Analysis of water management situation in the Syr Darya and Amu Darya River Basins over the non-growing season 2024-2025[1]

1 Syr Darya River basin

During the non-growing season (October 2024-March 2025), the actual inflow to the upper reservoirs of the Syr Darya River basin (Toktogul, Andijan, Charvak) was 6.12 km^3 or 119 % of the forecast.

Inflow to the Toktogul reservoir was 3.71 км^3 or 124% of the forecast. Inflow to the Andijan reservoir was less by 1% that it was expected and inflow to the Charvak reservoir was more by 20%.

The total water releases from the three upper reservoirs amounted to 11.53 km^3, which is by 2% more than the forecast schedule of BWO Syr Darya.

The total lateral inflow in the section from the Toktogul reservoir to the Shardara reservoir, including discharge from the Karadarya and Chirchik rivers, amounted to 11.32 km^3.

By the end of non-growing season the total water volume in upper reservoirs amounted to 10.31 km^3, including: Toktogul reservoir - 8.45 km^3 or 105 % of the plan; Andijan reservoir - 1.2 km^3 or 107 % of the plan; Charvak reservoir - 0.66 km^3 or 124 % of the plan. The Toktogul reservoir was drawn down by 4.59 km^3, the Charvak reservoir, by 1.14 km^3, while the Andijan reservoir was filled by 0.21 km^3.

Inflow to the Bakhri Tojik reservoir was 12.32 km^3, which is 1.04 km^3 more than the schedule of BWO Syr Darya. Water releases from the reservoir into the river were 11.13 km^3, which is 1.23 km^3 more than the schedule. The reservoir was filled up to 3.5 km$^{3.}$

The total water withdrawal from the Naryn and Syr Darya rivers amounted to 3.93 km^3, including: Kyrgyz Republic – 0.05 km^3; Republic of Tajikistan – 0.06 km^3; Republic of Kazakhstan (through the Dostlik canal) – 0.49 km^3; Republic of Uzbekistan – 3.33 km^3 (Table 1.1).

During the non-growing season, the inflow to the Shardara reservoir amounted to 13.36 km^3, which is 2.42 km^3 more than scheduled by BWO Syr Darya. By the end of the season the reservoir was filled up to 4.56 km^3, which is 88% of the plan. Discharge from the Shardara reservoir amounted to 8.71 km^3 or 129% of the forecast, including discharge into the river - 6.76 km^3, water diversion to the Kyzylkum canal - 0.26 km^3.

[1] Prepared in SIC ICWC. Authors: A. Nazarii, A. Sorokin, I. Ergashev

Water use in the Syr Darya lower reaches (water withdrawal, losses) amounted to 4.97 km^3 (Table 1.2). Water supply to the Aral Sea was 1.79 km^3 (107 % of the expected quantity) according to the the Committee for Water Regulation, Protection and Use at the Ministry of Water Resources and Irrigation of the Republic of Kazakhstan

Table 1.2 shows the river water balance and Table 1.3 shows the reservoir water balance.

Table 1.1

Water use by the Syr Darya River basin countries
(river reach up to Shardara reservoir), non-growing season 2024-2025

№	Water user	Water volume, km^3		Water availability, %
		Limit/ schedule	Actual	Season
1	**Total water withdrawal**	4.25	3.92	92
2	**By country:**			
	Kyrgyz Republic	0.05	0.05	102
	Republic of Uzbekistan	3.34	3.33	100
	Republic of Tajikistan	0.37	0.06	15
	Republic of Kazakhstan	0.49	0.49	100
3	**By river reach:**			
3.1	Toktogul reservoir – Uchkurgan hydroscheme	1.38	1.33	97
	Including:			
	Kyrgyz Republic	0.04	0.04	94
	Republic of Tajikistan	0.08	0.04	52
	Republic of Uzbekistan	1.25	1.25	100
3.2	Uchkurgan hydroscheme - Bakhri Tojik hydroscheme	0.25	0.19	77
	Including:			
	Kyrgyz Republic	0.01	0.01	143
	Republic of Tajikistan	0.07	0.00	2
	Republic of Uzbekistan	0.17	0.18	104
3.3	Bakhri Tojik hydroscheme – Shardara reservoir	2.62	2.41	92
	Including:			
	Republic of Kazakhstan	0.49	0.49	100
	Republic of Tajikistan	0.21	0.01	5
	Republic of Uzbekistan	1.92	1.91	99

