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Climate change related risk management in Latvia

Ieva Bruņeniece *PhD cand*
Ministry of Environmental Protection and Regional Development (MEPRD)
Climate change department

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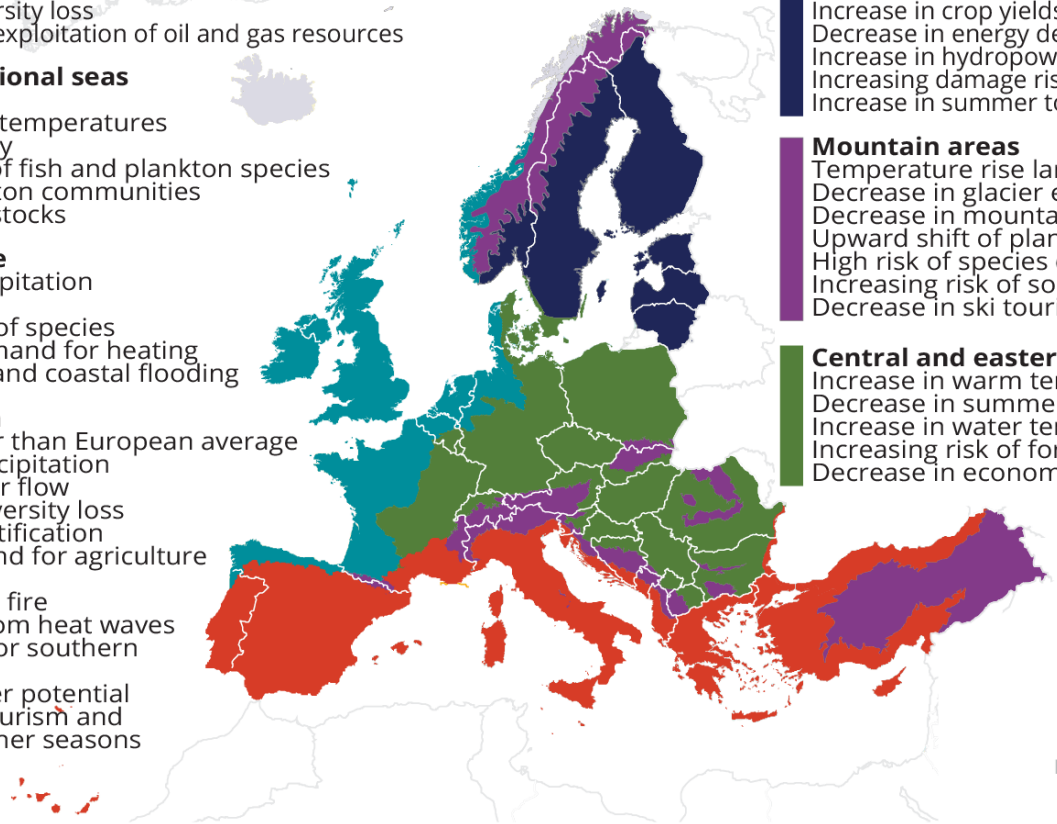
Key impacts from climate change for the main regions in Europe



Arctic
Temperature rise much larger than global average
Decrease in Arctic sea ice coverage
Decrease in Greenland ice sheet
Decrease in permafrost areas
Increasing risk of biodiversity loss
Intensified shipping and exploitation of oil and gas resources

Coastal zones and regional seas
Sea-level rise
Increase in sea surface temperatures
Increase in ocean acidity
Northward expansion of fish and plankton species
Changes in phytoplankton communities
Increasing risk for fish stocks

North-western Europe
Increase in winter precipitation
Increase in river flow
Northward movement of species
Decrease in energy demand for heating
Increasing risk of river and coastal flooding

Mediterranean region
Temperature rise larger than European average
Decrease in annual precipitation
Decrease in annual river flow
Increasing risk of biodiversity loss
Increasing risk of desertification
Increasing water demand for agriculture
Decrease in crop yields
Increasing risk of forest fire
Increase in mortality from heat waves
Expansion of habitats for southern disease vectors
Decrease in hydropower potential
Decrease in summer tourism and potential increase in other seasons

