Municipal Sustainable Coastal Governance: Social-Ecological Systems Studies Towards Complementary Instruments

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Abstract— Municipal sustainable coastal governance (SCG) developments in Latvia have been investigated throughout the whole governance cycle - from understanding and initial applications of social-ecological systems studies approach towards related strategic decisions, policy formulations and planning with next applications of integrated management to be done by complementary introduction and use of the set of six main groups of instruments, and finally, evaluation/assesment work by monitoring/indicator system. Environmental/coastal management instruments have been analyzed, emphasizing approaches of collaboration governance and integration. Both disciplinary and integrative instruments are to be complementary planned/applied and possibly also integrated in order to improve the consequence and coherence (horizontal integration) in-between the various sectors and governance levels (vertical integration). SCG, being of integrative character, require especial attention towards development of collaboration instruments. There are proposed and tested integrated methodology combining all mentioned above into the applied model of collaboration governance in order to be used further on as coastal sience-policy-practice interface for municipal, especially rural, SCG required developments, since research-and-development studies in coastal municipalities are concluding on still existing deficiencies characterizing local coastal stakeholders, being neither satisfactory informed and knowledgable nor aware of integrated coastal problem-solving approaches and instruments.

Keywords—coastal governance cycle, collaboration governance, interface, set of coastal instruments, coastal communication

I. Introduction

Coastal management is integrated, dynamic multi-disciplinary and interactive process that ensures the sustainable governance promotion in coastal zone (ES, 2002). In this context, the term "integrated" refers to the integration of objectives as well as many instruments which are necessary to meet these objectives. It means the integration among all of the respective policy areas, sectors and management levels as well as integration between components of mainland and sea, both in time and space. Integrated coastal management is characterized by the following basic principles (ES, 2002):

- Broad view in holistic perspective;
- Long-term perspective;
- Adaptive governance in step-by-step process;
- Reflection of local peculiarities;
- Observance of nature processes on the coast;
- Public and target group participation planning;
- The support and involvement of all administrative institutions;
- Combination of governance instruments.

Why is it important to address the question about integrated environmental governance and integrated governance in the planning of territorial development, particularly in the context of municipality? Municipalities are responsible for different functions and these functions are carried out or managed by many different departments of the organization, often with restricted resources of all kinds. Integrated environmental governance (IEG) offers an instrument to improve the sequence and coordination among different policy trends from the environmental perspective, as well as device for increasing the efficiency of these policy trends within allocated budgets. It can also offer greater transparency in policy development and promote greater public participation and more positive perception (Ernšteins, 2010:247.pp.). UNO acknowledges that (UNO summit, Rio-de Janeiro, 1992), that environmental problems cannot be solved only by legislative restrictions or latest technologies, it requires problem solving approach tended towards people - upon the individual, its awareness and behavior. To address the individual environmental and sustainable communication is required and particularly communication viewed from activity orientation, that is, from information to education and through participation to environmentally friendly behavior (Ernšteins,1999: p.184) – it bridges the gap between human and environment, it is the instrument for creation of environmental awareness and behavior.

Both, in the context development planning (elaborating of Sustainable development strategy for municipality (SDS) for long-term planning and medium term Development program (DP), and also environmental governance (EG), in case of planning the turnover circle, that is particularly important and yet untraditional, the municipal audit is structured in the perspective of all the three dimensions of traditional

sustainable development (SD), also viewing it as innovative by adding, to our mind, the compulsory fourth dimension, that is, assessment of complete current situation, structuring further planning according to four (SD) dimensions: natural environment; social environment; economic environment; governance and communication environment (see figure 1).

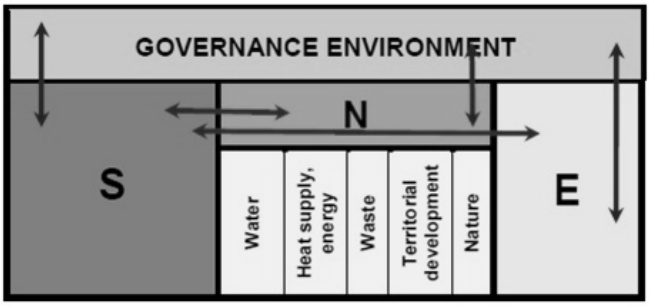

Figure 1. Four dimensional sustainable development model, developing governance environment concept (Ernsteins, 2006: p.7, Ernsteins, 2012:1012.)

