

MODEL MAPS AND GRAPHICS OF THE BASIN ASSESSMENTS

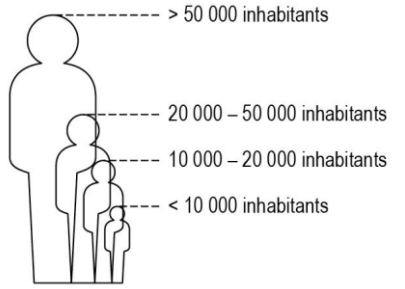
Second meeting of the task force on the water-food-energy-ecosystem nexus in transboundary basins under the water convention

Geneva, 8-9 September, 2014



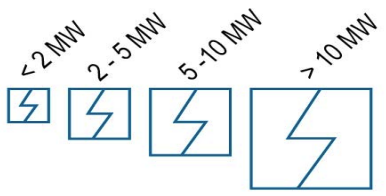
Nexus Alazani basin

Population of major cities and municipalities



Hydropower facilities

Installed capacity (MW)



- Existing hydropower plant
- Projected hydropower plant

- Forest
- Agriculture
- Irrigated agriculture

- Inadequate wastewater treatment in urban areas

Indicators Alazani basin

General



Georgia

Azerbaijan

Population



In the country: **4 935 880** / In the basin: **400 000**



In the country: **9 686 210** / In the basin: **no data**

Area used for agriculture



In the country: **no data** / In the basin: **1962 km²**



In the country: **no data** / In the basin: **no data**

Internal renewable freshwater resources



In the country: **38 km³/year** / In the basin: **3.6 km³/year**



In the country: **8 km³/year** / In the basin: **3.47 km³/year**

Electricity – installed generating capacity



In the country: **4.538 million kW** / In the basin: **no data**



In the country: **6.392 million kW** / In the basin: **no data**

Electricity from hydroelectric plants installed generating capacity



In the country: **984 MW** / In the basin: **2.4 MW**



In the country: **2850 MW** / In the basin: **35.95 MW**

GDP



In the country: **\$15.7 billion** / In the basin: **\$6.2 million**



In the country: **\$66.6 billion** / In the basin: **no data**

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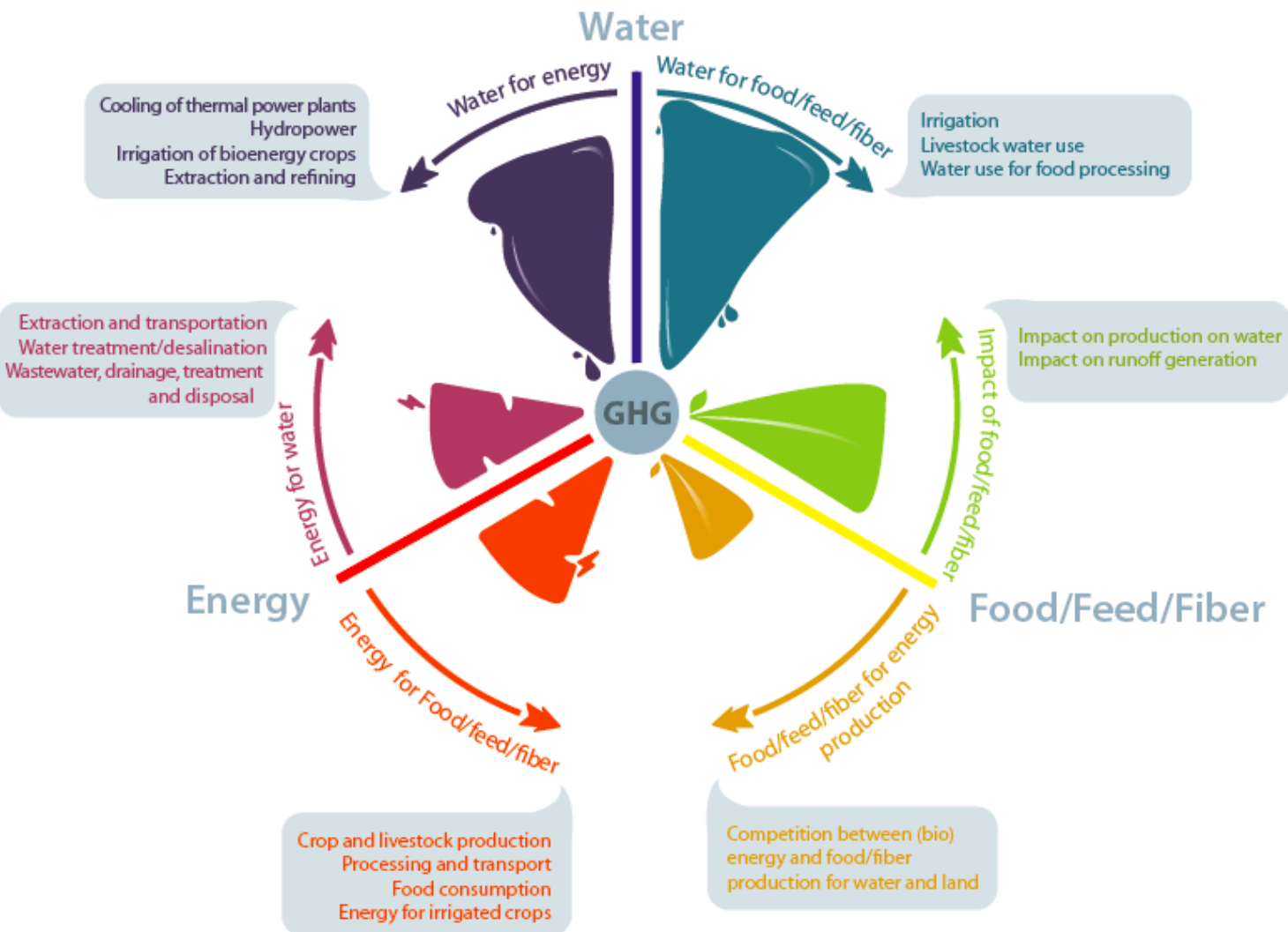


