



FACTS AND FIGURES
ON TRANSBOUNDARY
GROUNDWATERS IN
CAUCASUS AND
CENTRAL ASIA

Aquifer No. 1: Osh Aravoij		Shared by: Uzbekistan and Kyrgyzstan
Type 5, Medium links to surface water systems, groundwater flows from Uzbekistan to Kyrgyzstan		
	Uzbekistan	Kyrgyzstan
Area (km ²)		
Water uses and functions (percentage of total abstraction)	Drinking water supply (25-50%), irrigation, mining, livestock (<25%)	Drinking water supply (25-50%), irrigation
Pressure factors	Agriculture, industry, waste disposal	Agriculture
Problems related to groundwater quantity	Polluted water drawn into aquifer	Lack of relevant data to be quantified
Problems related to groundwater quality	Serious problems with pesticides, moderate problems with heavy metals, slight problems with hydrocarbons and radioactive elements	Lack of relevant data to be quantified
Transboundary impacts	Decline of groundwater level, groundwater pollution	Lack of relevant data to be quantified
Groundwater management measures	Need to be improved: transboundary institutions, monitoring of groundwater quantity and quality, need to be applied: abstraction management, efficiency of use, mapping, good agricultural practices, integrated river basin management, treatment of industrial effluents, data exchange	Need to improved: transboundary institutions, monitoring of groundwater quantity and quality
Status and what is most needed	Improvement of the monitoring of groundwater quantity and quality	Improvement of the monitoring of groundwater quantity and quality
Future trends and prospects	Expected pressure on the water resources due to economic growth and climate change	Expected pressure on the water resources due to economic growth and climate change

Aquifer No. 2: Almoe-Vorzin		Shared by: Uzbekistan and Kyrgyzstan
Type 5, Medium links to surface water systems Groundwater flows from Uzbekistan to Kyrgyzstan		
	Uzbekistan	Kyrgyzstan
Area (km ²)		
Water uses and functions (percentage of total abstraction)	Drinking water (50-75%), irrigation (25-50%), industry, livestock (<25%)	Drinking water supply (25-50%), irrigation
Pressure factors	Agriculture, ore mining, waste disposal	Agriculture
Problems related to groundwater quantity	Polluted water drawn into aquifer	Lack of relevant data to be quantified
Problems related to groundwater quality	Nitrogen species, pesticides, heavy metals, hydrocarbons	Lack of relevant data to be quantified
Transboundary impacts	Groundwater pollution	Lack of relevant data to be quantified
Groundwater management measures	Effective: quality monitoring Need to be improved: quantity monitoring, transboundary institutions, data exchange Need to be applied: abstraction management, mapping, treatment of industrial effluents	Need to improved: transboundary institutions, monitoring of groundwater quantity and quality
Status and what is most needed	Good agricultural practices, neutralization of radioactive elements	Enhancement of monitoring programme
Future trends and prospects		Improvement of the monitoring of groundwater quantity and quality

Aquifer No. 3: Moiansuv		Shared by: Uzbekistan and Kyrgyzstan
Type 5, Strong, medium links to surface water system, average thickness 50 m		
	Uzbekistan	Kyrgyzstan
Area (km ²)	1,760	Not identified yet
Water uses and functions (percentage of total abstraction)	Irrigation (50-75%), drinking water, industry, livestock (<25%)	Drinking water supply, irrigation
Pressure factors	Industry	Agriculture
Problems related to groundwater quantity	Reduction of borehole yields, degradation of ecosystem, polluted water	Lack of relevant data to be quantified
Problems related to groundwater quality	Hydrocarbons, sulphates	Lack of relevant data to be quantified
Transboundary impacts	Groundwater pollution	Lack of relevant data to be quantified
Groundwater management measures	Effective: protection zones Need to be improved: transboundary institutions, quality and quantity monitoring, integrated river basin management Need to be applied: mapping, good agricultural practices, treatment of urban and industrial wastewater	Need to improved: transboundary institutions, monitoring of groundwater quantity and quality
Status and what is most needed		Enhancement of monitoring programme
Future trends and prospects	Improvement of the monitoring programme of both quality and quantity	Improvement of the monitoring of groundwater quantity and quality