Development of integrated approach and its municipal application practice in Latvia should be reviewed in a wider development context in municipal environmental governance (EG) (Zīlniece, Ernšteins,Benders 2010: p.112.; Lagzdina, Ernšteins, 2009: p.135), but particularly during the process of development of methodology and (EG) by Department of Environmemtal Management (DEM) of University of Latvia. EG research has been successively developing since 1990s, but particularly when elaborating DEM Master's degree study programs "Environmental governance" field study (FS) research methodology since 1998/1999, based on so called integrative asessment approach (Ernšteins, 2012: p.1009) – it consists of Case study research, including compulsory Stakeholders analysis, while completing it as a whole Collaboration research. Next, governance project development of municipal/coastal territory has to be mentioned – interaction of multi-ecosystem and social-economic system and horizontal/vertical integration imparative approach have been improved and practically absorbed. Through the intensified studies and cooperation guidelines for Environmental policy and Environmental governance, including SD governance and Integrated Coastal Governance (ICG), Environmental communication, as well as Household EG, Climate Change adaption (CCA) and others have been elaborated. Since 2004/2005 integrated model approach of SD has been successfully developed into other SD dimensions, paricularly emphasizing mutual integration of environmental governance - all of the municipal services and departments should be involved in EG. In order to meet the integration requirements, governance environment (and communication) as one of the essential SD dimensions has been incorporated into guidelines since 2007/2008, along with the development of concept and principle of collaborative governance, as well as municipal EG/SD/ICG/CCA and other indicator systems have been elaborated. Elements of integrated model approach of SD and FS results have been diversely applied in practical work of municipalities of RL, including the elaboration and approval of disciplinary and integrative municipal planning documents.

Likewise, practical examples of SD integration model approach should be mentioned – environmental policy plans and action programs (EPP/EAP) of different regions/cities and components of devlopment planing processes/documents, including development programs (DP) and other planning documents which were elaborated by within the framework of DEM, UL and municipal cooperation projects or based upon them, hence approved and implemented in municipal governance :

- EPP and EAP for the city of Cēsis, 2005
- EG and the Declaration of integrated collaboration and the vision for the development of Environmental sector and atcivity guidelines of Līvāni district, 2005
- EAP for the city of Liepā, 2009 – Environmental communication chapter
- Green Region Declaration of Salacgrīva, 2010
- Saulkrasti integrated coastal management guidelines for indicator systems, 2011
- Climate change adaption strategy of Salcgrīva district, 2011
- (Intgrated) Regional Development Programs 2012-13: Beverīna, Cesvaine, Aglona, Saulkrasti districts (based upon integrated approach methodology),
- DP of Saulkrasti region – SD indicator system, 2013.

The accumulated experience of theoretical elaboration of EG and its practical implementation contributed to the elaboration of collaborative governance model and improved the formation of integrated approch methodology along with new and innovative adjustment to the development problem issues of coastal areas and municipalities (Ernšteins, 2011:p.29; Ernšteins,2012: p.1008).

II. COLLABORATIVE GOVERNANCE APPROACH

Collaborative governance model (Ernšteins, 2008: p.160) is being offered as the model of basic structure of environmental governance turnaround circle or as the potentially prevailing environmental governance principle. The concept of the model is based upon the fact that environmental governance must be realized with the integrative collaboration of all the main components of governance circle- the model consists of 5 main and complementary components and subordinated components:

1. Mutual cooperation development of internal and external governance **target groups**;
2. Development of vertical and horizontal integrative **thematic** cooperation;
3. Cooperation development of governance **instruments**;
4. Cooperation development of governance **assessment (**indicator assessment);

5. **Communication** development of collaborative governance.

The component of the first model- mutual cooperation development of internal and external governance target groups (see figure 3) – is tended towards cooperation development among governance / Council **internal target groups** (cooperation development both vertical and horizontal in Council and other departments of municipality) and consequently realizing collaboration with **external target groups** (collaboration both, with regional municipality / Council external target groups and collaboration development beyond external target groups of regional council).

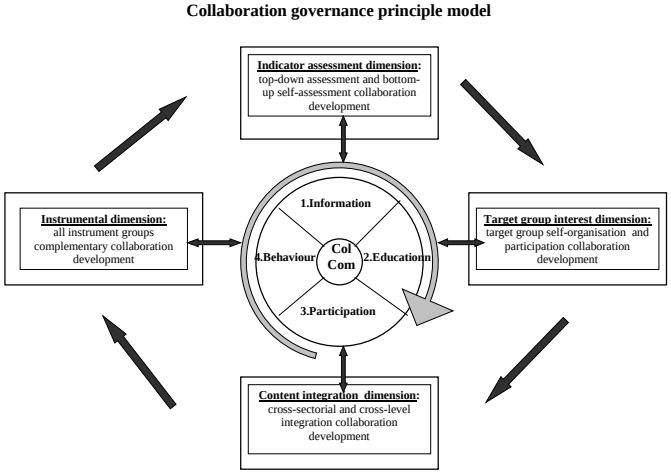

Figure 3. Collaborative governance principle (R. Ernsteins, 2010)

