Ten Answers from the Amudarya River Basin

Maja Schlüter & Darya Hirsch

Leibniz-Institute of Freshwater Ecology and Inland Fisheries, Berlin
& United Nations University
Institute for Environment and Human Security, Bonn

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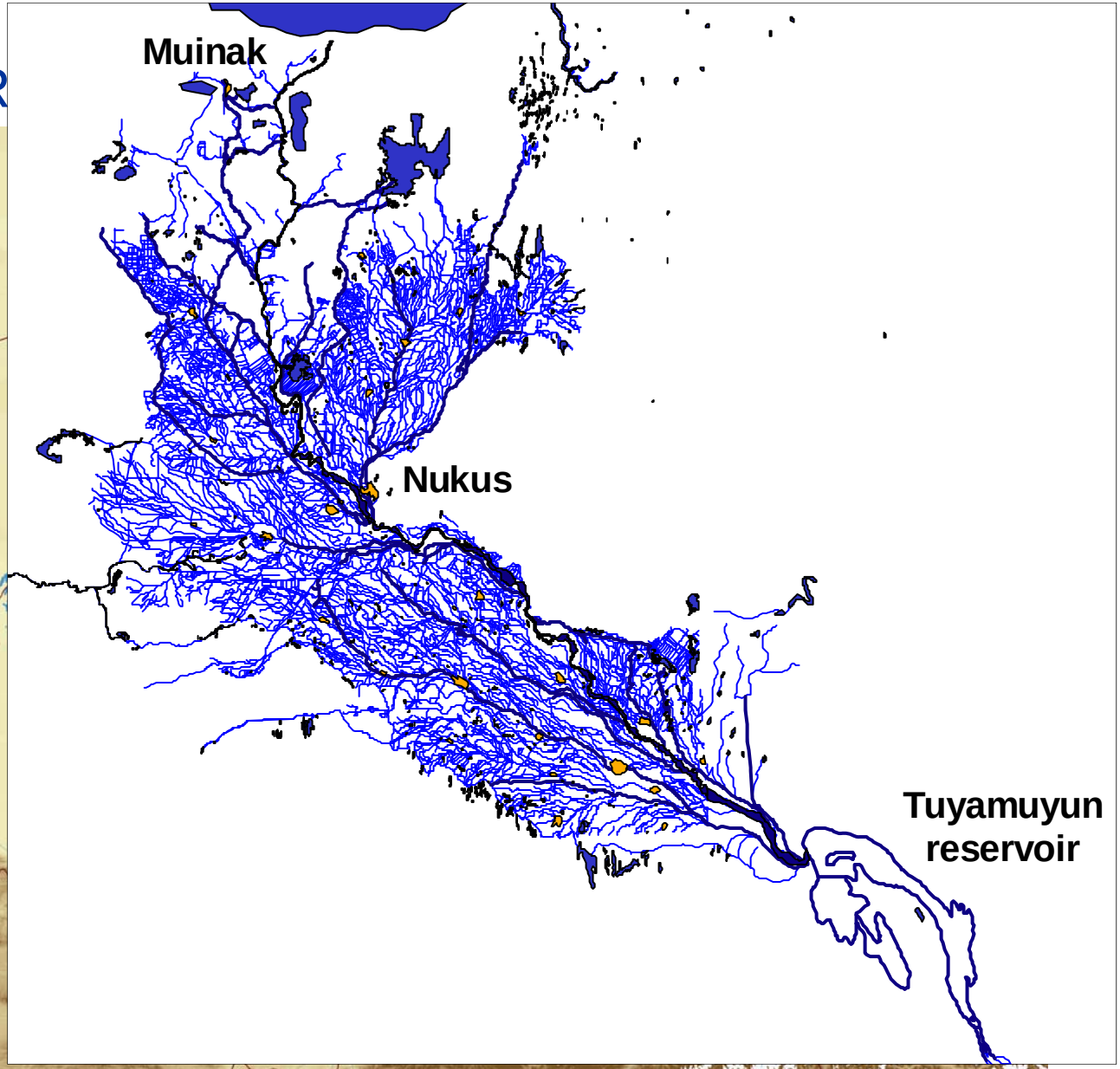
