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People for Ecosystem based Governance
in Assessing Sustainable development of
Ocean and coast

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# Implementing ICZM - exploring the barriers, opportunities and options

## Report on a workshop held during the 3rd PEGASO General Meeting, Rabat, 21$^{st}$ - 22$^{nd}$ March, 2103

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# 1.    Context and Aims of the Workshop

This document reports the processes and outcomes of the workshop organised as part of the 3rd PEGASO Annual General Meeting in Rabat in March 2013. It was the culmination of a series of three workshops designed to allow members of the PEGASO Consortium and the end-user community to discuss the barriers and opportunities facing those concerned with implementing Integrated Coastal Zone Management (ICZM) in the Mediterranean and Back Sea Basins, and in particular to better understand how the data and tools being developed within PEGASO can be used in an integrated way.

The workshop in Arles, in November 2012 looked specifically at issues in the Mediterranean. It explored how causal chain analysis, based on the DPSIR framework, could be used as a way of discussing key issues. The meeting also considered how scenarios developed by Plan Bleu (Sanna and Le Tellier, 2012) could help to identify how issues might evolve in the future and what this meant for the goals of ICZM within the Region. A key goal of the meeting was to identify what people thought were the important focal questions around which scenarios could be built so that people better understood the impact of the drivers of change at local and regional scales relevant to ICZM under a range of plausible futures. A number of thematic areas were considered at the workshop, including biodiversity, aquaculture and fisheries, waste and water management and governance. A conclusion to emerge from the meeting was the need to better understand the ways a vision for the coastal zone might be developed, and the role that scenario tools might play in taking such work forward.

The follow-up meeting in Istanbul, in December 2012, focussed on issues from a Black Sea perspective. It too considered a range of key issues in the light of some future scenarios; the discussions included the topics of: urbanisation and its wider impacts; waste management; erosion and changing currents; cross border pollution (including radioactivity); infrastructure and transport development; and tourism and the often poor state of beaches. A key difference between the Istanbul workshop and that in Arles was the greater number of 'end-users' who attended the meeting; they were mainly drawn from the Back Sea ICZM Advisory Group. Governance issues and future governance mechanisms emerged as one of the most important areas for debate. A tentative vision for the next decade was suggested, involving the implementation of some kind of legally binding ICZM agreement at regional and national scales, broadly equivalent to that in the Mediterranean, supported by various activity centres and tools such as that being developed by projects like PEGASO. In looking to the future, it was interesting to note that the time horizon considered for framing the discussion was of the order of the next two decades rather than periods of 50-100 years, normally considered by scenario studies.

The Arles and Istanbul workshops set the scene for the Rabat meeting. The goal was to build on the experience gained from the earlier discussions to explore how the tools being developed in PEGASO could be used to gain a better understanding of ICZM issues, and how these might be explored in a systematic and evidence-based way. A particular concern was to exploit the work done to develop a set of ICZM indicators within PEGASO, and use them to develop a medium term vision for both Basins. A corollary was to better understand the opportunities and barriers to taking the goals of ICZM forward, and the kinds of threat that might hinder sustainable development. In keeping with the overall aims of PEGASO, it was essential that this should be done in a participatory way that could illustrate and inform participants' understanding of what the ICZM Governance Platform being developed by the Project might do.

The specific aims of the Rabat workshop were therefore to:

- Explore what 'balanced urban development' and 'protection of natural capital' means in the context of ICZM, and how to measure them both qualitatively and quantitatively in terms PEGASO indicators and the factors that influence them;

- Give people experience of using participatory processes to develop influence diagrams, and the way they could be used to model causality using Bayesian Networks; and,

- To give people insights into how PEGASO tools might be linked and used.

As the work undertaken in PEGASO Task 4.1 on 'Indicators' has noted (Santoro et al., 2011), a structured approach to ICZM requires the development of a set of indicators to measure progress in, and effects of, ICZM policies. Such a set should cover issues related to governance, environmental, and socio-economic factors that relate to the specific management interventions that can be triggered by ICZM practices. The indicator set proposed has therefore been built around the different principles of ICZM as defined by the work in PEGASO Task 2.1 (Haines-Young and Potschin, 2011). In the planning for the series of workshops that led up to Rabat, two thematic policy areas were identified as especially important to explore, namely the ICZM goals of 'preserving the wealth of natural capital in coastal zone' and achieving 'a balanced use of coastal zone, and avoid urban sprawl'. It was felt that while these goals have been widely accepted as fundamental to what ICZM is seeking to achieve, their implications are not easy to understand or measure 'on the ground', not least because the way they are interpreted might vary in different geographical situations. These two policy objectives these were therefore taken as the focus for the Rabat workshop.

In planning the event at Rabat, a small team from the Consortium looked at the way some of the PEGASO ICZM indicators related to the two policy areas, and in particular how thinking about the factors that influence them could be made 'operational' using a tool such as a Bayesian Belief Network (BBN) (Haines-Young, 2011; Haines-Young et al., 2013). BBNs enable people to storyboard the way they think or believe systems are structured and potentially onto model both qualitatively and quantitatively how systems behave. A first step in constructing a BBN is to draw up an influence diagram, describing the causal relationships between the variables that people think make up the system; in the case of the Rabat workshop, these were the policy goals of preserving natural capital and balanced use of the coastal zones.

Given that PEGASO is now in its final stages a further motivation for the Rabat workshop was the need to show how some of the key components developed in WP4 'Multi-scale tools, methods and models for integrated assessment' could be used in an integrated way. By using influence diagrams and eventually Bayesian Believe Networks (BBNs) to more formally examine the factors that influence the 'preservation of natural capital' and 'balanced use'[1] under a range of different assumptions, it was considered that the 'Rabat Workshop' was a useful opportunity to look at the PEGASO ICZM indicators in the context of scenario development (T4.3), and that the outcomes could then feed into the Regional Assessment being made in T5.2. It was recognized that the workshop also provided an opportunity to showcase some of the accounting data and methods (T4.2) and how they might be used to understand geographical differences across the two Basins, and to illustrate the use of participatory methods (T4.4) within the context of the ICZM Platform being developed by PEGASO.

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[1] The workshop preparation team as well as the authors of this document are aware of the difficulties the term 'balanced use' causes for some, e.g. no definition, unclear concept and the term 'balanced urban development' was suggested. Both terms are used as synonyms in this document.

## 2.    Structure of the Rabat Workshop

The 'Rabat Workshop' lasted one and a half days; the programme followed is shown in Appendix 1, together with the briefing notes given to the facilitators. Its design was formulated during a preparatory meeting hosted at Nottingham in February 2013[2]. The programme was split into two parts.

### Day 1 (Exercises 1 & 2)

On day 1 the aim was to allow participants to work in groups of five or six people, to develop an influence diagram of the factors that determine the success or failure of the policy goals relating to the preservation of 'natural capital' and 'balanced use'. Altogether there were seven groups, one of which conducted their discussions in French. Each group was allocated a facilitator or moderator, who helped the groups to do the different exercises. The moderators (Appendix 1) were briefed before the before workshop and met in Rabat prior to each exercise for briefing and update.

The preparatory meeting in Nottingham[2] identified a range PEGASO ICZM indicators that could be relevant to the two policy goals. At the Rabat workshop the groups were then asked (Exercise 1) to review the indicators, suggest how the different variables might causally relate to each other, and consider the wider drivers and pressures that might steer change in the system. In a further step of Exercise 1 the groups were asked to use their influence diagrams to consider how the system would respond over the medium term under what they considered to be the 'best' and 'worst' case scenarios. Although the groups were free to define the scenarios for themselves, the best case was assumed to be something like 'full realisation of the goals of ICZM'. A key conclusion from the Arles workshop was recognition that the aspirations of agreements such as the ICZM Protocol represented a kind of 'normative scenario' that could be used to explore the barriers and threats that might prevent these desired outcomes from being achieved. Groups were thus encouraged to think about what the best outcomes might be and identify the major factors that could hinder progress. Their views were captured by asking them to identify which drivers might be controllable or uncontrollable under the best and worst case scenarios (Exercise 2).

At the 'Rabat Workshop' groups worked in a highly interactive way (Plate 1), arranging and fixing cards to a base to identify the variables that were considered important and the relationships between them. Although the outcomes from the individual groups are important in their own right, a purpose of the exercises on Day 1 was also **to develop a shared understanding of issues and concepts** that could be built on in Day 2, where the focus moved to using a BBN tool. The group work generated much discussion but the outcomes clearly depended on establishing some kind of consensus. In order to preserve and capture views at an individual level, however, an on-line questionnaire administered at the end of the first day.

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[2] A "what-if modelling workshop" was held on 12 and 13 February 2013 in Nottingham. For list of participants, agenda and workshop report please consult the PEGASO intranet – WP4, T4.3.

**Plate 1: 'Building Influence Diagrams' Activities at the Rabat Workshop, Day 1** (Photos: Gloria Salgado)



The questionnaire was constructed following the preparatory workshop at Nottingham, and designed to elicit information from the workshop participants about the factors they through influenced the policy goals of preserving natural capital and achieving balanced use of the coastal zone. It was implemented using the Survey Monkey system[3], with question formats selected to capture the kinds of data that could be used to construct a BBN. A copy of the questionnaire is shown in Appendix 2. The questionnaire took about 20-30 minutes to complete. Altogether 49 people provided responses.

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[3] http://www.surveymonkey.com/

The questionnaire results were analysed overnight by the authors, and used to calibrate some key variables in a Bayesian Belief Network that had been created at the preparatory meeting in Nottingham. While in principle each of the groups could, with assistance, have turned their own influence diagrams into a BBN, the time available at the workshop was limited. Thus the pre-prepared BBN was used to illustrate what could be done with the kinds of experience developed during Day 1, and how these kinds of tool could be used to operationalise the kinds of thinking the group work had generated.

The details of the BBN presented to the participants will be discussed below. Following a short presentation of the results from the questionnaire and the way the data was used to calibrate the BBN, the groups were given copies of the network to use as the basis for Exercise 3. The BBN was built using the NETICA software, which could be downloaded for free[4]. Initially the network was loaded onto the laptops of the facilitators, but in many groups individuals installed the software for themselves and used the software directly (Plate 2).

**Plate 2: Building BBNs at the Rabat Workshop, Day 2** (Photos: Gloria Salgado)



The groups were asked to explore the way the BBN had represented the issues of preserving natural capital and balanced use, compared to their attempts on Day 1; in particular, participants were asked to use the network to explore the consequences of the 'best' and 'worse' case scenarios that they had identified in Day 1, or at least a version that was as consistent as possible, given that not all of their drivers might be represented in the BBN. Exercise 3 concluded by asking groups to provide

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[4] http://www.norsys.com/netica.html

feedback on the insights that the BBN had provided over an above the experience gained in Day 1, and any conclusions they drew about the suitability of the methods used in the workshop for decision support and, in particular, as an aid in the development of action plans for ICZM at local, national and regional scales.

