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First steps towards an implementation of coastal management: From theory to regional practise

Abstract

The European Integrated Project “Science and Policy Integration for Coastal Systems Assessment” (SPICOSA) started in 2007 with the aim to develop a self-evolving, holistic research approach for integrated assessment of Coastal Systems. Aim is to support the implementation of Integrated Coastal Zone Management (ICZM) policies. The result is a series of manuals containing guidelines. Our objective was to apply these guidelines in the Oder/Odra estuary region and to critically reflect the outcome and our regional experiences. The approach is problem “Policy Issue” oriented and provides guidance how to approach a coastal problem. The application in the Oder/Odra estuary region was useful, clarified the joint understanding of specific coastal problems and the way how to come to a solution. The guidelines helped us to structure the existing ideas, motivated discussions and lead to useful visualizations. In detail, the approach still has several short-comings. However, the SPICOSA methodology can serve as a background for German guidelines, but has to be modified.

Keywords: Stettiner Haff, Szczecin lagoon, Odra river basin, IKZM-Oder, Baltic Sea, Water Framework Directive

1 Introduction

During the last decade Integrated Coastal Zone Management (ICZM) became a major issue of European policy. In the Recommendation of the European Parliament and of the Council concerning the implementation of Integrated Coastal Zone Management in Europe of 30 May 2002 (2002/413/EC) it is stated that coastal zones are of strategic importance to the European Union because they are home to a large percentage of European citizens, a major source of food and raw materials, a vital link for transport and trade, the location of some of our most valuable habitats, and the favoured destination for leisure time. However, the attractiveness of coastal zones is under increasing pressure: coastal resources are depleted beyond their carrying capacity, scarcity of space leads to conflicts between uses, there are large seasonal variations in population and employment, and the natural ecosystems that support the coastal zones suffer degradation. The coastal areas are particularly exposed to risks, aggravated by the possible impacts of climate change”

(2002/413/EC). Against this background, the EU ICZM Recommendation calls for a strategic approach to coastal zone planning and management in order to achieve sustainable development.

The European Recommendations for ICZM initiated many national ICZM reports and strategies. These national strategies are an important step forward and serve as a framework to promote a spatially and temporal integrated, interdisciplinary coastal management across the administrative borders and across hierarchic levels. However, in a report to the European Parliament, the Commission evaluated the national strategies for ICZM in Europe (COM/2007/0308) and outlined several short-comings. One of the most important critique is that the national ICZM reports provide only limited indications of effective ICZM implementation mechanisms. This is true for Germany, as well. The German report and national strategy (BMU 2006) is not legally binding, does not create adapted administrative structures, and clear responsibilities for ICZM are lacking. Further, it does not provide guidelines how to establish, to support and to maintain regional ICZM Initiatives.

We can summarize that a framework for ICZM exists, but it has no practical consequences for regional ICZM initiatives. In Germany, spatial planning already covers many ICZM aspects. Regional bottom-up initiatives, involving a large number of stakeholders actively, are not common. However, in some cases ICZM initiatives might be useful. Therefore, the question is how to establish a regional ICZM initiative. Of course, initiatives can utilize the vast amount of available literature, handbooks and guidelines (etc. CICAN-SAIN 1998; OLSEN & TOBEY 1998; OLSEN 2002; PERNETTA & ELDER 1993; POST & LUNDIN 1996). They can build upon the traditional 4-5 step systems: Initiation, planning, authorization, implementation and monitoring, but usually this literature and the approaches have short-comings, especially with respect to a practical implementation. Often they do not contain directly applicable methods or are not transferable to a specific national setting and the regional situation.

Against this background, the European Integrated Project “Science and Policy Integration for Coastal Systems Assessment” (SPICOSA) was initiated. 54 partner institutes and 18 regional coastal case studies try to “develop a self-evolving, holistic research approach for integrated assessment of Coastal Systems so that the best available scientific knowledge can be mobilized to support deliberative and decision-making processes aimed at improving the sustainability of Coastal Systems by implementing Integrated Coastal Zone Management (ICZM) policies.” The result is a series of manuals and guidelines explaining how to establish an ICZM initiative in Europe.

The objective of this article is to apply the SPICOSA guidelines, especially the “Design Step” manual, coordinated by P. Tett (SPICOSA WP3, 2007), in the Oder estuary region and to critically reflect the outcome and the regional experiences. We further evaluate, if this concept can serve as a basis for the development of implementation guidelines, supporting the national German ICZM strategy.

