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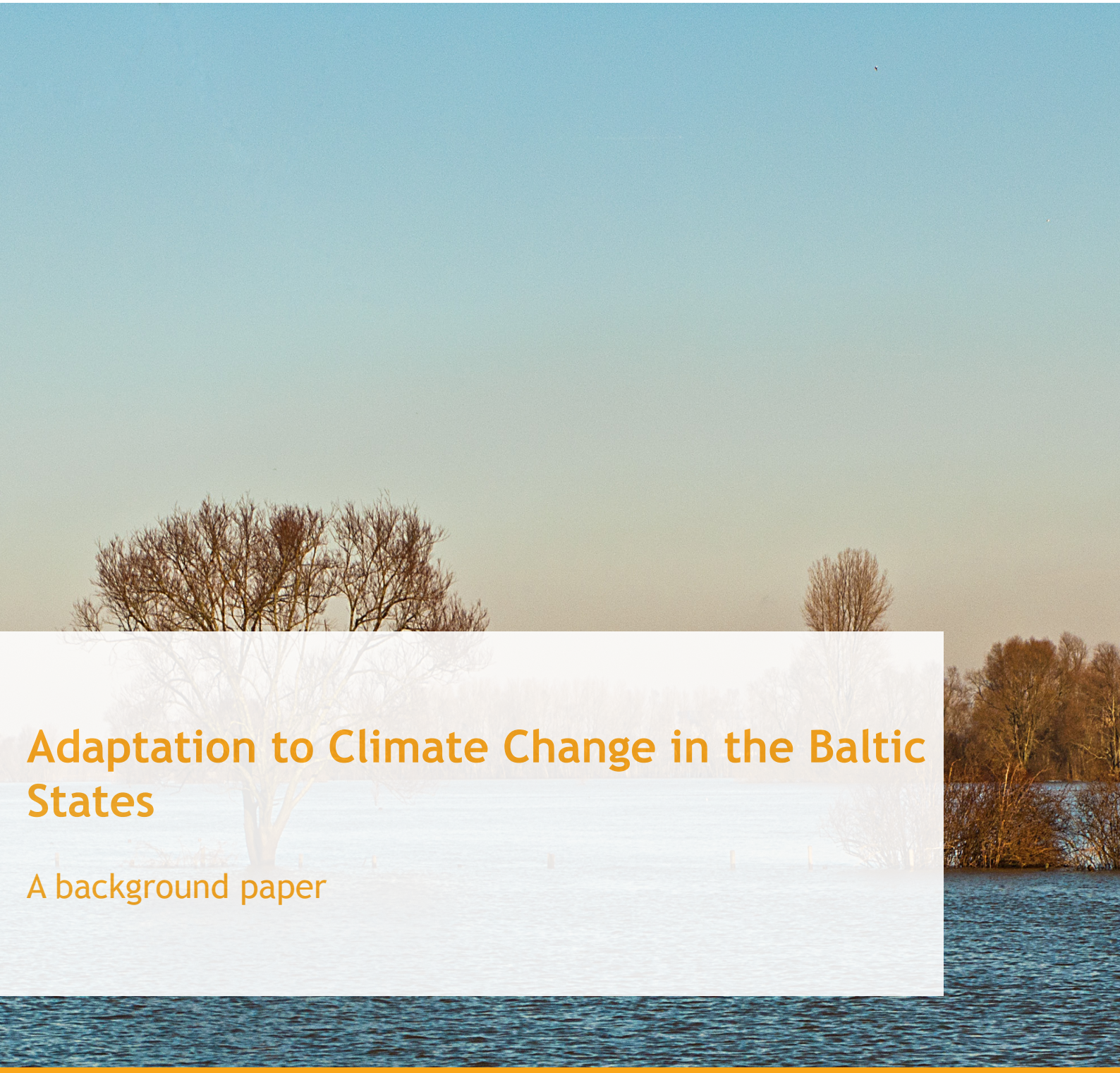

Adaptation to Climate Change in the Baltic States

A background paper

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About this paper

This background paper was prepared in the frame of the project BaltClim which shall support national adaptation strategies to climate change in the Baltic States. This paper reflects the national activities on adaptation to climate change in the Baltic States in summer 2012.

The project BaltClim is implemented by the BEF network and the Institute for Ecological Economy Research (IÖW) in close cooperation with the Baltic Ministries of Environment. The goal of BaltClim is to develop roadmaps which shall lay down the way to the final adaptation strategy and which will show options for actions and how to overcome barriers and obstacles. The roadmap will define thematic priorities and first steps for each of the three target countries. This background paper is the first step for these roadmaps.

The BaltClim project is part-financed by the European Commission and the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety with means of the Advisory Assistance Programme for Environmental Protection in the Countries of Central and Eastern Europe, the Caucasus and Central Asia.

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Abbreviations

BSR	Baltic Sea Region
ECCP	European Climate Change Programme
EEA	European Environment Agency
EU	European Union
ETS	European Emission Trading System
GHG	Greenhouse gases
IPCC	Intergovernmental Panel on Climate Change
MEPRD	Ministry of Environmental Protection and Regional Development (Latvia)
NAS	National Adaptation Strategy
NSCCMP	National Strategy for Climate Change Management Policy (Lithuania)
UNFCCC	United Nations Framework Convention on Climate Change

Introduction

The climate is changing throughout the world. Irrespective of mitigation measures, i.e. measures aimed at reducing greenhouse gases, adaptation to the changes already caused by the emissions of greenhouse gases will be necessary to meet the consequences for the environment, economy and society anticipated by experts. Modern climate policy is therefore based on two pillars: reducing greenhouse gas emissions and adaptation to those consequences of climate change which are already unavoidable.

In 2009, the European Union (EU) outlined its approach to adaptation by publishing the White Paper *Adapting to Climate Change: Towards a European Framework for Action* (Commission of the European Communities 2009). The White Paper sets out a framework to reduce the EU's vulnerability to the impacts of climate change. Due to the varying severity and nature of the impacts of climate change between different regions in Europe, the White Paper so far leaves adaptation decisions to individual countries.

In the Baltic States, climate change mitigation has been recognised as an important issue on a national level and the first set of measures have been adopted. However, the portfolio of adaptation measures in Estonia, Latvia and Lithuania is much more limited. This becomes particularly evident when comparing the action already taken on adaptation by the Baltic States to other countries within the Baltic Sea Region, such as Germany and Finland, which have developed national adaptation strategies and which are already actively implementing measures to adapt to climate change.

Addressing climate change adaptation is necessary, not only in order to be consistent with EU targets and visions, but in particular in view of the fact that some regions of the Baltic States are already experiencing first changes in the natural environment. Within the coastal zones, for instance, climate-related changes such as an acceleration of the rise of sea levels, a further rise in sea surface temperature and more extreme weather events can be expected to have a range of impacts (Policy Research Corporation 2009). The storm of January 2005, for example, affected all three Baltic States heavily (Bruneniece/ Klavins 2011: 492) and the vulnerability of Latvia, Lithuania and Estonia to coastal erosion and flooding will increase through climate change as the frequency and intensity of storms in the Eastern Baltic Sea region are predicted to rise (Policy Research Cooperation 2009[1]).

This background paper briefly introduces adaptation as a policy issue and outlines developments at EU level. Followed by these general chapters, the paper will examine the situation in the Baltic States. These country-specific chapters are based on interviews conducted with representatives of the Environment Ministries of Estonia, Latvia and Lithuania as well as background research. The content of these chapters therefore reflects the views of the three ministries to a large extent.

A final summary will highlight the main findings and conclude by outlining the activities which should be carried out in the following months and years.

1 The individual files of the three Baltic States, including information on coastal erosion and flooding can be downloaded at http://ec.europa.eu/maritimeaffairs/documentation/studies/climate_change_en.htm.

Climate change and adaptation to climate change

An overview of climate change

There are many scientific indications that man-made climate change is indeed taking place and will take place in the future. However, we are uncertain about the extent of climate change and its exact impacts. Scientific models, projections and scenarios allow us to make statements about trends and changes that will occur to a greater or lesser extent in our natural environment. The Baltic Sea as a special water body and the surrounding region has been the subject of scientific research regarding many environmental concerns, including climate change. Accordingly, a variety of studies have been undertaken about the various effects of climate change on environmental parameters specifically in the Baltic Sea Region (BSR). These studies suggest for example that the effects on the sea level by projected regional climate changes are expected to be greater in the Northern and Eastern parts of the Baltic Sea; however, after subtracting the isostatic uplift, the Southern parts will be more affected (Baltadapt Climate Info #4). The frequency of extreme sea level rise and flooding may also change in a future climate in this region which is on the shorter time-scales affected by local meteorological conditions (ibid.). All of the BSR will show increased air and water temperatures, the air temperature will especially increase in the winter season (Baltadapt Climate Info #1 and #7). Precipitation will likely increase in winter and for the northern parts of the basin – including e.g. Estonia – this is also projected for the summer (Baltadapt Climate Info #2). The increased precipitation over land will most likely lead to a larger run-off from tributaries which in turn will decrease the salinity of the Baltic Sea. These changes in temperature, precipitation and salinity will affect the Baltic Sea as an ecosystem. Habitats and coastal ecosystems are at risk. However, warmer summer temperatures and a possible decrease of precipitation in the more southern parts of the Baltic Sea in summer might make the Baltic Sea a more attractive tourist destination in this region.