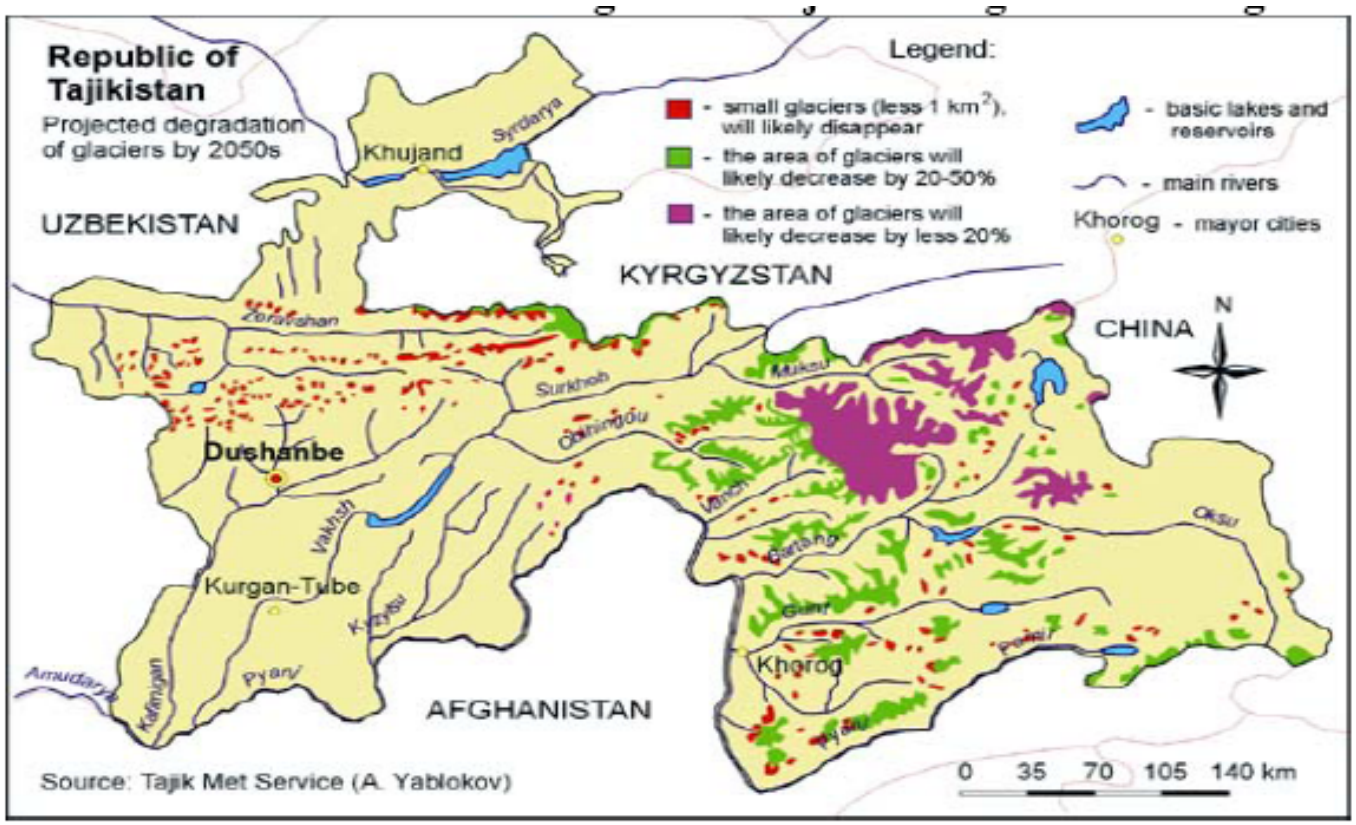
The Amudarya R

- Area: 309,000km^2
- Runoff: 79km^3
- Precipitation (average in RB) : 200 mm/year
- 1mio ha irrigated land
- Strong environmental degradation



How is global change manifested?

