Perspective from a pilot basin: how different water-related sectors are involved in the pilot project on river basin management and climate change adaptation in the Neman river

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Fourth Workshop on Water and Adaptation to Climate Change in transboundary basins

Geneva,
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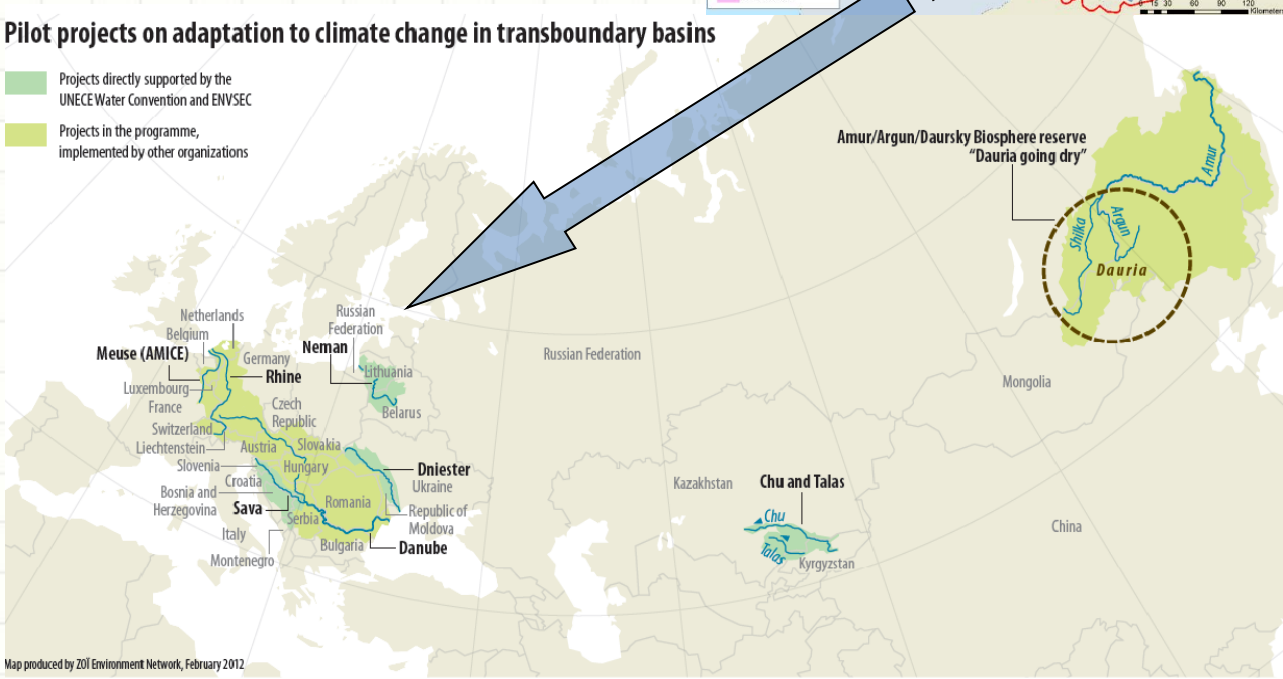


MOST IMPORTANT RESULTS AND LESSONS LEARNT

- Assessment of and forecast of runoff with account of different climate change scenarios (A1B and B1) for the entire Neman River Basin with use of Lithuanian and Belarusian models take into account economic development tendencies (for Belarus);
- Agreed indicators of water bodies status, along with respective criteria (values), and systems for classification of water bodies' state and parameters, assessment of water quality with using agreed indicators and criteria;
- Proposals to optimize the monitoring systems with account of climate change;
- Estimation and forecast of the future climate change impact on the water quality at the highest generalization level;
- Common information platform (Internet database), containing data on water resources management and adaptation to climate change for the Niemen River basin countries (http://www.cricuwr.by/neman/);
- Assessment of the expected impacts of climate change in the Neman river basin, the potential and possible adaptation measures (summary of the vulnerability assessment of the basin) based on the results of the project and on the intersectoral cooperation;
- Development of the draft concept of the Strategic framework for transboundary adaptation for climate change (Strategy on Adaptation to Climate Change for the Neman River Basin) and start of preparation of the Strategy.

