climate change impacts, inadvertently increases exposure and/or vulnerability to climate change. It can also include actions undertaken to adapt to climate impacts that do not succeed in reducing vulnerability but increase it instead (OECD 2009)
Exploratory scenarios	Exploratory scenarios describe events and trends as they could evolve based on alternative assumptions on how these events and trends may influence the future, i.e. "What can happen?" The exploratory scenario type provides a plurality of plausible alternative futures, in which active strategies to adapt (or not) have been pursued. (Centre for Research in Futures and Innovation 2010)
PESTLE	PESTLE analysis stands for "Political, Economic, Social, Technological, Legal and Environmental analysis" and describes a frameworks of macro-environmental factors used in helping to identify the different driving forces in play in particular situation. (Centre for Research in Futures and Innovation 2010)

Background and context:

This report is developed under the IMCORE project.

IMCORE stands for "Innovative Management for Europe's Changing Coastal Resource". The main objective of IMCORE is to promote a transnational, innovative and sustainable approach to reduce the ecological, social and economic impacts of climate change on coastal resources of North West Europe. IMCORE is a unique partnership, were expert couplets of researchers and policy-makers test innovative ways to address coastal climate change to see what works best. This approach has been adopted to enable stakeholders to think more creatively about the future, encouraging more proactive attitudes to adaptation as well as enhancing appreciation of the interconnectivity of processes and stakeholders operating at different scales. IMCORE is a European INTRREG IVB NW Europe project.

Within the IMCORE project one of the goals is to elaborate a sustainable approach for the development of adaptation strategies. In order to elaborate such adaptation strategies a methodology has been developed across different Work Packages, which is tested stage by stage by the different expert couplets and will lead to 9 adaptation strategies, one per expert couplet. Results are compared and lessons are learned. The first step in the elaboration of an adaptation strategy was the identification of climate change issues (Work Package 2.3). This action assesses which climate change impacts affect Belgian coastal sectors. The assessment makes use of stakeholder participation and scientific literature. The second step is the development of socio-economic scenarios, and forward looking how the future might unfold through an exploratory scenarios approach (Work Package 3.3). It is in this light that this report is written. The last phase is the formulation of an adaptation strategy (Work Package 4.3). The results of the IMCORE project will be presented at an International Workshop in September 2011.

The nine expert couplets of IMCORE are:

- Maritieme Dienstverlening en Kust (MDK) – Coastal division & Maritime Institute (MI), University of Ghent (Belgium)
- Cork County Council & Coastal and Marine Resource Centre, University College Cork (Ireland)
- Donegal County Council & Centre of Coastal and Marine Research, University of Ulster (Northern Ireland)
- Severn Estuary Partnership & Marine and Coastal Research Group, Cardiff University (Wales)

- Aberdeen City Council & Aberdeen Institute for Coastal Science and Management University Aberdeen (Scotland)
- SIAGM - Intermunicipal Syndicate for Planning in the Gulf of Morbhian & Centre for Maritime Lax and economy University of Western Brittany (Brittany)
- Durham Council & Envision, Newcastle University (UK)
- Sefton Council & Edgehill University (UK)
- Government Office (East of England), Colne Estuary Partnership & CoastNet (Essex) (UK)

