

Integrated coastal management for local municipalities in Latvia: sustainability governance and indicator system

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Abstract

Municipal audit for integrated coastal management (ICM) development for local municipality includes analysis of stakeholders, document frame and planning process analysis, vertical governance assessment combined with sectorial analysis for all four dimensions of sustainability; nature environment, economics environment, social environment and also governance and communication dimension in Saulkrasti coastal municipality. ICM guidelines model frame were elaborated during this collaboration research project by University of Latvia performed in R&D cooperation with local authority and with involvement of all local stakeholder groups. Further on related indicator system based on these sustainability dimensions and designed ten main integrated work directions were elaborated, including 24 thematic groups with 55 indicators.

Keywords: sustainable development dimensions, governance and communication dimension, collaboration principle, indicators system.

1 Introduction of ICM from international to local level

Sustainable coastal development, as widely acknowledged [1–4], has to be implemented employing integrated coastal (zone) management frame as for many years introduced and here are generic definition and additional explanation available from European Commission [1, 2]. Integrated Coastal Zone Management (ICZM) is a dynamic, multi-disciplinary and iterative process to promote sustainable management of coastal zones. “Integrated” in ICZM refers to the integration of objectives and also to the integration of the many instruments needed to meet these objectives. It means integration of all relevant



policy areas, sectors, and levels of administration. It means integration of the terrestrial and marine components of the target territory, in both time and space.

Also eight key principles for successful ICZM are officially delivered in 2000 [1]: broad “holistic” perspective; long term perspective; adaptive management during a gradual process; reflect local specificity; work with natural processes; participatory planning; support and involvement of all relevant administrative bodies; use of a combination of instruments.

All this has to be taken into account when planning for local level ICM as well as appropriate system of indicators [3–5, 7] shall be introduced, e.g. like United Nations (UNCSD, 2001) has developed indicators for sustainable development in order to: translate physical and social science knowledge into manageable units of information that can facilitate the decision-making process; help to calibrate and measure progress towards sustainable development goals; provide early warning to prevent damage; and communicate ideas, thoughts and values.

2 ICM model frame for Saulkrasti municipality

Following are ICM development studies [6] in Latvia, particularly using Saulkrasti municipality case study research example, based on previous experiences [7–9] and approaches designed and implemented [10]. Description of Saulkrasti municipality in brief would include following. Geography – area 48 km², town area is 6,8 km², shoreline 17 km, 45 km from capital city of Riga, four small rivers. Demography and habitat structure – 6105 habitants (2009) in four historical parts (Pabaži, Pēterupe, Neibāde, Zvejniekciems) and almost 13 000 summer houses inhabitants in season. Entrepreneurship and factors, having impact on area development – mainly Skulte port with cargo turnover 451 thsd. tons at 2008. Tourism facilities – main resources of nature and environment are 17 km sand beaches, statutory designed nature park area “Piejura”. The most important risks – coastal erosion, transport risks. Saulkrasti coastal municipality sustainability audit and further on ICZM guidelines were elaborated during collaboration research project by University of Latvia (with involvement of environmental management master program students – ViPa16 group) during 2009–2010 in R&D cooperation with local authority and with involvement of fall local stakeholder groups [6]. These guidelines are based on studies of legal framework, national, regional and local planning and management documents and case study research field work: seminars, interviews, questionnaires, etc. Municipal sustainability audit was performed taking into account three main sustainable development capitals - nature environment, economic environment (particularly, emphasizing tourism environment (reviewed separately, meaning the great importance for Saulkrasti municipality development), social environment (incl. culture, health, education etc. subsectors) – as well as adding fourth important (even horizontal and cross-sectoral) capital as governance and communication. In the table 1 we can see all mentioned sustainability dimensions and, subsequently, recognized and structured frame of 10 main integrated problem areas to be seen as main work directions, as well as ICZM work sub-directions.



Table 1: Saulkrasti ICM system frame.