2 The SPICOSA methodological framework

The first steps in the initiation and planning process can be sub-divided into "Issue resolution" and "System Definition". According to the SPICOSA methodology (SPICOSA WP3, 2007) these steps cover the following activities:

Issue Resolution

a. Reach agreement on Policy Issue(s) and associated scenarios, indicators, descriptions and criteria.
   - Identify the basis on which to chose stakeholder groups
   - Identify the stakeholder groups and describe the process by which they will be consulted about the issue
   - Carry out the consultation process
   - Agree a Policy Issue
   - Identify the subset of stakeholder partners for this Issue
   - List the ecological indicators agreed for this Issue
   - List the management and global scenarios agreed for this Issue

b. Identify what dysfunction (impacts) in the natural system is implied by this Policy Issue and prioritize them in the case of multiple impacts.
   - List the main Laws and Regulations, and the public governance processes, that apply to this issue
   - List, in order of priority, the impacts agreed as the subject for management in relation to this Issue
   - List the management objectives agreed as a consequence of this

c. Identify social concerns and public perceptions relative to the Policy Issue(s).
   - List the main concerns identified by stakeholders in relation to the Issue

d. Identify economic activities directly impacted and those potential economic effects including non-market impacts.
   - Identify the main economic activities related to the issue
   - Give an approximate economic value for each activity within the Study Site, as defined in relation to the Issue
   - Identify the main externalities associated with the Issue
   - Identify the main ecosystem Goods and Services that are relevant to the Issue
   - Describe the method(s) that will be used to give an economic value to these Goods and Services
   - Identify the methods of economic analysis (CBA, CEA or MCA) to be used with the outputs of numerical model simulations

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System Definition

a. Define the Coastal Zone (CZ) System to be studied by ascertaining that all primary functionality is within its boundaries, i.e. leaving within the system all of its major interactions.
   - Draw a geographic map showing the main features of the CZ to be included in the 'virtual' System; include the 'real' boundaries if known, and the 'virtual' System boundaries.
   - Identify vertical structure that should be described in the 'virtual' system because it is important to the ecosystem's functioning.
   - List the main ecosystem components, and their main internal transformations, to be included in the 'virtual' System.

b. Specify the necessary boundary conditions, i.e. identifying information/data needed for prescribing the external boundary conditions, anthropogenic drivers. Specify the relevant internal inputs, controls, constraints, and social and economic demands relative to the proposed Policy Issue(s).
   - List or map the main trans-boundary exchanges that should be included in the 'virtual' System.
   - List or map the main (natural & anthropogenic) inputs or withdrawals of matter & energy to be included in the 'virtual' System.
   - List the steps in the DPSIR chain, and the corresponding SPICOSA CZSFL, relating to the ecosystem dysfunction that provides the 'problem'.
   - Identify the stakeholder groups linked to the Policy Issue, categorize them as C, A or O in

relation to at least one set of T, W and E; thus, list the typifying features of each group's behaviour in relation to the Issue
  - Identify the main property rights and goverance structure relating to the Issue, and draw an Institutional Map.
  - List the present and potential economic demands likely to be made in the 'real' system in relation to the Policy Issue, and which should be included in the 'virtual' system.
c. Anticipate characteristics of potential risks (e.g. geological, ecological, social, economic) that should be evaluated and estimate the resources required.
  - List the main 'shock events' that pose a risk to the 'real' system, and estimate the work required to evaluate the level of hazard and the probability of its occurrence
d. Synthesize the state of the impacted ecosystem relative to its function, knowledge gaps, and major component interactions.
  - Include the above information in a narrative that defines the 'virtual' ecosystem in relation to the Policy Issue, and add a preliminary assessment of the impact of relevant HAs.
  - Discuss this narrative with other scientists and the stakeholders in order to identify knowledge gaps.

After a short introduction of the study site, chapters 4 and 5 apply the SPICOSA methodologies. The chapters follow the guidelines and carry out and document the results of the action points.

3 Background: The Oder Estuary study site

The Oder (Polish:Odra) (854 km length) is one of the most important transboundary rivers in the Baltic region. Its basin (118,000 km²) is shared between Poland (89 %), the Czech Republic (6 %) and Germany (5 %). The Oder is a lowland river with an average discharge of 530 m³/s. Floods are a rare phenomenon. The last extreme flood with a discharge up to 2,800 m³/s took place during late summer 1997 and caused severe damage.

The Oder estuary region is a complex pattern of lagoons and islands and shared between Germany and Poland. With about 840,000 inhabitants (414.000 in the city of Szczecin) the region is only sparsely populated. Neglecting Szczecin and Świnoujście, the population density is about 50 inhabitants per km². The Oder river flows through Szczecin and drains into the large, shallow Oder Lagoon. The river and its loads are responsible for the poor water quality in the lagoon and its highly eutrophic state. Through the lagoon runs the waterway, which links the Baltic Sea with the city of Szczecin, its large harbour and important ship-building industry.