## 3.    Workshop Outcomes

### Day 1, Exercise 1

The set of influence diagrams developed are shown in Figure 1. There was considerable diversity of thinking between the groups and the resulting paper-based diagrams looked very different. Following the workshop the diagrams have been transcribed by the UNOTT team into NETICA so that the commonalities and differences can be more easily seen. In a BBN the variables that make up the system are known as 'nodes' in the network. In Figure 1 the nodes have been represented as simple labelled box, but these have been coloured up in the same way according to the kinds of thing the nodes represent, across all the groups. This the indicators for natural capital and balanced development have been represented in shades of green and pink, respectively, and the drivers that influence them in blue. During their work groups were asked to identify any important geographical (i.e. spatial factors) that might result in different outcomes in different types of location. In the networks shown in Figure 1 these factors are shown in yellow. The colour coding was used by the groups who had been given a set of pre-prepared cards on which they could enter their information. The same coding was used in the BBN that subsequently became the focus of discussion on Day 2. The approach was designed to help people find their way around the different networks during the workshop exercises.

**Figure 1: Influence diagrams developed during Day 1** [for Group identification see Appendix 1]
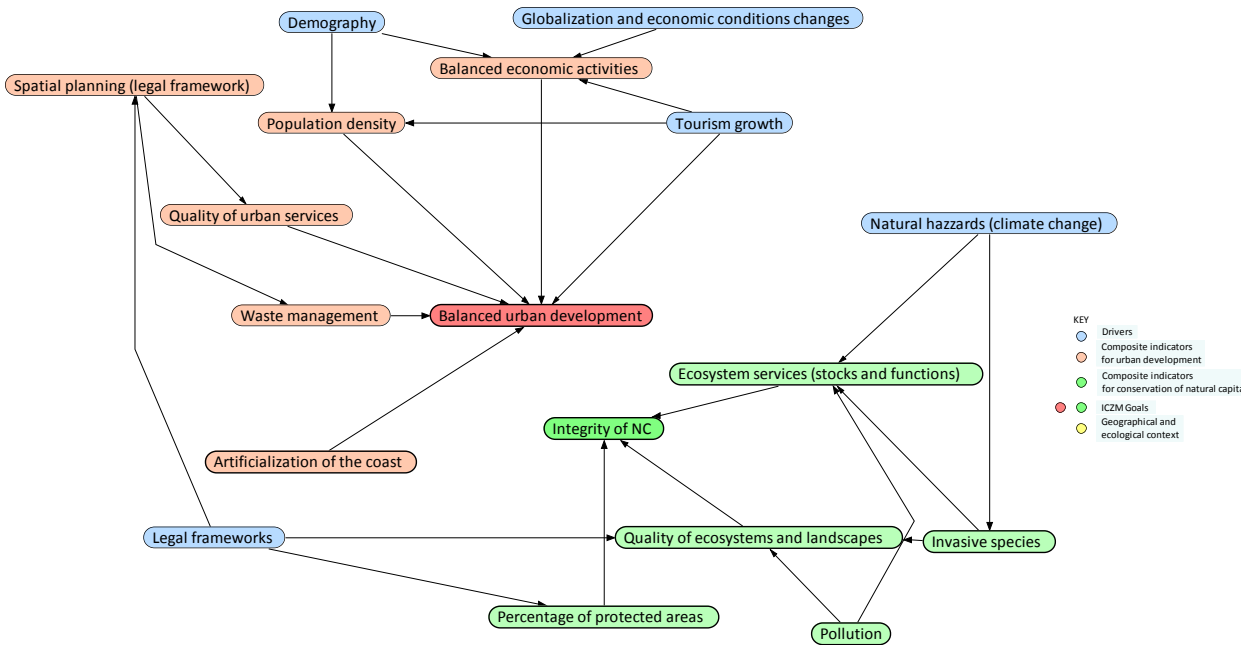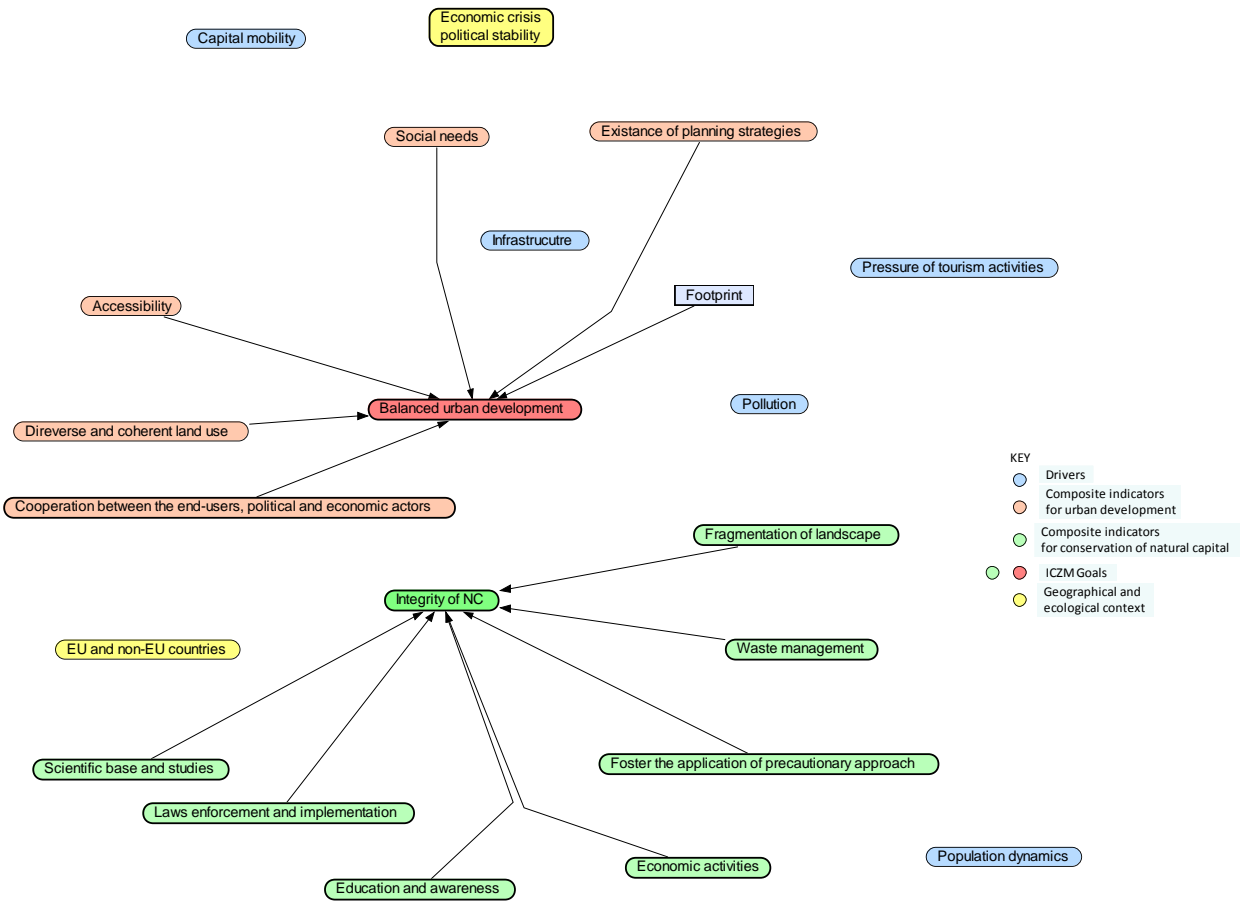
## Group 1
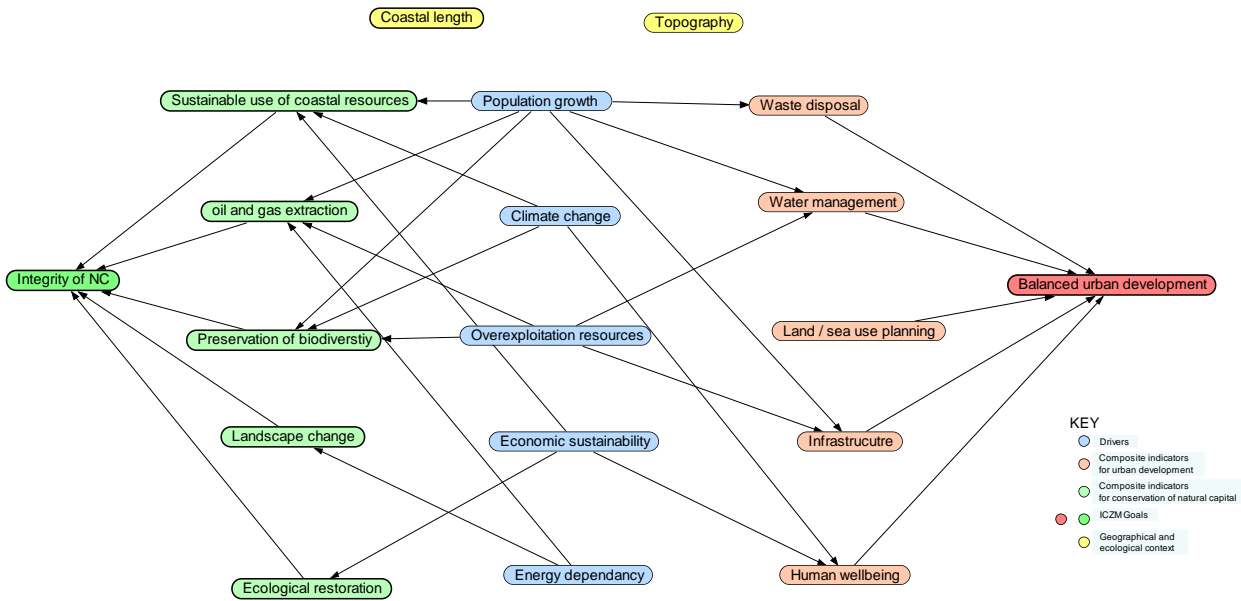