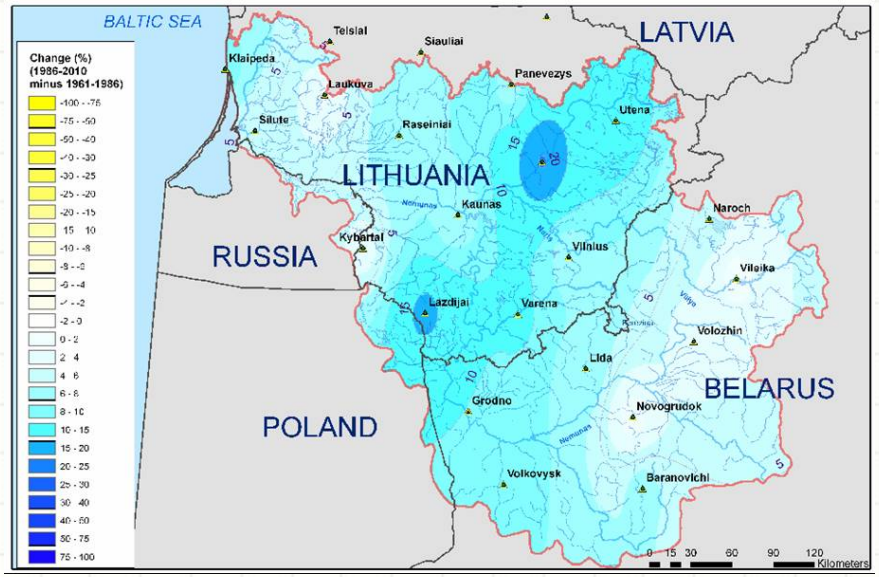
MOST IMPORTANT RESULTS

Detected changes of meteorological and hydrological characteristics for the period from 1961 to 2010:

- **–Statistically significant increase in annual, winter and summer temperature (largest changes were observed in January);**
- **–Statistically significant increase in winter precipitation;**
- **–Maximum spring flood discharge decreased and the minimum winter flow increased statistically significant in large part of territory;**
- **–Peak of spring flood and the dates of minimum winter flow tends occur earlier in the whole basin area.**

Parametr: Temperature (annual)

Parametr: Precipitation (annual)



Future climate projections. **The regional CCLM model runs are driven by the initial and boundary conditions of the Global Circulation Model ECHAM5/MPI-OM. Realizations of the ECHAM5/MPI-OM model were dynamically downscaled to a smaller grid using the CCLM model.**

Temperature and precipitation forecast (annual):

- ✓**Mean annual air temperature in the basin is expected to rise by 1.4° C–1.7° C with a 2.0 ° C–2.8° C increase in Winter and 0.7° C–1.1° C increase in Summer;**
- ✓**The annual precipitation amount will increase by 28 - 73 mm, the largest positive changes are foreseen for winter and spring**

Impact of climate change will be more important on runoff in the Neman River Basin in comparison with forecasted impact of water use changes.

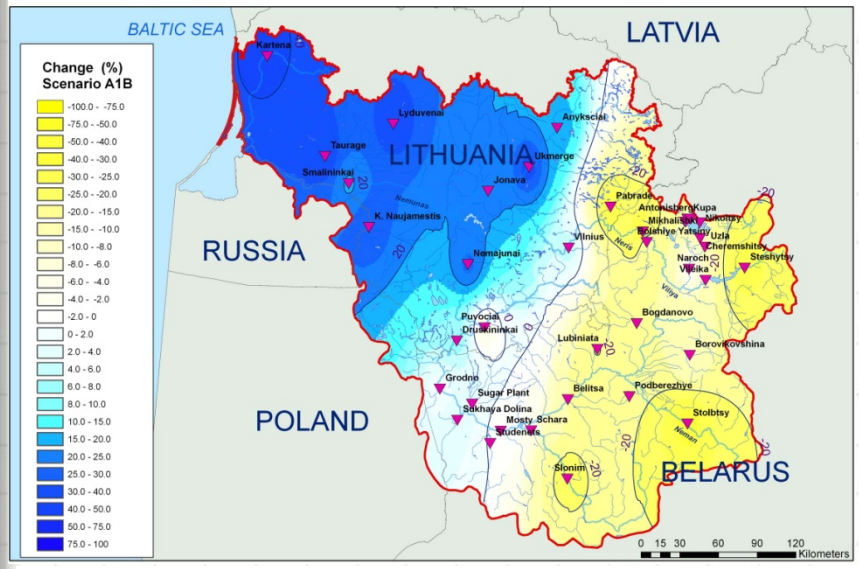
Estimation and forecast of the future climate change impact on the water quality at the highest generalization level:

- ➢**Average decrease of dissolved oxygen content in surface water in summer forecasted as 0.25-0.3 mg/l**
- ➢**Increase of mineralization estimated on 3-10%**
- ➢**Correlation with water temperature and other WQPs were not found take into account climate change because other factors more significant**
- ➢**Possible increase of nutrient and hydrobiological characteristics deterioration because of dissolved oxygen content decrease**

Examples of the results of runoff forecast in the Neman River Basin (summer)

Belarusian hydrology-climatic calculations model (HCCM)

A1B - scenario



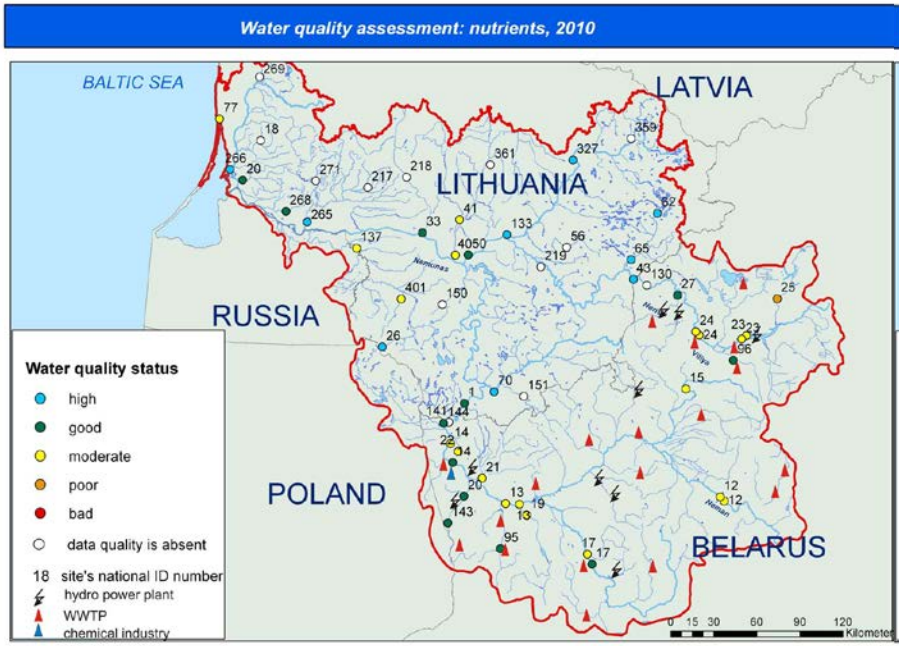
B1 - scenario

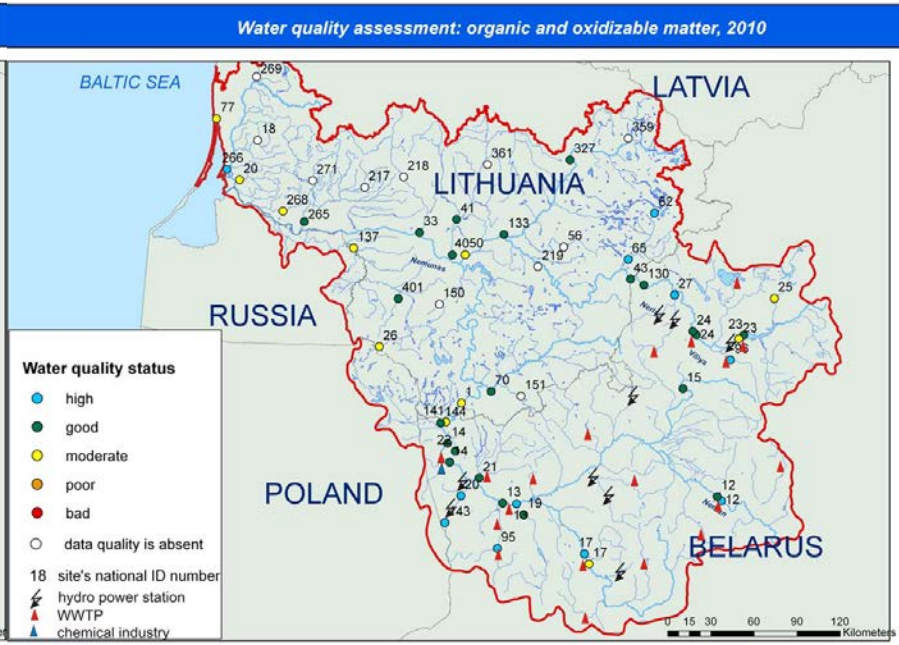
Lithuanian model (WatBal Model)

