Sustainability indicators to support Coastal and Marine Management (SAF): Tool & Examples

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A SYSTEM APPROACH FRAMEWORK FOR COASTAL RESEARCH & MANAGEMENT

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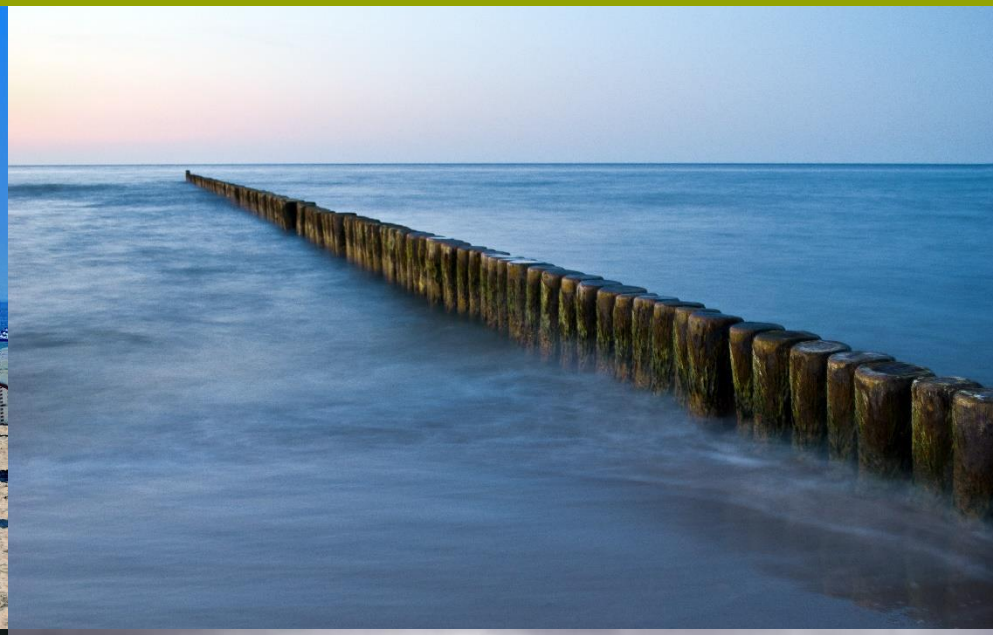
Outline

- Introduction
- Sustainability indicators background
- Challenges and Motivation
- Objectives and Study method
- Indicator-based ICZM Evaluation Tool
- Examples and Application results
- Conclusions and Future steps
- Exercise
- Discussion

Our costal zones



Our costal zones

Why is sustainable management needed?

ICZM & MSP requirements

- **2002** - **“Recommendation concerning the implementation of Integrated Coastal Zone Management in Europe”** (2002/413/EC)

- **On 23 July 2014** the European Parliament and the European Council adopted the new **European directive on Maritime Spatial Planning (MSP)** – (Directive 2014/89/EU), establishing a framework for maritime spatial planning and integrated coastal management

- Maritime spatial planning will contribute to the effective management of marine activities and the **sustainable use of marine and coastal resources**

- **ICZM principles are included in Maritime Spatial Planning**

Land and sea interactions

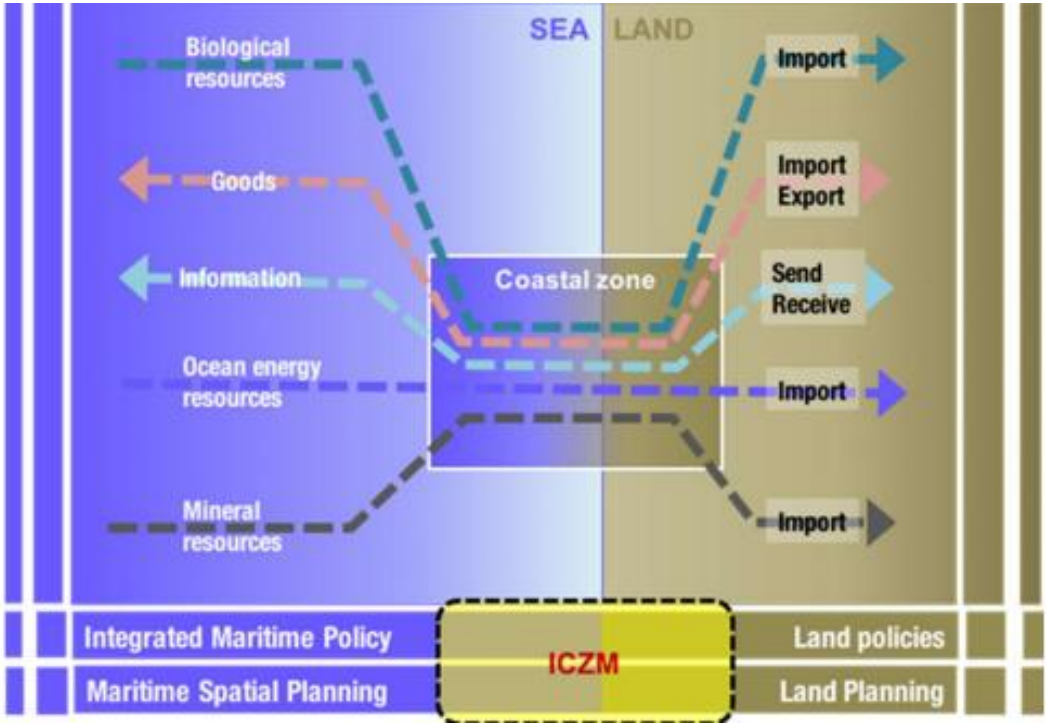


Fig. 1 Coastal zone – a key area for most maritime activities
Source: Chr. Le Visage. Dalyan/ MEDCOAST 2016

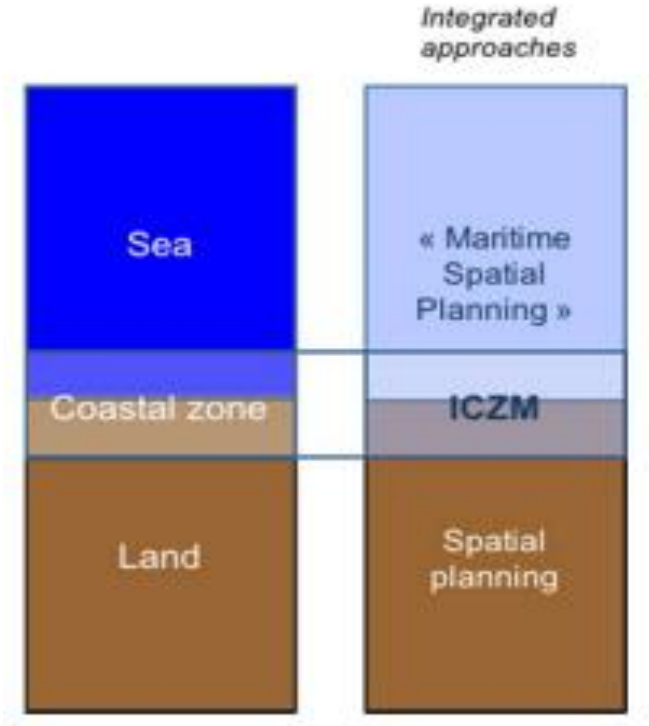


Fig. 2 Role of ICZM in the planning system
Source: Chr. Le Visage,Rennes, 2011

- **ICZM in practice:** the lack of a systematic, stepwise, user-friendly approach/tool with high practical relevance that guides through a **full ICZM process cycle**

- What about **Maritime Spatial Planning (MSP)?..**

Systems Approach Framework (SAF) approach could help to avoid it?