The components of the second model - development of vertical and horizontal integrative thematic cooperation – the goal is to ensure the **content integration** of governance sectors (see figure 2), that can be achieved by interaction of sector actors – vertical and horizontal cooperation of sector actors. The third model component emphasizes that **complementary instrument set** should be applied to ensure the successful development of environmental governance and development planning, which means the adequate application of all 6 environmental governance instruments: political and legislative instruments; planning instruments; economic and financial instruments (budget resources, tax policy, attraction of finances from support programs/funds, promotion of public-private partnership, eco-certification, green procurement and other); administrative and institutional instruments (structural improvement of national/local authorities/ organizations, establishment of quality management / environmental governance systems and others); infrastructural instruments; communication instruments.

The fourth model component is about system's development for governance assessment, that is, indicator assessment approach, which considers both, downward and upward approach as well as their coordination (development of interaction between both of assessment approaches), so that the progress of environmental governance development would be evaluated by both sides of community governance. The model component of the closing fifth part is directed towards actions to ensure **collaborative communication** which is essential driving force of all the collaborative governance and entity of communication instruments- it includes access to information for the involved target groups about collaboration, the skills and knowledge and understanding for involvement / participation and collaboration and to ensure the fulfillment of collaborative governance of due diligence and result communication, that is, to ensure: information accessibility of collaborative governance; participation practice of collaborative governance; development of due diligence within collaborative governance.

III. RESEARCH DEVELOPMENT AND PROCEDURE

Environmental governannce research was carried out in municipalities during the field studies, both in Salacgrīva and Saulkrasti districts in 2014-2016, also governance instruments assessment.

The field study procedure of coastal municipalities was organized conceptually as collaboration research of UL and municipality, specifically carrying out integrated case study, with cumpulsory Stakeholder (tareget group) analysis: document studies, questionning and interviewing of 8 main traget groups (at least 40-60 interviews within each research) and focus groups observation research (Ernšteins, 2012: p.1006). Development planning research, by elaboration of current situation analysis, were carried out in Saulkratsi district, as well as in Beverīna, Cesvaine and Aglona districts. The circle of environmental and development (planning) governance was viewed in the context of 4P model - inquiry → planning → management → testing → and once again inquiry/assessment. Consequently the environmental governance circle consists of : problem analysis/inquiry (P1); policy elaboration (P2); programming of planning and action (P3); management (P4)- subsequent and systematic realization of action program (Ernšteins, 2006:p.4; 2008: p.160).

IV. PRINCIPLE OF SCIENCE-POLICY INTERFACE WITHIN MUNICIPAL ICM

The issue is providing interface between science and policy, meaning preparation in an integrated manner science knowledge that we can translate, transfer and integrate into ICM related decision making and implementation practice. This objective would require to elaborate necessary background and tools for both transfer process and products, in order to manage the interpretation of scientific data into language understandable for local/regional/national politicians and general public as well. To assess the coastal situation, science-based and at the same time easily applicable and interpretable municipal coastal monitoring and coastal indicators system should be created.

In this article we will demonstrate and discuss approach and principles of such system development to transfer coastal science integrated knowledge into coastal decision making to help to improve ICM decision planning and policy. This system based on nature-social science factors and their

interaction, including citizens science component, thus might become an effective instrument for the coastal governance at local level. To create this multi-folded and multi-sectoral coastal governance system, the following main structural elements are needed:

1. coastal zone as socio-ecological system thinking and understanding, incl. academical and applied practice development, in all governance levels and thematical fields/sectors and, especially, in the operation of inter-sectoral reference and planning/management,
2. multi-thematical reference (and, accordingly, planning) development and specifically, necessary integration of coastal nature (physical) science research and knowledge with that of coastal social science knowledge research integration, when studies must be planned to be acquired in parallel and realized complementary (e.g., flood risks shall be investigated both in nature science and social science point of view),
3. development of coastal area classification system (physical classification including social elements) serving as a basis for science based general knowledge transfer and exchange between coastal territories/areas.
4. creation of the management system to interpretate the scientific data into language understandable to politicians, stakeholders and people in general,
5. and, at the end is understandable, that necessary integration this knowledge into the whole municipal coastal governance cycle process/products with innovating and facilitating ICM decision making and policy renewal, complementary instruments based planning and implementation, for which realization is necessary
6. imperative coastal communication systematic development as still new and on interaction settings based multi-thematical and multi-instrumental communication development, and here it is seen within two basic complementary frameworks:

(1) as science-policy interface communication and also as

(2) stakeholders communication.

