



PEER research project
“Transboundary water management
adaptation in the Amudarya basin to
climate change uncertainties”



Amudarya – the great river in anticipation of momentous decisions

Prof. Viktor Dukhovniy

- SIC ICWC in Central Asia
- Eastern European Caucasus Central Asia Network of Basin Organizations

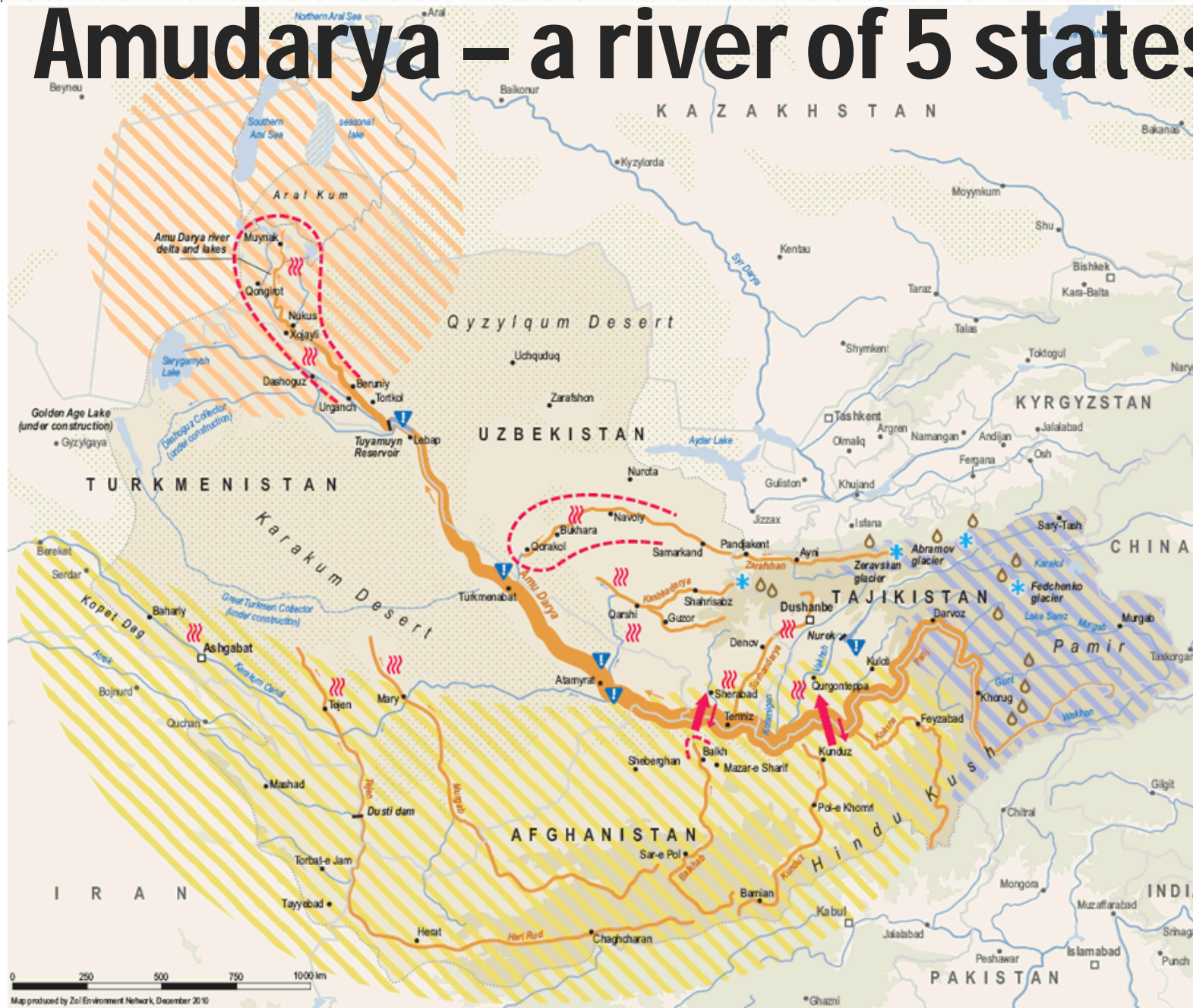


International Summit on "Water and Climate; Meeting of the Great Rivers of the World",
23-25 October 2017 Rome, Italy