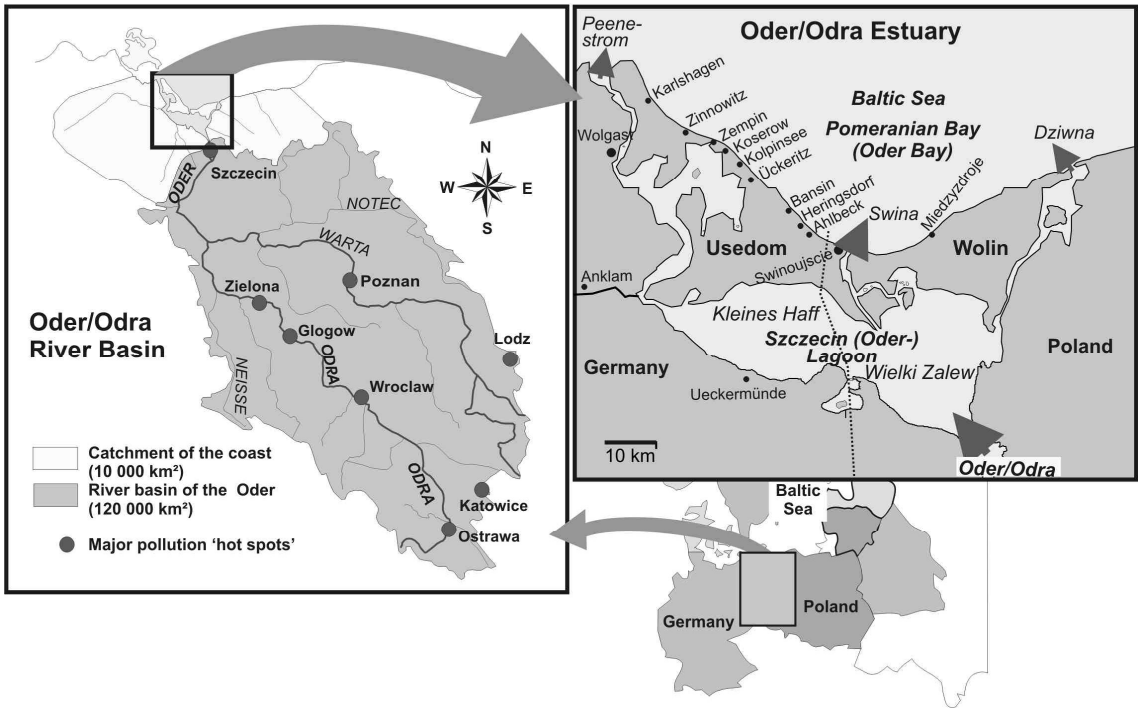

Abb. 1 The Oder/Odra estuary and river basin

The landscape around the lagoon is flat and dominated by agricultural land and forests. In some areas sand, gravel, oil and gas are exploited. Broad reed belts and artificial sandy beaches near the few small towns characterize the coastline. Due to its outstanding ecological value and beauty, most of the coastal area is under nature protection. An overview about the lagoon's ecology is given in RADZIEJEWSKA & SCHERNEWSKI (2008).

The lagoon water is discharged into the Oder Bay via three outlets. The bay is part of the Baltic Sea and its shoreline is characterized by seaside resorts, coastal forests, cliffs and long sandy beaches. Details about the river basin and the coast are given in LÖSER & SEKŚCIŃSKA (2005) and BEHRENDT & DANNOWSKI (2005).

4 Application: Issue Resolution

4.1 The Policy Issue

Large rivers have a strong influence on their adjacent estuary and the surrounding coastal area. During the last decade it became more and more obvious that coastal zones in the vicinity of large rivers cannot be management independently from the rivers and their catchments. The idea of an integrated coastal area - river basin management (ICARM) is reflected in the UNEP-ICARM approach, in the European Water Framework Directive and partly in LOICZ (Land-Ocean Interactions in the Coastal Zone). The development of an integrated river basin – coast is an important challenge for the Oder, as well. It became the guiding principle for the choice of a policy issue and the background for our initiative, which started in 2003.

The process - building upon existing knowledge: A large amount of regional development plans and strategies, expert's reports, official documents an community and district level as well as scientific reports existed for the Oder case. A systematic analysis and evaluation of these documents provided a detailed overview about the major concerns, issues and challenges in the region. For the coastal zone the following general issues were regarded as most important:

- Economic and infrastructural development of the city of Szczecin and the countryside, preservation of cultural heritage and a sustainable strategy to deal with a shrinking population
- Improved cross-border cooperation in planning and administration, strengthening the identification with as well as the integration and advertisement of the region
- Reduced and sustainable resource consumption as well as improved waste and sewage treatment
- Sustainable tourism and agriculture against the background of fast changing social and economic framework conditions
- Flood management, coastal protection and shipping
- Environmental quality (air, radiation, noise) with focus on water quality
- Preservation of biodiversity and nature, strengthening of cooperation in environmental protection as well as harmonisation of multiple uses with nature protection
- Environmental education, improvement of educational systems and access to information.

The German-Polish cross border integration and cooperation receives much more attention than a river basin-coast co-operation and management. This is true for the coast and even more pronounced in the river basin. Only the issues "flood management, coastal protection and shipping", "Environmental quality with focus on water quality" and, to a certain degree, "preservation of biodiversity and nature…" possess a clear river basin - coast dimension.

The general regional issues were picked up, subdivided into more detailed issues and analysed according to their river basin – coastal area relevance. In a second step these issues were linked to future threats and challenges, to ensure that they have not only relevance in the present situation but are of growing concern. The resulting issues are: a) Flooding, shipping and technical measures in river and estuary, b) eutrophication and water quality and c) species migration and alien species.

Finally, water quality and eutrophication became our policy issue. The availability of a political commitment with pre-defined focus issues (German-Polish Regional Agenda 21), discussions with Federal State (Land Mecklenburg-Vorpommern) ministries and authorities (what would they support) as well as the competence of the (project) consortium were finally responsible for the choice. This choice does not reflect the priority setting in the region itself but political reasons, a lack of competence, a lack of a critical financial mass etc. did not allow to tackle other issues.

