



Problem-oriented indicators for an ICZM in the Oder Estuary Region

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Abstract

The article describes the approach chosen for the development of indicators for an ICZM in the Oder estuary region. The development of indicators focuses on regional problems. A bottom-up-approach based on the inductive description and assessment of problems is combined with a top-down-approach including the deductive differentiation of an integrative sustainable development model. The basis was provided by the analysis and compilation of problems relevant to coastal zones discussed at the national, international, and European levels. The resulting problem portfolio describes core issues characterising the current discourse on coastal zones and their management. The problems were assessed by regional stakeholders and served as an accepted framework for the regional approach. This bottom-up-approach was supported by a top-down-perspective modelled on the principle of sustainable development. At the interface of the norm-orientated top-down-approach and the problem-orientated bottom-up-approach, indicators specify the issues discussed. This means linking the minimum demands made by sustainable development to the specific regional problems. Indicators were selected on the basis of certain criteria from a pool of indicators. The regional approach provides the following results: a high degree of orientation towards existing problems and user needs, the vertical integration of the issues discussed at the international and European level, and links to the concept of sustainability.

1 Background and Motivation

The development and use of indicators for ICZM processes has been in increasing demand since the mid-1990s. Most of the published guidelines for ICZM underline the importance of indicators as an extremely useful way of monitoring states and developments in coastal zones and of assessing the performance of management intervention in these areas. There have been efforts on different levels to develop indicators and promote their use in the practise of ICZM. Hundreds of indicators can be found in various existing indicator sets. The practical use of indicators, however, is still very rare.

To understand the restrictions of indicator development and use it is important to consider previous experience. Two studies summarise the experience gained in the development and use of sustainability indicators in German regions and communities (Gehrlein, Krug 2001; Heiland et al. 2003). These studies show divergences between scientific demands on indicators and their practical implementation. Information and public relations have been the main functions of sustainability indicators to date. They are rarely used to control and evaluate management processes. To achieve better results in implementing indicators at the local or regional level, for example, the following aspects are recommended: consideration of different indicator functions and target groups, identification of interfaces with practical management and user needs, participation of stakeholders and orientation towards accepted goals (Heiland, Tischer 2004; Gehrlein 2002).

The development of indicators for an ICZM was also one of the tasks within the research project ICZM Oder. The aim of the work was the development of an indicator set as an accepted basis for a discussion regarding ICZM issues in the regional context. It was, therefore, very important to involve the practitioners and their experiences and user needs in order to reduce the restrictions described. Orientation towards regional practice was the main consideration in the approach chosen for this task.

2 ICZM in the Oder estuary region – current state and conclusions for the approach

For an effective implementation of indicators it is important to consider some aspects at an early stage: intended function of the indicator set and conclusions deduced for its conception, mode of stakeholder participation, selection criteria, responsibilities for the indicators and utilisation of existing experience with indicators. (Heiland et al. 2003, p. 33) The discussion of the following aspects was the first part of the approach to the work with indicators in the Oder estuary region. The results can be summarised as follows:

