

Local Coastal Collaboration Governance System Development: Municipal Participatory Monitoring

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Abstract. Coastal socio-ecological systems (SES) are complex systems based on mutually interconnected elements of nature, culture, socio-economic resources and, especially, often not really taken into account, governance resources. SES governance system developments evergrowing require not only anymore collaboration governance approach, but even principle. For this, besides horizontal and vertical governance integration (actually, collaboration), and stake-holders collaboration integration, our studies confirm also, that the main driving force for municipal sustainable coastal governance, daring to close the understanding and knowledge gap jeopardizing effective management at the local level, is coastal communication process necessary development - complementary applying instruments for coastal information and education/training, participation and coastal friendly stakeholders' behavior mutual development for coastal governance content and process collaborative facilitation.

To conclude this listing of the complementary collaborative governance model components for local coastal governance system establishing, there is to be mentioned the most critical and initial one – the assessment of both, coastal resources/status and their management, using necessary local governance innovation: municipal coastal monitoring system, that is adjusted to the specific local circumstances, based on nature-social science and governance factors (particularly, with citizen science contribution) and their interaction assessment. Related research-and-development studies were applied for the pilot territory - Salacgriva municipality in Latvia.

Keywords: coastal and collaborative governance, municipal monitoring, socio-ecological system.

1. Introduction

Integrated coastal zone management (ICZM) is one of the key elements to ensure sustainable development of the Baltic Sea region. A number of research papers identify that decision-makers and politicians at all governance levels have insufficient science-based information and understanding to cope with ICZM challenges in practice, e.g. how to integrate coastal issues into spatial development planning process. Identified ICZM gaps in Latvia are:

- lack of appropriate coastal management instruments at all levels of governance;

- insufficient human/institutional capacity and focus on coastal issues;

- low stake-holders' knowledge and public awareness and thus interest in efficient/sustainable use of coastal resources/potential;

- insufficient knowledge in creating links between national and local level planning documents;

- limited knowledge on local planning related to specific coastal issues ICZM;

- limited knowledge in coastal communication (instruments and practical implementation)

As a result, vulnerability to the external impacts and global changes, particularly – climate change, is increasing, and the most affected are local communities. This is confirmed by also our recent studies of municipal flood risk assessment, planning and management, as growing coastal issue, and there could be stated both risk related issues and general coastal governance issues at the same time:

- not satisfactory based on the local areas (municipalities) sustainable development complementary dimensions approach,

- there are limited local municipality stakeholder groups oriented communication between stakeholders and stakeholder groups (particularly - local municipality, public bodies, freeport businesses, educators, general public, media, NGOs),

- detailed coastal/environmental risk communication is not satisfactory integrated neither into a special risk management nor optional environment and/or mandatory municipal development planning process and planning/management documentation,

- there are often sufficient number/type of suitable municipal communication tools and channels, but they are not at all either satisfactory applied in order to provide open access to environmental risks related public information, nor used complementary,

- the same situation with public education and involvement, and almost non provision of reducing risks and adequate emergency actions.

Coastal risk governance, actually, as also general coastal governance, in Latvian municipalities has to be identified/assessed and managed not only as a traditionally technical-environmental problem, but also as socio-economic and culture tradition oriented problem field as it all and complementary affects local communities and territory. Cross-level (vertical) and cross-sectorial (horizontal) integration is to be implemented into the all mandatory municipal planning documents and esp. in the

process of preparing, making and carrying out coastal decisions during whole governance cycle. In the latter, there also shall be integrated also mostly not known yet municipal monitoring (incl. public based/citizen science) and eventual governance indicator systems.

When coming to the main/basic ICZM related models and approaches studied and, at least partially, applied in Latvia, there have been discussed the collaboration communication model evaluating its successful realization at municipal level in Latvia during last decade. In order to provide successful coastal communication, it is necessary to complementary apply following collaboration communication instruments – information, educations, participation and environment friendly and risk adapted behaviour, to be applied among all of the interest groups.

