



The Second Assessment of Transboundary Rivers, Lakes and Groundwaters - the Caucasus Sub- Region: Status and remaining gaps

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Convention on the Protection and Use of Transboundary Watercourses and International Lakes

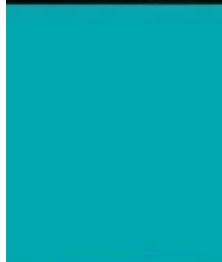
Process of assessing the Caucasus

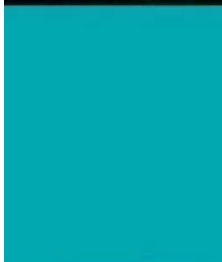
- 8-10 December 2009: subregional workshop on transboundary water management in the Caucasus (Tbilisi, Georgia)
- 1 February: Caucasus countries return completed datasheets to UNECE, country making the ppt coordinates inputs from all riparian
- 8 March: UNECE send to Caucasus countries draft assessment
- 1 April: comments from Caucasus countries to draft assessment
- 21 April: finalized consolidated assessment
- 5-7 July: Review of the assessment by the Working Group on Monitoring and Assessment



Information collected

- Description of the basin/aquifer (hydrology & hydrogeology, map)
- Surface and groundwater resources: distribution among the riparian countries within a basin/aquifer
- Pressures and their importance (water uses, polluting activities, diversion etc)
- Quality and quantity status of transboundary watercourses
- Transboundary impacts
- Response measures taken
- Cooperation: joint bodies, agreements, joint monitoring etc
- Trends





Kura and tributaries

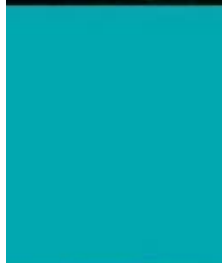
Basin/sub-basin	Status of reporting: Revised datasheets received	Still needed
Kura (AM, AZ, GE, IR, TR)	AZ, GE, TR, (IR	AM input
Iori (AZ, GE)	GE	AZ input
Alazani (AZ, GE)	AZ, GE	
Ktsia/Khrami (GE, AM)	GE	AZ input
Debed (AM, GE)	AM, GE	
Agstev (AM, AZ)	AM	AZ input
Lake Jandari (GE, AZ)	GE	AZ input
Potskhovi/Posov (GE, TR)	GE, TR	
Kartsakhi Lake/Aktaş Gölü (GE, TR)	GE, TR	

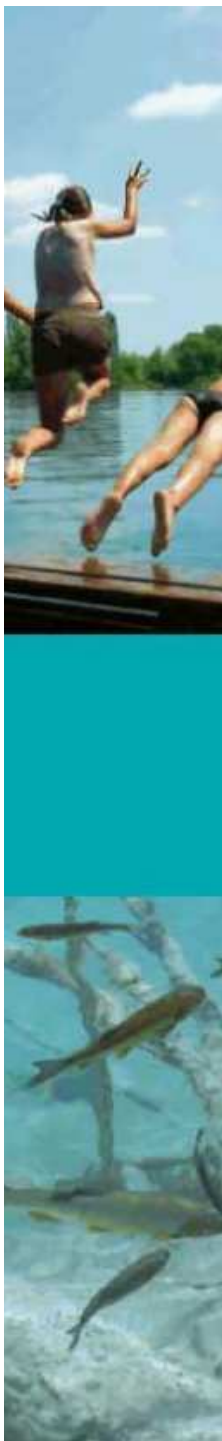
Araks/Aras and tributaries

Basin/sub-basin	Status of reporting: Revised datasheets received	Still needed
Araks/Aras (AM, AZ, IR, TR)	AM, IR, TR	AZ input
Akhuryan (AM, TR)	AM, TR	
Akhuryan/Arpaçay dam and reservoir (AM, TR)	AM, TR	
Arpa (AM, AZ)	AM	AZ input
Vorotan (AM, AZ)	AM	AZ input
Voghji (AM, AZ)	AM	AZ input
Sarisu (TR, IR)	TR, IR (message)	