Dimension of sustainability	Integrative problem area – directions	Work sub-directions
Nature environment D	The protective zone for coastal dunes: erosion, managing, biodiversity	Permanent managing of coastal dunes protection area; Realisation of conservation for biodiversity; Supporting of collaboration and dialogue among different stakeholder groups; Corresponding construction at coastal dunes protection area; Corresponding activities for tourism and recreation
	Strategic management in public services sector	Decrease waste in nature environment; Decrease emissions of sewage; Decrease emissions from fossil fuel from industry and public services;
Economical environment E	Port complex	Further development of port aquatoria and landings; Rational, poly-functional use of port territory; Development of access roads corresponding to perspective needs
	The development planning	Social partnership, involving all stakeholder groups; Strengthening of municipal planning capacity; Elaboration of planning documents and actual amendments
Economical environment: tourism ET	Resources of nature, cultural history and recreation as preconditions for tourism development	Resources of nature and cultural environment for tourism development; Development of infrastructures for nature and cultural environment resources; Development of human resources; Information system and forming of environmental awareness; Strategic planning for using the nature and cultural environment resources
	Entrepreneurship in promotion of tourism development	Strategic planning for tourism at municipal level; Project management and development in the tourism branch; Education for tourism entrepreneurship; Marketing of tourism
Social environment S	Quality of life for inhabitants	Further development of infrastructures for the public services; Improving the households' comfort and energetic efficiency; Development of public transport and transport infrastructures; Improving the town environment quality;
	Polycentrics or existing of several centers with equivalent dominance in the municipality area	Improve and intensify the communication between spatial parts of the community and inhabitants from different parts; Even up accessibility of public services in different parts of municipality; Promote tourism and entrepreneurship activities in all areas of the municipality;

Table 1: Continued.

Dimension of sustainability	Integrative problem area – directions	Work sub-directions
Governance and communication P	Collaboration governance for coastal municipality	Development of collaboration among governance stakeholder groups; Development of vertical and horizontal integrative thematic collaboration; Development of tools for collaboration; Development of assessment collaboration;
	ICZM coastal communication	Develop system of co-ordination for coastal communication, Promote internal and external communication of stakeholders; Design and develop unitary space for coastal communication;

ICZM at Saulkrasti municipality can be given a look as case of good praxis and a model case for other coastal municipalities in Latvia with following recognized advantages : auditing all sustainability sectors and their interlinkage, particularly, within complex coastal territory; definition then of integrated problem areas (see table 1) as principal stage at integrated coastal planning and management process; both auditing and preparing guidelines for whole sustainable governance/management cycle; measuring coastal sustainable development with indicator method – full scale sustainability indicator system as for the first time in Latvia. Further on indicator system based on sustainability dimensions and designed 10 integrated work directions were elaborated, including 24 thematic groups with 55 indicators.

3 Indicator system for coastal management in Saulkrasti

3.1 General characteristics and structure

An indicator system for measuring coastal sustainability differs from the general case by its spatial specifics: the coastal zone is formed by a coastal line with the related set of other geospatial elements [1]. The indicator system through which coastal sustainability is assessed should therefore be able to at least differ the coastal zone from the inland and provide a comparison, to establish the origin of impact factors on the coastal status and development trends, and to create understanding of the distribution of coastal impacts within the governance territory. Ideally, the term ‘coastal zone’ should apply to a territory where the specific coastal impacts can be detected, and vice versa – a territory which impacts the developments on the coast and its proximity, as these impacts [10]: may in advance be unknown precisely enough; may change over time; differ for different factors; the specifics of spatial distribution of the data used may prevent their correct differentiation. In practice, the term ‘coastal zone’ is therefore applied to a relative territory which – within a single system - may in addition be applied in a number of ways depending on the data character.



Saulkrasti county, which is comparatively small, relatively urbanised (for Latvian conditions) Baltic Sea coastal territory (Fig. 1), had the coastal integrated development guidelines elaborated for it in 2009–2010 within the University of Latvia COBWEB project [6], as the central component of municipal integrated governance. Special attention was devoted to measuring sustainability, and for this purpose, a system of indicators was developed (see Table 2). The system was elaborated based on the analysis of four dimensions of sustainability (natural, social and economic environment, governance and communication) and integrative problem areas as defined on their points of intersection. In Saulkrasti municipality, the coast may be defined in the following ways based on the character of indicator data spatial distribution: coastal geometrical zone, which is formed as a coastal geometrical buffer; point-shaped measurement locations on the coast; coastal dune protection zone with adjacent protected biotopes; coastal 5 km-wide zone of limited economic activity, which can be adjusted depending on local geographical conditions [9, 10]. For the last two, it is defined with the help of municipal spatial planning, in Saulkrasti its spatial plan is still under preparation.