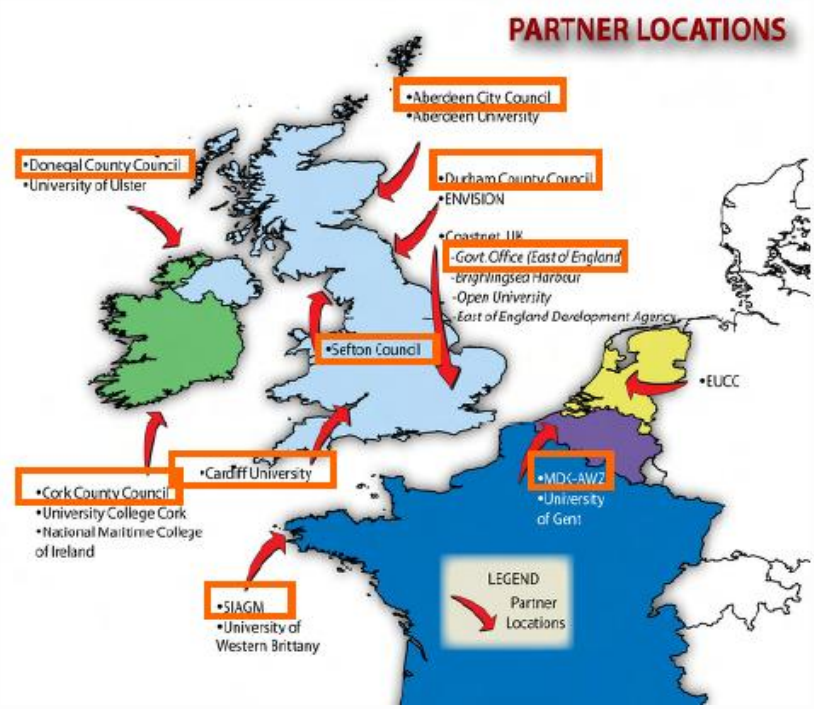


Figure 1. Locations of each of the nine IMCORE expert couplet areas (http://www.imcore.eu/)

Introduction

As our climate is changing, this will have an impact on the World. Population will grow and economies will continue to develop. If no actions are taken, this will contribute additionally to further climate change impacts and will necessitate far going adaptation measures. To estimate the effects of climate change in the Belgian Part of the North Sea, it is necessary to develop scenarios to assess how the socio-economic future might unfold. Higher populations imply more people to be affected by climate change. It also implies a higher demand for food, for water, for places to live, for energy. Furthermore, innovations in e.g. energy, information and construction technology and changes in tourism patterns, fishing activities and governance will affect society dramatically. To assess the changing socio-economic environment, scenarios are commonly used, because we cannot exactly predict the future. One of the definitions given in the UNEP Handbook on Methods for Climate Change Impact Assessment and Adaption Strategies is: '*Scenarios are coherent, internally consistent and plausible description of a possible future state of the world*' (Tol 1998). Scenarios are developed to help decision-makers understand the wide range of possible futures, confront uncertainties and understand how decisions made now play out in the future. It is important to develop socio-economic scenarios of the future because socio-economic changes may substantially increase or decrease vulnerability to climate change (Malone 2004).

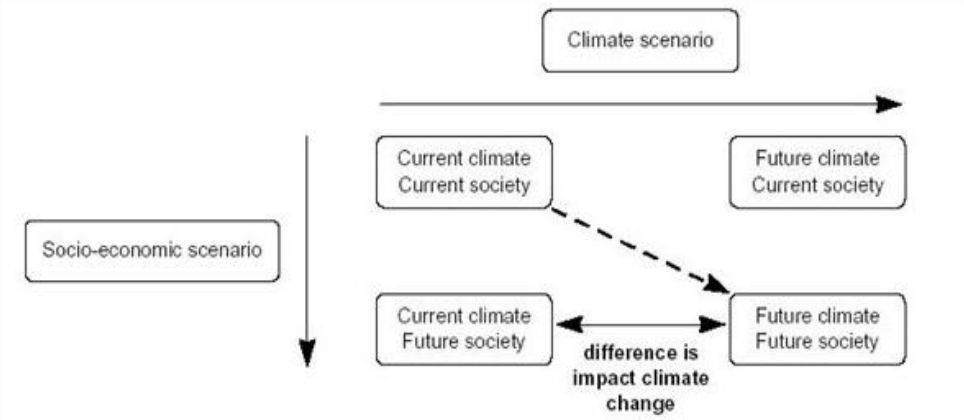


Figure 2. Climate change and socio-economic scenarios (Tol, 1998)

Figure 2 displays four combinations of current or future climate scenario's and current or future societies. Only by combining climate and other social and economic changes, the effects that will be observed can be assessed. If only an assessment would be made of the effects of climate change in the current society, a theoretical future will be assessed. Therefore it is needed to estimate how the future society handling climate change impacts, will look like.

This report describes how the Belgian socio-economic coastal future could look like, taking into account climate change. These socio-economic futures are developed through the use of the exploratory scenario-building process. This report expounds how the scenario-building process was worked out by the Belgian Expert Couplet. The different steps within the process are explained in detail. Consequently the different socio-economic futures are elaborated. A preferred scenario is chosen as a basis for the further development of an adaptation strategy for the Belgium coast.