- **The SAF refines the ICZM/MSP cycle and makes it applicable**
- The Systems Approach Framework **provides a stepwise systematic** approach for ICZM/MSP process

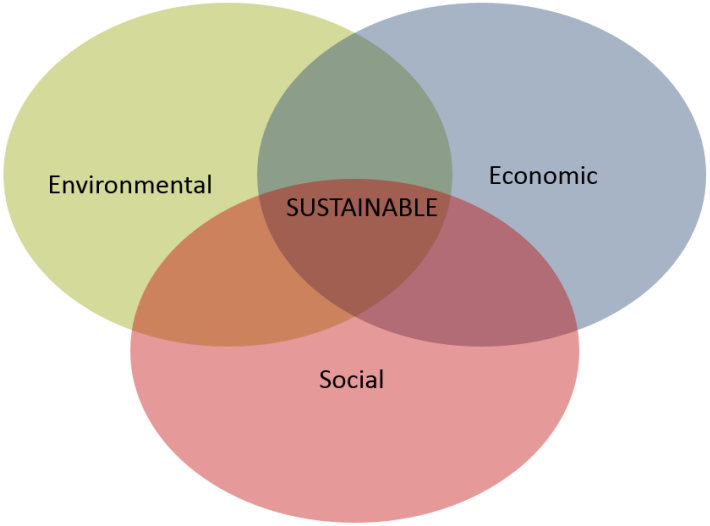
There is a gap..

- But there is still lack of **supporting tools** that enable **an easy and relatively fast** application process of **sustainable measures**

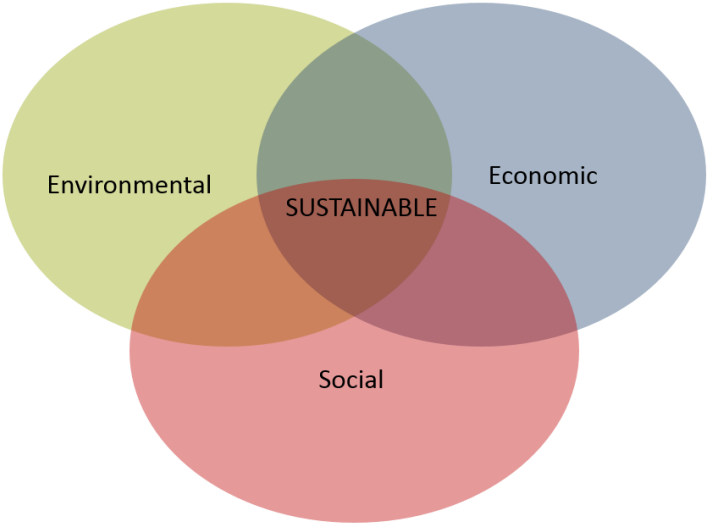
  - Can **sustainability** be achieved?
  - Is it measurable?
  - What is the “way” to do it?

Why indicators?

Where are you?



How far you are from where you want to be?



Which way you are going?

Indicators in the context of ICZM

- 1990s – „need for common methodologies for learning from the rapidly accumulating experience in the practice of coastal management worldwide" (Olsen at al. 1999)
- **Manual for Assessing Progress in Coastal Management** (Olsen at al. 1999)
- **A recommendation for the implementation of ICZM in Europe was adopted** (European Council and Parliament 2002)
- **The EU ICZM Expert Group established a Working Group on Indicators and Data** (WG-ID 2004; Pickaver et al. 2004)
- Progress indicators were tested – **COREPOINT**
- Sustainable development indicators – **DEDUCE** (DEDUCE Consortium 2007)
- **Handbook for Measuring the Progress and Outcomes of Integrated Coastal and Ocean Management** was established (IOC, UNESCO 2006)
- European INTERREG-IVC-Project **SUSTAIN – created fully implementable policy tool to measure sustainability** (SUSTAIN Partnership, 2012a)
- **QualityCoast program –** award for sustainable destinations (EUCC & ECNC, 2014)

Progress indicators

- A new model indicator set to measure the progress in the implementation of integrated coastal zone management (ICZM)
- 26 indicators

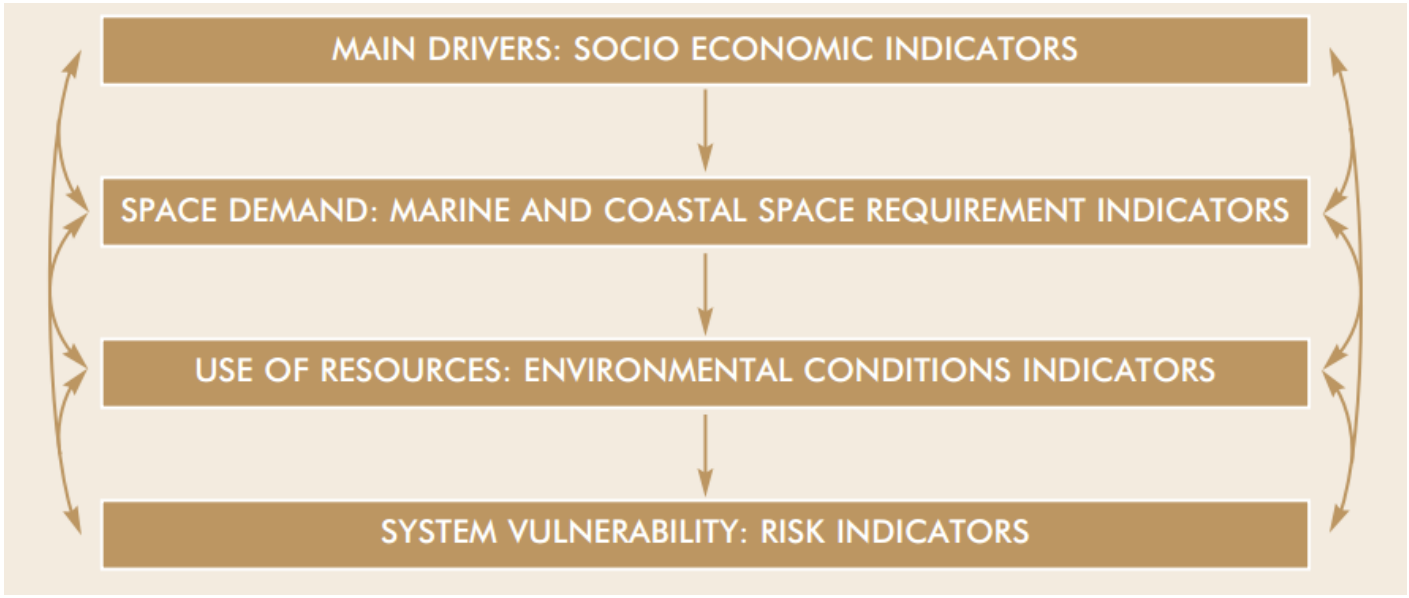
Phase	Action	Description	National		Regional		Local	
			1995	2000	1995	2000	1995	2000
I. Laying the basis for ICZM	1	Aspects of coastal management are taking place.	Yes	Yes	Yes	Yes	Yes	Yes
	2	Decisions about planning and management on the coast are governed by general legal instruments.	No	Yes	No	Yes	No	Yes
	3	Aspects of the coastal zone, including marine areas, are regularly and routinely monitored.	No	Yes	Yes	Yes	Yes	Yes
	4	Planning on the coast includes the provision, where appropriate, for the protection of natural areas.	No	Yes	Yes	Yes	Yes	Yes
	5	Funding is generally available for the implementation of coastal management plans.	No	No	No	No	No	No
II: A framework for ICZM exists	6	Existing instruments are being adapted and combined to deal with planning and management issues on the coast.	No	No	No	No	No	No
	7	Ad hoc demonstration projects are being carried out that contain recognisable elements of ICZM.	No	Yes	No	Yes	No	Yes

