SYSTEM ANALYSIS FRAMEWORK FOR MUNICIPAL COASTAL GOVERNANCE PROCESS DEVELOPMENT: SALACGRIVA RURAL TERRITORY

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A SYSTEM APPROACH FRAMEWORK FOR COASTAL RESEARCH & MANAGEMENT

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CONTENT OF THE PRESENTATION

1. Highlights
2. Introduction. **Rationale for the case study**
3. **Materials and Methods:**

- key elements characterising the case study site
- current practice of coastal governance: establishing coastal governance scenarios
- application of SAF methodology
- fact finding mission: establishing of nature science data charactering long-term changes on the coast
- **Results**
- Clarification of policy issues and cause effect relations
- Stakeholders and institutional mapping
- Stakeholders engagement
- Use of the Indicator system as the ESE model
- Set of Coastal Governance Tools
- Recomendations for coastal area multi-use (coastal thematic plan) and coastal spatial planning

HIGHLIGHTS

- SAF general framework was applied to create, based on active public involvement, better coastal development planning and coastal governance processes at the local level
- SAF methodology was applied to create coastal municipality owned **COASTAL INFORMATION MANAGEMENT SYSTEM** – based on SAF, ESE (incl. Governance system/resources) modelling and later adaptation to national/local information possibilities/needs
- Innovative coastal governance **interface** (module) with particular **ICZM INSTRUMENTS** were developed, for WP5 case territory (to be transferable to all coastal municipalities in Latvia) – **all products as national inovations in Latvia** :

-1- **Coastal Outlook**

Municipal level Coastal Statuss and Governance (Thematic) Report's Content/Process Guidelines – to be basic Source Book/Report/data for any ICZM and OTHER sectors decision making/planning

-2- Coastal Municipal Monitoring System

Municipal Coastal Sustainable Development Monitoring Programme:

- for regular/actual info provision and also 2-4 years Coastal Outlook update, incl. and to be used separately also, the following:

- Coastal Indicators System (incl. detailed list of necessary indicators within ESE frame)
- Public Coastal Monitoring Programme Outline

-3- Integration Guidelines

Blueprint for data/monitoring/procedures integration into mandatory municipal planning **PROCESS AND DOCUMENTS** – Municipal Development Program (for 7 years period with annual upgrade) and also Spacial Planning/spatial plan

INTRODUCTION:
RATIONALE FOR THE CASE STUDY

RATIONALE FOR THE CASE STUDY

Case study is orientated to coastal **development and governance** - improvement of coastal governance system based on collaboration of the stakeholders as the key driving force for integrated and sustainable coastal zone management (protection, use and development of coastal socio-economic, natural and cultural resources).

Thus, overall objective within Salacgriva case is to adapt and test the general SAF methodology for application in municipal governance sector, understanding coastal areas as both the national (state), municipality and local communities' interest territories.

We shall find such coastal area and coastal resources governance models, which are adequate and well working in case of long coast rural local municipalities with limited human, administrative and financial etc. capacities and instruments, in order to govern and develop sustainably such complex socio-ecological systems as the coast is.

RATIONALE FOR THE CASE STUDY

Improvement of Coastal Governance is based on:

(1) modifying and better use of existing component, namely, better application of existing municipal institutions capacities,

(2) adding new component, namely, opening space for new bottom-up stakeholders initiatives and organizing them in common package.

(3) Integrating this new component and optimising existing component will lead to establishment of new approach for assessment of coastal area state and new governance decisions based on it.

Principal feature of Salacgriva case is that **the coastal governance issues are investigated in a long-term perspective.**

REFERENCE TO THE GENERAL SAF METHODOLOGY

- in case the coastal state quality will be improved by technical infrastructure implementation («hard solutions») – the classical system modelling tools is well suitable for stakeholders involvement and discussions
- in case the coastal state quality will be improved by better coastal governance («soft solutions») – the problem is that the system modelling tools, based on mathematical formulae, is not well suited for the modelling impact of coastal governance instruments. There are no yet evidence-based formulae, allowing to mathematically describe the impact of wide range of different governance instruments, and uncertainty of results will be high, limiting the practical use of such modelling results.

Thus we paid efforts to look for other interface system between research (conceptual system dynamic model) and decision making process

GOALS AND AIMS I

- As underlined by the SAF Handbook, the general objective of the SAF is "to provide multidisciplinary and trans-disciplinary advice to environmental managers and policy-makers concerning environmental problems in the coastal zone, in order to improve the zone's ecological *sustainability,* economic *efficiency*, and social *equity*".
- Evidently, it means that the SAF approach shall serve as the tool **to translate the science knowledge in the language understandable by stakeholders and decision makers** and not to lose the science knowledge during this translation.
- **Important Latvia feature is** lack of reliable and in-time information as the critical obstacle for coastal governance: **no information – no governance**

GOALS AND AIMS II

- to establish interface between SAF methodology and coastal & development planning methodology and plans' supervision - applying of coastal information systems (coastal indicators systems) developed in accordance with SAF methodology
- to demonstrate the transition process from separate isolated research (devoted to single issue) to unified comprehensive multi-disciplinary coastal research;
- to demonstrate the benefits of application of multi-disciplinary coastal research approach to implementation of full coastal governance cycle (from problem identification/analysis to measures/actions monitoring)
- to create the systematic set of Tools which can be used for understanding coastal state, projecting future state and establishing necessary coastal activities. Tools should be at low cost regarding their use and should be implemented based on efforts of municipal specialists and local stakeholders, as possible (minimising necessity for outside experts and skills). To demonstrate the synergy between academic research and citizens science.

MATERIALS AND METHODS

MATERIALS AND METHODS

1. Identification of key elements characterising the case study site
2. Establishing current practice of coastal governance, definition of coastal governance scenarios
3. Application of SAF methodology
4. Fact finding mission: establishing of nature science data charactering long-term changes on the coast:
   - coastal erosion,
   - number of biologically active days 1951 - 2015,
   - number of strong wind days annually 1971 - 2015,
   - precipitation extreme cases characterised by number of 75th percentile exceedances 1961 – 2015
   - etc.

DESCRIPTION OF THE SITE

SALACGRIVA CASE

Map of Latvia:
Riga and Salacgriva municipality – WP5 CSS

SALACGRIVA CASE

Salacgriva rural municipality: related characteristics

- Located approx. **only 50–100 km** from capital Riga with **700 000** inhabitants, at north bordering with Estonia;
- Long shore line – **55 km (10%** - whole Latvia coastline)**;**
- Placed on **5-15 km broad coastal strip**, area – 638 km^2;
- Permanent inhabitants – **7574 (01.01.2017)** and **~36%** in Salacgriva town;
- Population densisity in rural areas (without towns) – less **7 inhabitants per km^2,** what is almost **3 times lower** than average in the Latvia;
- 2009 admin reform – **3 small** coastal municipalities united
- Riga – Tallinn **highway located along/close** the coast and new Baltic **Railway** line Tallinn – Warsaw in coming years will be built **via municipality** along coastline too.