Amudarya – a river of 5 states

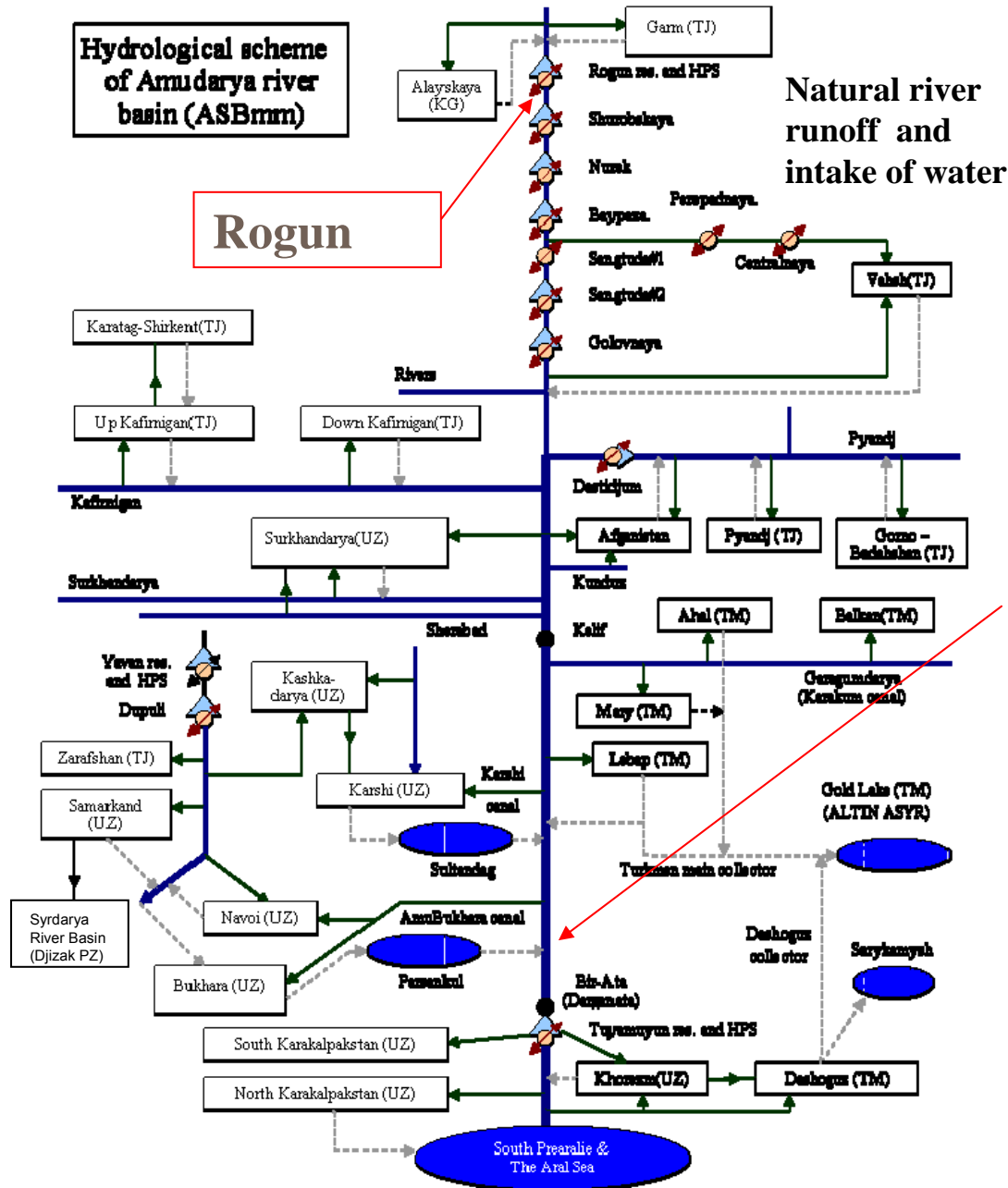
Climate change impacts in the Amu Darya river basin

- Rivers with intense water use and increased stress from climatic and hydrological changes
- Large river delta communities and natural ecosystems with increased environmental stress and high risk of water shortages during low water years / regional droughts
- Elevated 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 risk of cross-border spread of invasive species and new diseases
- Deserts
- Areas above 2000 metres
- Important glacier monitoring sites