## Group 2

**Figure 1 (cont.): Influence diagrams developed during Day 1, cont.**

*Group 3*



*Group 4*

**Figure 1 (cont.): Influence diagrams developed during Day 1, cont.**
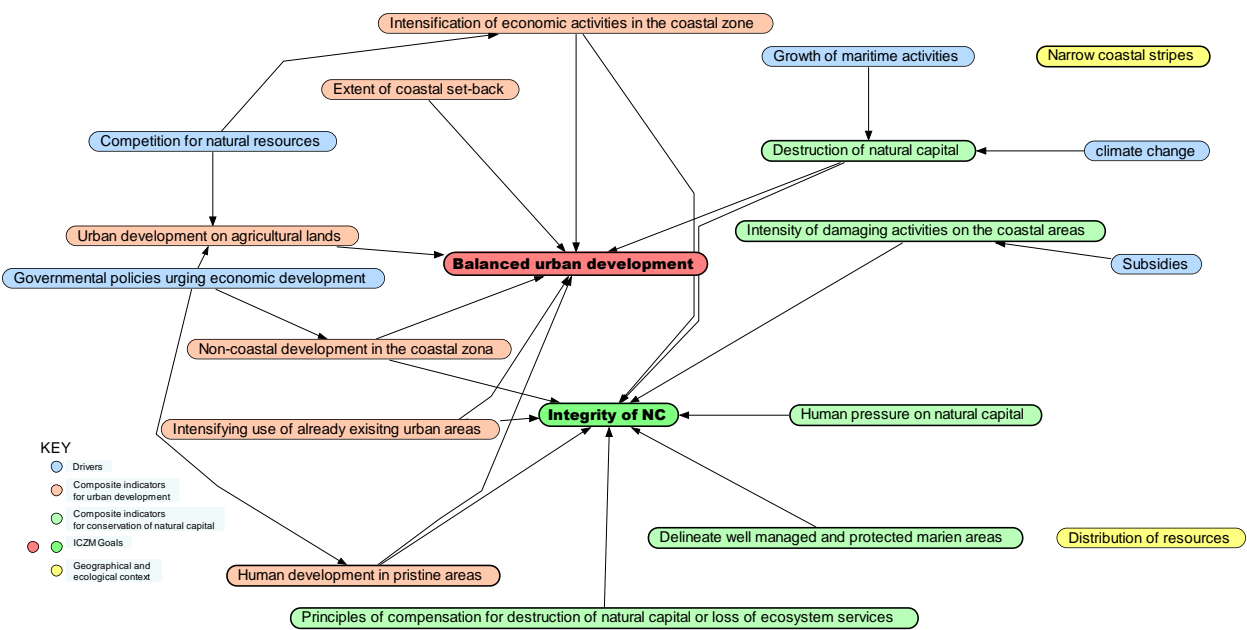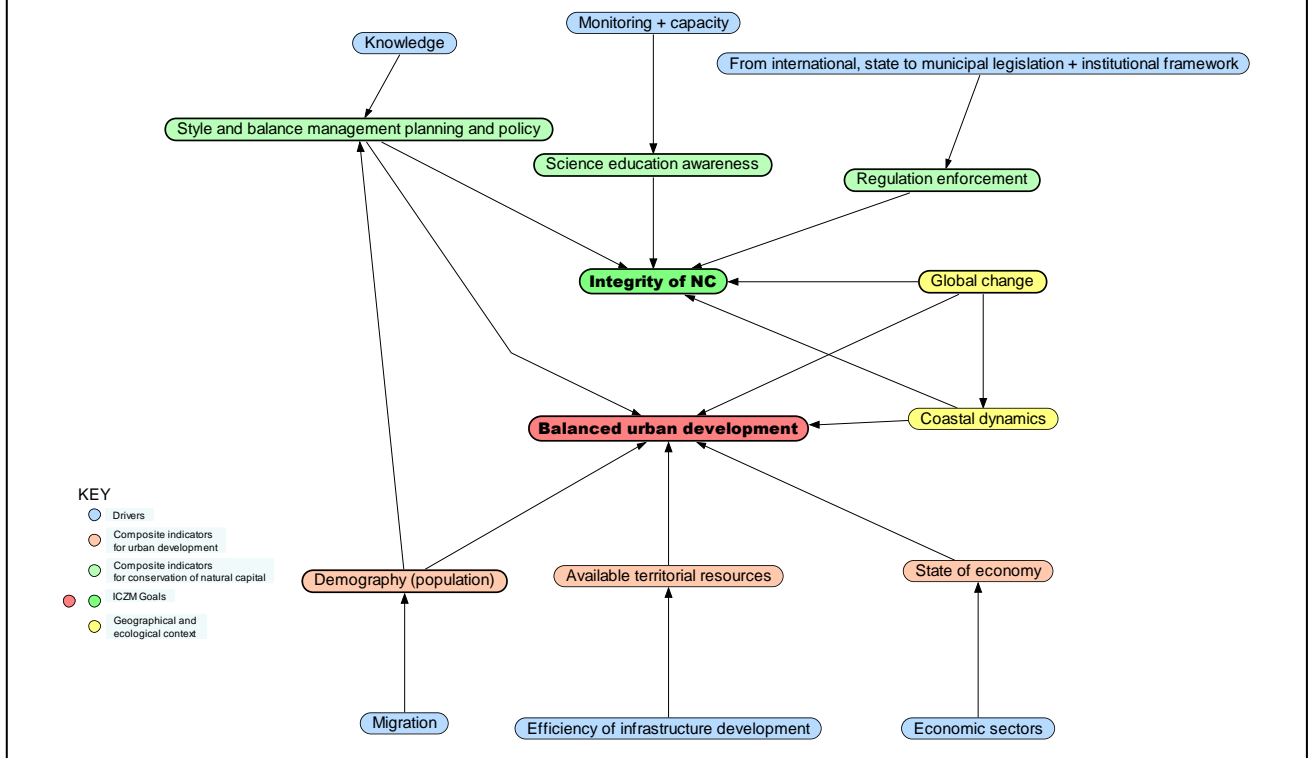
*Group 5*



*Group 6*

**Figure 1 (cont.): Influence diagrams developed during Day 1, cont.**

_**Group 7**_



The work of each group was constrained by giving them a limited number of cards for each policy theme and potential drivers, and restricting the number of arrows they could use to represent the relationships between them. This was done so that the resulting networks would not become overly complex, and to ensure that by having to prioritise groups only included what they considered to be the most important variables in their network diagrams. A further advantage of this method was that the resulting networks were all of roughly the same size so that they could be more easily compared. Since influence diagrams (and the BBNs that might result from them) are not meant to be complete representations of the world, simplicity of the outcomes is an important goal of such work. Participants were encouraged to take a broad view, and not attempt to identify all the steps in a causal chain in detail but to think and represent the system at a high level by simply identifying preconditions and outcomes. In building the network the groups started with the cards representing the two policy goals of integrity of natural capital and balanced use, and worked outwards through the indicators that they thought could be used to characterise them and the drivers that in turn would influence them. The assist discussion the groups were given a list of potentially relevant indicators from the PEGASO ICZM set, but were able to add any others they thought relevant.

As a review of the influence diagrams (Figure 1) shows that the groups differed in their approach and level of complexity they attempted when constructing the influence diagram. In order to identify the commonalities across the groups, the seven networks have been analysed and the similarities and differences in nodes identified have been recorded (Table 1). The data for the two policy themes have been separated along with the nodes that the groups suggested were either 'context' variables or 'drivers'. In each block of data shown in Table 1, the variables have been ranked by the number of times the groups included a theme in their network.

10

**Table 1: Factors shaping ICZM identified by workshop groups (Exercise 1)**

| | Group 1 | Group 2 | Grpup 3 | Group 4 | Group 5 | Group 6 | Group 7 | Citations |
|---|---|---|---|---|---|---|---|---|
| **DEVELOPMENT Indicators** | | | | | | | | |
| Land and sea use planning/Setback measures/Policy for coastal zone | x | x | x | x | x | x | | 6 |
| Human well-being/Employment/Prosperity | x | | x | x | x | x | | 5 |
| Infrastructure/Artificalisation/Intensification of use/Economic pressure | x | x | | x | x | x | | 5 |
| Population density | | x | | | | | x | 2 |
| Waste disposal/waste management | x | x | | | | | | 2 |
| Accessibility | | | x | | | | | 1 |
| Balanced economic activities | | x | | | | | | 1 |
| Cooperation between stakeholders | | | x | | | | | 1 |
| Quality of urban services | | x | | | | | | 1 |
| Reduction of exposure to natural hazards. | | | | | | x | | 1 |
| Resource availability | | | | | | | x | 1 |
| Water management | x | | | | | | | 1 |
| **NC_Indicators** | | | | | | | | |
| Landscape/Land use change and fragmentation | x | x | x | x | x | | | 5 |
| Human pressures and resource exploitation (esp. oil & gas) | x | | | x | x | x | | 4 |
| Pollution and waste management | | x | x | | x | x | | 4 |
| Preservation of biodiversity and ecosystem services/coastal protection | x | x | | | x | x | | 4 |
| Economic activities | | | x | x | x | | | 3 |
| Foster the application of precautionary approach/Awareness/Compensation | | | x | x | | | x | 3 |
| Laws enforcement | | | x | | | | x | 2 |
| Spatial Planning | | | | | | x | x | 2 |
| Water management/use | | | | x | x | | | 2 |
| Ecological restoration | x | | | | | | | 1 |
| Invasive species | | x | | | | | | 1 |
| Scientific evidence | | | x | | | | | 1 |
| Sustainable use of coastal zone | x | | | | | | | 1 |
| **Drivers** | | | | | | | | |
| Knowledge, monitoring and capacity, awareness | | | x | x | | | x | 3 |
| Legal frameworks | | x | x | | | | x | 3 |
| Climate change | x | | | x | | | | 2 |
| Economic sectors | | | | | | | x | 1 |
| Economic sustainability | x | | | | | | | 1 |
| Efficiency of infrastructure development | | | | | | | x | 1 |
| Energy dependency | x | | | | | | | 1 |
| Food security | | | | x | | | | 1 |
| Migration | | | | | | | x | 1 |
| Overexploitation resources | x | | | | | | | 1 |
| Political instability | | | | x | | | | 1 |
| Population growth | x | | | | | | | 1 |
| Pressure of tourism activities… | | | x | | | | | 1 |
| **CONTEXT** | | | | | | | | |
| Climate change and natural hazards | | x | | x | | x | | 3 |
| Coastal structure and dynamics | x | | x | | | | x | 3 |
| Demography/Population | | x | x | | | x | | 3 |
| Globalization and economic activity/Capital mobity | | x | x | | | | x | 3 |
| Governmental policies for economic growth | | | | x | x | | | 2 |
| Spatial planning/Governance/Institutional frameworks | | | | | | x | x | 2 |
| Competition for natural resources | | | | x | | | | 1 |
| Distribution of resources | | | x | | | | | 1 |
| Economic crisis political instability | | | x | | | | | 1 |
| EU and non-EU countries | | | x | | | | | 1 |
| Growth of maritime activities | | | | x | | | | 1 |
| Infrastructure | | | x | | | | | 1 |
| Pollution | | | x | | | | | 1 |
| Subsidies | | | | x | | | | 1 |
| Topography | x | | | | | | | 1 |
| Tourism growth | | x | | | | | | 1 |

**Note:** The theme names do not correspond precisely to the labels that the groups used in the exercise; terms used by the groups have been combined and broad correspondences interpreted in order to better identify commonalities. The thematic areas shaded approximately correspond to the nodes used in the BBN prepared prior to the workshop that were based on indicators derived from the PEGASO ICZM set. For Group identification compare Appendix 1

Table 1 shows that the indicators most frequently cited as a way of characterising balanced urban development related broadly to planning policy, and especially the extent to which development respected the need for coastal set-back, together with measures related to human well-being and prosperity and extent of infrastructure development. For the preservation of natural capital, measure of land use or landscape change were considered most influential, followed by measures of human pressure on resources, the output of pollution and wastes, and efforts to preserve biodiversity and ecosystem services. Knowledge, monitoring capacity and awareness, together with the effectiveness of legal frameworks were identified as the major drivers of change. Differences in the impacts of or exposure to the risks of climate change, the influence of variations in coastal structure and processes, and exposure to globalisation processes were identified most frequently as the major contexts variables affecting the two policy themes.