- Cognition of existing problems in the coastal zone: Various stakeholders within various formal and informal contexts on various spatial levels deal with the problems of the coastal zone. An integrated approach to these problems does not yet exist.
- Implementation of ICZM in the region: To date there have only been external impulses for an implementation of an integrated management of the coastal zone. These impulses have not generated an internal, regional discussion about ICZM and the related opportunities and threats. According to the policy cycle of ICZM (Olsen, Lowrey, Tobey 1999, p. 8) the state of affairs can be classified under phase one: laying the basis.
- Suitable normative basis: For the assessment of indicators it is indispensable to reference their values to a suitable normative basis. The reference to targets provides information regarding the movement towards these targets. Existing target values provide the possibility of identifying the degree of target achievement. However, a suitable normative basis for an ICZM does not yet exist in the Oder estuary region. A compilation and analysis of existing formal and informal regional plans and concepts showed that a lot of ICZM issues are addressed by these documents (Hoffmann 2005). The targets compiled from different sources cannot, however, be a sufficient basis for the work on indicators. As a consequence the integrative approach to sustainable development in the HGF-project (see below) was chosen as the normative basis for the work on indicators.
- Previous experience with the development and use of indicators: The general appraisal of the importance of indicators in local and regional processes can also be confirmed within the context of Mecklenburg-Western Pomerania and its regions. Indeed, indicators are rarely used, often only for sectoral monitoring programs. Indicators have so far only been used in the Oder estuary region to evaluate the annual working programs of a rural development process. However, the high degree of detailing caused by the reference to concrete actions and project steps has not allowed the transfer of this approach to the work planned on indicators for an ICZM (in the current situation).
- Function and target group of the indicators: In the context of management processes, indicators fulfil various functions: (1) information and communication, (2) orientation and comparison, (3) evaluation. The function chosen also defines the target group. In the light of the current situation of ICZM in the region, the orientation function seemed to be the most important. The development of indicators aimed to provide a basis for future discussions regarding the objectives of a regional ICZM process. The target group are the stakeholders from the local and regional authorities and administrations and other organisations influencing the management of the coastal zone. These stakeholders are the potential participants in a regional discourse concerning ICZM.
- Methods of stakeholder involvement: The possible forms of stakeholder involvement in processes are (1) consultation, (2) cooperation and (3) participation (Witteck 2002, p. 50). Against the background of the current state of affairs of ICZM in the region, consultation with regional experts from various sectoral perspectives was chosen as a form of stakeholder involvement to ensure feedback. The initiation of a stand-alone cooperation process with the aim of developing a strategy for an ICZM, including goals and objectives as reference points for indicators, did not seem to be a manageable approach. There are too many cooperation processes within various

contexts at the regional level and the competition between these processes would have been too fierce.

The main assumptions for the work on indicators for an ICZM in the Oder estuary region can be summarised as follows:

(1) orientation to the accepted problems of the coastal zone, (2) integrative approach to sustainable development as a normative basis, (3) focus on the function orientation, to provide a basis for future discussion processes, (4) consultation of selected stakeholders and experts to ensure the consideration of user needs and the acceptance of the practitioners.

3 Methodical approach

3.1 The integrative concept of sustainable development (HGF-concept)

Nearly 60 different definitions of sustainable development and concepts for its implementation are available. They can be divided into three conceptual approaches: the one-column-models (focused on the ecological dimension), the three-column-model (focused on the ecological, economical and social dimension) and comprehensive models integrating the dimensions of sustainability. (Jörissen 2005, p. 16-21) The, so called, HGF-concept is an integrative approach and is a result of a research project conducted by the Helmholtz Association of German Research Centres (HGF). The concept emanates from three constitutive elements: intra- and intergenerational equity, global orientation and anthropocentric view. The first stage in a deductive differentiation is the transformation of these constitutive elements into three general objectives: securing human existence, maintaining the productive potential of society and retaining possibilities for societal development and action. Together they represent the fundamental normative principles. From these general objectives 15 substantial sustainability rules and 10 instrumental rules have been derived. These rules are globally applicable minimum demands of sustainable development. This norm-oriented top-down-approach is combined with a problem-oriented bottom-up-approach. At the interface of these two approaches, indicators specify the issues discussed. (Kopfmüller et al. 2001)

3.2 Application of the HGF-concept for the development of ICZM indicators

The approach to the development of indicators for an ICZM in the Oder estuary region can be subdivided into three main steps:

(1) Problem orientation: The first step was the analysis and compilation of problems relevant to coastal zones discussed at the national, international and European levels. The resulting problem portfolio describes the core issues characterising the current discourse on coastal zones and their management. In addition, regional documents were analysed to add regional aspects. Regional stakeholders assessed the relevance of the various problem descriptions of the portfolio providing their views concerning current and future problems of the coastal zone in the Oder estuary region.

(2) Contextualisation: During the contextualisation stage the problem descriptions were assigned to the 15 substantial sustainability rules of the HGF-concept. The resulting structure of rule-problem-complexes served as a thematic framework of the indicator system and as a working program for the identification of suitable indicators within the subsequent implementation stage.

(3) Implementation: The implementation stage implied the selection of indicators for the rule-problem-complexes. A database containing more than 600 indicators of 18 indicator sets from the European and global level served as the selection pool. Single indicators from sectoral studies (e.g. on fisheries or tourism) were added. The proposed indicators for the rule-problem-complexes were compiled in a list. This list was the basis for the subsequent consultations with experts. Within the consultations the proposed indicators were assessed and discussed against the background of the selection criteria.

