Adaptation to climate change in transboundary basin of the rivers Chu and Talas

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Adaptation to climate change in transboundary basin of the rivers Chu and Talas

UNECE and UNDP (2010-2013)

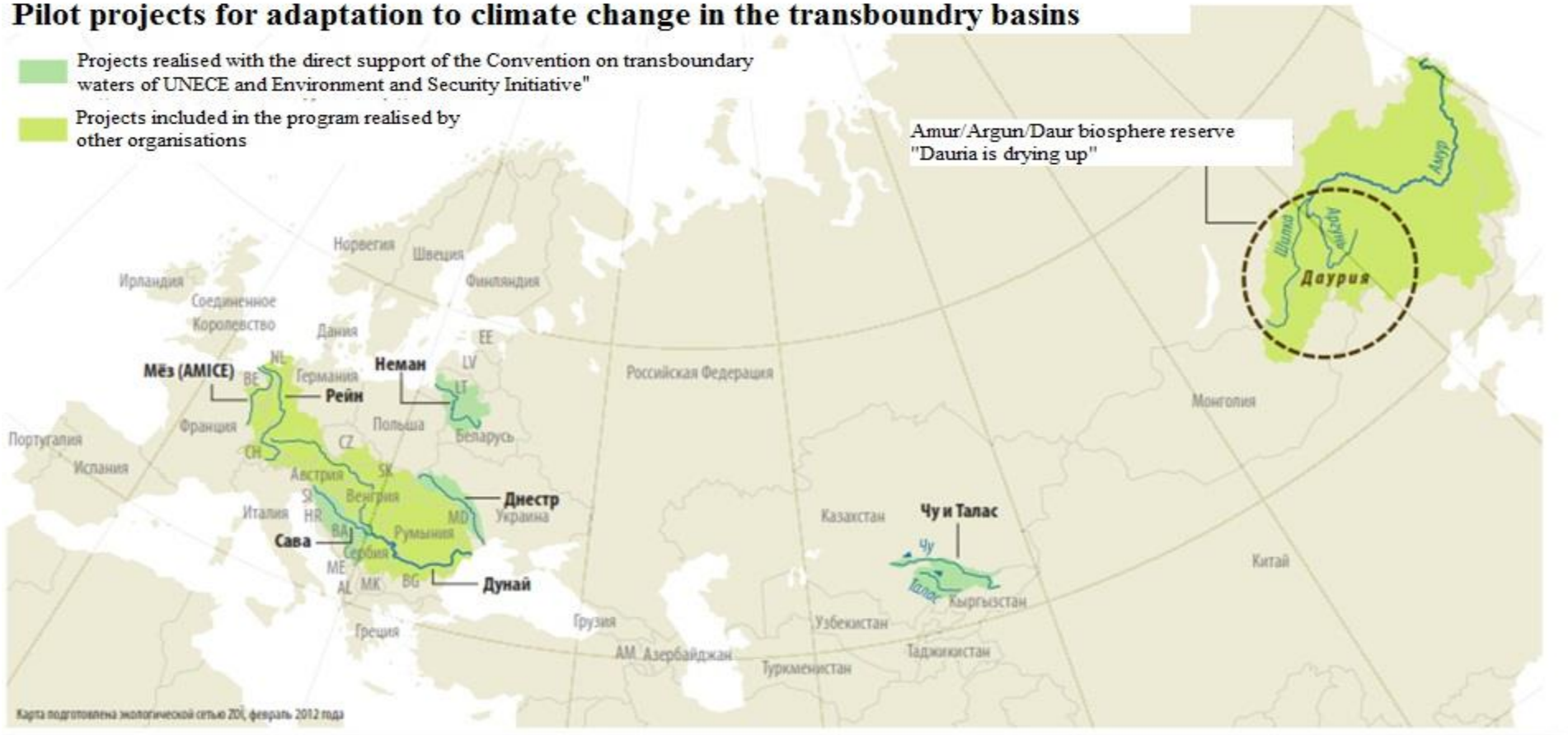
Tasks

- **Modeling** possible changes in resources of the rivers Chu-Talas in connection with climatic conditions and development **of the joint scenarios**.

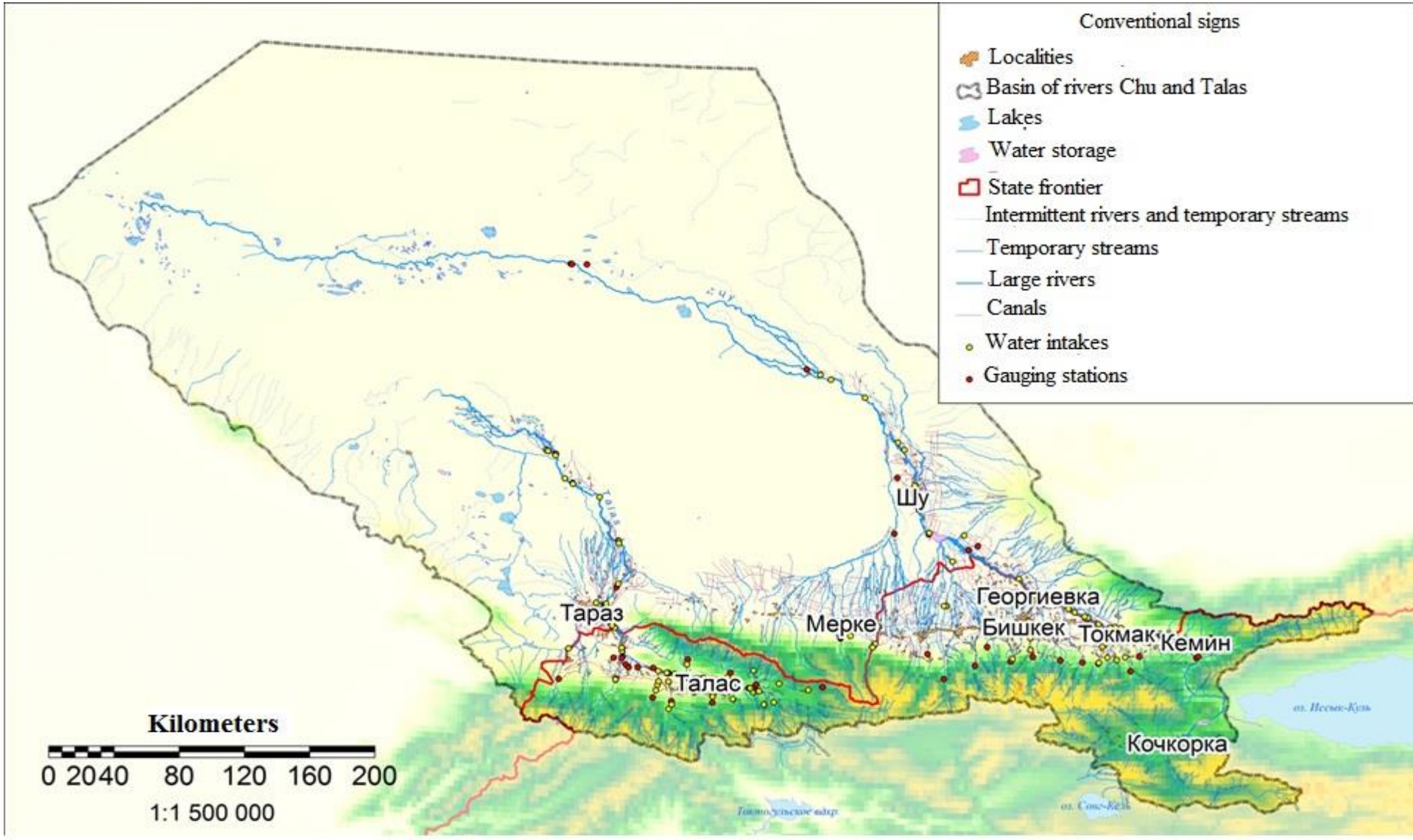
- Preparation **of the joint vulnerability estimation** with a focus on the chosen areas/branches representing special value for the Commission's activity.