Other rivers of the Caucasus

Basin/sub-basin	Status of reporting: Revised datasheets received	Still needed
Samur (AZ, RU)	RU	AZ input
Sulak and transboundary tributary Andis-Koisu (GE, RU)	GE, RU	
Terek (GE, RU)	GE, RU	
Psou (RU, GE)	GE, RU	
Chorokhi/Coruh and transboundary tributary Machakheliskali (GE, TR)	GE, TR	



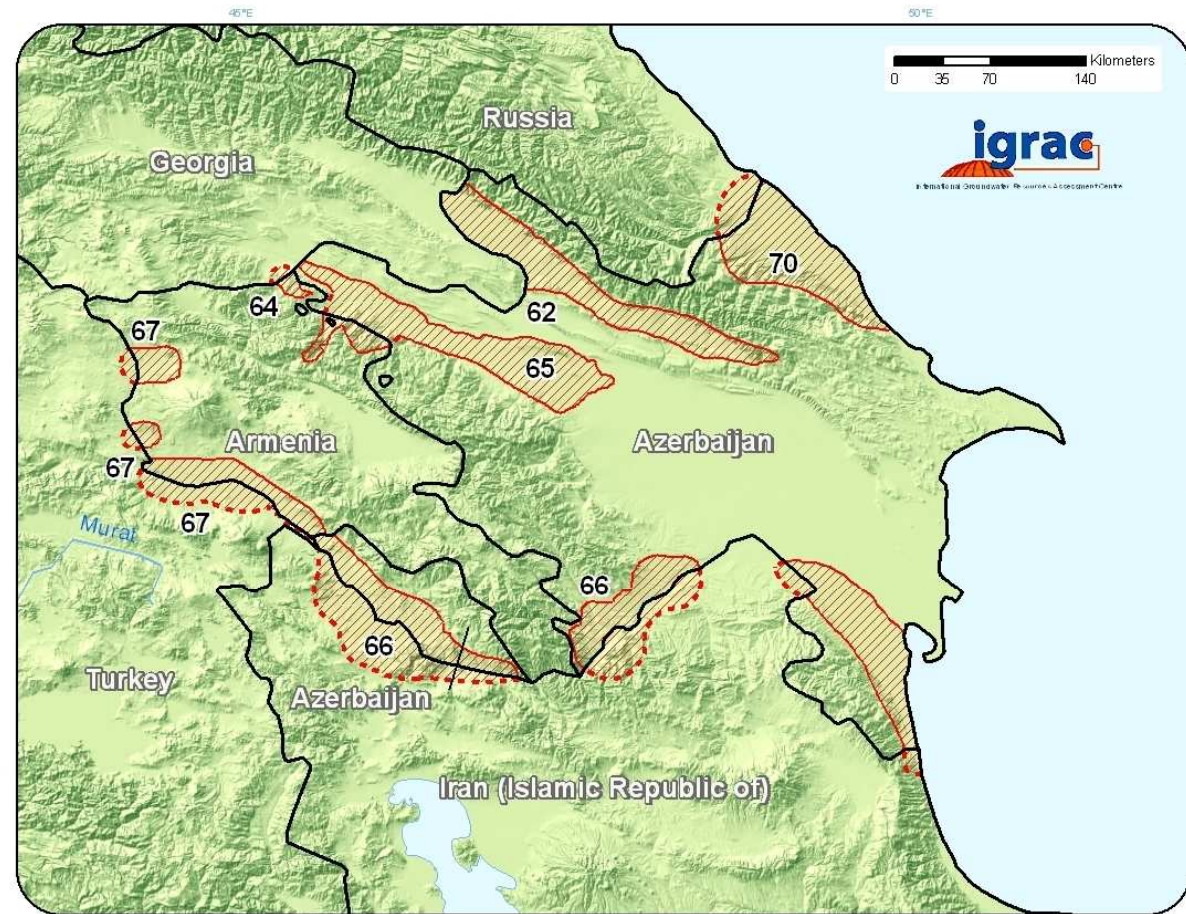
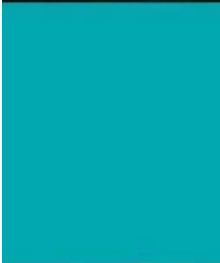