Table 1.2

River water balance of the Syr Darya River, non-growing season 2024-2025

№	Balance item	Water volume, km^3		
		Forecast/ plan	Actual	Deviation (actual - plan)
1	Inflow to the Toktogul reservoir	2.99	3.71	0.71
2	Lateral inflow in the Toktogul reservoir – Shardara reservoir reach (+)	10.44	11.32	0.88
	Including:			
2.1	*Disharge from the Karadarya river*	1.35	1.78	0.42
2.2	*Discharge from the Chirchik river*	1.65	1.62	-0.02
2.3	*Lateral inflow from CDN and small rivers*	7.44	7.91	0.48
3	Flow regulation by reservoirs: recharge (+) or diversion of flow (-)	3.62	3.36	-0.26
	Including:			
3.1	*Toktogul reservoir*	5.00	4.55	-0.45
3.2	*Bakhri Tojik reservoir*	-1.38	-1.19	0.19
4	Regulated flow (1+2+3)	17.05	18.39	1.34
5	Water diversion in the Toktogul -Shardara reach (-)	-4.25	-3.92	0.32
6	Inflow to the Shardara reservoir	10.94	13.36	2.42
7	Water release from Shardara reservoir into the river	6.42	6.76	0.35
8	Water use in the reach Shardara – Aral*	4.75	4.97	0.23
9	Water supply to Aral (Karaterent gauging station)**	1.67	1.79	0.12

*Water withdrawal plus in-stream losses minus lateral inflow plus filling of Koksaray reservoir

**According to the data of Committee for Water Regulation, Protection and Use at the Ministry of Water Resources and Irrigation of the Republic of Kazakhstan

Table 1.3

Reservoior water balance in the Syr Darya River basin, the non-growing season 2024-2025

№	Balance item	Water volume, km^3		
		forecast/ plan	actual	Deviation (actual - plan)
1	**Toktogul reservoir**			
1.1	Inflow to the reservoir	2.99	3.71	0.71
1.2	Water volume:			
	- beginning of the season (1 October 2024)	13.04	13.04	0.00
	- end of the season (1 April 2025)	8.03	8.45	0.42
1.3	Water releases	8.00	8.26	0.26
1.5	Flow regulation: recharge (+) or diversion of flow (-)	5.00	4.55	-0.45
2	**Andijan reservoir**			
2.1	Inflow to the reservoir	0.82	0.81	-0.01
2.2	Water volume:			
	- beginning of the season (1 October 2024)	0.99	0.99	0
	- end of the season (1 April 2025)	1.11	1.20	0.08
2.3	Water releases	0.69	0.58	-0.11
2.5	Flow regulation: recharge (+) or diversion of flow (-)	-0.13	-0.23	-0.10
3	**Charvak reservoir**			
3.1	Inflow to the Charvak reservoir	1.34	1.60	0.26
3.2	Water volume:			
	- beginning of the season (1 October 2024)	1.81	1.81	0
	- end of the season (1 April 2025)	0.53	0.66	0.13
3.3	Water releases	2.63	2.69	0.05
3.5	Flow regulation: recharge (+) or diversion of flow (-)	1.29	1.08	-0.21
4	**Bakhri Tojik reservoir**			
4.1	Inflow to the reservoir	11.29	12.32	1.04
4.2	Lateral inflow	0.35	0.28	-0.07
4.3	Water volume:			
	- beginning of the season (1 October 2024)	1.72	1.72	0.00
	- end of the season (1 April 2025)	3.45	3.50	0.05
4.4	Water releases from reservoir	10.01	11.16	1.15
	Including:			

№	Balance item	Water volume, km^3		
		forecast/ plan	actual	Deviation (actual - plan)
	- water releases into the river	9.90	11.13	1.23
	- water diversion from the reservoir	0.11	0.03	-0.08
4.6	Flow regulation: recharge (+) or diversion of flow (-)	-1.38	-1.19	0.19
5	**Shardara reservoir**			
5.1	Inflow to the reservoir	10.94	13.36	2.42
5.2	Lateral inflow	0.00	0.00	0.00
5.3	Water volume:			
	- beginning of the season (1 October 2024)	1.12	1.12	0.00
	- end of the season (1 April 2025)	5.18	4.56	-0.61
5.4	Water releases	6.73	8.71	1.98
	Including:			
	- discharge into Arnasay	0.00	1.69	1.69
	- water releases into the river	6.42	6.76	0.35
	- water diversion from the reservoir	0.31	0.26	-0.05
5.6	Flow regulation: recharge (+) or diversion of flow (-)	-4.19	-6.59	-2.41

2 Amu Darya River basin

The actual available water in the Amu Darya River at "nominal Kerki" g/s (upstream of water intake to Garagumdarya) was 14.55 km^3, which is 3.97 km^3 more than forecast (Table 2.2).

Inflow to Nurek dam amounted to 4.42 km^3 (120% of the forecast), while water releases were 8.13 km^3 (105% km^3 of BWO Amu Darya schedule). Surplus to river flow through drawdown of the Nurek reservoir amounted to 3.71 km^3. By the end of the season, the reservoir was drawndown to 6.18 km^3 (Table 2.3).