Coastal science communication models shall be elaborated, based on nature and social science complex interaction application. It is necessary to design an integrated coastal science communication content/products and to prepare local authorities and stakeholders participated communication process with integrated governance process and governance instruments development.

All this shall result in ICZM development model for particular municipal coastal territory.

The Figure 2 demonstrates the structure and the key challenges realizing the science-policy practice interface.

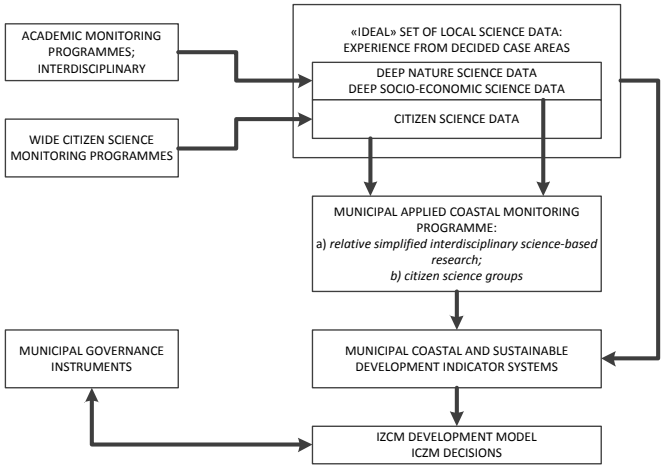

Figure 2. Principle of science-policy interface

At **first**, the local governance challenge and first interface element and step is **coastal multi-thematical research development** and results support, as the initial scientific justification for ICM development.

Our physical and social knowledge of land-sea boundary is known from a number of academic and applied studies, however we can still recognize the lack of locally based coastal research knowledge. Examining for different interested target groups actual, complex governance solutions for interdisciplinary and intermediary coastal problems, primarily must be carried out integration of coastal nature science research results with social science results, both had an obligatory/important part of public science local contribution, as a result ensuring understanding of nature-social science interaction and complementarity about its possible introduction in municipalities ICG firstly agenda, and after in planning and implementation.

Important, for local coastal municipalities, having direct coastal forcing and governing impact, there is necessary to have not only shoreline physical development characteristics, but also the knowledge of interests and behavior of **main stakeholder groups** and intermediaries, also collaboration capacity, traditions and overview of instruments available for existing ICM oriented practice.

V. SIX STEPS INTERFACE MODEL

Locally based coastal knowledge might be improved by applying combination of two approaches:

- in development and realization of new methods for research performance in the local level, which are feasible both in terms of financial, human resources and time contribution, i.e. significant investment there can provide citizens science development and cooperation between local governments and universities, finding the optimal shape of such cooperation;

- other one is to facilitate the transfer of research knowledge (as well as of best ICM practice knowledge) from one case/country to another cases/countries.

Regardless to a significant diversity, we may find quite many similarities of coastlines and coastal areas in particular regions (like south-eastern part of the Baltic Sea coast), then we do come to conclusion that we need to elaborate a locality based coastal area classes (CAC) system, to categorize various coastal units that can be mapped at meaningful scales, in order to introduce classes/sub-classes of coastal physical, but not excluding also social, characteristics, as support tool for such transferability.

Adaptation and socialization of existing models for SE Baltics, consideration of coastal geomorphologic properties depending upon their significance and attitudes toward ICM purposes are the biggest challenge of such approximation. We will not analyze those coastal research development aspects more detailed in this article, just indicate, that their solutions are some important research worth. It can be noted, that SE Baltics coastal peculiarities manifest in a way that majority of coastal sections are formed of unconsolidated quaternary sediments, main sediment input to the coastal system is provided by coastal erosion, and in addition also longshore sediment drift is widespread, linking waste portions of coast in to subsystem elements. Complex research data, being obtained in the decided academic research areas will justify the relatively simplified measurements, to be used for municipal monitoring needs.

The second interface element and step Coastal governance survey (CGS). It`s development ensure necessary coastal multi-thematical condition/situation summary and assessment (comparatively similarly to Environmental survey in development planning and environmental impact assessment), but in direct and complementary correlation with coastal governance content and process, as well as it`s realizing target groups, in the particular coastal governance segments. CGS development takes place accordingly to the basic step of planning process stated in the Law on development planning system – existing situation survey, and it must be regularly and periodically updated and, particularly essential, also multiple used for all particular territory/municipality planning process realization and development of resultative products – development of mandatory (SDS, DP and SP) and voluntary planning documents, for example, Coastal thematical plan, Tourism development plan etc.