For more details the reader is asked to consult the BALTEX publication database (http://www.baltex-research.eu/) for scientific articles or the Baltadapt project homepage where the "Climate Info" factsheets will introduce the reader to climate change impacts on selected indicators.

Adaptation to climate change

Adaptation has always taken place in human history but - as the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) outlines - new challenges are formed by the uncertainty, the speed of the changes to come, as well as by the fact that the extremes are likely to exceed previous conditions (IPCC 2001).

The IPCC defines adaptation as the "adjustment to reduce vulnerability or enhance resilience in response to observed or expected changes in climate and associated extreme weather events" (IPCC 2007: 720). Such adjustments can take place in natural or human systems and may both restrict damage or exploit beneficial opportunities. Adaptation thus includes both anticipatory and reactive actions in response to already observed and expected climate changes. Adaptation practices can be differentiated across several dimensions, including for example the spatial scale, sector, action or actor (Peltonen/ Juhola 2010: 3). It should be emphasised that adaptation measures tend to be on-going processes, reflecting many factors, and are seldom undertaken in response to climate change alone (IPCC 2007: 720).

The extent to which climate change impacts upon different ecosystems, regions and sectors of the economy will depend not only on the sensitivity of the ecosystems to climate change, but also on the ecosystems' ability to adapt to climate change, including economic, social, geographic, cultural, institutional, governance and environmental factors.

The integration of local knowledge with additional scientific and technical knowledge can play an important role when improving climate change adaptation (IPCC 2011: 14). According to the IPCC, however, there is broad agreement that it is national systems that are at the core of countries' abilities to meet the challenges of weather and climate extremes occurring as a consequence of

climate change (IPCC 2011: 9). Therefore effective national systems comprising multiple actors from national and sub-national governments, the private sector, research bodies, civil society and a strategic approach to climate change adaptation on a national level are of significant importance.

Developments at European Level

As a region of industrialised countries, Europe has in the past two decades focused its climate policy mainly on mitigation. However, as in other regions worldwide, in Europe climate changes are also already visible, and the impacts of climate change are expected to become more pronounced in the future. Projections for 2100 suggest that the temperature in Europe will have risen by between 2 to 6.3 °C above 1990 levels, sea levels are projected to rise and a greater frequency and intensity of extreme weather events are expected (EEA 2006: 6). These changes would continue for many decades, even if greenhouse gas emissions stopped today. In Europe, mountain regions, coastal zones, wetlands and the Mediterranean region are particularly vulnerable (ibid.).

At European political level, adaptation was addressed for the first time by the EU Environment Council meeting in December 2004 and subsequent meetings in 2005. The 2004 Council concluded that there is a need to prepare for and adapt to the consequences of some inevitable climate changes (Council of the European Union 2004: 17). The European Environment Agency (EEA) also called for adaptive responses to climate change in Europe by documenting the wide ranging impacts of climate change (EEA 2004) and providing information on vulnerability to climate change in Europe (EEA 2006).

When the European Commission launched the second phase of the European Climate Change Programme (ECCP) in 2005 – which is primarily aimed at identifying additional measures to reduce greenhouse gas emissions – there was an agreement to also address adaptation issues. Under the second ECCP, in 2007, a wide-ranging consultation process was launched by the Green Paper on *Adapting to Climate Change in Europe – Options for EU Action* (Commission of the European Communities 2007). In this Green Paper, the European Commission provided a broad outline of Community action to be taken for the EU's adaptation to climate change and raised a number of questions so that stakeholders could determine whether they find the Commission's proposed direction satisfactory, make known their wishes regarding the EU's priorities, and provide new ideas.

The contributions and responses to the Green Paper as well as further research programmes that identified action to be taken in the short-term provided important input for the European Commission's 2009 White Paper, *Adapting to climate change: Towards a European framework for action* (Commission of the European Communities 2009). The White Paper considers that a more strategic approach is needed to ensure that timely and effective measures are taken and pursues the aim of ensuring coherence across different sectors and levels of governance. It presents the framework for adaptation measures and policies to reduce the European Union's vulnerability to the impacts of climate change.

The framework presented in the White Paper is designed to evolve as further evidence becomes available. It adopts a phased approach. The intention is that phase 1 (2009-2012) will lay the ground work for preparing a comprehensive EU adaptation strategy to be implemented during phase 2, commencing in 2013. With the strategy, a framework for action will be created as well as guidelines for the Member States.

Phase 1 focuses on the following key actions:

- building a stronger knowledge base on the impact and consequences of climate change for the EU;
- taking climate change impacts into consideration in key EU policies;
- employing a combination of policy instruments (market-based instruments, guidelines, public-private partnerships) to ensure effective delivery of adaptation;
- supporting wider international efforts on adaptation by helping for example non-EU countries to improve their resilience and capacity to adapt to climate change.

The framework will respect the principle of subsidiary, i.e. the EU will not take action unless it is more effective than action taken at national, re-

gional or local level. By complementing the activities of its Member States, the European Union can support action by promoting greater coordination and information sharing between Member States, and by ensuring that adaptation considerations are addressed in all relevant EU policies. The EU sees a particularly strong role for action on a community level when the impact of climate change transcends the boundaries of individual countries (e.g. river and sea basins and bio-geographic regions).

In order to improve knowledge management and share existing information and research among Member States, the EU has established the Climate Adaptation Platform (CLIMATE-ADAPT: http://climate-adapt.eea.europa.eu/) as an IT tool and database on climate change impact, vulnerability and case studies on adaptation. For particular adaptation activities and projects in the BSR, the section on the Baltadapt homepage "Climate change adaptation" offers an overview of current and finalised projects relevant for the BSR (http://baltadapt.eu/index.php?option=com_zoo&view=category&Itemid=262).

Development of a National Adaptation Strategy in Estonia

Policy Objectives and National Documents on Adaptation

Estonia has recognised climate change as an important policy field. At national level, the focus so far has been on greenhouse gas mitigation policy and crisis management, the latter being regulated by the 2009 *Emergency Act* and emergencies and crisis management plans under the regulation of the Emergency Act (Ministry of the Environment of the Republic of Estonia 2009: 146). The most relevant policy objectives in this context concern energy-related questions and agricultural policy, according to the Estonian Ministry of the Environment.

Much less significance, however, has been attributed to adaptation to climate change than mitigation so far. When approved by the Estonian government in 2007, the *Estonian Environmental Strategy 2030*[2] and the *National Environmental Action Plan of Estonia 2007-2013*[3], serving as the implementation plan of the strategy, did not specify climate change adaptation as a goal or activity of the Estonian environmental policy (Ministry of the Environment of the Republic of Estonia 2007 and 2008). Some existing policy documents, however, do contain aspects regarding adaptation: the *Estonian Forest Development Plan until 2020* mentions the changed composition of species and notes that this topic needs to be investigated more deeply; the *Public Health Development Plan 2009-2020* and the *HELCOM Baltic Sea Action Plan* also includes adaptation aspects. Furthermore, the topic of adaptation has recently been added to the updated draft version of the *National Environmental Action Plan of Estonia*, the draft version of *Development Plan for the Ministry of the Environment 2012-2015*, to the *Nature Conservation Development Plan up to 2020,* the as yet unpublished sectoral Climate Change Adaptation Strategy by the Ministry of Agriculture, as well as to the work plan of the Climate and Radiation Department of the Ministry of the Environment.

At local level, the strong storm of 2005 in particular resulted in the development of detailed adaptation and action plans as to how local governments were to deal with storms and floods (Ministry of the Environment of the Republic of Estonia 2009: 26). The storm gave a clear indication that there is a need to improve the readiness of regions in case of emergencies, and the cities that were most influenced by the storm (Tallinn, Pärnu, Haapsalu) are also by far the most active in implementing adaptation measures (Ministry of the Environment of the Republic of Estonia 2009: 146). Apart from the above mentioned preliminary approaches at national level, crisis management plans also provide guidelines on how municipalities should act in the case of floods and other emergency situations, and therefore often include adaptation aspects.

According to the Ministry of the Environment it is essential to conduct a thorough analysis of the impacts of climate change in order to develop a national adaptation strategy. As this has not been done so far, the Ministry finds it difficult at this time to name the most important objectives regarding adaptation, to make statements about policy objectives influenced or endangered by climate change as well as to suggest new policy goals. Goals mentioned in national documents are mostly of a very generic nature, often inspired by EU documents. In general, the ministry regards spatial and strategic planning as important objectives relevant to climate change adaptation in Estonia, highlighting in particular the importance of a long-term vision.