(Pickaver et al, 2004)

DEDUCE project

- **Progress indicators** – An indicator set to measure the progress of the implementation of ICZM (tested during COREPOINT project)

- Indicators of Sustainable Development – A core set of **27 indicators**, composed of **46 measurements**, to monitor sustainable development of the coastal zone



Interactions and cause/effect relationships in the coastal zone (DEDUCE, 2007)

SD indicators proposed by the WG-ID

GOALS	INDICATORS	MEASUREMENTS
To control further development of the undeveloped coast as appropriate.	1. DEMAND FOR PROPERTY ON THE COAST	1.1. Size, density and proportion of the population living on the coast
		1.2. Value of residential property
	2. AREA OF BUILT-UP LAND	2.1. Percentage of built-up land by distance from the coastline
	3. RATE OF DEVELOPMENT OF PREVIOUSLY UNDEVELOPED LAND	3.1. Area converted from non-developed to devel oped land uses
	4. DEMAND FOR ROAD TRAVEL ON THE COAST	4.1. Volume of traffic on coastal motorways and major roads
	5. PRESSURE FOR COASTAL AND MARINE RECREATION	5.1. Number of berths and moorings for recreational boating
	6. LAND TAKEN UP BY INTENSIVE AGRICULTURE	6.1. Proportion of agricultural land farmed intensively
To protect, enhance and celebrate natural and cultural diversity.	7. AMOUNT OF SEMI-NATURAL HABITAT	7.1. Area of semi-natural habitat
	8. AREA OF LAND AND SEA PROTECTED BY STATUTORY DESIGNATIONS	8.1. Area protected for nature conservation, land scape and heritage
	9. EFFECTIVE MANAGEMENT OF DESIGNATED SITES	9.1. Rate of loss of or damage to, protected areas
	10. CHANGE IN SIGNIFICANCE COASTAL AND MARINE HABITATS AND SPECIES	10.1. Status and trend of specified habitats and species
		10.2. Number of species per habitat type

(DEDUCE, 2007)

Integrated Coastal and Ocean Management

- **Handbook published by UNESCO** aims to contribute to the sustainable development of coastal and marine areas by promoting a more outcome-oriented, accountable and adaptive approach to ICOM
- ICOM is based on several principles, with sustainable development being the overarching principle

Goals	Functions
Area planning	• Plan for present and future uses of ocean and coastal areas • Provide a long-term vision
Promotion of economic development	• Promote appropriate uses of ocean and coastal areas (e.g., marine aquaculture, ecotourism)
Stewardship of resources	• Protect the ecological base of ocean and coastal areas • Preserve biological diversity • Ensure sustainability of uses
Conflict resolution	• Harmonize and balance existing/potential uses • Address conflicts among ocean and coastal uses
Protection of public safety	• Protect public safety in ocean and coastal areas typically prone to significant natural, as well as human-induced, hazards
Proprietorship of public submerged lands and waters	• As governments are often outright owners of specific ocean and coastal areas, manage government-held areas and resources wisely and with good economic returns to the public

- Governance performance indicators
- Ecological indicators
- Socioeconomic indicators

(Belfiore et al, 2006)

Measuring sustainable coastal development

The SUSTAIN policy tool

DeCyDe-for-Sustainability

- Methodology to measure and promote sustainable development in coastal municipalities
- Develop a tool with high practical value for coastal municipalities to evaluate their sustainability performance
- User-friendly, spreadsheet-based decision support tool
- Two step method
  - Indicator assessment to evaluate sustainability performance
  - Weighting exercise

(SUSTAIN, 2012)

DeCyDe-for-Sustainability

Pillar →

Issues →

Economics

1. Economic Opportunity
2. Fisheries & Aquaculture
3. Land Use
4. Tourism
5. Transportation

Environmental Quality

6. Biodiversity, Natural Resources & Process Management
7. Energy & Climate Change incl. Waste Management
8. Fisheries and Aquaculture
9. Land Use
10. Water Resources & Environmental Pollution

Social

14. Public Health and Safety
15. Local and cultural Identity
16. Education and training
17. Equity
18. Demography

Governance

19. Policies/ strategies for sustainability
20. Monitoring tools for sustainability
21. Human resources capacity building
22. Implementation of good management practices
23. Stakeholder involvement/ public participation

SUSTAIN

(SUSTAIN, 2012)

SUSTAIN approach

Choice of **core** and **optional** indicators for all issues of the 4 pillars (Governance, Social, Economy, Ecology) to allow comparisons across regions and to reflect specific local situations.

Indicator application: Data search and numerical scoring of indicators, aggregation of indicator scores to issue and pillar scores.

Moderated stakeholder exercise to self-determine the relevant importance of the Issues and Pillars, based on matrices.

Combination of the indicator application results with the weighting matrices. Visualization of the state of sustainability.

Use of the system as a decision-support tool for policy options.

(SUSTAIN, 2012)

QualityCoast label

- International certification program for **sustainable tourism destinations**
- Developed for **coastal municipalities**
- Certification is based on a set of **(core and optional)** indicators that cover similar aspects as the SUSTAIN indicator set

(QualityCoast, 2015)

EUC Coastal Union

Comparison of SUSTAIN and QualityCoast categories

(Schernewski et al., 2014)

Challenges and Motivation

- There is **no commonly agreed set of indicators** that can be used to measure sustainability
- **Limited ability to measure progress and success** of ICZM/MSP initiatives
- **Poor practical relevance** of ICZM and sustainability indicators
- **Low level of reproducibility and comparability**

