

MUNICIPAL CLIMATE CHANGE ADAPTATION GOVERNANCE IN LATVIA: APPROACHING CROSS-SECTORIAL AND MULTI-INSTRUMENTAL UNDERSTANDING

RAIMONDS ERNŠTEINS¹, ANITA LONTONE², JĀNIS KAULIŅŠ³, LĪGA ZVIRBULE⁴, JĀNIS STRAZDIŅŠ⁵,
ZANE ŠTEINBERGA⁶, IVARS KUDREŅICKIS⁷, ILGA ZILNIECE⁸, ANDRIS ĶĒPALS⁹

University of Latvia (Latvia)

ABSTRACT

Climate change adaptation being one of today's main challenges on global agenda do affect people worldwide, but even though most decisions regarding climate change governance are made at the international or national level, the implementation of these decisions in most cases takes place at the local level. Municipal climate change adaptation research project in Latvia was carried out with special emphases on main stakeholder understanding, preparedness and communication factors using several complementary research methods – case study research in Salacgrīva coastal municipality, sociological surveys with both Salacgrīva town households / inhabitants (home visits / questionnaires) and also nation-wide municipal planners/ specialists survey (web based) in Latvia, as well as complementary interviews with various national agencies governance level experts. The comprehension and level of understanding of all sectors and necessary elements of complex municipal climate change governance development in Latvia is not sufficiently high neither for municipal planners/specialists nor for municipal (flood endangered) households, according to the needs of both those groups. There is in Latvia diverse and wide list of separately developed and already available instrument groups for municipal climate change governance (MCCG), especially, complementary communication instruments, as well as sufficient enough number of instruments are in possession of the any particular municipality, but usage of them is quite limited by their type and range, and not complementary. Necessary is to change municipal project type thinking-working towards comprehensive planning / programming municipal development / support and pro-active communication and collaboration.

KEY WORDS: *climate change adaptation, governance, integration and disciplinarisation, climate communication, municipal planning, household understanding.*

JEL CODES: Q, Q5, Q56, Q58

DOI: <http://dx.doi.org/10.15181/rfds.v14i3.862>

- 1 Raimonds Ernšteins – professor, doctor, University of Latvia, Department of Environmental Management (UL DEM). Scientific interests: Environmental / coastal governance and communication
E-mail: raimonds.ernsteins@lu.lv
Tel.: +371 294 766 20
- 2 Anita Lontone-Ieviņa – doctoral student, UL DEM. Scientific interests: Integrated coastal governance and governance environment
E-mail: anita.lontone@lu.lv
- 3 Jānis Kauliņš – doctoral student, UL DEM. Scientific interests: Sustainable development governance indicators
E-mail: janis.kaulins@lu.lv
- 4 Līga Zvirbule – PhD student, UL DEM. Scientific interests: Environmental collaboration governance and local management.
E-mail: liga.zvirbule@lu.lv
- 5 Janis Strazdiņš – doctoral student, UL DEM. Scientific interests: Municipal climate change governance
E-mail: janis.strazdins@lu.lv
- 6 Zane Šteinberga – doctoral student, UL DEM. Scientific interests: Coastal risk governance
E-mail: zane.steinberga@lu.lv
- 7 Ivars Kudreņickis – doctoral student, UL DEM. Scientific interests: Energy and climate change governance
E-mail: ivars.kudrenickis@lu.lv
- 8 Ilga Zilniece – doctoral student, UL DEM. Scientific interests: Municipal environmental/risk governance
E-mail: ilga.zilniece@gmail.com
- 9 Andris Ķepals – doctoral student, UL DEM. Scientific interests: Coastal risk governance and communication
E-mail: andris.kepals@latja.lv

Introduction

Impacts of climate change to a greater or lesser extent, are observed in all latitudes and in all sectors of the economy – there is a concern about loss of biodiversity, threats to human health, new pests in agriculture, unpredictable and drastic changes in weather conditions, natural disasters, and many other manifestations of climate change may lead to a large scaled economic and environmental damage with long-lasting and even irreversible consequences (IPCC, 2007; BACC, 2008; Hales, 2014; Aall, 2007 etc). There are numerous research institutions and programs in the world dealing with climate change and its governance, also communication issues. This scientific knowledge have been widely and successfully translated into climate change mitigation and adaptation policies at all governance levels from global to local, particularly in EU and USA, as well as further on have been developed diverse implementation projects to change situation and also to study from. Researchers and practitioners from different regions and countries are producing guidelines and recommendations also for local municipalities (e.g. Hales, 2014; Shaw, 2011; Haq, 2013).

Assessment of climate change for the Baltic Sea basin (as regional climate studies), done by BACC project author team, consisting of more than 80 scientists from 13 countries, offers also verdict conclusions, that the Baltic region climate has already started to change and region will become considerably warmer and wetter in some parts, but dryer in others (BACC, 2008) – this way also socio-economic and culture dimensions of sustainability will be facing serious changes. Also nature science researchers in Latvia are actively giving their contribution to this growing field of research both within national and international research programs (Klavins, 2010; Menzel, 2006 etc), and subsequently supporting related communication/dissemination and, particularly, the development of National climate change policy and related implementation and management programs/projects, being established within governmental sector for Environmental protection and regional development, but developing also more links to other governance sectors.

Climate change and alternative energy development issues are those ones of priority areas for next EU programming period in Latvia. In the same time, other branches of science in Latvia, besides nature science, and especially those of social sciences, have been definitely less involved into both climate change research and related policies development, what is unfortunately very much limiting cross-stakeholder's, cross-sectorial and cross-level governance understanding of climate issues. During last 4–5 years this situation has been somewhat improved especially also at the municipal governance level, having various national/local top-down and bottom-up initiatives and international partnership impacts taking place, but MCCG steps are still mainly based on project development instruments and very limited range and type of other governance instruments employed (Ernsteins, 2010; 2012a,b).