Innovative and effective in practice governance instrument can be CGS, although specifically and purposefully named "governance report" – it includes both coastal natural sciences and socio-economical data analysis, and coastal governance characteristics. Scientific data analysis and interpretation is provided in the context of coastal governance. Survey must fulfill the following requirements:

- survey looking at and analyzing coastal zone as a socio-ecological system,
- survey is based on scientific data and including wide quantitative (numerical) information,
- survey language is easy to understand for local target groups and decision makers,
- survey is based/reflecting on values, which are important for local municipality/inhabitants community,
- reported information in survey must serve as a catalyst for the discussion about identification and creation of new values (information must be presented in the form and content, which is able to perform this task).

In the context of the **third** interface element most important socio-natural processes and impacts parameters and it's system is transformed in the frame of Coastal governance survey content (thematical table of content) and process is the backbone of to be designed and applied for the next governance cycles **coastal governance assessment system –** also as **municipal coastal monitoring system** but later also as an indicator system, which, clearly, are mutually complementary connected and developed.

The introduction of **municipal coastal monitoring programme,** based on various types of applied measurements done by local employees and stakeholders/citizens groups, and being suitable for unambiguously interpretation of coastal state & conditions are those real instrument considered by authors that could be applied by coastal municipalities and used in practice for coastal policy development and implementation thus having municipal practice based way of ensuring the interface between coastal science and policy. Municipal monitoring programme offers specifically minimal-optimal research amount, quantitatively describing the state of a coastal system. Important, the municipal applied monitoring should include both nature and socio-economic monitoring and particular programmes of municipal monitoring should be adapted for different CAC.

The task of the system is to discover coastal key indicators and to promote improvement of ICG models and scenarios. Municipal coastal monitoring program is based on different type of applied coastal monitoring measures/actions, which potentially execute as:

(1) local municipality administration and employees of organizations/services and/or

(2) other organizations, incl. social, after particular function delegation for them from municipal management, and/or

(3) that would be very significant – interested parts/inhabitants groups and their representatives, so potentially providing, so called public participation science contribution (*citizen science*), and

(4) supplementing it with, when necessary ordered, experts studies/assessments.

Important in addition to emphasize this citizen science contribution or in practice – public monitoring development, involving/self-organizing potential networking of different voluntary groups/individuals and maximally on scientific principles based activity. In functioning of such activists and networks in Latvia is gained considerable experience in nature

protection and also all kind of supporting materials sets of public monitoring programs and their full provision developed by experts. In the public monitoring usually actively engages in local schools, particularly eco-schools, as well as local NGOs etc., but definitely possible also participation of local municipalities more responsible and active part of society, pensioner`s associations etc.

The innovative offer of given recommendations is methodology, which ensures, that such municipal monitoring is applicable for the adequate interpretation of coastal situation and status, and it is/can be really functional instrument, which is applied in practice in coastal municipalities and used for the development of coastal policy. Coastal monitoring program offering specific minimally-optimal research amount, which quantitatively describe the state of the coastal system. Important, that municipal applied monitoring must include in coastal area both nature, and socio-economical monitoring and socio-economical monitoring and municipal monitoring particular programs must be adapted for different coastal zone categories.

Coastal governance survey in complete with Coastal monitoring program is significant **innovation in Latvian situation.** Their use result provides:

- accessibility of such data for coastal municipal governance, which cannot be provided with efforts of municipal administration (public participation science role and contribution),
- strengthens cooperation both between inhabitants interest groups and municipality, and also cooperation inside inhabitants target group between its different subgroups, promote mutual trust,
- serves as an instrument in to the knowledge based target groups discussion,
- opportunity society in general and particular **coastal interest groups self-initiative development,** starting/proposing coastal public monitoring process and content, which could prove to be crucially important in circumstances, when municipalities lacking administrative and other capacities or is not enough responsible motivation in every day work of coastal development and governance,
- the last, but not least, thereby it can serve as the starting point for coastal governance quality improvement in the municipal level.

The **fourth** challenge is creation and application of **municipal coastal (and development) indicators system.**

Indicators are a tool of information organizing, priorities determination. The contemporary complex and not satisfactory studied situation do require both sophisticated analysis and also applied municipal practice related solutions to those many overlapping and interrelated issues in the coastal areas. This is to be done by organization of physical and socio-economical as well as governance parameters, and their mutual integration, qualitatively and quantitatively characterizing the subject into a coherent multilevel approach.