Exploratory scenario-building process

Exploratory scenarios describe events and trends as they could evolve based on alternative assumptions on how these events and trends may influence the future, i.e "What can happen?" The exploratory scenario type provides a plurality of plausible alternative futures, in which active strategies to adapt (or not) have been pursued. (Centre for Research in Futures and Innovation 2010)

Step 1: Identification of stakeholders

The Belgian coastline is a densely populated area and hence a very intensively used zone with important economic and tourist activities. Furthermore the Belgian Part of the North Sea is characterized by high productivity and highly diversified habitats but also by dense shipping traffic, intensive fisheries, tourism, the presence of cables and pipelines, sand and gravel extraction, dredging activities, and offshore wind turbine parks. In addition to the intensive use of the North Sea, there is a complex structure of governance. There are four authorities responsible for regulating activities in the Belgian North Sea and the coast, each with their own competences (e.g. the local municipalities, the federal government, province of West Flanders, Flemish government). Next there are different coastal and marine stakeholders active at sea and on the Belgian coast (tourism, water recreation, ports and shipping, coastguard, fisheries and aquaculture, dredging, shipping assistance, nature conservation, energy supply and sand and gravel extraction).

Step 2: Identify the issues

What are the main climate change impacts at the Belgian coastal zone and how will this affect the different coastal sectors?

This step has been conducted throughout a detailed scientific literature review on the impact of climate change at the Belgian coastal zone, combined with a stakeholder engagement to assess the effects on Belgian coastal sectors. A Workshop was held on 21th April 2009 (see Annex 1. Report Workshop 21.04.2009).

Impacts of climate change at the Belgian coast (2100):

Temperature increase (2°C-4°C)
Seawater temperature increase (2,5°C-3,5°C)
Sea level rise (0,60m-2m)
More precipitation in winter, less precipitation in summer
More and severe storms

(CLIMAR 2008)

Coastal sectors will be affected by these impacts in different ways. For instance fisheries and shipping can be affected by storms, resulting in less shipping days, more

infrastructural damage and people at risk. The latter is also applicable for the tourist sector. Seawater temperature increase will lead to a shift of species and force fisherman to fish elsewhere or change their fishing equipment. Coastal defence should be modified since it needs to cope with sea level rise. Depending on which coastal defence measures will be taken, positive effects can be generated for different sectors, such as tourism and dredging. Tourism will benefit from defence measures which preserve the coastal panorama, maintain the current beaches and create one sea front along the Belgian coast (such as beach nourishment, and larger dykes). Dredging will benefit from large beach nourishment and the creation of islands before the coast.

Secondary effects can also be subdivided in:

- ecological effects (changes in water quality, in ecosystem productivity and biodiversity);
- economical effects (changes in production and additional cost);
- social effects (such as attractiveness of the coast, employment, human settlement, health, accessibility, cultural value and welfare).

The main issue is how to adapt to these climate change impacts and their effects for the coast, in other words, the need for a coastal adaptation strategy.

Step 3: Identification of drivers of change

What will shape a coastal climate change adaptation strategy for the Belgian coast in 2040?

On October 14th 2010 a workshop was organized to answer this question. The workshop took place in Blankenberge, a Belgian coastal city, facilitated by MDK & MI (see Annex 2. Report Workshop 14.10.2010).

Drivers of change were identified through the use of the PESTLE framework. By means of a questionnaire these drivers were ranked according to:

1. The degree of certainty the stakeholder had that the driver will take place as described.
2. The degree of importance the driver will have in the light of climate change adaptation.

The results of the questionnaire were visualized by placing the different drivers of change mentioned in the questionnaire on the axes (certainty and importance). The results were discussed within the group of attendant stakeholders in order to check if the positioning was correct since the results were based on the use of averages. The group was asked to identify other drives of change.

The most important identified drivers of change were: 1. investing in research and communication of scientific data to the sectors/stakeholders to create awareness for coastal communities; 2. informed decision making combined with cooperation to reach an integrated coastal vision.