Climate change adaptation aspects do affect people and in very diverse way in whatever local territory and municipality, but, particularly at the coastal ones. Climate change and sea level rise will not only increase the frequency and strength of flooding and erosion cases, but also influences different socio-economic changes, resulting particularly also into the significant increase in the size of endangered house property/belongings and the land property of the population in every particular coastal municipality (Bubeck, 2013; Ernsteins, 2014). Even main decisions regarding climate change governance are made at the international and/or national level, the implementation of these decisions more and more takes place and has to be taken at the local level, and also in Latvia.

The issue of this report is oriented towards still continuing start-up situation of municipal climate change governance (MCCG) development in Latvia, even real climate change aspects has been recognized here and numerous international experience is available around the nearby Nordic countries and further afield. The lack of related MCCG research and information (if not communication as best), from research institutions/government side, and lack of interest and understanding, from municipal governance side, forms the basic background (Ernsteins, 2012a, b) context of this research and development (R&D) project described. Research problem studied in Latvia could be characterized around yet generally missing MCCG process, structures and products – neither inter-sectorial target oriented and disciplinary ones nor cross-sectorially

integrated ones, both being necessary complementary and supported by whole range of implementation instruments in order to manage successful adaptive and collaborative MCCG (Ernstes, 2012a; 2013).

For example, there could be discussed the gains received and eventually further decision making process planned and organized by the municipalities (also related to their utilities, but private companies are not included for this accountancy), when summarizing results of just one, the National Climate Change Financial instrument (CCFI), contribution to MCCG. During recent years CCFI framework has funded a number of programs targeted at the increase of energy efficiency and the use of renewable energy resources in municipal institutions – the total ex-ante CCFI support is about 100 mill EUR. It was expected that implementation of program projects would result into CO₂ savings of about 50 thousand tons per year, what is a quite a result for Latvia situation. Unfortunately, accordingly to former studies (Ernstes, 2012b; 2008; 2010) climate change policy at the local level still is often seen only as a tool to obtain additional financial resources and also as best as international co-operation building tool.

However, the next step for municipal governance development (not only for MCCG) is to understand the climate change policy, first, as the need, and second, as the tool for the complex and integrated municipal development. Then next decisions waiting are to be on setting ambitious municipal development goals within climate change framework and mobilizing all type internal resources to achieve them, as well as to use effectively the existing opportunities and instruments, and, further on, to search for the development of the new forms of climate governance and very importantly also communication at the municipal level for all stakeholders and households particularly (Ernstes, 2012a; 2013; 2008). Accordingly, the R&D project goal was to clarify the current period understanding of MCCG at both governance levels/components of municipality – municipal planners/administrators and local (coastal and real climate change effects influenced) population – as well as to elaborate suggestions for general municipal guidelines.

The main tasks for this R&D project subsequently were designed as follows: 1) Introductory summary on MCCG development in Latvia with emphasis on only municipal climate change adaptation strategy case in Salacgriva municipality; 2) Sociological survey with Salacgriva town households/inhabitants; 3) Nationwide municipal planners/ specialists survey (web based) in Latvia; 4) Municipal indicators set for adaptation to climate change; 5) General recommendations for approaching MCCG in Latvia. This municipal climate change adaptation research project in Latvia was carried out with special emphases on main stakeholder understanding, preparedness and communication factors and using several complementary research methods – case study research, sociological surveys as well as complementary interviews with various national agencies' governance level experts.

Department of Environmental management (DEM) at the Faculty of Economics and management University of Latvia (UL) has been organized in 1992 based on interdisciplinary understanding of environmental science, relatedly multidisciplinary staffed and developing environmental governance interdisciplinary research (e.g. governance of socio-ecological interaction systems), also working in the areas of climate change adaptation governance and communication research and integrated coastal and risk governance and communication research, esp. municipal/coastal environmental governance. This report is based on DEM municipal research and development projects (Ernstes, 2006) realized during 2013 and being a complementary component of Climate change adaptation and coastal risk governance and communication R&D program started at DEM at 2009/2010 (Ernstes, 2010; 2012a; 2014; Kalnina, 2013). Report results discussed here have been acquired realizing collaboration R&D projects between DEM and particular coastal municipalities and also supported by THESEUS and FOODWEB projects, being co-financed by European Union 7 RTD and INTERREG IV A 2007–2013 Programs, subsequently, but, the contents of this publication represent the views of the authors and the authorities are not responsible for the contents of this work.

Research methodology was based on the combined complementary set of methods and comprises qualitative and quantitative research, using:

1. Integrated case study research method in Salacgriva coastal municipality, incl. document analysis (analysis of planning and legislative documents, reports and other studies), interviews (in-depth interviews on MCCG at local level, e.g. implementation instruments, integration and stakeholder

group co-operation), questionnaires (express questionnaires with inhabitants and representatives of main stakeholders), observation in practice. Results were used also for designing and discussion of the complementary set of indicators prepared as per project task.

2. Sociological survey with Salacgrīva town households (inhabitants) being realized as home visits and first with introduction and spreading questionnaires, and, second, with collecting answer on the next evening. As target audience were chosen households (private home owners) located nearby coastal sea and Salaca river delta of Salacgrīva town, especially from town areas being split into eventual flood zones according to the different likelihood of the risk of flooding there (Ernšteins, 2014). Flood risk probability planning map was taken from the project BaltCICA “Climate Change: Impact, costs and adaptation in the Baltic Sea Region” published in 2012. Number of questionnaires spread was 200 – received from 130 households (respondents).
3. Nation-wide municipal planners/specialists survey (web based) in Latvia municipalities, as well as complementary interviews with various national agencies governance level experts. As target audience for survey were chosen employees of municipalities facing climate change issues as their office duties. Information/invitation e-mails were sent to all 110 local municipalities (except main towns) and respondents from 47 municipalities filled the web survey questionnaire.