Local municipal indicator system simultaneously provides input both, for the municipality ICM and the assessment and achievement of municipal strategic development goals. Assessment of indicator values is carried out by local municipality based on precisely elaborated system of algorithms, assuming active implementation of citizens science principle, external experts can be contracted initially while starting the system and only upon specific necessity later on. System is supplemented by external indicators that can be referred to local territory.

As the pilot the Sustainable coastal development governance indicator system has been developed for Saulkrasti municipality, accepted by Saulkrasti local authority as a part of supervision for municipal long-term strategy and mid-term program. The system contains an 65 indicators, including: (i) 19 environmental indicators, divided in 7 thematic groups, (ii) 20 economic indicators , divided in 6 thematic groups, (iii) 15 social indicators , divided in 5 thematic groups, (iv) 8 governance indicators , divided in 3 thematic groups, (v) 3 integral indicators. Most of indicators are integrated at least for 2 dimensions of sustainability. In this pilot system 21 of indicators directly or indirectly describe the coastal impacts and processes.

The **fifth** interface element and development step is design of coastal planning instrument – **Coastal governance thematical plan** or realization of disciplinary/sectoral ICG approach.

Such eventual opportunity allows and optionally determines DPSL (Development Planning System Law), and therefore it is voluntary municipality decision about such specialized planning document development and at present in Latvia is known only one such decision and appropriate document. Such plan should accordingly be an important component of municipal spatial plan, specifically detailing coastal territory/zone of given municipality.

Important, that CGP as the second interface step is being developed only initiating the original ICG, namely, in it`s first governance cycle (P1 step of 5P governance cycle model), because after the first ICG product development in future firstly are reviewed both monitoring, and indicator systems and on the basis of the results is being developed CGP.

The **sixths** and decisive step of coastal governance interface is the result of all previously developed scientific-practical results, whereby, regardless of how many and what kind of mutual cooperation module or interface steps are taken in particular municipality, **integration in the existing municipality mandatory development planning documents** – SDS, DP and SP, as well as accordingly in the municipal budget.

Equally desirable that similar integration occur in connection with all others already existing or in future in municipality developed voluntary planning documents. Such

integration process and result then indeed ensure realization of **ICD integrative approach**, as principle EC set (EC …. 2000./2002.) introducing in the national and local coastal zone development practice.

VI. COSTAL GOVERNANCE INSTRUMENTS

The attempt has been made within the framework of research to analyze, systematize and generalize the range of environmental governance instruments, both disciplinary and integrated that are in disposal of municipality. It has to be noted that governance instrument groups are orientated towards product/result and environmental governance process. The proposed instruments groups are undoubtedly relative and quite often the same concrete instrument according to its form of application can be both, disciplinary and also integrated into other instruments that are in disposal of municipality. Basically, the experience of Ventspils municipality has been used, supplementing it by the experience of other municipalities. The completed analysis is summarized in the table. In order to carry out the efficient and comprehensive coastal governance, it is necessary to use mutually and complementary all of the available governance instruments: political and legislative instruments; planning instruments; economic and financial instruments; administrative and institutional instruments; infrastructural instruments; communication instruments.

Table 1. Integrated and disciplinary Political and legislative EG instruments

Political and legislative instruments
Integrated EG instruments
International Conventions, international agreements, multilateral and bilateral cooperation agreements, EU regulations, directives and others. **National** Latvian Sustainable Development Strategy, National Development Plan, Law "On municipalities", Law on Development Planning System, Coastal Spatial Development Strategy, Law on Regional Development, Law on Planning of Territorial Development, Law on Construction, Law on Protective Zones, Law on Environmental Impact Assessment **Regional** Spatial plan of Kurzeme Planning Region **Local** Decisions by Ventspils City Council, binding municipal regulations, territorial use and building regulations, binding regulations on the use and maintenance of the beach", binding regulations on The Lake Būšnieki and its coastal area, binding reguations on public services and order of Ventspils City
Disciplinary EG instruments
International Conventions, incl.Orhus convention, UNO General Convention on Climate Change and Kyoto Protocol, Baltic Sea Region convention on marine environment protection (Helsinki convention), HELCOM Baltic Sea Action Plan, Agenda 21 **National** Latvian Environmental Policy Strategy, Law on Pollution, Law on Environmental Protection, law on Waste Management, Law on Specially Protected Environmental Territories, Law on Tax of Environmental Resources **Local** **Decisions by Ventspils City Council, binding municipal regulations**, binding regualtions (BR) "On collection, transportation, sorting and disposal of domestic waste", BR" Environmental licencing regulations of Ventspils City", BR "Usage instructions of subscriber network of water main and sewarage system of Ventspils City", Resoulution by Ventspils City Council „On oganziation of public discussion about category B polluting activities", Environment policy declaration (EMAS, City of Jelgava)**, Green District declaration** (Salacgrīva district)