The collaboration governance model (Fig.1) shall be introduced as well as tackling the whole governance cycle and being particularly relevant to multi-dimensional governance processes, where collaboration communication also plays central role.

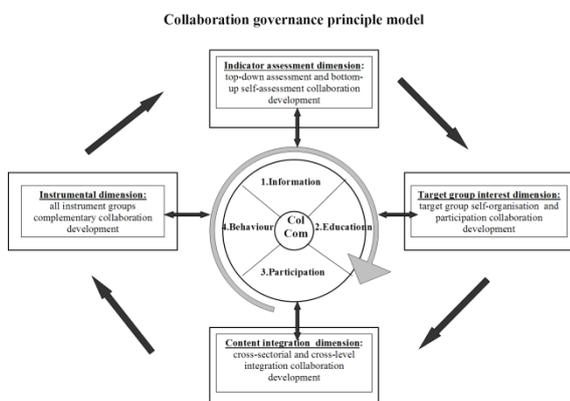


Figure 1. Collaboration governance principle model: four dimensions and collaborative communication (col.com.) for whole set application enhancement

2. Salacgriva governance case study developments

The research-and-development (R&D) studies mentioned in the paper analysed coastal governance and also all stakeholders communication process and

content in the coastal rural and town municipalities of Latvia - Salacgriva, Paviļosta, Dundaga, Ventspils and Liepaja. During the realization of the Latvian National Research Program Project SUSTINNO at the University of Latvia Environmental Science department, there were performed structured main stakeholders' in-depth interviews and previously also two questionnaire surveys done (Salacgriva, Ventspils), as well as expert interviews conducted. Results from coastal case studies are suggesting the whole scope of governance and communication enhancement recommendations to be complementary developed for coastal governance, even most of them are separately known theoretically and/or by international practice and some separately also step-wise applied by Latvian municipal environmental and coastal governance practice as well.

Further on existing R&D realization knowledge has been transformed for detailed coastal governance pilot study in

Salacgriva municipality (one of 17 Latvian coastal, mainly rural, municipalities), applying System analysis framework approach, based on social-ecological system analysis and participatory approaches, being performed within EU BONUS BaltCoast project frame. There was realized coastal erosion studies, marine/beach litter monitoring and studies, followed by coastal multi-issue monitoring test-run, as well as beach visitor survey and governance stakeholders' studies.

Salacgriva is the one of the most advanced local municipalities in Latvia with respect to collaborative environmental governance. The municipality is characterized by a long shore line that stretches for 55 km (10% of the whole Latvia coastline) and a disperse population with average density only around 12 pers/km². The territory faces a problem of unsustainable use of coastal resources for several reasons, particularly insufficient capacity for coastal governance at the local level that is combined with governance shortcomings at the higher administrative level (national, regional), as well as due to climate change impacts from which additional risks evolve on the use of coastal resources. Efficient collaborative governance that involves all stake-holders and governance levels shall be implemented with aim to ensure sustainable and multi-functional use of coastal resources and improve integration of the coastal issues into municipal planning processes and policy documents, especially, through spatial planning activity.

Top-down governance of the coastal territories is determined by national level planning documents, starting with National Sustainable Development Strategy 2030 that acknowledges the coast of the Baltic Sea as a unique area of national interest. Two recent national coastal planning documents are to be mentioned - Strategy for Coastal Spatial Development for 2011-2017 that reconfirms significance of coastal nature and cultural united heritage, and aims at development of the coast as a multi-functional space with appropriate infrastructure and good governance practice, as well as, National Long-Term Thematic Plan for the Coastal Area of the Baltic Sea (2016), specifying coastal infrastructure development as for main priority direction.

Bottom-up governance of the coastal territories is in hands of the local authorities and stake-holder groups. General guiding documents for them are Municipal Development Programmes and Spatial Plans. Salacgriva municipality have also some specialized policies, being elaborated in partnership with university of Latvia: Green Municipality Declaration (2010), Climate Change Adaptation Strategy (2011) and Sustainable Development Strategy until 2030. All include coastal issues, being even not close to the central issues for municipality mainly spread along 55 km of its coastline.