Responsibilities

The Ministry of the Environment is the highest executive body in Estonia responsible for implementing the national environmental policy, including climate change policy. In the Ministry, the Climate and Radiation Department is responsible for the coordination of the reporting activities under the United Nations Framework Convention on Climate Change (UNFCCC), its Kyoto Protocol and EU legislation and also for the development and implementation of climate change mitigation and adaptation policies. As the process of developing a national adaptation strategy in Estonia has not yet started, the Ministry of the Environment – responsible for the development of the document and the management of the process – is not yet sure which other important institutions (authorities and agen-

2 See www.envir.ee/orb.aw/class=file/action=preview/id=1101230/inglisekeelne.pdf

3 See www.envir.ee/orb.aw/class=file/action=preview/id=1101231/inglise_keeles_tegevuskava.pdf

cies) will be involved in making decisions related to the impacts of climate change.

However, climate change adaptation as a horizontal topic is already now also being addressed by other Ministries, a process in which the Ministry of the Environment is not always involved, according to its own statement. The representatives of the Climate and Radiation Department at the Ministry of the Environment are aware of the need to organise adaptation horizontally and to pursue a harmonised approach for including adaptation aspects in different policy documents. This, however, can also only be done after the analysis of climate change impacts, according to the interviewed representatives.

Currently, there is no body or public institution that coordinates research and information on climate change, and promotes dialogue, understanding and coordination between different actors and stakeholders. However, the Ministry of the Environment does not regard the existence of such a coordinating body as necessary, arguing that Estonia is a very small country and emphasizing the need more on strengthening cooperation on an international level.

Planned Activities

In cooperation with the Ministry of Finance and the Ministry of Agriculture, the Estonian Ministry of the Environment has applied for funding from the European Economic Area and Norwegian Grants financial mechanisms. Within the Ministry of the Environment, the Climate and Radiation Department, the Nature Conservation Department, the Marine Environment Department and the Foreign Financing Department were involved in this process; the Estonian Marine Institute of the University of Tartu participated in the application as an external stakeholder.

In the framework of the funding programme, the Ministry of the Environment is planning to conduct an adaptation research project which will analyse and identify the impacts of climate change in Estonia and develop national measures for adaptation, aggregating also existing scientific information related to the impacts and potential measures of climate change adaptation. The most important section in this project is the prioritisation and economic analysis of proposed measures on climate change, which will result in the Estonian climate change adaptation strategy.

If the funding is granted, the Ministry of the Environment will coordinate the process of implementing the applied activities. For some of the activities that are anticipated to take place from autumn 2012 until 2015, there are plans to award contracts.

Scientific Activities and Challenges

In recent years, several projects on adaptation to climate change in the Baltic Sea region have been implemented. The main project for gaining information on adaptation to climate change in the Baltic Sea region has been the project "Developing Policies & Adaptation Strategies to Climate Change in the Baltic Sea Region" (ASTRA)[4], funded by the INTERREG IIIB Programme (Baltic Sea) of the European Commission (Ministry of the Environment of the Republic of Estonia 2009: 145). The project was carried out between 2005-2007 with the Institute of Ecology at Tallinn University, the Geological Survey of Estonia and Pärnu City as Estonian partners. Its main objective was to assess the regional impact of the on-going global climate changes in the Baltic Sea region and to develop strategies and policies for regional adaptation to climate change, providing a basis for the governments to handle threats arising from climate change in the Baltic Sea Region, such as extreme temperatures, droughts, forest fires, storm surges, winter storms and floods. In the framework of the project, regional and local impact scenarios as well as adaptation strategies for regional planning purposes were developed. Furthermore, policy recommendations for climate change adaptation were delivered for different spatial scales from local to national and Baltic Sea Region levels.

Between 2007-2008, the Estonian Ministry of the Environment financed a climate change related research project, called: "Trends in reducing greenhouse gas emissions and analysis of adaptation to climate change" (Ministry of the Environment of the Republic of Estonia 2009: 155).

Currently, there are several projects on clima-

4 Project ASTRA. Developing Policies and Adaptation Strategies to Climate Change in the Baltic Sea Region (2005-2007). For more information, see: www.astra-project.org

te change adaptation already on-going or in the preparation stage. The project "BalticClimate"[5], funded by the Baltic Sea Region Programme 2007-2013 of the European Commission, targets mainly small and medium sized cities and rural areas in all Baltic Sea region countries to support their development. The project aims to identify how the climate change phenomenon could also present opportunities and chances and not just obstacles for the development of municipalities and regions when they are accounting for climate change information in their long term strategies and planning. The main objectives are to enable Baltic Sea region municipalities, regions and local actors to deal with the climate change issue in a cooperative, integrated and sustainable way and to make them more competitive for future challenges. Outcomes of the project relevant for Estonia are a transport case study (feasibility study) covering the city of Tallinn, Harjumaa and Raplamaa counties, thematic plans (transport plans) for Harju county and Rapla county (currently in process), four railway station and cycling infrastructure pilot projects, climate scenarios until the year 2100 for the Estonian project area and the BalticClimate toolkit[6].

The project "Baltadapt"[7], funded by the Baltic Sea Region Programme 2007-2013 of the European Commission, aims at developing a Baltic Sea Region-wide climate change adaptation strategy. It reviews state of the art knowledge on climate change in the Baltic Sea Region, identifies the information needed for designing appropriate adaptation measures and reviews the impact of climate change on coastal zones.

Although several regional as well as transnational projects regarding climate change have taken place, the exchange between these projects and the Estonian Ministry of the Environment is not always satisfactory. In some cases, the Ministry states that it only learns about relevant projects accidentally, e.g. at international seminars and meetings. Although it has the impression of being recently more involved in respective projects, the Ministry of the Environment perceives a lack of interaction between projects on climate change adaptation and its own institutions.

In spite of the already conducted research projects, there are still gaps regarding climate and socioeconomic data for Estonia. In the framework of the European Emission Trading System (ETS) and the greenhouse gas (GHG) inventories, the Ministry of the Environment collects data on CO_2 emissions.

Some analysis has been carried out by the Water Department of the Ministry of the Environment, but the most necessary data and information is expected by the Ministry as a result of different projects and in particular by the analysis foreseen as activities under the European Economic Area and Norwegian financial mechanism.

A thorough analysis of climate change impacts has not been conducted yet and according to the Ministry representatives interviewed, the currently existing knowledge on climate change in Estonia concerns mainly water-related issues. At this level of knowledge, the Estonian Ministry of the Environment regards the rise of sea levels, coastal erosion, floods and increased precipitation as the most important impacts of climate change for Estonia. As other issues have, to the knowledge of the Ministry, not been analysed in greater depth yet[8], it is difficult for the Ministry to assess whether there are or will be other important climate change impacts for Estonia. Sectors that might be discussed include energy supply, agriculture, forestry and others.

As it currently has the best knowledge on water-related issues, the Ministry of the Environment expects the citizens living in coastal areas to be affected the most by climate change. Different economic sectors as well as ecosystems are also expected to be 'exposure units' affected by climate change impacts; here as well however, the Ministry's representatives perceive a need to analyse the influences in more detail.

The representatives of the Ministry of the Environment interviewed are not familiar with approaches on how to assess potential impacts. Such approaches have according to the Ministry not been developed in Estonia yet.

In general, the Estonian Ministry of the Environment perceives that the impacts of climate change in Estonia are relatively small and the foreseen rise in temperature and precipitation are expected to have positive rather than negative effects on the

5 Project BalticClimate (2007-2013). For more information see: www.balticclimate.org

6 The toolkit is accessible at http://toolkit.balticclimate.org.

7 Project Baltadapt (2007-2013). For more information see: www.baltadapt.eu

8 This is planned under the Norwegian Grant.

Estonian economy (Ministry of the Environment of the Republic of Estonia 2009: 133).

The interviewed representatives of the Climate and Radiation Department consider addressing the still considerable uncertainty about the dimensions of climate change and its effects by conducting common research and communication. In this context, they regard informative portals like the EC climate adaptation website[9] as a good example.

Although it has not yet developed a portfolio of possible adaptation options, the Ministry of the Environment states that it is familiar with methods and criteria that can be used to prioritise adaptation options, like cost-benefit analysis, cost-effectiveness analysis and multi-criteria analysis.

9 http://climate-adapt.eea.europa.eu

Institutional Challenges

The Ministry of the Environment is facing different institutional challenges regarding the development of a national adaptation strategy. It is only partly aware of relevant projects on climate change adaptation; good communication and cooperation between project consortia and the Ministry is often lacking. However, an institution coordinating research and information is not needed in Estonia according to the Ministry.

