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PRELIMINARY ASSESSMENT OF OTHER MAJOR TRANSBOUNDARY RIVERS IN CENTRAL ASIA ORIGINATING IN OR FLOWING THROUGH EECCA COUNTRIES*

Submitted by the Chairperson of the Working Group on
Monitoring and Assessment

Addendum

1. This preliminary assessment is an intermediate product that deals with major transboundary rivers in Central Asia which have a desert sink or discharge into an enclosed lake. Practically all of the renewable water resources in this area are used predominantly for irrigation, and the national economies are developing under conditions of increasing freshwater shortages.

2. Given the countries' responses to the datasheets[1] and the data available from other sources, this assessment focuses on the four watercourses shown in the following table. The other watercourses will be included in the updated version to be submitted to the sixth Belgrade Ministerial Conference "Environment for Europe" (Belgrade, October 2007) as explained in document ECE/MP.WAT/2006/16.

* This document was submitted on the above date because of processing delays.

1 The cut-off date was 1 September 2006.

Transboundary rivers						
Basin/sub-basins	**Riparian countries**	**Recipient**	**Status of assessment**			
			Hydrology	*Pressure*	*Impact*	*Trends*
Chu and Talas	KZ, KG	Desert sink	x	x	x	x
- Chu	KZ, KG	Desert sink	x	x	x	x
- Talas	KZ, KG	Desert sink	x	x	x	x
- Assa	KZ, KG	Desert sink	…	…	…	…
Hari	AF, IR, TM	…	…	…	…	…
Ili	CN, KZ	Lake Balqash	x	x	x	x
Murgab	AF, TM	Desert sink	…	…	…	…
Pu Lun T'o	CN, KZ, MN, RU	…	…	…	…	…
Tarim	AF, CN, KG, PK, TJ	Desert sink	…	….	…	…
- Kek-Suu (Kök-Suu)	CN, KG	Tarim	…	…	…	…
- Tooshkan-Darya (Kakshaal)	CN, KG	Tarim	…	…	…	…
- Sary-Dzhaz	CN, KG	Tarim	…	…	…	…
Tejen	AF, IR, TM	Desert sink	…	…	…	…

The following abbreviations for country names are used: Afghanistan (AF), China (CN), Iran (IR), Kazakhstan (KZ), Kyrgyzstan (KG), Mongolia (MN), Pakistan (PK) and Russian Federation (RU).

The following abbreviations for the status of the assessment are used: x – draft assessment made; (x) –draft assessment partially made. Three dots (…) indicate that no data were submitted.

For Lake Balqash, see also the assessment in document ECE/MP.WAT/2006/16/Add.1.

I. ASSESSMENT OF THE STATUS OF TRANSBOUNDARY RIVERS IN THE CHU-TALAS BASINS

3. The Chu-Talas basins include the basins of three transboundary rivers: the Chu, the Talas and the Assa. The major part of their basins (73%) is located in desert and semi-desert zones. The Tien Shan Mountains occupy 14% of the basins' total area and the steppe-like hilly part covers 13%.

4. The Chu-Talas basins also encompass 204 smaller rivers (140 rivers in the Chu basin, 20 in the Talas basin and 64 in the Assa basin), as well as 35 lakes and three large water reservoirs.

5. Most of the runoff of the Chu, the Talas and the Kukureu-su (Assa's main tributary) is formed in Kyrgyzstan. The water resources of the Chu River are estimated at 6.64 km^3 and those of the Talas River at 1.81 km^3. The Chu, Talas and Assa are ultimately regulated.

6. In Kyrgyzstan, the biggest reservoirs are the Orto-Tokoy reservoir (design capacity of 0.42 km^3) on the Chu and the Kirovsk water reservoir (design capacity of 0.55 km^3) on the Talas.

In Kazakhstan, there are the Tasotkel reservoir (total volume 0.62 km^3) on the Chu and the Tersashchibulak reservoir on the Ters River, a tributary to the Talas, with a volume of 158 million m^3. The reservoirs of the Chu-Talas basins are used mainly to supply water for irrigation.

A. Chu River

7. The basin, shared by Kazakhstan and Kyrgyzstan, covers an area of 62,500 km^2; the mountainous part of the basin stretches over an area of 38,400 km^2 (60% of it in Kyrgyzstan).