Aquifer no. 4: Sokh		Shared by: Uzbekistan and Kyrgyzstan
Type 5, Strong links to surface water systems		
	Uzbekistan	Kyrgyzstan
Area (km ²)		
Water uses and functions		Drinking water supply, irrigation
Pressure factors	Irrigation	Agriculture
Problems related to groundwater quantity		Lack of relevant data to be quantified
Problems related to groundwater quality	Salinization (1-3 g/l)	Lack of relevant data to be quantified
Transboundary impacts	Groundwater pollution	Lack of relevant data to be quantified
Groundwater management measures	Effective: quantity and quality monitoring Need to be improved: transboundary institutions, abstraction management, protection zones, integrated river basin management. Need to be applied: mapping, good agricultural practices, urban wastewater treatment and reuse	Need to improved: transboundary institutions, monitoring of groundwater quantity and quality
Status and what is most needed		Enhancement of monitoring programme
Future trends and prospects		Improvement of the monitoring of groundwater quantity and quality

Aquifer No. 5: Alazan-Agrichay		Shared by: Azerbaijan and Georgia
Type 3, Medium links to surface waters Groundwater flows from Greater Caucasus to Alazani river		
	Azerbaijan	Georgia
Area (km ²)	3,050	Not identified yet
Water uses and functions (percentage of total abstraction)	Irrigation (80 – 85%) Drinking water supply (10 – 15%) Industry (3-5%)	Drinking water supply
Pressure factors	No substantial problems	No substantial problems
Problems related to groundwater quantity	No substantial problems	No substantial problems
Problems related to groundwater quality	No substantial problems	No substantial problems
Transboundary impacts	Lack of relevant data	Lack of relevant data
Groundwater management measures	Need to be improved: integrated management, abstraction management, efficiency of use, monitoring, agricultural practices, protection zones, mapping Need to be applied: treatment of urban and industrial wastewater, transboundary institutions, data exchange	Need to be improved: control of the use of groundwater resources. Need to be applied: treatment of urban and industrial wastewater, monitoring programmes both quantity and quality, data exchange
Status and what is most needed	Joint monitoring programme	Joint monitoring programme
Future trends and prospects	Increased water demands	Increased water demands by economic growth (irrigation, drinking water and industry)

Aquifer No. 6: Samur		Shared by: Azerbaijan and the Russian Federation (Samur river)	
Type 3, Gravel – pebble, sand, boulder			
	Azerbaijan	Russian Federation	
Area (km ²)	2,900		
Water uses and functions (percentage of total abstraction)	Drinking water (90-92%), irrigation (5-8%), industry (2-3%)		
Pressure factors	None		
Problems related to groundwater quantity	None		
Problems related to groundwater quality	None substantial problem		
Transboundary impacts	Groundwater pollution		
Groundwater management measures	Need to be improved: abstraction management, quantity and quality monitoring, protection zones, good agricultural practices, mapping Need to be applied: transboundary institutions, data exchange, integrated river basin management, treatment of urban and industrial wastewater		
Status and what is most needed	Joint monitoring programme		
Future trends and prospects	Increased use of water due to economic growth		

Aquifer No. 7: Middle and Lower Araks		Shared by: Azerbaijan and Islamic Republic of Iran (Araks river)
Type 3, Gravel – pebble, sand, boulder		
	Azerbaijan	Islamic Republic of Iran
Area (km ²)	1,480	
Water uses and functions (percentage of total abstraction)	Irrigation (55-60%), drinking water (40-45%)	
Pressure factors	None	
Problems related to groundwater quantity	None	
Problems related to groundwater quality	None	
Transboundary impacts	None	
Groundwater management measures	Need to be improved: abstraction management, quantity and quality monitoring, protection zones, good agricultural practices, mapping Need to be applied: transboundary institutions, data exchange, integrated river basin management, treatment of urban and industrial wastewater	
Status and what is most needed	Joint monitoring programme	
Future trends and future prospects	Increased use of water due to economic growth	

