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Identifying ecosystem-based management measures and policies: taking action

Once the main deficits between policy and societal objectives and the baseline scenario have been identified (see Developing Scenarios), the "best" ecosystem-based management (EBM) measures and policies can be identified. These management options together make up the management plan that is expected to effectively, efficiently and equitably address those deficits and hence contribute to the achievement of the policy objectives (see Integrative environmental policy objectives).

Often, management options are developed with the aim to mitigate a specific single threat or to achieve a specific and individual policy objective, e.g. fisheries management in the marine realm or river regulation measures for flood protection in the freshwater realm, but without any consideration of its consequences on the wider ecosystem and/or other policy objectives. Ecosystem-based management provides an approach that allows a more holistic perspective when identifying, designing and evaluating those management options and that should therefore contribute towards the achievement of multiple objectives as part of a more complete ecosystem-based management plan.

MANAGEMENT MEASURES AND POLICY INSTRUMENTS:

Any potential responses to an environmental problem, consists of two interconnected and structured (yet well differentiated) sets of actions:

Management measure or **Programme of Measures.** This constitutes a single or combined set of actions that, if properly designed and implemented, contribute **to the environmental objectives** and thus to enhance and protect the ecological system.

- Prevention measures that manage the causes of the risk to the ecosystem, targeted at the human activity and/or the pressure. Examples are input controls that limit the cause of the pressure (such as scrapping schemes to reduce the capacity of the fishing fleet), output controls that prevent the pressure from entering the system (e.g. catch controls in fisheries) or spatial- and/or temporal distribution controls (e.g. marine protected areas or real-time closures).
- Mitigation measures are implemented to mitigate a pressure once it is present in the system (e.g. beach cleaning after oil spills) and or recover the ecosystem component that is impacted (e.g. habitat restoration or stocking programs).

Policy instruments consisting of all the arrangements or reforms that are required in the governing system (as part of the social system) to fully implement the Programme of Measures. Examples are legislative instruments (e.g. conservation laws), regulatory instruments (e.g. bans or permits), economic instruments (e.g. tariffs, taxes and charges), but also instruments involving information, awareness-raising, and public engagement such as training and qualifications (obtaining certificates or proof of qualification) related to environmental protection, public information programs, stakeholder and public participation, and innovation groups that aim to build capacity and knowledge (e.g. about a particular environmental, economic, or practical issue).

THE FIVE STEPS OF SELECTING AN APPROPRIATE EBM RESPONSE

1 Step 1: Understanding your goals

Before taking any action, it is necessary to perform a policy characterisation for the definition of policy objectives and societal goals in the case study area:

- Identification of key threats compromising the achievement of policy and/or societal goals for the protection of biodiversity. A threat typically consists of a list of human activities and the pressures that impacts the ecosystem. This selection should not only reflect the most significant threats, but also their social significance and importance for local actors.
- Identification of relevant policies: Their description can include their objectives, targets, current deficits or gaps (difference between current state/status and policy targets), an inventory of existing management strategies, identification of administrative bodies in charge, scale of implementation, stakeholder groups, and funding.

(see Integrative environmental policy objectives and Mobilising stakeholders for supporting EBM)

2 Step 2: A tailor-made description of the socio-ecological system for management purposes

Using the knowledge developed in understanding the social ecological system (see Linkage Framework, Developing relevant indicators and Scenario development), this step describes of the current status in the case study area, and an understanding of how this will develop in the future under current management plans.

The basis of EBM planning requires a full understanding of the ecological system (including its ecological integrity and biodiversity and the human activities and their pressures which co-produce the services demanded by society) and the social system (in terms of governance and institutions relevant for the achievement of societal goals) (see AQUALINKS tool).

TIP! For practical reasons and to avoid the inherent complexity in understanding each connection in the system, a reduced understanding of ONLY those relevant components and their potential linkages for which adequate knowledge is available is sufficient to scan potential responses.

3 Step 3: Inventory existing management measures and policy instruments

This planning phase commences with an inventory of the existing management measures and policy instruments. These have the advantage that they can be assumed to be without any major issues (e.g. they are technologically feasible, financially viable or politically expedient) and are already embedded in the institutional context. To improve their environmental and social impact, these management measures can then be modified, in terms of:

- **Where** they are implemented – e.g. The Danube case study (see Case Study: Danube) is prioritizing sites for river restoration and conservation. The Intercontinental Biosphere Reserve of the Mediterranean Case Study (see Case Study: Spain/Morocco) proposed alternative zones for Green and Blue Infrastructure.
- The **degree** to which they are implemented - e.g. The North Sea case study (see Case Study: North Sea) evaluated further reducing fishing effort.
- How they can be **extended** with additional measures (e.g. restoration of saltmarshes through re-vegetation in the AQUACROSS case study in the Ria de Aveiro (see Case Study: Ria de Aveiro, Portugal)

4 Step 4: Screening further potential EBM measures

Alternatively there is the possibility to implement novel management options e.g. increase lake water levels in the AQUACROSS case study in Lough Erne (see Case Study: Lough Erne, Ireland), different design of offshore windfarms in the North Sea (see Case Study: North Sea) evaluated or the implementation of cross-boundary management plans (see Case Study: Lake Ringsjön, Sweden).

> **TIP!** Before identified measures can be considered for more detailed evaluation, we recommend pre-screening to determine in advance that the various issues that may prevent the management plan from being implemented are considered. Criteria for the pre-screening of measures can be found in D8.1.

5 Step 5: Selection of Management Strategies for further evaluation

Based on the results of the pre-screening exercise, one or several combinations of measures and policies that will be considered for further evaluation are identified and selected (see Evaluating EBM options). This includes any relevant combinations of policy instruments and measures to achieve the identified societal goals and preserve or restore the resilience and the sustainability of the system consisting of both the ecosystem components and their interactions (i.e., ecological system), but also the governing institutions and markets (i.e., social system).

CASE STUDY EXAMPLE – NORTH SEA

The North Sea case study (see Case Study: North Sea) identified three key objectives: sustainable food supply, clean energy and a healthy marine ecosystem. Understanding of the North Sea social-ecological system was used to construct a simplified matrix of key relationships, and to look ahead and identify key gaps between the expected future (the baseline) and the societal and policy goals. The Case Study selected nine management measures for further evaluation, which included, e.g. marine protected areas, banning fishing in offshore-wind sites, allowing new fishing technology, among others.

← Go to Brief #7: Developing Scenarios	www.aquacross.eu/results	Go to Brief #9: Evaluating EBM →

Further information

This is one of 38 short briefs summarising the key results of the AQUACROSS Project. For more detailed information on the topics covered in this brief, see the following:

- Piet et al. (2017) Making ecosystem-based management operational. Deliverable 8.1, European Union's Horizon 2020 Framework Programme for Research and Innovation grant agreement No. 642317. (Deliverable and Executive Summary)
- Mattheiß et al. (2018) Evaluation of Ecosystem-Based Management Responses in Case Studies. Deliverable 8.2, European Union's Horizon 2020 Framework Programme for Research and Innovation grant agreement No. 642317. (Deliverable and Executive Summary)

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