The nature of data determines not only coastal definition types but also the spatial relations to the coast by indicators themselves. Here, the following cases can be distinguished [10]: special coastal indicators directly characterise some values characteristic of the coast only; coastal discernible indicators which characterise elements not directly coast and coastal relatively discernible indicators; indicators non-applicable to the coast, which characterise a factor in the overall territory. In the indicator system for Saulkrasti 18% of indicators are

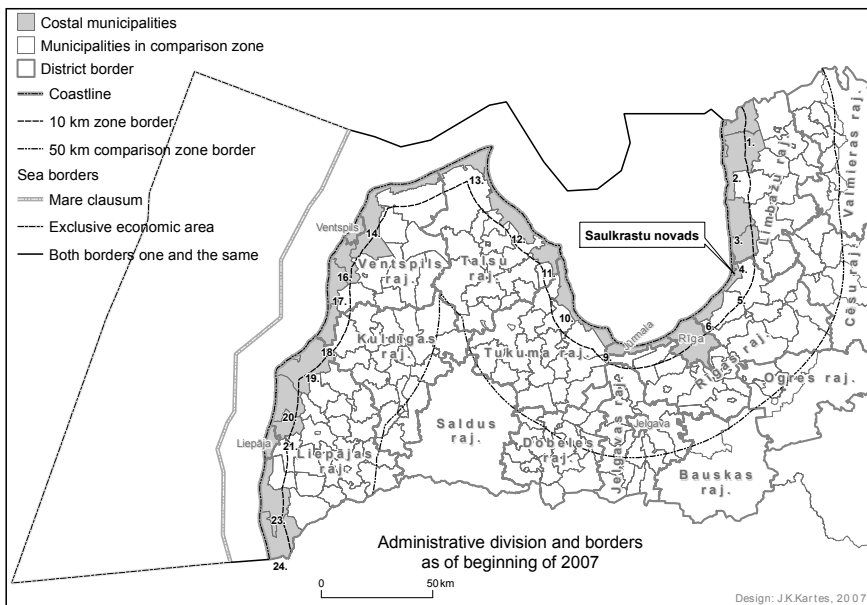


Figure 1: Saulkrasti raj and coasts in Latvia.

Table 2: The system of sustainability indicators in Saulkrasti.

Dimension of sustainability	Thematic subdivision	Indicator
I. Nature environment D	D1. Green frame status	D1.1. Cut and restored wooden areas
		D1.2. Cutting permissions in non-wooden lands
		D1.3. Land transformation from non-developed to developed types
	D2. Potential loads on the environment from public utilities	D2.1. Total waste amount and coastal litter
		D2.2. Satisfaction of inhabitants with waste management
		D2.3. Providing of households by centralised drinking water support and sewerage
		D2.4. Emissions from sewage treatment plants
		D2.5. Financial resources for public utilities
	D3. Air quality and climat change factors	D3.1. Using of environmental-friendly fuel at public and industrial sector
		D3.2. Emissions of greenhouse-effect gases at public and industrial sector from fossil fuel
		D3.3. Snow cover condition
	D4. Surface water quality	D4.1. Bathing water quality
	D5. Land use development	D5.1. Permissions for building
	D6. Nature risks	D6.1. Number of stormy days
		D6.2. Coastal erosion
	II. Economic environment E	E1. Economically active people
E2. Municipal budget		E2.1. Structure of municipality budget incomes and expensions
E3. Traffic routes		E3.1. Proportion of hard-covered roads in all state and municipal roads and density of network of roads
		E3.2. Public transport traffic
E4. Skulte port development		E4.1. Cargo turnover in Skulte and Salacgrīva ports
		E4.2. The ship visiting in Skulte port
E5. Tourism characteristics ET		E5.1. Number of tourism services and distribution by types of them
		E5.2. Bed number in tourism accommodation
		E5.3. Bed space occupancy in tourism accommodation

Table 2: Continued.

Dimension of sustainability	Thematic subdivision	Indicator
II. Economic environment E	E5. Tourism characteristics ET	E5.4. Personnel at tourism industry
		E5.5. Financial resources for Tourism Information Center and numbers of attendance
		E5.6. Environment friendly tourism accommodation
III. Social environment S	S1. Health care characteristics	S1.1. Provision by health care personnel
		S1.2. Loading for family doctors
	S2. Supporting for cultural environment	S2.1. Municipal funding for supporting of cultural heritage
		S2.2. Municipal funding for supporting of cultural events
		S2.3. Number of cultural events
	S3. Employment and entrepreneurship	S3.1. Employment and their characteristics
		S3.2. Unemployment
	S4. Social care and social security	S4.1. Degree of social exclusion
		S4.2. Crime statistics
	S5. Education system characteristics	S5.1. Number of pupils in "key" classes
		S5.2. Mutual payments among the municipalities
	S6. Social life quality	S6.1. Habitat comfort level
S6.2. Public services accessibility		
S6.3. Average incomes <i>per capita</i>		
IV. Governance and Communication P	P1. Activities for environment maintenance	P1.1. Number of people involved in environment maintenance and municipal financial resources for it
		P2. Information of society about environmental events
	P2.1. Publications in local mass media about environmental questions	P2.2. Satisfaction of people by municipal communication with society
		P3. Activities in nongovernmental sector
	P3.2. Number of environment friendly activities, organized by all NGOs	
V. Integral indicators I	I1. Number of inhabitants	I1.1. Number of declared and seasonal inhabitants
	I2. Area development index	I2.1. Area development index

Table 2: Continued.