2. Coastal governance problems aggregation

Existing municipal governance limited practice creates conflict for sustainable resources use: there is no balance between resources protection, their overuse, on one hand, and sustainable use for future development, on the other hand. Vulnerability of the complex coastal socio-ecological systems cannot be maintained in a sustainable way unless major stake-holder groups and local communities are aware of the current situation. Without

relevant information, it is difficult to assess policy options and take weighted decisions. One of opportunities to improve ICZM is to develop science-policy interface which means transfer of the coastal science (including understanding of nature and social science interactions) knowledge into decision making. This could be done by integration of scientific data into coastal monitoring system which shall be designed, approved and used at the local level based on the developed coastal indicator system.

A method for identification and analysis of the coastal problems was based on system analysis approach which was used in the iterative and multi-step wise manner. This approach was built on the following core elements:

- extensive national and local policy and planning documents studies in relation to the coast related issues coverage;
- environmental and socio-economic data gathering, their analysis and further studies in the selected case study territory;
- involvement of the local stake-holders' groups into situation assessment, priorities setting and solutions identification through social interviews and stake-holder seminars;
- integrating of nature and social studies results and involving citizen science elements.

Performed extensive desk studies of the relevant planning documents and data analysis allowed to identify a number of coastal problems and draw relationship models linking causes and effects. Further, discussion groups were organized with the local stake-holders with aim to agree on the priority list of the coastal zone problems and group them: (i) the state of environment problems (including coastal erosion, marine litter, biotopes degradation, forest damage, sea water quality, and algae blooming), and (ii) socio-economic problems or pressures (tourism impacts, restricted access to the sea due to the construction and private fences, lack of sufficient coastal infrastructure, inadequate safety and rescue services, household pollution, and flooding).

Two essential conclusions were drawn after iterative process of problem analysis. Firstly, there are few coastal territories in the municipality where resources are over exploited or used in interest of a limited stake-holder group or even individuals; this creates additional stress on resources, as well as environmental pollution and distrust among other stake-holders. At the same time, there are other territories where resources are under managed that, on its turn, causes risks of further degradation of the coastal resources. The main causes of this situation are: insufficient understanding of the current situation and potential of the coastal resources for local development; insufficient municipal efforts and capacity to ensure efficient coastal management, limited involvement of locally existing citizens self-organizing forms (NGOs, interest groups etc.) into coastal management process; and finally – disperse and very low density of the population on the coast.

3. Risks - coastal retreat and beach litter

Changes in conditions determining the evolution of the coastal slope is believed to be the main cause of growth in coastal erosion rate and spread in Latvia and in the Salacgriva municipality in particular. Among other, such a conclusion is based on the observations and coastal change

measurements carried out in close proximity to the anthropogenic objects affecting the stability of the coast (coastal protection structures and harbors). Using historical, even partial, data from 2005 and data collected during the field work in the Salacgriva municipality in 2015, important conclusions were drawn. Several coastal sections can be distinguished where long-term coastal retreat or temporary (compensated) erosion during extreme storms can be considered as a significant issue for coastal management as data show that for approximately 25% of the municipal coastline, over the course of last 11 years, the average retreat rate in these coastal sections was between 0.3 and 0.6 meters per year.

Data suggest that, in previously dynamically neutral coastal sections, after the catastrophic erosion caused by the hurricane Gudrun in 2005, slope regeneration towards pre-storm parameters is very slow. That should be considered as a significant issue for the ICZM. Despite increased coastal erosion spread and intensity during the recent decades, coastal sections where coastal slope stability remains high are still widespread in the municipality (29.5 km).

A sociological survey was carried out aiming to identify perceptions of the local people related to the flood risks. Most of the interviewed answered that there are no serious climate change impacts experienced at the local level, however they mentioned few phenomena like spring floods, heavy rain falls, storm surge, and pointed to the observed sea level rise. The latter two have been considered as the main risks to their households. 50 % of the interviewed could not recall any information on the flood risks; one third have heard something in the national media, and only one fifth could remember information in the local media. 81% of interviewed agreed that flood risk preparedness at the municipal level is essential for climate adaptation and resilience.