Collaboration with other Ministries also poses challenges: the Ministry of the Environment perceives different understandings of why and whether there is a need for a climate change adaptation strategy among the different Ministries and there are also different opinions on the question concerning at which political level the strategy should be located. Although responsibility for the development of the national adaptation strategy in Estonia lies with the Ministry of the Environment, the Ministry is not sure which other important institutions (authorities and agencies) should be involved in decisions related to climate change and which ones will be involved in the process of developing a national adaptation strategy.

The other stakeholders to be involved in the development of the adaptation strategy have also not been identified yet. Therefore it is difficult for the Ministry to assess the level of awareness regarding climate change and the interest in an adaptation strategy.

It is planned to establish a steering group composed of representatives from different institutions and organisations. An experience exchange with other countries that have already developed national adaptation strategies could provide helpful insights. However, the Estonian Ministry of the Environment regards cooperation with other countries on this topic as rather difficult, stating that countries with similar climate conditions like the Scandinavian states, are much more advanced in their strategies and are therefore not in a comparable situation. More information exchange is expected from the working group on climate change adaptation established by the European Commission.

A general difficulty concerning the development of an adaptation strategy can be considered to be that the topic of adaptation is not regarded as having a high priority in Estonia. Up to now, the focus of Estonian climate policy has been on climate change mitigation as in this area - unlike in the case of adaptation policy - concrete obligations do exist for developing national measures from international agreements and the EU policy.

For the Estonian Ministry of the Environment it would be very helpful to hear the experience of other countries on practical aspects regarding the development of a national adaptation strategy. Aspects of interest to Ministry include above all the first steps in developing a strategy, the question at which stage to involve stakeholders, and an approximate time schedule concerning the different activities necessary in the development of a strategy. The Ministry would also appreciate advice on which national adaptation strategies already in existence could contain elements helpful for Estonia, as it is regarded as difficult to evaluate which parts of other countries' strategies might be used in Estonia.

- Extension of the scientific knowledge base for a closer analysis of regional and sectoral vulnerabilities would provide a broader basis for the formulation and prioritisation of adaptation strategies.

- A regionalisation of climate change scenarios for Estonia would be an important step in these attempts.

- Coupling other physical, ecological and economic models to these climate scenarios could be subsequent steps.

- To supplement the research budget available from Estonian research institutions and programmes, research budgets from European and international research programmes could be acquired. Through cooperation within international research projects, data and methodological approaches could be tested and cautiously transferred to Estonian conditions.

- Drawing on improved information about the prospective climate change effects on Estonia, the vulnerability of geographical regions, economic sectors and social groups should be analysed.

- These findings could then be discussed in the course of an extensive process of stakeholder involvement that identifies and prioritises adaptation challenges and opportunities.

- Parallel to the participation process the experiences of different Ministries and other public institutions with specific competences and experiences should be drawn together to exchange their respective perspectives on domains challenged by climate change.

- This could take place by establishing a special inter-ministerial and interdisciplinary working group or by using already existing forums interlinking the different institutions and approaches. Without such a forum of exchange, the formulation and implementation of a National Adaptation Strategy would be severely hampered.

- This process should include an extensive exchange between science and policy, between researchers and experts in Ministries and public agencies.

- This could be facilitated inter alia by an internet based knowledge platform managed by a Ministry, university or another well-established and renowned institution.

- To stimulate personal commitment and to ensure institutional continuity such a platform must be supplemented by personal exchanges in real life – through workshops, conferences and other discussion rounds.

- Identifying and communicating best practice examples are means to make adaptation options more tangible than strategies on paper. These examples are often put forward by highly dedicated personalities that can be contacted and addressed personally – and in many cases they are open and willing to pass on experiences about the practical solutions they have chosen. Processes of social learning can be facilitated by this approach of promoting best practice examples.

- If no best practice examples are at hand, financing pilot projects or launching public contests can breed or help to discover them.

- In that geographical closeness leads to a similarity of vulnerabilities to climate change, an exchange of knowledge and a discussion of approaches to deal with these challenges should take place among the three Baltic States as well as with their neighbouring countries facing similar problems.

Development of a National Adaptation Strategy in Latvia

Current Approaches to Climate Change Adaptation

Policy Objectives and National Documents on Adaptation

Latvia does not yet have a national adaptation strategy, but has started the preparations for a related document. A systemic approach was begun in 2008 by the Latvian Government's approval of the *Report on Adaptation to Climate Change* with the Latvian Government (Bruneniece/ Klavins 2011: 481). This advisory report cites the risks related to climate change (e.g. more frequent and more powerful storms, floods, droughts, human health problems, loss or movement of animals and plants etc.) as well as the advantages of climate change (e.g. a longer vegetation period and an increasing volume of precipitation which will allow higher and more stable power generation from own hydro power plants to be achieved). The report considers the costs and benefits arising from climate change impacts and policy response alternatives (Bruneniece/ Kalnins 2011: 495). Furthermore, it gives an overview on relevant research at international and national level and details the most important international policy initiatives related to adaptation. It describes adaptation needs and gives preliminary recommendations for future adaptation measures to be taken (Swart et al. 2009: 226).

The report serves as a basis for the development of Latvia's national strategy on climate change adaptation, which, however, will not be entitled 'National Adaptation Strategy' but 'National Adaptation Guidelines'[10]. It was planned that within one year after the adoption of the European Commission's *White Paper on Adaptation to Climate Change* – i.e. until 1 April 2010 - the Latvian Ministry of the Environment would have developed a concept on adaptation to climate change (Ministry of the Environment of the Republic of Latvia 2009: 129). Until now, however, neither the format of the national adaptation guidelines nor that of the adaptation action plan has been agreed. According to the latest protocol of the Cabinet of Ministers, adopted on 29th May 2012, the Ministry of Environmental Protection and Regional Development has to prepare guidelines for adaptation by 1st December, including within changes of Environmental Policy guidelines for 2009-2015.

Nevertheless, some objectives concerning climate change and adaptation are already included in other documents, e.g. in the Strategy for Spatial Development of the Coastal Area 2011-2017, the Environmental Policy Guidelines 2009-2015 and the legislation documents regulating the use of funding from the Kyoto mechanisms,[11] which is amongst others meant to be used for climate change adaptation activities. However, no projects have been implemented on adaptation activities. A few single sectors, e.g. forestry, have also evaluated climate change impacts already and have developed measures for their own sector. Other precautions, such as a compensation mechanism in agriculture and forestry, action in case of floods and construction regulations for coastal areas endangered by flooding and erosion are being envisaged according to the Ministry of Environmental Protection and Regional Development (MEPRD). According to the Ministry, however, they are not necessarily attributed to risks related to climate change.

In the opinion of the Spatial Planning Department of the Ministry of Environmental Protection and Regional Development, a policy objective in Latvia particularly relevant to climate change is the concept of land user and land owner responsibility. This was mentioned for the first time in the draft Law on Land Management and states that the land owner is responsible for the adaptation of his land to climate change. For this purpose there are different instruments available, e.g. insurances. According to the Spatial Planning Department this aspect shall be mentioned in Latvia's national adaptation guidelines as currently people expect the government – therefore the department – to pay for such measures. Furthermore, the department regards it necessary to include in the guidelines information on how to integrate the topic of climate change in other sectors and documents.

10 This specification is stated in the Act on Territorial Development Planning, which was approved in 2011.

11 The so called „The Climate Change Financial Instrument" is a Government of the Republic of Latvia budget program that aims to prevent global climate change, adapt to the effects of climate change and contribute the reduction of greenhouse gas emissions. More information is available at http://www.lvif.gov.lv/?object_id=299&l=2

According to the Climate Change Division of the Ministry, objectives that will be influenced by climate change include in particular those objectives which are related to regional development, e.g. the planning of business areas, infrastructure and settlements.

Responsibilities

In Latvia, the preparation process of the national adaptation guidelines is led and coordinated by the Ministry of Environmental Protection and Regional Development (MEPRD). Inside the Ministry, the responsibility lies with the Climate Policy Division of the Climate Policy and Technology Department. Besides the responsibility regarding the development of the national adaptation guidelines, the division states that it is also in charge of the elaboration of the action plan, the supervision of the implementation of the related activities and the development of horizontal legislative documents for the implementation of the national adaptation guidelines.

Although not in charge of the national adaptation guidelines, the Spatial Planning Department of the Ministry of Environmental Protection and Regional Development also expects its work to change significantly due to climate change as on the one hand the existing infrastructure is affected by climate change impacts and on the other hand climate change needs to be taken into account for the planning of new real estate especially on the sea coast (including residential buildings, roads and engineering works).

