System for monitoring adaptation to climate change in Latvia

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IDENTIFICATION OF CC IMPACTS (RISKS AND GAINS) ON MAIN SECTORS

Sectors

- Health and welfare
- Water management and infrastructure
- Construction and building
- Biodiversity
- Forestry
- Transport infrastructure
- Water management and infrastructure
- Construction and building
- Biodiversity
- Forestry
- Transport infrastructure

Example: Water management and infrastructure

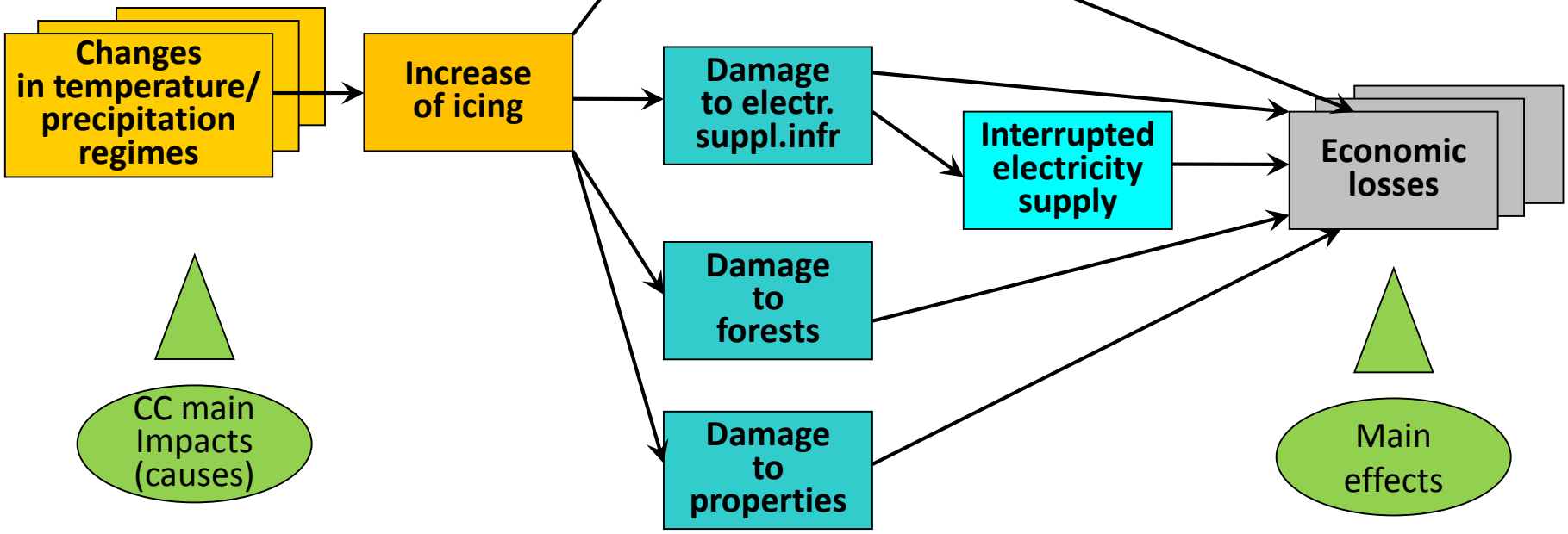
Risks

- Damage to hydropower plants (HPP) built on a big rivers as a result of extreme hydrological conditions;
- Flood caused problems in a water supply and sewage systems;
- Flood caused threat to public and civil engineering infrastructure;
- Threat caused by the coastal erosion to the infrastructure objects near the Baltic Sea and / or the Gulf of Riga;
- Ice congestion and flood damage to private properties

Gains or benefits

- Increase in river flow;
- Changes in the seasonality of river flows and hydroelectric power resources;
- Decrease of the early spring flooding risk