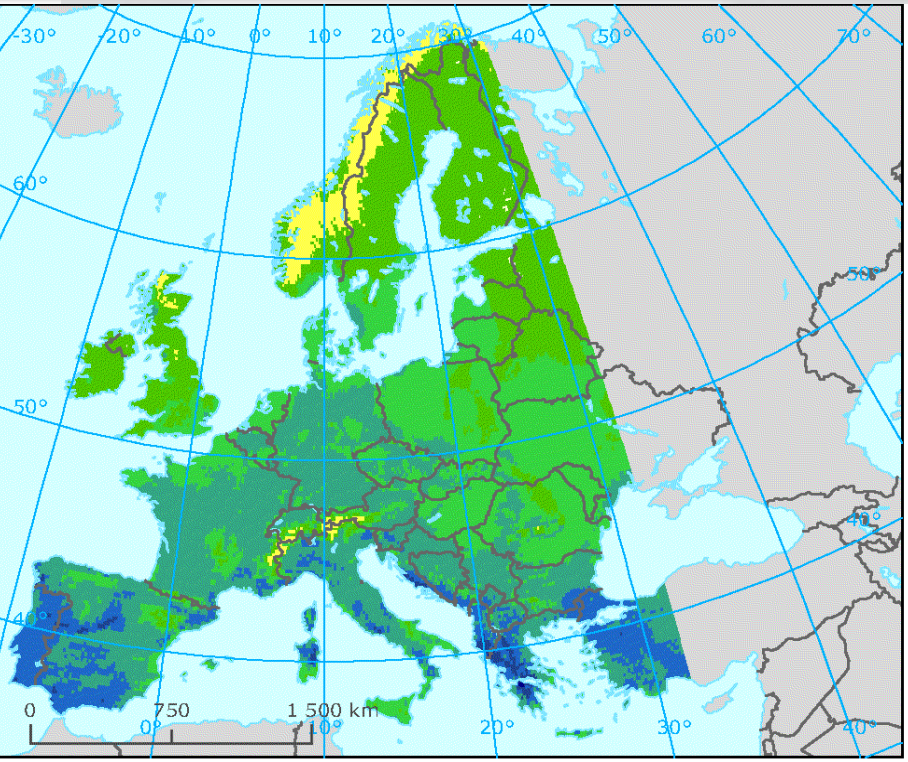
Northern Europe
Temperature rise much larger than global average
Decrease in snow, lake and river ice cover
Increase in river flows
Northward movement of species
Increase in crop yields
Decrease in energy demand for heating
Increase in hydropower potential
Increasing damage risk from winter storms
Increase in summer tourism