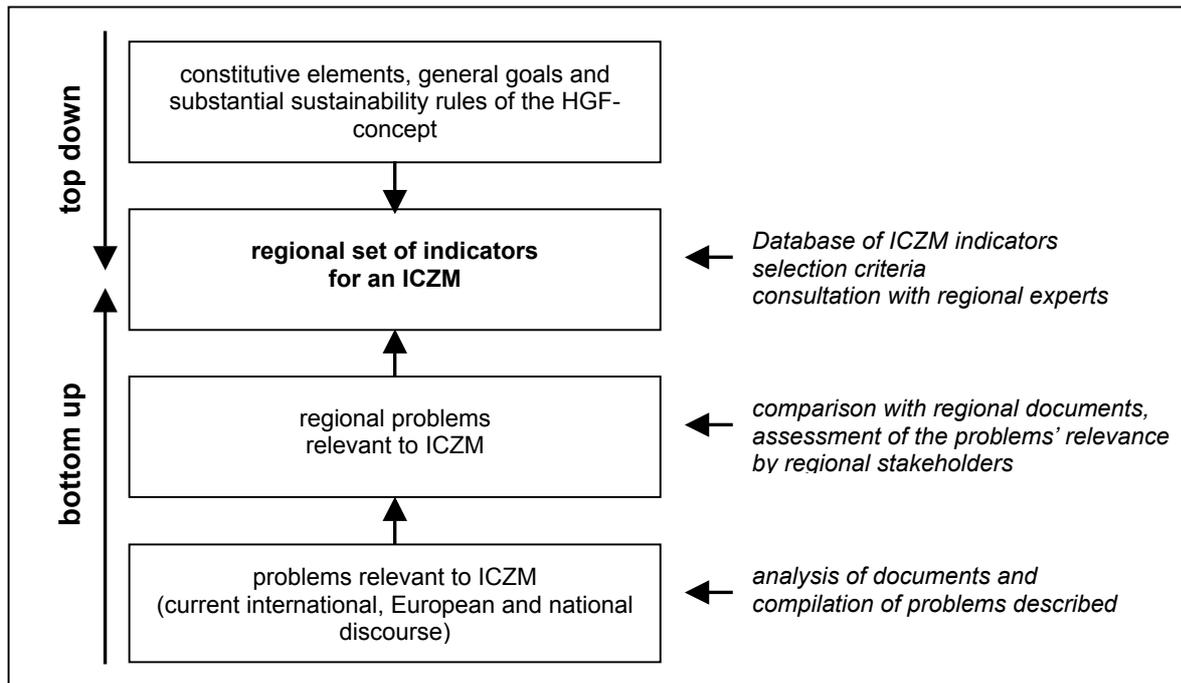


Figure 1: Combination of top-down and bottom-up-approach (Hartmuth 2005 based on Kopfmüller et al. 2001 and own completions)

4 Results

4.1 Results from the problem-orientation and contextualisation stages

A general problem portfolio was the first result of the problem-orientation stage. This narrows down the many aspects of the discussion regarding coastal zones to a core of relevant problem descriptions. These current and future problems are the initial points of management intervention in the coastal zones. The following documents were analysed: BMU 1997: chapter 17, BMU 2006, Europäische Kommission 1999: attachment 1, Europäische Kommission 2001: 7-17, Europäische Kommission 2002, recommendation 2002/413/EG, EEA 2006: chapter 2, SRU 2004. An additional analysis of regional documents as a second part of the problem-orientation stage led to some completions of the general problem portfolio. The most important completions resulting from the analysis of regional documents can be summarised as follows: spatial concentration of tourism activities and infrastructure in the coastal zone areas (causing a difference between the coast and the hinterland of the region), temporal (seasonal) concentration of tourism activities, inadequate integration of maritime tourist structures and offers, traffic loads on the main access roads to the island of Usedom (connected with the main arrival and departure days of the tourist season), insufficient connection of regional harbours with the hinterland.

The subsequent assessment by regional stakeholders aimed to analyse the relevance of the several problems described within the regional context, since only relevant and accepted problems can provide a basis for an accepted ICZM process. To exclude strong sectoral expert positions, the assessment of the problem portfolio was carried out by selected regional stakeholders with a more multidisciplinary background. The stakeholders involved were asked to assess the relevance of the problems on a scale from 1 to 4. In addition they were asked to add problem descriptions, which are still lacking. It is important to note that the problem portfolio focuses specifically on problems related to the management of the coastal zone. Other very important problems concerning the regional development, such as unemployment or the impacts of demographic changes, did not form part of the problem portfolio. The results of the assessment can be found in table 1.