- Development **of the package of possible adaptable measures** and appropriate procedures, studying of possible changes for the Commission which can contribute to reduction of potential tension in connection with water regime changes.

Network of transboundary projects



Chu-Talas Basin



Brief characteristic of the basin

Main orientation of economy of the basin - agrarian.

Population - 3 mln. per. (RK - 1), (KR - 2).

Ploughed field- 1416 thousand hectares (RK - 828), (KR - 588).

Irrigated - 652 thousand hectares (RK - 206), (KR - 446).

Used water resources 2,5: groundwater - 10 %, the remain is surface water (on KR).

The agriculture consumes about 95 % of all the water resources.

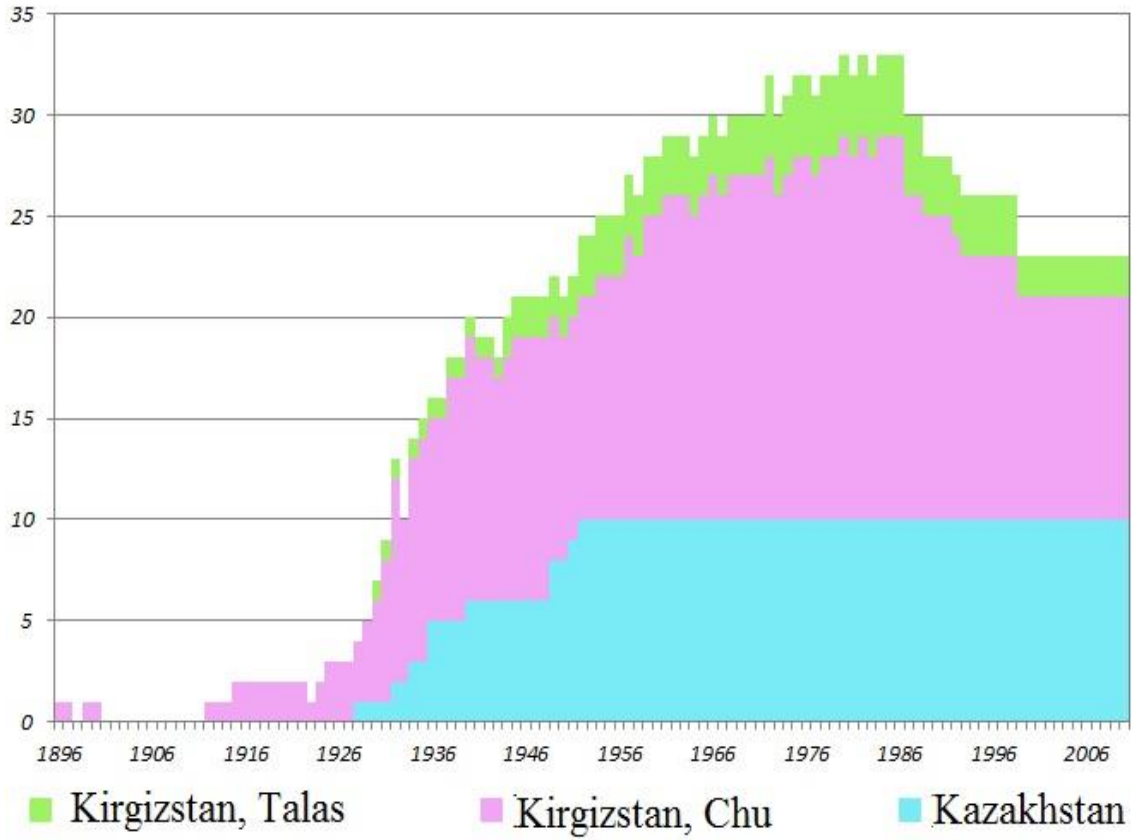
Losses of water resources - about 40 %.

Total water yield of the basin - more than 8 cubic km.

More than 75 % of water resources of the basin are formed at the territory of KR.

Water apportioning - Chu (42/58 %), Talas (50/50 %).