Table 2. Integrated and disciplinary Planning EG instruments

Planning instruments
Integrated EG instruments
Sustainable Development Strategy (SDS); Development program of Venstpils City (DP) + SEIA; Spatial plan of Ventspils City (TP) + SEIA; detailed and local planning, thematic planning of specific teritories; development strategies of municipal branches, plans; declaration on environmental governance and communication (part of DP, district of Līvāni)
Disciplinary EG instruments
Strategic EIA and concrete planning document **Environmental review** (has to be elaborated for all of the municipal plans and is integral part of them); **environmental policy plan/Action program (voluntary instrument)**; n**ature protection plans** of specially protected areas (for example, geological and geomorphological natural object „Staldzene bluff" un arī „Dampeļi outcrop",nature reserve „The coast of the Lake Būšnieki"); specific instruments of EG , taht are elaborated and integrated into municipal development planning documents, for example **300 m of protected littoral area** (150m in populated areas) is integrated into SP.

Table 3. Integrated and disciplinary Economic and financial EG instruments

Economic and financial instruments
Integrated EG instruments
The cash flow of municipality of Ventspils City (5 year plan): **Annual budget; a**mendments in the budget within a year only after the resolution by the respective commission; **financial support** by municipality for different activities, for example energy efficiency measures for apartment houses; **projects** financed by Latvia and EU; annual awards ceremony of the biggest tax payers; attraction of entrepreneurs and private investors
Disciplinary EG instruments
Nature resources tax ; the budget of environmental

protection measures as the part of municipal special budget; **environmental projects** finaced by Latvia and EU

Table 4. Integrated and disciplinary Administrative and institutional EG instruments

Administrative and institutional instruments
Integrated EG instruments
Commission of emergency situations; working goup for dealing with certain current issues, by involving experts other institution (except for municipal); **cooperation projects** with schools, enterprises, other municipalities, international organizations (for example, Union of Latvian Municipalities, Union of The Baltic Cities); joint commission sessions with Environmental protection commission; participation of municipal environmental expert in the commission of City development issues; participation of municipal environmental expert in the **risk management of potentially dangerous enterprises** (Risk assessemnt commission of **Environment State Bureau** and the complex inspection commsion work organized by State Environmental Service on annual basis); **administratative fines** (Administrative building inspection un Municipal police); proposals for **environmental requirements**, their integration into architectural and planning assignments issued by Architectural and Municipal Construction department
Disciplinary EG instruments
Resolutions of State Environmental Service Ventspils Regional Environmental Board, including the provision of permits for polluting activities; **environmental protection commission of** Ventspils city council; **environmetal supervision department** of Ventspils city council; agreements/projects with environmental consultants and scientists who are contracted for reasearch works; proposal submission for **permits for polluting activities**, issued by Regional Envirronmental Board; **environmental licence** (start-up of entrepreneurship and carrying out of polluting activities); **cooperation agreements** with Latvian State Geological and Metorological Centre on information acquisition about environmental status and related topics; cooperation **projects in environmental sector; public environmental inspector;** the spring **inspection checks** of illegal waste dumping places

Table 5. Integrated and disciplinary Infrastructural EG instruments

Infrastructuaral instruments
Integrated EG instruments
Technical infrastructure Cycling tracks, green territories of the city, The Baltic Sea coast, incl,the beach and its amenities, city market and „Green markets" organized there **Social infrastructure** Availability of computers and internet in public places , Municipal institutions of "Ventspils Library" "Education Board" with schools and kindergartens, Children's playgrounds , „Cultural centre" , „Museum of Ventspils" with Coastal open air museum, sports facilities.
Disciplinary EG instruments
Technical infrastructure Waste deposit areas, sorted waste reception places, containers for sorted waste for apartment houses, centralized water supply and sewage networks, sewage water treatment facilities, cycling tracks , green territories of the city , incl. Seaside park, outdoor training equipment in green territories **Social infrastructure** Blue flag movement – the Baltic Sea coast/beach