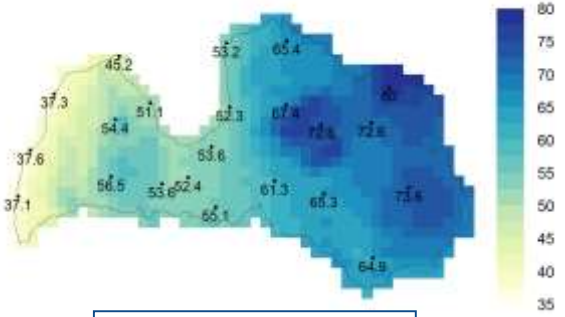
CLIMATE CHANGE DIRECT / INDIRECT IMPACTS ON SECTORS



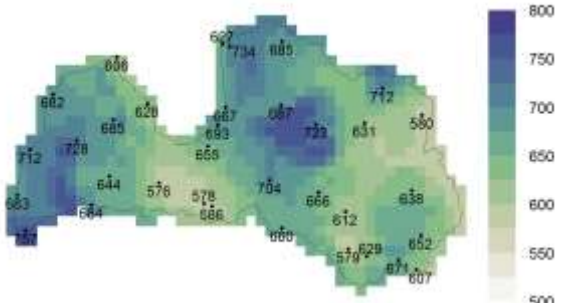
DEVELOPMENT OF CLIMATE CHANGE SCENARIOS

Past climate data analysis:

- Used observations: average, minimum and maximum air temperature, precipitation, average and maximum wind speed;
- Time period: 1961 – 2010;
- Time resolution: daily values
- Calculation of 48 climate indices for past climate
- Trend identification and estimation
- Past climate and climate indices visualization and interpolation with spatial resolution 10x10 km and taking into account topographical features



Ice days 1961-2010



Yearly mean precipitation 1961-2010

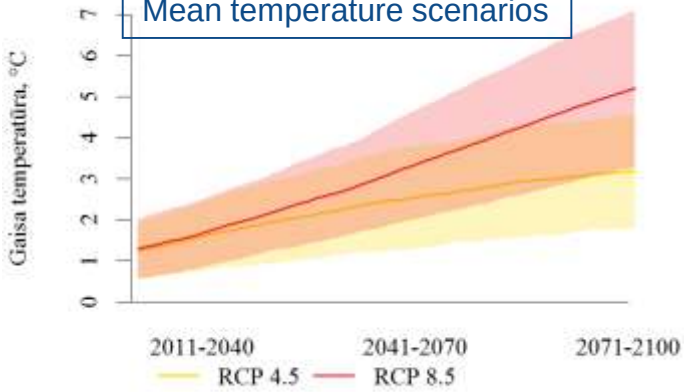
Windy days: avgerage wind speed> 6Bft

DEVELOPMENT OF CLIMATE CHANGE SCENARIOS

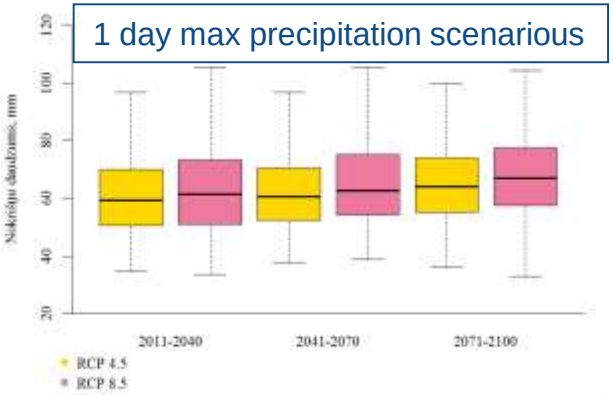
Future climate analysis:

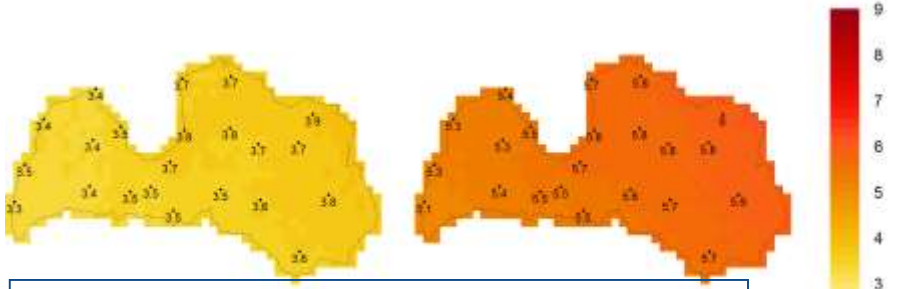
- Future climate change scenarios for the periods: years 2011-2040, years 2041-2070 and years 2071-2100
- Used scenarios: RCP2.6, RCP4.5 and RCP8.5 of IPCC (2013)
- Calculation of 40 climate indices for future climate
- Future climate and climate indices visualization