It was envisaged that the national adaptation guidelines themselves would be developed by two working groups which were set up for this purpose: one inter-governmental expert group, consisting of representatives of several Ministries (e.g. the Ministry of the Interior, the Ministry of Agriculture, the Ministry of Transport and the Ministry of Welfare), and one expert group consisting of scientists (e.g. from the University of Latvia, the Latvian University of Agriculture and the Latvian State Forestry Research Institute "Silava"), specialists from different agencies (e.g. Regional Development Agencies) and representatives of companies and the insurance sector (Swart et al. 2009: 226ff.). These working groups represented the key Latvian stakeholders involved in the development of the national adaptation guidelines[12]. Due to a lack of institutional capacity and financial resources for relevant research, the two working groups had to temporarily stop their work. It is foreseen that they will resume work in 2012.

Planned activities

The Latvian Ministry of Environmental Protection and Regional Development has applied for funding from the European Economic Area and Norwegian Grants financial mechanisms. The applied activities under the "predefined project" are those which are regarded by the Ministry as those most necessary to develop Latvia's national adaptation guidelines and include the establishment of a data base, the definition of indicators, the revision of the existing monitoring system and the development of a new monitoring system, an assessment of data gaps and the development of a flood risk map for the river basins, as in the opinion of the Ministry it is very important to have detailed maps that are developed based on similar guidelines.

The decision which activities to apply for was based on the Ministry's needs, taking into account previous national and international projects. Experts of the Climate Policy Division developed the first draft of the proposal, which was then discussed with the head of the Climate Policy and Technology Department and the Development Instrument Department, the latter being the managing body of the Norwegian program, should the application be successful. In addition, there were consultations with other departments of the Ministry of Environmental Protection and Regional Development, e.g. the Department of Environmental Protection and the Spatial Planning Department, and the project proposal was furthermore sent to other Ministries and passed to the Environmental Consultative Board (NGOs).

If the application is successful, the Climate Policy and Technology Department will be responsible for the implementation of the predefined project. Some activities will be tendered and subcontracted. The applied activities are planned to start at the beginning of 2013.

12 A list of the working group members can be obtained by the Ministry of Environmental Protection and Regional Development

Scientific Activities and Challenges

Several research projects and programmes related to the impacts of climate change have contributed to the development of Latvian adaptation policies and will also support the development of the national adaptation guidelines. One of the most important research programmes contributing to adaptation policy development has been the national research programme "KALME"[13] which focused on the impacts of the climate on water. In the framework of the project, water monitoring was carried out. This provided important data on this topic for which no respective state program exists, according to the Ministry of Environmental Protection and Regional Development.

Furthermore, research projects related to the impacts of climate change on forests, agriculture or geological coastal processes in Latvia have been carried out (Swart et al. 2009: 228), among them the EU funded LIFE-Nature project "Protection and Management of Coastal Habitats in Latvia"[14].

Among international research projects on climate policy, a contribution to the development of adaptation policies has in particular been made by the project "Developing Policies and Adaptation Strategies to Climate Change in the Baltic Sea Region" (ASTRA)[15], implemented between 2005-2007.

In 2009, the international project "Baltic Climate Change: Impacts, Costs and Adaptation in the Baltic Sea Region" (BaltCICA)[16] was launched with Latvian participation. In the framework of BaltCICA, a small regional adaptation strategy in the Salacgriva region has been prepared and was adopted in August 2011. Possible adaptation options have been developed and appraised, and their implementation will be initiated with particular focus on coastal erosion, flooding, water quality and water availability.

13 National Research Programme KALME. Climate Change Impact on Water Environment in Latvia (2006-2009). For more information, see: http://kalme.daba.lv/en.

14 Project Protection and Management of Coastal Habitats in Latvia (2002-2006). For more information, see http://piekraste.daba.lv/EN/.

15 Project ASTRA. Developing Policies and Adaptation Strategies to Climate Change in the Baltic Sea region (2005-2007). For more information, see: www.astra-project.org.

16 BaltCICA. Climate Change: Impacts, Costs and Adaptation in the Baltic Sea Region (2007-2013). For more information on the mentioned case study, see: www.baltcica.org/casestudies/latvia.html.

The project "Baltadapt"[17] within the EU's Baltic Sea Region Programme 2007-2013 aims at developing a Baltic Sea Region-wide climate change adaptation strategy.

The project "BalticClimate"[18], also funded by the European Commission's Baltic Sea Region Programme 2007-2013, aims at enabling Baltic Sea region municipalities, regions and local actors to deal with climate change issues in a cooperative, integrated and sustainable way and to support their development.

The Ministry of Environmental Protection and Regional Development is aware of these projects regarding climate change adaptation and the most relevant climate and socioeconomic data for the Climate Policy Division of the Ministry are – as the representatives of this division state – in fact those generated in the framework of projects. However, the Climate Policy Division regards it as problematic that the existing data are not bundled, but rather exist as "bits and pieces" in different institutions, e.g. in the Ministry of Agriculture and in the Air and Climate Division in the Latvian Environment, Geology and Meteorology Centre (LEGMC). The Climate Policy Division considers it likely that for a successful elaboration of the national adaptation guidelines and other relevant documents more data will be needed, but finds it difficult at this moment to define which data exactly this might be. One subject that the Ministry, however, can already cite is the field of economic risks. A study commissioned by the Ministry on how to use insurance systems in the field of climate change came to the conclusion that currently neither clients nor insurance companies see a strong need to introduce such an approach. Nonetheless, the Ministry would like to gain more information on this issue. The identification of other necessary data will be possible after a risk assessment as this will show which data are not available in the form necessary to estimate the risks, according to the representatives of the division.

The Spatial Planning Department in the Ministry of Environmental Protection and Regional Development states that it has access to socioeconomic data, but regards the information availab-

17 Project Baltadapt (2007-2013): For more information see: www.baltadapt.eu.

18 Project BalticClimate (2007-2013). For more information see: www.balticclimate.org.

le as not sufficient for spatial planning. Regional climate models would be needed and they are very important in the view of the Spatial Planning Department - in particular monitoring programmes whose results can be used by national institutions as well as municipalities to forecast erosion, flooding and the rise of water levels. The previously existing national monitoring programme on coastal erosion was stopped due to the financial crisis and therefore monitoring data is no longer available for municipalities and other stakeholder groups. The issue is, however, currently being discussed in the Ministry of Environmental Protection and Regional Development and it is planned that in the near future the Department of Environmental Protection will develop new environmental monitoring guidelines and renew coastal monitoring in Latvia. As formality is of high importance in Latvia, according to the Spatial Planning Department, it is thus very important to include the requirements for monitoring in the national adaptation guidelines – only if the requirements are included in political documents will they be fulfilled, which is one more reason why the national adaptation guidelines are urgently needed in the opinion of the Spatial Planning Department.

The cooperation with national and international projects is judged ambivalently by the Ministry of Environmental Protection and Regional Development. The Spatial Planning Department in the Ministry regards national projects in general as effective and useful as they would inform the Ministry about project events and activities and provide important data. International projects with Latvia as a partner are perceived by the department as much less effective for Latvia, also because the project results are often not easily available for the Ministry. The Climate Policy Division of the Ministry sees the cooperation with projects in general more critically: according to this division, the Ministry usually gets to know about projects only if the project partners need information, data or a speaker for a project event from the Ministry. The coordination among different projects is also criticised: although several projects on climate change have been conducted, the planned and implemented activities in these projects are often not coordinated and related to each other and it is not always clear how the results will be used later.

Despite the described difficulties concerning the cooperation and communication with and among projects, the Ministry of Environmental Protection and Spatial Planning regards international as well as national projects on climate change as important supporting forces contributing to an adequate response to climate change in Latvia and names as a good example the approved adaptation strategy of the municipality Salacgriva, developed in the framework of the project BaltCICA (see above).

According to the Ministry of Environmental Protection and Regional Development, the main impacts of climate change in Latvia are the rise of the water level in river basins and along the Baltic seacoast, an increase in the strength and frequency of winds/storms, a higher frequency and intensity of floods and coastal erosion.

Although the Ministry representatives name some impacts of climate change for Latvia, methods and approaches on how to identify such impacts are only partly known to the Ministry[19]. The Ministry itself does not use such methods because – as the Ministry states – there is both a lack of capacities and financial resources for buying such models and investing the work time. The Latvian Environment, Geology and Meteorology Centre uses such models for analysing information and has so far been able to estimate various environmental indicators.

Although in Latvia building density is lower than in other parts of the EU, the named impacts might in the opinion of the Ministry have an influence on existing buildings and infrastructure, including roads, the electrical power network and the sewerage network. Referring to Latvia's recent experiences with electricity cut-offs lasting several weeks due to storms, the Ministry emphasises that local inhabitants can be considered as being most affected by climate change. Sectors which are, according to the Ministry of Environmental Protection and Regional Development, affected by climate change impacts are forestry and agriculture. However, the interviewed representatives from the Ministry remarked that it would be difficult to assess which parts of the damages e.g. due to storms can be attributed to climate change. This question, as well as the question of which other sectors are affected by climate change, would still need to be investigated. The Ministry in particular states the necessity to analyse how far human

19 The representatives interviewed mention environmental risk estimation methods, e.g. environmental impact assessment, and models, e.g. climate modelling and modelling of floods.

health is influenced by climate change, mentioning the recently hot summers in Riga during which the citizens experienced different health problems.