Later it turned out that our policy issue was too ambitious and general and we focussed on the question: Which measures would support a water quality improvement and how efficient will they be? However, even this required the definition of a set of sub-issues or in our case, a set of questions.

- How do different stakeholders perceive water quality?
- What are their demands with respect to water quality?

- Would a “good” water quality (according to the Water Framework Directive) statisfy all stakeholders?
- Can a “good” water quality be reached in the entire estuary? If not, what are the alternatives?
- Which measures in the river basin are necessary?
- Which nutrient sources have to be tackled preferably?
- On which nutrient (nitrogen or phosphorus) should the focus be?
- What are the costs for reaching a good water quality status?
- How would a cost-efficient approach look like?
- Which measures in the estuary would support a water quality improvement and how efficient will they be?
- How long would it take to reach a good status?

Stakeholders: An existing stakeholder-group of the project ICZM-Oder was involved in this initiative from the beginning. The stakeholders are mainly representing authorities, administrations and non-governmental organizations. Additionally, scientists from several universities and from different disciplines are involved. Meetings take place once or twice a year. The stakeholder meetings are documented under http://www.ikzm-oder.de.

Indicators: Ecological indicators to evaluate the present state and the success of measures are given in the European Water Framework Directive (WFD): composition, abundance and biomass of phytoplankton, benthic invertebrate fauna, fish fauna and other aquatic flora. However, we became aware that we needed a more comprehensive approach including social, economic and governance indicators. We followed two strategies: the development and test of own, “bottom-up” indicators, in co-operation with the stakeholders (Hoffmann 2007) and the application of the UNECSO-IOC programme “Integrated Coastal Area Management” (ICAM) indicators. ICAM already included and linked ecological, socio-economic and governance indicators (UNESCO-IOC 2006). The detailed objectives of our regional indicator applications were (SCHERNEWSKI et al. 2006):

- To evaluate the benefit and suitability of the ecological ICAM-indicators for measuring the ecological state of aquatic ecosystems.
- To evaluate to what extent the ecological indicators are really suitable for an application within the Water Framework Directive.
- To compare indicator applications based on different years and to evaluate to what extent temporal changes in the ecosystems are reflected in the indicator results. Questions were, how to deal with temporal variability or seasonal effects in data, and how to measure the progress towards ecological sustainability.
- To evaluate the meaning of spatial variability in data for the indicator applications. How can we ensure that the indicator is representative for the entire ecosystem or region?
- To elaborate the problem of defining a good ecological status. What are the thresholds for a very good, good and poor status? How to determine the reference conditions (very good status) as a basis for an ecosystem quality classification system?
- To elaborate on the problem how to aggregate and compare very different types of indicators (different scales etc.) into one indicator set, reflecting ecosystem quality.
- To evaluate, if the socio-economic drivers and pressures in general allow a good ecological state of the coastal waters.
- To elaborate on the problem of linking socio-economic and ecological indicators,
- To discuss, if socio-economic indicators are beneficial for the Water Framework Directive.

The results of the indicator application and suggestions towards an improvement are reported in SCHERNEWSKI et al. (2006).

4.2 Impacts, dysfunctions and management objectives

Impacts and dysfunctions: Already for centuries, the river basin is under strong human influence. Agricultural land covers 70% of the upper river basin and 58 % of the middle basin. However the contribution of agriculture to the gross product is only 3.9 %. Several larger cities and many industries are located in the river basin (total population 15.4 millions). Nitrogen (N) and phosphorus (P) loads in the early 1960's were already high (N: 50,000 t/a; P: 6,000 t/a), increased further and reached its maximum during the 1980's (N: 116,000 t/a; P: 16,000 t/a). Due to economic changes, warm and dry years as well as improved sewage treatment, a significant decrease of nutrient loads took place until the late 1990's (N: 94,000 t/a; P: 8,500 t/a). The Oder river flows through Szczecin and enters the large, shallow Szczecin (Oder) Lagoon. The river and its loads are responsible for the poor water quality in the lagoon and its highly eutrophic state. Temporary anoxia, fish kills, algae bloom and poor water transparency reflect this state.

Laws and regulations: During recent years, European environmental policy became a major driver for coastal management and the European Parliament passed important directives and recommendations, like the Marine Strategy, the Recommendations on Integrated Coastal Zone Management (ICZM), the Habitat Directive (Natura 2000) and the Water Framework Directive (WFD). The WFD is a cross-border, river basin and coastal approach (up to a distance of 1 nm) that requires, for example the preparation of an integrated river basin – coastal water management plan until 2008. Aim is to reach a good ecological status in European rivers, lakes and coastal waters as well as in groundwater. Natura 2000 will create a large network of protected areas in the Oder region, which call for an effective management. The Marine Strategy has the aim to promote sustainable use of the seas and conserve marine ecosystems. The aims shall be reached through the existing directives.

Management objectives: The support of the WFD aims are the main objective. Based on scenario-analysis with reduced riverine nutrient loads we explore the possibilities to reach a good water quality status in the Oder estuary. In general, several options exist. Basic measures should take place in the river basin. Alternative or additional options are measures in the lagoon, like enlarged mussel beds, extended macrophyte stands and additional pile rows to reduce resuspension.