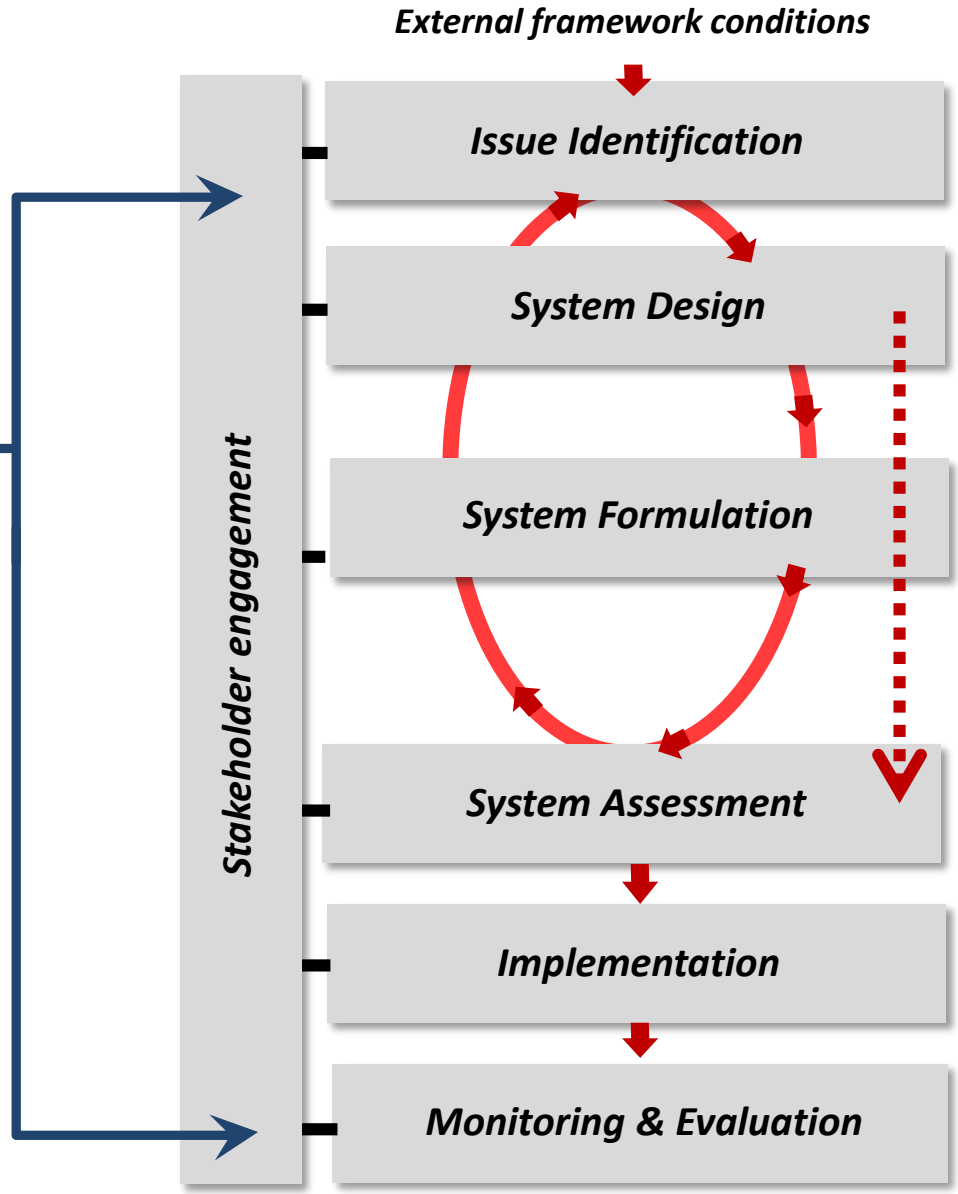
But…

- **Important to raise awareness** about coastal sustainability
- The need of developing frameworks and methods that will **assist formal reporting** of ICZM effort
- Indicators are tool **to improve implementation** and monitoring processes, and they play an **important role in ICZM/MSP**

Systems Approach Framework (SAF)

Our objectives are to:

- measure the **current state of sustainability**
- assess the **success** of ICM/MSP/SAF applications
- **to monitor the progress**

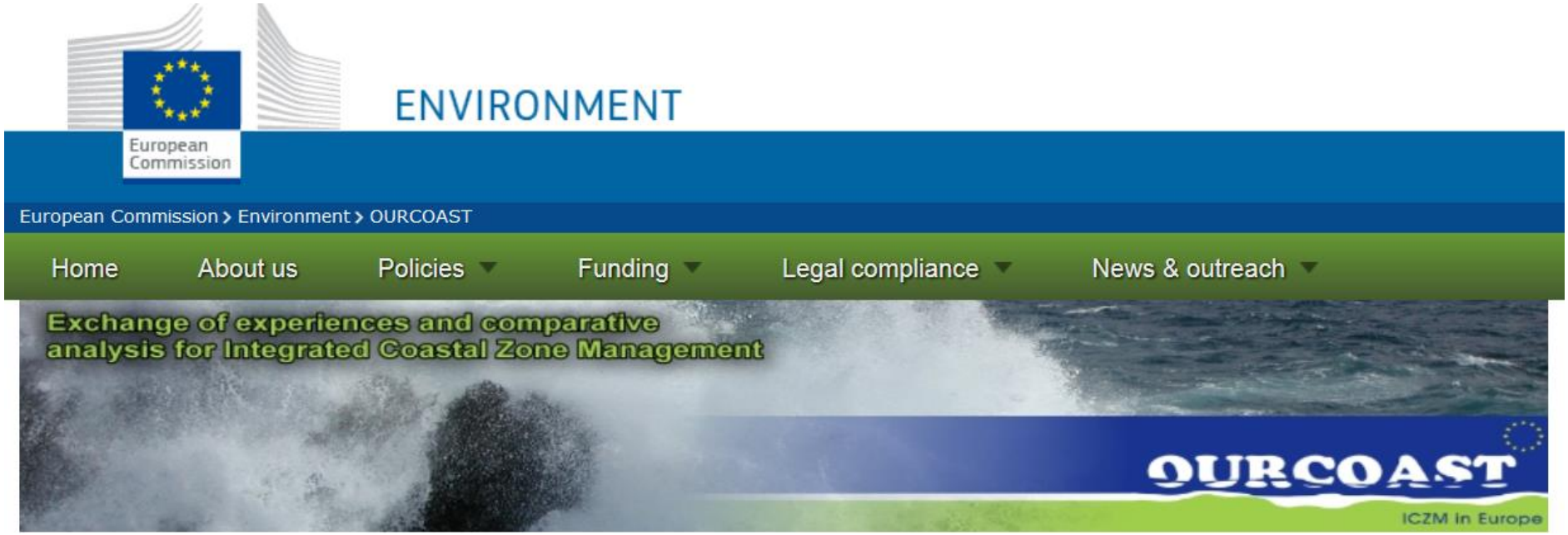


BONUS BaltCoast

www.baltcoast.net

ICZM experiences

>350 best-practice examples of coastal management



…but **are they really good examples?**

Can we learn from it?