Transboundary aquifers identified

No.	Aquifer name	Count ries	No.	Aquifer name	Count ries
60	Kura	GE- AZ	67	Leninak-Shiraks	AM- TR
61	(no name)	GE- AZ	68	Herher, Malishkin and Jermuk	AM- AZ
62	Alazan-Agrichay	GE- AZ	69	Vorotan-Akora	AM- AZ
63	Ktsia-Kharami	GE- AZ	70	Samur	AZ- RU
64	Debed	GE- AM	71	Quaternary aquifer (name?)	GE - RU
65	Agslev-Akstafa/Tavush-Tovuz	AM- AZ	72	Quaternary aquifer (name?)	GE - RU
66	Nakhichevan/Larijan and Djibrail	AZ-IR			



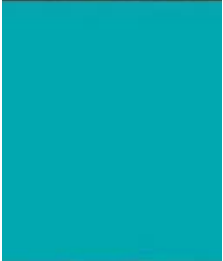
Transboundary aquifers

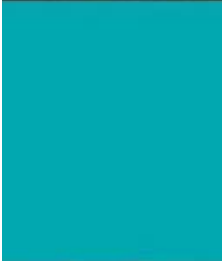


<p>Legend</p> <p>Transboundary Aquifers</p> <ul style="list-style-type: none"> aquifer extent confirmed boundary approximate boundary 		<p>Geographical elements</p> <ul style="list-style-type: none"> political borders lakes rivers 		<p>elevation</p>	<p>Base maps</p> <p>Geographic features: ESRI data and maps (2006) Elevation: SRTM and GTOPO30 provided by ESRI (2006)</p> <p>Map projection</p> <p>Robinson projection, geographic coordinates, spheroid WGS84, longitude of central meridian 0°.</p> <p>Cartographic editing/GIS</p> <p>C.M. van Kempen</p>	<p>© IGRAC, 2010</p> <p>IGRAC works under auspices of UNESCO and WMO, is hosted by DELTARES and funded by the government of the Netherlands through Partners for Water.</p> <p>www.igrac.net info@igrac.net</p> <p>P.O. Box 85467 3508 AL Utrecht the Netherlands</p>
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General observations about the input received

- Some aspects not covered in the datasheets (e.g. groundwater, climate) – probably an issue of inter-agency coordination
- Input focused on technical information (discharges, water quality); very little information on the management response
- Climate change information very scarce
- Little information on management response





New compared with the first Assessment

- Groundwater information presented together with the surface water information
- Selected transboundary Ramsar sites/wetlands of transboundary importance assessed (in the Caucasus: Wetlands of Javakheti region and Floodplain marshes and fish ponds in the Araks/Aras river valley)
- Separate assessments of selected lakes: Lake Jandari (already in the 1st Assessment), Kartsakhi lake/Aktaş Gölü, Akhuryan/Arpaçay dam and reservoir



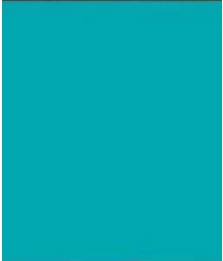
Kura (AM, AZ, GE, IR, TR)

- Irrigation: AZ, GE, TR
- Nutrient and fertilizer pollution from agriculture and animal husbandry:
- Municipal wastewater discharges (at least GE, TR – severe, but local)
- Controlled and uncontrolled dump sites (AZ, GE, TR)
- Mining: AM, GE, IR
- Land and soil degradation: AZ, GE, TR



Kura

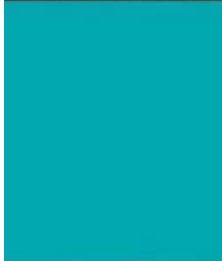
- Status: satisfactory (GE, ecol.& chem.), unpolluted and/or less polluted (TR)
- Water use expected to increase (TR – hydropower, GE)
- Climate: a decrease in precipitation (with increased seasonal variability) and in runoff predicted (TR)