Table 1: Structure of sustainability rules and associated problems of the coastal zone in the region (in parentheses the results of the assessment of the relevance within the regional context: 4 – high relevance, 3 – medium relevance, 2 – little relevance, 1 – no relevance)

Substantial sustainability rules	Problems (resultS of the assessment)
Goal 1: Securing human existence	
Rule 1.1 Protection of human health	- Impairment of bathing water quality (4) - Accumulation of harmful substances in food chains (2)
Rule 1.2 Guarantee of the satisfaction of basic needs (nutrition, housing, medical care, etc.)	- Displacement of local people on the housing market as a consequence of increasing numbers of holiday and second homes (3)
Rule 1.3 Provision of livelihood based on income from own work	
Rule 1.4 Equitable allocation of options for environmental resource use	- Environmental nuisances caused by tourism (4) - water resources / water quality (4)
Rule 1.5 Adjustment of extreme disparities in income distribution and property ownership	
Goal 2: Maintaining the productive potential of society	
Rule 2.1 Sustainable use of renewable resources	- Degradation of marine organisms due to pollutants (nutrients) (4), (heavy metals, persistent organic substances) (2) - Disturbance or destruction of terrestrial (3) and marine habitats (2) in coastal proximity
Rule 2.2 Sustainable use of non-renewable resources	
Rule 2.3 Sustainable use of the environment as	- Pollution loads to coastal waters (3)
Rule 2.4 Avoidance of unacceptable natural and technical risks	- Discharges of oil by ships at sea (2) - Risks caused by the impacts of climate change (4)
Rule 2.5 Sustainable development of capital stock, human resources and knowledge	- Downturn of commercial fishing (3,5) - Temporal (seasonal), spatial concentration of tourism (4) - Inadequate integration of maritime tourist potential (4)
Goal 3: Retaining possibilities for societal development and action	
Rule 3.1 Equal opportunities	
Rule 3.2 Participation in social decision-making processes	
Rule 3.3 Conservation of cultural heritage and cultural diversity	- Threats to characteristics of regional maritime traditions (3)
Rule 3.4 Conservation of the cultural function of the nature	- Impairment of the cultural landscape (3)
Rule 3.5 Maintenance of social resources	

The assessment of the problem portfolio by regional stakeholders led to a ranking of the therein contained problem descriptions in relation to the regional situation and perceptions thereof. It can be confirmed that many of the problems discussed at the national, international and European levels are also relevant for an ICZM at the regional level. The main result of the problem orientation stage was a

reduction of complexity. The orientation towards accepted problems functions as a filter. It has to be accepted that the discussion processes towards an implementation of a policy approach for the coastal zones is not only a normative construct, it is also a social construct. (Hartmuth, Huber, Rink 2006, p. 112)

At the end of the problem orientation stage the regional problem portfolio contained 19 aggregated problem descriptions. The aggregation of the problem descriptions was not a problem, since the associated indicators always allowed for sufficiently firm establishment. Of much greater importance and also more beneficial was the reduction of the number of problem descriptions to obtain a manageable framework for the indicators. Within the subsequent stage of contextualisation the aggregated problem descriptions were assigned to the 15 substantial sustainability rules of the HGF-concept (see table 1). The resulting structure of rule-problem-complexes served as a thematic framework for the indicator system and as working program for the identification of suitable indicators within the subsequent stage of implementation.

4.2 Results from the implementation stage

A list of proposed indicators was compiled based on the structure of rule-problem-complexes. The basis for the selection of indicators was both a database and an analysis of indicator studies for various sectors, such as tourism and fisheries. The great number of indicators compiled in the database and identified in the studies could give the impression that there was a problem in selecting suitable indicators for the list. However, the first screening of the indicator pool showed that its content can be reduced to a manageable number of indicators. For each rule-problem-complex three indicators at most were assigned as a proposal.

Expert consultations took place on the basis of this list. Within these consultations the relevance of the problem descriptions were assessed (as described above) and the proposed indicators were discussed against the background of selection criteria. The following criteria were used: (1) relation to sustainable development, (2) relation to regional management instruments, (3) comprehensibility, (4) possibility of assessment against the background of the normative basis, (5) data availability and (6) overall assessment.