The water accumulation plan for the non-growing season was fulfilled in the reservoirs of the Tyuamuyun hydroscheme (TMHS). By 1 April, the actual water volume was more than planned one by 0.97 km^3 and amounted to 3.81 km^3. The river flow at Darganata section amounted to 8.26 km^3 (145 % of the forecast). Water releases from TMHS exceeded by 1.14 km^3 the amount scheduled by BWO and totaled 7.14 km^3.

The allocated water withdrawal limit for the Amu Darya River basin was covered by 93%. The total water withdrawal was 14.71 km^3, including 12.1 km^3 – downstream of Kerki g/s (starting from water intake to Garagumdarya). Water supply was 79% in Tajikistan, 97% in Turkmenistan and 95% in Uzbekistan (Table 2.1).

The allocated limit of sanitary-environmental flow for canals in the Amu Darya River lower reaches was used by 98%, and 0.78 km^3 of water were supplied. According to UzHydromet data, 1.56 km^3 of river water reached the Aral Sea region based on records at Samanbay g/s and of collector-drainage water inflow, which was 74% of the plan.

Table 2.2 shows the data on river water balance and Table 2.3 on reservoir water balance.

Table 2.1

Indicators of available water supply for riparian countries of the Amu Darya River Basin, non-growing season 2024-2025

№	Water user	Water volume, km^3		Water availability, %
		Limit	Actual	Season
1	Total water withdrawal	**15.79**	**14.71**	93
2	Breakdown by states:			
	Kyrgyz Republic	-	-	-
	Republic of Tajikistan	2.94	2.33	79
	Turkmenistan	6.50	6.33	97
	Republic of Uzbekistan	6.35	6.05	95
3	Downstream of nominal Kerki g/s	**12.48**	**12.10**	97
	Including:			
	Turkmenistan	6.50	6.33	97
	Republic of Uzbekistan	5.98	5.77	96
4	By river reach:			
4.1	Upper reaches	3.31	2.61	79
	Including:			
	Kyrgyz Republic	-	-	-
	Republic of Tajikistan	2.94	2.33	79
	Republic of Uzbekistan, Syrkhandarya province	0.37	0.28	75
4.2	Middle reaches	8.35	7.97	95
	Including:			
	Turkmenistan	5.10	4.954	97
	Republic of Uzbekistan	3.25	3.01	93
4.3	Lower reaches	4.13	4.13	100
	Including:			
	Turkmenistan	1.40	1.380	99
	Republic of Uzbekistan	2.73	2.75	101
5	Sanitary-environmental flow to canals in the lower reaches	0.80	0.78	98
	Including:			
	Turkmenistan	0.15	0.15	100
	Republic of Uzbekistan	0.65	0.63	97
6	Water supply to the Aral Sea region	2.10	1.56	74

Table 2.2

River water balance of the Amu Darya River, non-growing season 2024-2025

Balance item	Water volume, km^3		Deviation (actual-plan)
	forecast/ plan	actual	
1. Water content in the Amu Darya River – non-regulated flow at nominal Kerki station*	10.58	14.55	3.97
2. Flow regulation by Nurek reservoir: recharge (+) or diversion of flow (-)	4.08	3.71	-0.37
3. Water withdrawal in middle reaches (-)	-8.35	-7.97	0.38
4. Return flow of CDW in middle reaches (+)	0.83	0.93	0.10
5. River flow at Darganata g/s	5.69	8.26	2.56
6. Water releases from TMHS (including diversion from the reservoir)	5.99	7.14	1.15
7. Water withdrawal in lower reaches, including diversion from TMHS (-)	-4.13	-4.13	0.00
8. Emergency water releases into canals (-)	-0.80	-0.78	0.02
9. Flow of the Amu Darya river at Samanbay g/s	0.90	0.96	0.06

* Non-regulated flow of the Amu Darya River excluding upstream water withdrawal (Tajikistan, Surkhandarya province).

Table 2.3

Reservoir water balance in the Amu Darya River basin, non-growing season 2024-2025

Balance item	Water volume, km^3		Deviation (actual-plan)
	forecast/ plan	actual	
1 Nurek reservoir			
2.1 Inflow to the reservoir	3.70	4.42	0.73
2.2 Water volume in reservoir:			
-beginning of the season (1 October 2024)	10.57	10.57	0.00
- end of the season (1 April 2025)	6.11	6.18	0.07
2.3 Water releases from reservoir	7.77	8.13	0.36
2.4 Flow regulation: recharge (+) or diversion of flow (-)	4.07	3.71	-0.36
2 Reservoirs of TMHS			
2.1 River flow at Darganata g/s	5.69	8.26	2.56
2.2 Water volume in reservoirs:			
-beginning of the season (1 October 2024)	4.00	4.00	0.00
- end of the season (1 April 2025)	2.83	3.81	0.97
2.3 Water releases from hydroscheme	6.0	7.14	1.14
Including:			
water releases into the river	4.23	5.04	0.81
water diversion	1.77	2.10	0.34
2.4 Flow regulation: recharge (+) or diversion of flow (-)	0.30	-3.22	-3.52