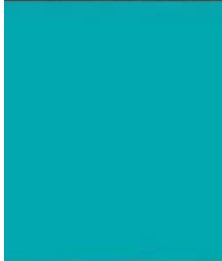




Kura: gaps/clarifications needed

- Pressure information from AM, AZ
- Information about the AZ part of the Kura aquifer
- Reservoir capacity table to be filled in (now information only from AZ & GE – probably incomplete)
- Renewable water resources: AM, IR; to be checked: per capita for AZ
- Population: AM, IR
- Landuse/land cover: AM, IR
- Water use in different sectors (%)





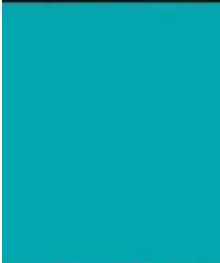
Iori sub-basin (AZ, GE)

- Pollution from agriculture (moderate & limited extent) and municipal wastewaters (severe & widespread) main pressures in GE, uncontrolled waste dumps (severe but local), surface water withdrawal esp. for (severe & widespread) & water losses
- Status unchanged from the first assessment: “good” (GE), little human impact (AZ)



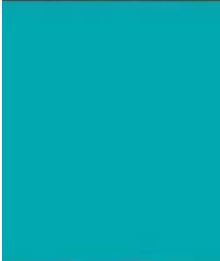
Iori sub-basin: checks needed/gaps

- Population information need from AZ, GE checked?
- Renewable water resources from AZ
- Name for the aquifer, information about AZ part
- Pressure and status information from AZ
- Landuse/land cover in the AZ part; GE checked the figures (area did not add up right)?
- Water use in different sectors in AZ
- Importance of groundwater not fully clear; mainly used by rural population?
- Some revisions from GE to be incorporated; leave out national tributaries?



Alazani sub-basin (AZ, GE)

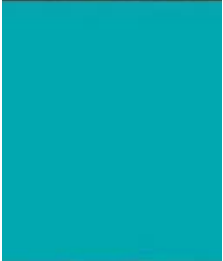
- AZ concerned about transboundary pollution from municipal wastewaters and from agriculture
- GE ranks pollution from agriculture, viniculture & animal husbandry severe and widespread
- Renovation of low-efficiency irrigation infrastructure expected to reduce water losses
- Some river bank erosion – severe but local (GE assessment)
- Trends: GE predicts 10% increase in water withdrawal



Alazani sub-basin: checks needed/gaps

- The groundwater resource estimates are very different; have different methods been applied
- Mismatch in population density reported by AZ and calculated value
- Type of the Alazan-Agrichay aquifer?
- Landuse/land cover figures from AZ do not align well with share of the basin area
- Situation with wastewater treatment in Azerbaijan's territory?
- Water use figures missing
- Some corrections from GE remain to be incorporated + to be clarified: NO substantial problems reported on Alazan-Agrichay aquifer





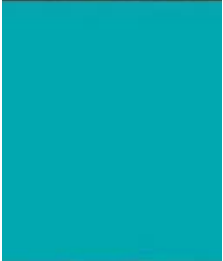
Ktsia-Kharami (GE, AZ)

- Pressures (GE): municipal wastewater discharges – treatment plants not operational (serious but local, GE priority to address), illegal waste dumps (widespread and severe), pollution by metals from copper mining, a risk of accidental pollution Ceyhan-Tbilisi-Baku oil pipeline
- Measures to economize water use in mining and irrigation, protection of river banks (GE)
- Joint monitoring GE-AZ-AM (EU project)
- River basin manag. plan to be developed 2012
- Decrease in total water use in GE by 2015, energy use to decrease compared with others



Ktsia-Kharami: checks needed/gaps

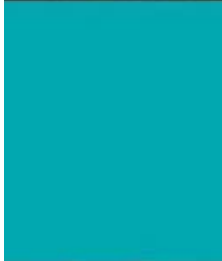
- Ktsia-Kharami aquifer: information about AZ part
- Population, water resource etc figures not required from AZ because of small share (1.1 %); meaningful to have separate assessments for Debed and Ktsia-Kharami?