SALACGRIVA CASE: DOMINATING ELEMENTS

- **Ecological**

North Vidzeme Biosphere results, Nature 2000 territories

- **Historical – cultural**

Strategic place on Tallin-Riga road

Area in which the Latvian sailing ships history had started – places of building and harbours

- **Economic**

Long traditions on large scale fish processing industry, small scale fishermen businesses (lamprey fishing), both nationally and internationally recognised coastal tourism, local harbor serving for North Vidzeme as well as South Estonia local products (timber, etc). Transit road Riga-Tallin (transit economics)

- **Social**

Decrease of human capital/population

- **Governance**

Range of buttom-up governance elements innovative for Latvia

COASTAL GOVERNANCE SCENARIOS

COASTAL GOVERNANCE SCENARIOS

Based on studies and current research outcomes the following basic/general

Municipal Governance Scenarios are:

1. Base (BAU – bussiness as usual) governance scenario
2. Top-down governance scenario
3. Bottom-up governance scenario
4. Collaborative governance scenario

COASTAL GOVERNANCE SCENARIOS

Base (BAU) scenario:

In general corresponds to **minimum requirements** defined by Latvian development planning/management legislation - the coastal development issues mandatory shall be **integrated** within all municipal planning documents:

- municipal sustainable development strategy (25 years),
- municipal development programme (7 years),
- muncipal spatial plan (7/12 years).

Results:

On the bases of analysis of the planning documents of Latvian coastal municipalities it was concluded that this approach:

- **Partially works** for development planning/management practice of **large coastal aglomerations** (cities);
- **Very limited works** for development planning/management practice of **small coastal municipalities.**

COASTAL GOVERNANCE SCENARIOS

Base (BAU) scenario:

Reasons for failure, e.g.:

- The **municipalities'** administration and planning bodies has low interest for such integration, thus **only formal integration is performed**, if any
- The **state** administration bodies has **no capacity to control the** fulfilment of this requirement,
- The **involvement** of stakeholders and the society in general in this process **is weak**,
- Small coastal municipalities' specialists **have not adequate coastal info** and have only **very limited knowledge how to perform such integration** in real municipal development planning/managament practice.

COASTAL GOVERNANCE SCENARIOS

Top-down governance scenario:

- The ICZM is integrated within the general muncipal governance environment (content, process and products);
- The municipality takes full responsibility for coastal governance, with at least formal/mandatory involvement of local stakeholders.

Results:

On the bases of analysis it was concluded that **municipality is not yet capable nor really interested to fully take such wide responsibility**

COASTAL GOVERNANCE SCENARIOS

Top-down governance scenario:

Reasons for failure

- Even having **environmental planning initiatives and tools**, there are not enough incentives to develop such also for coastal planning/governance
- Latvian coastal municipalities (if not considering large cities) have **limited both financial, human and institutional resources** to implement this scenario successfully in practice;
- the **financing** of coastal investments currently is **mainly based on external sources**, e.g. EU Funds programmes,

being limited by:

  - availability of project funds in both amount and time scale; and
  - thematical (contentual) restrictions regarding use of these projects.

COASTAL GOVERNANCE SCENARIOS

Bottom-up governance scenario:

- In a great extent the coastal governance is implemented by local coastal stakeholders in partnership with municipality **– ICZM function delegation approach**;
- The Salacgriva municipality has **untraditional range of important bottom-up governance elements** like village elderlies, coastal village based NGOs, consultative councils (youth, business), etc.

Results:

On the bases of analysis it was concluded that:

- Bottom-up stakeholders are **very important actor** in maintaining established local coastal **infrastructure**;
- However implementation of coastal governance in **whole municipal** scale is **not possible by using mainly** bottom-up elements

COASTAL GOVERNANCE SCENARIOS

Bottom-up governance scenario:

Reasons for failure:

- bottom-up practice elements mainly are **too local** and focused on particular village only;
- and **communication** along 55 km coast is very limited and collaboration even less;
- contentual analysis of local initiatives (LEADER) projects, clearly indicated that the most interest relates to the activities which promote improvement of very important socio-economic processes benefitting locals in coastal territories **but not to coastal issues** by themselves.

COASTAL GOVERNANCE SCENARIOS

- Conclusion: the scenario, based on collaboration, shall be implemented for better coastal governance.
- **Collaborative scenario** shall implement three principal requirements:

  (1) shall be based on **multidisciplinary research** results,

  (2) shall have **wide and strong stakeholders** involvement component,

  as well

  (3) useful aspects of previous 1.-3. governance scenarios shall be **complementary incorporated** as far as possible.

APPLICATION OF SAF METHODOLOGY STEP-BY-STEP

STEP 1.
ISSUE IDENTIFICATION

STEP 1. ISSUE IDENTIFICATION

- **Problems** in coastal area identified and link with **Human Activities** established
- Problems **relationships with ecosystem services** established
- Stakeholders **involvement process provided**
- **Institutional mapping** done, personalized stakeholders established
- **DPSIR analysis** provided
- **CATWOE model** developed
- **Social and Economic components relevant** for the Issue **identified**
- **Priorities of village level stakeholders established** – analysis of implemented local projects (LEADER programme), they relations to the coastal state

STEP 1. ISSUE IDENTIFICATION

Problems and Human Activities identification were done according the following Template

	Problems	Localization	List of Human Activity	Causing Stakeholders	Interested in solving Stakeholders

STEP 1. ISSUE IDENTIFICATION

Framework for DPSIR analysis

Driving

Coastal territory is understood as a territory of interaction on diverse human society needs, mainly represented by:

- needs of **local coastal citizens**
- needs of **visitors** for recreation
- needs of **wider human society** for natural capital, biodiversity, united coastal nature-culture heritage

Pressure

Activities of coastal citizens that are performed to ensure living space and related to it self-sustainability

Visitors activities and impact to coastal environment is directly dependent form efficiency of coastal governanance

Pressures which are created due to lack of Human Activities

State

State of Coast – Natural state, Economic state, Social State

Impact

Loss of quality of unified coastal nature and culture heritage

Responses

- **Development of „bottom-up" self- governance for coastal territories management**
- **Interaction of municipal (top-down) and „bottom-up" processes – development and enhancement of integrated coastal zone management system,**
- **Implementation of coastal information system**
- **coastal communication (information, education, stakeholders participation, environmentally sound behaviour/actions) covering both local people and visitors.**

STEP 2.
SYSTEM DESIGN

STEP 2. SYSTEM DESIGN

- Relevant coastal area **geographical boundaries for data established**
- **Subsystems described** - elements and material flows as well as external hazards within Nature, Social, Economic and Governance subsystems of the Coast
- **Conceptual model** developed (1st iteration)
- **Translation of conceptual model to STELLA language** (2nd iteration), increased complexity and number of elements in subsystems compared with the 1st iteration provided

STEP 2. SYSTEM DESIGN

Hierarhy of data established, based on relevance for coastal governance and availability

Depending from contentual substance of the data and features of data spatial distribution, each data has defined territory, which in the case of particular data is called as the coastal area.