4.3 Social concerns and public perception

The public perception of water quality is an important topic. Different stakeholders define water quality in a very different manner and have very different perceptions what a good water is. Beside the hygienic (Bathing Water Directive) and ecological water quality (Water Framework Directive) especially the tourism sector and tourists perceive water in a different way. To get an impression about water quality perception a survey has been carried out during two weeks in August 2001 and altogether 449 tourists were interviewed. The survey showed that tourists primarily evaluate water quality on the basis of their visual impression, like water transparency, the lack of jellyfish, sea-grass and macro-algae. They implicitly take into account infrastructural aspects like clean beaches etc., as well (DOLCH & SCHERNEWSKI 2002). A consequence of different water quality perceptions is that a potentially good water quality according to the WFD might not satisfy all

stakeholders. A more comprehensive approach to define water quality against the demand of different stakeholders is needed.

The coast mainly suffers from activities in the river basin, but at the same time, the coastal area is small compared to the large catchment. Experiences concerning the implementation of the WFD in other river basins revealed that a small coastal community usually faces many representatives from the river basin. Therefore, the coastal community is afraid not to be able to attract attention for their issues and problems.

4.4 Economic activities

With about 50 inhabitants per km², the countryside is sparsely populated. The whole region is suffering from economic problems. The high unemployment rate above 20 % is a major problem and causes an ongoing decline of the population. Especially young people leave the region. Further, strong social and economic gradients between Germany and Poland as well as between coast and hinterland exist.

Tourism is the exclusive economic factor along the coastline, and altogether more than 10 million tourists visit the estuary region per year. Tourism shows a strong seasonality. Tourists visit the region mainly during summer and public holidays in spring and autumn. Major activities are bathing, sailing and angling. The short tourism season creates problems to maintain the tourist infrastructure and offers only seasonal income. There are plans to reduce the pressure on the coastline and to develop a tourist infrastructure in the hinterland, as well. Holidays on farms, bike and ride tourism as well as trips through nature parks are new offers.

Shipping is an important economic activity in the coastal zone. The large Polish harbours Świnoujście, Szczecin and Police have a joint annual turnover of more than 22 million tons (2002). The German harbours are of minor importance, eight harbours have a turnover of only 400,000 t/a each. More than one million ship passengers arrive annually.

Agriculture is a traditional economic sector, but lost its dominating position. Especially cattle-breeding still plays an important role. Fishing is another traditional economic sector, but is nowadays only of minor importance and in decline. At present, 40 professional fishermen on the German territory and about 260 on the Polish territory exploit the fish resources (using mainly stationary gear) of the lagoon. The landings are about 3,000 t per year. Pikeperch, perch, roach and whitefish as well as eel migrating between lagoon and Baltic Sea are of most commercial importance.

Several economic sectors are directly affected by eutrophication and changes in goods and services provided by coastal waters. Most important are tourism (swimming, sports fishing, boating, sailing) and commercial fisheries. Other important services are the retention and transformation capacity for nutrients and pollutants.

5 Application: System Design

5.1 Definition of the coastal system

Our physical system covers the coastal zone (Oder estuary) but has to take into account the river basin, as the source of pollution, as well (Abb.2). The islands of Usedom and Wolin and the immediate surrounding of the lagoon can be regarded as the economic system. The administrative system is divided between Poland and Germany. It has to take into account the existing administrative units, the Woivodeship in Poland and the district (Landkreis) in Germany. The physical, administrative and economic systems have different sizes and locations. This situation makes an important problem obvious: administrative, economic, and natural scientific analyses cannot be directly compared and evaluated together because of a different spatial reference. In other words, the natural scientific problem (eutrophication) cannot be managed within the existing coastal administrative system. Further, the consequences of eutrophication will not easily be reflected in the economic system and in economic evaluations.