1. Planning approaches applied for municipal climate change adaptation research

One of particularly important and affected interest areas for authors of the 3rd national assessment of climate change impacts in the United States were particularly rural communities (Hales, 2014). Authors do emphasize that climate changes in the timing of seasons, temperatures, precipitation etc. will severely impact rural communities since many of them are less diverse than urban areas in their economic sector zoning and also social sector planning, and, community stability will be under serious stress. There were proposed main key messages to be taken into account (in short) when planning for climate issues:

- rural communities are highly dependent upon natural resources for their livelihoods and social structures and progressing climate change related impacts will shift the locations where rural economic activities (like agriculture, forestry, and recreation) can thrive;
- rural communities face particular geographic and demographic obstacles in responding to and preparing for climate change risks;
- responding to additional challenges from climate change impacts will require significant adaptation within rural transportation and infrastructure systems, as well as health and emergency response systems;
- governments in rural communities have limited institutional capacity to respond to, plan for, and anticipate climate change impacts.

Next example to be taken into account comes from K. Waagsaether and G. Ziervogel, who were exploring science–management interface in South Africa, and especially in terms of the communication of climate change-related data from climate scientists to one particular stakeholder group as water resource managers (though could be also many several other groups mentioned quite similarly), revealing how continuous communication is necessary in order to help narrow the gap between such two groups. This is also necessary for offering guidance for planning and adaptation strategies and establishing a new form of management based on “learning to manage by managing to learn”. Authors do recommend also so called Climate change forum as a medium for communication necessary for the production of comprehensible, relevant and applicable climate data (Waagsaether, 2012).

Another piece of research related to MCCG developments has been done in UK (Shawn, 2011) and was aiming to critically review the concept of resilience and to assess how it might be used both to understand and to evaluate local government responses to climate change. Authors are emphasising the transformational view of resilience as “bouncing forward” and there are proposed ten particular features being a genuine op-

opportunities for resilient local government approach to mitigation and adaptation to climate change: ambitious use of existing powers; responsiveness and flexibility; creativity and innovation; the learning organization; futurity planning; a strategic approach to risk; strong and visionary leadership; collaboration and coordination; empowering citizens to devise their own solutions and promoting environmental justice.

Other UK researchers (Haq, 2013) in their article on targeted social marketing approach for community pro-environmental behavioural change are reporting on the case of recruiting community teams from the municipal neighbourhoods and providing them with information, advice and mentoring on how to reduce their carbon footprint over a six-month period. As the result each participant achieved a mean reduction in their carbon footprint of 2.0 tonnes of CO₂e/year, particularly successful change was achieved in the areas of shopping and home energy. Authors propose then also cost-effective model of community engagement: go beyond carbon; have a clear target; establish a baseline; get participants to pledge; use mentors and local champions; provide “foundation information”; outline a programme of activities; provide incentive; hold milestone events; provide feedback; reward success; follow-up. There is recommended to assess the “rebound effect” e.g. where economic savings achieved from reduced energy, car use and food has led to increased consumption in other aspects of life.

There are two more approaches/models to be mentioned, when preparing for MCCG research, even, generally speaking, they could be used for any other non-traditional and non-sectoral municipal governance development cases. During R&D projects in Latvia there has been realized main sustainable development (SD) principle applying both sectorial-dimensional analysis and especially very purposely also their integration attempt with each of the three pillars of SD – i.e., natural environment, social environment (incl. culture environment etc) and economic environment. Our research approach priority always do include also the fourth pillar – an additional and complementary research and planning/management area, being almost not recognized in planning processes in Latvia still and not sufficiently studied. This is governance environment (*parvaldības vide* – in Latvian), which is to be considered the unifying horizontal element encircling all the three vertical SD sectors and intentionally is to be called “integrating medium” as well (Ernšteins, 2012a). Importantly is to recall, that this governance environment is to be managed in both complementary ways – directly as disciplinary (dimension) and integrative as obviously interlinked and deciding on to other three sustainability dimensions. This fourth dimension is crucial particularly for any cross- and inter-disciplinary municipal issues, eg. climate, risk etc, studied and decisions taken as this dimension do include such decision making components as the local administration structure and content, all interaction process for decision making preparation and taking, within particular administrative/working environment, and, as the result of all this mentioned, also all related municipal products and services being developed (Lontone, 2012; Ernšteins, 2012a).

Besides governance environment and collaboration communication model (communication as complementary use of instruments’ set as starting from information and education, and, concluding with participation and environmentally-friendly behaviour [Ernšteins, 2012a]) practice based concepts mandatory applied for R&D projects, there shall be emphasized also, so called, collaborative governance model (Ernšteins, 2008) being offered as a climate change adaptation governance framework model. The model is based on the concept that any sector or cross-sector governance must be implemented through integrative collaboration of all major its governance cycle components. This model as the minimum of necessary governance cycle components has been composed based on various known principles and approaches, and, consists of 5 main complementary and subordinate components: internal and external governance stakeholder groups mutual collaborative development; vertical and horizontal integrative thematic collaborative development; governance tools collaborative development; governance assessment (indicator top-down and bottom-up assessment) collaborative development; governance communication collaborative development.