Projected degradation of glaciers by 2050



Source: Tajikistan 2002: State of the Environment Report

How is global change manifested?

- Significant decrease in glacier area in Pamir and Hindukush
- Change in relative runoff contributions of glaciers, snow, rain->change in hydrograph
- Decrease in runoff estimated at up to 15% by 2050 (Uzbek Hydromet)
- Change in political context (five newly independent states of FSU + Afghanistan)

How do changes in climate, land cover/use, demography, institutions, etc. affect the characteristics of the Amudarya catchment?

- In Uzbekistan: increase in grain versus cotton production, but no significant reduction in water use, decreasing soil quality, environmental degradation
- Increased water scarcity, downstream areas very vulnerable to drought (see 2000/2001);
- Change in hydrograph can aggravate water scarcity in agriculture
- However, despite water problems no significant changes in land use so far, agricultural sector dominant (20-30% of GDP)

2000

2001

What are the expected impacts on society and ecosystems?

- Further desertification, loss of ecosystem services and thus livelihoods for local population in wetlands in delta (fish, pasture, reeds, hunting, wind protection, etc.), loss of biodiversity
- Further salinization of agricultural soils and loss of agricultural productivity
- Increase in conflict between different water users and uses
- Increase in health problems, particularly in the delta region (combination of social and environmental factors)

Meteorological, hydrological or biogeochemical connections from beyond the catchment

- Will affect catchment through changes in the runoff generating areas in the high mountains (Himalayan glaciers and monsoon regimes)

Determining factors and the consequences of virtual water trade

- Uzbekistan more integrated in global economy since independence
- Cotton account for a considerable share of foreign exchange revenues and GDPs, it provides employment and income security for a large percentage of the rural population.
- Cotton production, has, nevertheless, resulted myriad ecological and social consequences
- Cotton from Uzbekistan has large water footprint on blue water resources and can be associated with the desiccation of the Aral Sea

Impacts of international power relations

- Conflicts between hydropower (upstream) and irrigation (downstream) are becoming more severe
- Cooperation agreement between FSU basin countries modelled on Soviet allocation rules (strongly favouring irrigation downstream), not suitable for today's water needs
- International interest in the region's fossil resources
- Region of geopolitical interest to the West, Russia and China

Framework to address vulnerability, resilience and adaptive capacity of water systems in river basins

- Has to take ecological and social aspects, particularly their dynamics and interactions, into account
- To investigate the response of the river basin to pressures and change
- Needs to take complexity of river basins into account
- Should ensure comparability between different catchments to identify general patterns

Comparison of water governance systems across catchments

- Two comparative studies (Krysanova et al, in review; Huntjes et al., in review) about climate change adaptation and policy learning among seven river basins in Europe, Africa and Central Asia
- Relevant governance characteristics for policy learning
  - Degree of centralization (Amudarya: high)
  - Level of cooperation and information management and sharing (Amudarya: low)
  - other factors such as availability of financial capital, human resources, technologies, level of education, available information, etc. also important
- For climate change adaptation
  - Horizontal and vertical integration
- Adaptation measures in Amudarya not very advanced; mostly ad hoc strategies

Influence of international institutions and global actors

- Strong involvement of international donor community in Amudarya river basin, in introduction of IWRM to the basin
- Impact on development of more sustainable water management so far rather small
- Need for both technical and institutional measures
- Major contributions of international donors for capacity building and exchange

Balancing water needs for human activities and ecosystems

- The concepts of resilience and ecosystem services explicitly address the linkages between social and ecological systems and as such can contribute to an approach to balance water needs for different users
- However, choice of desirable set of ecosystem services to sustain is a societal choice
- A system in a very undesirable state, e.g. no water for ecosystems, can be very resilient (at least at the short term)
- Thus ES and resilience are only useful criteria if the overall goal of water governance is sustainable resource use and long-term resilience of a desirable state of the social-ecological system
- Local scientists embraced the concept of resilience and ES, however, practitioners are more skeptical; concepts have to operationalized in a useful way for a given context