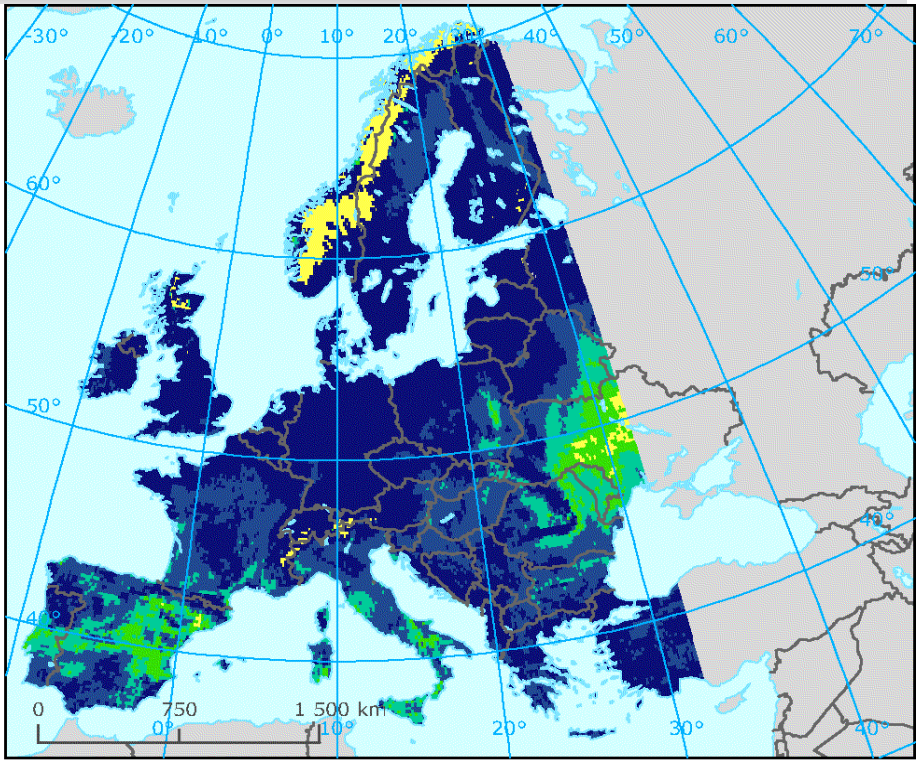
Mountain areas
Temperature rise larger than European average
Decrease in glacier extent and volume
Decrease in mountain permafrost areas
Upward shift of plant and animal species
High risk of species extinction in Alpine regions
Increasing risk of soil erosion
Decrease in ski tourism

Central and eastern Europe
Increase in warm temperature extremes
Decrease in summer precipitation
Increase in water temperature
Increasing risk of forest fire
Decrease in economic value of forests

European Environment Agency

Projected impact of climate change on the potential distribution of reptiles and amphibians in Europe - 2050