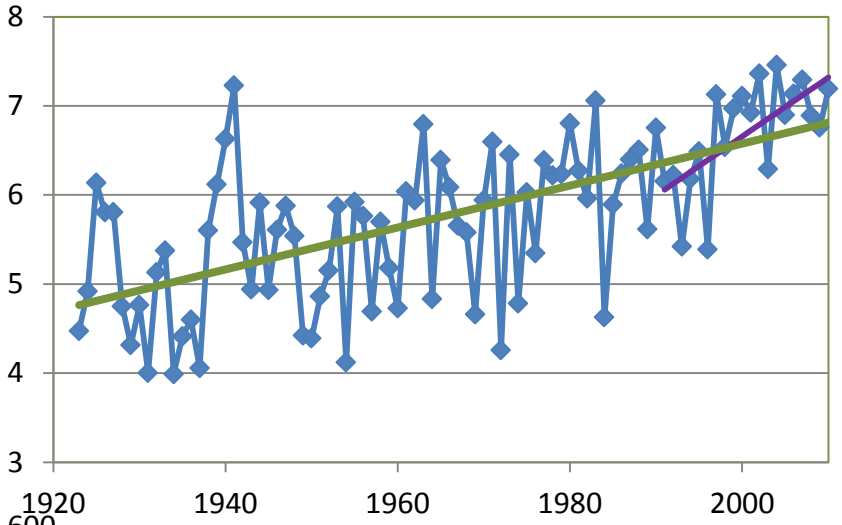
Results. Monitoring

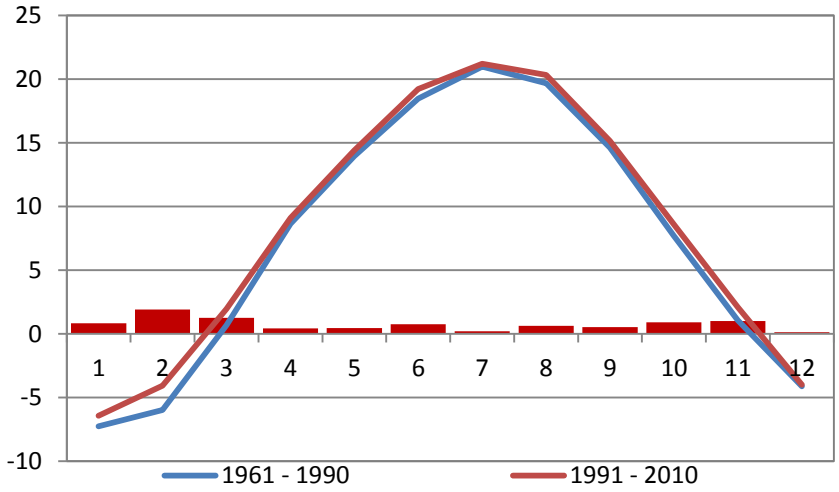


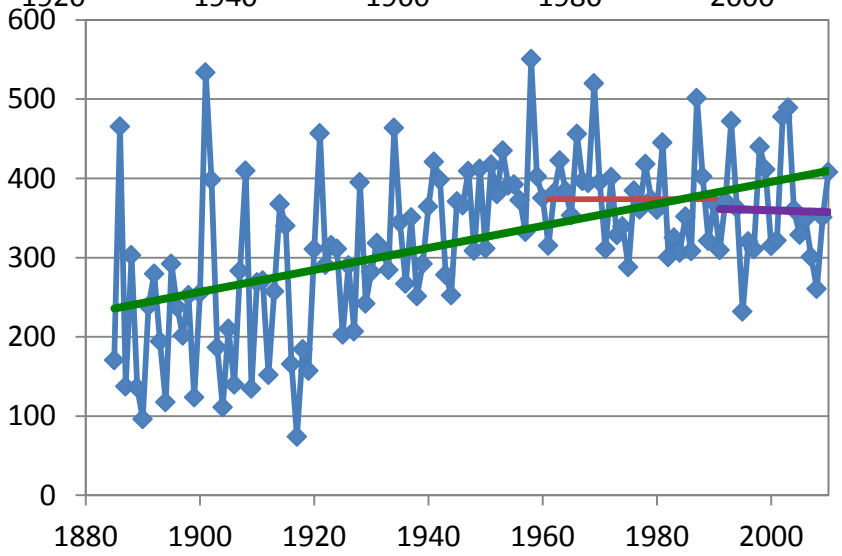
One meteorologi-cal station contains more than 5000 km2 (almost 2 times more than recommenda-tions of WMO)