Mean temperature scenarios



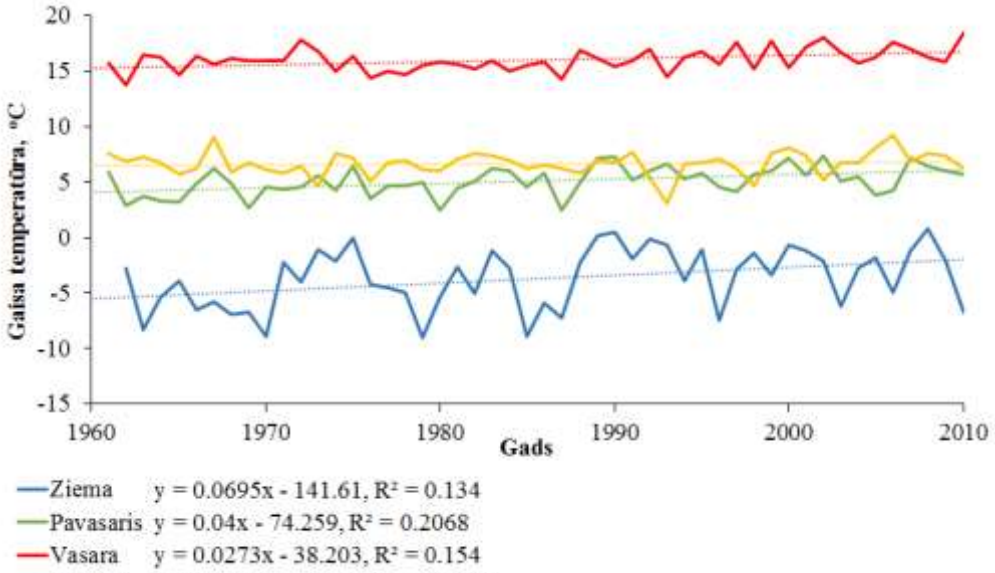
1 day max precipitation scenarious

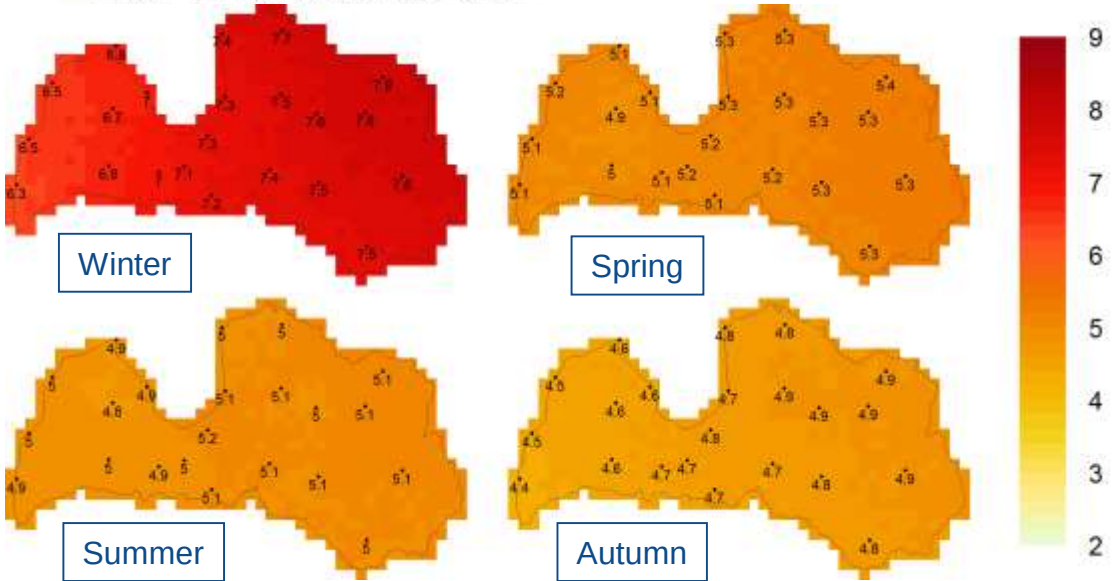




changes in min temperature: RCP 4.5 & RCP 8.5

CLIMATE CHANGE
AIR TEMPERATURE

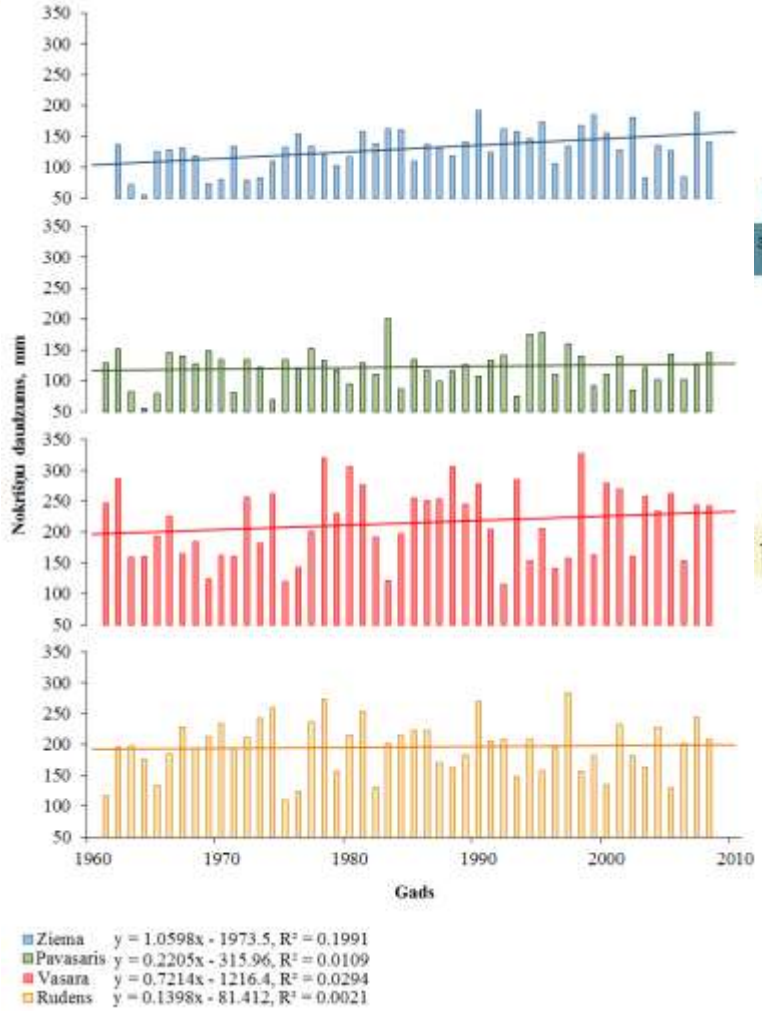




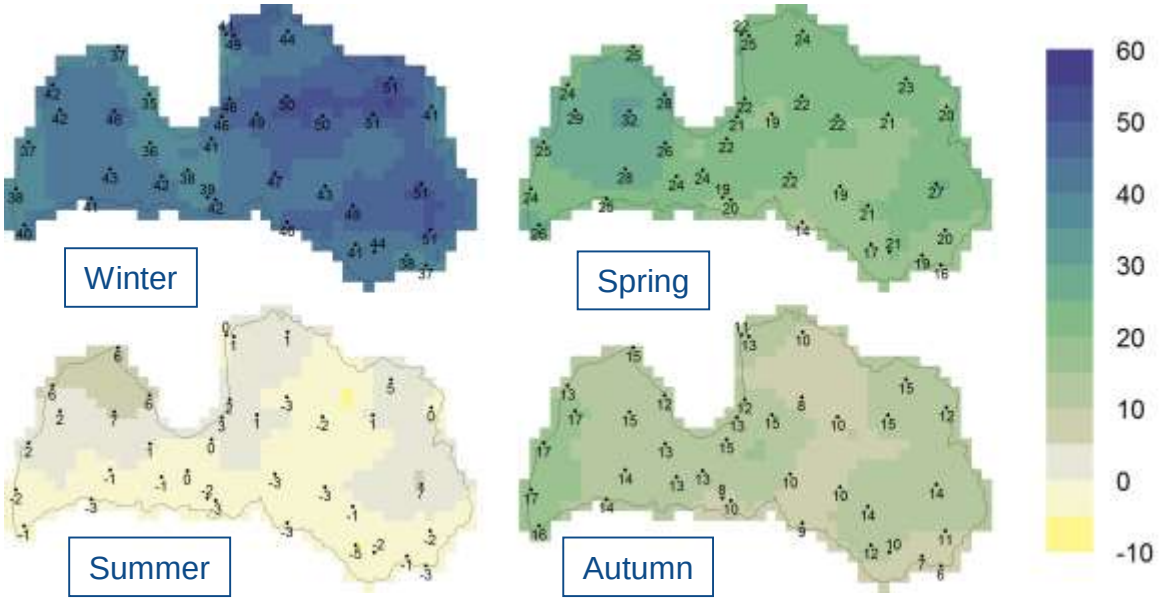
The average air temperature increases much faster in winter than summer. Also spring has significant air temperature increase during years 1961-2010

Similar trend is expected in the future. Changes (RCP 8.5) between 2071-2100 and 1961-1990 periods could reach 6-8°C during the winters.