Do they help practitioners/desicion makers?

http://ec.europa.eu/ourcoast/

Objectives

- To develop a tailor-made set of indicators suitable to **evaluate** the **success** and **progress** of **ICZM best practices**
- to provide the **indicator-based spreadsheet tool**
- to apply the indicator set to **18 contrasting study sites**
- to identify **strengths** and **weaknesses** of different ICZM measures
- to **analyse the role of different evaluators** and their perception, background and required time for applications
- to discuss **benefits** and **limitations** of the indicator set and the tool

The first try – development of an indicator set

DEDUCE SUSTAIN QualityCoast

- **The new indicator set:**
  - 4 categories
  - 20 criteria
  - 92 indicators
- **Workshop** on WP6 tools – project meeting (Riga), July 2015
- **Feedback** from project partners and advisor board, June 2015
- **Testing** the tool at ICZM course, September 2015 (Lithuania)

ENVIRONMENTAL QUALITY	Pollution
	Water Resource Management
	Blue Flags & Beaches
	Sustainable Mobility
	Waste Management & Recycling
	Energy & Climate Mitigation
	Changes at the Coast & Adaptation
	Biodiversity & Nature Protection
ECONOMICS	Economic Opportunity
	Business & Tourism
	Hospitality & Satisfaction
SOCIAL WELL-BEING	Local Identity & Tradition
	Freedom & Justice
	Public Health & Safety
GOVERNANCE	Policies/Strategies for Sustainability
	Monitoring Tools for Sustainability
	Human Resources Capacity Building
	Implementation of Good Management Practices
	Stakeholder Involvement & Public Participation

Limited ability to measure the **progress** and **success** of ICZM initiatives

Lead us to the new study method..

Review of existing indicator-based assessment methodologies

Progress indicators by Pickaver et al.

Thematic criteria
- Relevance to ICZM and sustainability
- Indicator robustness
- Suitable to measure
- changes

Technical criteria
- Availability of data
- Quality of datasets
- Ability to be scored

Indicator selection process based on criteria and checklist creation

Pre-assessment using the checklist and analysis of results

Desk-review, discussion, revision and creation of tailor-made indicators

Creation of ICZM best practice evaluation tool including final indicator set

The process of developing Indicators Set that are tailored to evaluate **progress** and **success** of ICZM initiative

Indicator-based ICZM Evaluation Tool (1)

- **What is new?**
- 4 categories
- 45 indicators
- 2 scoring ranges

Air, water and land pollution, biodiversity and resources management, change at the coast, energy and climate change etc.

Economic opportunity, economic performance, energy and climate change

Equity, education and training, local and cultural identity

Management (policies, guidance, processes and decisions) – **following of SAF steps**

Indicator-based ICZM Evaluation Tool (2)

- **Where can you find it?**
- www.baltcoast.net → Tools & Integration → Evaluation Tool

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW

AB53

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INDICATOR-BASED ICZM 'BEST-PRACTICE' EVALUATION TOOL

The Tool is designed to evaluate the success of different Integrated Coastal Zone Management (ICZM) initiatives from sustainability point of view (environmental quality, economics, social well-being, governance).

Please identify the best-practice example of ICZM for the application: ICZM best-practice
Please identify the area of application (provide the map and pictures).

EXPLANATORY NOTE: Please follow the arrows (→)

→ The indicator set consists of a set of **45 indicators** that are grouped into the four categories **Environmental Quality (13), Economics (9), Social Well-Being (9)** and **Governance (Process Indicators) (14)**.

→ **Environmental Quality, Economics, Social Well-Being** indicators needs to be scored on a scale from -3 to 3 (see scoring scale below).

-3	-2	-1	0	1	2	3
Negative effects			No changes			Positive effects

→ Only one score can be given for each indicator. Please read the brief description that is provided for each indicator carefully. Please choose the most suitable answer and indicate it by typing the corresponding number in the white field below (see example below).

		No, strong negative effects	No, considerable negative effects	No, weak negative effects	No changes	Yes, weak positive effects	Yes, considerable positive effects	Yes, strong postive effects	No Data
1. The best-practice reduces environmental risks and prevents air, water and soil pollution	Please indicate on a scale from -3 to 3 and clarify with examples	-3	-2	-1	0	1	2	3	X
								3	
2. The best-practice improves the status of water (ecological and chemical)	Please indicate on a scale from -3 to 3 and clarify with examples	-3	-2	-1	0	1	2	3	X
					0				
3. The best-practice supports policy and system to conserve key natural sites (including marine and nature scenic, cultural, and wild landscapes)	Please indicate on a scale from -3 to 3 and clarify with examples	-3	-2	-1	0	1	2	3	X
			-2						

→ **Governance (Process) Indicators** needs to be scored on scale from 0 to 4 (see example below).

		No, not at all	Yes, slightly	Yes, moderately	Yes	Yes, fully	No Data
1. A management team with broad competences and sufficient representation was built to lead the planning process	Please indicate on a scale from 0 to 4 and clarify with examples	0	1	2	3	4	X
						4	

Please upload the map of the area and pictures in this box:

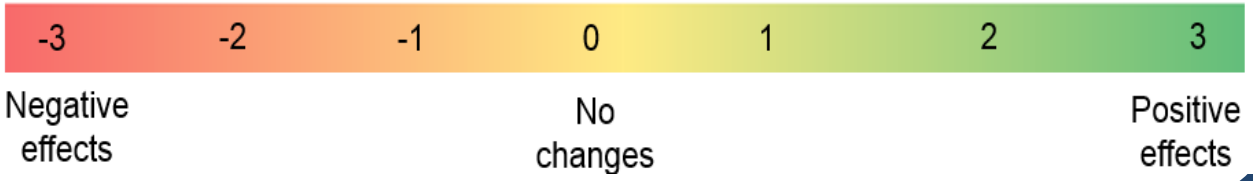
Fig. 1: Abbots Hall Farm/ Blackwater Estuary (source: OpenStreetMap, july 2016)

Fig. 2: Aerial view of Abbotts Hall (source: ComCoast flood risk management schemes - Final report, september 2007)

Scoring ranges

Sustainability Indicators

6. The best-practice supports natural habitats, biodiversity and their quality	Please indicate on a scale from -3 to 3 and clarify with examples	No, strong negative effects	No, considerable negative effects	No, weak negative effects	No changes	Yes, weak positive effects	Yes, considerable positive effects	Yes, strong postive effects
		-3	-2	-1	0	1	2	3
			-2					



Governance (Process) Indicators

6. Different alternative scenarios were simulated and results discussed with stakeholders	Please indicate on a scale from 0 to 4 and clarify with examples	No, not at all	Yes, slightly	Yes, moderately	Yes	Yes, fully
		0	1	2	3	4
						4

The scoring of Indicators

1. To find data relating to the indicators
2. To score the indicators based upon the data

INDICATOR	DESCRIPTION	SCORING RANGES								INDICATOR SCORE
1. The best-practice effects financial policies and instruments to support economic stability and resilience	Please indicate on a scale from -3 to 3 and clarify with examples	No, strong negative effects	No, considerable negative effects	No, weak negative effects	No changes	Yes, weak positive effects	Yes, considerable positive effects	Yes, strong postive effects	No Data	1.50
		-3	-2	-1	0	1	2	3	X	
						1				
2. The best-practice increases economic diversification	Please indicate on a scale from -3 to 3 and clarify with examples	No, strong negative effects	No, considerable negative effects	No, weak negative effects	No changes	Yes, weak positive effects	Yes, considerable positive effects	Yes, strong postive effects	No Data	
		-3	-2	-1	0	1	2	3	X	
					0					
3. The best-practice ensures an acceptable employment and training opportunities for local residents	Please indicate on a scale from -3 to 3 and clarify with examples	No, strong negative effects	No, considerable negative effects	No, weak negative effects	No changes	Yes, weak positive effects	Yes, considerable positive effects	Yes, strong postive effects	No Data	
		-3	-2	-1	0	1	2	3	X	
							2			
4. The best-practice increases payments and investments in coastal management	Please indicate on a scale from -3 to 3 and clarify with examples	No, strong negative effects	No, considerable negative effects	No, weak negative effects	No changes	Yes, weak positive effects	Yes, considerable positive effects	Yes, strong postive effects	No Data	
		-3	-2	-1	0	1	2	3	X	
								3		