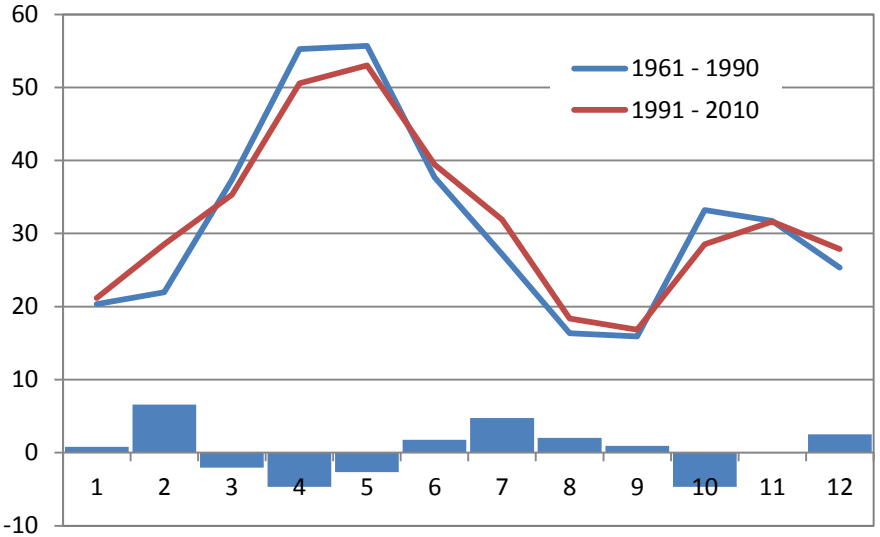
Results

Evaluation of the observable climatic changes in the basin









Results. Temperature. Significance

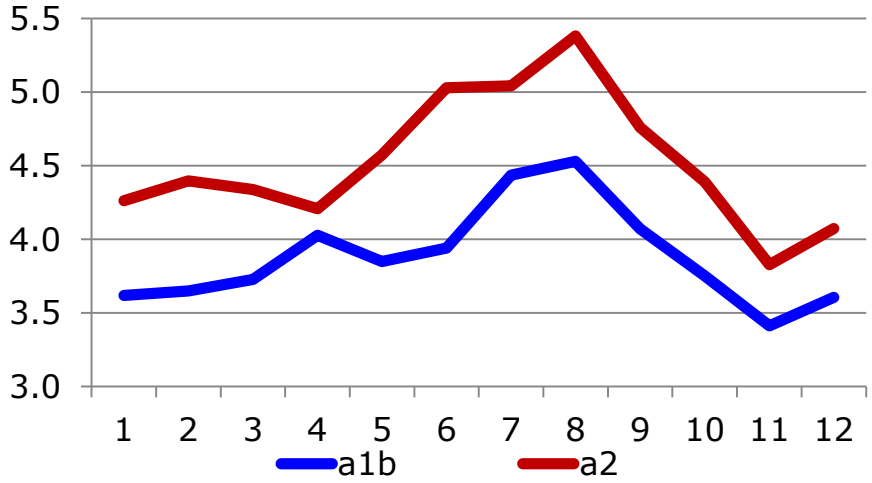
Indicator	KR	RK	Basin
Average1961-1990 (base)	4,714	8,5611507	5,945386
Average1991-2010	5,349845	9,420554	6,690121
Difference of averages	0,635845	0,8594033	0,744735
Increase from1991 to 2010	1,4796	1,0994	1,3244
Critical - 2,0106	3,357867	4,07682	3,845593

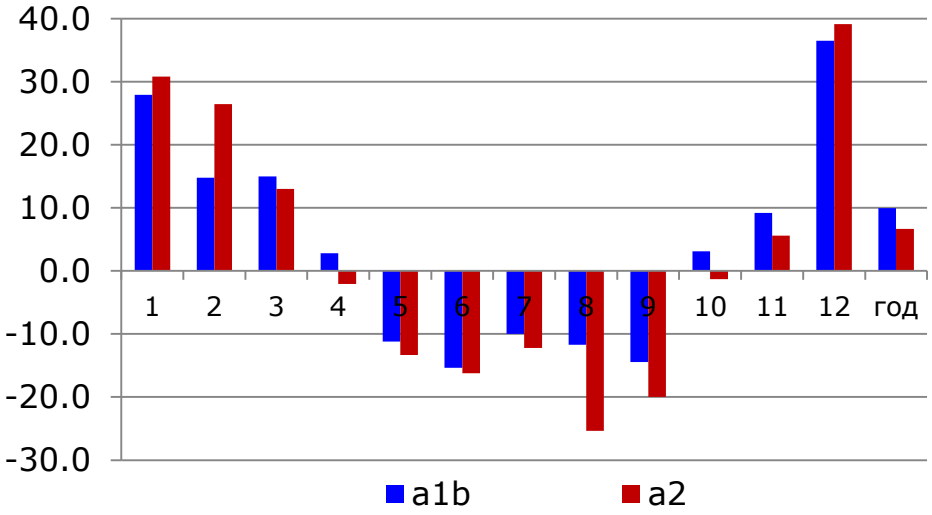
Results. Precipitations. Significance

Indicator	KR	RK	Basin
Average1961-1990 (base)	416,914	234,2613	373,6933
Average1991-2010	397,845	232,461	359,5092
Difference of averages	-19,069	-1,80038	-14,1841
Increase from 1991 to 2010	22,2644	-13,017	-4,1618
Critical 2,0106	0,9716	0,12295	0,77851

Results

Evaluation of the observable climatic changes in the basin





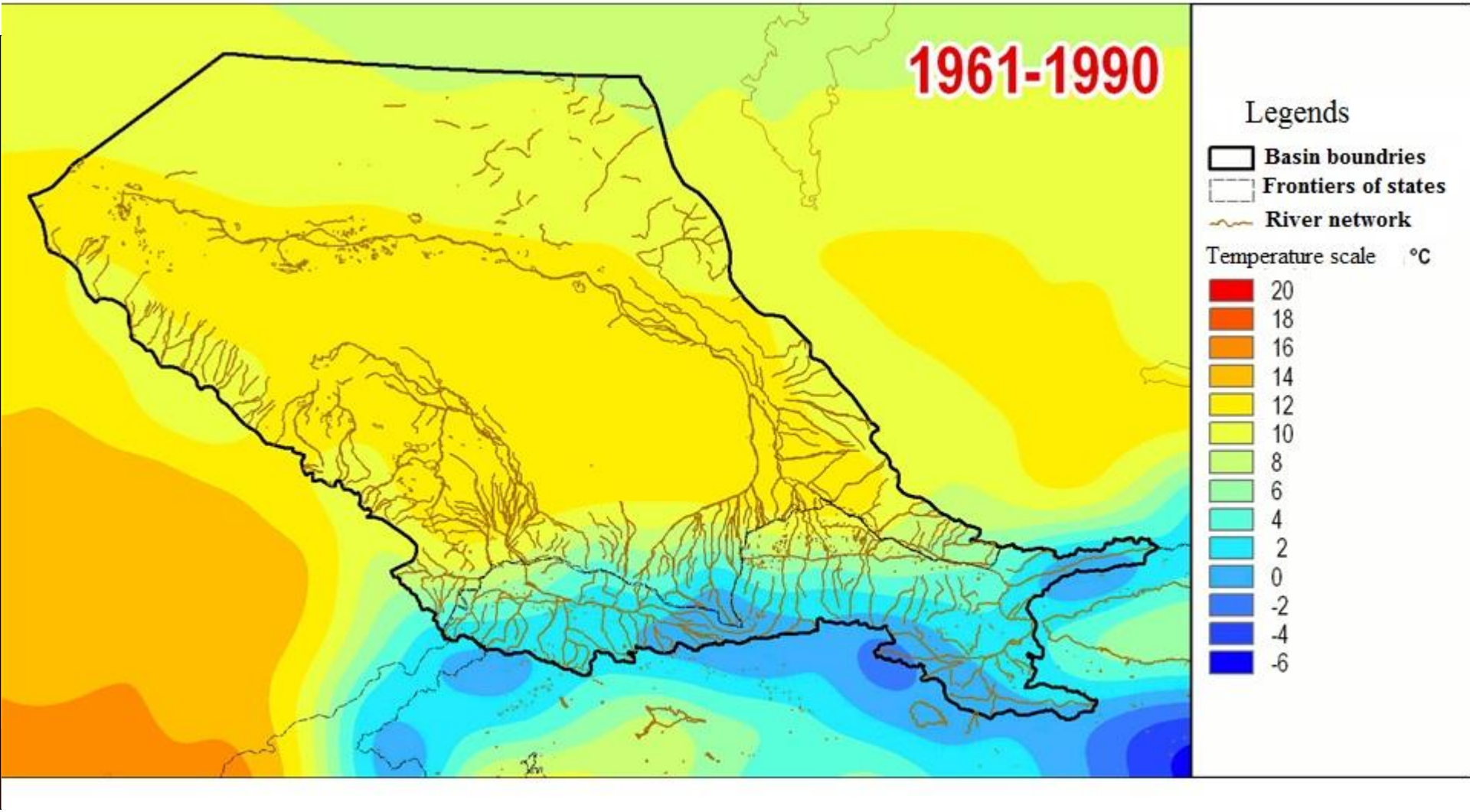
Increase of average annual temperature of ground air within the limits of:

- 1,6…1,8 °C to 2016-2045,
- 2,5…2,9 °C to 2036 -2065,
- 3,8…4,8 °C to 2071-2100.

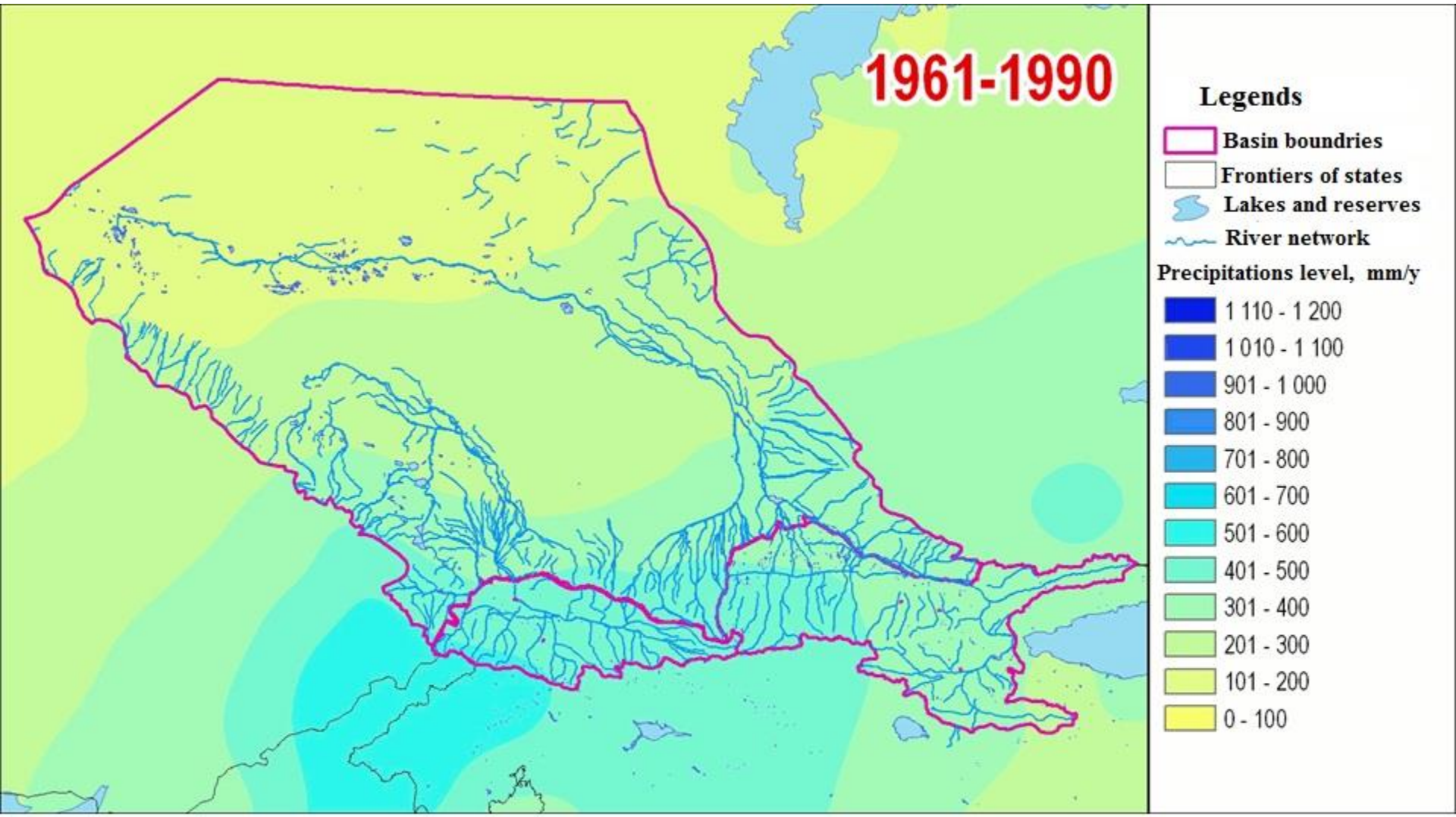
Insignificant increase in the annual volumes of precipitations:

- 2…11 % to 2016-2045,
- 2…13 % to 2036-2065,
- -1...14 % to 2071-2100.