CLIMATE CHANGE
PRECIPITATION



Total amount of precipitation per seasons in period 1961 to 2010

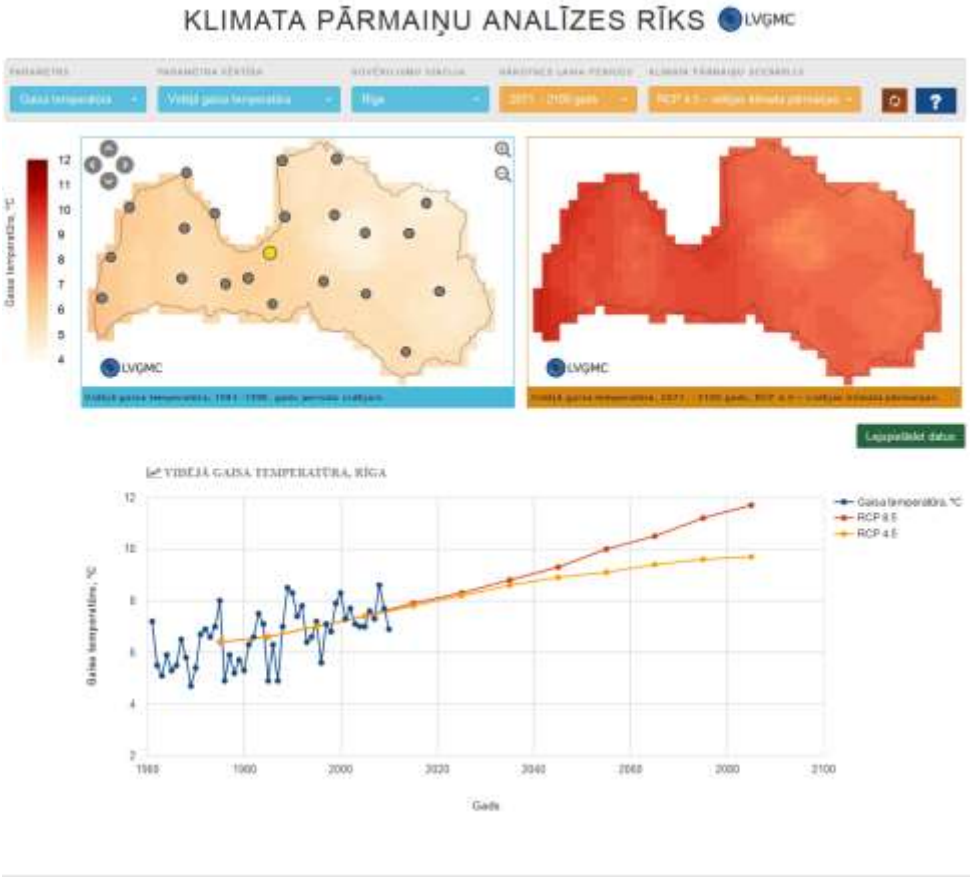


Atmospheric precipition forecasts by global climate model ensembles (changes, %), period 2071-2100 vs 1961-1990, RCP 8,5 scenario

GIS TOOL FOR INTERACTIVE VISUALIZATION OF CLIMATE DATA

Tool functionality and options:

- Data selection by climatic parameter, scenario, location and time period
- Spatial data visualization as an interpolated map
- Time series visualization for a chosen station as a chart;
- Option to select and download the data and related information