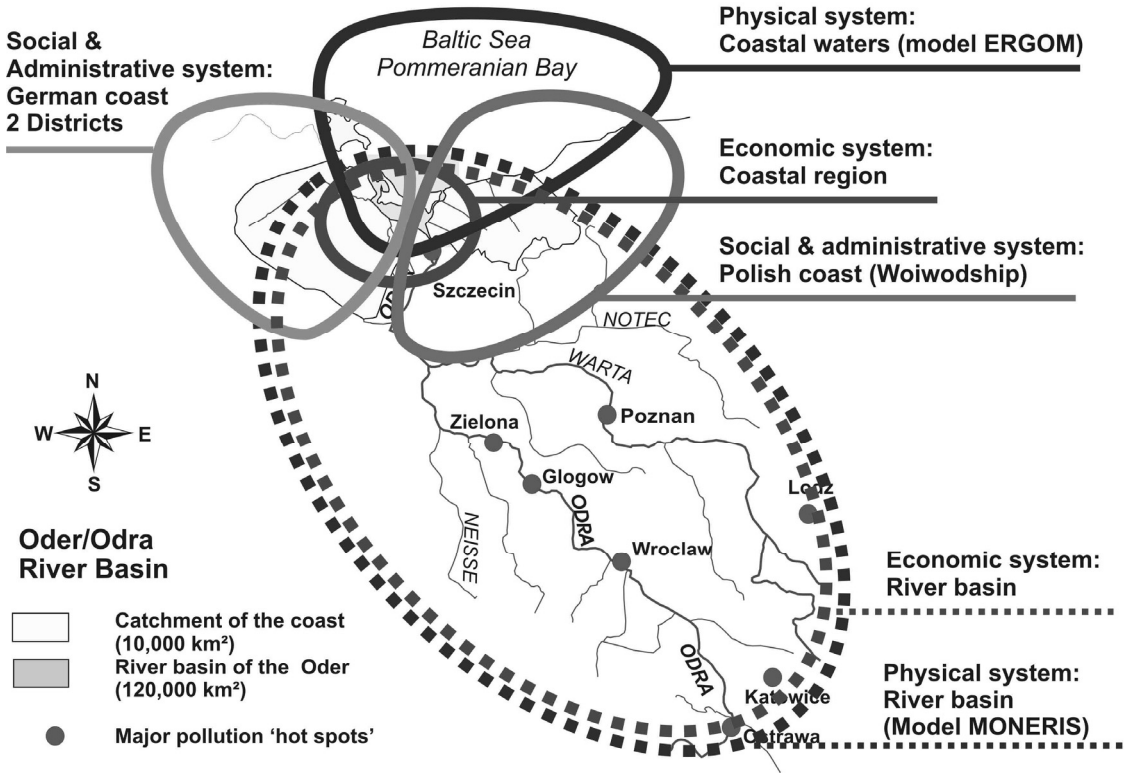

Abb. 2 Definition of the system (Oder/Odra coastal zone and river basin)

5.2 Boundary conditions

The SPICOSA manual suggests several methods to obtain a better insight into the system and the anthropogenic drivers. Some were tested in the Oder estuary.

The DPSIR (Driver - Pressure - State – Impact – Response) system is a suitable tool to visualize a problem (Policy Issue) and to clarify basic dependencies in a system. In detail, DPSIR contains a lot of short-comings and simplifications. It is lacking a spatial and a temporal dimension and especially the aspects “Impact” and “Response” can be defined from very different perspectives. “Impact” e.g. can refer to the response of an ecosystem to ongoing eutrophication (fish kills, algae blooms), can refer to tourists who avoid swimming due to poor water quality and choose other beaches or it can mean the impact on other economic sectors like fishing.

Policy Issue: Water quality / Eutrophication

Improvement of coastal water quality by reducing riverine nutrient loads from diffuse, agricultural sources and point sources in the river

System Definition: DPSIR

Driver:
Intensive human activities in the river basin

↓

Pressure:
High input of N and P into the coastal system

↓

State:
Concentrations of N, P, Chl.a; water transparency

↓

Impact:
Ecological: Eutrophication, algae blooms, fish kills
Social & economic: hampered bathing tourism

↓

Response:
Improved nutrient management in the river basin

The CATWOE-model follows a different approach and subdivides between C = Customers, victims or benificiaries of T; A = Actors, those who would do T; T = Transformational process, the conversion of input to output; W = Weltanschauung : the worldview that provides a (meaningful) context for T; O = Owner(s), those who could stop T and E = Environmental Constraints, elements outside the system which are accepted as given. A possible CATWOE diagram for our Policy Issue could be:

Customers:

Beneficiaries: The coastal community and coastal tourism
(Victims): Farmers, industries and communities in the river basin

Actors:

European Union (through the Water Framework Directive), the Oder/Odra Commission and regional authorities

Transformation:

Changes in land use & farming practize,
reduced fertilizer application & improved sewage treatment

Worldview:

The majority of the society perceives eutrophication as a major coastal ecological problem (with strong economical and social implications)

Owners:

Farmers, industries and communities in the river basin

Environment:

Regulatory laws, administrative structure, biological carrying capacity, morphometric and hydrodynamic situation

DPSIP and CATWOE allow to transfer and to communicate the own understanding of the system to others and motivate a discussion.

Governance: according to SPICOSA WP3 (2007) defined as “the act or manner of, or the system for: ruling or controlling the subjects or citizens of a State; or, conducting the affairs of an organization.”

Several agreements between Germany, Poland and Czech Republic ensure a close cooperation in the river basin. The International Commission on the Protection of the Oder against Pollution (ICPO) has the aim to protect rivers, lakes and the sea. In May 2002, ICPO received the mandate to coordinate the implementation of the EU Water Framework Directive within the international Oder river basin. Another ICPO task is the flood protection which is the major issue in the Polish “Program Odra 2006”. A systematic cooperation between river basin and coast does not exist at the Oder and a comprehensive and integrated coastal area - river basin management (ICARM) is lacking.

Spatial development and plans: The German hierarchical spatial planning system tries to integrate ecological aspects with spatial demands of economy and society. Spatial planning in Germany is organised in a system of graded responsibilities. The federal states (Länder) and the municipalities have the legal responsibility for spatial planning. The new Spatial Development Programme of the federal state Mecklenburg-Vorpommern (LEP M-V 2005) covers land and coastal waters as well as different utilizations in the coastal waters up to 12 nm off-shore. It specifies ICZM as a conflict resolution possibility. In 2006, the not binding Spatial Development Programme was transferred to the regional level and the detailed Regional Spatial Planning Programme for the Oder region was updated. In Germany, Regional Spatial Planning Programmes are largely regarded as a substitute for Integrated Coastal Zone Management plans.