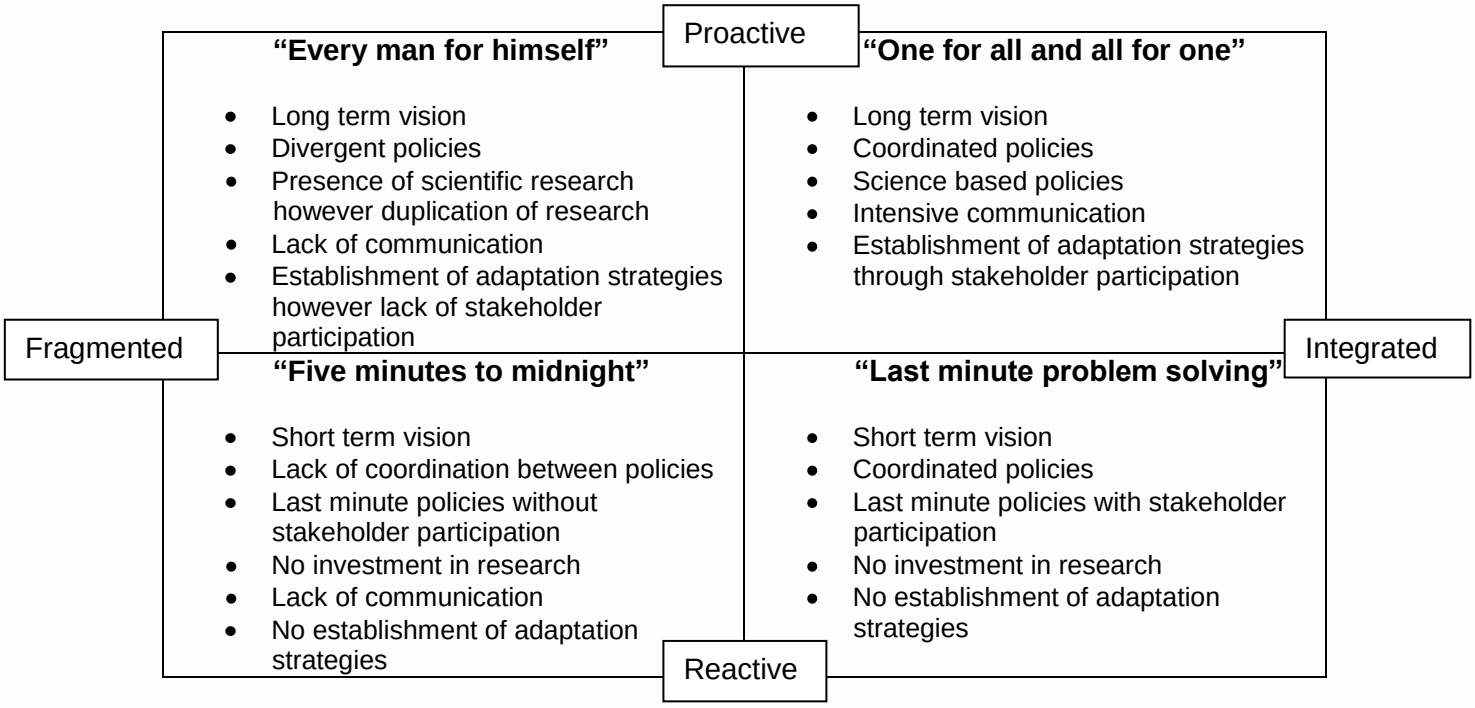
Step 4: Select the scenarios axes or scenario logics:

Identify the logic of the drivers – and what the poles are.

The output of the workshop was analysed. The axes around which the scenarios are developed were chosen from the range of drivers that were most important i.e. aware communities and informed decision making combined for cooperation towards an integrated coastal vision.

The logic behind the first driver is that informed communities and informed decision making implies the need for a long term*, proactive vision* since the gaining of awareness and informed decision making is a gradual process. The logic behind the second driver is that cooperation to reach an integrated coastal vision implies that policies need to be *coordinated* to reach an *integrated* coastal vision. This holds a profound cooperation of the different levels and sectors of government, stakeholders and scientific community.

The poles can be identified as proactive versus reactive, integrated versus fragmented.