2. Latvian municipalities and climate change mitigation/adaptation developments

Approaching general developments of MCCG in Latvia we shall look shortly into today’s situation and future challenges for Latvian municipalities in the frame of climate change mitigation/adaptation. Today

awareness of the importance of climate policy and its cross-border and international character is increasing among the municipal political leadership. E.g. 19 Latvian municipalities have signed the international Covenant of Mayors, however only 6 have developed requested/recommended Sustainable Energy Action Programmes (SEAP). Latvian Environmental Investment Fund has initiated project for methodological assistance of SEAP elaboration in 6 municipalities of the Latgale region (least developed region status). Climate change actions so far have often been carried out as isolated projects. To a large extent it was defined by the current national climate policy support system, which has been focused on particular project, not on comprehensive program support. Climate change policy is often seen as a tool to obtain additional financial resources as well as international co-operation building tool (Ernsteins, 2013). At national level, the financial support by National Climate Change Financial Instrument (CCFI) is provided for the CO₂ emission reduction projects and also for educational programs (also via EEA Grant Programmes).

As the first for future challenges shall be mentioned SEAP further development – process acceleration and increase in quality. Ambitiousness of CO₂ limitation in target setting is not to be stopped at the Covenant defined minimum of 20 % vs. 1990, what in Latvian conditions, in fact, is met automatically. Next is establishing of SEAP methodically advisory centre on the national scale. Also establishing support for the implementation of complex municipal climate action programmes is to be mentioned. International donors are interested in CO₂ rather than adaptation and finding of financial instruments for the implementation of the adaptation measures. Questionable is the sustainability of the future financial support under the conditions of decreasing the CCFI funding capacity. Also very important shall be the effective use of the existing opportunities and search for the development of the new forms of climate communication at the municipal level (Ernsteins, 2013).

Empirical part of the research has been realized in Salacgrīva municipality based on DEM municipal research and development project realized during 2013, being a complementary part of Climate change adaptation and coastal risk governance and communication R&D program started at DEM at 2009/2010. This is also one of the most successful university-municipality collaboration cases on MCCG to be mentioned separately and it was started in 2010 as Salacgrīva coastal municipality climate change adaptation research project. After initial fieldworks completed there, one of our project first spin-off recommendations for Salacgrīva municipality was also to consider employment of the still new for Latvia, but eventually influential municipal environmental management instrument – environmental (green) declaration as formal municipal green work pledging as well as green public relations introduction. Thanks direct interest and dedication of municipality leadership in August 2010 the Council of the municipality has approved the Declaration of the Green Municipality – nationwide first guideline manifest for public and target groups' and, as particularly stressed, for individual inhabitant's involvement towards environmentally friendly municipal governance and management, also encountering all main MCCG sectors and instruments.

Collaboration project between the DEM and Salacgrīva municipality in 2010–2011 concluded with elaboration of the climate change adaptation policy planning guidelines for Salacgrīva coastal municipality. The main work directions recognized were within the following sectors: Nature environment/dimension sector – biodiversity; water resources and waste management; coastal protection and development; Economic environment sector – energy management and entrepreneurship development; agriculture, forestry, fishery management and tourism development as well as, transport and infrastructure; Social environment sector – inhabitant's life quality; human resource adaptive capacity; Municipal governance and communication sector – governance system and process adaptation; environmental and climate change adaptation communication development (Ernsteins, 2010; 2012a). Municipality leaders strong commitment assigned further work to be done and municipality planners/specialists in partnership with main stakeholders, and within the project BaltCICA "Climate Change: Impact, costs and adaptation in the Baltic Sea Region" have been finalizing guidelines up to formal municipal planning document.

Nowadays Salacgrīva municipality could be recognized even as MCCG development model territory in Latvia since this is still the only municipality that has not only adopted the Green Municipality Declaration (2010) and implemented a range of alternative energy and other projects, but has also adopted this mentioned

Salacgrīva Municipality Climate Change Adaptation Strategy (2011), and has been successfully working on also on MCCG integrated planning approaches, while developing now newly mandatory in Latvia so called Sustainable development strategy (collaboration project with DEM during 2013/2014).

3. Sociological survey on flood risk with Salacgriva town households

The particular flood risk situation assessment in the Salacgriva municipality was carried out in each of the four pillars of sustainable development – i.e., natural environment, social environment and economic environment, and mandatory as described before, governance environment. Within the governance environment, both internal administrative and external stakeholders oriented communication is particularly essential, definitely including environmental and climate change communication. In both assessment processes – the risk governance environment and household risk understanding – collaboration communication model (Ernstes, 2012b) was applied, which contains four key components – risk information and education, participation and risk friendly public behavior – and embraces all key actor groups being also interviewed – local inhabitants, municipal and state institutions, business sector as well as all main mediators as NGOs and the media, educators and experts.

In the interests of this MCCG project particular target audience were involved and questionnaires spread – households located in coastal sea and river areas in Salacgrīva town. Areas were chosen due to likelihood of the risk of flooding according to the Flood risk probability planning map taken from the project BaltCICA “Climate Change: Impact, costs and adaptation in the Baltic Sea Region” (2012). Number of households selected was 200, but in return we received back filled and accepted 130 questionnaires. Key issues studied – flood risk background and personal experiences, flood risk communication in general and understanding, as well as the local municipality management and communication performance in the case of flood risks. Main results received could be shortly characterized:

- Most of inhabitants do recognize climate change impacts in their surrounding territory and they do observe more / wider spring river flooding, heavy rain falls, storm surge and sea level raise, as well as last two have been considered by them as main risks to their household.
- Most of inhabitants have not seen/heard any information-activities on flood risks – 50 %, but 29 % at least have heard something related in the national TV and radio and only 21 % have ever recognized related info in local area, particularly in local media and as civil protection info, planning documents, seminars.
- Almost none of inhabitants have ever participated in any training/learning activities on flood risks, except 11 persons / households did participate, but as happened to be they do work at municipal or port administration and so knew of such quite various training options.
- Only 10 % of inhabitants surveyed have ever took part at any local public hearing/participation activity, even 32 % have heard of such possibility, but 58 % never heard of citizen participation options.

