14th International Conference "Europe-INBO 2016" Lourdes - France - 19 - 22 October 2016

Adapting to climate change in the Amudarya basin: dealing with droughts...



Dinara Ziganshina, PhD

Scientific Information Center of Interstate Commission for Water Coordination in Central Asia Member of the Implementation Committee under the UNECE Water Convention



Research project under «Partnerships for enhanced engagement in research (PEER)" Cycle 4: Transboundary water management adaptation in the Amudarya basin to climate change uncertainties



Annual runoff: 79.4 km³/year. Catchment area: 309,000 km².

Riparians: Afghanistan (~13%), Kyrgyzstan (2%), Tajikistan (74%), Turkmenistan (1.7%) & Uzbekistan (8.5%).

Flow regulation: Nurek on Vakhsh (total capacity 10.5 km3), Tuyamuyun on Amudarya (total capacity 7.3 km3), a network of small reservoirs & canals. Proposed large facilities: Rogun on Vakhsh & Dashtidjumn on Pyandzh.



Climate change impacts in the Amudarya



Climate change impacts in the Amu Darya river basin

 Rivers with intense water use and increased stress from climatic and hydrological changes

 Large river deita communities and natural ecceystems with increased environmental stress and high fisk of water shortages during low water years / regional droughts

- Bevated risk of glacial lake outburst floods (GLOFs) and ice and snow hazards
- Increased sedimentation of reservoirs and essential water infrastructure

Increased risk of climate-related hazards in the mountains; more intense ice and snow melt and intensified hydrological cycle; increased surface runoff

Increased risk of droughts in grazing areas, rainfed and irrigated croplands; more arid climate conditions; reduced surface runoff

Impacts of the shrinking Aral Sea on regional climate and dust storms

Increased heat stress for rural workers on agricultural fields

Potential fisk of cross-border spread of invasive species and new diseases

Deserts

Areas above 2000 metres

Important glacier monitoring siles

Sources: Second Netranal Communications on dimate change of Tajkistan, Turkmenistan and Uzbekistan, Olimate Change in Central Asia: A visual systemic (2009), Environment and Security Initiative regional consultations in Asingabat (Sep 2007) and Kabal (Nev 2007) and regional field missions (May 2008).



Droughts in the Amudarya

Droughts are increasing in frequency, severity & duration:

- Frequency of dry years increased by 1.3 times from 1991 to 2008
- Severity of highly dry years increased by 1.5 times (deviation of the average flow in dry years from the average flow for the given period)

Runoff during the dry years in Amudarya may decrease for 25-40% by 2050 Intensified by uncoordinated flow regulation

The Nurek Reservoir operation in dry growing seasons of 1989 & 2001



Water allocation in the driest growing seasons

% of actual water allocation against agreed limits – along river reaches

Dry years	Upstream (TJ/UZ)	Middle stream (TM/UZ)	Downstream (TM/UZ)	River Delta
2000 (72%)	84	83	48	20
2001 (69%)	97	92	50	5
2008 (58%)	92	91	45	21

% of water received by countries against agreed limits Kyrgyzstan – 2.2.% Tajikistan – 94% Turkmenistan – 72% Uzbekistan – 63%

Response to droughts reactive, not proactive

Lack of institutional flexibility, low level of preparedness \rightarrow higher vulnerability:

- Countries & regional institutions react to droughts when these occur (awareness seminars, strict water discipline, etc) but do little at regional scale to prevent them;
- Poor forecasting accuracy is the main cause of poor preparedness & uncertainty;
- Lack of long-term planning reduces climate-resilience of the whole system;
- Lack of sanctions or other provision for violation of agreed water allocation regime.

Need for drought management plan or strategy under ICWC:

 No concerted efforts at the regional level to initiate a dialogue on the adoption of drought management plans that would provide a framework for a proactive, risk-based management for dealing with droughts, including comprehensive monitoring, information & early warning systems, impact assessment procedures, risk management measures, etc



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Learn more

on the project that seeks to build adaptive capacity of the countries sharing the Amudarya basin to manage effectively their transboundary waters under climate change and other uncertainties at <u>http://cawaterinfo.net/projects/peer-amudarya/about_e.htm</u>