Basin of the Chu River			
Area	Countries	Countries' share	
62,500 km^2	Kazakhstan	…	…
	Kyrgyzstan	…	…
Source: Joint communication by the Ministries of Environment Protection of Kazakhstan and Kyrgyzstan.			

Hydrology

8. The Chu River is 1,186 km long; 221 km of this length forms the border between Kyrgyzstan and Kazakhstan.

9. The river is fed mainly by glaciers and melting snow. Rainfall is of secondary importance. Groundwater inflow, particularly in the foothills and lowlands, is particularly important for the formation of the basis flow and the spring flow.

10. In Kyrgyzstan, only one gauging station on the Chu River is still operational, and the number of groundwater observing wells has fallen by more than 50% since the 1980s. Consequently, the accuracy of runoff forecasts and water balance computations has decreased. Luckily, the number of measuring points for discharge regulation in the irrigation channels has been maintained.

11. In Kazakhstan, four gauging stations are operational, including one station downstream of the border with Kyrgyzstan at the village of Blagoveshshenskoye.

Pressure factors

12. The water quality of the Chu River depends on the degree of pollution of its tributaries, lakes in the basin and groundwaters as well as the pollution of glaciers, mainly due to human impact. Apart from irrigated agriculture in both countries, the main pressure factors in Kyrgyzstan arise from untreated municipal and industrial wastewaters, animal husbandry, mining in the mountainous parts and unregulated disposal of wastes next to human settlements. One of the main pollution sources is "Gorvodocanal" in Bishkek.

13. In the lowlands, runoff regulation has decreased the occurrence of floods and/or their duration, which in turn has adverse effects on riparian vegetation and vegetation in the former flood-prone areas.

Transboundary impact

14. In Kazakhstan, water quality is measured at the village of Blagoveshshenskoye, downstream of the border with Kyrgyzstan. Water quality falls into classes 3 and 4. Nitrates, phenols and copper play a major role in pollution.

Water pollution characteristics of the Chu River in Kazakhstan (Blagoveshshenskoye village downstream of the border with Kyrgyzstan)

Year	Water-pollution index	Determinands	Mean concentration in mg/l	Factor by which MPC is exceeded	Water quality
2001	1.58	Sulphates	143.45	1.43	Class 3
		Ammonium-nitrogen	0.473	1.21	
		Nitrate-nitrogen	0.053	2.65	
		Iron, total	0.34	3.4	
		Iron (2+)	0.195	39.0	
		Copper	0.0012	11.73	
		Zinc	0.0245	2.45	
		Phenols	0.0013	1.33	
2002	2.87	Sulphates	265.95	2.66	Class 4
		Nitrate-nitrogen	0.043	2.17	
		Iron, total	0.255	2.5	
		Iron (2+)	0.08	16.0	
		Copper	0.0097	9.67	
		Zinc	0.0186	1.86	
		Phenols	0.002	2.0	

Note: Class 3 – moderately polluted; class 4 – polluted.

Source: Ministry of Environment Protection of Kazakhstan.

Trends

15. According to an assessment by Kyrgyzstan, the technical status of water construction works, including irrigation channels, and the infrastructure for industrial and municipal water supply is deteriorating, which has adverse effects on the availability and quality of water resources. The pressure on water resources will also increase due to the worsening technical status of water supply and wastewater treatment systems. An additional adverse impact on groundwater quality will be created by increasing contamination caused by the worsening status of water protection zones.

B. Talas River

16. The basin, shared by Kazakhstan and Kyrgyzstan, covers an area of 52,700 km^2 as shown in the following table.

Basin of the Talas River			
Area	Countries	Countries' share	
52,700 km^2	Kazakhstan	41,270 km^2	78.3%
	Kyrgyzstan	11, 430 km^2	21.7%
Source: Joint communication by the Ministries of Environment Protection of Kazakhstan and Kyrgyzstan.			

Hydrology

17. The Talas River is formed by the confluence of the Karakol and Uchkosha rivers, which have their sources at the slopes of the Kyrgyz Ridge and the Talas Alatau. The river vanishes into the Moinkum sands without reaching Lake Aydyn. Of the river's total length of 661 km, 453 km flow through in Kazakhstan.

18. In Kyrgystan, only 13 of 21 former gauging stations are still operational, and the number of groundwater observing wells has decreased, (as it is the case for the Chu basin) by more than 50% compared to the 1980s. Consequently, the accuracy of runoff forecasts and water balance computations has decreased. Luckily, the number of measuring points for discharge regulation in the irrigation channels has been maintained.