Potential changes in climate space of reptiles and amphibians in 2050

Current number of species

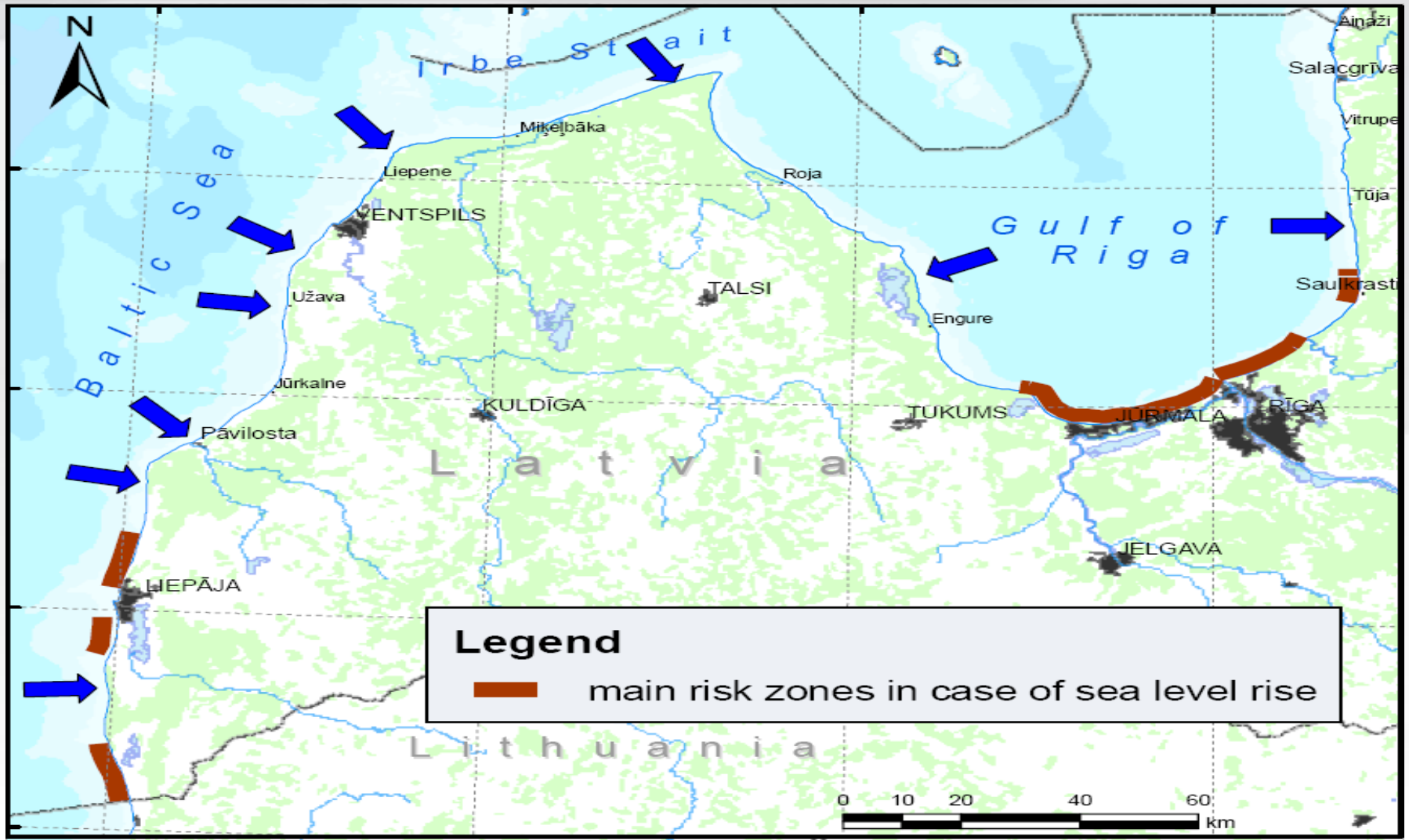
0 1 10 20 30 40 50 60

Outside coverage

Percentage of stable species in 2050

0 20 40 60 80 100

Threats from sea level rise



From global causes and risks – to scenarios

01 Population increase

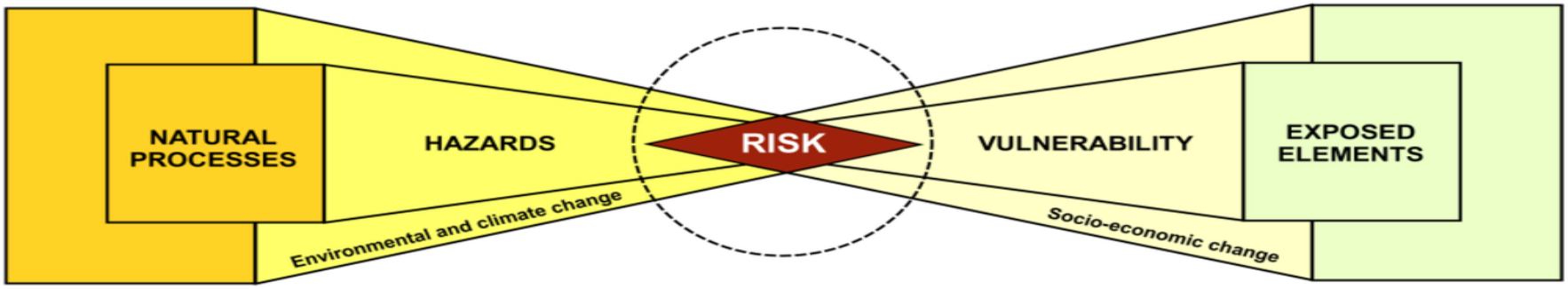
02 Rapid urbanization

03 Climate change

04 Environmental conditions

ACTUAL STATE

SCENARIO



What do we need for successful climate change related risk assessment?