- monitoring points & measurement spots
- Beach/Bathing places
- Coastal dune protection zone
- Coastal protection zone
- Notional territory (mainly to the West from road A1 Riga – Tallinn)
- Whole municipality,
- In addition, special areas – port, small rivers

STEP 2. SYSTEM DESIGN

Elements and material flows within Nature and Governance subsystems established (as the example below)

SES components	Material flows	External Hazards
Main Ecological components of the SES are: **1. shore line** **2. beach and coastal dunes** **3. valuable biotopes and habitats** **4. coastal forests** **5. marine resources (fish, algae)** **6. water quality** **7. weather conditions** **8. sand and stones**	Main Ecological (material) flows are: 1. marine litter 2. nutrients flow (by natural systems: rivers etc.) 3. sediments (sand) 4. coastal erosion 5. floods 6. wind falls	Clmate risks (storms, extreme weather conditions, floods, rain falls) Ship pollution Algae blooming Coastal fires (forests, reeds)

SES components	Material flows	External Hazards
Main Governance components are: 1. Local administration capacity 2. Local regulation acts 3. Specific areas specialists (environmental /nature/culture) 4. Coastal Information system 5. Participation mechanisms (elderly institution; councils etc)	Main Governance flows are: 1. Information flow and communication 2. Environmental Communication 3. Specialists (on environment, coast, nature, toursim) 4.	Administrative Territorial reform Conflict between local and national development interests Brains outflow (loss of experienced people)

STEP 2. SYSTEM DESIGN

Conceptual model development: background

The central issue of the overall system **Unsustainable governance of coastal resources**

- **What comprises coastal resources?**

The approach had been based on environmental governance goals, namely, the **coastal resources are characterized through: protection of biological diversity, environmental quality and sustainable use of natural resources**

- **System components**

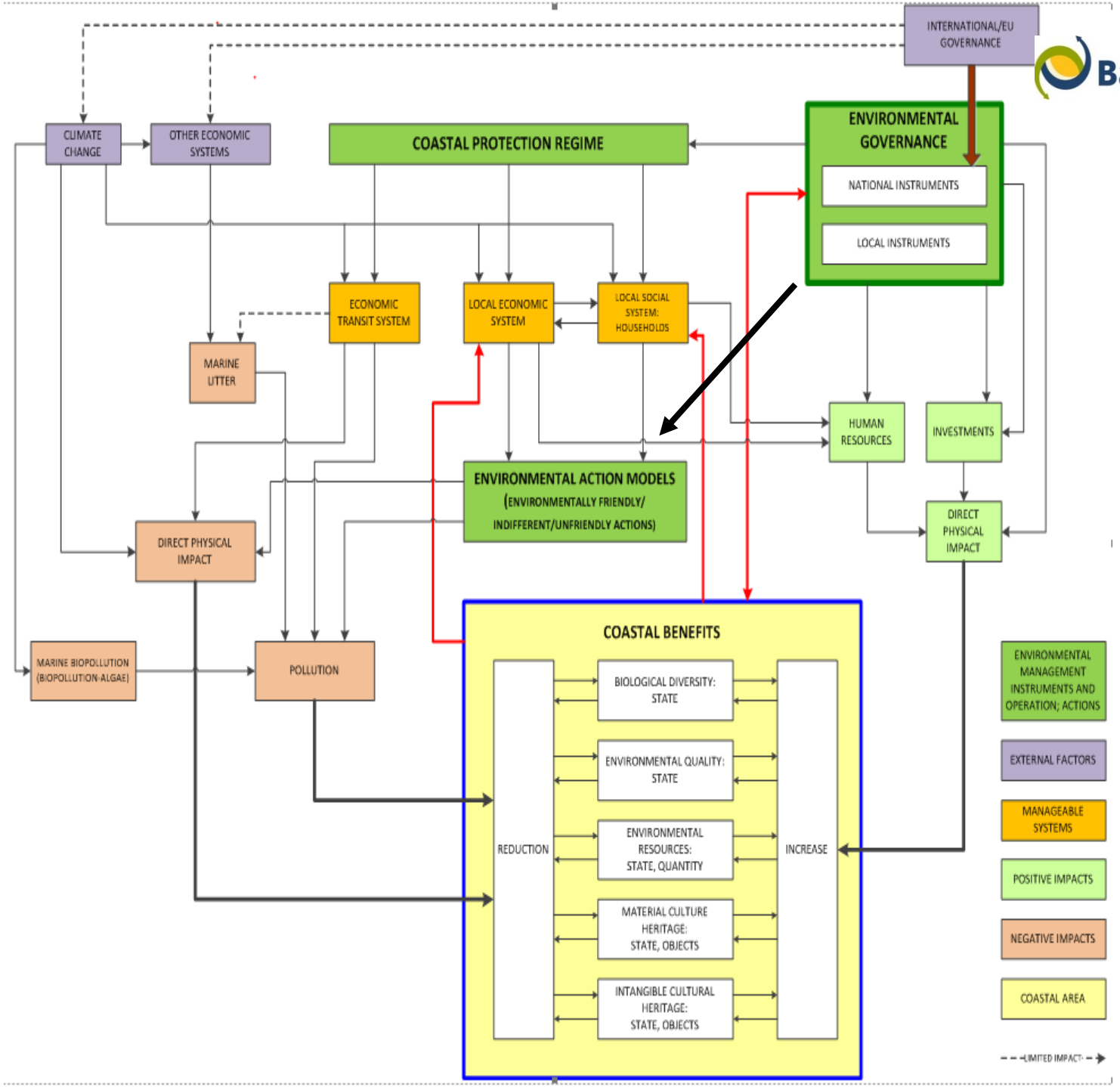
Governance subsystem is added to SES. Governance subsystem had become a central block allowing to address an issue of ‘’unsustainable governance of coastal resources’’

- **Flows conceptualization**
- **‘’pollution flow’’** impact is negative
- **‘’direct physical impact’’** migh be positive or negative

- **Environmental actions models**

Certain factors of the system which influence system behaviour is put in the centre (see next slides)

- **Impacts of external subsystems** (see next slides)