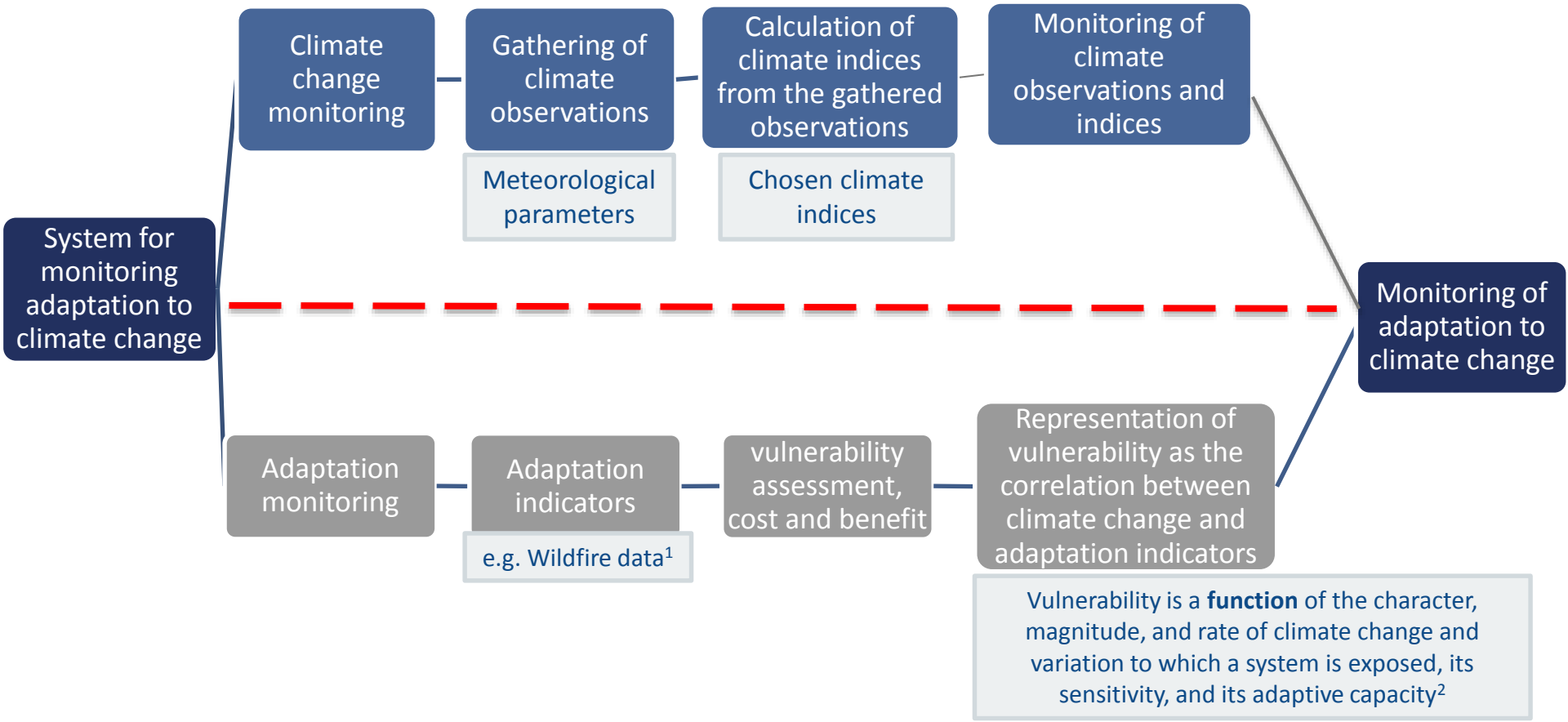
ADAPTATION TO CLIMATE CHANGES

Development of the a concept of monitoring system for adaptation to climate change in Latvia for most vulnerable sectors, done in cooperation with experts of 6 scopes:

- Construction and infrastructure planning;
- Agriculture and forestry;
- Civil protection and emergency assistance planning;
- Landscape planning and tourism;
- Biodiversity and ecosystem services;
- Health and prosperity




CONCEPT OF MONITORING SYSTEM

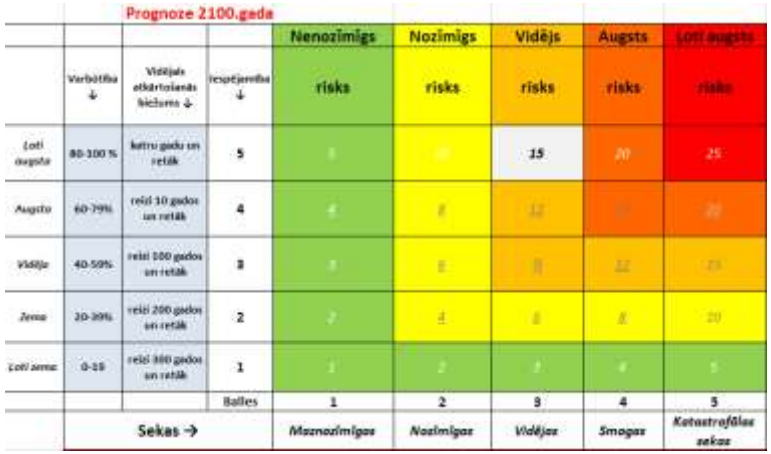


[1] Climate change, impacts and vulnerability in Europe 2012. An indicator-based report, EEA, Copenhagen, 2012
[2] An EU strategy on adaptation to climate change, SWD(2013) 132 final, Brussels 16.4.2013