Inspection of the data in Table 1 also shows that some factors were considered to play different roles by the groups. Thus spatial planning was considered to be important in the context of achieving balanced urban developed <u>and</u> the preservation of natural capital. Climate change was regarded as both an important driver and context variable.

The purpose of the first exercise was to initiate thinking within the groups about how they might structure ideas, and to developed a shared understanding of issued that could provide a focus for subsequent discussion. It is interesting to note, however, that the metrics that the group as a whole identified that would be important for characterising progress towards balanced urban development and preservation of natural capital were broader than those identified in the preparatory meeting, although most of the measures from the PEGASO ICZM set suggested in the preparatory were flagged as important by the group as a whole; the measures that corresponded to the preliminary set are those highlighted in Table 1.

### Day 1, Exercise 2

Having developed the influence diagram, the groups were asked to consider how the relationships that they had defined for the two policy areas would affect outcomes under the 'best' and 'worst' case scenarios. The idea of using the goals of ICZM in a normative way to define the best case scenario was explained to the groups, who were asked specifically to look at the factors they had identified and explore whether they though they were 'controllable' or 'uncontrollable', under the best and worse case scenarios. The briefing given to the groups suggest that they could understand the notion of controllability under the conditions of a scenario, involve the idea that some kind of intervention could be made that would result in positive outcomes.

The exercise generated a considerable volume of output (Appendix 3). No attempt has been made at this stage to aggregate and fully summarise the data, but some idea of the patterns of thinking that emerged can be gained from the 'word clouds' shown in Figure 2; these were generated using the on-line Wordle tool[5]. These word clouds show the contrasts that emerged between the things that groups thought were controllable an uncontrollable under the different scenarios. A key point to note was that the density of terms describing the things that can be controlled is much higher than for the things that cannot be controlled under the best case scenario (top row in Figure 2), whereas for the worse case scenario the reverse is true (middle row, Figure 2). The word cloud at the bottom of Figure 2 shows those things that switch from controlled to uncontrolled between the best and the worse case scenarios.

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[5] http://www.wordle.net/

**Figure 2: Word clouds for the best and worst case scenarios identified across all groups**

*Best case scenario*

*Things that can be controlled*                    *Things that cannot be controlled*



*Worst case scenario*

*Things that can be controlled*                    *Things that cannot be controlled*



*The factors that change between scenarios (controlled to uncontrolled)*

In order to summarise their thinking and feedback their ideas, the groups were asked to highlight three characteristics of what they took to be the best and worse case scenarios. For the best case, factors like 'grass root support for ICZM', 'ICZM governance policy developed and endorsed', and 'policy implemented and respected' were identified. Political and economic stability and integrated thinking, through effective spatial planning in the terrestrial and marine sectors, were characteristics emphasised as significant under the best case scenario by many of the groups. Commitment to rehabilitation of ecosystems and mitigation of human impact was also highlighted. In most cases the groups described the worse case scenario as being characterised by the lack of these preconditions.

When asked about the implications that the comparison between the two scenarios had for policy or management, a number of measures or strategies were identified. They included incentives to promote a green economy in the coastal zone, and efforts to ensure better 'institutional coordination and administration of governance by all interested parties'. Measures to promote education and awareness and especially to encourage participatory styles of governance were also recognised as important. Since many of these factors were considered 'controllable' under the best case scenario, the ideas generated were potential useful for people, in terms of trying to identify and prioritise the kinds of policy or management options that might need to be considered.

Groups were much less certain about the role of geographical or spatial factors within the best and worse case scenarios, although it was suggested that differences of coastal types, vulnerabilities to climate change and demographic trends might be important factors. Political and social differences between European and North African counties were also suggested as a potentially important factor to consider.

As with Exercise 1, the purpose of the second exercise was to develop shared thinking around the idea of scenarios and what factors might need to be included when developing them in a more formal way. The exercise was also designed to get participants familiar with the ideas of controllability etc. so that they would more easily understand the questionnaire that they were asked to complete at the end of the day.


### *Day 2, Questionnaire results*

As noted above, the questionnaire (Appendix 2) was designed to enable people to express their views at an individual level, and to understand better the diversity of thinking within the group as a whole. It was also experimental in that different question formats were being tried, to better understand how such tools could be used to help develop influence diagrams, Bayesian Networks and scenarios by interacting with people outside a workshop environment.

The questionnaire had three major sections. There were a series of preliminary questions to establish people's background and the geographical areas they were most familiar with. Next were a set of questions to allow the BNN that had been prepared prior to the Rabat meeting to be calibrated on the basis of the views within the group. Finally, were a set of questions designed to explore the factors that people considered to be important under the best and worse case scenarios, as they had done on Day 1.

In terms of people's background, the majority were from countries bordering the western Mediterranean (especially European countries). More than 70% regarded themselves as 'researchers', while around 10% described themselves either as coastal managers or policy advisors (note people could assign themselves multiple roles).
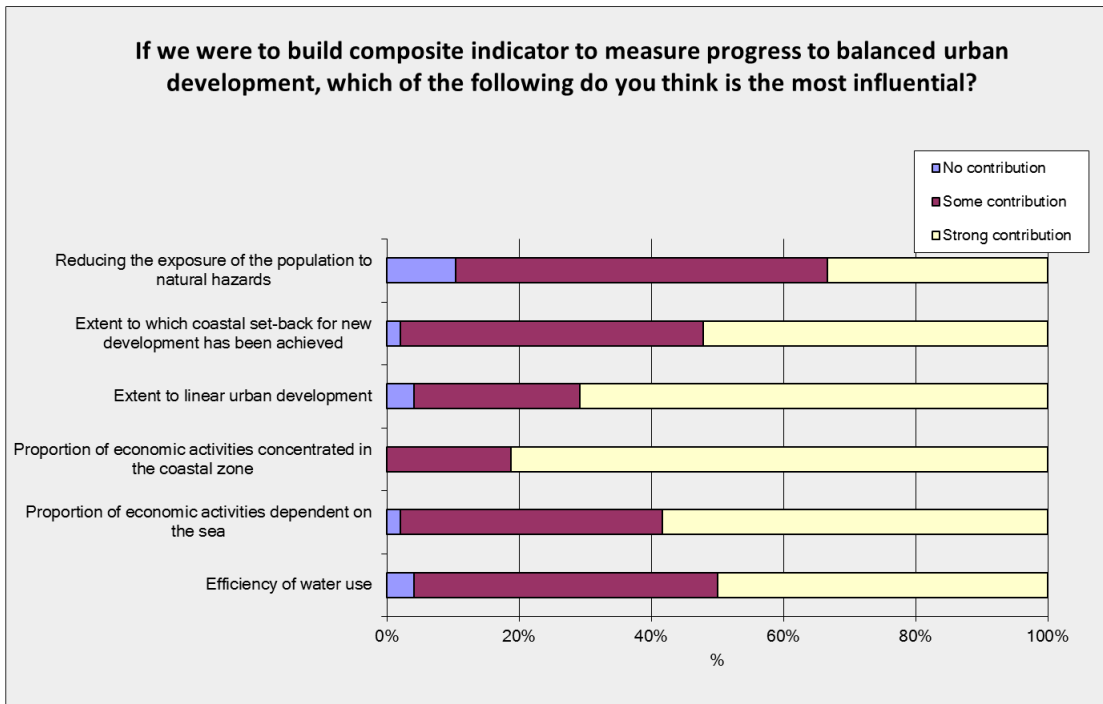
**Figure 2: Characterising balanced urban development**

**If we were to build composite indicator to measure progress to balanced urban development, which of the following do you think is the most influential?**

- No contribution
- Some contribution
- Strong contribution

Reducing the exposure of the population to natural hazards

Extent to which coastal set-back for new development has been achieved

Extent to linear urban development

Proportion of economic activities concentrated in the coastal zone

Proportion of economic activities dependent on the sea

Efficiency of water use

0%   20%   40%   60%   80%   100%

%

**Figure 3: Characterising preservation of natural capital**

**If we were to build composite indicator to measure the preservation (or integrity) of natural capital, which of the following do you think is the most influential?**

