



INTEGRATED MODELING OF THE ILI – BALKHASH WATERSHED

Transboundary water cooperation in the
Central Asia

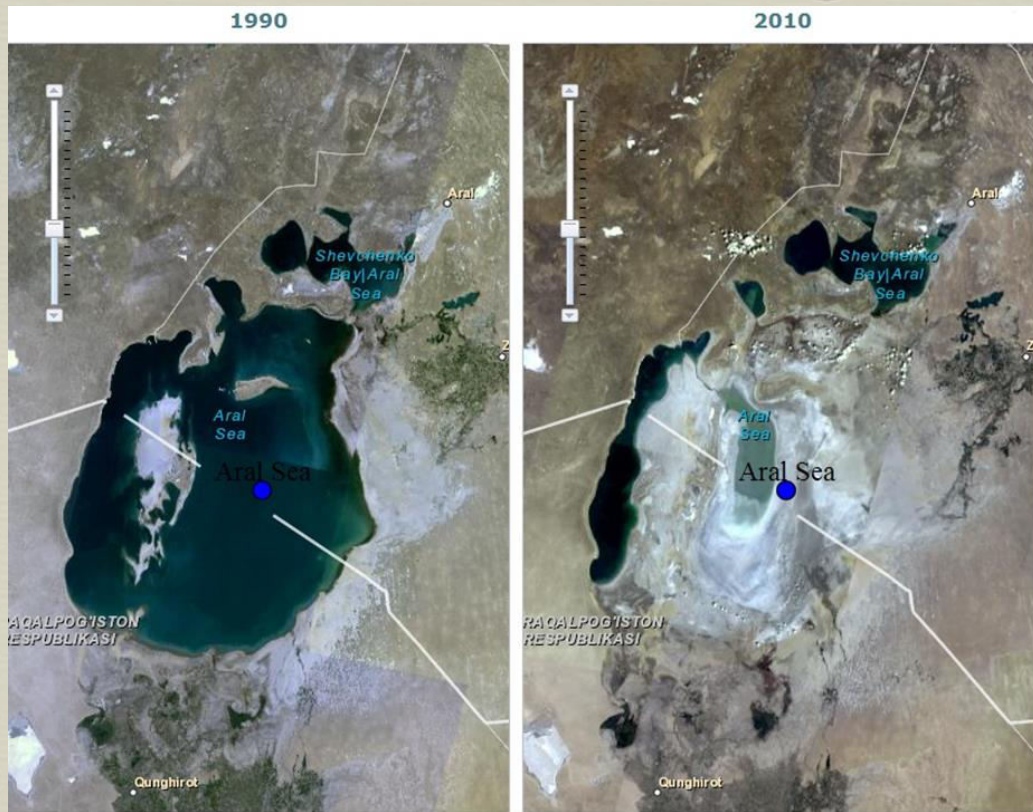
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Central Asia



- ❧ An increase of the average air temperature by 1.3°C during the century that region is already facing is two times higher than the global warming value (Ibatullin 2009).
- ❧ The global warming consequences aggravate the deficit of water resources in the arid part of the Central Asia (Gessner et.al., 2013).
- ❧ Most of the river catchments in Central Asia dominate by meltwater runoff and hence are sensible to warming climate.