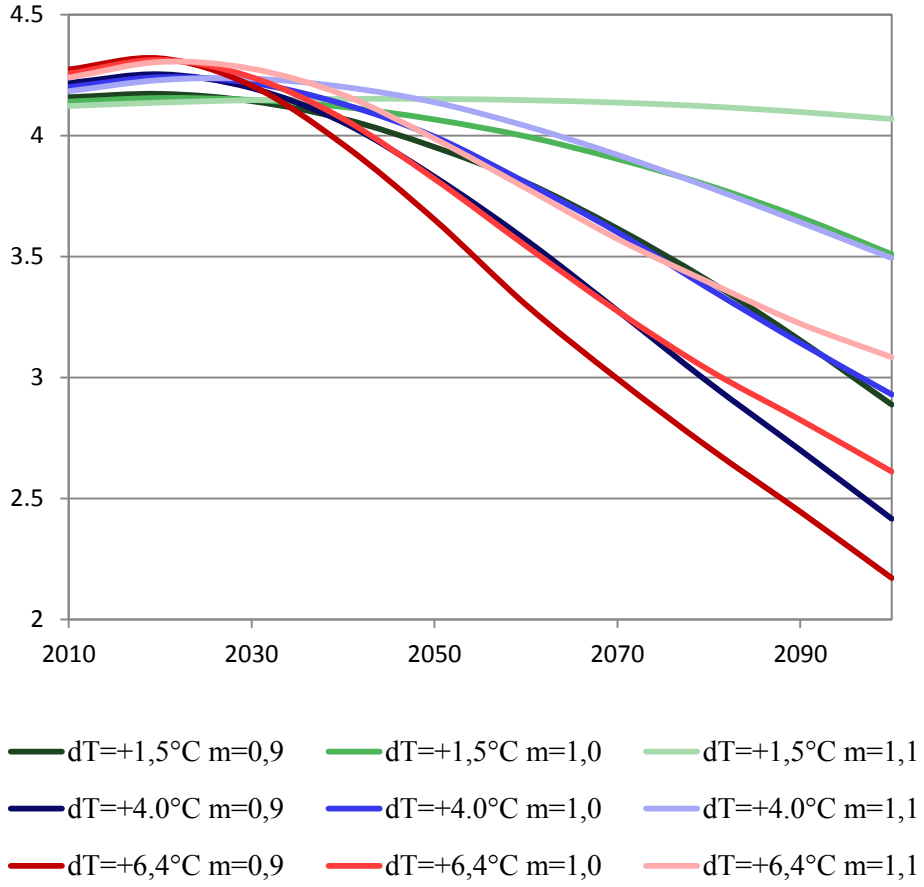
Results. Temperature variation



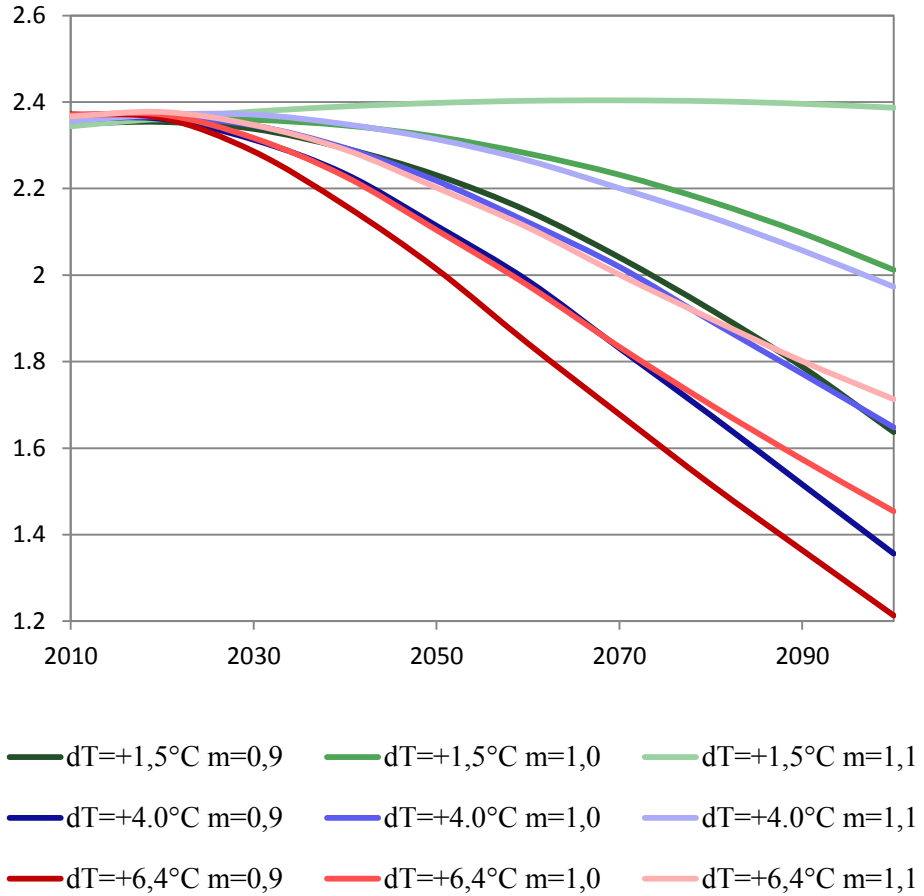
Results. Precipitations variation