Table 6. Integrated and disciplinary Communication EG instruments

Communication instruments
Integrated EG instruments
Information and education Regular thematic page „ENVIRONMENT" in the newspaper „Ventas Balss"; **the City website**; involvement of mass media; press release, calendar of events in the website, interviews, live broadcast in TV, press conferences, section of "Ventas Balss" „Hello", section on the website"„Resident inquiries answered by City Council", section on the website"Ask the question", annual **municipal report** for voters; regular elaboration of **communication plans** in departments; regular preparation of **publicity plan** in departments; educational courses in Adult Education Center and Lifelong Education departmentof of Ventspils High School; **agreements with mass media** – the newspaper „Ventas balss", Kurzeme TV , Ventspils subsidiary of radio SWH , „Russian radio" **Public participation** Public discussion of municipal planning documents (Development programs and Spatial planning; public discussion of detailed planning; public discussion of building perspectives; regular thematic and sociologic interrogation of population; applications by residents, incl., postboxes **Environmentally friendly behavior** Hoisting of blue flag in the beach as the event marking city festivities; annual competition " Environmentaly friendly enterprise"
Disciplinary EG instruments
Environmental information and education • Informative and educational **thematic materials – booklets,** incl: popular version of Environmental Policy Plan in three languages; The Baltic Sea coastal management in Ventspils; Ventspils coastal area. The Blue flag; High risk objects in Ventspils city; Specially

protected natural territories- The Lake Būšnieki; Blue flag in teh beach; hazardous waste; Waste sorting; Relax and protect!

- **Visual instruments and stands,** incl: Blue flag in the beach; „Mother Nature" at Secondary School Nr.4.; 3 information stands in the beach; information stand at the NATURA 2000 naterure reserve „The coast of LAKE Būšnieki "; informative border signs on the border of specially protected territories.
- **Collaboration in education:** Environmental project weeks in schools; Cooperation with eco-schools; Formal education at school in collaboration with methodological unit of environmental education, Learners' creativity house.

Environment/public participation

Public discussion; application for the permits of category A and B polluting activities, for reception of **environmental licences**, nature protection plans; regular thematic and **sociologic interrogation of population**; **applications by residents,** incl. postboxes; **public environmental inspector**

Environmentally friendly behavior

Energy efficiency measrues in municipality buildings; **environmental initiatives** of international and local scale; mobility week, Water day, Earth hour, Pigman; collection campaign of bulky waste 2 times a year; cooperation with latvian Green Point in organization of waste sorting campaign; support in implementation of environmental management systems (ISO) in the largest Free port terminals; territory **upkeeping activities**; forest planting, tree planting activities, installation of bird-cages

VII. Conclusions

Policy initiative offering innovative approach for science-policy-practice mutual cooperation module or interface for municipal ICG implementation, which is based on following main coastal governance process assurance for communication-planning-communication instruments or **main courses of action:**

(1) coastal research development, combining data/information and lessons of academic science (natural and social sciences) studies and public science studies,

(2) local municipal coastal monitoring system, based in the participation of society target and interest groups,

(3) coastal governance thematical survey, unifying coastal situation and coastal governance situation analysis/assessment,

(4) on survey basis conducted definition of priorities and coastal action program development,

(5) identification and specification of coastal action program implementation instruments, ensuring their compliance for concrete local municipality situation,

(6) coastal and development indicator system, applicable for the municipal level (system content) and its practical use in the coastal governance planning (system application process).

Certainly, each of these stages includes interface between science knowledge and policy practice. The necessity to improve sustainable coastal governance requires to innovatively address, analyze, design, test up and implement new governance models particularly at local municipal level, but not only, what is to be done in the general context and particular application of the sustainable development paradigm for coastal areas, emphasizing system approach and integration principle necessity for complementary development of the disciplinary and integrative ICM approaches.

By this it is offered the comparatively innovative approach for science-policy interface within municipal ICM based on local municipal coastal monitoring and coastal indicators systems and on substantiated data/information of natural sciences as well of social sciences and having important part of citizens science.

There is an extensive range environmental governance instruments at the disposal of Ventspils as coastal municipality and other municipalities as well. Current processes in municipalities of Latvia allow predict wider application of integrated approach, without turning down disciplinary approach, at the same time seeking more of mutual supplement and complementarity. Municipal instruments for implementation of environmental policy are not used in multiple ways, basically it is focusing on administrative instruments and on investments for technical solutions.

Integrated municipal environmental governance viewing it from the context of already completed administrative reform, is important instrument for environmental situation exploration of extended municipal territories, assessment and purposeful setting of priorities. National policy in environmental sector and legislative regualtion are considered to be influencing factors from "above" to the devlopment of municipal environmental governance in Latvia. Environmental communication is not only recognized as an important governance instrument but also as environmental governance sector (see the examples of Liepāja regional Environmental Board and elswhere), that include environmental information, education, participation and environmentally friendly behavior. The application of this instrument is not always sufficient, systematic, with particular emphasis on complementarity potential of the instrument.

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