Step 5: Develop scenario narratives:

Scenario 1: Every man for himself

Key characteristics:

- Long term vision
- Divergent policies
- Presence of scientific research however duplication of research
- Lack of communication
- Establishment of adaptation strategies however lack of stakeholder participation

Narrative:

Due to a proactive approach towards climate change, there is room for a long term vision. Short and long term investments will be taken, both in the field of scientific research as in the development of adaptation measures. Scientific research will not only focus on the impacts of climate change but also on innovative ways of adaptation. However due to a lack of communication and coordination the research results will not reach the interested parties e.g. other researchers, policy makers, relevant stakeholders and the general public. The taken investments will lead to duplication and inefficient research, thus squandering of fundings.

At the different policy levels (Europe/National/Regional/Local) adaptation strategies and plans are developed nevertheless there is no integrated approach, which leads to various incompatible and inconsistent adaptation measures, namely maladaptation Throughout the development process of these adaptation measures, stakeholders are not informed nor involved. Consequently the possible opportunities that climate change can create are not foreseen or taken into account, as the different perspectives on climate change are not communicated.

There is no increase of climate change awareness of the general public, since the scientific evidence is not adequately communicated and they are not involved in the adaptation policy making process.

Scenario 2: One for all and all for one

Key characteristics:

- Long term vision
- Coordinated policies
- Science based policies
- Intensive communication
- Establishment of adaptation strategies through stakeholder participation

Narrative:

Due to a proactive approach towards climate change, there is room for a long term vision. Short and long term investments will be taken, both in the field of scientific research as in the development of adaptation measures. Scientific research will not only focus on the impacts of climate change but also on innovative ways of adaptation. The scientific results are communicated towards the interested parties in a transparent manner, e.g. other researchers, policy makers, relevant stakeholders and the general public. Fundings are spent in an efficient and sustainable way.

At the different policy levels (Europe/National/Regional/Local) adaptation strategies and plans are developed. These adaptation policies are aligned, each level plays it role in the light of their competences, with a shared integrated coastal view. Based on the available scientific data one climate change scenario is chosen and used consistently for each adaptation policy. This leads to integrated and coordinated coastal adaptation policies where the opportunities of climate change come to the surface and are put into action, meaning a combination and balance of adaptation measures. In addition stakeholders and the general public are thoroughly involved in the process.

There is an increase of climate change awareness of the general public, since the scientific evidence is adequately and transparently communicated and they are involved in the adaptation policy making process.

Scenario 3: Five minutes to midnight

Key characteristics:

- Short term vision
- Lack of coordination between policies
- Last minute policies without stakeholder participation
- No investment in research
- Lack of communication
- No establishment of adaptation strategies

Narrative:

Since climate change is addressed at the last minute, only a reactive, short term approach towards climate change is possible. Therefore only short term investments can be taken, mostly in the development of responsive adaptation measures. No investments in scientific research are made, as climate change is not seen as one of the priorities of the policy makers.

No adaptation strategies are developed at the different policy levels (Europe/National/Regional/Local). However when climate change impacts occur last minute actions will be taken, but in an uncoordinated and sectoral approach, leading to maladaptation. The reasoning behind this is the lack of communication and coordination between policy makers, stakeholders, and scientific researchers and of course the lack of interest in the topic.

There is no increase of climate change awareness of the general public, since there is no interest in possible climate change impacts and adaptation thereto.

Scenario 4: Last minute problem solving

Key characteristics:

- Short term vision
- Coordinated policies
- Last minute policies with stakeholder participation
- No investment in research
- No establishment of adaptation strategies

Narrative:

Since climate change is addressed at the last minute, only a reactive, short term approach towards climate change is possible. Therefore only short term investments can be taken, mostly in the development of responsive adaptation measures. No investments in scientific research are made, as climate change is not seen as one of the priorities of the policy makers.

No adaptation strategies are developed at the different policy levels (Europe/National/Regional/Local). However when climate change impacts occur last minute actions will be taken in a coordinated and integrated approach with cooperation of the relevant players, due to a high degree of communication between policy makers, stakeholders, and scientific researchers.

There is no increase of climate change awareness of the general public, since there is no interest in possible climate change impacts and adaptation thereto.

Conclusion

The exploratory scenario building process within the Belgian expert couplet, led to four possible socio-economic scenarios. Taken into account the results of the workshop on scenario building there can be concluded that the second scenario “one for all and all for one” is the most preferred scenario in which an adaptation strategy for the Belgian coast can be established.

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