INTERNATIONAL/EU GOVERNANCE
CLIMATE CHANGE
OTHER ECONOMIC SYSTEMS
COASTAL PROTECTION REGIME
ENVIRONMENTAL GOVERNANCE
NATIONAL INSTRUMENTS
LOCAL INSTRUMENTS
ECONOMIC TRANSIT SYSTEM
LOCAL ECONOMIC SYSTEM
LOCAL SOCIAL SYSTEM: HOUSEHOLDS
MARINE UTTER
HUMAN RESOURCES
INVESTMENTS
ENVIRONMENTAL ACTION MODELS (ENVIRONMENTALLY FRIENDLY/ INDIFFERENT/UNFRIENDLY ACTIONS)
DIRECT PHYSICAL IMPACT
DIRECT PHYSICAL IMPACT
MARINE BIOPOLLUTION (BIOPOLLUTION-ALGAE)
POLLUTION
COASTAL BENEFITS
REDUCTION
BIOLOGICAL DIVERSITY: STATE
ENVIRONMENTAL QUALITY: STATE
ENVIRONMENTAL RESOURCES: STATE, QUANTITY
MATERIAL CULTURE HERITAGE: STATE, OBJECTS
INTANGIBLE CULTURAL HERITAGE: STATE, OBJECTS
INCREASE
ENVIRONMENTAL MANAGEMENT INSTRUMENTS AND OPERATION; ACTIONS
EXTERNAL FACTORS
MANAGEABLE SYSTEMS
POSITIVE IMPACTS
NEGATIVE IMPACTS
COASTAL AREA
LIMITED IMPACT

STEP 2. SYSTEM DESIGN

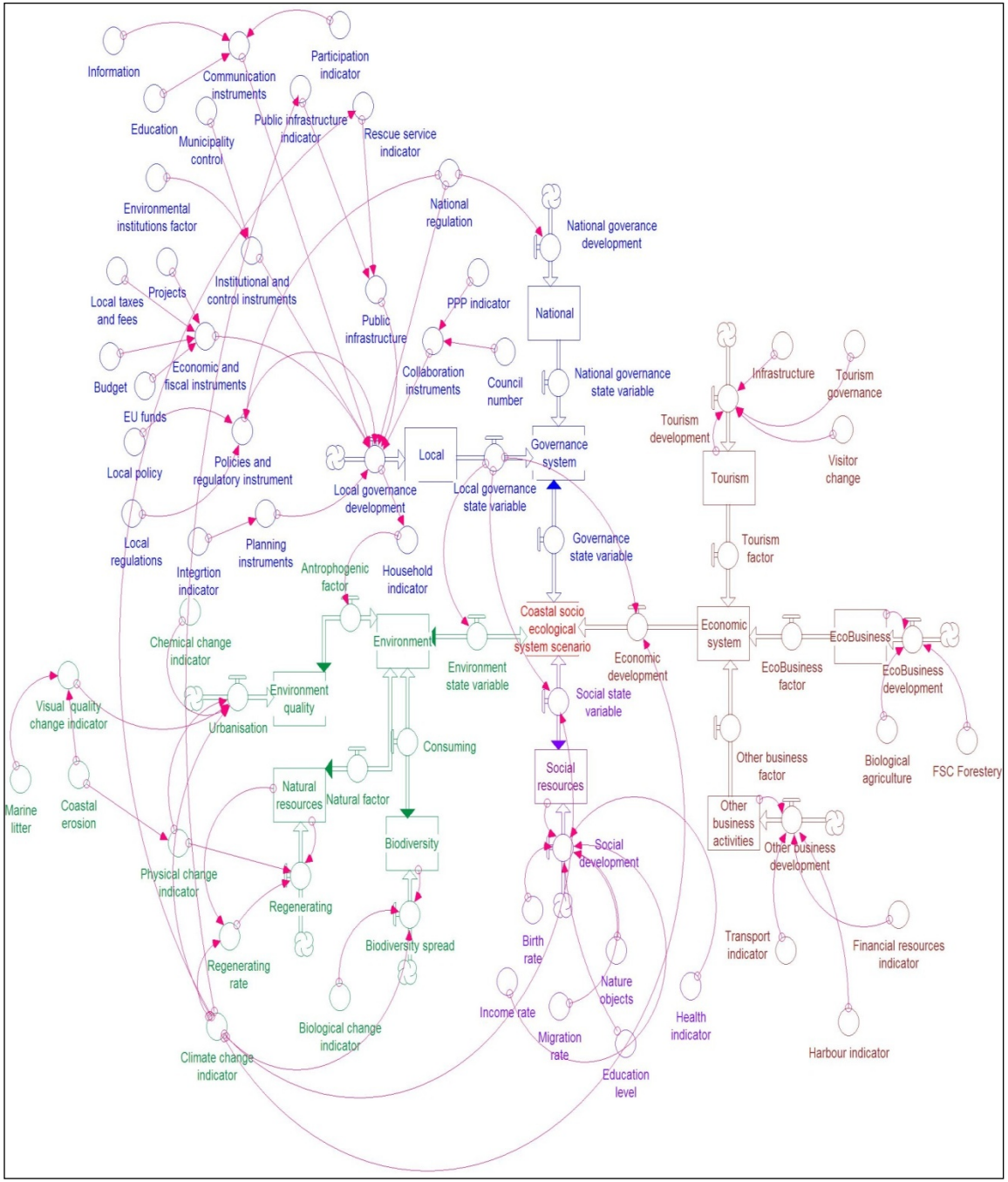
Through **“Environmental action models”** we create links between:

- Environmental governance and especially instruments what are at disposal or should be developed by municipal administration
- stakeholder groups that are representing local social, economic systems as well as economic transit system
- application of specific governance models and instruments act on stakeholders and try push them towards desired coastal friendly activities/behaviours
- it has positive direct impact on reducing pollution of coastal area/ resources depletion

STEP 2. SYSTEM DESIGN

Impacts of external subsystems manifests:

- On local economical activities
- On Social system, the central element of that in this model is households and their practices or environmental activities
- Marine litter as emerging globally and also specifically to the coast in Salacgriva municipality
- External natural system - impacts show as coastal erosion
- Algae blooming causing direct social and economic impacts (loss of property value, impacts on visitors in season etc) ,
- Appearance of invasive species (climate change) causing the similar impact through restricting open coastal space for visitors placement


Information
Communication instruments
Participation indicator
Education
Municipality control
Public infrastructure indicator
Rescue service indicator
Environmental institutions factor
National regulation
National goverance development
Local taxes and fees
Projects
Institutional and control instruments
Public infrastructure
PPP indicator
National
Budget
Economic and fiscal instruments
Collaboration instruments
Council number
National governance state variable
EU funds
Local
Governance system
Infrastructure
Tourism governance
Tourism development
Local policy
Policies and regulatory instrument
Local governance development
Local governance state variable
Visitor change
Tourism
Local regulations
Integrtion indicator
Planning instruments
Governance state variable
Tourism factor
Antrophogenic factor
Household indicator
Coastal socio ecological system scenario
Economic system
EcoBusiness
Chemical change indicator
Environment
Environment state variable
Economic development
EcoBusiness factor
EcoBusiness development
Visual quality change indicator
Environment quality
Urbanisation
Social state variable
Consuming
Other business factor
Biological agriculture
FSC Forestery
Social resources
Marine litter
Coastal erosion
Natural resources
Natural factor
Other business activities
Biodiversity
Social development
Other business development
Physical change indicator
Regenerating
Transport indicator
Financial resources indicator
Birth rate
Regenerating rate
Biodiversity spread
Nature objects
Income rate
Health indicator
Biological change indicator
Migration rate
Harbour indicator
Climate change indicator
Education level

TRANSFER FROM SYSTEM DYNAMIC MODEL (SDM) TO COASTAL INDICATORS SYSTEM

The SDM has allowed to establish the optimum number parameters set (necessary and sufficient) to characterize the state of the coast in rural coastal municipalities.