Aquifer No. 8: Pretashkent		Shared by: Uzbekistan and Kazakhstan
Type 4, Large deep groundwater (artesian type)		
	Uzbekistan	Kazakhstan
Area (km ²)		
Water uses and functions	Mineral water and partly as drinking water source	Drinking water supply
Pressure factors	Not recognized	Water abstraction on both sides of the aquifer
Problems related to groundwater quantity	Not recognized	Reduction of borehole yields
Problems related to groundwater quality	There are no problems with pollution	There are no problems with pollution
Transboundary impacts	Not recognized	Decline of the groundwater levels were observed
Groundwater management measures	Licensing of the groundwater abstraction and monitoring programme in place It is urgently needed to establish the transboundary institutions and data exchange	Licensing of the groundwater abstraction and monitoring programme in place It is urgently needed to establish the transboundary institutions and data exchange
Status and what is most needed	Enhancement of monitoring programme	To enhance monitoring programme and assessment methods as mathematical modelling for making water balance
Future trends and prospects	Increased economic activities and climate change can have a pressure on the groundwater resources	Increased economic activities and climate change can have a pressure on the groundwater resources

Aquifer No. 9: Chu Basin	Shared by: Kyrgyzstan and Kazakhstan	
Type 4, Quaternary sand, gravel, weak links to surface water systems, groundwater flow from Kyrgyzstan to Kazakhstan		
	Kyrgyzstan	Kazakhstan
Area (km ²)		
Water uses and functions (percentage of total abstraction)	Drinking water, irrigation, industry, mining, livestock, thermal spa (<25%)	Drinking water 50%, irrigation 50%
Pressure factors	Water abstraction	Water abstraction
Problems related to groundwater quantity	Degradation of ecosystems, salt water upcoming	None
Problems related to groundwater quality	Salinization	None
Transboundary impacts	None	Not quantified yet
Groundwater management measures	Effective: quantity, quality monitoring, mapping, urban and industry wastewater treatment. Need to be improved: transboundary institutions, abstraction management, protection zones. Need to be applied: good agricultural practices, integrated river basin management, data exchange	Effective: quantity, quality monitoring Need to be improved: transboundary institutions, abstraction management Need to be applied: good agricultural practices, integrated river basin management, data exchange
Status and what is most needed	Enhancement of the monitoring programme	Enhancement of the monitoring programme
Future trends and prospects	Lack of data and information to make proper predictions	Lack of data and information to make proper predictions

Aquifer No. 10: Pambak-Debet		Shared by: Georgia and Armenia
Type 3		
	Georgia	Armenia
Area (km ²)		
Water uses and functions (percentage of total abstraction)	Drinking water supply 100%	Drinking water up to 90%, irrigation and mining industry
Pressure factors	Lack of data	Mining industry and agriculture
Problems related to groundwater quantity	Lack of data	Lack of data
Problems related to groundwater quality	Lack of data	Lack of data on the pollution from the agricultural and industrial activities
Transboundary impacts	Lack of data to evaluate these effects	Lack of data
Groundwater management measures	Effective: controlled water abstraction Need to be improved: urban and industrial wastewater treatment, Need to be applied: transboundary institutions to be set up, monitoring programme to be enhanced	It is important to make controlled water abstraction. Need to be improved: urban and industrial wastewater treatment, Need to be applied: transboundary institutions to be set up, monitoring programme to be enhanced and data exchange
Status and what is most needed	Joint monitoring programme	Joint monitoring programme
Future trends and prospects	Increased use of water as consequence of the economic growth	