The consultations proceeded very differently. The main problem was the time-frame. The duration of the consultation ranged from 20 minutes to 120 minutes. On average the consultations lasted almost 60 minutes. It was clear in the first minutes of the meeting whether there was a willingness to deal with the complete assessment procedure or not. Within some consultations the assessment of the proposed indicators could only be undertaken on the basis of the selection criterion “overall assessment” and the suitability of the indicators was more broadly discussed.

The assessment of the relevance of the various problem descriptions did not on the whole differ from the assessment results from the regional stakeholders. The discussion and assessment of the proposed indicators led to a reduction of the number of indicators and generated many references for the further work on the indicator set. Even though there were some consultations with simply a more general assessment, it can be estimated that the resultant list of indicators provides a good impression regarding suitable indicators in relation to regional problems and regional user needs. The main background to the assessment by the experts was the respective work context and experience within this context. This results in an orientation of the indicator list towards practical experience and feasible aspects.

The resultant indicator list should not be understood as a completed list. It has to be enhanced during the further discussion process. The structuring of the list is oriented towards the goals and substantial sustainability rules of the HGF-concept. Table 2 presents examples of the indicators (here for goal 1 and its rules). The light grey shaded row represents a problem with little relevance within the regional context. For this problem, therefore, no expert consultation was undertaken. The indicators in parentheses can be used as completion indicators. The complete list is published in Hoffmann (2007).

Table 2: Compilation of indicators for goal 1 and its rules (complete list in Hoffmann 2007)

GOAL 1 SECURING HUMAN EXISTENCE
<p>Rule 1.1 Protection of human health</p> <p>Problem: Impairment of bathing water quality</p> <ul style="list-style-type: none"> ▪ number of days with where mandatory or guideline values are breached ▪ (<i>bathing water quality at controlled beaches in the region</i>) ▪ (<i>number of beaches with the Blue Flag</i>) <p>Problem: accumulation of harmful substances in food chains</p> <ul style="list-style-type: none"> ▪ heavy metals (Cd, Pb, As, Hg) in selected commercially important fish stocks ▪ organic, organic chlorine compounds in selected commercially important fish stocks
<p>Rule 1.2 Guarantee of the satisfaction of basic needs</p> <p>Problem: Displacement of local people in the housing market as a consequence of increasing numbers of holiday and second homes</p> <ul style="list-style-type: none"> ▪ ratio of first to second and holiday homes – in selected coastal communities ▪ percentage of second and holiday homes owned by non-locals in selected coastal communities
<p>Rule 1.4 Equitable allocation of options for environmental resource use</p> <p>Problem: Environmental degradation caused by tourism</p> <ul style="list-style-type: none"> ▪ land use through tourism ▪ water consumption caused by tourism per overnight stay ▪ (<i>volume of waste caused by tourism per overnight stay</i>) ▪ traffic load on the roads B110/B111 – at selected cut off dates relevant to arrival and departure traffic ▪ percentage of guests using public transport for arrival and departure in relation to the total number of guest arrivals ▪ number of tour tickets sold by the „Usedom Bäderbahn GmbH“ ▪ (<i>percentage of tourist companies with environment management systems accordant to EMAS/ISO 1400 or with certification in accordance with EU Eco-label or Viabono criteria</i>) <p>Problem: water resources / water quality</p> <ul style="list-style-type: none"> ▪ water consumption of private households ▪ water consumption due to tourism ▪ total area of drinking water catchments

5 Discussion of results and experiences

Problem-oriented approach: Generally the actors and experts involved assessed the problem-oriented approach as very practicable and positive. The orientation towards existing problems was understood as a signal to focus the research on the real situation of the region and the user needs of the practitioners dealing with these problems. An early orientation towards the rules of sustainability or the ICZM approach would have resulted in resistance to the research activities. The relevant problems of the coastal zone provide the best arguments for securing the involvement of the responsible actors.

