LIFE LOCAL ADAPT | Integration of climate change adaptation into the work of local authorities

Climate Change Adaptation Strategy Monitoring

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Authors: XXX

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Content

List of Figures

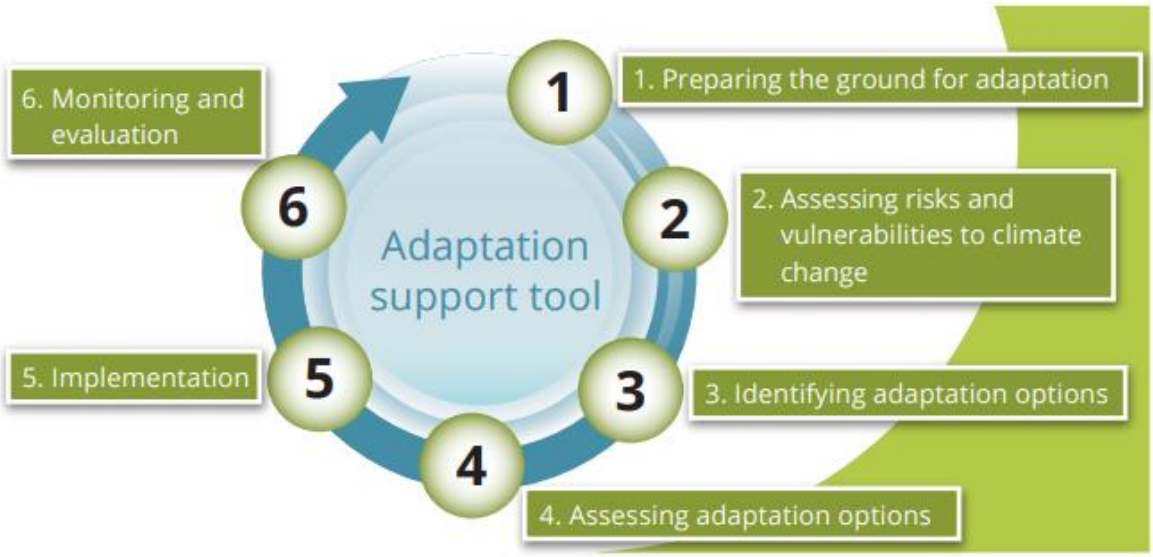
List of tables

1 Introduction

Due to the complex nature of the issue, succesfull adaptation to climate change requires a conscise and decisive action plan on an unprecendented scale, including all levels of scientific and polytical organisations and people responsible for implementation of counter-measures. Any significant impact will be achieved only by ongoing cooperation and implementation of prevention and mitigation steps over an extended period of time.

Adaptation process consists of several stages, including initial risk assesment, establishing possible adaptation measures, implementation and, finally, assessing their efficiency, aimed to assist in developing viable and sucessfull adaptation strategies.

Figure 1. The European Adaptation Support Tool (1)



To assess sucess of the undertaking and its long-term effect and sustainability, monitoring and evaluation of adaptation measures is of utmost importance. It ensures efficacy of actions and consistency of results, maximizing obtained benefits and reducing cost by updating or eliminating inefficient steps.

Most of European countries are developing a national-level monitoring and evaluation system. Shared information, experience and national-level case studies help to improve climate change adaptation policies and practices.

- **Monitoring** refers to a continuous process of examining progress made in planning and implementing climate adaptation. This might also include examining the context and environment within which adaptation occurs or drivers which shape resilience and vulnerability. The objective of monitoring can be described as being 'to keep track of progress made in implementing an adaptation intervention by using systematic collection of data on specified indicators and reviewing the measure in relation to its objectives and inputs, including financial resources' (2).

- **Evaluation** refers to a systematic and objective assessment of the effectiveness of climate adaptation plans, policies and actions, often framed in terms of the impact of reducing vulnerability and increasing resilience. Evaluations usually draw upon a range of quantitative and qualitative data, including those gathered through monitoring processes. Evaluations are undertaken at a defined point in the project or policy cycle. Ex ante and mid-term evaluations focus on ways of improving a project or programme while it is still happening. An ex post evaluation seeks to judge the overall effectiveness of an intervention, usually after a project or programme has been completed (2).

