Coastal water ecosystem services assessment within a Systems Approach Framework

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1. Background

Depending on the precise definition used, coastal zones occupy around 20% of the earth's surface, but host more than 45% of the global population and 75% of the world's largest urban agglomerations (Turner et al., 2014). A "slice" of this percentage is related to transitional water ecosystems, such as coastal lagoons. Coastal and transitional waters are very important ecosystem services and goods suppliers supporting the natural and anthropogenic environment. The Ecosystem Services (ES) concept was majorly explored in Millennium Ecosystem Assessment, defining ecosystem services as "benefits that people take from the environment" (MEA, 2005). Although the concept is being more explored its application is so far generally focused on terrestrial ecosystems, leaving the marine environment "aside". Ecosystem Services research follow now the objective of integrating it into a multidisciplinary approach for management and policy matters.

3. Systems Approach Framework (SAF)

- **SAF** is an issue oriented investigation and methodology that applies a holistic perspective. It investigates and quantifies the functions of systems in order to simulate specific questions concerning their functions or policies.
- The approach includes a scientific (ecological, social and economic) evaluation divided into 5 steps, but **BaltCoast** will further develop a new step, the **Implementation** of SAF results into management and EU policies.
- The **ESAT** will be introduced in the SAF loop in early stage, assessing and mapping ecosystem services in the selected case studies and re-analysis studies.

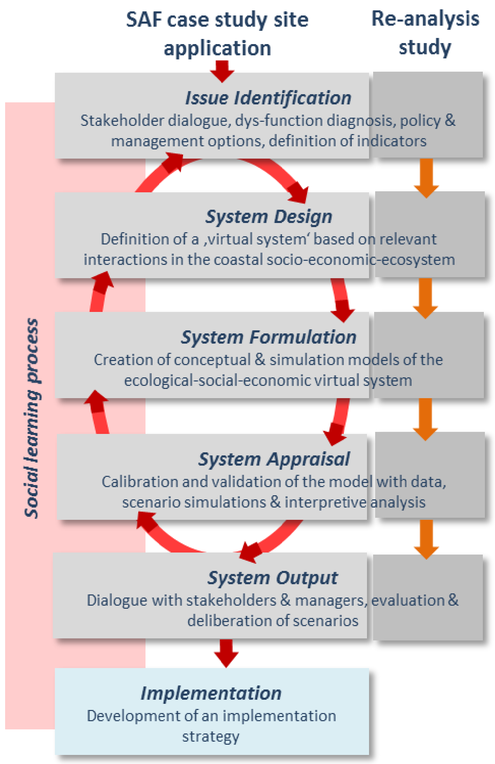

Figure 2: SAF methodology within BaltCoast Project

2. Ecosystem Services Assessment Tool (ESAT)

Description:

- The tool is tailored for application in marine environment, specifically coastal lagoons, and later coastal waters;
- Follows the latest accepted classification CICES dividing the services into providing, regulating & maintenance and cultural ecosystem services; and "The Matrix" approach developed by Burkhard (2012), together with EU Policies;
- The development of the tool is based on a user friendly application, using and easy to work Excel sheet interface;
- The tool will be developed in a hierarchical way comprising three categories: Spatial scale, ES division and Type of data to be used;

Objectives:

- Bridge the gap of ES assessments for marine environment;
- Provide a user friendly and easy to apply tool;
- Give flexibility for the user on how the application will be made, in terms of spatial scale, hierarchical division, and type of data used;

End-Users:

- Researchers from the field of natural, social and economic sciences;
- Stakeholders and decision making groups;
- Municipalities and governance groups;
- Master Students working on their theses:

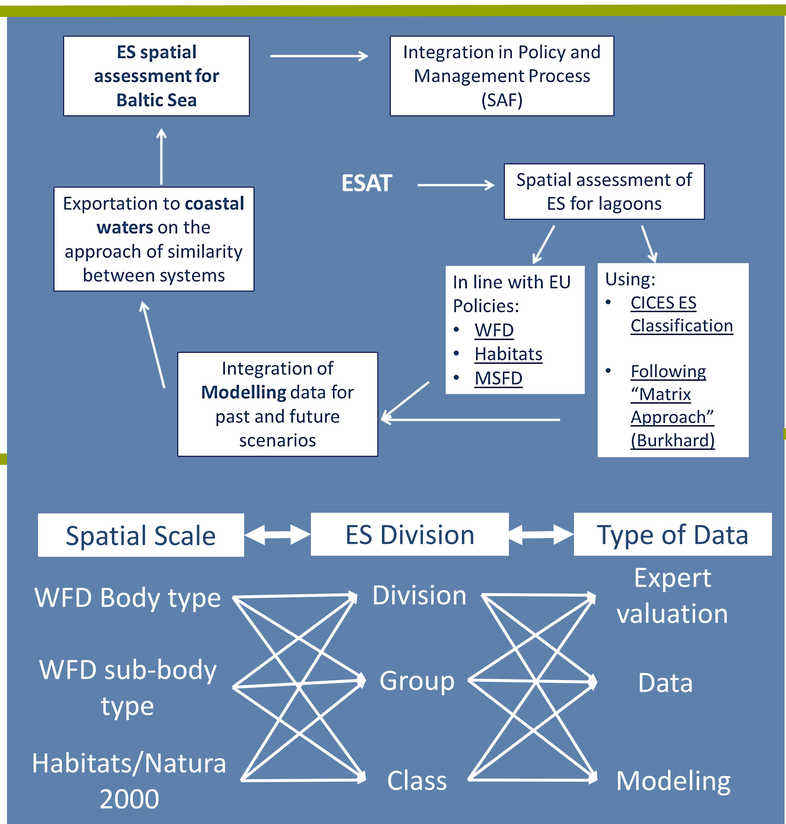

Figure 1: Down: Categories within ESAT. Up: Work Flow Scheme, from the development of the tool until its integration into SAF

Outputs within BaltCoast:

- Assessment and mapping of ES for the study sites;
- ES relative change from past and future scenarios using modelling data;
- Integration into SAF loop for an integrative view of system;
- Integrate the assessment (and possibly tool) into policy and management;

Future Work:

- The tool is to be tested in selected case studies in BaltCoast;
- Application of the tool into ongoing management projects;
- **Attract Master Students and other volunteers to test and apply the tool;**

WP1	**WP2**	WP3	WP4	WP5	**WP6**	WP7
Management & end-users	**SAF development**	Socio-economics & scenarios of change	ICM re-analysis studies	SAF-application & case study sites	**Tools & science-policy integration**	Dissemination, training & network

4. BaltCoast Project

BaltCoast is the acronym for a new Baltic ICM Project called **"A systems Approach Framework for Coastal Research and Management in the Baltic"** and is divided into 7 Work Packages. The objective is to develop a coherent and systematic management approach that encompasses multiple impacts in a spatially heterogeneous context, by using SAF as a tool. SAF will be applied in 6 local coastal case studies and in at least 15 in-depth retrospective analysis case.
More information can be found in project's website: **www.baltcoast.net**

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