In the coastal zone, several mutual agreements concerning cross-border cooperation between Germany and Poland exist. Results are e.g. the joint Euroregion Pomerania, the regional Agenda 21 “Szczecin Lagoon” and the joint Environmental Commission. They form the basis for cooperation and concrete projects. However, spatial planning and the development of Integrated Coastal Zone

Management (ICZM) plans are carried out independently. In 1996 a first Polish ICZM plan was provided by the HELCOM PITF MLW Odra Lagoon Area Task Team. In 2004, a draft ICZM-Plan for the German side has been prepared. Both plans are not legally binding and were so far not integrated in spatial planning. Steps towards a comprehensive institutional mapping are documented under: http://www.ikzm-oder.de.

5.3 Risks

We defined major threats and future challenges for the Oder region, which have or may have a serious impact on water quality and eutrophication.

During the last decades important social, political and economic changes took place in Poland and Germany and are still ongoing. The Oder estuary is a mirror of these changes. Despite huge financial efforts, ongoing economic problems cause e.g. a high unemployment rate, the movement of labour and a declining population. During the last decade, the economic and social developments in Germany and Poland were largely independent and caused strong social and economic gradients. In the coastal area social problems are increasing and the gap between the flourishing seaside resorts and the hinterland became deep.

With Poland's EU-membership in 2004, the entire Oder region became part of the European Union. The EU environmental directives are now being implemented in Poland, as well. The new agriculture and industry policy, but also the implementation of new standards will cause dramatic changes. Cross-border co-operation as well as competition might increase and cause social and economic transformations. This will have multiple effects on the Oder basin, the river and the coastal area.

Climate change scenarios predict an increased risk of extreme weather events. Ongoing sea-level rise and a sinking coast as well as changes in precipitation in the catchment, with subsequent changes in river discharge and nutrient loads. Of possibly even higher importance are transformation processes in agriculture due to global changes in food production and demand. A more intensive agriculture bears the danger of increasing riverine nutrient loads.

6 Comments and Discussion

The previous chapters reflected the results of the guideline application and the reader can evaluate by himself if this approach provided him with a deeper insight into the problems, structures and solutions of the Oder estuary. In the following, I like to evaluate the present state of the SPICOSA approach.

The "Design Step" manual (SPICOSA WP3 2007) is an extensive document and reflects the SPICOSA project methodology. It provides definitions, outlines key ideas and the application guidelines shown in chapter 2. The full document gives a background how to plan and initiate regional ICZM. The aim is not to establish a comprehensive regional ICZM initiative. The approach is problem "Policy Issue" oriented and provides guidance how to approach a coastal problem and how to come to solutions. This is very positive and allows a regional application with limited resources. Further, several methods and examples are provided, which support the application in a study site.

In the Oder estuary, ICZM is not new. A management plan is available, an ongoing cross-border co-operation between Germany and Poland exists and the project “Research for an Integrated Coastal Zone Management in the Oder estuary region” (IKZM-Oder) already deals with several coastal conflicts and problems. Despite that, the SPICOSA manual application was useful and clarified the joint understanding of specific coastal problems and the way how to come to a solution. It helped to structure the ideas, motivated discussions and lead to useful visualizations. However, some reflections on the guidelines applicability, possible function and perspectives seem necessary to me.

Does the SPICOSA manual go much beyond the present state-of-the-art? As mentioned before, there are many books, guidelines and manuals on ICZM available. The SPICOSA manual does not reflect and critically evaluate the present state-of-the-art in ICZM, it does not define the existing gaps and needs especially in Europe and does not really build-up on existing approaches. At the moment, it serves more as an internal document for the project and the project study sites. It remains unclear if this manual will survive the project duration as a generalized stand-alone product. An interesting aspect is the attempt to link natural science closely to socio-economy and governance. Further, the suggested methods are helpful. However, the aim of these methods and their benefits are not always obvious. The definition of indicators to measure the progress and success of an initiative is important and very relevant, but in this respect, too, the manual does not adapt the ongoing discussion and the guidelines consider indicators only briefly.

Do the guidelines meet the demand in Europe to implement ICZM? No target groups for the document outside the project are outlined. Apart from the 18 project study sites, it remains unclear, who shall use the approach and apply the guidelines. Even the concrete situation and the demand of the study sites are not reflected. Lacking awareness of the practical regional demand and of the target groups are possible reasons for some short-comings: A user would expect short guidelines accompanied by optional explanations for a deeper understanding and several consistent examples. Instead, the document is very extensive, time-consuming to read and has a complex structure. The reader easily gets lost. In the guidelines, the succession of suggested steps is not always logical and does not always meet the practical requirements, as well. Further, the language is often complicated and the reader needs a very good command of English to be able to understand the details.

Are the guidelines too theoretical or do they address regional problems in an appropriate manner? The guidelines possess a linear, stepwise structure which is suitable to set-up a new initiative in regions without ICZM experiences. In reality, most coastal regions have existing structures or activities which at least partly address coastal problems. Therefore, the first step has to be an analysis of existing regional structures and activities and a review of the management history. One needs an understanding, how the existing management works, why a region looks like it is and how local decision processes work. One needs an insight into regional communication processes and about important stakeholders before one can start the discussion about a problem. This first step could be called a mapping of coastal management history.