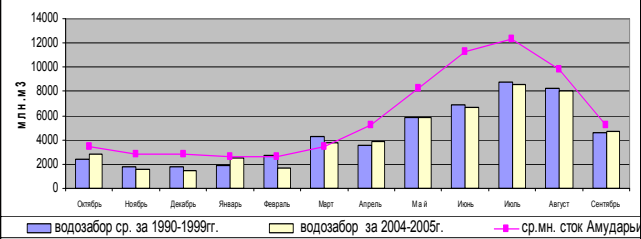
Sources: Second National Communication on climate change of Tajikistan, Turkmenistan and Uzbekistan; Climate Change in Central Asia: A visual synthesis report (2009); Environment and Security Initiative regional consultations in Ashgabat (Sep 2007) and Kabul (Nov 2007) and regional field missions (May 2008).

Hydrological scheme of Amudarya river basin (ASBmm)



Rogun

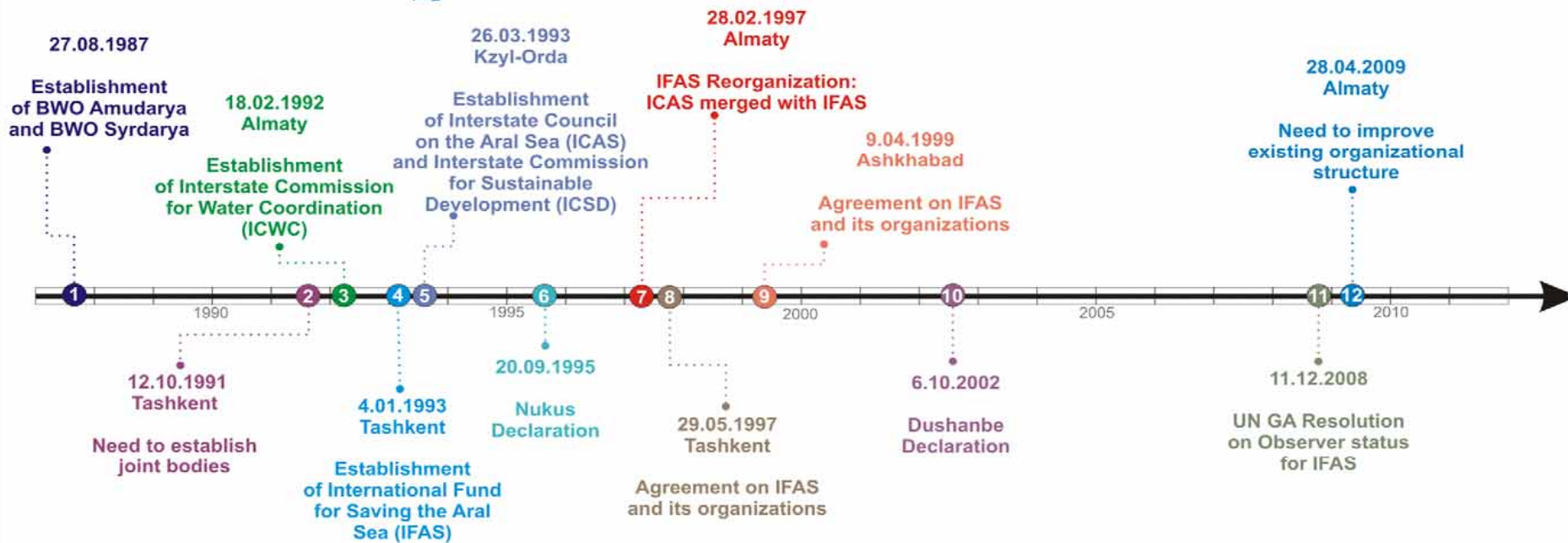
Рис. 1.1. Сравнение естественного стока Амударьи с водозабором из реки.