So far, no adaptation options have yet been developed for Latvia. A portfolio of possible adaptation options is planned to be developed in the framework of the predefined project funded by the EEA/ Norwegian Grants (see chapter 4.1.3). Whilst it is aware of methods and criteria that can be used to prioritise adaptation options, the Ministry of Environmental Protection and Regional Planning regards it as impossible to familiarise itself with these methods and to be able to properly apply them due to capacity constraints. Therefore, it plans to subcontract this task, e.g. to universities which have the necessary knowledge and skills. Both the Climate Policy Division and the Spatial Planning Departments regard the prioritisation of adaptation options as not being their direct responsibility.

In the opinion of the Spatial Planning Department, a way to deal with the still considerable uncertainty about the dimensions of climate change and its effects is the identification of stakeholder groups, their needs and interests. The different stakeholder groups have different understandings of climate change and the Spatial Planning Department regards it as important to provide state and municipal institutions, planners and building companies with a common view on climate change related topics.

Institutional Challenges

Officially, all scientific research in Latvia is coordinated by the Ministry of Education and Science. As laid down by the respective legislation, all research financed by state funds has to be made publicly available. According to the Ministry of Environmental Protection and Regional Development, however, this is not promoted by the science funding scheme in Latvia. Also, there is currently no public institution that coordinates research and information on climate change and promotes dialogue, understanding and coordination between different actors and stakeholders. It would be helpful for the Ministry of the Environmental Protection and Regional Development to get more information about good examples concerning such bodies in other states. However, in the opinion of the Climate Policy Division, the Ministry of the Environmental Protection and Regional Development – as well as other state institutions – would not be the institution to play the role of coordinating research as climate change would not be a very high priority for Latvia, and in the current financial situation resources need to be allocated carefully. The Climate Policy Division suggests that this could be done by an agency, a centre established on a project basis, e.g. the Agenda 21 Centre or by the University of Latvia which is already involved in the issue.

According to the Ministry of Environmental Protection and Regional Development, a general difficulty in addressing climate change adaptation in Latvia is the low awareness and understanding of climate change. As a result, there is a low level of interest in related issues from the perspective of politics, economy and the general public in Latvia.

In order to inform the general public, easily understandable information and a systematic approach for communicating with citizens is regarded as necessary by the Ministry. It argues that it would be important to make citizens understand that they can do a lot themselves in order to protect their households and property.

A communication strategy is also perceived as necessary for the communication with other Ministries and stakeholders. Besides clarification of the question of which information should be provided to which stakeholder group, the Ministry aims to define how to discuss the adaptation document and the planned activities with a broad audience, including the general public, farmers, landowners and enterprises, and to conduct a good consultation process.

The cooperation with stakeholders is assessed differently by the Climate Policy Division and the Spatial Planning Department of the Ministry of Environmental Protection and Regional Development. While the Climate Policy Division perceives the communication with other Ministries as good, arguing that they are interested in an adaptation strategy as such and also in participating in its development, the Spatial Planning Department criticises the low level of interest national institutions express in events on this topic. It regards the information exchange and commu-

nication with Ministries, but also with other stakeholder groups, as rather weak and fragmentary. The Spatial Planning Department gives an example of unsuccessful communication with the company Latvenergo (state-owned electricity provider), in particular regarding the issue of electricity security in coastal areas. The Ministry perceives a need to address this topic. It has therefore requested data about cases of electricity cuts in these areas as well as on problems due to storms, but the company argues that electricity security in the coastal areas would be the same on the coast as inland and the Ministry lacks data to disprove this statement. The situation remains unresolved as Latvenergo requires additional financial and human resources to address the Ministry's concern. The cooperation with municipalities and scientists, however, is working well, according to the Spatial Planning Department.

Good practice examples of other national strategies (in particular of examples similar to the Latvian situation), information concerning the operating content of such a framework as well as issues that might be addressed would be very useful for the development of the national adaptation guidelines in Latvia, according to the Ministry. Furthermore, it is regarded as important to get information on which kind of data other countries have used for their national adaptation strategies in order to try to obtain these data for Latvia as well.

A very important step in the development of the national adaptation guidelines is according to the Ministry the drawing up of a draft which would serve as a basis for discussion with stakeholders and make the communication much more concrete. As soon as a draft exists, the Ministry plans to re-establish the two working groups (see chapter 4.1.1).

Options for Action

- Latvia is facing options that are very similar to those identified for Estonia. Taking into account the currently on-going processes addressing adaptation needs and options in Latvia, the options identified in this section are only marginally different from the Estonian case (see 3.4).
- Extension of the scientific knowledge base for a closer analysis of regional and sectoral vulnerabilities would provide a broader basis for the formulation and prioritisation of adaptation strategies. Promising approaches like the already established monitoring system on coastal erosion (which had to be stopped due to budget limitations) should be further supported.
- As mentioned by the Spatial Planning Department, a regionalisation of climate change scenarios for Latvia would be an important step in these attempts.
- Coupling other physical, ecological and economic models to these climate scenarios could be subsequent steps.
- To supplement research budgets available from Latvian research institutions and programmes (that have already been active in several national research projects, such as. KALME, for example), additional research budgets from European and international research programmes could be acquired. Through cooperation within international research projects, data and methodological approaches could be tested and cautiously transferred to Latvian conditions.
- Drawing on improved information about the prospective climate change effects on Latvia, the vulnerability of geographical regions, economic sectors and social groups should be analysed.
- These findings should then be discussed in the course of an extensive process of stakeholder involvement that identifies and prioritises adaptation challenges and opportunities.
- Parallel to the participation process the experiences of different Ministries and other public institutions with specific competences and experiences should be drawn together to exchange their relevant perspectives on fields challenged by climate change.
- The two working groups which have already worked towards an exchange between science and policy – involving several Ministries, specialised agencies and researchers (see 4.1.2) – should be revived.
- The coordinating role of the Ministry of Environmental Protection and Regional

Development, also integrating the perspective of spatial planning, is a promising approach that could prove to be very effective in working on the National Adaptation Strategy – if supported further by the other Ministries and coupled with a participation process involving stakeholders.

- The process could be facilitated inter alia by an internet based knowledge platform managed by a Ministry, university or another well-established and renowned institution.

- To stimulate personal commitment and to ensure institutional continuity such a platform must be supplemented by personal exchanges in real life – through workshops, conferences and other discussion rounds.

- Identifying and communicating best practice examples are means to make adaptation options more tangible than strategies on paper. These examples are often put forward by highly dedicated personalities that can be contacted and addressed personally – and in many cases they are open and willing to pass on experiences about the practical solutions they have chosen. Processes of social learning can be facilitated by this approach of promoting best practice examples.

- If no best practice examples are at hand, financing pilot projects or launching public contests can breed or help to discover them.

- In that geographical closeness leads to a similarity of vulnerabilities to climate change, an exchange of knowledge and a discussion of approaches to deal with these challenges should take place among the three Baltic States, as well as with their neighbouring countries facing similar problems.

Development of a National Adaptation Strategy in Lithuania

Current Approaches to Climate Change Adaptation

Policy Objectives and National Documents on Adaptation

In January 2008, the Government of the Republic of Lithuania approved the *National Strategy for the Implementation of the UNFCCC until 2012*[20] (Ministry of the Environment of the Republic of Lithuania 2010: 105). Specific measures not only for mitigation but also for adaptation to climate change are described in the strategy[21]. Measures to ensure relevant adaptation to climate change and to minimise the adverse impacts on human health and the environment are divided into the following groups:

- measures aimed at ensuring more effective monitoring of climate change,
- measures to ensure the assessment of the vulnerability of the landscape, ecosystems and biological diversity, and the planning of adaptation options,
- measures to reduce the impact of the energy, industry, transport, agricultural and forestry sectors on the climate,
- measures to reduce the impact of climate change on human health, to develop research and to raise public awareness in combating climate change

(Ministry of the Environment of the Republic of Lithuania 2010: 105ff).

The *National Strategy for the Implementation of the UNFCCC until 2012* furthermore determines deadlines and responsible authorities, included in the annex on measures attached to the strategy (Ministry of the Environment of the Republic of Lithuania 2010: 14). The implementation of the strategy is organised and coordinated by the Ministry of the Environment with the Ministries of Energy, Finance, Transport and Communications, Health, Education and Science, Economy, Agriculture and other institutions involved depending on their competences (Ministry of the Environment of the Republic of Lithuania 2010: 12).