The guidelines do not take into account cultural and social differences, as well. Especially the involvement and motivation of stakeholders and the means of communication differ between countries and regions. The consequence is that approaches might work well in one region but possibly not in another. Therefore, alternative strategies are needed. In the Oder estuary e.g. stakeholder motivation is a

major problem. Well defined benefits of coastal management (best practice) were needed and personal consultation worked better than round-table discussions.

Stepwise processing the guideline action points in the Oder estuary region, we became aware that we could utilize existing knowledge and results for several action points. On the other hand, other points were not relevant for our region at all. We further became aware, how important it is to adapt and utilize existing knowledge, structures and activities, instead of sticking to certain guidelines. This linear, stepwise (but even a cyclic) approach does not reflect the reality well. In practise we had to jump back several time to action points and to repeat certain actions, like the discussion of the “Policy Issue”. Altogether, to me the guidelines are at the moment largely theoretical and they should become more a kind of modular tool box. This means that basic information and methods are provided for every action point. A study site or ICZM initiative then chooses and carries out only the action points it needs.

In SPICOSA, scientists address a coastal problem and try to find a solution. In German practise, this is largely the task of regional spatial planners and they have their own methodology to do it. Scientists are to a certain degree involved as advisers, but are not the drivers in a coastal management process. It remains questionable, if regional spatial planners will pick up elements of the SPICSA methodology. A serious obstacle is the exclusive use of English language and the very high required level.

Which lessons do we learn for the development of national German guidelines? The SPICOSA methodology can serve as a background for German guidelines, but has to be modified. We need a tailor-made approach taking into account our planning system, the shared responsibilities (federal state system) and our legal and administrative structure. For stakeholder motivation as well as for funding and the implementation of measures a high ranking “political commitment” is imperative and should be a starting point. Otherwise activities will hardly survive several years. Guidelines have to tackle the problem of funding in a concrete and convincing manner. Guidelines further have to define different groups of stakeholder, with a different intensity of involvement. An initiative should not be restricted to a permanent group of stakeholders but actively communicate to and involve other, larger groups, as well. The dissemination and communication strategy has to be discussed in an early stage. Examples of successful initiatives and clearly outlined benefits are imperative for the acceptance of ICZM approaches and guidelines.

Are conceptual models useful? According to the SPICOSA methodology conceptual models shall be developed after finishing the steps “Issue Resolution” and “Systems Definition”. They have the task to visualize the primary characteristics of a system in relation to each other, to specify key forcing, variables and processes, to identify the links between the physical, economic, social (and administrative) system and to specify external and internal inputs as well as system outputs.

However in the Oder estuary the conceptual model turned out to be very useful for the discussions and work within “Issue Resolution” and “Systems Definition”. They finally served as a kind of framework and helped to reach a joint understanding of the system: How the river basin model will be linked to the coastal water and sea model, how economic and social aspects can be linked to the system and, finally, about the possibilities and limits of the considered simulations models. We used the conceptual model to reflect our discussion, to evaluate our ideas in iterative processes, to serve as container for new ideas (even if they cannot be implemented in one of the

simulation models right now) and to reflect all important dependencies, interactions and boundary conditions in the system. Therefore, our conceptual model approach goes much beyond the finally implemented simulation model.

An important aspect was the possibility to visualize the system in the conceptual model and to transfer our ideas and understanding to other scientists, to reveal links for possible scientific cooperation (e.g. social scientists), to motivate stakeholders, practitioners and authorities to get and/or to stay involved and to attract them to support and accept the approach and to help to improve the public understanding of the system as well as to increase the acceptance for measures. This shows that conceptual models can and should go much beyond the implemented model. They are a container of ideas, reflect existing knowledge and define the work-programme for the next years.

Especially eutrophication, our policy issue, is no new problem and the reasons and possible measures to prevent it are well known. New is in our case the application to this study site, the integration between river basin – coast and sea and the stronger links to economy and the social system. Therefore, our conceptual model development took advantage from a screening of existing simulation models with a similar focus. Existing models contained a lot of knowledge and they were partly adapted and used. This saved time, costs, and I think, increased the acceptance of the own approach. We were able to apply more complex models to evaluate more complex solutions. We learned that models have to meet a real demand. Otherwise the modelling energy is wasted and the stakeholders are easily losing interest. Too simple models are only an academic exercise.

7 Zusammenfassung

Das integrierte EU-Projekt “Science and Policy Integration for Coastal Systems Assessment” (SPICOSA) verfolgt seit 2007 das Ziel einen ganzheitlichen Forschungsansatzes für die integrierte Untersuchung und Bewertung von Küstensystemen zu entwickeln. Auf der Basis aktueller wissenschaftlicher Kenntnisse soll dadurch das Integrierte Küstenzonenmanagement (IKZM) gefördert und optimiert werden. In diesem Artikel wird diese Methodik aufgegriffen und die entsprechenden Berichte auf eine konkrete Fallstudie, das Oderästuar, angewendet. Die Ergebnisse und Erfahrungen werden dokumentiert und die Methodik kritisch beleuchtet.

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