Pressure factors

19. Water resources are used mainly to support grazing and animal husbandry in the mountainous parts of the basin, and irrigated agriculture and animal husbandry in the foothills and lowlands. In Kyrgyzstan some 137,600 ha are irrigated land, and in Kazakhstan 105,000 ha.

20. Apart from irrigated agriculture in both countries, the main pressure factors in Kyrgyzstan arise from untreated municipal and industrial wastewaters, discharges from livestock breeding, wastes from mining in the mountainous parts, and unregulated disposal of waste next to human settlements. In Kazakhstan, additional pressure on water quality arises from return water from wastewater infiltration fields used by the sugar and alcohol industries.

Transboundary impact

21. Water quality in the Talas River basin depends on the extent of pollution of its tributaries, lakes in the basin and groundwaters as well as pollution of glaciers, mainly due to human impact. Major pollutants include ammonium and copper. In the vicinity of the city of Talas, water pollution is higher due to elevated concentrations of iron (total iron and iron-II).

22. Currently, Kazakhstan assesses the Talas's water quality as "good".

Water pollution characteristics of the Talas River in Kazakhstan (Pokrovka village downstream of the border with Kyrgyzstan)

Year	Water pollution index	Determinands	Mean concentration in mg/l	Factor by which MPC is exceeded	Water –quality
2001	1.19	Ammonium-nitrogen	0.492	1.29	Class 3
		Iron, total	0.137	1.37	
		Iron (2+)	0.046	9.2	
		Copper	0.0028	2.76	
2002	0.81	Iron, total	0.155	1.55	Class 2
		Iron (2+)	0.064	12.8	
		Copper	0.0019	1.96	
2003	0.79	Iron, total	0.164	1.64	Class 2
		Iron (2+)	0.071	14.2	
		Copper	0.0015	1.48	
2004	0.88	Iron, total	0.107	1.07	Class 2
		Iron (2+)	0.032	6.4	
		Copper	0.0016	1.57	

Note: Class 2 – slightly polluted; class 3 – moderately polluted.

Source: Ministry of Environment Protection of Kazakhstan.

Trends

23. As with the Chu basin, Kyrgyzstan finds that the technical status of water construction works, including irrigation channels, and the infrastructure for industrial and municipal water supply is deteriorating, which has adverse effects on the availability and quality of water resources. The pressure on water resources will also increase due to the worsening technical status of water supply and wastewater treatment systems. An additional adverse impact on groundwater quality will be created by increasing contamination caused by the worsening status of water protection zones.

C. Assa River

24. An assessment of the Assa River will be made at a later stage.

II. ASSESSMENT OF THE STATUS OF TRANSBOUNDARY RIVERS IN THE HARI BASIN

25. An assessment of the Hari River, whose basin is shared by Afghanistan, Iran and Turkmenistan, will be made at a later stage.

III. ASSESSMENT OF THE STATUS OF TRANSBOUNDARY RIVERS IN THE ILI BASIN

26. The basin, shared by China and Kazakhstan, covers an area of 413,000 km^2 as shown in the following table.

Basin of the Ili River			
Area	Countries	Countries' share	
413,000 km^2	Kazakhstan	353,000 km^2	85.4%
	China	60,000 km^2	14.6%
Source: Ministry of Environment Protection of Kazakhstan.			

Hydrology

27. The Ili River is 1,439 km long, including 815 km in Kazakhstan. Its source is in the eastern Tien Shan at the confluence of the Tekes and Kunes rivers. Before flowing into Lake Balqash, it forms an immense delta with vast regions of lakes, marches and jungle-like vegetation.

28. In China, there are some 15 reservoirs on the tributaries to the Ili (Kash, Kunes, Tekes); some 40 small reservoirs are in the planning phase. The biggest reservoir in Kazakhstan is the Kapshagan hydropower station on the Ili; a number of smaller hydropower stations are operational on the Ili's tributaries.

Pressure factors

29. In China, some 600 million ha are irrigated. The area of irrigated land in Kazakhstan is only 8.18 million ha; 6.53 million ha of this consists of grasslands for grazing of cattle, sheep, goats, horses and camels.

30. In the lowlands, flow regulation by the many reservoirs has an indirect impact on flood plain vegetation: due to the decreasing number of flood events and/or a shortening of their duration, this vegetation is dying, which adversely affects animal grazing. In the river delta itself, the opposite is happening in winter: high water discharges from the reservoirs to satisfy peak energy demand lead to complete flooding of the river delta, which adversely affects the riverine ecosystem.