The score is indicated by the scoring bar under the scoring ranges

If no data is available, then need 'X' needs to be typed under the "No data" cell

The total indicator score will be automatically calculated

To fill in specification for each answered indicator in "Comments" cell

Study sites of in-depth analysis

(a) Geltinger Birk
(b) Timmendorf
(c) Markgrafenheide
(d) Klaipeda
(e) Rusne
(f) Western Finland
(g) Southwest Finland

- applications carried out by **experts**
- **no restricted time**

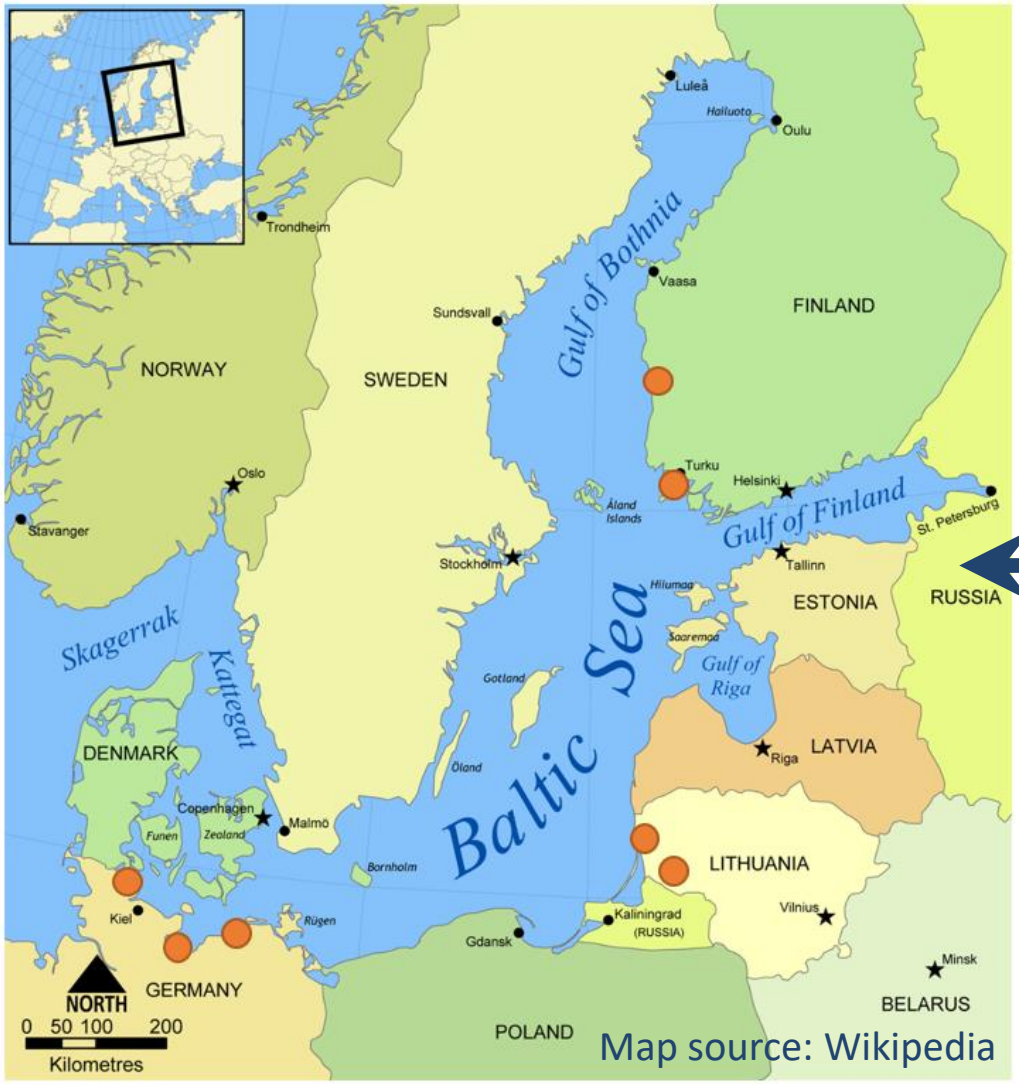
(Karnauskaite et al., submitted)

Study sites: fast screening method

- **3 repeated & 14 applications**
- Abbott's Hall - **4 evaluators with different backgrounds**
- Time limit **12-16 hours**
- **Non-experts** (Karnauskaite et al., submitted)

(1) Geltinger Birk, (2) Timmendorf, (3) Markgrafenheide, (4) Gotland, (5) Ystad, (6) Køge Bay, (7) Tryggelev Nor, (8) Odense, (9) Rotterdam, (10) Perkpolder, (11) Coastline: Weybourne to Lowestoft, (12) Abbott's Hall, (13) Horsey Islnad, (14) Inch Beach, Co. Kerry

Applying indicators to ICM “best-practice” studies



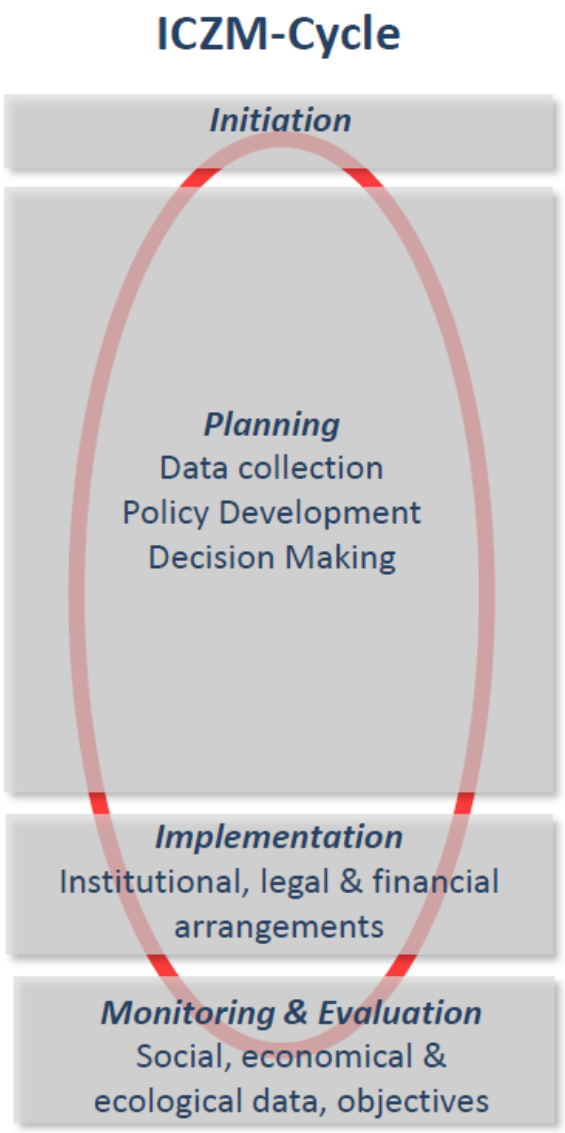
Map source: Wikipedia

- Are indicators reflecting the measure?
- are they really best practice examples?