Debet (AM-GE)

- Agriculture the biggest water use
- Heavy metal concentrations: naturally elevated (AM: widespread and severe); improvements in ore processing has decreased but tailings are still a concern
- Municipal and industrial wastewater discharges (AM: severe, local – industrial, municipal – widespread)
- Deforestation (AM: moderate, local)
- Other pressures: freight transport, air deposition, solid waste (moderate, local)





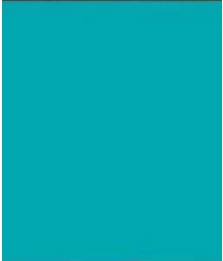
Debet: checks needed/gaps

- Reported population density in AM does not match with calculated
- AM water resources per capita: population correct?
- Information about pressures in GE
- Total water use in AM
- Sum of reported landuse/land cover figures exceeds total share of GE
- Very little information about management measures taken or planned
- Some of the problems in figures due to counting in or leaving out Debet tributary?



Agstev: AM, AZ

- Domestic and municipal wastewaters (AM: severe, widespread)
- Diffuse pollution from agriculture (severe, widespread)
- Effluent from landfills (AM: severe, widespread)
- Naturally elevated metal concentrations (AM: severe, widespread)



Agstev

- Reduction of pollution load observed from the first Assessment, at least when the amount of solids is looked at
- Climate: increase of T, decrease in rainfall and runoff predicted. Groundwater level decrease with minor change in groundwater quality
- Gap: groundwater reduction as percentage (%) not clear



Agstev: gaps/clarifications needed

- Population & population density from AZ
- AM: Does groundwater occurrence of Margaovitsky below to a different aquifer system than Agslev-Akstafa/Tavush-Tovuz aquifer?
- Landuse/land cover figures to be checked: as calculated from the hectare amounts if summed up, they exceed Armenia's share
- AM: the reason for deforestation in recent years not clear



Agstev: gaps/clarifications needed (*cont.*)

- AM: the amount of suspended solids has increased from 2006 to 2009 – any explanation?
- AM needs to confirm that the data in the draft assessment is correctly interpreted.
- A lack of data on GW quantity and need for joint monitoring still actual? AZ – GW use predicted to increase
- Very little information provided about management measures taken

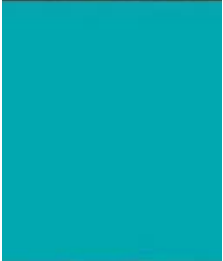




Lake Jandari

- Pollution increasing: wastes from industry, settlements and agriculture
- Water level has decreased as a result of expansion of irrigated area uncoordinated use by many users
- Does not have a good ecological or chemical status



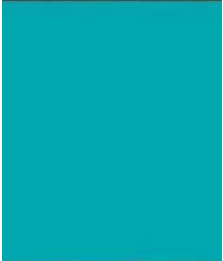


Lake Jandari: gaps/clarifications needed

- Population information needed from AZ
- Does the trend of expanding irrigated land area still continue? Any measures taken to reduce water level decrease?
- wastes from industry mentioned, but GE reports not have industry



Potskhovi/Posof

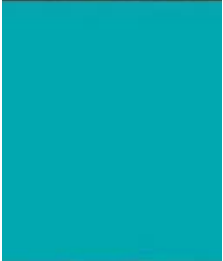


- Wastewater discharges: no installed treatment plants in the Turkish part where small rural population (TR: moderate, local), discharges from settlements untreated in Georgia (GE: severe but local).
- Pollution from fertilizers (GE: moderate, local)
- Landslides, erosion (moderate, local)



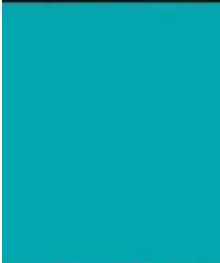
Potskhovi/Posof

- Response includes afforestation campaigns and activities (TR), a transboundary biodiversity conservation project (TR-GE) and a project to construct new landfills (GE); possibility of joint monitoring looked into.
- Irrigation in agriculture and animal husbandry on the increase in TR
- Decreased precipitation and an increase in seasonal variability predicted (TR)



Potskhovi/Posov: gaps/clarifications needed

- Water withdrawals by sector missing from GE, but apparently not available





Lake Kartsakhi/Aktaş Gölü (GE, TR)