4. Nation-wide municipal planners web based survey in Latvia

Target audience chosen for web-based survey – planners/experts as employees of municipalities facing climate change issues as their office duties. Information / invitation email was sent to all municipalities in Latvia (not including 9 towns, altogether 110) and 47 respondents filled the questionnaire. Key issues studied – recognition of the climate change existence, the driving forces and threats /potential positive effects, awareness of adaptation, the role of local municipalities in the context of climate change governance, use of climate change governance tools, efficiency and capacity constraints, communication and co-operation of municipality with the stakeholders. Main results acquired could be shortly characterized like this:

- Dominant majority respondents (96 %) are aware that climate change indeed takes place and significant majority (72 %) recognizes the anthropogenic influences on the development of climate change.

- Climate change is seen as a major threat in the fields like economics, agriculture, biodiversity and human health. Besides the half of the respondents consider that climate change has also positive impacts like longer growing period and the possibility of tourism development, but then there is a question on these possibilities in the long-term perspective and how they are understood by the respondents.
- About half of the respondents (53 %) are not familiar with climate change adaptation as climate change management practices. This is an important finding, and the question arises here: what do we generally know about the adaptation in Latvia? Respondent's as a specialist awareness is significantly higher than the overall awareness of the local municipality.
- There is a discrepancy between respondents' attitudes towards the role of municipalities in combating climate change and how the local municipality understands the need of MCCG and there is no consensus among respondents if the municipality should develop its own climate change governance document as there is the equal number of *yes / no* answers.
- For climate change impacts municipalities use infrastructure development and communication instruments. Other types of instruments are used relatively little, what could be understandable, because the infrastructure is supported by the public money, communication – if there is a good staff member, but other instruments are not really developed also at the national level. On the average, the most important limiting factors are the lack of financial resources and the motivation to use the instruments.
- Collaboration of local municipalities with different target groups is inactive. Only a small number of respondents rated it as successful. As limiting factors are mentioned the financial resources and the lack of interest/motivation to collaborate on the side of the relevant target groups. At the same time the importance of the target group information/education is seen by ~40 % of the respondents.

The discussion basically focuses on the content and sectors of municipality policies and measures to realize MCCG elements and it may be concluded, that already today Latvia municipalities do have enough instruments to start proactive governance / management as the integrative policy of municipality and there is no necessity to wait while the perfect set of related governance instruments will be established at national level. On the other hand, the data of empirical research reveals important critical points and very important one is none or non-effective communication between municipality and stakeholders. In general, it is important for municipality to understand the necessity for development of MCCG as the new challenge and new possibilities for municipality development, not to be seen as the burden.

5. Adapting to climate change: municipal policies and indicators

In order to complete municipal climate change governance cycle development in the framework of R&D project in Salacgrīva municipality and, subsequently, to be able to observe and monitor climate change adaptation strategies progress, the performance indicators system was developed (Table 1) that provides information to the public and decision makers about both the climate change and the related actions. The indicator system is developed in accordance with the selection methodology, based on the sustainable development governance indicator definition and indicator system development algorithm (Kauliņš, 2011).

For to be developed the whole Salacgrīva municipality development planning document package this set of indicators may be an element of supervision particularly on the climate change adaptation strategy, or to be included/integrated into the mandatory medium and long-term planning document development process and monitoring system itself. The latter approach may be more rational, since it is expected that a number of indicators will be shared between the climate change adaptation governance and general governance of the municipality, noting also that important place of environmental issues having in the current local governance approach of the Salacgrīva municipality.

Table 1. Municipal adaptation to climate change indicators system

	Policy	Indicators
Nature dimension		
Climate change adaptation programmes for:	water management	Bathing water quality, guided and mandatory value exceeding
		Water treatment and supply and wastewater treatment energy capacity
	waste management	Share of general population/ enterprises involved in waste management system
	coastal management	Air temperature, rainfall, nebulosity and average wind speed in Ainaži
		Number of stormy days in Salacgrīva and Ainaži. Water level at the Salaca estuary ³
	biodiversity management	Number of tree-cutting permissions for non-forest lands and their spatial distribution
Forest clearcut and reforestation, area and per cent from total forest area		
		Salmon <i>Salmo salar</i> : amount of smolts in the Salaca river
Economic dimension		
Climate change adaptation policy action programme for:	energy and production management	Renewable energy share in the heat supply in Salacgrīva municipality
		Number and volume of implemented energy efficiency projects per year
	business and tourism management	Share of forest areas managed meeting FSC and PEFC standards
		Share of biologically and non-biologically managed agricultural land
		Number of tourist lodging sites with different types of ecological certificates in Salacgrīva district
	transport and infrastructure management	Salacgrīva district public transport operation, number of passengers per year, number and total length of local bus lines
		Bicycle infrastructure development: length of built-up and marked bicycle roads, number of parkings.
		Buried supply network electrical cable length and share of them in overall length of supply network
Social dimension		
Climate change adaptation policy action programme for:	social management	Share of population living in areas at climatic risk
		Number and total duration of electricity supply interruptions
		Households number and share, owning a second home
		Insurance cases number and volume of natural disasters
Governance and communication dimension		
Climate change adaptation policy action programme for:	governance management	Environment and climate change adaptation friendly action share in the population daily routine
		Population ecological footprint, overall for municipality and separately for local communities
	Communication management	Number and frequency of publications about environment and climate change in local media
		Number and frequency of published opinions and information level about climate change

The selection of indicators was hampered by the fact that the locally available range of sources of information and acquired data reliability is limited. But thematically system is sufficiently presentable as it reflects in a balanced way all identified action policy areas and its main role could be also as a prototype for both municipal and higher levels risk governance indicator system development and implementation. System of 24 indicators has been structured along the four sustainability environments or dimensions (Ernstes, 2012a). They, in turn, comprise up to four action policies, each of which affects a certain area of adaptation and each of these policies are described by 2–3 indicators or, in some cases, parameters. According to the definition, the management indicator can only be the parameter that can be directly or indirectly affected by the same

level management decisions. Obviously, the parameters like climate parameters cannot be influenced by the local-level management decisions, but it is important to know them for the same decision-making needs.