MOST IMPORTANT RESULTS

Implementation of common Lithuanian and Belarusian approach for assessment of water quality of surface waters taking into account Lithuanian experience

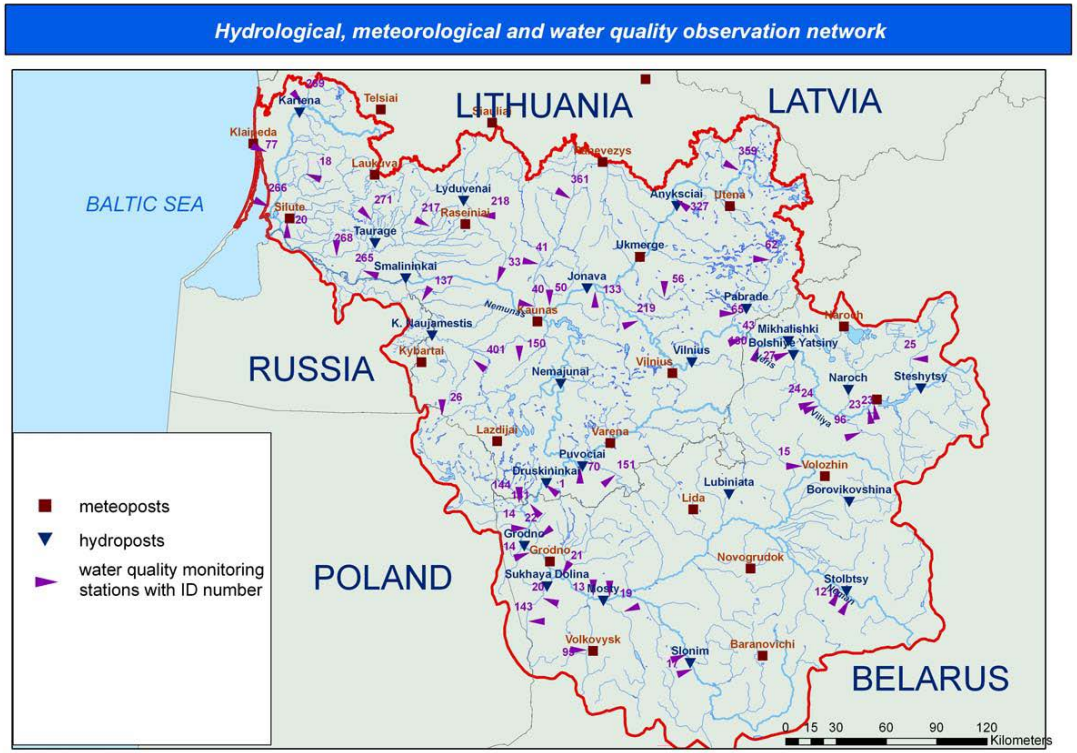
No.	Quality element		Parameter	River type	Criteria for ecological status classes of rivers				
					High	Good	Moderate	Poor	Bad
1	General data	Nutrients	NO_3-N, mg/l	1-5	<1,30	1,30-2,30	2,31-4,50	4,51 -10,00	>10,00
2			NH_4-N, mg/l	1-5	<0,10	0,10-0,40	0,41-0,8	0,81-1,5	>1,5
3			NO_2-N, mg/l	1-5	<0,01	0,01-0,02	0,021-0,05	0,051-0,08	>0,08
4			PO_4-P, mg/l	1-5	<0,050	0,050-0,090	0,091-0,180	0,181-0,400	>0,400
5			Pt, mg/l	1-5	<0,100	0,100-0,140	0,141-0,230	0,231-0,470	>0,470
6		Organic and oxidizable matter	BOD_7, mg/l	1-5	<2,30	2,30-3,30	3,31-5,00	5,01-7,00	>7,00
7			Chemical oxygen demand (bichromate), mg/l	1-5	<30	30,1-40	40,1-60	60,1-80	>80
8		Oxygenation	O_2, mg/l	1, 3, 4, 5	>8,50	8,50-7,50	7,49-6,00	5,99-3,00	<3,00
9			O_2, mg/l	2	>7,50	7,50-6,50	6,49-5,00	4,99-2,00	<2,00