Other and new type of growing local risks – beach/marine litter. On average for all beaches under monitoring, the long term trend indicates an increase of beach litter amounts in Salacgriva municipality. The average amount of litter is 205 items per 100 meters of monitoring beach site, which is higher than the national average of 130 units. In all of the beaches the majority of litter items collected are related to tourism and household sources – from 60% to 80%, while the dominant item was plastic pieces, similar to all of the other coastal regions. Overall, the data indicates a generally worse situation in municipality than the Latvian coastal average despite the relatively lower number of seaside towns, villages and other local litter sources there.

The results of the on-spot survey indicate that half of respondents-beach visitors being met at the coast do perceive Latvian coastline and beaches as being clean or very clean. Analyses showed that those rankings do not have a direct connection to the results of beach litter surveys on local level, leading to conclusion that beach cleanliness evaluation is based on the range of other factors as well. Nevertheless, the cleanliness of beach is among leading factors, when people choose their coastal destinations – together with accessibility of beach and its location. Visitors of Latvian beaches put the beach infrastructure presence (restaurants, children playground,

beach patrol) in much lesser priority when choosing recreation destination. When asked to identify, which marine litter fractions are the most problematic, respondents mainly identified plastic items, twice as much as next following glass and cigarette butts items. That corresponds to the data about beach litter situation in Latvia, where plastic litter constitutes more than half of litter found on the beaches.

Regarding possible tools to be used as for solution, most frequent and highest ranked response were raising public awareness, followed by improvement in beach infrastructure and beach management. However, the most important issue for any local public monitoring is to have direct data application for related decision making at the local municipality, which requires not only the involvement of various local stakeholders, but also collaboration between them and municipality itself.

4. Municipal level monitoring system

Scientific information available to the municipal level managers about the physical state of the coast is often missing, either incomplete and too complex, thus difficult to be used. Innovation of locally tailored monitoring system at the municipal level, initially based on available science information, and further promoted through development of specific coastal indicator system suitable for unambiguously interpretation of coastal state, becomes an instrument that could be applied by the coastal municipalities and used in practice for the coastal policy development, implementation and assessing results.

Coastal integrated governance basic principle includes all four sustainability dimensions – natural, economical, social and governance environment aspects consideration into their mutual correlations. Particularly efficient municipal governance comprises synthesis of top-down and bottom-up approaches, which is expressed in involvement of public interest groups in the formal development planning processes and this involvement must take place in the all five municipal governance cycle stages: situation investigation, policy formulation, policy planning, implementation, monitoring and assessment, which is known also as 5P cycle. At the local level it is necessary to receive and assess information, which spatial resolution at the state and different institutions maintained information systems is not allowing to determine various aspects of coastal impacts and this information often is possible to receive and assess only with public assistance.

One of the main territorial investigation process results now is to be coastal governance survey (CGS), which contains information about coastline in the perspective of all four sustainability dimensions and which qualitative assessment is based on ecosystem services approach. The concept of CGS descriptive part consists of the following substantial contributions: general characteristics of the territory, coastal definitions, natural, economical and social environment's structured descriptions, coastal anthropogenic loads and risks characteristics, and governance system's description. In the last is to be reflected governance normative framework, municipal governance organization and operation and bottom-up governance interest groups, traditions and active mechanisms. Governance quantitative aspects is to be reflected in coastal sustainable development governance

indicators system (IS). IS in its development process is to be seen also as in system dynamic model of territory based data frame for description of coastline and its processes. At present CGS is in the beginning of development in the EU BONUS BaltCoast research territory in Salacgriva municipality. Involvement of interest groups in CGS development for different dimensions is designed in different forms, which correspond to each sustainability dimension information particularities: public monitoring in the nature environment, questionnaires and interviews in the economic and social environment, and focus groups work etc. in the governance environment.