Continuing, the analysis of the SDM have allowed

(i) to understand in details the on-going natural (ecological) and socio-economic processes in the typical Latvia coastal areas and their interaction,

(ii) to understand the necessary framework for the interface to link science - governance decision making.

Thus, **the main objective for the next step** was to perform the transfer from mostly research (as the development, modelling and analysis of SDM) to practical improvement of the coastal governance.

STEP 3&4
SYSTEM FORMULATION AND APPRAISAL

COASTAL INDICATOR SYSTEM AS THE SAF TOOL

INDICATORS SYSTEM DEVELOPED IN ACCORDANCE WITH SAF

- **Based on system dynamic model**
- **Algorithm developed how to transfer model's parameters to Indicators of the indicator system**

We have elaborated the approach how the system dynamics model can be translated to coastal indicators system.

Important, that indicators system is both information flows system and modelling tool, well understandable by stakeholders, as the tendencies in indicators values allows to project future state.

Indicators come from values and create values (*indicators measure the parameters which are important for local society and consensuss about new indicators means recognition by stakeholders new values*)

Cost of indicators system can be lowered by involving in their measurement both local municipal specialists and stakeholders groups (public monitoring, citizens science).

TRANSFER FROM SYSTEM DYNAMIC MODEL (SDM) TO COASTAL INDICATORS SYSTEM (CIS)

Coastal Indicators System

CIS is designed for coastal long-term planning and planning documents (coastal governance strategy, thematic plan etc.) due to observe sustainability and sustainable development. With minimal transformations the developed for Salacgriva municipality system can be adapted for other coastal municipalities of Latvia.

The transforming of the SDM to CIS was done based on the following principles:

- evaluating the dynamism of SDM parameters and including in the CIS those parameters with sufficient dynamics;
- evaluating regular, reliable and on coastal area applicable data obtaining opportunities from publicly available data sources or by applying other direct methods for data obtaining, incl. citizen science;
- including indicators which provide a link with the Salacgriva municipality long-term sustainable development strategy till 2030 and mid-term municipal development programme;
- evaluating necessity of additional indicators to characterize the coastal natural- socio economical system in the more detailed manner based on the capitals of sustainable development.

RESULTS

RESULTS

- Clarification of policy issues and cause effect relations
- Stakeholders and institutional mapping
- Stakeholders engagement
- Use of the Indicator system as the ESE model
- Set of Coastal Governance Tools
- Recomendations for coastal area multi-use (coastal thematic plan) and coastal spatial planning

CLARIFICATION OF POLICY ISSUES AND CAUSE EFFECT RELATIONS

PROBLEMS AND THEIR INTERLINKAGES

- **16 sectorial problems** had been identified in given coastal territory
- Matrix of relationships among identified problems established (*direct, indirect and explict, less explicit links*)

- Analysis of their structure had allowed to conclude on **3 generic type problems:**

  Insufficiently managed low density territories,

  Low environmental management/ governance capacity

  Limited coastal communication

PROBLEMS: MATRIX OF RELATIONSHIPS

3– direct, explicit link; 2 – direct, less explicit link; 1 – indirect link; 0 – unclear link

Nr.	Problema\Respective Nr.of related problem	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	Σ
1.	Restricted access to sea		3	3	0	0	2	0	1	0	0	0	1	2	1	3	3	2	0	3	24
2.	Coastal erosion	3		0	1	3	2	1	0	0	0	2	0	1	1	3	1	3	3	2	26
3.	Access of coast for people with special needs	3	0		0	0	0	0	1	0	0	0	0	1	0	1	2	3	0	1	12
4.	Coast erosion	0	1	0		3	1	1	1	0	0	2	1	2	3	0	1	1	1	1	19
5.	Over flooding during storms	0	3	0	3		1	2	1	0	0	3	1	3	3	0	1	0	1	1	23
6.	Risks to valuable biotopes	2	2	0	1	1		0	0	2	2	0	0	1	1	0	1	2	3	3	21
7.	Sea water quality	0	1	0	1	2	0		2	2	3	2	0	3	0	2	1	0	1	0	20
8.	Human safety in bathing /swimming places	1	0	1	1	1	0	2		1	2	1	1	3	0	3	0	3	0	1	21
9.	Nutrients pollution from rivers	0	0	0	0	0	2	2	1		2	1	2	2	1	0	0	1	2	1	17
10.	Indvidual households' wastwaters	0	0	0	0	0	2	3	2	2		0	0	2	0	3	1	3	2	2	22
11.	Potential pollution form industrial sites	0	2	0	3	3	0	2	1	1	0		0	2	1	0	1	0	1	0	17
12.	Forest damage	1	0	0	1	1	0	0	1	2	0	0		0	2	1	2	1	1	0	13
13.	Marine litter	2	1	1	2	3	1	3	3	2	3	2	0		0	2	0	1	2	1	29
14.	Risks to nature and culture capital	3	2	0	3	3	1	0	0	1	0	1	2	0		0	2	3	2	3	22
15.	High local seasonal pressures	3	3	1	0	0	0	3	3	0	3	0	1	2	0		0	1	1	0	21
16.	Construction of residential buildings on coast	3	1	2	1	1	1	1	0	0	1	1	2	0	1	0		2	1	2	20