MOST IMPORTANT RESULTS

Analysis of the monitoring systems in the Neman River Basin and elaboration of proposals to optimize the systems with account of climate change



Summary of proposed intervention for the upgrade and expansion of the Neman RB Hydro-meteorological monitoring and Early Warning system (*Giovanni Crema and Inna Rusaya*)

Country (sub-portion of river basin)	New stations		Stations to be upgraded		Stations to be integrated in the overall system (additional to new or upgraded)	
	Meteo	Hydro	Meteo	Hydro	Meteo	Hydro
Belarus	1	10	9	30	-	-
Lithuania	2	4	-		8	11
Kaliningrad Ob.	2	2	-	-	1	5
Total	**5**	**16**	**9**	**30**	**9**	**16**

INTERSECTORAL COOPERATION

EVENTS

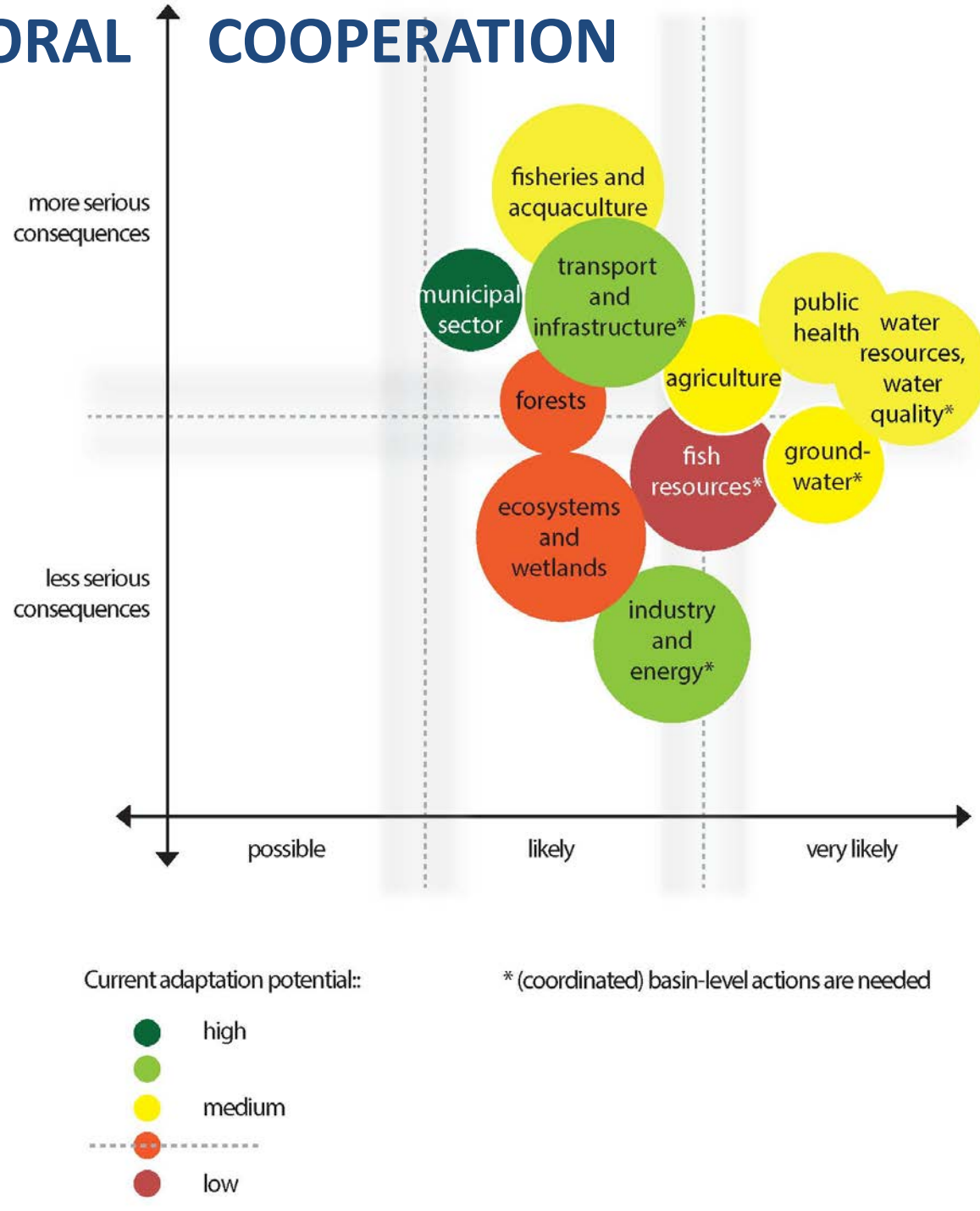
- Multi-stakeholder seminar in Belarus, 19 March 2013, Minsk;
- Multi-stakeholder cconsultations and bilateral meetings in Lithuania, 15-17 May 2013, Vilnius.