1. From evidence based climate change impact observations in nature and society - to risk assessment in sectors, societies, ecosystems

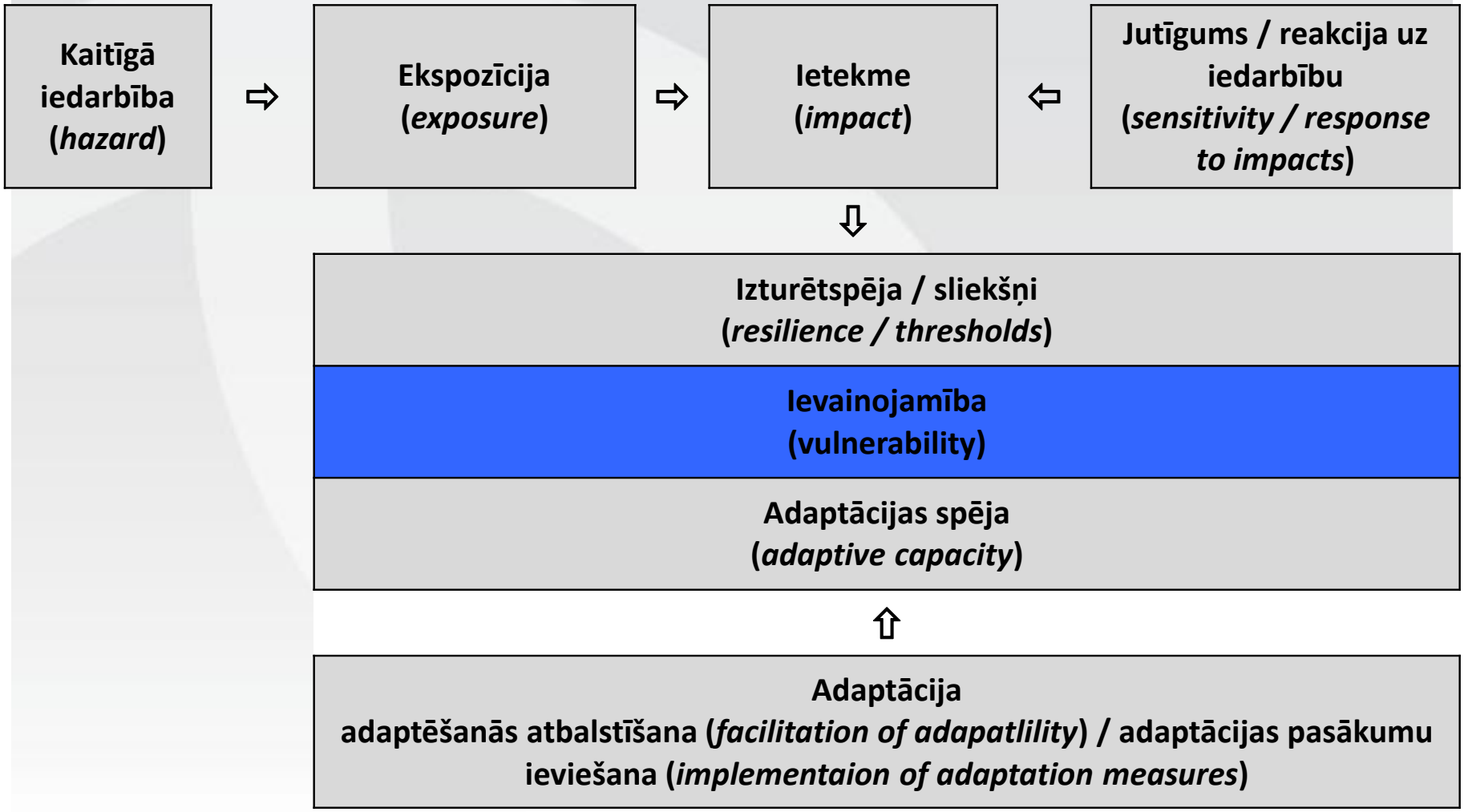
2. Understanding, knowledge, historical data and scenarios on future pathway of global GHG emissions, socio economic development

3.Risk assessment and mapping

4.Framing the relation between CC risk and disaster risk management to adaptation

5.Effective policies and measures on places

Defining vulnerability



Matrix template for cause – effect analysis of risks (or opportunities) caused by climate change