PROBLEM RELATIONSHIP WITH ECOSYSTEM SERVICES

Nr.	Problem\Services group	Prod.	Regul.	Val.	Func.	Total
1.	Restricted access to sea	2	0	3	0	5
2.	Coastal erosion/dune existence	1	2	3	3	9
3.	Access of coast for people with special needs	0	1	3	0	4
4.	Coast erosion/shoreline preservation	1	3	2	3	9
5.	Over flooding during storms/areas with minimized risk of flooding	2	2	0	1	5
6.	Risks to valuable biotopes/the existence of valuable habitats	1	3	2	3	9
7.	Sea water quality	1	1	3	1	6
8.	Human safety in bathing/swimming places	0	0	3	0	3
9.	Nutrients pollution from rivers/ensuring the quality of water in rivers and on the coast	3	3	0	2	8
10.	Indvidual households' wastwaters/ensuring the quality of water in rivers and on the coast	3	3	0	3	9
11.	Potential pollution form industrial sites/industrial territories with (at least) no increase in the amount of pollution	0	2	1	1	4
12.	Forest damage/the existence of high-quality forest ecosystems	3	2	3	3	11
13.	Marine litter/unpolluted coastal assurance	1	3	3	1	8
14.	Risks to nature and culture capital/natural and cultural heritage of the existence of high quality	2	0	3	1	6
15.	High local seasonal pressures/providing minimally polluted coastal zone in sezonality visiting periods	2	2	3	1	8
16.	Construction of residential buildings on coast\dune existence	1	2	3	1	7
17.	Insufficiently managed low density territories	2	1	3	2	8
18.	Low environmental management/governance capacity	1	3	2	3	9
19.	Limited coastal communication/the existence of coastal communication	3	1	2	2	8
	Service group involvement	29	34	42	31	136
	The share of service group	21%	25%	31%	23%	100%

PROBLEMS IDENTIFICATION: KEY FINDINGS

- ***There are few local coastal territories where resources are over exploited or used in interests of limited stakeholder group or even individuals,*** this creates additional stress on resources, as well as environmental pollution, as well as discomfort among other stakeholders

- ***At the same time, there are local coastal territories where resources are under managed, causing risks for further degradation of coastal resources***. Insufficient management is caused by:

(1) disperse and very low density population on the coast limits basis for sustainable coastal management,

(2) stakeholders (including municipal authorities) insufficiently understand the potential of the coastal resources for local development;

(3) there are still no adequate reliable information to support sustainable use of coastal resource for local development

(4) insufficient municipal efforts in ensuring adequate coastal management (social needs prevail);

STAKEHOLDERS AND INSTITUTIONAL MAPPING

INSTITUTIONAL MAPPING

Institutions involved in the coastal management/governance identified and their roles/activities established

It was identified more than 130 institutions currently involved or having potential interest for coastal governance

- **Authorities – 56** (state level 21, regional 9, municipal 16, villages (parishes administration and elderlies) 10)
- **Public service enterprises – 3**
- **Local businesses - 13**
- **Communicators** – **21** (national level 3, regional 2, Local: newspapers 2, Education establishments formal and non-formal – 11, museums 2, tourism centre 1)
- **local NGOs – 39** (cross horizontal 32, villages based 7)

personalised stakeholders established as well

STAKEHOLDERS ENGAGEMENT

STEP 1. ISSUE IDENTIFICATION

Stakeholders involvement process

- on-site interwieving (August 2015), face-to-face meetings hold
- Stakeholders workshop (October 2015),
- On-site meetings with local authorities as well as other local stakeholders (November 2015), ~30 face-to-face meetings hold

STEP 2. SYSTEM DESIGN

Stakeholders involvement

The on-site meetings have been done with the following categories of the stakeholders **(August 2016)**

- deputies of municipal Council
- municipality executive power and institutions,
- representatives of local bottom-up structures of coastal villages
- visitors of the beach (by questioning method, end of August 2016)
- discussion seminar organized as the final event of the campaign “My Sea”
- questioning of selected coastal households in the municipality (in Salacgriva and Ainazi towns and Svētciems and Tūja villages)

Results:

More precise information on stakeholders perceptions, needs and priorities as well as collaboration among them

STEP 5. SYSTEM OUTPUT

Stakeholders Discussion on implementation of developed Coastal Indicators System

- preliminary meetings with selected youth focused stakeholders (Salacgriva area Youth NGO “Bāka” (Beacon”), library, secondary school, North Vidzeme Biosphere Reserve Education Center) – Spring 2017
- large scale meeting – **on-going (end of August 2017)**

USE OF THE INDICATOR SYSTEM AS THE ESE MODEL

DIFFERENT RANGES OF PARAMETERS FOR MONITORING

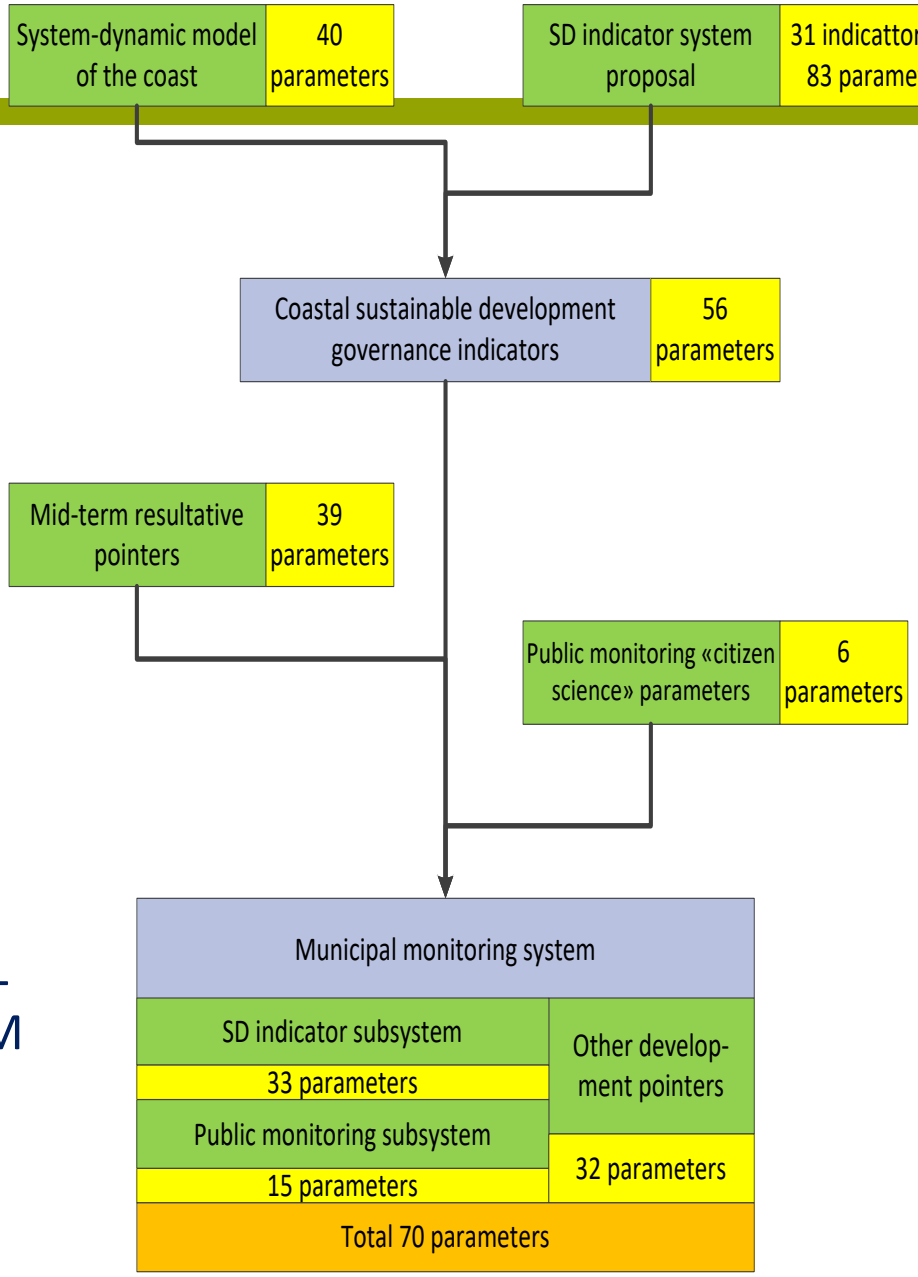
- **Indicators**; long-term processes, maybe objectives too; quantitative
- **Resultative pointers**, the achievement of objectives; quantitative
- **Semi-quantitative parameters**: ranged observations (for example, in scale «It is not found-A little-Average-Totally»)
- **Resultative pointers**, checklist type («Yes/No»)