Results. Evaluation of water resources vulnerability

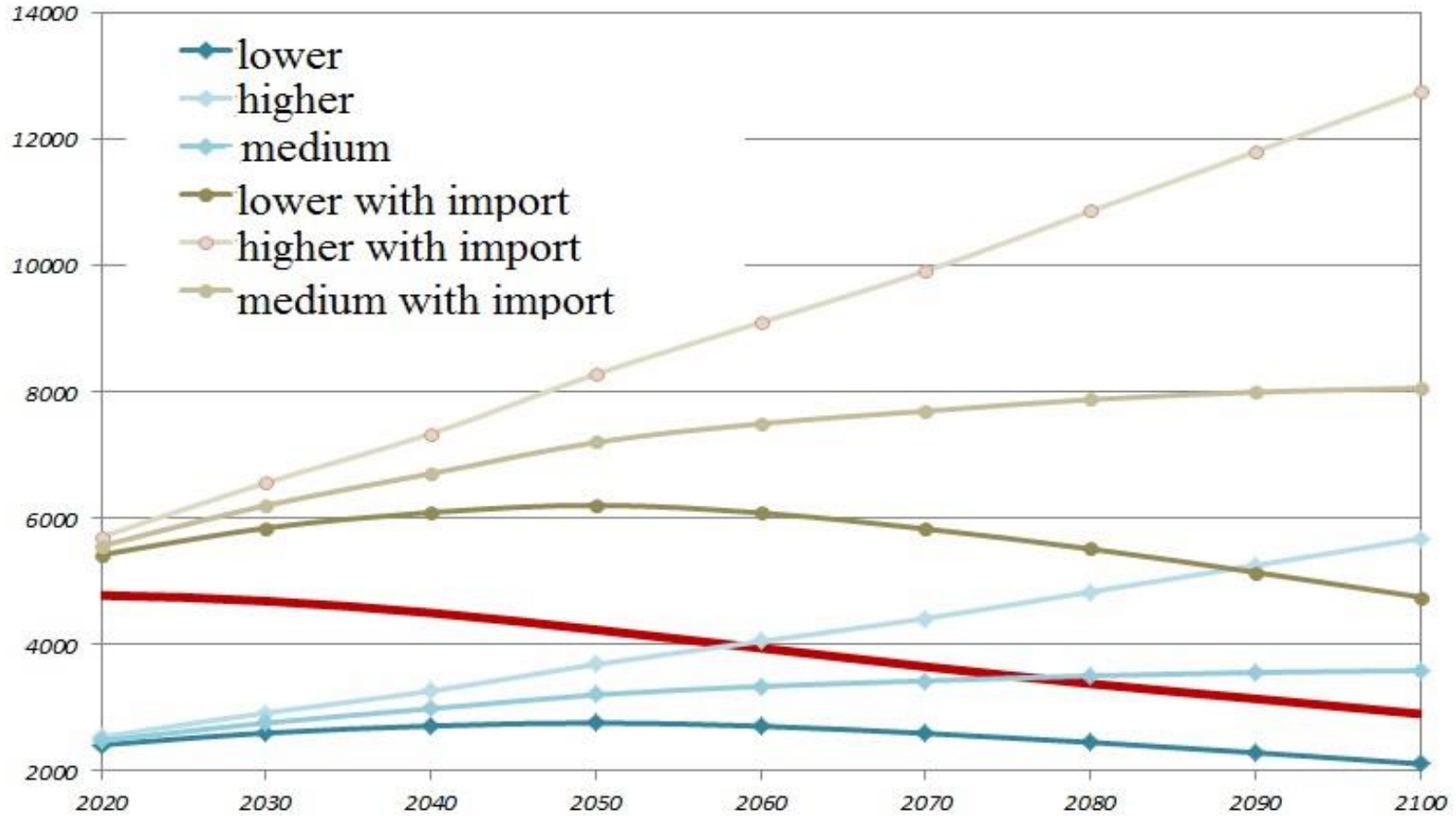


Chu



Talas

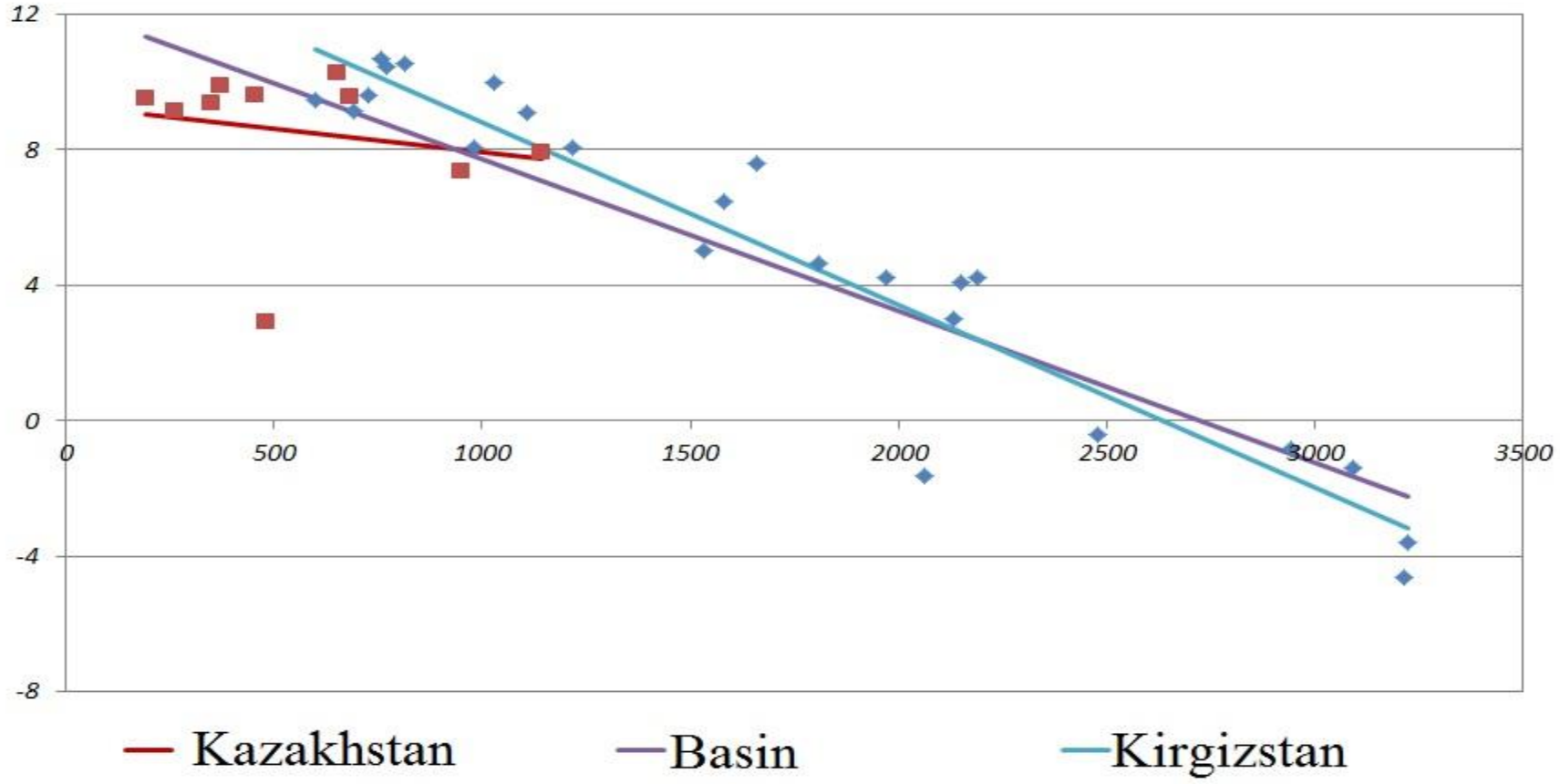
Evaluation of water resources availability