Aquifer No. 11: Agstev-Tabuch		Shared by: Armenia and Azerbaijan
Type 1, 2, Moderate connections with surface water systems.		
	Armenia	Azerbaijan
Area (km ²)	500	500
Water uses and functions (percentage of total abstraction)	Drinking water up to 75%, irrigation up to 25% and mining industry	Irrigation 80%, drinking water 15%, industry 5%
Pressure factors	Mining industry and waste disposal	Mining industry
Problems related to groundwater quantity	Lack of data	Lack of data
Problems related to groundwater quality	Lack of data on the pollution from the agricultural and industrial activities	Heavy metals
Transboundary impacts	Lack of data	Moderate pollution by heavy metals
Groundwater management measures	It is important to make controlled water abstraction. Need to be improved: urban and industrial wastewater treatment, Need to be applied: transboundary institutions to be set up, monitoring programme to be enhanced and data exchange	It is important to make controlled water abstraction Need to be improved: urban and industrial wastewater treatment, Need to be applied: transboundary institutions to be set up, monitoring programme to be enhanced and data exchange
Status and what is most needed	Great need to organize joint monitoring programme on both sides and to set up the regular data exchange	Great need to organize joint monitoring programme on both sides and to set up the regular data exchange
Future trends and prospects		Increased use of water by economic growth

Aquifer No. 12: Birata-Urgench		Shared by: Uzbekistan and Turkmenistan
Type 3, Quaternary sand, loam, groundwater flow from Uzbekistan to Turkmenistan		
	Uzbekistan	Turkmenistan
Area (km ²)		
Water uses and functions	Drinking water supply	Drinking water supply
Pressure factors	Water abstraction	Water abstraction
Problems related to groundwater quantity	Widespread/moderate reduction of borehole yields, widespread/serious reduction of base flow, spring flow	Widespread/moderate reduction of borehole yields, widespread/serious reduction of base flow, spring flow
Problems related to groundwater quality	Salinization (natural origins and irrigation) as results of waste water and drainage waters	Salinization (natural origins and irrigation) as results of waste water and drainage waters
Transboundary impacts	Need to be investigated	Need to be investigated
Groundwater management measures	Joint quantity and quality monitoring, data exchange	Joint quantity and quality monitoring, data exchange
Status and what is most needed	Improvement of the groundwater monitoring programme	Improvement of the groundwater monitoring programme
Future trends and prospects	Lack of information for making trends prediction	Lack of information for making trends prediction

Aquifer No. 13: Karotog		Shared by: Tajikistan and Uzbekistan
Type 2, Moderate connections with surface water bodies		
	Tajikistan	Uzbekistan
Area (km ²)	328	Necessary to be corrected
Water uses and functions	Drinking water supply	Drinking water supply
Pressure factors	Water abstraction	Water abstraction
Problems related to groundwater quantity	Change of water resources on the edge of sustainability	Change of water resources based on the water abstraction on the Tajikistan territory
Problems related to groundwater quality	Negligible local contamination by nitrate (agriculture)	Negligible local contamination by nitrate (agriculture)
Transboundary impacts	Necessary to be investigated	Necessary to be investigated
Groundwater management measures	Joint monitoring of the groundwater	Joint monitoring of the groundwater
Status and what is most needed	Enhancement of the monitoring network of groundwater	Enhancement of the monitoring network of groundwater
Future trends and prospects	Not sufficient information to make predictions	Not sufficient information to make predictions

Aquifer No. 14: Dalverzin		Shared by: Uzbekistan and Tajikistan
Type 2, Moderate connections with surface water bodies		
	Uzbekistan	Tajikistan
Area (km ²)		
Water uses and functions	Irrigation	Drinking water supply and irrigation
Pressure factors	Water abstraction	Water abstraction
Problems related to groundwater quantity	Water resources are recharged in the course of year	Water resources are recharged in the course of year
Problems related to groundwater quality	Moderate increase in mineralization and hardness	Moderate increase in mineralization and hardness
Transboundary impacts	Necessary to be investigated	Necessary to be investigated
Groundwater management measures	Monitoring of the groundwater status	Monitoring of the groundwater status
Status and what is most needed	Enhancement of the representative monitoring network of transboundary waters	Enhancement of the representative monitoring network of transboundary waters
Notes		
Future trends and prospects	Lack of information for making predictions and trends	Lack of information for making predictions and trends