INDICATOR CONCEPT FOR SD MONITORING

Parameter or commonly interpretable group of parameters can be defined as indicator of the governance of sustainable development if it/they are considered as subsequent and **mutually comparable numerical values** and which reflect the goals of governance, sustainable values and the change of these values in course of time and which:

- allow to judge about system to be governed and the condition and tendencies of its components, including comparison among system's parts and /or in comparison with other, similar systems,
- are directly or indirectly affected by administration decisions in respective level of governance,
- provide principal information for the needs of the governance decision making process,
- are approved by appropriate governance decision.

DEVELOPMENT OF MUNICIPAL COASTAL MONITORING SYSTEM



COASTAL INDICATORS SYSTEM

CIS is structured firstly by main components of sustainability (nature, economics, social environment, governance, integral indicators). Each indicator included in the CIS has passed review on its disciplinary area of expertise. The following disciplinary parts are included in the CIS:

- coastal nature and environmental quality,
- coastal economics
- coastal lifestyle.

The interlinkage of different parts of CIS to reflect interdisciplinary character of coastal area has been done by introducing within the CIS the part of integral indicators.

COASTAL INDICATORS SYSTEM

The CIS as a whole complex system thus

- describes state of the coastal area, stability of both coastal ecosystem and coastal socio-economic system, and their restorative potential and participatory functions.
- Regarding the participatory function, the CIS presents the main stakeholder concerns through the key parameters of the coastal state which can be improved within the collaborative governance scenario by stakeholders participation.
- The set of indicators, included in the CIS, are both necessary and sufficient to be sure they represent adequately the coastal system functionality and impacts of actions performed in coastal area and can produce reasonable view on coastal and coastal governance state and dynamics taking into account known defined limitations and conditions. This reasonability are provided both by the chosen structure of the CIS and the chosen data collection & processing, and analysis methods.

COASTAL INDICATORS SYSTEM

Regarding the application area of the CIS, all three areas below are valid:

- the CIS relates to public policy,
- the CIS relates to the occurance of natural events and long-term change – by inclusion in the CIS the indicators characterising the climate change,
- the CIS relates to the interactions between nature and the society – the stakeholders may identify the impact of the increase of a specific type of human activity through the overall change of the state in the coastal area.

SET OF COASTAL GOVERNANCE TOOLS

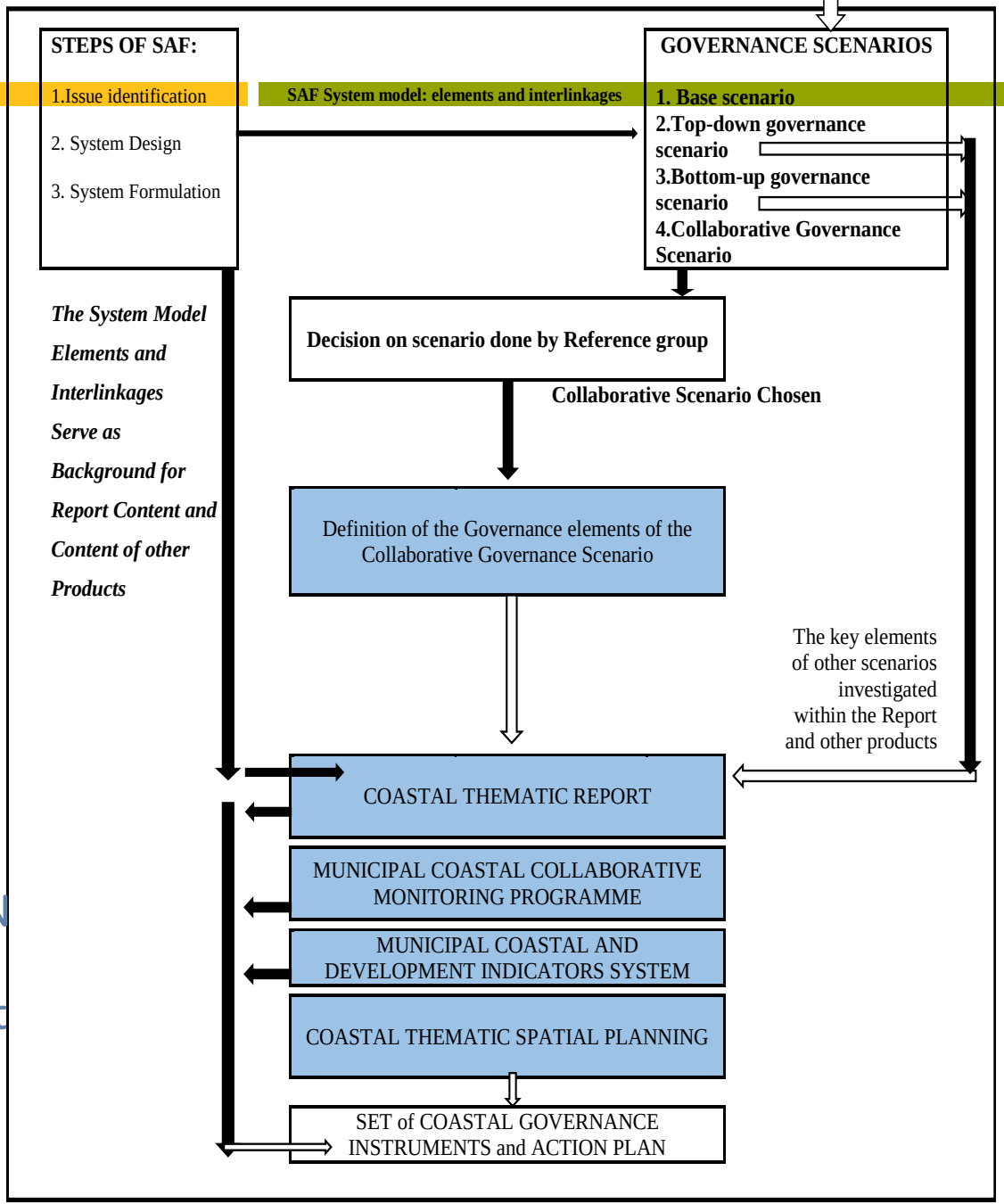
Layout of Coastal Governance Tools Elaborated