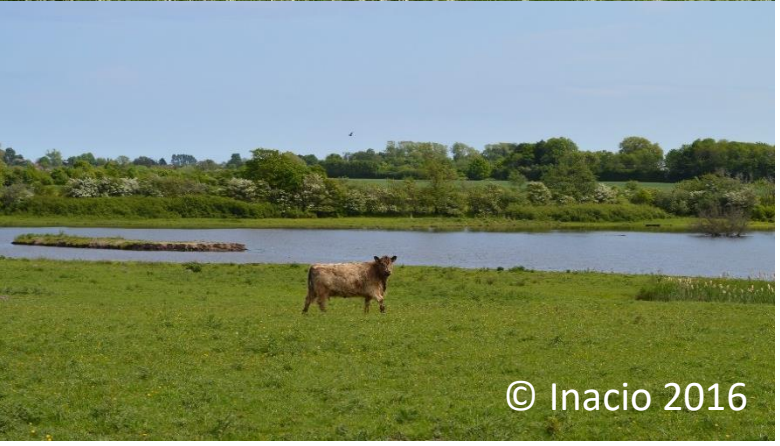
- **Adaptation to risk**
- **Sustainable use of resources**
- **Sustainable economic growth**

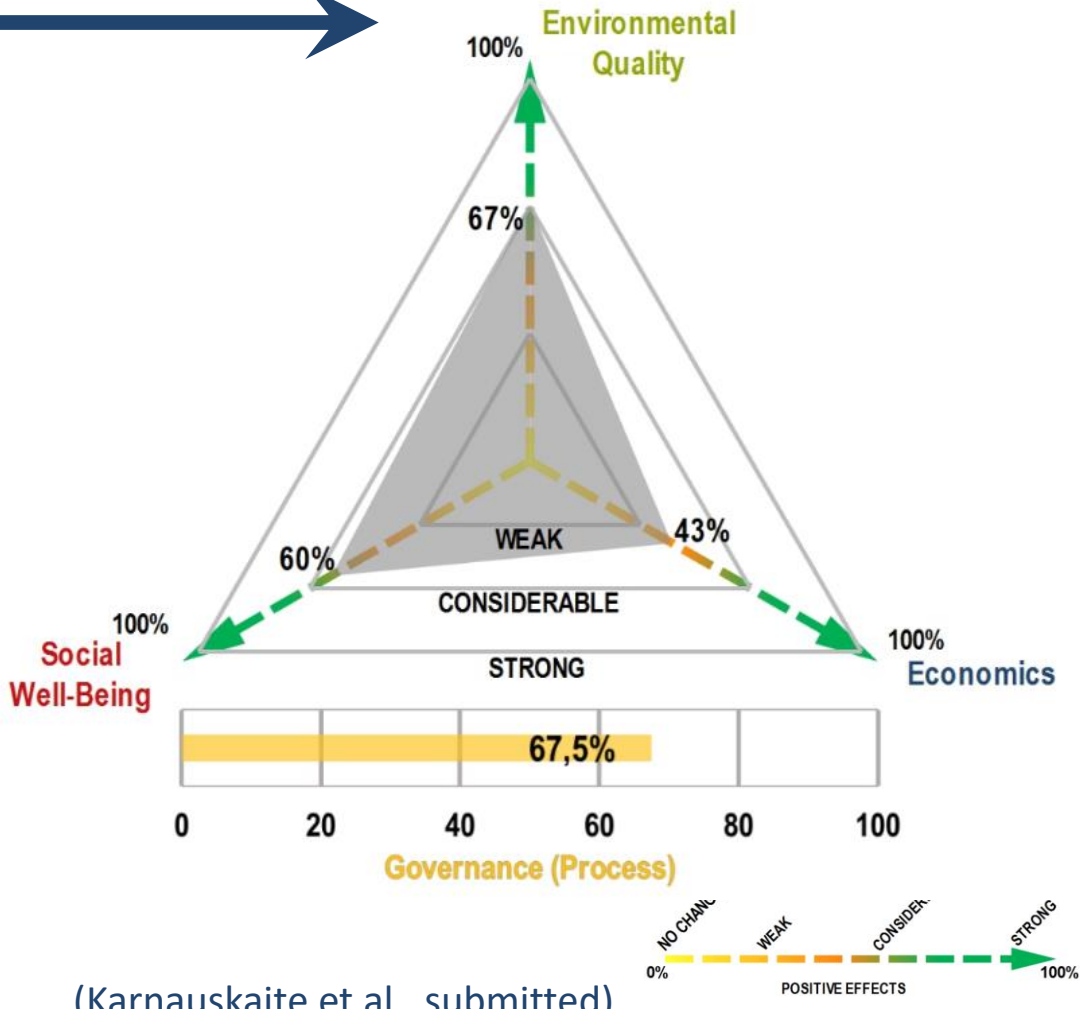
Results – Strength and weaknesses of ICZM studies

- The evaluation **covered the full cycle of ICZM**
- revealed to **which extent targets** and objectives **towards sustainable development** have been met
- The tool was helpful to evaluate if a study can be defined as **best practice**
- **different characteristics** and some study sites have more impact on a **social level**, some have a greater impact of **environment** and, others indicating greater investment in **economy**



Coastal realignment and wetland restoration in Geltinger Birk (Germany)