Lithuania's second main document concerning climate change is the *Law on Financial Instruments for Climate Change Management*[22] (Republic of Lithuania 2009). Passed in July 2009, it addresses the rights, duties and liabilities of the persons engaged in economic activities resulting in greenhouse gas emissions, the sphere of competence of state institutions and bodies, and the EU Emission Trading Scheme. It also lays down provisions for the *National Strategy for Climate Change Management Policy (NSCCMP), which currently is in the process of development*. In Lithuania there are no plans to develop a separate Climate Change Adaptation Strategy. Instead, the *NSCCMP* for the period 2013-2050 will cover both mitigation and adaptation.

The *NSCCMP* is being developed by a Lithuanian consultancy company, which has been charged with this task by the Ministry. The Ministry provided the company with data and strategic documents and they jointly agreed on the document structure, including the selection of the following sectors for the analysis of both mitigation and adaptation: water resources, landscape, ecosystems and biodiversity, air pollution, waste, forestry, agriculture, energy, transport, industry, and public health. During the contracting phase, the company has maintained regular contact with the Ministry and furthermore approached the Ministries of Transport, Economy, Energy, Agriculture and Education, as well as different universities. Data were also provided to the consultancy by the Industry Confederation, the Association of Municipalities and some municipalities. The contractor's tasks included the analysis of climate change mitigation and adaptation options in the selected public management sectors, the suggestion of mitigation and adaptation goals and tasks on a national level as well as for the public management sectors, and the development of the *NSCCMP* draft strategy document and the implementation plan. A review or quality control of the *NSCCMP* is also included in the contract with the company.

20 National Strategy for the Implementation of the UNFCCC until 2012, see www.am.lt/VI/en/VI/index.php#a/202.

21 See information provided by the European Environmental Agency: http://www.eea.europa.eu/themes/climate/pam/details?id=2596.

22 See www3.lrs.lt/pls/inter3/dokpaieska.showdoc_e?p_id=353938&p_query=&p_tr2=.

The first draft of the *NSCCMP* was prepared in spring 2012. It provides climate change adaptation objectives, measures and tasks, and defines the format of the adaptation action plan. In June 2012 the draft version was sent to all related Ministries and was also made available for comments to the public. It is planned that the *NSCCMP* will be approved by the Seimas at the end of 2012 and that the strategy will come into force in 2013.

According to the Ministry of the Environment, the most relevant existing policy objectives in Lithuania related to climate change include the promotion of renewable energy sources and improvement of the energy efficiency, including the refurbishment of the housing stock. The main objectives concerning adaptation defined in the *NSCCMP* include the following:

- to mainstream adaptation objectives and measures in the policy documents, objectives and activities of the most important economy sectors, i.e. energy, industry, agriculture and transport;
- to promote the use of EU funds and the government's budget for adaptation-related projects;
- to monitor and evaluate the impact of climate change in Lithuania and other countries;
- to coordinate and ensure a systematic gathering and dissemination of climate change information to various interest groups and the public;
- to promote research and innovation in the field of climate change, including adaptation measures, and ensure an efficient allocation of finances;
- to ensure the education and continuous skills development of climate change specialists;
- to create an effective insurance and compensation mechanism for damage caused by extreme weather events.

In the current draft of the *NSCCMP*, a need for adaptation measures is stated for the following sectors: biodiversity and ecosystems, agriculture and soil, public health, energy, transport, industry, forest and water management. The Ministry of the Environment is of the opinion that it is good to analyse as many sectors as possible because currently there is still not sufficient information about many sectors.

Responsibilities

The main national institution involved in the development of the *NSCCMP* is the Lithuanian Ministry of the Environment. It coordinates the process among other Ministries and the Lithuanian Parliament (Seimas) and ensures the communication with the consulting company. The responsible unit within the Ministry of the Environment is the Climate Change Policy Division. It formulates climate change policy, organises the implementation of the EU and international commitments in the field of climate change and represents the country in international and EU forums (Ministry of the Environment of the Republic of Lithuania 2008: 9).

Besides the Ministry of the Environment, other Ministries and the Seimas, the National Climate Change Committee also takes part in the development of the Lithuanian *NSCCMP*. The National Climate Change Committee was established in 2004, the composition of the committee and its regulations are periodically updated. The latest update of the composition of the Committee was carried out in January 2012. The objectives of the committee are to organise the implementation of the provisions of the UNFCCC, to coordinate compliance with the requirements of the Kyoto Protocol and EU legal acts related to climate change, and to evaluate the efficiency of the creation of the national legal basis in this area (Ministry of the Environment of the Republic of Lithuania 2008: 9). The National Climate Change Committee consists of 21 representatives from various Ministries (the Ministries of Health, Communication, Economy, Agriculture and Energy), other governmental or municipal institutions (e.g. the Association of Municipalities), science and education institutions, NGOs and industry.

Planned activities

It has not yet been examined whether the state monitoring programme sufficiently documents impacts of climate change and of climate change protection and adaptation measures. It is planned to adjust the monitoring programme to climate change issues with funding from the European Economic Area and Norwegian Grants financial mechanisms. The Lithuanian Ministry of the Environment furthermore aims to conduct joint projects on climate change adaptation among the

Baltic States in the next EU Multiannual Financial Framework for the period 2014-2020.

Scientific Activities and Challenges

In 2007, the Vilnius University Institute of Ecology, on behalf of the Ministry of the Environment, carried out the study *Climate change impacts to the land ecosystems, biodiversity, water resources, agriculture and forestry and human health and the strategic plan for the mitigation of consequences* (Ministry of the Environment of the Republic of Lithuania 2010: 99).

The project "ASTRA"[23], which was completed in 2007, analysed climate change impacts on the seashore and coastal eco-systems, dune deflation and erosion patterns and provided recommendations for adaptation. For Lithuania specifically, flood management schemes as well as a report indicating high-risk zones were prepared for the city of Klaipeda. The Lithuanian partners involved in this project were the Environmental Centre for Administration and Technology, Vilnius University, the Institute of Geology and Geography and the City of Klaipeda.

In the frame of the project "BaltCICA"[24], adaptation options for the city of Klaipeda and the district of Klaipeda were analysed in the context of three distinct case studies. The issues addressed comprised the problem of flooding in urban areas, ground water management and decisions on coastal infrastructure in the Klaipeda district. For some of the adaptation measures proposed the process of implementation will be initiated. Five institutions from Lithuania have been involved in this project: the Environmental Centre for Administration and Technology, Vilnius University, the Lithuanian Geological Survey under the Ministry of Environment, Klaipeda city municipality and Klaipeda district municipality.

The project "BalticClimate"[25] aims at increasing the competitiveness of small and medium sized cities and rural areas in the Baltic Sea region by enabling them to deal with climate change issues in a cooperative, integrated and sustainable way.

The project "Baltadapt"[26] reviews state of the art knowledge on climate change in the Baltic Sea Region, identifies the information needed for designing appropriate adaptation measures and reviews the impact of climate change on coastal zones. The aim of the project is to develop a Baltic Sea Region-wide climate change adaptation strategy. The Baltic Environmental Forum (BEF) Lithuania is the national partner in Baltadapt.

The Ministry of the Environment is aware of these existing projects and is keen to contribute and/ or use the projects' outputs. However, the Ministry is of the opinion that in general not enough research on climate and socioeconomic data is carried out and that the conducted research is mostly very specific. It perceives a need to systemise the available information so that it can be used for political decision-making.

The Ministry representatives interviewed expressed a lack of thorough understanding of approaches and methods on how to assess potential climate change impacts and set priorities for adaptation, they would thus be willing to learn about them in more detail. At the moment, the study on climate change impacts carried out by the Vilnius University in 2007 (see above) serves as the main information source for the Ministry to understand the needs for adaptation in Lithuania. Based on this study, the Ministry named the following impacts of climate change as the most important for Lithuania: extreme weather events (storms), a rise in sea levels rise, coastal erosion, soil erosion, and an increase in the average temperatures. The Ministry expects the named impacts to affect Lithuania's infrastructure, the Baltic Sea coast, water management, agriculture and biodiversity. Data concerning other sectors are still not sufficient; therefore it is difficult for the Ministry of the Environment to identify in which sectors adaptation measures are most needed. More studies and knowledge not only on climate change impacts but also on sectors affected by these impacts would be needed by the Ministry.

Up to now, adaptation options have not yet been

23 Project ASTRA. Developing Policies and Adaptation Strategies to Climate Change in the Baltic Sea region (2005-2007). For more information, see: www.astra-project.org.

24 Project BaltCICA. Climate Change: Impacts, Costs and Adaptation in the Baltic Sea Region (2009-2012). For more information on the mentioned case studies, see: www.baltcica.org/casestudies/klaipedacity.html and www.baltcica.org/casestudies/klaipedadisctrict.html.

25 Project BalticClimate. (2007-2013). For more information see: www.balticclimate.org.

26 Project Baltadapt (2007-2013): www.baltadapt.eu

developed. The identification of relevant adaptation options will lie in the responsibility of the relevant Ministries, according to the sectors specified in the NSCCMP document.