- Military zone on the Turkish side – human impact limited, natural conditions
- No marked water abstractions reported
- Gaps: country shares of the basin area not known





Araks/Aras (AM, AZ, IR, TR)

- Agricultural pollution, animal husbandry
- Wastewater discharges from industries (TR – moderate, local; IR – severe and widespread)
- Pollution risk from controlled dump sites (TR – moderate but widespread)
- Flooding (TR)
- Bank erosion, influenced e.g. by aggregate mining (AM): severe, local – TR, widespread - IR
- Heavy metal pollution from mining: AM
- Hydropower projects under development (TR)





Araks/Aras: gaps/clarifications needed

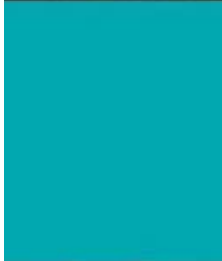
- Population; AM, AZ
- Nakhichevan/Larijan and Djebrail aquifer: IR
- Landuse/land cover: AM, AZ
- Water use in different sectors: AM, AZ
- AM to check correctness of quality data interpretation





Akhuryan/Arpaçay (AM, TR)

- River flow heavily regulated
- Main pressures: agriculture, animal husbandry; discharge of untreated/insufficiently wastewaters; other pressures: controlled dump sites, erosion
- Surface water mainly used for irrigation: TR
- Information on Akhuryan/Arpaçay dam and reservoir ok





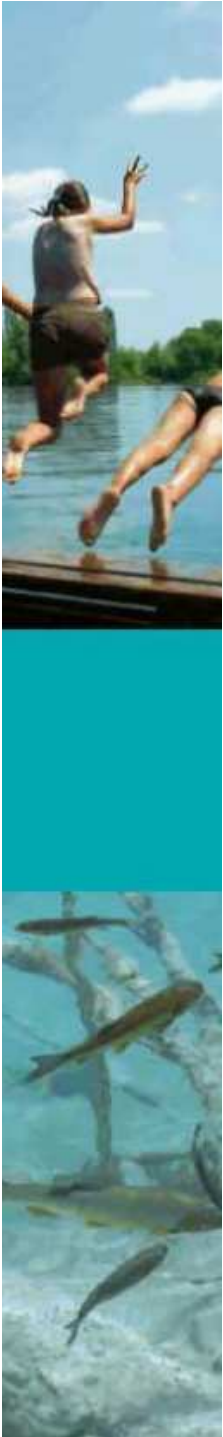
Akhuryan: gaps/clarifications needed

- Leninak-Shiraks aquifer: TR input (not available because not assessed)
- Landuse/land cover: an update was expected in AM?
- Time-frame of predicted climate change in AM



Arpa (AM, AZ)

- Untreated wastewater discharges: AM (severe and widespread)
- Nutrient pollution from agriculture: AM (moderate but widespread)
- Inappropriate handling of trash: AM (moderate)
- Naturally elevated concentrations of metals
- Status: assessed to be very clean; with almost no human impact, but some increase of nitrate compounds observed from 2009 (AM)





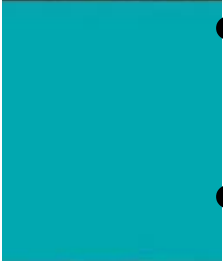
Arpa: gaps/clarification needed

- Population data: AZ
- Installed hydropower capacity
- Herher, Malishkin and Jermuk aquifers form one aquifer system or should all of them be assessed separately as individual aquifers? Information on AZ part needed.
- Possible reason for increase in N-compounds? (AM)
- Pressures, Landuse, status and transboundary impact from AZ
- Very little management response information
- Is surface water withdrawal or groundwater abstraction for irrigation a concern?