- Rivers
- Lakes
- Reservoirs (res)
- Planning zone (PZ)
- HPS
- Changing stations
- Intakes
- TJ - Таджикистан**
- Transfers
- UZ - Узбекистан**
- TM - Туркменистан**
- Returns, Outflow
- KG - Кыргызстан**



Aral Sea Basin: Timeline of Regional Bodies Establishment and Reorganization



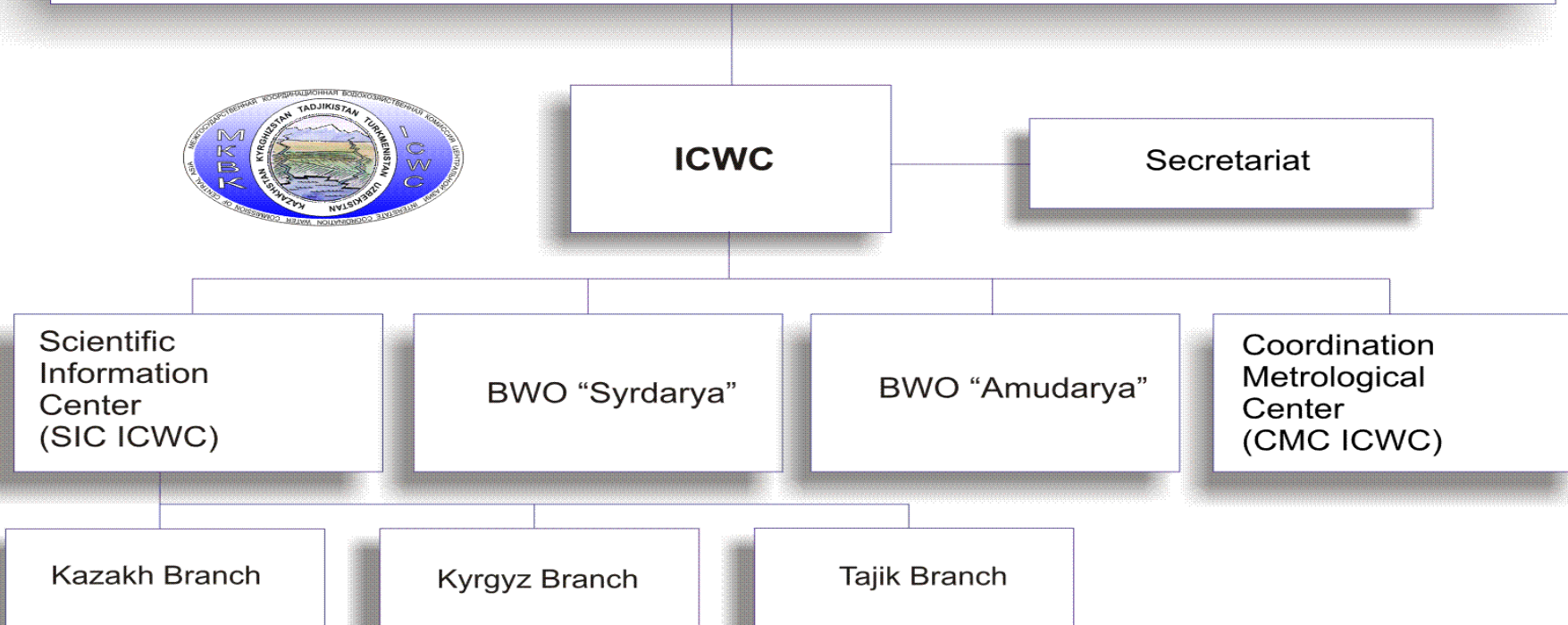
1. Order of the USSR Ministry of Reclamation and Water Management on the establishment of basin administrations on inter-republican water allocation in Amudarya and Syrdarya (Water Management Administration «Amudarya» and «Syrdarya») (Moscow, August 1987)
2. Statement of the heads of water authorities of the Central Asian Republics and Kazakhstan (Tashkent, October 1991)
3. Agreement between the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan, Turkmenistan, and the Republic of Uzbekistan on Cooperation in the Field of Joint Management of the Use and Conservation of Water Resources of Interstate Sources (Almaty, 18 February 1992)
4. Decision by the Heads of Central Asian Republics on the establishment of International Fund for Saving the Aral Sea (Tashkent, January 1993)

