# Cooperation for Adaptation to Climate Change in a Transboundary Basin in Central Asia

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## Introduction

Cooperation is essential for adaptation to climate change in transboundary basins. Along the Khojabakirgansai, a small tributary of the Syr Darya in Kyrgyzstan and Tajikistan, we asked:

(1) How is climate change impacting the basin?
(2) How are stakeholders responding?
(3) Are current cooperative strategies adaptive?

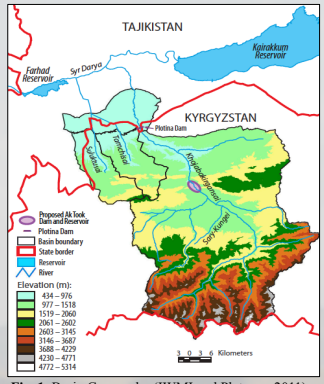


**Fig. 1.** Basin Geography (IWMI and Platonov 2011)

The 117km-long river flows through a mountainous and arid basin (Fig. 1), one of two dozen trans-boundary tributaries in the Ferghana Valley. The increasing agrarian population is ethically mixed, with ~34,000 upstream and ~114,000 downstream. Irrigated agriculture covers 5,427ha upstream (with 3 water user associations (WUAs)) and 14,205ha downstream (with 14). A Soviet-era water sharing agreement from 1962 allots 21% of annual flow to the Kyrgyz part of the basin and 79% to the Tajik part (Kazbekov and Yakubov 2010). The Plotina Dam diverts the vast majority of water into a large canal for Tajik WUAs. A proposed reservoir would double irrigated lands upstream, but remains unfunded.

## Methods

- regional climate change literature review
- 20 in-depth structured interviews with water experts at provincial, district, and WUA levels
- site visits to 3 upstream and 3 downstream WUAs
- 49 household surveys in the same WUAs
- 31-person stakeholder workshop for validation of research and further discussion

## Results

(1) In the Khojabakirgansai basin, climate change, population growth, deteriorating irrigation infrastructure, and upstream expansion of irrigated agriculture contribute significantly to:

- decreased and more variable water supply (Fig. 2),
- increased demand, and
- significant water losses,

resulting in mounting pressures on basin inhabitants.

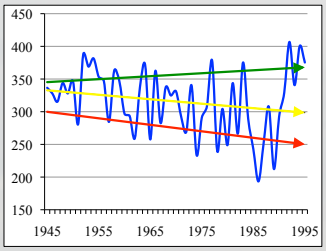


**Fig 2**. Khojabakirgansai Annual Flow in Million m3, 1945-1995; green is above-average year trend, yellow is overall trend, red is below-average year trend (data from Rysbekov 2008)

Furthermore, the number of flashfloods has increased over the past 20 years and shifted earlier in the year, mostly in March – May when crops are being planted (Solijonov and Karimov 2010). Droughts have also increased in number, with severe ones reported in 2000, 2001, and 2008.

(2) While water tensions exist at the international level (Allouche 2007), our research shows that cooperation exists within and among WUAs, districts, and provinces, crossing national lines and ethnic identities. Though inadequate funds limit some, cooperative responses try to address:

**Water Scarcity**
- allocate water based on Soviet-era basin agreement
- rotate water between districts, WUAs
- ration water within WUAs
- clean and repair canals
- construct household water tanks and/or wells
- plant less water-intensive crops
- expand orchards
- apply IWRM principles in WUAs (and the emerging basin commission)

**Droughts**
- do not plant a second crop
- plant drought resistant seed varieties
- plant less water-intensive crops

**Flashfloods**
- clean and repair canals
- build stone-cage bank reinforcements
- make early warning calls

## Conclusions & Recommendations

Paraphrasing Allan and Karshenas (1996), three general development scenarios are possible:

- *Conventional* – raises living standards in the short term, but is predicated on natural capital depletion and attendant reduction in living standards
- *Precautionary* – first reduces natural capital, but then stabilizes it, maintaining living standards
- *Regenerative* – improves both natural capital and living standards over the long-term

(3) Based on this framework, cooperative responses to **drought** and **flashfloods** in the basin are *precautionary* and, to varying degrees, adaptive.

While cooperation on **water scarcity** also exists, water sharing strategies and canal cleaning and repair continue to serve the *conventional*, Soviet-era agreement that seeks to use 100% of river flow. Constructing household wells (though more needs to be understood about groundwater) and planting less water-intensive crops (from cotton to onions downstream and from cotton to wheat upstream) are *precautionary* and help adapt to water scarcity. Finally, the expansion of orchards and integrated water resources management (IWRM) in WUAs *regenerate* natural capital and help communities adapt to climate change.

We encourage local and external stakeholders to:

- build on existing cooperation to accelerate the shift from conventional strategies to regenerative ones;
- if built, use the upstream reservoir primarily for greater water control in an increasingly unpredictable hydrological context to help mitigate flashfloods and store water for periods of scarcity and drought;
- in parallel, implement regenerative strategies that help achieve these same ends, for example large-scale afforestation;
- implement a comprehensive water monitoring system to help increase trust and cooperation among riparians; and
- support ongoing formation of representative, basin-wide commission to engage in democratic water-related decision-making, help coordinate data collection, and implement adaptive strategies.

## Further Information

This research first appeared in the *Mountain Research and Development Journal* special issue on Central Asian Mountain Societies in Transition (Stucker et al 2012). An elaborated chapter will be published by Earthscan / Routledge (Stucker et al, forthcoming 2013). Photos by author.

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