Vorotan (AM, AZ)

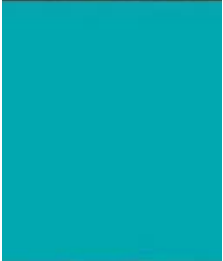
- Flow heavily regulated, several hydroelectric power stations
- Agriculture one of the main pressure factors: AM (moderate, widespread)
- Discharges of untreated municipal wastewaters: AM (severe but local)
- At the time of 1st assessment, almost no human impact, but some increase in nutrient concentrations observed recently (AM)
- Some metal concentrations potentially naturally elevated
- Climate: decrease of precipitation & runoff predicted (AM)





Vorotan: gaps/clarifications needed

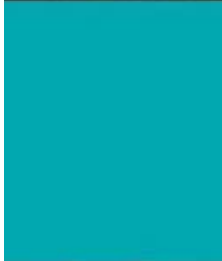
- Population, discharge AZ
- Water resources per capita: AM to check
- Reservoir volume and installed hydropower capacity
- Thickness of Vorotan-Akora aquifer in AM? Information about AZ part
- Landuse AZ, any update from AM?
- , Angeghakot and Shakin, part of the same Vorotan-Akora aquifer system, or are they separate aquifers? 60 million m³/year =total renewable groundwater resource ?



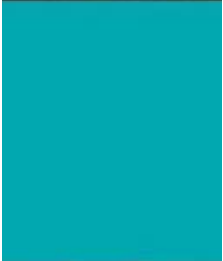


Vorotan: gaps/clarifications needed (*cont.*)

- Water withdrawal information AM, AZ
- Maximum Allowable Concentration (MAC) for mentioned determinands as reference?
- Any explanation to N and P peak below Sisian tributary?
- Complementing trend information: climate change prediction AZ; projects, new legislation – Am, AZ?
- Quantification of groundwater level decrease not clear as % (AM)

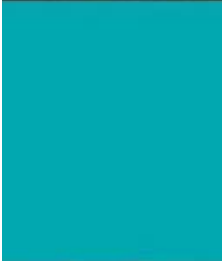


Voghji (AM, AZ)



- Discharge of untreated or insufficiently treated municipal wastewater (severe, widespread)
- Industrial activities (severe, widespread)
- No significant agriculture (pastures on slopes)
- Heavy metal pollution from mine tailings; concentrations elevated naturally
- Hydropower infrastructure: AM (moderate, local)
- Inappropriate waste disposal
- Some anthropogenic impact observed along the course of the river in AM
- Decrease in precipitation & runoff predicted as a result of climate change (AM)





Voghji: gaps/clarifications needed

- Schedule of completing Geghi reservoir (AM)
- Check/revision of AZ area; AZ population data
- Renewable water resources , discharge in AZ
- Current situation with deforestation (AM)
- Wastewater discharge situation in AZ
- Water withdrawal Am, AZ
- Clarify the extent of regulation; are the stations not impounding flow?
- Landuse AZ, update from AM?





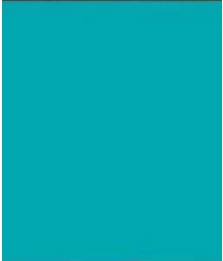
Voghji: gaps/clarifications needed (*int.*)

- Very little information on management response
- Trend information only on climate change in AM (reduction of precipitation and runoff predicted)
- Ecological and chemical status unchanged since the 1st assessment (“not satisfactory for aquatic life”)?



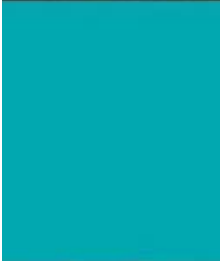
Sarisu (TR, IR)

- No pressures reported on
- A protocol signed about basic principles of the water use in the border region, minimum water flow and water allocation.
- Gaps: landuse/land cover in IR



Samur (AZ, RU)

- water demand of both countries exceeds the available resources, indicated by reduced flow downstream; moderate but widespread groundwater level decrease (RU)
- Locally elevated natural metal concentrations
- Efforts in recent years to establish a bilateral agreement
- Gaps: Population information, AZ & RU; water resource info received from RU? Irrigated area figures up-to-date?