5. Agreement between the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan, Turkmenistan, and the Republic of Uzbekistan on Joint Actions for Addressing the Problems of the Aral Sea and Its Coastal Area, Improving the Environment, and Ensuring the Social and Economic Development of the Aral Sea Region (Kzyl-Orda, March 1993)
6. Nukus Declaration of the Central Asian States and International Organisations on the Problems of Sustainable Development in the Aral Sea Basin (Nukus, September 1995)
7. Decision by the Heads of Central Asian Republics on the reorganization of International Fund for Saving the Aral Sea (Almaty, February 1997)
8. Agreement between the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan, Turkmenistan, and the Republic of Uzbekistan on the Status of International Fund for Saving the Aral Sea and Its Organizations (Tashkent, May 1997)

9. Agreement between the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan, Turkmenistan, and the Republic of Uzbekistan on the Status of International Fund for Saving the Aral Sea and Its Organizations (Ashgabat, April 1999)
10. Dushanbe Declaration (Dushanbe, October 2002)
11. UN General Assembly Resolution on Observer status for the International Fund for Saving the Aral Sea in the General Assembly (December 2008)
12. Joint Statement Made by the Heads of States Founders of the International Fund for Saving the Aral Sea (Almaty, April 2009)

STRUCTURE of Interstate Coordination Water Commission of Central Asian states

FOUNDERS OF ICWC



Water allocation between riparian states

States	km ³ /year	%%
Uzbekistan	29.6	48.2
Tajikistan	9.5	15.4
Kyrgyz Republic	0.4	0.6
Turkmenistan	22.0	35.8
Total:	61.5	100

Change of spring crossover through 10°C threshold temperature days



ICWC in Central Asia – heads of national water agencies of 5 Central Asian countries

BWO Amudarya

BWO Syrdarya

SIC ICWC

National hydromet services

Provincial water management organizations

Upper Darya Division in Kurgan-Tyube, Tajikistan

operates 8 water intake structures, controls water intakes from rivers Vakhsh, Pyandj, Kafirnigan (on the territory of Tajikistan) and on the Amudarya River 246 km reach to Kelif gauging station

Melioration & Water Resources Administration, Hatlon district in Tajikistan
287300 th.ha

Amu-Surkhan BISA in UZB –
108520 th.ha

Middle Darya Division in Turkmenabad, Turkmenistan

operates 9 big river water intakes, controls water intakes at the Amudarya River 552 km reach from Kelif to Darganata gauging stations

Garagumdarya in TM –
698000 th.ha

Amu- Kashkadarya BISA in UZB -
332000 th.ha

Lebabsuvhodjalyk in TM
314157 th.ha

Amu-Bukhara BISA in UZB –
323000 th.ha

Amudarya Inter-republican Canals Division (Upradik) in Urgench, Uzbekistan

operates 11 river water intakes, 52 hydrostructures on main canals, 386 km of main canals, controls water intakes within river 167 km reach from the Tuyamuyun hydrounit to the Kypchak gauging station

Dashoguzsuvhodjalyk in TM –
223312 th.ha

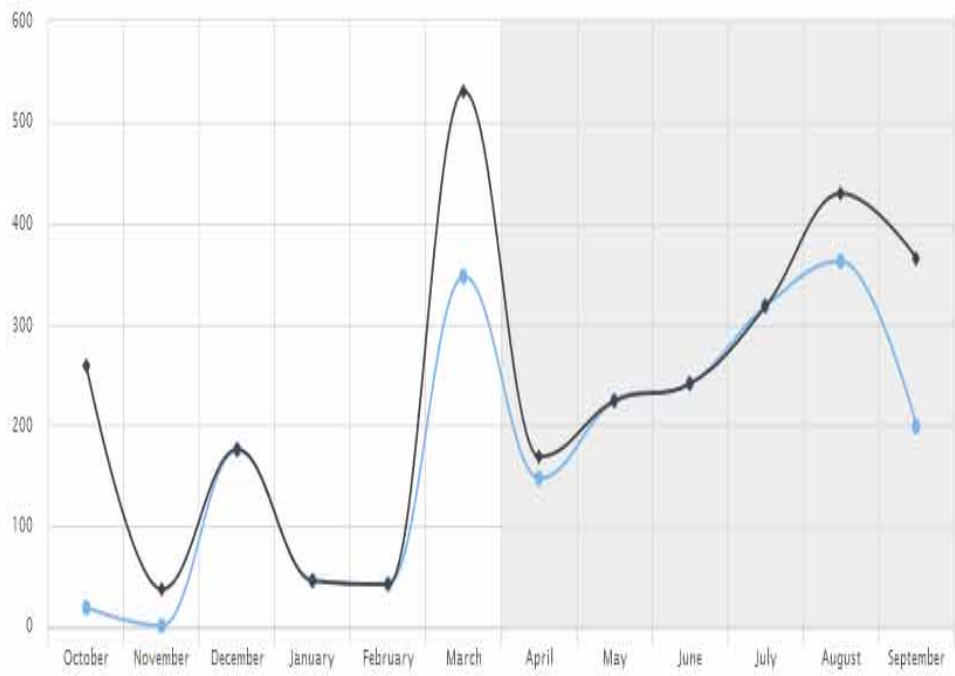
Lower-Amudarya BISA in UZB –
373573 th.ha