For nine of these indicators the methodology for their calculation has been developed and, by testing them in practice, the calculation has been carried out. Indicators show that the risk of adaptation measures in the Salacgrīva municipality so far have been generally successful, until they were considerably affected by the 2008–2009 economic crisis.

Another very similar Latvian coastal municipality – Saulkrasti municipality has developed the risk communication strategy (Ernšteins, 2012). It tested several indicators that characterize risk communication and are associated both with the specific coastal risks and climate variability in general. Salacgrīva municipality sustainable development strategy for 25 years (from 2013 being the mandatory document at all levels of governance in Latvia) as the first municipality in Latvia do includes now also monitoring indicator system (Kauliņš, 2011; Ernšteins, 2012a). Also contains several risk and risk adaptation indicators, but in the overall context of the strategy currently to this topic is not given special attention.

6. Discussion and recommendations

Climate change in Latvian municipalities is now slowly identified/assessed not only as an environmental, but also as socio-economic problem that affects local communities and territory. Consequently, the management basis is equally and purposefully designed and developed for both - the climate change mitigation and adaptation measures, from planning to implementation stages at the local level.

Since climate change is not only environmental but also socio-economic problem, and, in order to achieve the motivation to develop sustainable governance of climate change, it is first necessary to achieve a complete and comprehensive understanding of the climate change threats in short and long term. Besides, to achieve the fullest and most comprehensive understanding, the responsible professionals of local municipalities should be provided with necessary information / education on both climate change mitigation and adaptation to climate change. Intermediate integration of sectors and levels is one of the basic conditions for sustainable management of climate change. Only the integration of climate change in local planning documents and elaboration, adoption and implementation of related decisions, can provide a comprehensive reflection of climate change management in the practice. Providing a clear targeting of planning documents, each target group and every governance level may be able to identify their role in managing climate change. Only in this way each player would be best informed of the best available climate change management intellectual, technological and methodological solutions, and the best available instrument combinations.

It is critically important to ensure the use of all MCCG instruments potential in the existing capacity of local municipalities, as well as continually look for opportunities to increase the capacity of local municipalities. MCCG instrumental section also shall consist of all main instrument groups – political / legislative, planning, economic / financial, administrative / institutional, infrastructure and communication – the most comprehensive climate change planning implementation into practice requires a multi-instrumental approach, assessing the unexploited opportunities of each instrument in the current capacity context and with a view to increase the capacity at the same time constantly looking for new opportunities.

The pro-active participation of all target groups involved in the climate change management is a key to the successful and mutually supportive/complementary collaboration in practice. Uninterested/unmotivated target group might have an allergic effects on the climate policy process – it can become a climate change management chain bottleneck and undermine the proper functioning of other parts of the chain, and, also that can lead to a sort of “domino effect” affecting other players and resulting into avoiding financial, legal and even moral obligations being as important part of MCCG system. That is why it is necessary to promote the target group interest on climate change rather than a burden of daily operations, but as a shared responsibility and at the same time an unprecedented collaboration opportunity in which the players can be involved in the mutually fruitful interplay and thus each make their own points, while also achieving the common goal of the team.

MCCG requires a systematic and co-ordinated approach. As the study showed, the climate change causes complex and multi-sectoral nature problems and their management requires a complex and multi-sectoral approach, too. This approach involves a large number of interrelated elements where a chaotic or incomplete use will lead municipalities to chaotic or incomplete results. That is why it is necessary to systematize and co-ordinate the governance process. Using the above analogy, the municipality would be in the team captains position, and each player on the field knows the game rules, roles and tasks.

Flood risk management in Latvian municipalities as the complementary part of MCCG can be successfully implemented and can be working also in the long term when adaptably and innovatively applying the basic governance conditions known (Ernstesins, 2013; 2012a). First of all, the flood risk assessment, planning and further management is based on the local areas (municipalities) sustainable development complementary four dimensions approach, taking into account both the natural, engineering and spatial environment and the social, cultural and economic environment, in their interaction with the local municipal governance and communication environment, creating the inter-dimensional foundations for the coastal areas and the society development resilience. Secondly, the flood risk (pro-active) management is to be integrated in to the local environmental management and development management process, by complementary application of all instruments of governance – institutional, planning, legal and administrative, economic, infrastructure and communication, thus ensuring the municipalities readiness to flood danger as well as flood events and flood abatement of flood consequences. And finally, the local support system, collaborative communication to all involved stakeholder groups, public authorities and scientists/experts, population, entrepreneurs and mediators (trainers, NGOs, mass media) is to be established to provide information and education, and ensure the involvement and adequate action of all parties in the flood risk management process.

Conclusions

Municipal climate change (mitigation and adaptation) governance (MCCG) development in Latvian municipalities is limited by: lack of information and awareness both about the threats caused by the climate change as well as adaptation to them; insufficient/missing integration of climate change issues into both decision-making and local planning documents; underestimated role of municipality administration as a proactive stakeholder both at local and also national levels as well as the unsuccessful co-operation with related target groups; not employed whole potential of existing whole range of climate change management tools and, of course, lack of financial resources.