2 Adaptation measures

2.1 Identified risks

Based on available data on climate change risks identified on a national level, various experts were invited to discuss the regional situation in context of risk relevance and risk-mitigation possibility, identifying 5 risks significant to Valka County (Table 1.)

Table 1: Risks relevant to Valka County based on their significance and mitigation ability.

No.	Risk
1	Chronic diseases flare (CVD, diabetes etc.) and increase in death rate
2	Acquired endemic state and/or increase in diseases caused by insect-born infections
3	Increase storm-caused rooftop damage
4	Road damage risk due to rainfall caused flooding
5	Electrical transmission network damage due to wind gusts

2.2 Implementation of adaptation measures

Regional risk mitigation strategy was designed in line with Valka County's vision as a favourable, clean and tidy forest-rich environment with quality infrastructure for living and conducting business in Northern Vidzeme.

Adaptation measures were determined in context of national climate strategies to mitigate identified risks. Several adaptation measures have been already set in motion within the framework of various projects, however, other require additional funding for implementation (Table 2).

Table 2: Implementation progress of Valka County adaptation measures in context of National climate change adaptation policies

Valka county climate change adaptation measures	In progress (Yes/No)	Details
Analyzing risk and impact and identifying measures to adapt to climate change under the LIFE program	Yes	Project conducted since 2017 under the LIFE program
Development of climate change monitoring system		
Mapping of potential flood and wind caused flooding territories	Yes	Cartographic material available at the Valka County Council
Mapping of the Heracleum genus (hogweed) invasion	Yes	Cartographic material available at the Valka County Council
Providing infrastructure to prevent flood risk caused by climate change		
Check and, if necessary, improve the operation of the pumping station	No	Measures not yet implemented due to additional funding requirements
Inspect and, if necessary, improve the rainwater drainage system	No	Measures not yet implemented due to additional funding requirements
Inspect and, if necessary, improve the locks on the Pedele river (Selija street)	No	Measures not yet implemented due to additional funding requirements
Tree trimming and maintenance of energy supply networks to prevent and limit their damage in the event of storms	No	Measures not yet implemented due to additional funding requirements
Explore possibility of introduction and exploitation of alternative energy sources	No	Measures not yet implemented due to additional funding requirements
Implementation of climate change mitigation measures in various areas		
Assessment and limitation of the invasion of Heracleum genus species (hogweed)	No	Measures not yet implemented due to additional funding requirements
Informing and educating the public		
Informing and educating medical staff, social workers and other officials working with organized groups or people belonging to a particular risk group	Yes	In December 2017, an informative seminar on tick-borne diseases and viral infections was organized in the framework of the EPICURO project

High cost of monitoring system installation, operation and maintenance poses a significant challange for smaller municipalities. This situation highlights importance of cooperation and free information flow, in order to develop viable strategies to cope with the adverse effects of climate change. Some of the local strategies will undeniably overlap with national policies

on tackling the issue. Compounding action on both a national and local level can have a synergistic effect, however, care must be taken to allocate time and resources to achive the best possible outcome and to avoid waste.

Due to limited resources, Valka county heavily relies on the data obtained by national and regional monitoring systems to assess meteorological changes over time, or prevalance of the disease and mortality rate in the region. However, some parameters of climate change can be monitored at local level.

Areas of flooding and distribution of invasive species (Heracleum genus) were identified and are available in form of cartographic material at the Valka County Council. However, in order for this data to be relevant, further data has to be geathered at regular intervals in order to assess changes in distribution and effectiveness of adaptation measures.

Current action plan will focus on continuing implemented activities (limitation of Heracleum genus weed spread, followed by additional mapping), as well as securing funding and implementing remaining adaptation measures.

Inspections must be carried out to assess current state of drainage systems, river locks and pumping stations, which in turn will allow to estimate additional cost required for repair/improvement of the infrastructure.