- No contribution
- Some contribution
- Strong contribution

Efficiency of water use in the coastal zone

Effectiveness of waste management systems in the coastal zone

Human pressures on natural capital

Effectiveness of management and conservation measures

0%   20%   40%   60%   80%   100%

**Figure 4: Identifying potential barriers to ICZM**

### What are the liely barriers to ICZM in next 25years
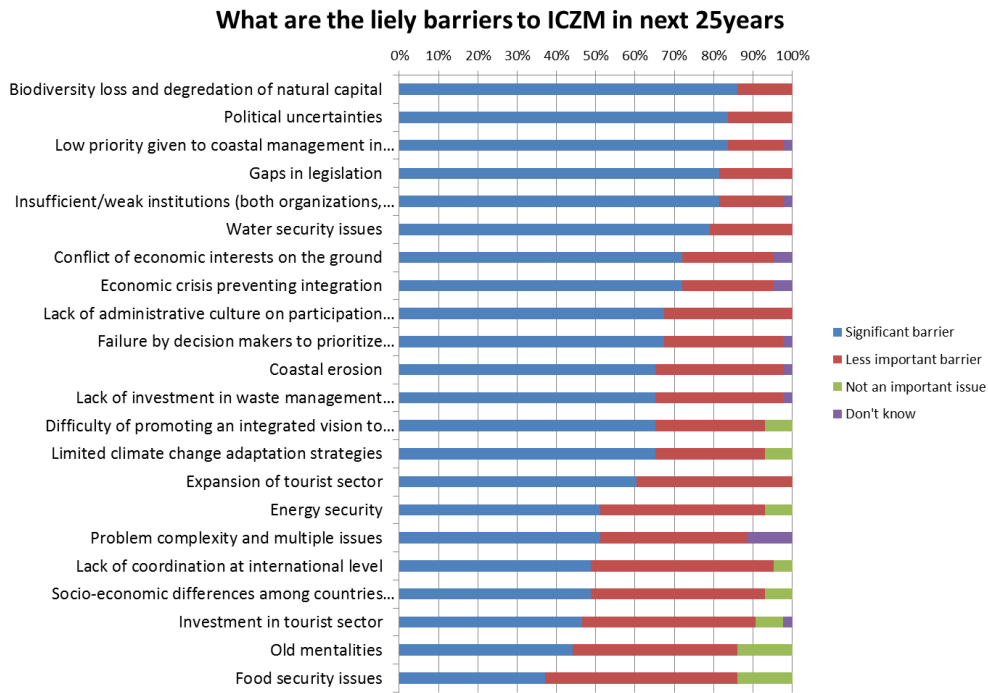


**Figure 5: Characterising best and worse case scenarios**

### Controllable under and worse case scenarios
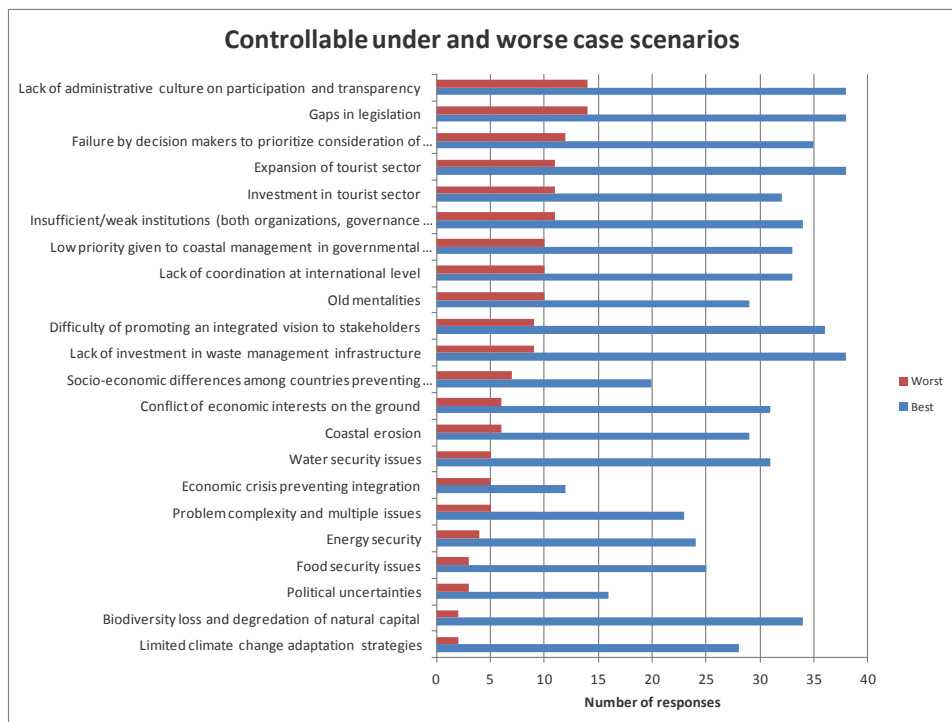
For the questions relating to the factors that influence balanced urban development, the most significant factors identified by in the responses were: the proportion of economic activities concentrated in the coastal zone; the extent to linear urban development; and the degree to which coastal set-back for new development has been achieved (Figure 2). As noted above, each corresponds to ICZM indicators proposed from the work done in Task 4.1. For the preservation of natural capital the two most important indicators identified were: human pressures on natural capital; and effectiveness of waste management systems in the coastal zone (Figure 3).

When people moved on to consider the scenario aspects of the questionnaire, they were asked to identify what they consider to be the likely barriers to implementation of ICZM over the next 20 years (Figure 3). The 'top 10' identified were, in descending rank order:
- Biodiversity loss and degradation of natural capital
- Political uncertainties
- Low priority given to coastal management in governmental agendas
- Gaps in legislation
- Insufficient/weak institutions (both organizations, governance mechanisms)
- Water security issues
- Conflict of economic interests on the ground
- Economic crisis preventing integration
- Lack of administrative culture on participation and transparency
- Failure by decision makers to prioritize consideration of environmental issues

The prominence of governance issues in this list is consistent with the findings of the group work that emphasised the role of planning, institutional stability and regulatory frameworks. If we are to use these results to build, then we need to establish the major uncertainties that surround them, thus the questionnaire invited people to identify the factors that were controllable and uncontrollable under a 'best' and 'worse' case scenario. The questionnaire framed the notion of best case in exactly the same way as in the workshop and the same definition of what constituted 'controllability'. The results are shown in Figure 5.

The difference between Figures 4 & 5 is that in the latter the factors have been ranked in descending order according to the frequency people thought that they would be controllable under the worse case scenario. The purpose of looking at the gap between what people thought was controllable and uncontrollable factors was to gain an insight into some of the major uncertainties that might shape the future. One strategy might be to focus on those elements are potentially controllable under all circumstances and prioritise those actions, as being most likely to yield success. Inspection of the data shown in Figure 5 suggests that governance issues, together with control of the tourist sector would fall into this group of interventions.

Alternatively, one might consider a strategy based on the biggest gap between what is controllable and uncontrollable under different circumstances, and try to ensure that a trajectory towards the worst case is, so far as possible. The results shown in Figure 5 suggest that issues here would include such factors as food and energy security, poor adaptation to climate change and political uncertainty. The Figure also shows that biodiversity loss and degradation of natural capital is also a factor that switches between controllability and uncontrollability between scenarios, however, this is more of an 'outcome' than a type of intervention, and so is rather different from the others in this category.

Only a subset of the questions from the questionnaire has been reported here. The others are best dealt with in the context of Exercise 3, below.

The final exercise during combined workshop combined the results from the questionnaire survey and the Bayesian Belief Network (BBN) prepared prior to the meeting. The BBN (Figure 6) had been designed by a small group to explore how the ICZM indicators developed in PEGASO could be used to characterise and potentially measure the two policy goals of balanced urban development and preservation of natural capital. In creating this network it was recognised that it did not cover all factors affecting ICZM, and that it could be developed after the workshop. However, it was considered to be a useful starting point for discussion, and especially for the development of scenario thinking.

A detailed account of the BBN shown in Figure 6 will be provided in the Deliverable (ID4.3.2) arising from T4.3; in summary its structure follows the same logic as that described for the influence diagram exercise described above which was, in fact, designed to encourage groups to develop a model along the same lines. The colour coding used in Figure 6 is the same as that used in the presentation of the influence diagrams, above. The goal was to use the workshop both to test the plausibility of the overall structure and to use the questionnaire results to calibrate the BBN with data on the beliefs held by the group so that they could use it to explore their implications.



**Figure 6: The pre-prepared BBN that formed the basis of the questionnaire exercise**
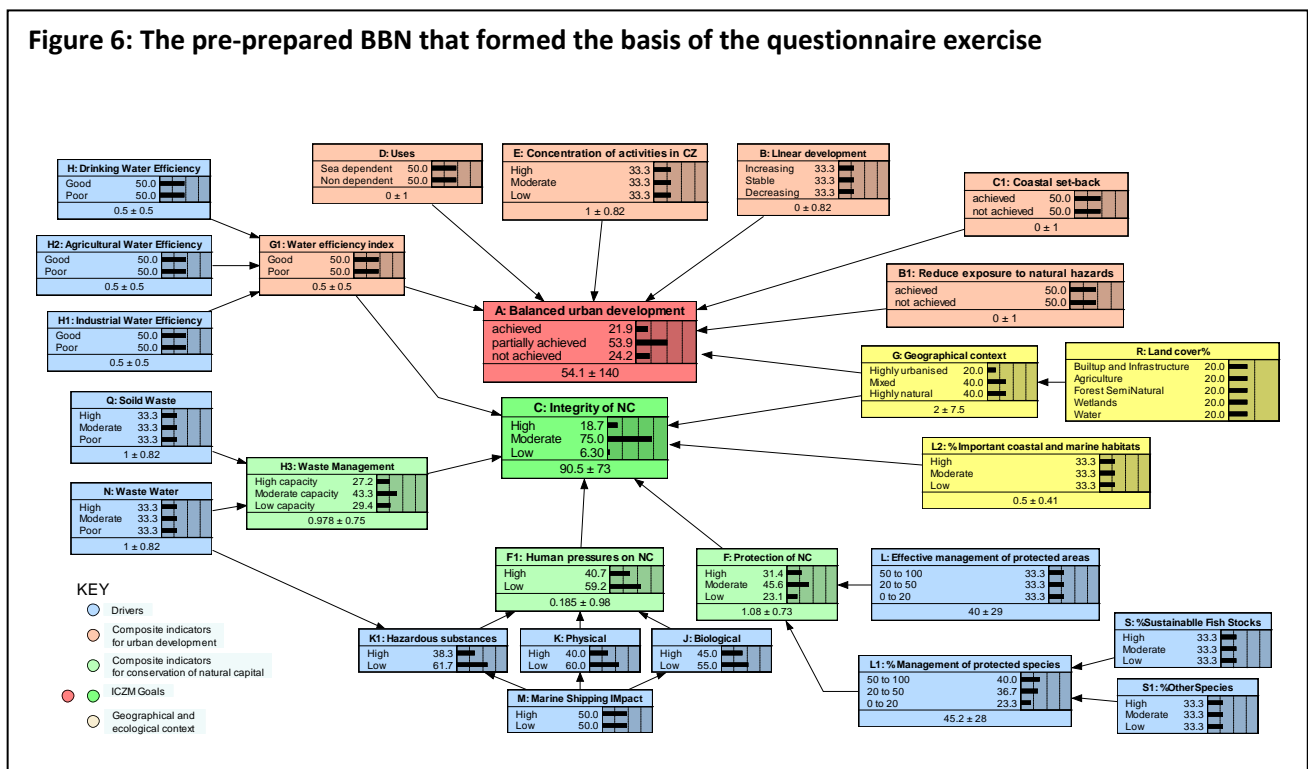
Nodes A and C were the primary focus of the questionnaire exercise. The information on the importance of the various factors influencing balanced urban development and preservation of natural capital was used to calculate a series of 'weights' that could be used to express the strength of influence that each facto had. The data on the indicators feeding into A and C were treated separately. Each was set up as a continuous variable in Netica, with discrete levels ('achieved', 'partially achieved', 'not achieve' etc.), and the outputs calculated as a function using a simple linear equation that weighted the inputs according to the importance derived from the questionnaire survey. Figure 6 shows the BBN as a set of 'belief bars', which express the probability of each node

18

being in a particular state. The relationships between the drivers and the indicators were defined during the preparatory stage.

Following the presentation of the questionnaire results the BBN was presented to the group, and the logic what lies behind it was described. Since many people had not used BBNs before the nature of these tools was also described. The groups were then encouraged to use the network and in particular explore how their best and worst case scenarios might play out using the calibrated model. To wrap-up the exercise, the groups were asked to report back on their experience and complete a short feedback sheet about the insights gained and the utility of the approach.