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NEXUS for the Alazani basin



Water for food/feed/fiber

Agriculture plays important role in the basin's economy. To illustrate, agricultural land accounts for 47.5% of the total land. Kakheti region is one of the most important regions in Georgia with respect to agriculture, having the biggest share, 38% of the total arable land of the country. Agriculture is important for the socio-economic development of the region, employing 82% of the labour force. Also, around 65-70% of vineyards in Georgia are concentrated in Kakheti Region. (KTH report)

Water for energy

The Alazani/Ganikh basin has significant hydro-power potential (as shown in following paragraph) and the flow also contributes to the capacity of the Mingechevir hydropower station downstream on the main stem of the Kura. (KTH report)

Energy for water

Currently, there are no available wastewater treatment plants in the regions of Kakheti. Therefore large quantities of wastewater are not treated. In 2013 the annual amount of municipal wastewater, industrial water and other reached in total 9.3 million m³. Telavi and Akhmeta municipalities hold the lion share in the wastewater discharge as seen in the figure below. (KTH report) – but it also means that no energy is consumed for the water.

There is no mention in the report, how exactly the water is extracted from the river.

Energy for Food/feed/fiber

In past years pumping stations were enabled in Kakheti region to irrigate 27,082ha of agricultural lands, including 16,412 ha of area in the Alazani/Ganikh river basin. The total capacity of the basin reaches 49,000 m³/h while the installed capacity reaches 3,386 kWh. (KTH report). Total Arable land in Kakheti region accounts for 196,237 ha. So only 8% of the arable land is irrigated with the pumping station. (apparently). But according to the report not in a very efficient way.

Food/feed/fiber for energy production

Bio energy is not of a high importance currently in both countries. Bio energy was not mentioned in the report at all.

Impact of food/feed/fiber

Soil salinity caused by irrigation and toxicity in the water are a serious threat to agricultural practices itself, while on the discharge side the organic and chemical load from the use of fertilizers, nutrients and pesticides severely affects the quality of the water downstream, possibly causing eutrophication... Excess nitrogen and phosphorus affect the quality of the water and affect the ecosystem services (water provision) and are affected by the loss of ecosystem services (soil erosion etc). As can be seen from the following graph, the concentration of nitrite and nitrate is increasing over the last decade. Ammonium concentrations show a decreasing trend while phosphate levels remain stable over this time period. (KTH report)

NEXUS in the Alazani basin

- Water for food: Irrigation, livestock water use, water use for food processing
- Water for energy: cooling thermal power plants, hydropower, Irrigation of bioenergy crops, extraction and refining
- Energy for water: extraction and transportation, water treatment/desalinization, wastewater, drainage, treatment and disposal
- Energy for food: crop and livestock production, processing and transport, food consumption, energy for irrigated crops
- Food for energy: competition between bioenergy and food/fiber, production for water and land
- Food for water: impact on production of water, impact of runoff generation

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Thank you!

- Your comments?
 - Proposals?
- Recommendations?