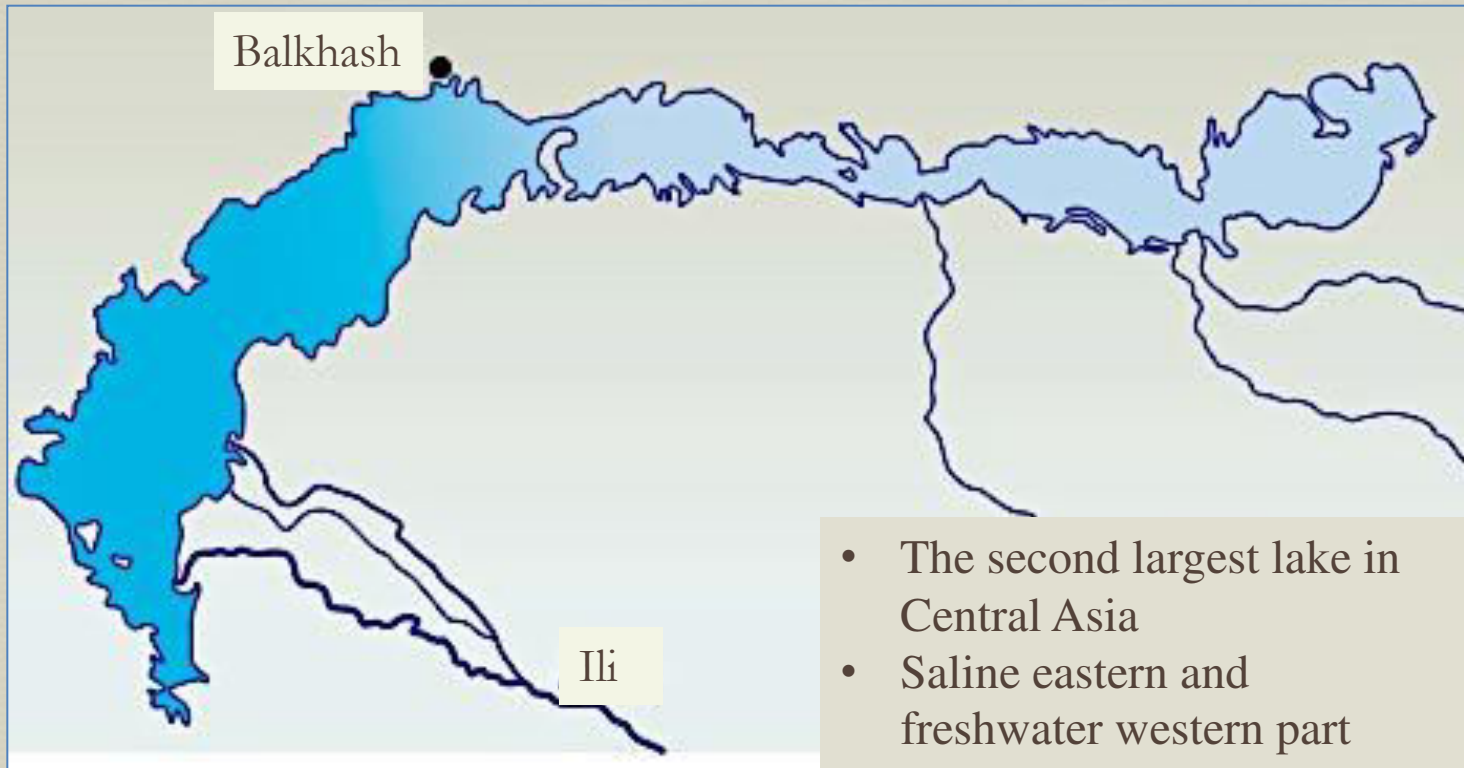
Aral Sea disaster



Upstream countries increased uptake. As a result:

- Lake shrinking
- Pollution
- Environmental degradation

Unique lake Balkhash



Transboundary watershed



Ili River



- China - Kazakhstan
 - 80% of the Balkhash's water
 - Water used for agriculture and energy
- China is increasing uptake
- Kazakhstan concern:
- Lake shrinking
 - Environmental degradation

Possible Aral Sea disaster repetition. Balkhash lake may lose up to 86 percent of its water reserves by 2045.

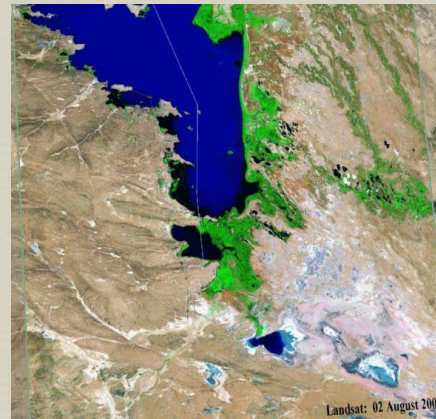
Economic Development



The border line between Kazakhstan and China

Aim

- ∞ The aim of the research is to assess the fate of the Balkhash lake based on the regional development including social and environmental changes .