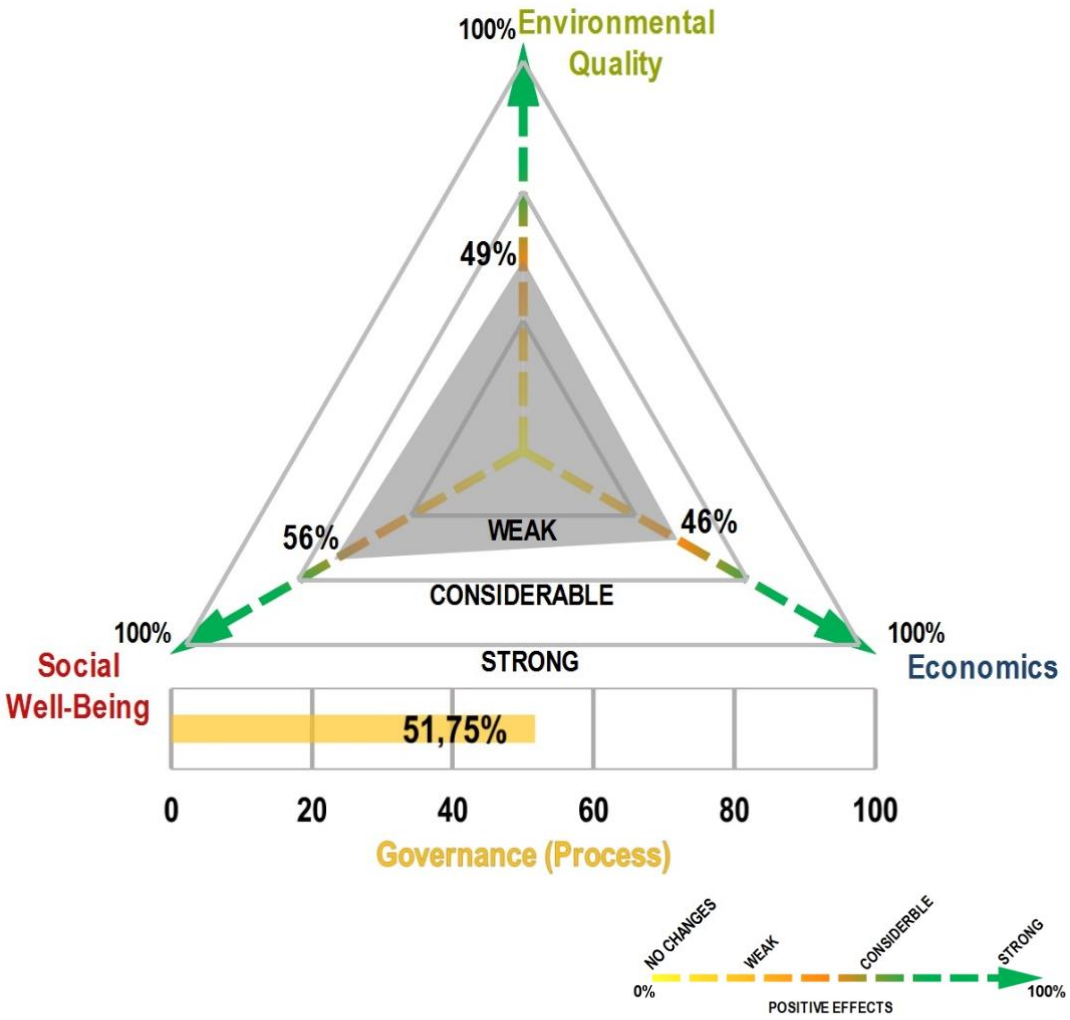


(Karnauskaite et al., submitted)

Restoration of important habitats through sustainable agricultural practices, Rusne (Lithuania) (1)

- Beginning of the 90‘s, almost **all grasslands were abandoned**
- They became **overgrown with scrub and reeds**
- **Unsuitable as feeding and breeding habitat** for most of the birds
- **Low agriculture** activity was followed by degradation of grasslands
- The dual purpose **was to improve the local economy and make the grasslands more suitable for breeding and migratory birds**
- Other objectives **were to promote environmental/ecological education** within the local population;
- and **to develop ecotourism**

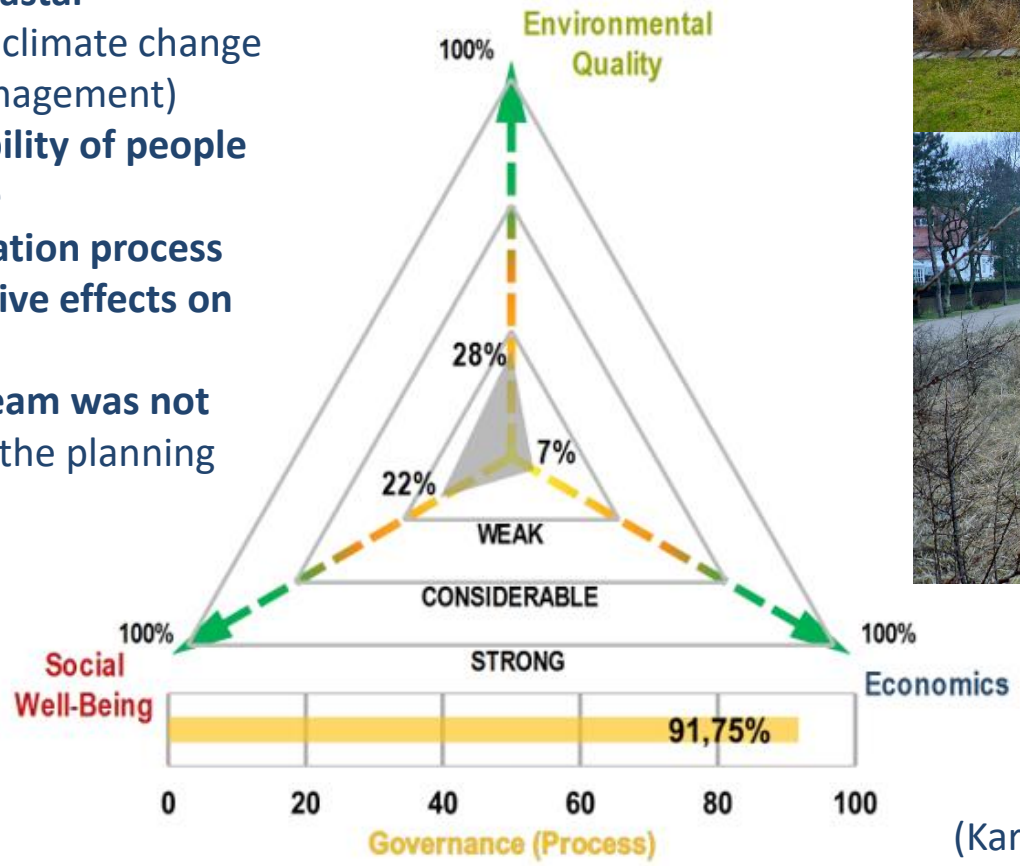
Restoration of important habitats through sustainable agricultural practices, Rusne (Lithuania) (2)



(Karnauskaite et al., submitted)

Public Participation in Integrated Flood Risk Management in Timmendorf (Germany)

- **Promotes flood prevention**, protection and mitigation
- Increases the resilience and **reduces vulnerability to climate change impacts**
- Increases payments and **investments in coastal management** (on climate change and flood risk management)
- **Reduces vulnerability of people to climate change**
- **Good implementation process**
- Some weak **negative effects on tourism**
- **A management team was not fully built** to lead the planning process



(Karnauskaite et al., submitted)

Fast screening vs analysis in-depth results

- Results **strongly differ**
- Key words: '**public participation**' and '**development strategy**'
- The success of ICZM process - the effective operation between the **public and authorities**

- **stakeholder groups** were involved from the **very beginning** of the planning process, **were successful**
- Some **data is not obtainable** for a screened evaluation – **expert consultation is needed**

(Karnauskaite et al., submitted)

Conclusions

- **An easy to apply and user-friendly** tool
- Provides **relevant and fast results** for evaluation and monitoring
- measure **changes** in the state of **sustainability**
- helps to identify **strengths** and **weaknesses** of ICZM best-practices
- Compared with the in-depth method, showed different results but the **same direction** as improved sustainability and achieved positive changes in respect to sustainable development

Next Steps..?

(MarketingTech, 2016)

On-going and Future Steps

- Further **development** of the tool
- **Tailor** indicators to the needs for different ICZM/MSP measures/plans
- **Splitting** of indicators into **core** and **optional (qualitative & quantitative)**
- More **testing** and **applying** for wider spectrum case studies with hyphothetical scenarios
- **Connection** with Ecosystem Services indicators

Thank you for your attention!

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