Lower Darya Division in Takhiatash, Uzbekistan

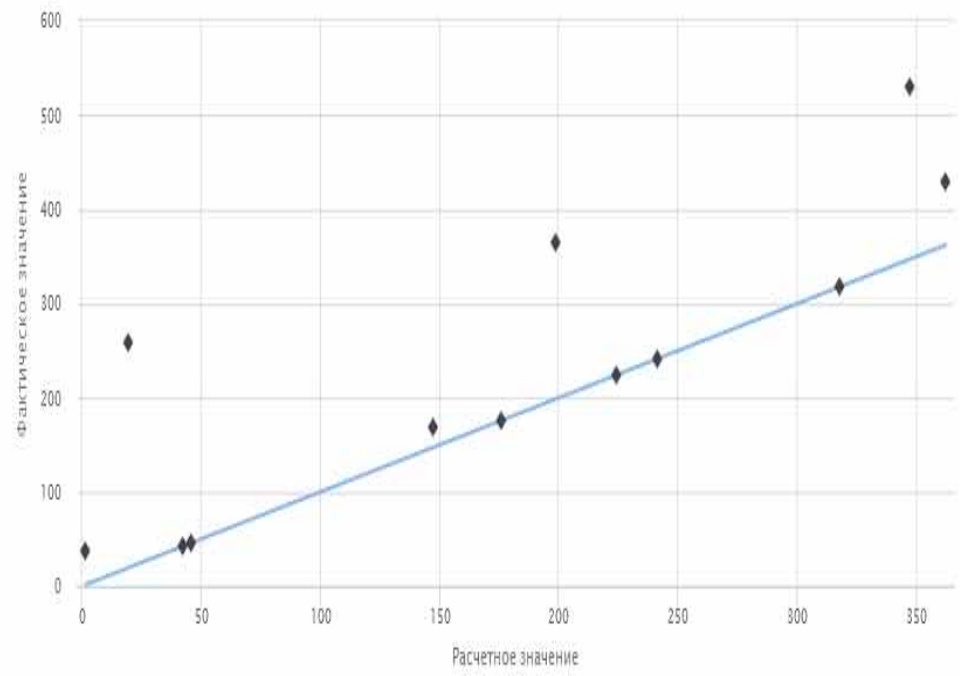
operates Takhiatash hydrounit, head water intakes of canals Khan-yab & Jumabaysaka, controls all water intakes from river within 283 km reach from Kypchak gauging station to Aral Sea

Dashoguzsuvhodjalyk in TM –
194250 th.ha

Lower-Amudarya BISA in UZB –
411963 th.ha



◆ Общий водозабор, млн куб. м/мес
 ◆ Фактическое значение, млн куб. м/мес
 ◆ Относительное отклонение, %



— Line $y=x$
◆ Общий водозабор, млн куб. м/мес


Modeling water demand of planning zone in comparison with actual

Challenges

Challenge	Water
Demographic pressures (320 th.persons/year)	2.5 km ³
Reductions of flow due to climate change	1.5 km ³
Growth demand of North Afghanistan	3.0 km ³
Growth of water demands in irrigation lands of Tajikistan, Turkmenistan and Uzbekistan	1.0 km ³
Total	8 km³

Adaptation measures

- Implementation of IWRM in the basin
 - Reassessing water demands of irrigated lands, taking into account the advantages of temperature growth (Dr. Stulina's research findings)
 - Implementation of SCADA system.
 - Shift in regimes of flow regulation from priority hydropower production to combined hydropower and irrigation regime
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Thank you for your attention!

Learn more

http://cawater-info.net/projects/peer-amudarya/about_e.htm