- Salacgriva Municipality Coastal Governance Thematic Report: Content Guidelines
- Coastal sustainable development collaborative monitoring system in Salacgriva Municipality
- Outline of Public Monitoring Programme (*citizens science*)
- Recommendations for coastal thematic spatial planning

They are definitely innovations for Latvia coastal governance practice

All tools are not only separate tools but also integrative coastal governance instruments, application of which might give significant input in the development of coastal action plan

SAF SYSTEM MODEL is the BASE



Coastal Governance Scenarios are incorporated

LOCAL INNOVATIONS: complementary

COASTAL OUTLOOK

Statical part and dynamical part

Statical part - represented by the snapshot of the parameters of coastal system dynamic model (CSDM)

Dynamical part - represented by the Coastal systainability indicators system (CIS)

Qualitative and quantitative part

Quantitative part – described by the CIS

Qualitative part – illustrated by main qualitative relationships of the CSDM, as it not possible describe by the CIS

PARAMETERS FOR MUNICIPAL COASTAL MONITORING SYSTEM AT SALACGRĪVA

Nr.	Referable development goal by Salacgriva district SDS	Parameter	Target value 2030 or trend	Coastal zone definition	Source of parameter	Data source	Period of measurements
N Nature and environment quality at coastal zone							
1	Spatial and functional assurance of coastal accessibility	The total length of tracks in the dune area, km	[increases]	Coastal PZ; by SP	SDS, SDM (mod.)	Municipality Council	Annual
2		Exit points at the sea, which are fixed in nature, % from indicated in SP	100	Coastal PZ; by SP	SDS, DP	Municipality Council, PM	Annual
3		Exit points at the sea, which are suitable for disabled people, % from all the real	100	Coastal PZ; by SP	SDS, DP	Municipality Council, PM	Annual
4	Climate change and adaptation to the reinforced natural risks	Photo documentation of coastal processes	n/a	Coastal dune PZ	Expert	PM	Annual
5		Monitoring of wintering aquatic birds	[not decreases]	Shoreline	Expert	PM	Annual
6	Risks reduction caused by transport flows and related to it	Illegal motor vehicle entrance in the dune zone, cases per year	[decreases]	Coastal dune PZ	SDS	Municipality Council, PM	Annual
7	Planning and creation of coastal environmental infrastructure	The number of public toilets in the dune zone or in the vicinity	[optimal][a]	Coastal dune PZ	SDS, SDM	Municipality Council, HI, REB	Annual, at season
8	Coastal environmental quality (in the SDS targets indirectly)	Marine litter, number of items	[decreases]	Beach	SDM	PM: project „My Sea”	Annual
9		Bathing water quality, % of the guided and mandatory values	90 and 100	Coastal PZ in the sea – bathing places; by SP	SDS, SDM (mod.), DP	HI	Annual
10		Distribution of invasive species in terrestrial part of the dunes	[decreases]	Coastal PZ; by SP	Expert	PM	Annual

MUNICIPAL SHORT TERM ACTION PLAN MONITORING INDICATORS FOR COASTAL DEVELOPMENT

Position in action or investment plan	Measure or parameter to be monitored	Measured unit
SM1 United, active, socially secured and inteligent society		
VTP1.1. Effective governance	Participation of council staff in professional development events	number
	Office building construction of Salacgriva port authority	completed; fact
	Inhabitants satisfaction with governance	% of positive satisfaction in inhabitants groups
	Cooperation projects with other coastal municipalities in Latvia and abroad	number
	Developed new municipality spatial plan	taken decision about approvement
	Resources spent in support programs	EUR
VTP 1.2. Diverse education	Established professional education program	marking on fact
	Increased qualification of education, culture and sport specialists of municipality	number
	Resources spent in support programs	EUR
VTP1.3. Cultural environment	Resources spent in support programs	EUR
VTP1.4. Physically active and healthy lifestyle	Summer and winter sports equipment available for rental	marking on fact
	Resources spent in support programs	EUR

LEVELS OF APPLICATION OF COASTAL INDICATORS SYSTEM

(1) strategic level – application of the full CIS. The measurements shall be done each 2 years for very dynamic indicators and 5+ years for the indicators with lower dynamic. The main obstacles for implementing the full scale CIS is high requirements for costs and human resources (compared to the existing availability of them in rural coastal municipality). Thus, the implementation of full scale CIS should be understood as the medium/long term objective**.**

(2) thus, in the short term period the **tactical level** of coastal monitoring shall be implemented. Its means monitoring of indicators, highly relevant for characterization of change in the coastal area – it should be monitored the minimal required set of indicators to identify in due time the changes in the coastal area. Important, the measurements of them might be done at reasonable costs and by both municipal specialist and local communities (citizens science) efforts. At the noted tactical level the selected indicators should be measured each year. Important, the tactical level monitoring shall be done in close relation with the actual development targets of the municipality,

(3) the **operative level** means the observation of the processes within critical coastal areas, which should/might be done sezonally or even each month, if critical influence might be expected. Both municipal specialists and local coastal inhabitants should be included in the programme of the observation; the obtained data should be quickly processed and analysed, and based on it, the operative coastal management/governance decisions should be decided and implemented in due time.

OUTLINE OF PUBLIC MONITORING PROGRAMME (CITIZENS SCIENCE)

NATURE

- Photo documentation of coastal processes
- Monitor of the state and trends of coastal dune fortifications.
- Coastal accumulation/ erosion areas
- Locations of Washed ashore algae for assessment of as Beach quality and their further management
- Distribution of invasive species in terrestrial part of the dunes.
- Monitoring of wintering aquatic birds.
- Public Monitoring Programme on Marine Litter
- Illegal motor vehicle entrance in the dune zone,
- Small river ecological quality by bioindication

COASTAL GOVERNANCE

- Equipt sites
- Exit points at the sea, which are fixed in nature
- Exit points at the sea, which are suitable for disabled people
- Number of waste containers and bins
- Supported NGO driven projects number and total financing, thsd. EUR (NGOs involvement)
- Inhabitants satisfaction with the coastal governance (NGOs involvement)

INTEGRATION WITH GENERAL MANDATORY MUNICIPAL DEVELOPMENT PLANNING

Integration with and within:

- municipal long-term sustainable development strategy
- municipal medium –term development programme
- municipal short term action plan
- municipal spatial planning programme