Task priority will depend on the risk level and impact, such as drainage system improvement in areas with a higher flood risk. Similarly, maintanence of major distribution grid will occur prior to tree-trimming around rural networks. Once all current systems are fit for purpose, additional option of alternative energy sources can be considered.

Adaptation strategy must be flexible enought to adjust to environmental factors when required, for example, changing water management policy in response to changed flood frequency.

3 Monitoring and evaluation of adaptation strategy

Adaptation strategy implementation project is still in its early stages. Currently, assessment of the situation has been performed and possible adaptation measures have been established. Some of the measures (mapping flood area and Heracleum genus infestation) were set in motion, while other projects are still pending due to funding limitations.

Untill assessment of the relevant infrastructure is performed, it remains to be seen what additional funding might be required, and implementation of which steps will be prioritised.

However, once all systems are fit for purpose, following steps will ensure sucessfull progression of adaptation measure implementation:

- Closely monitor regional and national reports and forecasts related to climate change to assess the current state of affairs and prepare accordingly (heat waves, possible flooding, tick-borne disease outbreaks);
- Cooperate with and support organisations and initiatives in line with Valka county adaptation strategy;

- Once initial assessment of flood-prevention infrastructure is performed, and all systems are functioning as intended, establish reoccuring inspection plan at optimal time intervals to ensure that drainage, pumping systems and river locks are fit for purpose;
- Once initial tree-trimming and maintanance of energy supply networks is completed, establish reoccuring assessment and maintenance plan at optimal time intervals to prevent future power disruptions in case of storms;
- Implement measures to limit invasive species spread, and monitor (map) distribution area of invasive species (Heracleum genus) at various points of adaptation measure implementation to gauge effectiveness of these measures;

Based on analysys of obtained results, new research data, as well as current situation assessment, action plan can be corrected and adjusted accordingly.

Evaluation of the effectiveness of each mitigation measure can be obtained by analysing relevant data prior and post measure implementation. For example, comparison of the distribution area of invasive species before and after targeted infestation limitation activities can indicate action effectiveness in reducing spread of generalist species.

However, challenges can arise during analysis of correlations in results obtained. Identified connection can be misleading: increase in diagnosed Lyme disease cases can appear to be a result of better public awareness and education of medical personell (adaptation activity), but it could also be attributed to prolonged metereological summer, thus increasing overall infection incidence and number of diagnosed cases, even if detection percentage remains the same. Therefore sucess of each adaptation measure has to be assessed in context of other contributing factors.

4 Summary

Climate change is a multi-layered issue. To successfully prevent and combat adverse changes, complex set of measures has to be implemented. As more initiatives and projects are developed on various levels of organisations, it's essential to monitor their progression and evaluate obtained results.

Although many countries are employing various methods for monitoring and evaluation of adaptation measures, applying obtained data to development of improved adaptation policies is still limited. Currently, monitoring and evaluation results are largely communicated via published reports.

Not everywhere monitoring and evaluation system is required by legislation, however, it fulfills several important purposes, including improving our understanding of policy effectiveness and efficiency, providing accountability, and enhancing learning in order to improve policy and practice (3).

Adaptation process consists of various stages. Risks have been assessed and relevant adaptation measures were determined in context of national climate change adaptation policy frame. Some projects are already in implementation stage (maping of flood areas and invasive plant species distribution), while other measures are on hold due to additional funding requirements. Planned infrastructure assessments will determine furthere required actions and priorities in adaptive strategy implementation.

As with implementation stage, resourse constrains will also limit monitoring and evaluation of results, emphasizing the need of carefull planning and funding allocation, as well as making use of existing data sources.

5 Literature

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1. **The Adaptation Support Tool.** ***European Climate Adaptation Platform.*** **[Online] [Cited: 4 07 2018.] https://climate-adapt.eea.europa.eu/knowledge/tools/adaptation-support-tool.**

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6 Annex A Areas of flooding and distribution of invasive Heracleum genus species in Valka county