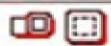


Methods



The research included:

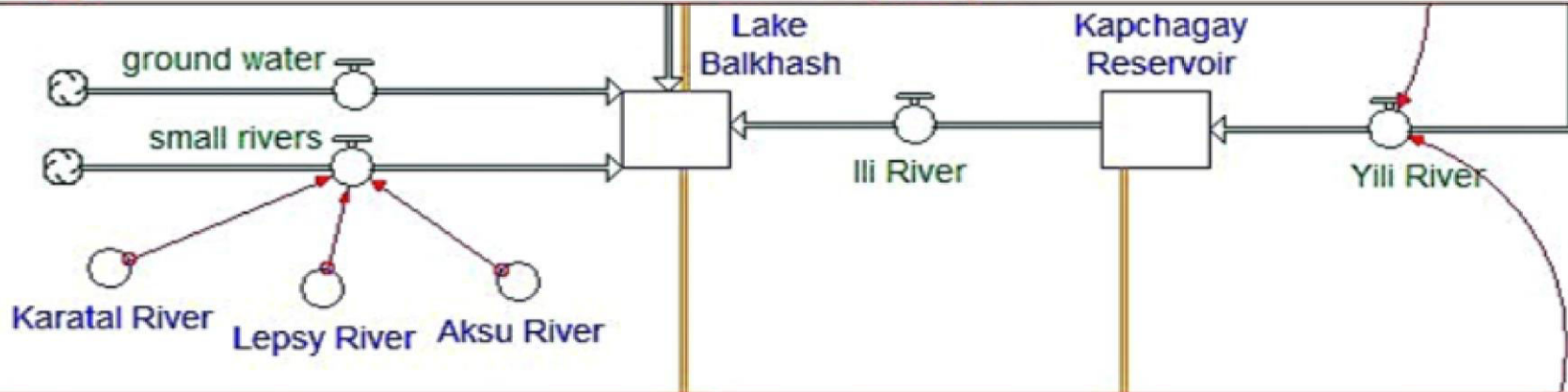
- ∞ Archival research
- ∞ Policy analysis
- ∞ Climate change analysis
- ∞ Land use change analysis
- ∞ Integrated modeling
- ∞ Remote Sensing