Most of Salacgrīva coastal municipality (and this is MCCG leading municipality) households / inhabitants living in the floods endangered areas and surveyed now do know of climate change induced more flood risks (FR), but even 81 % agreed that FR preparations are necessary, in the same time, heavy majority of households are not knowing and/or actively involved/doing any preparation steps – 2/3 never heard any local info on FR, not a single person (except those happened to be municipal employees) took part at any training on FR, as well as 90 % neither heard nor have interest to be involved in any participatory steps related to FR. There is diverse and wide list of separately developed but complementary communication instruments around in Latvia or even already available at particular municipality in order to successfully approach households towards necessary preparedness for FR already / eventually affecting local area.

The MCCG cross-level (vertical) and cross-sectorial (horizontal) integration is to be implemented in both the planning documents and in the process of preparing, making and carrying out decisions. The use of all types of MCCG instruments is to be effectively applied in comprehensive development of all climate policy dimensions applying multi-instrumental approach – political and planning, legal, economic and financial, institutional, infrastructure and communication instruments to be used necessary complementary. A pro-active communication and collaboration between the stakeholder groups involved in the MCCG process is to be taking place to ensure that a particular sector/level/group does not become a weak link in the chain of MCCG (Ernstesins, 2013).

MCCG do require vertically and horizontally coordinated system, including collaboration communication principle to be implemented by all eventual stakeholders from national to household levels and, particularly, changing project type thinking-working towards comprehensive planning / programming development / support and pro-active communicated use of the whole range of instruments to be applied.

References

- Aall, C., Groven, K., Lindseth, G. (2007). The Scope of Action for Local Climate Policy: The Case of Norway. *Global Environmental Politics*, Vol. 7 (2), p. 83–101.
- Adger, N. W., Dessai, S., Goulden, M., Hulme, M., Lorenzoni, I., Nelson, D. R., Naess, L. O., Wolf, J., Wreford, A. (2009). Are there social limits to adaptation to climate change? *Climatic Change*, Vol. 93 (3–4), p. 335–354.
- Atkinson, R., Klausen, J. E. (2011). Understanding sustainability policy: governance, knowledge and the search for integration. *Journal of Environmental Policy & Planning*, Vol. 13, Issue 3, p. 231–251.
- BACC Author Team. (2008). Assessment of Climate Change for the Baltic Sea Basin (Regional Climate Studies). *Springer*, 474 p.
- Baker, S., Eckerberg, K. (2008). Introduction: in pursuit of sustainable at the sub – national level: the ‘new’ governance agenda. In *Pursuit of Sustainable Development: New Governance Practices at the sub-national level in Europe*. Edited by S. Baker, K. Eckerberg. Routledge. 1–26.
- Bubeck, P., Botzen, W. J. W., Kreibich, H., Aerts, J. C. J. H. (2013). Detailed insights into the influence of flood-coping appraisals on mitigation behaviour. *Global Environmental Change*. Doi: 10.1016/j.gloenvcha.2013.05.009.
- Climate Change in Latvia and Adaption to It. (2012). Eds. M. Kļavins, A. Briede. *University of Latvia Press*. Riga, p. 188.
- Conrad, C. C., Hilchey, K. G. (2011). A review of citizen science and community-based environmental monitoring: issues and opportunities. *Environmental Monitoring Assessment*, Vol. 176, p. 273–291.
- Covenant of Mayors Committed to Local Sustainable Energy, How to develop sustainable energy action plans (SEAP) – guidebook*. (2010). Joint Research Centre, Institute for Energy. European Union. Available at: http://www.pilsetumerupakts.eu/index_lv.html.
- Ernšteins, R. (2006). Partnerships between Municipalities and Universities as Means to Promote Regional and Local Sustainable Development in Latvia. In: M. Adomssent (ed.). *Higher Education for Sustainability*, p. 245–250. Frankfurt, Germany, VAS Publishing.
- Ernšteins, R. (2008). Sustainable coastal development in Latvia: Collaboration communication and governance imperative. In: R. Ernšteins, R. Jūrmalietis (ed.). *Sustainable Coastal Development: Colaboration Governance*. University of Latvia Academic Publishing, Rīga, p. 159–178.
- Ernšteins, R., Kudreņickis, I., Urtāns, A., Antons, V., Kuršinska, S., Kauliņš, J. (2010). Coastal Municipal Strategy for Adaptation to Climate Change in Latvia: Interdisciplinary Audit and Action Guidelines. In: R. Ernšteins (ed.). *Abstracts of the international Research conference*. Environmental Science Council of Latvia, Jelgava, Latvia. Climate Change Adaptation Policy Planning for Coastal Municipalities: Salasgrīva Region (in Latvian). *University-Municipality project*. University of Latvia, Department of Environmental Management, Riga, p. 248.
- Ernšteins, R., Lontone, A., Zvirbule, L., Antons, V., Zīlniece, I., Kauliņš, J., Vasariņa, L. (2012a). Climate change adaptation integration into Coastal Municipal Development: governance environment and communication preconditions. *12th International Multidisciplinary Scientific Geoconference SGEM 2012*. Bulgaria, Albena, Proceedings, Academy of Science of Bulgaria, p. 1077–1084.
- Ernšteins, R. (2012b). Development of municipal and social resilience understanding: stakeholder complementary training on coastal governance and communication. *12th International Multidisciplinary Scientific Geoconference SGEM 2012*. Bulgaria, Albena, Proceedings, Academy of Science of Bulgaria, p. 1007–1014.
- Ernšteins, R., Lontone, A., Strazdiņš, J., Kudreņickis, I., Zīlniece, I. (2013). Municipal Climate Change Adaptation in Latvia: Communication and Adaptation for Cross-sectorial and Multi-instrumental Approaches. Abstract. *54th International Scientific Conference on Economics and Entrepreneurship (SCEE'2013)*. Riga Technical University.
- Ernšteins, R., Lontone, A., Šteinberga, Z. (2014). Flood risk management and communication in coastal local municipalities: the case of the Salacgrīva town. *Proceedings of International Research Conference*. Liepāja University and Melardaelen University (Sweden), Liepāja, Latvia, p. 48–57.
- Haq, G., Cambridge, H., Owen, A. (2013). A targeted social marketing approach for community pro-environmental behavioural change, Local Environment. *The International Journal of Justice and Sustainability*, Vol. 18(10), p. 1134–1152. DOI:10.1080/13549839.2013.787974.