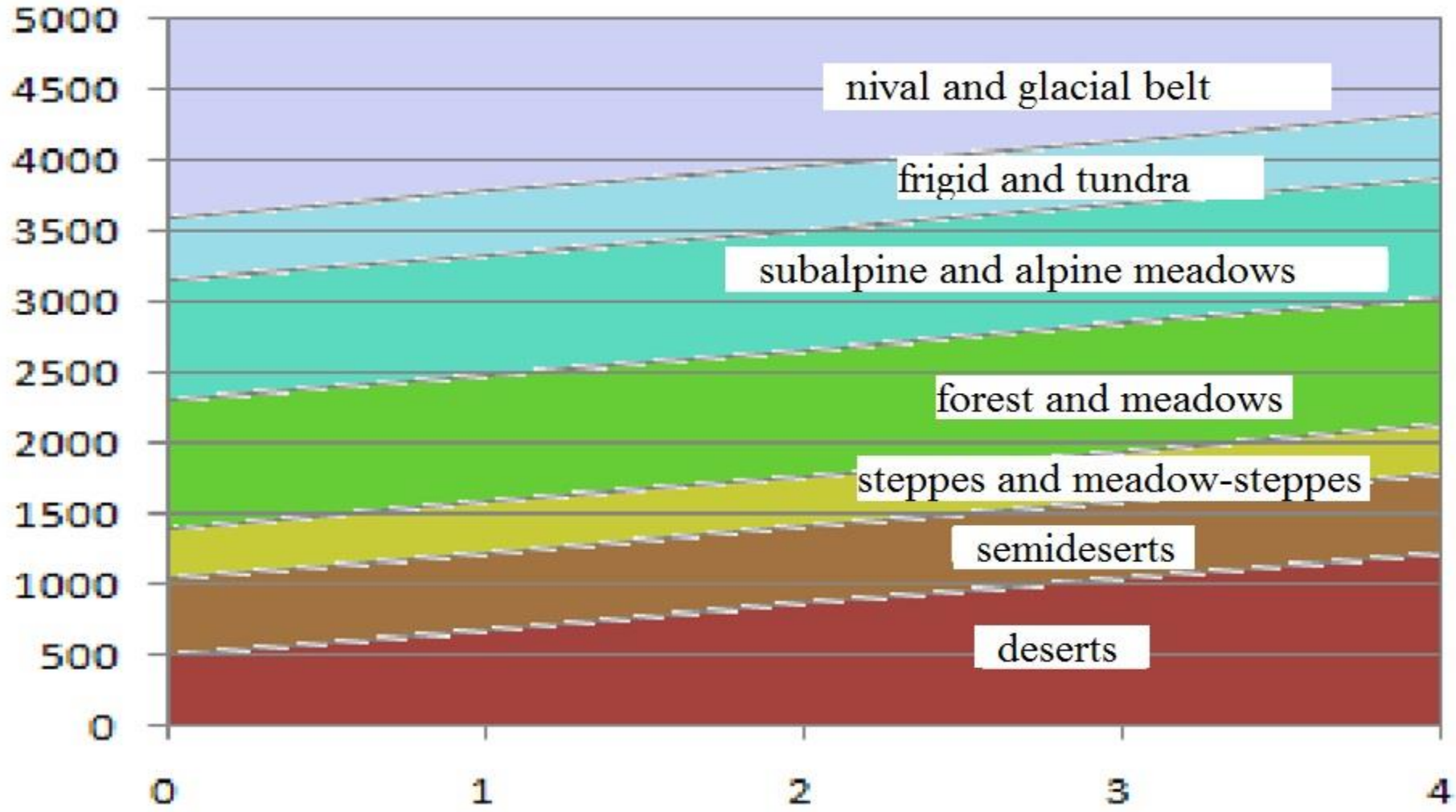
Increase of emergency situations by regions of KR with decreasing temperature of 1 degree C

Type of emergency situation	Chu region	Talas region
Landslides	-4,31	na
Avalanches	7,14	na
Torrents and floods	9,23	3,40
Saturation	na	na
Heavy rains	-0,45	0,91
Windstorms	4,91	2,48
Hailstorms	na	na
Snowfalls	na	na
Total	10,42	7,84

Temperature variation gradient



Results. Displacement of climatic belts



Adaptive measures

- Rehabilitation and modernization of the monitoring network;
- Rehabilitation of the irrigational systems with a view of reduction of water losses;
- Development of the storage facilities and updating of the regulation mode;
- Change of structure of the land use and diversification of agricultural crops;
- Use of the modern irrigation systems;
- Revision of subvention policy (including price formation of water) - for introduction of stimulus on economical use of water resources;
- Taking into account the climate change influence at definition of watering norms;
- Prevention of the emergencies consequences.

Economical evaluation of measures

- Involving of the additional lands:
- Construction of additional irrigational channels - 4,5 thousand $/ha.
- Construction of water reserves - 4,8 thousand $/ha.
- Economy of water resources:
- Use of modern irrigation systems - (sprinkler system - 200$/ha., economy of water 2 times), (drop system - 470 $/ha., economy of water 3 times)
- Rehabilitation of irrigational systems-?
- Rehabilitation and modernization of the monitoring network of the qualitative and quantitative condition of water resources-?

Lessons

1. To strengthen inter-country coordination for basin projects;
2. To eliminate a fragmentariness of performance in time;
3. To create base of initial data and results;
4. To increase knowledge of the project at all levels;
5. To strengthen cooperation with developers of the adaptation branch strategies.

Perspectives

1. Estimation of observable and expected climatic changes in the basin
   - Addition of the analysis of the observable climate;
   - Revision of the expected climate in conformity with scenarios and models under AR5.
2. Expansion of the vulnerability analysis:
   - Water resources (quantity, quality);
   - Agriculture (reduction in crop yield and increase in watering norms at change of climatic conditions);
   - Biodiversity (water and surface ecosystem);
   - Climatic extreme situations.
3. To evaluate economic damage by each sector.
4. Adaptable measures:
   - Develop the list of measures by all chosen vulnerable sectors;
   - Evaluate cost of offered measures and damage reduced by it;
   - Coordinate all measures between transboundary controls;
   - Make the list of measures on performance priority.

Thank you for attention!