The interviewed Ministry representatives are not sure how the still considerable uncertainty about the dimensions of climate change and its effects could be dealt with when discussing appropriate adaptation strategies.

Institutional Challenges

In Lithuania, the Ministry of Education and Science is the responsible institution for research and innovation issues; however there is no special body or public institution that coordinates research/ information on climate change and promotes dialogue, understanding and coordination between different actors and stakeholders. Such an institution, in the view of the Ministry, would also be very helpful to get a better overview on existing research data and results. However, the Ministry representatives are hesitant if the set-up of such an institution or the taking-over of such a coordination task by already existing institutions could actually be arranged, since the resources of the public institutions in Lithuania are limited, and climate change is not perceived as a high priority issue. However, the Ministry expressed an interest in receiving more information about such coordinating bodies and their way of functioning in other countries.

The Ministry points out that the Research Council of Lithuania is the only scientific institution creating national research programmes for state funded research, which are then approved by the government, Therefore, the national programme should have at least a certain overview on research related to climate change. However, it has not taken a holistic approach on this topic up until now. In the framework of the currently on-going programme on anthropogenic effects on the climate, most of the funds are dedicated to research on invasive species and other climate change related topics are not examined.

During the development of the *NSCCMP* the main external stakeholders involved in the process were other Ministries. In addition, the draft document has been submitted for review and comments to the Climate Change Committee, which comprises academic institutions, other Ministries, representatives of industry and NGOs. The committee representatives are expected to gather and represent opinions from their respective stakeholders. However, the Ministry of the Environment witnessed a fairly passive communication with other stakeholders, which may be down to a lack of awareness and not much importance being attributed to climate change.

The Ministry of the Environment pointed to the recent sanctions imposed on Lithuania by the Compliance Committee under the United Nations Framework Convention of Climate Change regarding the quality of data in the national greenhouse gas inventory as a supporting factor, which contributes to a better understanding of the importance of climate change and yields more adequate responses to the required procedures within public institutions. The communication with the Ministries of the Environment of Latvia and Estonia in the framework of semi-annual meetings serves as a useful exchange of experience as well. Finally, the best practices examples from other EU Member States, e. g. Scandinavian countries; are also regarded as helpful by the Ministry.

In the view of the Ministry, a general barrier in addressing climate change adaptation is the prevailing perception that the negative impacts of climate change in Lithuania are quite negligible. This contributes to the fact that little importance is still attributed to adaptation. Currently, energy supply and energy security issues have a higher priority in the political agenda, and therefore upstage political interest in climate change issues. A long-term approach in political decision-making is a major challenge regarding adequate responses to climate change in Lithuania. Both aspects have worsened in light of the economic crisis which has had a negative impact on both mitigation and adaptation policies.

Furthermore, an improvement of inter-institutional cooperation to address climate change related issues and the promotion of a low carbon development economy would substantially enhance the development of a climate change policy and implementation in Lithuania. Active involvement from other most relevant Ministries is crucial, e. g. the Ministry of Economy, the Ministry of Energy, the Ministry of Transport and Communication, and

the Ministry of Agriculture.

However, the underlying problem is the Ministry of the Environment's lack of human and financial resources for climate change issues. This lack of resources together with a lack of research data result in the Ministry of the Environment encountering problems in raising the awareness of stakeholders and in steering the climate change adaptation process. Due to a lack of resources, a comprehensive analysis of all sectors and their relation to climate change can also not be conducted sufficiently. However, the ministry expects that the situation regarding human resources will improve in light of the Lithuanian Presidency of the EU in the second half of 2013.

Options for Action

- Since Lithuania also faces problems similar to the other Baltic States, the options presented here differ only slightly from those identified in the sections above dealing with Estonia and Latvia (3.4 and 4.4 respectively).
- Extension of the scientific knowledge base also seems to be a current problem in Lithuania. A detailed and reliable knowledge base is necessary for a closer analysis of regional and sectoral vulnerabilities.
- Lithuanian researchers, government officials and stakeholders are also waiting for a regionalisation of climate change scenarios for their country.
- Coupling other physical, ecological and economic models and analyses to these climate scenarios could be subsequent steps.
- To supplement the research budget available from Lithuanian research institutions and programmes, research budgets from European and international research programmes could be acquired (as already realised successfully e.g. with ASTRA, BALTCICA and BALTADAPT, see 5.1.2). Through cooperation within international research projects, data and methodological approaches could be tested and cautiously transferred to the Lithuanian conditions.
- Drawing on improved information about the prospective climate change effects on Lithuania, the vulnerability of geographical regions, economic sectors and social groups should be analysed.
- Lithuania has moved forward already in formulating a National Adaptation Strategy (NSCCMP) – developed by the consulting company (see section 5.1.1). This process has mainly followed a top-down approach with formal stakeholder involvement.
- Parallel to the participation process the experiences of different Ministries and other public institutions with specific competences and experiences should be drawn together to exchange their perspectives on areas challenged by climate change.
- The establishment of the National Climate Change Committee is a promising step to interlink the different Ministries, governmental and municipal institutions (see section 5.1.2). This committee could play a more extensive role in coordinating a common knowledge base and in launching the necessary participation process.
- This process should include an extensive exchange between science and policy, between researchers and experts in Ministries and public agencies, drawing together expertise and knowledge from often scattered research project findings.
- This could also be facilitated in Lithuania inter alia by an internet based knowledge platform managed by a Ministry, university or another well-established and renowned institution.
- To stimulate personal commitment and to ensure institutional continuity such a platform must be supplemented by personal exchanges in real life – through workshops, conferences and other discussion rounds.
- Identifying and communicating best practice examples are means to make adaptation options more tangible than strategies on paper. These examples are often put forward by highly dedicated personalities that can be contacted and addressed personally – and in many cases they are open and willing to pass on experiences about the practical solutions they have chosen. Processes of social learning can be facilitated by this approach of promo-

ting best practice examples.

- If no best practice examples are to hand, financing pilot projects or launching public contests can breed or help to discover them. Pilot projects put forward by international research projects like BALTCICA developing elements of an adaptation strategy for the municipality of Klaipeda could serve as a start. But to launch a dynamic, self-evolving process, those externally supported initiatives must be integrated into a national platform or programme securing continuity.

- In that geographical closeness leads to a similarity of vulnerabilities to climate change, an exchange of knowledge and a discussion of approaches to deal with these challenges should take place among the three Baltic States as well as with their neighbouring countries facing similar problems. Establishing a Baltic Panel on Climate Change (BPCC) – as one of the Lithuanian participants in the Tallinn Workshop suggested – could be a promising idea.

The interviews have shown that the development and the current situation in the Baltic States are similar. There is considerable uncertainty concerning how to adapt to climate change and how to initiate the development of the adaptation strategy. In a wider EU perspective, the Baltic States should improve policy development on adaptation to climate change. The reasons are partly to be found in financial and personnel constraints, as well as in insufficient coordination of the adaptation process at national level. There is the obligation to develop the adaptation strategies in the Ministries of Environment; however, there is also a lack of capacity in the Ministries to take on a wider coordination and moderation role for the national adaptation policy. There is a lack of knowledge transfer between projects on adaptation, where the Ministries and the relevant department in the Ministry are not directly involved. In order to develop a common knowledge base, a more intensive exchange between scientific institutions and other stakeholders, which are currently already active in adaptation to climate change, should be facilitated. There is nonetheless the need for a more profound scientific knowledge base, e.g. the development of regionalised climate scenarios or vulnerability studies. With wider coordination on a national level, funded projects could offer a possibility of meeting these research needs and to expand the knowledge base. Trans-national projects on similar issues could be a possibility in terms of producing results for more than one country.

The information exchange between different Ministries also seems insufficient. Overcoming this barrier and gaining the support and interest of other Ministries could help to mainstream climate adaptation early on, thus spreading the responsibilities and financial obligations and indicating additional sectorial needs. Inter-ministerial working groups are an important instrument in this regard and should take up their work again, where they are suspended (Latvia).

The case of Lithuania is slightly different compared to the other two countries. The Lithuanian Ministry of Environment has charged a subcontractor with developing a strategy that includes adaptation options. This strategy will form the basis for the further development of the adaptation policy in Lithuania and can be the discussion basis for shaping concrete adaptation measures. That being said, the Lithuanian experience in elaborating the strategy could also serve as a first good example for Estonia and Latvia. Regarding inspiration for specific other steps or methods, the Ministries of Environment could draw on international experience and case studies more than hitherto.

The expected changes in the environment in the Eastern BSR will happen slowly and will not be as serious as in other parts of the world. Thus, there is no need to develop the adaptation policy hastily. However, this does not mean that adaptation efforts should be postponed. On the contrary - the time gained can be used for the development of a strategic approach, wider stakeholder involvement, as well as better and more intensive cooperation and the existing barriers can therefore be overcome.

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Name and Organisation/ Institution

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