Dimension of sustainability	Thematic subdivision	Indicator
V. Integral indicators I	13. Area attractiveness index	I3.1. Area attractiveness index
	14. Opinions of population	I4.1. Opinion for municipal management
		I4.2. Opinion for environment quality
		I4.3. Opinion for coastal zone status and facilities
		I4.4. Opinion for municipal planning
		I4.5. Personal attitude and connection with sea

special coastal, 16% – coastal discernible, 32% – relatively coastal discernible 0 and 34% has no coastal description function. It is estimated that, by improving data collection and storage quality, the proportion of coastal discernible indicators may increase. Within the small municipality extended along the coast the majority of key development factors, problems and opportunities have a directly relation to the coast.

The integrated environmental management cycle approach applied in Saulkrasti municipality was based on municipal situation analysis in sustainability dimensions and on segmentation of priority integrative problem areas at dimension intersection points. The indicators were selected separately for characterising both the sustainability dimensions and integrative problem areas. By way of combining both resultant systems and assessing how the indicators refer to sustainability components, we divided all indicators into 4 groups [10]: sub-sectoral indicators and sectoral indicators – describe governance level-specific aspect or the whole sector of the respective sustainability dimension; integrative indicators – describe integrative problem areas and other processes which concerns at least two sustainability dimensions; integral indicators – describe the key, more general pointers of the governed system that characterise a given governance system in its entirety and/or compared to other similar systems.

Sectorial indicators are of 20%, integral ones – 16% of the system. Others are integrative ones and almost 2/3 of them are related directly to the integrative problem areas of ICZM in Saulkrasti. Classical dimensions of sustainability are almost equally represented in the system, with the governance and communication dimensions less represented, as pointers characterising these and meeting indicator requirements are more difficult to find. The prevalence of integrative indicators in the system stems from the approach to planning itself, which is based exactly on an integrative perspective of seeing sustainability dimensions in their interactions. Separate sectors (e.g., tourism) are singled out when the related issues is significant enough for the development and welfare of the entire territory. The integral indicators also include separate indicators

selected to characterise particular dimensions, as these bear a considerably larger informative load, but are overall designed to characterise resident attitudes and opinions. Their number is comparatively small; in case of a bigger proportion, there is a risk of obtaining too general information, which provides an insufficiently detailed picture for the purposes of practical action and decision-making.

3.2 System building, implementation and documentation

The building and implementation of an indicator system is a process consisting of several stages, which have now been largely completed in Saulkrasti.

First, the development of an indicator system according to the results of sectoral and integrative problem analysis took place. Indicator selection for the system was carried out in a multiple-level scheme. Initially, all proposals by experts and working groups were collected without a critical evaluation; the number of proposed potential indicators reached over 100. Then, the values were dropped which were impossible to measure. A number of parameters were rejected where it was clear that no possibility would exist to obtain the required data, or where compliance with the indicator technical requirements was insufficient. The most significant exceptions were a number of pointers that can be obtained through opinion polls or voluntary monitoring; these were included in the indicator list on the condition that the measurements required would in future be done periodically.

Evaluation expert workshop took place in Saulkrasti (September, 2010), in which the indicator system was presented to municipality experts and the general public. This was followed by work in focus groups to evaluate the proposed system. The participants split into groups according to the interest and competence principle, with one group analysing indicators in the governance and social environments, and the other – in the economic and natural environments. Both groups concluded that the proposal is sufficient and adequately substantiated; the proposed additions were more concerned with the methodological approach in the calculation and interpretation of results. In addition, a proposal was made to apply indicators in the evaluation of sports and life-long learning events as well, which can, in fact, be included as additional parameters among existing indicators.

Summarising the conclusions of both groups, an assertion can be made that by introducing an indicator system for measuring sustainability, a municipality gets: comprehensive and well-arranged information on development and sustainability processes taking place in its territory, and an obvious comparison to its neighbours and competitors; review on the coastal processes and impacts, also in comparison to the inland part of the territory; effective instrument which allows for assessment of success in planning document implementation; forecasting instrument for planning further action, information on resident opinions and opinion changes. Indicators also serve as a powerful communication instrument in demonstrating governance effectiveness to the public and convincing the public of investments or other measures required.