2. (causes)	1. (risks / problems)	3. (consequences)	4. (actions)	5. (normative context)	
2.1. What is causing the problem?	1.1. What constitutes the problem for society?	3.1. What are secondary problems caused by the problem?	4.1. What actions could scale down the problem?	5.1. Is this problem identified and targeted in policy documents of the EU and / or Republic of Latvia?	
2.2What kind of processes is causing the problem? How spatial dimensions could be characterized?	1.2. What kind of processes is manifesting the problem? How spatial dimensions could be characterized?	3.2. What kind of processes is manifesting the secondary problems? How spatial dimensions could be characterized?	4.2. What policies already are addressing the problem?	5.2. What branch of the public administration is in charge of the policies and what would be the best arrangement?	
2.3. What state / stock indicators characterize causes of the problem?	1.3. What state / stock indicators characterize the problem?	3.3. What state / stock indicators characterize secondary problems?	4.3. What indicators characterize current policies?	5.3. What indicators are used as policy targets in documents addressing the problem? Specify – which documents.	
2.4. What processes have an impact on the problem? Specify tendency (+/–).	1.4. What is internal process of evolution of the problem?	3.4. What secondary processes the problem originates? Specify tendency (+/–).	4.4. What actions and policies could be the most effective to address the problem?	5.4. What are obstacles to implement the most effective policies?	
2.5. What indicators of change characterize processes having impact on the problem?	1.5. What indicators of change characterize the problem?	3.5. What indicators of change characterize secondary processes?	4.5. What indicators could be used to describe changes needed in existing policies?	5.5. What indicators of change are used as policy targets in documents addressing the problem? Specify – which documents.	

What does risk and probability mean?

Risk = Probability x Consequence

Probability -

$$p(A) = \frac{n_A}{m}$$

where:

p(A) - probability of occurrence of A

n A- number of cases of occurring A in a series of observations

m – total number of observations

Risk analysis: practical application

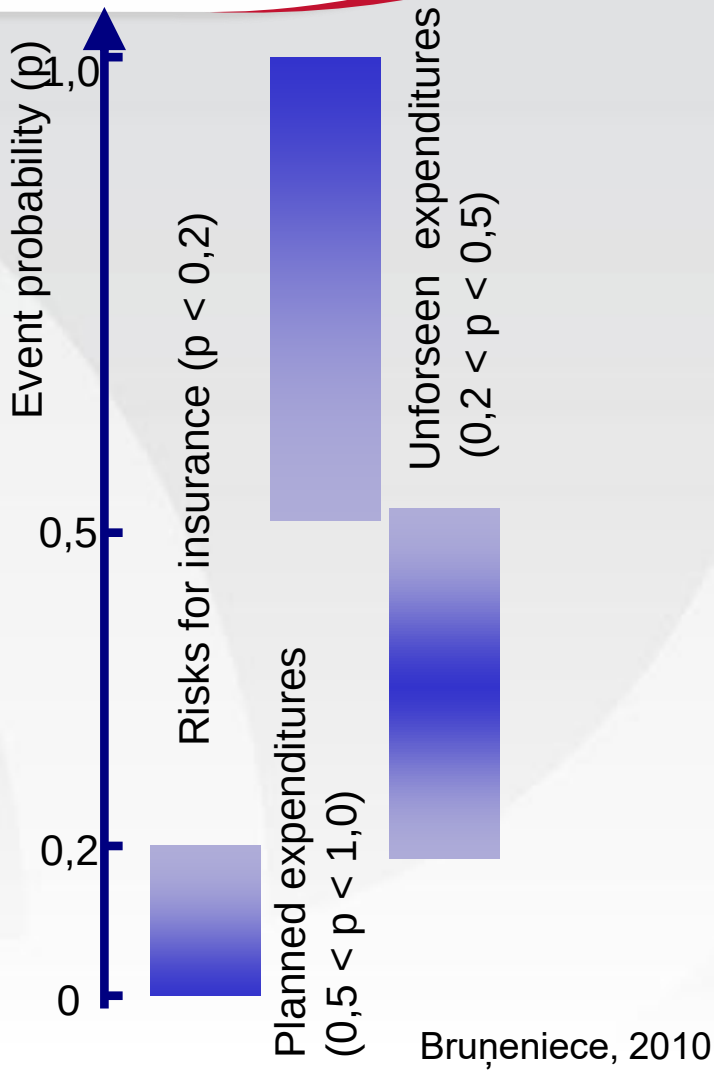
For climate change permanent impacts cost-benefit analysis and investments are useful to be planned