Many groups felt that there were major differences between the way the BBN represented the issues and the influence diagrams developed they developed on Day 1; this related both to the variable used and the links between them. An interesting suggestion was that in addition to naming the nodes, the links also should be labelled with the kind of relationships that existed between the valuables concerned. Although the extent to which they thought that either the BBN or their influence diagram needed to be updated is unclear, but issues of scale and data availability were highlighted as issues for further discussion. In terms of the sensitivity of the BBN to different kinds of intervention, one group felt that 'management efforts should have a larger effect than expected'. Another group reported that there was a 'difficult distinction between best and worst case' when using the BBN. These kinds of issue would need to be followed up in any 'plausibility tests' of the BBN. Unfortunately there was not time to do so at the workshop.

Some of the fullest comments were provided in response to the question about the utility of the tool for decision support, and the implications for policy and management. While it was noted that the BBN was not 'realistic' and too 'simple', it one group also felt that the 'BBN was a useful and valuable tool that they would use and share with others'. The same group reported that 'they liked the fact that it gave a global vision in a clear and simple way'. Another group reported that BBN 'give insights on where to focus the management activities' and could therefore provide 'support for further action plans/visions'. They highlighted that it was useful to 'raise awareness' and provide information. The back-casting capability of the BBN was identified as particularly useful for raising awareness. Suggestions for further work included the idea that it could be used at local scales, and one thought that it would be useful to compare planning exercises based on BBN with those that made greater use of GIS.

These suggestions for further work, together with the differences between the BBN and the influence diagrams developed at the workshop clearly need further investigation and will be covered in the deliverables arising from T4.3.

# 4.    Conclusions

The workshop had three aims. In terms of better understanding the factors that need to be considered in relation to the policy goals of 'balanced urban development' and the 'preservation of natural capital', issues of governance stood out as being of paramount importance. This finding confirms the general conclusions from the Arles and Istanbul meetings, and suggests that interventions and efforts to ensure more effective institutional capacity and deeper political commitment are probably essential. The results also seem to suggest that the indicators proposed by PEGASO are likely to be useful ways by which the outcomes of better governance might be assessed. This finding has implications for the work now being undertaken as part of the PEGASO Regional Assessment (T5.2).

A second aim of the workshop was to explore how participatory methods could be used to analyse issues related to balanced urban development and the preservation of natural capital in an interactive way. The influence diagram exercise appeared to work well as a vehicle for discussion, and there was some success in using these models as a focus for discussions about the future. The extent to which the distinction between normative and other types of scenario was fully understood is unclear, and so probably further work needs to be done on the design of the exercises to make this point more evident. Much useful feedback was gained from participants about the design of the questionnaire and there are a number of ways in which its structure could be modified if this kind of work is taken forward. A detailed discussion will be provided in the outputs form T4.3. Despite the limitations noted by participants of the kinds of approach used in the workshop, it was recognised that influence diagrams and BBN could be effective decision support tools, and useful ways of engaging with stakeholders. The fact that several groups are now considering applying these methods in their work indicates that the workshop was successful in meeting its second objective.

Finally, the workshop was designed to help people in the consortium see how different tools being developed within PEGASO could be linked and integrated. Given the limited time available for the workshop this was the most difficult aspect to accomplish. The goal probably needs to be pursued further in the later stages of the Project. Nevertheless, the workshop did make a strong connection to the work on ICZM indicators (T4.1) the articulation of the principles underlying ICZM (T2.1), and the findings will inform the on-going Regional Assessment (T5.2). Further work needs to be done on looking at how mapping data can be used as an input into the development of influence diagrams and BBNs, especially in the context of better understanding how outcomes would be different in different geographical situations.

# 5. References

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## Appendix 1: Workshop Programme and Briefing

The workshop took place on days 3 & 4 of the 3rd Annual Meeting. Only the programmes for those days are provided here.

| **Day 3 – Thursday 21st of March 2013 Pegaso partners and end users workshop** | | |
|---|---|---|
| **09:00 - 10:30** | 09:00- 10:00 | **Session with the Pegaso partners and the end users to present them the Pegaso achievements** Chair: Françoise Breton |
| | 10:00- 10:30 | Introduction to the WS Denis Bailly |
| **Implementing ICZM - exploring the barriers, opportunities and options** | | |
| **11:00 - 13:00** | 11:00 -13:00 | **Exercise part 1:** **Causal network exercise with the focus on balanced urban development and natural capital conservation** |
| | *13:00* | *Lunch break* |
| **14:00 -17:30** | 14:00 -14:15 | **Briefing** Roy Haines-Young |
| | 4:15 -16:30 | **Exercise part 2:** **Use networks to explore impacts of different stressors** |
| | 6:30-17:30 | **Review and questionnaire; Introduction Roy Haines-Young** |
| **Day 4 – Friday 22nd of March 2013** | | |
| **09:00-13:00** | 09:00 -10:30 | **Presentation of the Questionnaire Results and the Bayesian Belief Network tool (BBN) by Roy Haines-Young** |
| | 11:00 -12:30 | **What if" discussion based on network design and questionnaire results** Chair: Denis Bailly |
| | 12:30 -13:00 | **Wrap up and introduce the longer process of the network exercise in Pegaso Closure of the workshop** |
| | 14:00 -16:00 | **BBN Surgery Session** hosted by UNOTT |

# BRIFING FOR WORKSHOP MODERATORS, Rabat, March 2013

**Thursday, 22^(ND) MARCH**

Briefing session at 08.00-9.00 for moderators; RHY to explain arrangements for session on Day 1. Session starts @10.30; DB/FB providing an introduction on aims, purposes and structure of the day and how it fits in with the general needs to develop/activate the platform.

**Exercise Part 1 (11.00-13.00):** The aim here is to get people to discuss the relationship between the pre-defined variables that affect 'balanced urban development' and 'integrity of natural capital', and up to 12 major influences (Table 1 – you can share this with the group). We will then ask them to identify the wider pressures or drivers that affect these variables – say up to 6. We will allow them no more than 20 arrows to indicate <u>all</u> the relationships. UNOTT will organise the materials.

- This work will require people in groups of 5-6. We can split by language groups, but otherwise should attempt to have the same mix of expertise, experience, gender etc. in each group. There should be no attempt to split the BS and MED.
- The groups will work on flip-chart paper as a base and organise their ideas using cards which can be stuck on when the final influence diagram is agreed in the group. PLEASE MAKE SURE THE FINAL DIAGRAM IS FIXED TO THE PAPER SO WE CAN PHOTOGRAPH IT. PUT THE MODERATORS NAME ONTO THE PAPER.
- For each influencing variable groups should:
  a. Indicate how strong, relative to the others, their influence is.
  b. How they would measure these influencing variables (possible indicators?)
  c. Groups should record on the yellow sheets which <u>geographical</u> factors may affect the strength of influence of the different variables.
- For the findings a-c groups should record their thoughts on the feedback sheet that can be fixed to the poster.

**Exercise Part2 (14.00-16.30):** The aim here is to use the diagram constructed in the morning to identify which influencing variable can be controlled under the 'best-' and 'worse-case' scenarios. <u>NOTE</u>: the best and worse case scenarios define themselves by what people think is significant and what people think is <u>controllable</u> or not. **By controllable we mean that policy or management interventions can achieve outcomes that are positive given the aims of ICZM.**

- This work will require people to be in the same groups as the morning. Use the template in Figure 1 to draw up a gird on the large sheet of flip chart paper for the group to work on. Use Post-It stickers to locate the variables on the grid according to whether they are controllable or not under the best and worst case scenarios. This will enable people to move the variables around and have a discussion.
- For each scenario the groups will be asked to provide on the feedback sheets:
  a. Findings in a table that lists for each influencing viable whether it is controllable or uncontrollable under each scenario.
  b. Summaries (three bullet points) on the distinctive features of the best and worst case scenario. For example you might ask what variables are 'barriers' and which are 'enablers' in different contexts.
  c. Notes on any important geographical differences in the degree to which the influencing variables are controllable in different places.
  d. Groups should consider the implications for management/future strategies of those factors that change from controllable to uncontrollable under the two scenarios and record these on the feedback sheets.

**Final Session Day 1 (16.30-17.30):**

The group work should last 1.5 hours, and the final part should be taken up with:

- A tour of the tables to look at what other groups did (40 minutes)
- People starting to fill in the questionnaire (RHHY can introduce the structure and purpose of this to kick it off) (5 minutes)
- Immediate general feedback and discussion (45 minutes)

**Tour of the other tables:** People should be encouraged to review the work of other tables. One from each group to remain behind to explain what has gone on and what was concluded at each table. People can take this duty in turn so that everybody has a chance to look at the other groups.

**Questionnaire**

During the period when people are moving about they can also start to fill in the questionnaire. There will be a short briefing session to orientate people about the aims of the questionnaire. Basically the exercises undertaken in the workshop maps on to the questionnaire and will ensure that people are sufficiently familiar with the concepts for them to fill it in quickly. **Emphasise that people can use their judgement when answering the questionnaire and don't have to base their answers on what their groups did.**

The answers to Q13 will be more general than the others and illustrate the kinds of thing the 'Pegaso Platform' might do to develop a shared understanding or view.

- We will ask people to complete the questionnaire by 20.00 via the internet
- Paper copies will be available as backup (only use if instructed)
- HOWEVER, IT IS ESSENTIAL THAT WE HAVE THE INTERNET/COMPUTERS AVAILABLE. Could facilitators help here?
- The questionnaire is at: https://www.surveymonkey.com/s/Rabat_Workshop_Questionnaire

**Friday, 22nd March**

**09.00-10.30:** DB to introduce aims of session and UNOTT to provide overview of BBN approach and feedback on results of questionnaire etc.

- UNOTT will e-mail the calibrated BBN to facilitators for morning session.

**Exercise Part3 (11.00-12.30):** The aim of this session will be to review the influence diagram from yesterday on basis of the BBN provided, and to explore Day 1 scenarios using the pre-cooked BBN that has been calibrated using the questionnaire.