Currently, the development of several indicator methodologies is in different stages of elaboration. During indicator calculations, reports are prepared for each indicator individually. This is done by using a template, the key requirements for which are indicated in the methodologies of the respective indicators. A review of the system values in general is, of course, also prepared. The review is to contain a public part as well, which might be part of the municipality's annual report. It includes fact sheets for individual indicators and the overall sustainability assessment. Indicator system's documentation, which is prepared in the implementation stage, is a relatively independent component of the municipal development strategy. It should be arranged as a text-book consisting of brief overall description of the indicator system in the form of a table, as well as the set of indicator calculation methodologies.

4 Saulkrasti municipality: short indicator assessment

In the planning practice, a number of coastal issues are regulated through national legislation; this, besides quite well keeping general public interests, however, limits planning flexibility for local government in particular local sustainability circumstances, but wide integration work possibilities still do exist. The coastal dune protection zone is in Latvia defined (generally) as a 150m-wide belt in residential areas and a 300m-wide belt beyond residential areas, in which mainly construction and other anthropogenic loads have been limited. A zone of limited economic activity is 5 km wide (in Saulkrasti municipality case covering almost all territory) and has limitations for some types of industrial production, extraction of mineral deposits and placement of waste management objects.

The developed indicator system in Saulkrasti cannot be said to function with maximum efficiency yet. This is due to difficulties in obtaining information for a number of agreed indicators; parts of indicator measurements are carried out for the first time, which does not yet allow evaluating existing trends. However, when analysing the values already obtained, we have come to a number of sustainability governance characterizing aspects concerning both sectoral and integrative approach for coastal management in Saulkrasti county, which have to be further studied, discussed with all stakeholders and implemented, but complementary with established ICM framework and main work directions (see, table 1) planned:

- 1. Governance environment and communication.** The coastal area is the key geographical spatial factor influencing the development of Saulkrasti, which means highest potential as well as creating significant problems at the same time. In existing municipal planning documents of Saulkrasti municipality, coastal issues have been integrated relatively poorly – in fact, only as much as is required under the national regulatory framework. This means that the coastal dune protection zone and coastal zone with limited economic activity have been established, providing for relevant activity limitations.

- 2. Natural environment.** Seasonal pollution, damage inflicted by vehicles and tourism pressure in the dune zone and in other forests are of real threat. Renovation and extension of water and sewerage systems required and started as



the systems currently cover the built-up areas insufficiently and are in a poor technical condition, but the level of public knowledge on the status and problems can be considered as very good.

3. Social environment. Symbolism of town and the whole municipality takes out significance of seashore and internal waters. Opportunities afforded by the coast are insufficiently reflected in the territory's cultural environment, except part of mass scale events during summer.

4. Economic environment. Business (except tourism) is relatively little affected by proximity to the sea; however, it can use it to its advantage. The key facilitating factor for business is Skulte port. It is relatively little affected by seasonality. Tourism infrastructure is not functionally closely integrated with the coast, although its activities are largely determined by proximity to the sea and seasonality. Only some tourist objects are direct coastal elements.

Aware of the drawbacks and possibilities, Saulkrasti county municipality is currently working on a new set of development documents, setting coastal impacts and opportunities as one of the key tasks. There are no coastal experts in the municipal administration, however, the importance of these issues has been duly acknowledged and their integration is consistently requested from the spatial and development planning experts involved.

5 Conclusions

Sustainability indicators play a vital role in the sustainability integrated planning and management model as a multiple instrument of situation analysis, prognosis and development strategy. In case of the coastal area, indicators acquire an additional importance as they allow for distinguishing and understanding coastal influences, the extent of their expansion within the territory, and the intensity of the influences in its different parts. The assessment of the spatial factor is even more effective due to the use of geographical information systems both during the indicator calculation process and as a communication instrument – to reflect the results in a form understandable not only to experts but also to the public at large and to decision-makers.

In Latvian circumstances, this sustainability governance and indicators system model approach is new, both in theoretical developments and definitions as well as being local practice oriented, in fact applied in the local municipal planning practice for the first time as one of the key analysis and governance assessment and communication instruments. Saulkrasti municipality have evaluated this jointly elaborated approach and acknowledged the developed indicator system as very significant. The municipality is planning allocation of financing to the further development of the indicator system and implementation in the municipality's everyday work during spring-summer 2011, and to the training of municipal specialists in the practical use of the indicator system.



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