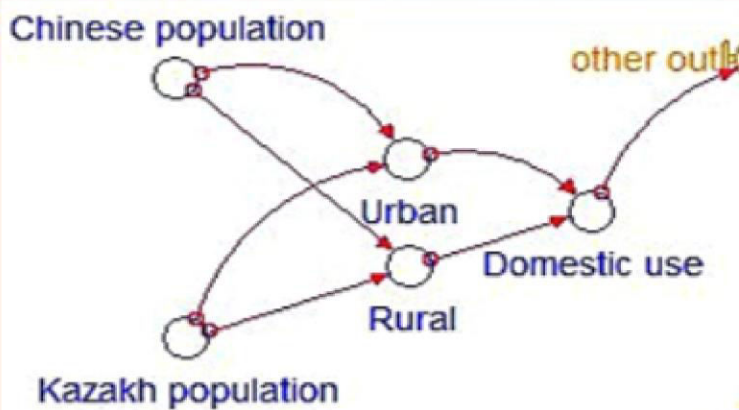
II sub-model: Climate



I sub-model: Hydrological

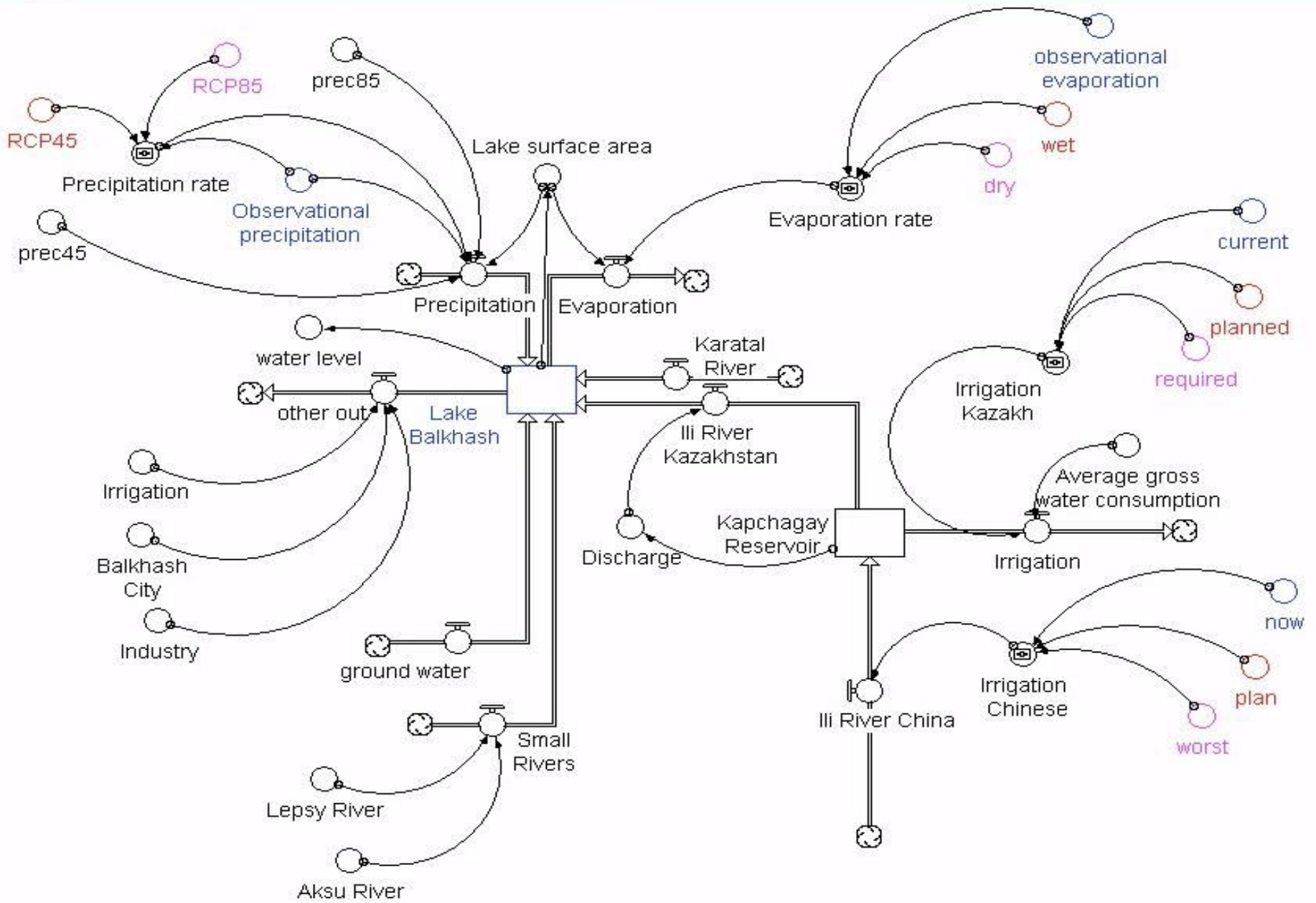


IV sub-model: Population



III sub-model: Economic

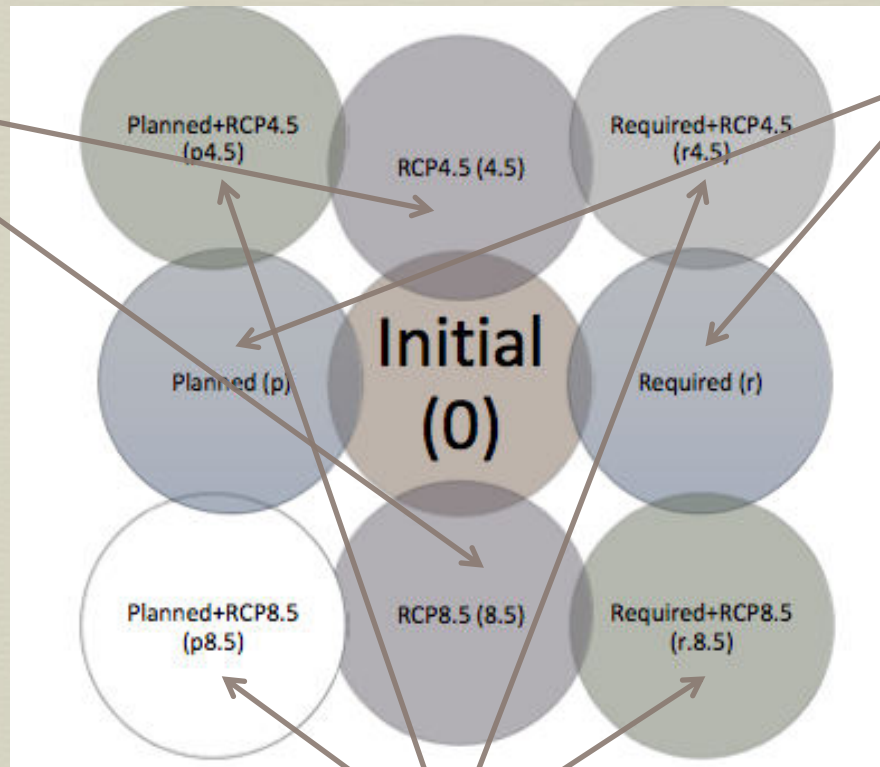




Scenarios

Climate Change

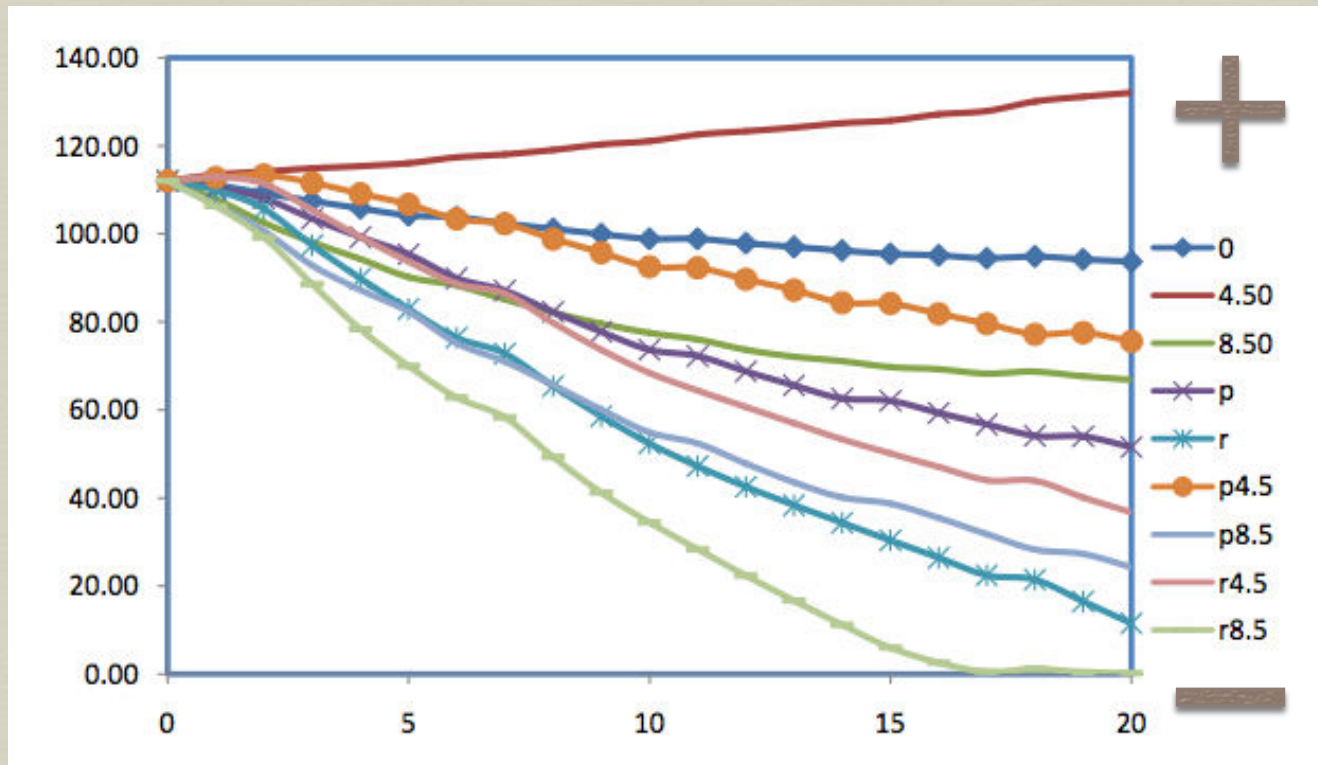
Economic Development



Integrated Scenarios

Results

Lake Balkhash volume (km³)



Comparison of the Balkhash Lake volume under nine scenarios

Emerging questions



- ❧ Energy-Food nexus, hydropower, irrigation
- ❧ Minority oppression, migration, urbanization, population change
- ❧ Bilateral agreements, joint commission, international legislation
- ❧ Integrated Water Resources Management (IWRM), a basin level management.
- ❧ Institutional differences, political will



Thank you for your
attention!