Sulak , Andis-Koisu tributary(GE, RU)

- Irrigation and human settlements the main pressure factors; transboundary impact assessed as insignificant
- Ecological and chemical status of Andis-Koisu is good
- Increased pumping lifts and costs in RU
- Climate: decrease in precipitation predicted in GE



Sulak , Andis-Koisu tributary: gaps/clarifications needed

- Information about Georgia's part of the Quaternary aquifer; name of the aquifer?
- Management interventions, future trends (some climate change information available on GE part)
- Plans were reported in the 1st assessment about construction of hydropower stations in RU. Progress in these plans?

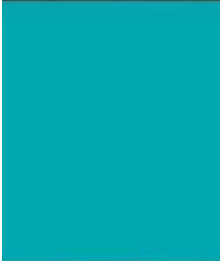


Terek (GE, RU)

- Irrigation and human settlements main pressure factors
- Status: Good (1st assessment); polluted (RU quality category); no significant variation 2005-2008

Gaps:

- Population RU
- Landuse RU
- Management response, trends



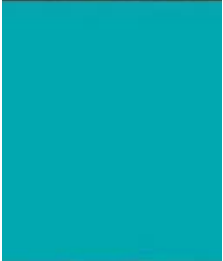
Psou (GE-RU)

- Erosion upon flooding
- Groundwater pollution from expansion of settlements
- Naturally elevated metal concentrations

Gaps:

- Population GE
- RU to check: expected 2020 water use





Chorokhi/Coruh (GE, TR)

- Wastewater discharges (moderate, local); some preliminary works for treatment plants made in TR
- Hydropower under development (TR)
- Agriculture (GE; moderate & local in TR)
- Washing-away problem in the coastal zone (GE) due to reduced sediment load
- flooding



Chorokhi/Coruh

- chemical and ecological status assessed as good (GE), or unpolluted/less polluted (TR)
- Climate (TR): increases in precipitation, its variability, runoff and groundwater levels predicted
- Non-consumptive use for hydropower expected to increase



Chorokhi/Coruh

- Bilateral technical cooperation, working group for joint monitoring exists, sediment trapping monitored; communications about early warning
- Machakheliskali/Macahale tributary: diffuse pollution from fertilizers (moderate, local); water used in GE for energy, water use stable





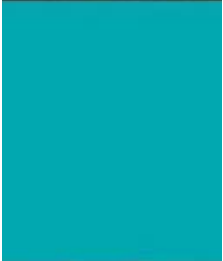
Chorokhi/Coruh: gaps and clarifications needed

- Only main consumptive uses (domestic and agricultural water use) estimated for the Turkish part



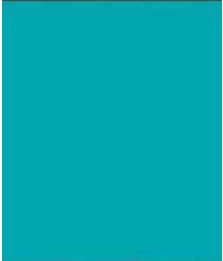
Still needed

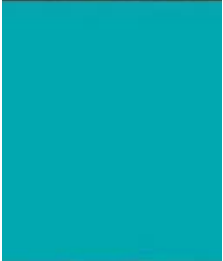
- A selection of graphics (AM, GE, RU have made some available)
- Checking the inventory of transboundary aquifers
- Revision of aquifer delineations, if appropriate
- Basin maps to be generated
- Possible thematic maps



Proposed editorial changes – content

- Water resources per basin or by a country's territory in each basin to be compiled to a summary table or bar chart (currently in the body text; not expressive/meaningful for e.g. a policy-maker)
- Mention of national tributaries to be removed unless information related to transboundary impacts given
- If a comprehensive table or reservoirs can be compiled, mentions of reservoirs to be moved from the narrative text?
- Some minor pressures maybe not systematically included





Proposed editorial changes

- Language check and editing still needed; terminology to be made consistent
- Some editorial shortening may be necessary, maintaining the essence of the content
- Discharge are to be presented in graphical form (accompanying basin maps) and therefore the tables are to be left out
- Better reorganization of the content to reflect the degree of impact

Schedule for finalizing the assessment

- 31 August: Caucasus countries send amendments and additions to the Caucasus basin assessments and the summary as exact wordings and the revised delineations of aquifers either as GIS shapefiles or as maps to UNECE
- By the end of 2010: Caucasus countries send their proposals for graphs to be included
- finalized consolidated assessment
- The countries will be contacted for the validation of (batches of) basin maps when draft versions become available