Most important challenges and lessons learnt

- ✓Discussions about expected impacts of climate change in the Neman river basin and about potential and possible adaptation measures;
- ✓Development of the draft concept of the Strategic framework for transboundary adaptation for climate change (Strategy on Adaptation to Climate Change for the Neman River Basin) and start of preparation of the Strategy based of the results of the project and intersectoral cooperation.

INTERSECTORAL COOPERATION

Possible impacts of climate change in the Neman river basin



INTERSECTORAL COOPERATION

Summary of the vulnerability assessment of the basin for different types of natural resources:

- ✓Surface water resources;
- ✓Ground waters;
- ✓Forest resources;
- ✓Other ecosystems and wetlands;
- ✓Fish fauna;

and for different sectors of economy:

- ✓Industry;
- ✓Energy;
- ✓Housing and public utilities;
- ✓Agriculture;
- ✓Fish industry and fish-breeding;
- ✓Legal and institutional aspects of water resources management;
- ✓Transport infrastructure, including water transport;
- ✓Health of population;
- ✓Recreation.

The most vulnerable resources in the Neman basin (example of table developed in frame of intersectoral cooperation)

Resource, industry	Risk features	Adaptation potential	Adaptation measures
Surface water resources	High probability of exposure to the impacts of climate change and variability. The tendency of a slight increase in the average annual flow across the basin (with decrease in Belarus). An increase of the intra-annual flow redistribution. Decrease of runoff and earlier onset of spring flood. Growth of probability of dangerous hydrometeorological phenomena (summer droughts and reduced water levels, summer and autumn rain floods, spring floods). The increased of risks of damages from floods in the upper reaches of the Neman river on the territory of Belarus, in the western part of Lithuania and the Kaliningrad region of the Russian Federation as well as across a basin with the increased intensity of reclamation of the river flood plains. An increase of water temperatures and possible reduction of the content of dissolved oxygen, deterioration of the hydrobiological indicators of the water ecosystems state, change in the regime of levels of surface water objects. The increase in periods of rainfall floods and costs of flood-protection works. The risk of significant reduction of the small rivers runoff (especially in summer) with lowering of water levels and deterioration of water quality as well as recreational potential.	Medium	Required the effective management of water resources and optimization of the water consumption; including regulation of requirements to agricultural and urban development activities in the river floodplains in order to reduce the risk and damage from floods and droughts. Monitoring of a situation in the basin, including an improvement of the monitoring system for hydrological, hydrodynamic and hydrochemical regimes as well as automation of the monitoring points. Organization of information exchange between the countries on a regular basis. Development of the management plans for water resources and flood risks across the basin, a regular mapping of the risk of flooding; the action plans for emergency situations, implementation of the early warning systems, information distribution (including across the borders) about the danger of floods, city planning according to flood risk maps. Reduction of pollution from point and non-point sources. Monitoring of the hydraulic installations in the mouths of the rivers. Awareness-raising of the population.

Expectations and answers which are hoping to get

- ✓Experience in the development of indicator's ranks system in the frame of vulnerable assessment
- ✓Experience in the development of the Strategies on Adaptation to Climate Change for different river basins: problem framing, decision-making process, institutions, communication and transparency

Thank you for attention

May 2013, Vilnius, Lithuania