CONCEPT OF MONITORING SYSTEM

Obstacles and problems during the project:

- A lack of qantitative indicators / functions as deliverables of the project to be able to replicate / calculate results with existing and new data;
- Indicators often represent points or some parts of the country. It's complicated to contrast to the grid of climate data;
- Complications to receive 3rd party data. There are no laws providing system for simple data transfer even between institutions under the state supervision;
- Snow data and water level/discharge analysis and projections are critical for more appropriate situation analysis and forecasts



				Prognoze 2100.gadā				
	Varbūtība ↓	Vidējais atkārtošanās biežums ↓	Iespējamība ↓	Nenozīmīgs risks	Nozīmīgs risks	Vidējs risks	Augsts risks	Ļoti augsts risks
Ļoti augsta	80-100 %	katru gadu un retāk	5	5	10	15	20	25
Augsta	60-79%	reizi 10 gados un retāk	4	4	8	12	16	20
Vidēja	40-59%	reizi 100 gados un retāk	3	3	6	9	12	15
Zema	20-39%	reizi 200 gados un retāk	2	2	4	6	8	10
Ļoti zema	0-19	reizi 300 gados un retāk	1	1	2	3	4	5
			Balles	1	2	3	4	5
	Sekas →			Nenozīmīgas	Nozīmīgas	Vidējas	Smagas	Katastrofālas sekas

ADAPTATION MONITORING

Monitoring of adaptation to climate change

Elaboration of climate data

Continuous data from round-the-clock stations for meteorological parameters

Interpolation of station data on a 10x10km grid

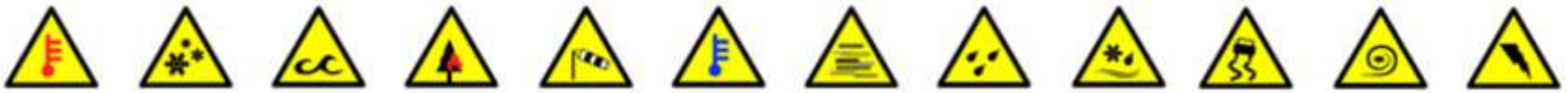
Calculation and interpolation of climate indices on a 10x10km grid

Periodic refinement of adaptation indicators

Vulnerability calculation and monitoring

Conception review:

- Database elaboration with new parameters and indices;
- Decreasing dimensions of the interpolation grid squares;
- Adding additional economic sectors;
- Adding additional adaptation indicators



LEGISLATIVE POLICY INSTRUMENTS REGARDING CC ADAPTATION

Policy planning documents:

- Latvia's long-term development perspective – up to 2030;
- flood risk assessment and management;
- agricultural risk management;
- land-use policy;
- rural development;
- territorial and spatial planning;
- Baltic Sea and Gulf of Riga coastal zone management;
- national security and civil protection system strengthening (including e.g. material reserves), etc.

Legislative acts:

- water management,
- sustainable forest management,
- protected belts and territories,
- compensations for damage in agriculture,
- invasive species distribution areal contain,
- flood risk control,
- construction standards (including building climatology), etc.

CLIMATE CHANGE AND RISK MANAGEMENT SYSTEM

EU level:

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

LV level:

- “Report on Adaptation to Climate Change” approved in Cabinet of ministers (2008) – CC risk identification in general
- Intergovernmental working group for preparing national risk assessment (2012)
- Analysis of CC risk assessment in sectors and proposals for development of adaptation system (2012)
- Ministry of Interior and State Fire and Rescue Service mapped 13 risk scenarios (causes, consequences and threats), e.g. storms, floods, forest fires, interruptions in electric power transmission and distribution systems (2015)
- Law on Civil Protection and Catastrophe Management (now draft in *Saeima* – national parlement - 2016)

THANK YOU FOR THE ATTENTION!

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Tālāk ir rezerves slaidi par klimata izmaiņām