The problem portfolio was assessed as providing a good overview of the various issues of the coastal zone. In addition to this good assessment by the actors, two remarks have to be mentioned. On the one hand, some actors noted that the problem-orientation approach results solely in the registration of issues that have to be assessed as negative. Taking into account, that their identification lays the basis

for a discussion process about objectives describing positive and negative future states, the negative character of problem description can be accepted. On the other hand, experience from other applications of the HGF-concept show that the question of prioritisation of the problem descriptions emerged (Hartmuth 2005, p. 83; Hartmuth et al. 2006, p. 113). The practitioners want to know which problems are the most important and have to be addressed in a special manner. An adjustment of competing priorities cannot be achieved within the HGF-concept. The rules of the concept have to be understood as coequal. The prioritisation of problems is a task within corporative and political discussion processes and can only be realised by responsible decision makers. Considering the experiences from other applications, the assessment of the problems was introduced as one step into the process. The resultant ranking of the problem descriptions provides an information base for future discussion processes including prioritisation steps.

Suitability of the selection criteria: The selection criteria proved to be of value. If there is generally a willingness to deal with the assessment procedure, the selection criteria serve as a manageable framework. They offer necessary clues for the structuring of the expert consultations and ensure the consideration of essential aspects concerning the description and application of the indicators. A reduction of the number of selection criteria would lead to several important aspects being disregarded. The time-frame emerged as the only main restriction. Within some consultations the assessment could only be carried out on the basis of the selection criterion “overall assessment”. In these cases, however, the other selection criteria also served as a background for discussion with the experts.

The normative basis for the indicators: The substantial sustainability rules of the HGF-concept stood the test as the normative basis for assessing the indicators. Against the background of the several related rule it was generally possible to assess whether or not the values of the indicator describe a development towards sustainability. This might be sufficient for this phase of the development of the indicator set. Looking forward it has to be noted that only concrete target values or reference values allow a reliable assessment of the states and developments described by the indicators. In most cases, however, these concrete target or reference values are lacking. Obligatory values only currently exist in connection with regulations and directives that have to be implemented at the regional level. Other target values do not exist. Furthermore, existing planning and development conceptions of the region do not offer sufficient normative fundamentals. Their targets are mostly defined in a vague manner.

Data availability: In many sectors a core of indicators moved to the mainstream. For these indicators data is collected at regular intervals. Official statistics and long-term monitoring programmes are the most steady data sources and, therefore, good links for indicator applications. Much of this data has to be formatted before it can be used. Data availability is one of the main aspects influencing the assessment of indicators. In particular, the need for extra data collections based on surveys and mappings often led to a poor assessment of the indicators. The cost-benefit ratio always provides a background for the assessment of the applicability of indicators. Moreover, other aspects of data quality, such as the spatial and temporal variability, have to be considered (e.g. most intensive developments in the first kilometre from the coastline, the hinterland as context for the description and assessment of developments in the coastal zone, necessity of long time-rows).

Theory and practise of indicator development and application: A divergence between theoretical demands and practicability can still be confirmed. Many aspects discussed at the scientific level take a back seat in the light of practical needs and possibilities. Furthermore the involvement of practitioners in the development of an indicator set for the Oder estuary region led to a strong orientation towards existing approaches, instruments, etc. This ensures the connectivity of the resultant indicators with the work of the practitioners. In the case of a discussion regarding ICZM issues in the region, it will be found that there are several practical backgrounds incorporated in the indicator list. Only a few “new” indicators complete the list, mostly based on a problem-related compilation of existing data. Confronting the divergence described between theory and practise in the medium term, the implementation and constant use of indicators in general seems to be the real target in the field of indicators.

6 Conclusion

In comparison to the objective, the identification of indicators as a point of reference for a discussion process regarding goals and objectives of a regional ICZM, the results can be assessed as sufficient. The resultant indicator list is based on a comprehensible approach including unambiguous assessments. It defines the core of starting points for an ICZM process in the region. The strong orientation towards the needs and possibilities of the practitioners ensures the connectivity to regional practise.

Further use of the results depends to a great extent on the degree of further implementation and acceptance of ICZM at the regional and also at the national and European levels. There is a close relationship between the progress of ICZM implementation, its acceptance and the chances for the use of indicators in the practice of all spatial levels. At the regional level especially it has to be understood, that ICZM is only one of many approaches in dealing with the various problems of the regions. There is a competition for the narrow resource stakeholder (experts, practitioners, decision-makers etc.) and their willingness to participate in processes. The added value of the ICZM approach in contrast with the existing practise and the aspect of feasibility are the main issues that will decide whether the gap between theory and practise can be bridged.

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