Transboundary impact

31. The pressure factors described above are causing pollution in both China and Kazakhstan. The main pollutants are copper and zinc (currently, out of 100 samples taken at the

border station in Kazakhstan, 72 samples usually exceed the maximum permitted concentration values) and oil products.

Water pollution characteristics of the Talas River in Kazakhstan (Dubunj measuring station downstream from the border with China)

Year	Water-pollution index	Determinands	Mean concentration in mg/l	Factor by which MPC is exceeded	Water quality
2001	4.01	Iron, total	0.165	1.65	Class 4
		Iron (2+)	0.039	7.89	
		Copper	0.017	19.9	
		Zinc	0.017	1.75	
		Phenols	0.002	2.0	
		Oil products	0.085	1.70	
2002	2.48	Nitrate-nitrogen	0.035	1.74	Class 3
		Iron, total	0.24	2.4	
		Iron (2+)	0.099	19.84	
		Copper	0.009	8.95	
		Zinc	0.016	1.57	
		Oil products	0.056	1.12	
2003	2.46	Nitrate-nitrogen	0.029	1.45	Class 3
		Iron (2+)	0.061	12.21	
		Copper	0.0086	8.63	
		Zinc	0.021	2.06	
		Oil products	0.077	1.54	
2004	2.14	Iron (2+)	0.059	11.8	Class 3
		Copper	0.0072	7.28	
		Zinc	0.015	1.51	
		Manganese	0.149	1.49	
		Phenols	0.0015	1.47	

Note: Class 3 – moderately polluted; class 4 – polluted.

Source: Ministry of Environment Protection of Kazakhstan

Trends

32. The ever-growing water use, including for irrigation; the attempt to increase the volume of the Kapshagan reservoir to boost hydropower production; the sealing of areas next to reservoirs; and the pollution of water protection zones in mountain rivers will all continue to have adverse effects on the status of aquatic ecosystems.

33. In addition, there is the potential threat of growing pressure on water resources due to increasing economic activities in China. Of the available 18.1 km^3/year (long-term mean average flow into the Kapshagan reservoir), one third (12.3 km^3/year) is formed in China. With the expected decrease to 8.0 km^3/year, which is very likely due to increasing water use in China,

Lake Balqash may – given the same amount of water use in Kazakhstan – share the fate of the Aral Sea.

IV. ASSESSMENT OF THE STATUS OF TRANSBOUNDARY RIVERS IN THE MURGAB BASIN

34. The Murgab River basin (46,900 km^2) is shared by Afghanistan and Turkmenistan. The river, with a total length of 978 km (516 km in Turkmenistan), is used mostly for irrigation in Turkmenistan. An assessment will be made at a later stage.

V. ASSESSMENT OF THE STATUS OF TRANSBOUNDARY RIVERS IN THE PU LUN T'O BASIN

35. The Pu Lun T'o River, shared by China, Kazakhstan, Mongolia and the Russian Federation, is not being assessed given its very small share in Kazakhstan (0.04%) and Russia (0.09%).[2]

VI. ASSESSMENT OF THE STATUS OF TRANSBOUNDARY RIVERS IN THE TARIM BASIN

36. There are at least three transboundary rivers with their sources in Kyrgyzstan and flowing into China which are part of the Tarim River basin. These are the rivers Kek-Suu (Kök-Suu), Tooshkan-Darya (Kakshaal) and Sary-Dzhaz. They will be assessed at a later stage.

37. Other tributaries to the Tarim and the Tarim River itself will not be assessed, given that the Tarim basin is almost entirely located in China and has very small transboundary areas in Afghanistan, Kyrgyzstan, Pakistan and Tajikistan.[3]

VII. ASSESSMENT OF THE STATUS OF TRANSBOUNDARY RIVERS IN THE TEJEN BASIN

38. The Tejen River basin is shared by Afghanistan, Iran and Turkmenistan. In Turkmenistan the river is used mostly for irrigation. An assessment will be made at a later stage.

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[2] See http://www.transboundarywaters.orst.edu/publications/register/tables/IRB_asia.html.

[3] Basic information and a simple map of the Tarim basin are available at http://earthtrends.wri.org/maps_spatial/maps_detail_static.php?map_select=373&theme=2.