- This work will require people in the same groups as the previous day.
- Report back via feedback sheets up to three new/additional insights gained from BBN about the scenarios, facilitators should have this on their lap-tops to show effects of changing inputs.
- Also report back on the feedback sheets discussion of:
    a. Role of such work in decision making
    b. The contribution that such work might have in developing national and/or local Action Plans for ICZM

**12.30-13.00:** DB to lead wrap-up session.

Table A1

| Some examples of possible influencing variables that could be used |
| --- |
| Efficiency of water use |
| Proportion of economic activities in the coastal zone |
| Proportion of activities in the coastal zone dependent on the sea |
| Linear urban development and urban sprawl |
| Extent of coastal set-back (>100m?) |
| Reduction of exposure of population to natural hazards |
| Waste management |
| Human pressures on natural capital |
| Protection of natural capital |

## Group allocations during the 'Rabat Workshop'

| Group No | 1 | 2 | 4 | 3 | 5 | 6 | 7 |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Mode-rator | Adolf Stips | Francesca Santoro | François Morriseau | Megan Nowell | Pascal Raux | Marion Potschin | Eduard Ariza |
| Partici-pants | Nathalie De Hauwere | Stefano Soriani | Serena Sanna | Alessandro Giordano | Eric Le Gentil | Emil Ivanov | César Martínez Izquierdo |
| | Sylvan Petit | Marian Mierla | Mamuka Gvilava | Pablo Avila | Anis Guelmani | Mohamed Farouk | Gonzalo C. Malvarez Garcia |
| | Eugenia Marin | Emilia Guisado | Christophe Le Visage | Iulian Nichersu | Flayou Lolifa | Alexis Conides | Amiran Gigineishvili |
| | Lisa Ernoul | Gloria Salgado | Manale N. Abou-Dagher | Fabrizia Buono | Hocein Bazaïri | Dimitris Klaoudatos | Sergey Konovalov |
| | Manal Nader | Željka Škaričić | Françoise Breton | Edward Bratfanof | Melle Souhila BOULEKRAO UET | Laura Alexandrov | Maria del Mar Otero |
| | | Suzan E.A, Kholeif | Erdal Özhan | Serdar Özuslu | M Burhan E. El Mounir BENCHARIF | Abdou Khouakhi | Vladyslav Zavgorodny |
| | | Sameh Bakr El KAfrawy | Maria Snoussi | Marko Prem | Mhamdi Nadia | Mahmoud Hussien | Aleko Mameshvili |
| | | Mohamed AmineTaji | | | Rheyati Nassira | Mohammed Ahmed | |
| | | | | | Benessaiah Nejib | | |

Figure A1: Suggested layout for grid to support the discussion of scenarios
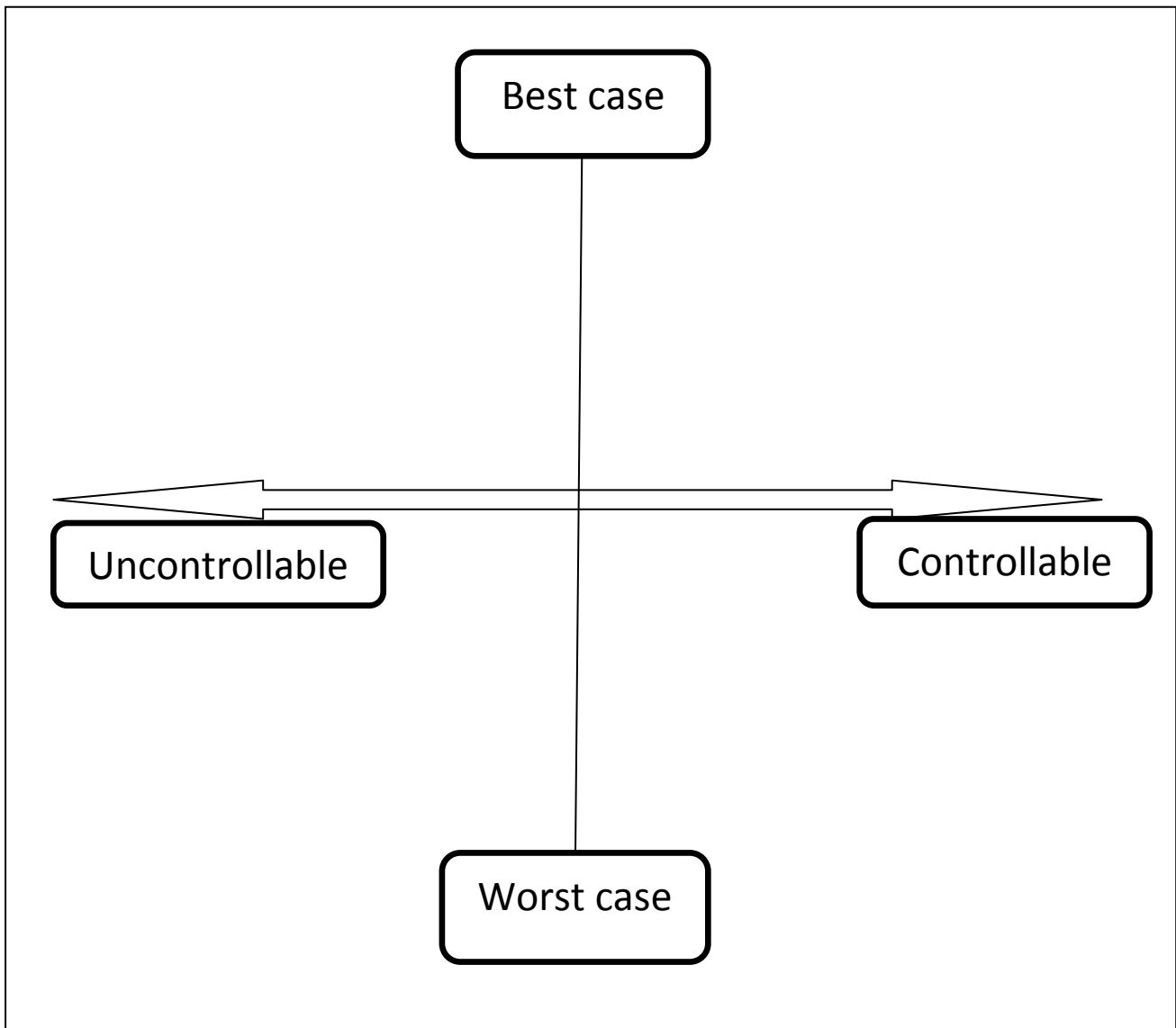
## Appendix 2: Questionnaire

# <b>Implementing ICZM: exploring barriers, opportunities and options</

## Introduction

The aim of this questionnaire is to gather information on how some of the **PEGASO** indicators can be used to measure progress towards the goals of ICZM. It should not take you more than about 15-20 minutes to complete it.

We will use the results to develop an influence diagram in the form of a Bayesian Belief Network (BBN). The BBN tool will help us use the opinions in the consortium to represent how strongly the indicators relate to the different goals, and some of the uncertainties associated with. It will also let us explore some of the pressures and drivers that may affect the indicators.

In the Rabat workshop we focus on two key ICZM goals as defined by the Barcelona Convention. Although they are important in the Mediterranean - they are also sufficiently general to be relevant in any coastal area.

The two goals are:

1. Balanced urban development
2. Protection of natural capital

## Getting to know you

**✳1. Please tell us about yourself. Your answers to all the questions we ask will be completely confidential, but we would like to send you the results and also check anything that is not clear with you because this is a prototype.**

First name:

Surname:

e-mail:

**✳2. From which area of the PEGASO study area do you draw your experience of coastal zone issues? Please select <u>at least one zone</u> shown on the map. If you need to you can select as many as you wish.**

*2. , cont. Please Select:

☐ Zone A

☐ Zone B

☐ Zone C

☐ Zone D

☐ Zone E

☐ Zone F

☐ Zone G

☐ Zone H

☐ Zone I

☐ Zone J

☐ None of these

*3. How would you characterise your current responsibilities in relation to coastal zone management issues:

☐ Researcher

☐ Consultant

☐ Lobbyest

☐ Knowledge broker

☐ Policy adviser

☐ Policy customer

☐ Decision maker

☐ Coastal or Environmental Manager

☐ Business leader

Other (please specify)

[                                        ]

## Balanced urban development - what does it imply?



**∗4. If we were to build composite indicator to measure progress to <u>balanced urban development,</u> which of the following do you think is the most influential? Please suggest which you think would have a strong influence and which would be less significant:**

| | Strong contribution | Some contribution | No contribution |
|---|:---:|:---:|:---:|
| >>>Efficiency of water use | ○ | ○ | ○ |
| >>>Proportion of economic activities dependent on the sea | ○ | ○ | ○ |
| >>>Proportion of economic activities concentrated in the coastal zone | ○ | ○ | ○ |
| >>>Extent to linear urban development | ○ | ○ | ○ |
| >>>Extent to which coastal set-back for new development has been achieved | ○ | ○ | ○ |
| >>>Reducing the exposure of the population to natural hazards | ○ | ○ | ○ |

What other factors should be considered?

## Achieving Balanced Urban Development: Drivers of change

*5. Think about the factors that influence urban development in the coastal zone and the extent to which the may threaten the goal of achieving some kind of balance. For each components of balanced urban growth considered in the last question what do you think the most significant threats to them are likely to be over the next 20-25 years??

You can only make one selection per row, but if you don't think a particular driver is relevant you can chose the 'not relevant' option.

| | Efficiency of water use | Proportion of economic activities dependent on the sea | Proportion of economic activities concentrated in the coastal zone | Extent to linear urban development | Extent to which coastal set-back for new development has been achieved | Reducing the exposure of the population to natural hazards | Not relevant |
|---|---|---|---|---|---|---|---|
| Pollution incidents at sea will most likely threaten | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Rapid population growth will most likely threaten | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Land abandonment will most likely threaten | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Lack of effective spatial planning will most likely threaten | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Lack of marine spatial planning will most likely threaten | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Poor nutrient management in upper catchments will threaten | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Demographic change (increasingly younger age groups) will most likely threaten | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| The drive for economic growth will most likely threaten | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Political instability will most likely threaten | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Poor economic growth will most likely threaten | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Demographic change (aging population) will most likely threaten | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Poor governance structures will most likely threaten | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Poor public understanding of coastal issues will most likely threaten | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Marine shipping activities will most likely threaten | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

What other drivers should be considered? Name one and suggest what it is most likely to threaten

**6. You can skip this if you did NOT identify an important 'other' factor above, but if you did:**

| | Efficiency of water use | Proportion of economic activities dependent on the sea | Proportion of economic activities concentrated in the coastal zone | Extent to linear urban development | Extent to which coastal set-back for new development has been achieved | Reducing the exposure of the population to natural hazards |
|---|---|---|---|---|---|---|
| It will threaten | ○ | ○ | ○ | ○ | ○ | ○ |

Comment

## Thinking about water efficiency

**The efficiency of water use would be an important factor that would influence development and the protection of natural capital. Clearly the efficiency of use may vary between different sectors of society and the economy. How do you think these influences will vary in different types of coastal location?**

**\*7. What kind of contribution to overall efficiency of water use would the following sectors make in a <u>highly urbanized</u> coastal area?**

|  | Strong contribution | Some contribution | Limited or no contribution |
|---|:---:|:---:|:---:|
| >>> Drinking water supplies | ○ | ○ | ○ |
| >>> Agricultural water use | ○ | ○ | ○ |
| >>> Industrial water use | ○ | ○ | ○ |

What other factors should be considered?

**\*8. What kind of contribution to overall water use efficiency would the following sectors make in a <u>highly natural</u> coastal area?**

|  | Strong contribution | Some contribution | Limited or no contribution |
|---|:---:|:---:|:---:|
| >>> Drinking water supplies | ○ | ○ | ○ |
| >>> Agricultural water use | ○ | ○ | ○ |
| >>> Industrial water use | ○ | ○ | ○ |

What other factors should be considered?