Aquifer No. 15: Zaforoboi		Shared by: Tajikistan and Uzbekistan
Type 2, Moderate connections with surface water bodies		
	Tajikistan	Uzbekistan
Area (km ²)		
Water uses and functions	Drinking water and irrigation	Drinking water and irrigation
Pressure factors	Water abstraction	Water abstraction
Problems related to groundwater quantity	Natural resources are recharged in the autumn and winter period	Natural resources are recharged in the autumn and winter period
Problems related to groundwater quality	No contamination	Moderate pollution
Transboundary impacts	Necessary to be investigated	Necessary to be investigated
Groundwater management measures	Existing monitoring network of groundwater programme, necessary to be improved	Monitoring network of groundwater programme, necessary to be improved
Status and what is most needed	Enhancement of the representative monitoring network of transboundary waters	Enhancement of the representative monitoring network of transboundary waters
Notes		
Future trends and prospects	Lack of information for making predictions and trends	Lack of information for making predictions and trends

Aquifer No. 16: Zeravshan		Shared by: Tajikistan and Uzbekistan
Type 2, Moderate connections with surface water bodies		
	Tajikistan	Uzbekistan
Area (km ²)	88	To be corrected
Water uses and functions	Drinking water supply	Drinking water and technological water
Pressure factors	Moderate water abstraction	Moderate water abstraction
Problems related to groundwater quantity	Change of water resources on the edge of natural sustainability	Change of water resources on the edge of natural sustainability
Problems related to groundwater quality	Significant effect of the industrial activities on the territory of Tajikistan	Lack of data for evaluation
Transboundary impacts	Necessary to be investigated	Necessary to be investigated
Groundwater management measures	Need to organize complex monitoring programme	Existing monitoring programme of the groundwater
Status and what is most needed	Enhancement of the complex monitoring network of transboundary waters	Development of the complex monitoring network of transboundary waters
Future trends and prospects	Lack of information for making predictions and trends	Lack of information for making predictions and trends

Aquifer No. 17: Salepta- Batkin- Nai-Icfor (Syr Darya)		Shared by: Kyrgyzstan and Tajikistan
Type 2, Moderate connections with surface water bodies		
	Kyrgyzstan	Tajikistan
Area (km ²)		891
Water uses and functions	Irrigation and drinking water	Irrigation, drinking water and technological water
Pressure factors		Water abstraction
Problems related to groundwater quantity	Over exploitation registered	Water abstraction on the territory of Kyrgyzstan
Problems related to groundwater quality	Contamination by nitrates and salinization	Increased mineralization, hardness and sulphates
Transboundary impacts	Necessary to be investigated	Necessary to be investigated
Groundwater management measures	Special monitoring is not performed	Monitoring is done partly
Status and what is most needed	Enhancement of the complex monitoring network of transboundary waters	Enhancement of the complex monitoring network of transboundary waters
Future trends and prospects	Lack of information for making predictions and trends	Lack of information for making predictions and trends

Aquifer No. 18: Chhatkal-Kurman		Shared by: Kazakhstan and Uzbekistan
Type 4, Weak link to surface waters, groundwater flow from Kazakhstan to Uzbekistan		
	Kazakhstan	Uzbekistan
Area (km ²)	20,000	
Water uses and functions (percentage of total abstraction)	Drinking water (100%)	Drinking water (100%)
Pressure factors	Water abstraction	Water abstraction
Problems related to groundwater quantity	Reduction of borehole yields, decline of groundwater level	Reduction of borehole yields, decline of groundwater level
Problems related to groundwater quality	None	None
Transboundary impacts	Decline of groundwater level	Decline of groundwater level
Groundwater management measures	Effective: protection zones, mapping Need to be improved: quantity and quality monitoring, abstraction management Need to be applied: transboundary institutions	Enhancement of the monitoring programme
Status and what is most needed	Joint monitoring programme	Joint monitoring programme
Future trends and prospects		Lack of information to make predictions