- Hales, D. W., Hohenstein, M. D., Bidwell, et.al. (2014). Ch. 14: Rural Communities. Climate Change Impacts in the United States: The Third National Climate Assessment. In: J. M. Melillo, T. C. Richmond, G. W. Yohe (eds.). *U.S. Global Change Research Program*, p. 333–349. Doi:10.7930/J01Z429C.
- IPCC. (2007). Intergovernmental Panel on Climate Change. Summary for Policymakers. In: S. Solomon, et. al. (eds.). *Climate Change: The Physical Science Basis. Contribution of Working Group I to the 4th Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, UK, New York, NY, USA: Cambridge University Press. Available at: http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ts.html
- Kaulins, J., Ernšteins, R., Kudrenickis, I. (2011). Sustainable development indicators for integrated coastal management: definition area and spatial properties. 8th International Conference on Ecosystems and Sustainable Development, Ecosystem and Sustainable Development VIII. *WIT Transaction on Ecology and the Environment*, Vol 144, p. 299–311. WIT Press.
- Kalniņa, M., Zīlniece, I., Ernšteins, R. (2013) Environmental risk communication for coastal municipality: Ventspils town case (in Latvian). *Proceedings of International Research Conference*, p. 427–435. Liepāja University and Melardaelen University (Sweden), Liepāja, Latvia.
- Lontone, A., Zvirbule, L., Roga, A., Kadurina, A., Ernšteins, R. (2012). Governance environment and environmental governance of coastal municipality (in Latvian). *Proceedings of International Research Conference*, p. 487–495. University of Liepaja, Liepaja, Latvia.
- Menzel, A., Sparks, T. H., Estrella, N., Koch, E., Aasa, A., Ahas, R., Alm-Kübler, K., Bissolli, P., Braslavská, O., Briede, A., et. al. (2006). European phenological response to climate change matches the warming pattern. *Global Change Biology*, Vol. 12, p. 1969–1976.
- Shaw, K., Theobald, K. (2011). Resilient local government and climate change interventions in the UK. *Local Environment: The International Journal of Justice and Sustainability*, Vol. 16 (1), p. 1–15. DOI: 10.1080/13549839.2010.544296.
- Waagsaether, K., Ziervogel, G. (2012). Bridging the Communication Gap: An Exploration of the Climate Science-Water Management Interface. In: W. Leal Filho (ed.). *Climate Change and the Sustainable Use of Water Resources*. Climate Change Management. DOI: 10.1007/978-3-642-22266-5_31.

KLIMATO KAITOS VALDYMAS LATVIJOJE, SIEKIANT MULTIINSTRUMENTINIO SUPRATIMO IR SUPRATIMO TARP SEKTORIŲ

RAIMONDS ERNŠTEINS, ANITA LONTONE, JĀNIS KAULIŅŠ, LĪGA ZVIRBULE, JĀNIS STRAZDIŅŠ,
ZANE ŠTEINBERGA, IVARS KUDREŅICKIS, ILGA ZĪLNIECE, ANDRIS ĶĒPALS
Latvijas universitetas (Latvija)

Santrauka

Prisitaikymas prie klimato kaitos yra vienas pagrindinių iššūkių, kylančių žmonėms visame pasaulyje. Nors didžioji dalis sprendimų, susijusių su klimato kaita, priimamai tarptautiniu arba nacionaliniu lygmenimis, šie sprendimai įgyvendinami ir kaitos poveikis jaučiamas vietiniu lygmeniu. Latvijoje atliktas prisitaikymo prie klimato kaitos savivaldos lygiu tyrimas, atsižvelgiant į visų suinteresuotųjų šalių supratimą, pasirengimą ir komunikacinius veiksnius, taikyti vienas kitą papildantys tyrimo metodai: atvejo analizė (Salacgrivos savivaldybėje), Salacgrivos gyventojų anketinė apklausa, nacionalinio lygmens savivaldos planavimo specialistų apklausa, interviu su nacionalinio lygmens valdymo ekspertais. Nustatyta, kad tiek savivaldos specialistų, tiek rizikos zonose gyvenančių gyventojų supratimo apie klimato kaitos valdymą lygis yra nepakankamas. Latvijoje gana platus įvairių klimato kaitos valdymo municipaliniame lygmenyje priemonių spektras, tačiau jų panaudojimas yra ribotas ir dažniausiai viena kitos nepapildo. Būtina savivaldybės lygmenyje vyraujančią projektinį mąstymą keisti proaktyviu komunikavimu ir bendradarbiavimu.

PAGRINDINIAI ŽODŽIAI: *prisitaikymas prie klimato kaitos, valdymas, integracija, komunikacija, municipalinis planavimas, namų ūkių supratimas.*

JEL KLASIFIKACIJA: Q, Q5, Q56, Q58