**✱9. What kind of contribution to overall water use efficiency would the following sectors make in a stretch of coast that was <u>a mixture of settlement, agriculture and some natural habitats</u>?**

|  | Strong contribution | Some contribution | Limited or no contribution |
|---|:---:|:---:|:---:|
| >>> Drinking water supplies | ○ | ○ | ○ |
| >>> Agricultural water use | ○ | ○ | ○ |
| >>> Industrial water use | ○ | ○ | ○ |

What other factors affecting water use efficiency should be considered?

**✱10. If we were to build composite indicator to measure the <u>protection of natural capital</u>, which of the following do you think is the most influential? Please suggest which ones you think would have a strong influence and which would be less significant:**

|  | Strong contribution | Some contribution | No contribution |
|---|---|---|---|
| >>>Effectiveness of management and conservation measures | ○ | ○ | ○ |
| >>>Human pressures on natural capital | ○ | ○ | ○ |
| >>>Effectiveness of waste management systems in the coastal zone | ○ | ○ | ○ |
| >>>Efficiency of water use in the coastal zone | ○ | ○ | ○ |

What other factors should be considered?

**11. Think about the factors that influence the extent to which the integrity of natural capital is protected. For each component that might form part of the composite indicator what do you consider the <u>most significant</u> threat to be over the next 20-25 years? .**

**You can only make one selection per row, but if you don't think a particular driver is relevant you can choose the 'not relevant' option.**

| | Effectiveness of management and conservation measures | Human pressures on natural capital | Effectiveness of waste management systems in the coastal zone | Efficiency of water use in the coastal zone | <u>Not relevant</u> |
|---|---|---|---|---|---|
| Marine shipping activities will most likely threaten | ○ | ○ | ○ | ○ | ○ |
| Lack of effective spatial planning will most likely threaten | ○ | ○ | ○ | ○ | ○ |
| Poor governance structures will most likely threaten | ○ | ○ | ○ | ○ | ○ |
| Political instability will most likely threaten | ○ | ○ | ○ | ○ | ○ |
| Lack of marine spatial planning will most likely threaten | ○ | ○ | ○ | ○ | ○ |
| Pollution incidents at sea will most likely threaten | ○ | ○ | ○ | ○ | ○ |
| Land abandonment will most likely threaten | ○ | ○ | ○ | ○ | ○ |
| Poor economic growth will most likely threaten | ○ | ○ | ○ | ○ | ○ |
| Demographic change (aging population) will most likely threaten | ○ | ○ | ○ | ○ | ○ |
| Rapid population growth will most likely threaten | ○ | ○ | ○ | ○ | ○ |
| The drive for economic growth will most likely threaten | ○ | ○ | ○ | ○ | ○ |
| Demographic change (increasingly younger age groups) will most likely threaten | ○ | ○ | ○ | ○ | ○ |
| Poor public understanding of coastal issues will most likely threaten | ○ | ○ | ○ | ○ | ○ |
| Poor nutrient management in upper catchments will threaten | ○ | ○ | ○ | ○ | ○ |

What other drivers should be considered? Name one and suggest what it is most likely to threaten

**12. You can skip this if you did NOT identify an important 'other' factor above, but if you did:**

|  | Effectiveness of management and conservation measures | Human pressures on natural capital | Effectiveness of waste management systems in the coastal zone | Efficiency of water use in the coastal zone |
|---|---|---|---|---|
| It will threaten | ○ | ○ | ○ | ○ |

Comment

```
[                    ]
```

**\*13. Previous PEGASO workshops have identified a number of barriers to achieving the goals of ICZM across the Mediterranean and Back Sea Basins.**

**Please review the issues listed below and tell us whether you believe they are likely to be significant barriers to ICZM over the next 25 years. Please also tell us whether you think they are controllable (i.e. manageable to achieve positive outcomes), in what you consider to be the 'best case' and 'worse case' medium term scenario.**

|  | Next 20-25 years | Best case scenario | Worse case scenario |
|---|---|---|---|
| Water security issues | ▾ | ▾ | ▾ |
| Old mentalities | ▾ | ▾ | ▾ |
| Lack of investment in waste management infrastructure | ▾ | ▾ | ▾ |
| Investment in tourist sector | ▾ | ▾ | ▾ |
| Gaps in legislation | ▾ | ▾ | ▾ |
| Political uncertainties | ▾ | ▾ | ▾ |
| Socio-economic differences among countries preventing standardised approaches | ▾ | ▾ | ▾ |
| Failure by decision makers to prioritize consideration of environmental issues | ▾ | ▾ | ▾ |
| Difficulty of promoting an integrated vision to stakeholders | ▾ | ▾ | ▾ |
| Energy security | ▾ | ▾ | ▾ |
| Economic crisis preventing integration | ▾ | ▾ | ▾ |
| Conflict of economic interests on the ground | ▾ | ▾ | ▾ |
| Insufficient/weak institutions (both organizations, governance mechanisms) | ▾ | ▾ | ▾ |

# <b>Implementing ICZM: exploring barriers, opportunities and options</

| | | | |
|---|---|---|---|
| Expansion of tourist sector | ▾ | ▾ | ▾ |
| Low priority given to coastal management in governmental agendas | ▾ | ▾ | ▾ |
| Climate change adaptation | ▾ | ▾ | ▾ |
| Coastal erosion | ▾ | ▾ | ▾ |
| Lack of coordination at international level | ▾ | ▾ | ▾ |
| Lack of administrative culture on participation and transparency | ▾ | ▾ | ▾ |
| Food security issues | ▾ | ▾ | ▾ |
| Problem complexity and multiple issues | ▾ | ▾ | ▾ |
| Biodiversity loss and degradation of natural capital | ▾ | ▾ | ▾ |

What other threats need to be considered?

## Appendix 3: Results of Exercise 2

| Group | Influencing variable | Best Case Scenario | Worst Case Scenario |
|---|---|---|---|
| 1 | Ecological Restoration | Controllable | Uncontrollable |
| 1 | Efficient Waste Disposal | Controllable | Uncontrollable |
| 1 | Efficient Water Management | Controllable | Uncontrollable |
| 1 | Demographyc Pressure | Controllable | Controllable |
| 1 | Job Opportunities | Controllable | Controllable |
| 1 | Urban Planning | Controllable | Uncontrollable |
| 1 | Infrastructure | Controllable | Controllable |
| 1 | Urban Policies | Controllable | Uncontrollable |
| 1 | Biodiversity Conservation | Controllable | Uncontrollable |
| 1 | Economic Orientation | Uncontrollable | Uncontrollable |
| 2 | Balanced economic activities | Uncontrollable | Uncontrollable |
| 2 | Population density | Uncontrollable | Uncontrollable |
| 2 | Spatial planning | Controllable | Uncontrollable |
| 2 | Waste management | Controllable | Controllable |
| 2 | Quality of urban services | Controllable | Uncontrollable |
| 2 | Artificialization of the coast | Controllable | Uncontrollable |
| 2 | Percentage of protected areas | Controllable | Controllable |
| 2 | Quality of ecosystems | Controllable | Uncontrollable |
| 2 | Pollution | Controllable | Uncontrollable |
| 2 | Invasive species | Controllable | Uncontrollable |
| 2 | Ecosystem services | Controllable | Uncontrollable |
| 3 | Economic Activity | Uncontrollable | Uncontrollable |
| 3 | Social Needs | Uncontrollable | Uncontrollable |
| 3 | Accessibility | Controllable | Controllable |
| 3 | Fragmentation | Controllable | Uncontrollable |
| 3 | Law Enforcement | Controllable | Uncontrollable |
| 3 | Communication | Controllable | Uncontrollable |
| 3 | Waste Management | Controllable | Uncontrollable |
| 3 | Sustainable Use Of Natural Capital | Controllable | Controllable |
| 3 | Oil And Gas Extraction | Controllable | Controllable |
| 3 | Protection Of Biodiversity | Controllable | Uncontrollable |
| 3 | Landscape Change | Controllable | Controllable |

| Group | Influencing variable | Best Case Scenario | Worst Case Scenario |
|---|---|---|---|
| 4 | Regulation Enforcement | Controllable | Uncontrollable |
| 4 | Education Awareness | Controllable | Uncontrollable |
| 4 | Human pressure on natural capital | Controllable | Uncontrollable |
| 4 | Delineated and managed protected marine areas | Controllable | Uncontrollable |
| 4 | Principle of compensation for destruction of natural | Controllable | Uncontrollable |
| 4 | Intensity of economic activities in coastal zones | Controllable | Uncontrollable |
| 4 | Extension of coastal set back | Controllable | Uncontrollable |
| 4 | Urban development on agricultural land | Controllable | Uncontrollable |
| 4 | Non –coastal related development in coastal zones | Controllable | Uncontrollable |
| 4 | Intensifying use of already existing urban areas | Controllable | Uncontrollable |
| 4 | Human development in pristine areas | Controllable | Uncontrollable |
| 5 | Destruction Of Natural Capital | Controllable | Uncontrollable |
| 5 | Intensity Of Damaging Activities In The Coastal Areas | Uncontrollable | Uncontrollable |
| 5 | Human Pressure On Natural Capital | Controllable | Uncontrollable |
| 5 | Delineated And Managed Protected Marine Areas | Controllable | Controllable |
| 5 | Principle Of Compensation For Destruction Of Natural | Controllable | Controllable |
| 5 | Intensity Of Economic Activities In Coastal Zones | Controllable | Uncontrollable |
| 5 | Extension Of Coastal Set Back | Controllable | Controllable |
| 5 | Demography | Controllable | Controllable |
| 5 | Territorial Resources | Controllable | Uncontrollable |
| 5 | Policy Planning | Controllable | Uncontrollable |
| 5 | State Of The Economy | Controllable | Uncontrollable |
| 6 | Extent of coastal set back | Controllable | Controllable |
| 6 | Linear urban development | Controllable | Controllable |
| 6 | Political decisions over area development | Controllable | Uncontrollable |
| 6 | Local domestic product | Controllable | Controllable/Uncontro |
| 6 | Economic activity | Controllable | Controllable |
| 6 | MPAs and artificial reefs | Controllable | Controllable/Uncontro |
| 6 | Water use | Controllable | Controllable |
| 6 | Human impact on ecosystems | Controllable | Controllable |
| 6 | Coastal maintenance | Controllable | Controllable |
| 6 | Waste management | Controllable | Controllable |
| 6 | Coastal erosion | Controllable | Controllable |
| 6 | Natural hazzards | Uncontrollable | Uncontrollable |
| 6 | Flooding | Controllable | Uncontrollable |
| 6 | Biodiversity | Controllable | Uncontrollable |
| 7 | Demography | Uncontrollable | Uncontrollable |
| 7 | Policy planning | Controllable | Controllable |
| 7 | State of the economy | Controllable | Controllable |
| 7 | Regulation enforcement | Controllable | Controllable |
| 7 | Education awareness | Controllable | Uncontrollable |
| 7 | Territorial resources | Controllable | Uncontrollable |