The complementary use of all types of governance instruments is to be effectively applied too - political and legal, planning, economic and financial, institutional/administrative, infrastructure and communication instruments. The main success precondition still remains - pro-active collaboration between the all main stakeholders groups involved in the process is to be taking place and especially mandatory using of all collaboration communication complementary set of instruments – information and education/training, participation and related everyday/risk behaviour - to ensure that any particular step/sector/level does not become a weak link in the necessary chain of governance.

5. Conclusions

General problem perceived for real coastal governance practice development is to be seen at both ends of the governance cycle – science and policy interaction and their integration into municipal planning and management practice. This requires all necessary science-policy integration tools – coastal science and municipal monitoring, incl. citizen science approach, complementarity of all groups of governance instruments (legal/political, admin/institutional, planning, infrastructure, economic/financial and communication).

Coastal governance as multi-dimension sustainability (resilience) governance has to be further detailed studied, but comprehensive framework recommendations could be designed applying collaboration governance model, stressing following complementary elements of the whole governance cycle (e.g. identification/assessment and policy formulation, planning and management) process, governance content and dimensions:

- 1- pro-active collaboration within and between the all main stakeholders groups to be mandatory involved, and related
- 2- integrated governance situation assessment, applying municipal monitoring (incl. public one) as locally based necessity (incl. indicator systems),
- 3- cross-level/vertical and cross-sectorial/horizontal integration,
- 4- development and complementary use of all groups of governance instruments, particularly applying and
- 5- mandatory using collaboration communication complementary set of instruments – information and education/training, participation and everyday/risk related behavior.

Mentioned components of collaborative governance could be eventually applied for other type of multi-dimensional local governance.

The assessment of coastal resources/status and their management, being absent at both national and local level

in Latvia, mandatory requires mentioned municipal coastal monitoring system development, based on nature-social science and governance factors (particularly, citizen science contribution) and their interaction assessment at the given locality, and, integrated into all stages of municipal development planning and implementation cycle.

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References

- Cepurītis, E., Ulme, J., Graudiņa-Bombiza, S., (2017) Development of Beach litter monitoring on the Latvian coastline: the citizen science perspective. *Regional formation and development studies*, No.1 (21), pp. 19-33.
- Ernšteins R., (2008). Sustainable coastal development in Latvia: Collaboration communication and governance imperative. In: *Sustainable Coastal Development: Collaboration Governance* (Ernšteins R., Jūrmalietis R., eds.), University of Latvia Academic Publishing, Riga, Latvia, pp.159.-178.
- Ernšteins R, Lontone et al. Integrated Coastal Management practice case studies: deficiency of collaboration and socio-ecological system approaches. *Economic Science for Rural Development Conference Proceedings*. 2017, Issue 45, pp. 63-70.
- Hopkins, T.S., Bailly, D., Stottrup, J.G. (2011) A Systems Approach Framework for Coastal Zones. *Ecology and society* 16(4): p.25.
- Hopkins, S. T., Bailly, D., et al.. (2012). A Systems Approach Framework for the Transition to Sustainable Development: Potential Value Based on Coastal Experiments. *Ecology and Society*, 17 (3), p. 39.
- Gilbert C. (ed.) (2008) State of the Coast of the South East Baltic: indicators-based approach to evaluating coastal sustainable development. Gdansk, 158p.
- Karpouzoglou, T., Dewulf, A., Clark, J. (2016). Advancing Adaptive Governance of Social-Ecological Systems through Theoretical Multiplicity. *Environmental Science & Policy*. Vol. 57, pp. 1–9.
- Kudrenickis, I., Ernšteins, R., Kaulins, J. (2016). Sustainable Coastal Science-Policy-Practice Interface Development: Municipal Coastal Governance Indicator System. *Journal of Environmental Science*, 1, pp. 255-264.
- Mette, A., (2011). Bridging the Gap between Science and Society. In: P. Tett, A. Sandberf, A. Mette, editors. *Sustainable Coastal Zone Systems*, Dunedin Academic Press, Edinburgh, UK, pp. 103–135.
- Stottrup, J.G., Dinenses, et al. (2017) Re-visiting ICM theory & practice: Lessons learned from the Baltic Sea Region. *Ocean& Coastal Management* 139, pp. 64-76.