For emergency events (storms, severe floods, etc.) - risk analysis is used

If the probability is low (e.g., once in five or more years; $p \leq 0,2$), insurance could be used

If probability is intermediate (e.g. once in two up to five years; $0,5 \geq p \geq 0,2$), then losses usually are considered as contingencies

If probability is high (e.g. annualy or biannualy; $1 \geq p \geq 0,5$), then losses have to be considered as regular expenditures. Highly probable events are permanent impact.



Climate risk design history in Latvia

EU level:

- European Commission document on Risks Assessment and Mapping Guidelines for Disaster Management (2010)
- EU Adaption Strategy Package (2013)

LV level:

- "Report on Adaptation to Climate Change" approved in Cabinet of ministers (August 2008) – CC risk identification in general
- Intergovernmental working group for preparing national risk assessment (2012)
- Analysis of CC risk assessment in concrete sectors and proposals for development of adaptation system (2015-2016)
- Ministry of Interior and State Fire and Rescue Service (SFRS) mapped 14 risk scenarios (causes, consequences and threats), e.g. storms, floods, forest fires, interruptions in electric power transmission and distribution systems
- Informative report on risk management in Latvia, approved by Cabinet of Ministers (January 2016), sent to the Commission
- Law on Civil Protection and Disaster Management (May 2016)

Where CC risks are considered already now

1. In National Communication from Parties included in Annex I to the UNFCCC (Annex I Parties) - in accordance with decision 11/CP.13

2. In development plans at State, regional, local level - in accordance with SEIA and EIA procedure

3. In civil protection – in new Law (2016), rules, plans

4. In the First National Adaptation report to European Commission (EU Climate-ADAPT) – in accordance with EU Regulation 525/EC

5.In insurance - regarding agriculture, human health and private property

6.In river basin and especially – flood risk - management plans

Flood risk assessment and management. Example

3% (or 200 thsd.ha) from Latvia`s territory is stated as national flood-prone territories

For that we have:

- River basin management plans for 2016-2021
- Flood risk management plans for 2016-2021

Practical solutions: EU Funding for period 2014-2020 within operational programme «Growth and Employment» - **Promotion of adaptation to climate change, risk prevention and management:**

5.1.1. To prevent threat of flood and coastal erosion risks in urban areas: measures for reduction of the coastal erosion, improvement and development of surface run-off and storm water infrastructure, protection of the flood risk areas by the reconstruction of the existing hydro-technical structures and construction of new ones.

5.1.2. To reduce flood risk in rural areas: reconstruction of hydro-technical structures (like pump stations and protecting dikes of polders), renovation of regulated river stretches.

Useful links

- European Climate Adaptation Platform Climate-ADAPT: http://climate-adapt.eea.europa.eu/
- Mayors Adapt - the Covenant of Mayors Initiative on Climate Change Adaptation - set up by the European Commission to engage cities in taking action to adapt to climate change: http://mayors-adapt.eu/
- The United Nations Office for Disaster Risk Reduction (UNISDR): https://www.unisdr.org/we/coordinate/hfa-post2015
- EU Policies contributing to Disaster Risk management. Managing risks to achieve resilience - COM(2014) 216 final and SWD(2014) 133 final: http://ec.europa.eu/echo/files/news/post_hyogo_policies_en.pdf
- IPCC on CC disaster risk, exposure, vulnerability and resilience: http://ipcc-wg2.gov/SREX/report/full-report/

THANK YOU!

ieva.bruneniece@varam.gov.lv