EASTERN PARTNERSHIP
CIVIL SOCIETY FORUM

Funded by
the European Union

ICFER

Equitable access to safe drinking water and sanitation in Georgia:

Well Water Inventory and Monitoring in Borjomi Municipality Resorts: Akhaldaba, Kvibisi, and Zanavi Georgia

Grigol (Gia) Abramia & Giorgi Dzamukashvili

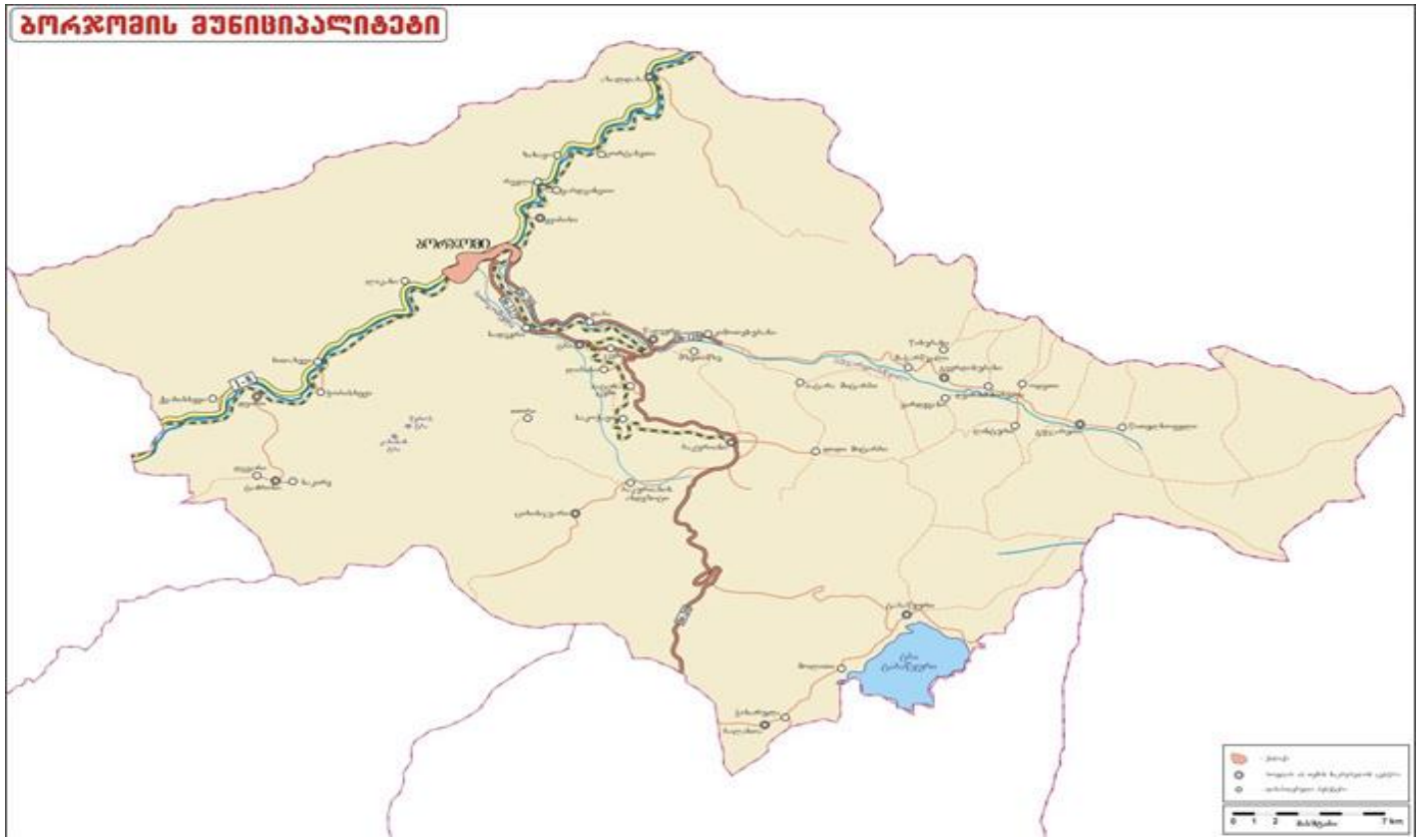
International Center for Environmental Research Tbilisi, Georgia

ECO-TIRAS

EASTERN PARTNERSHIP
CIVIL SOCIETY FORUM

Funded by
the European Union

ECO-TIRAS



Map of Borjomi Municipality (Source: Borjomi Municipality)

EASTERN PARTNERSHIP
CIVIL SOCIETY FORUM

Funded by
the European Union

ECO-TIRAS logo here]

Overview of Problems

- the ratification of the Protocol on Water and Health;
- the development and implementation of national objective indicators;
- and the improvement of mutual collaboration in the area of transboundary river management (river management);

[If needed partner logos go here]

EASTERN PARTNERSHIP
CIVIL SOCIETY FORUM

Funded by
the European Union

[Your logo here]

Key Challenges

Municipality	Total length (km)	Damaged part (%)
Akhaltsikhe	80	90%
Aspindza	17	20%
Adigeni	17	70%
Borjomi	56	15%
Akhalkalaki	55	90%
Ninotsminda	55	40%

Fresh Water Supply System Condition in Samtskhe-Javakheti
Source: Samtskhe-Javakheti Water Supply & Sewerage Company

[If needed partner logos go here]

EASTERN PARTNERSHIP
CIVIL SOCIETY FORUM

Funded by
the European Union

ECO-TIRAS

Well Water Inventory and Monitoring Field Study Visit to Borjomi municipality (Akhaldaba, Kvibisi, Zanavi)

Stage-1

Photo 1. Akhaldba (21.09.2023) left to right: CBO Borjomi member, Georgian acter Tristan Saralidze (local well owner), Alexander Mindorashvili, MEA, Kakha Neparidze, ICFER,Grgol Abramia, PIT, George Dzamukashvili, PIT

EASTERN PARTNERSHIP
CIVIL SOCIETY FORUM

Funded by
the European Union

ECO-TIRAS

Google Maps

Borjomi trip

Map of drinking water well samples taken in Akhaldaba

EASTERN PARTNERSHIP
CIVIL SOCIETY FORUM

Funded by
the European Union

ECO-TIRAS

- Time of research: 21.09.2023
- Area, district, settlement, street: Borjomi municipality: Akhaldaba, Kvibisi, Zanavi (Total-18 Wells)
- Location of well:
  - Street: 3
  - Yard : 9
  - Distance between houses: 2
  - Garden: 4
  - Orchard:
  - On the right place: 12
  - on an elevated slope
  - In the ravine
  - Near the ravine

- Existence of slope drainage ditch: in four cases yes; in fourteen cases no
- Possibility of covering the well during snow melting, torrential rains, floods: in 10 cases- yes, but in 8 cases-no
- The source of possible contamination is located above or below the well: above-6, above and below 7, none-5
- Type of well:
- pillar -2
- concrete -16
- brick or other material
- How far is the well from toilet, house, manure pit, sewage System, septic tank and other possible sources?
- There are wells in 10 meters distance-5; 20 meters distance-4; 30 meters distance-4; 40 meters distance-1; 50 meters distance-2.
- How far is it from the highway?
- There are wells in 10 meters distance-5; 20 meters distance-1; 30 meters distance-2. In distance more than 30 meters meters-9; less than 5 meters-1.
- The height of the well wall from the ground level?
- There are wells with following walls from the ground: 0,7-3; 0,8-4; 1,5-11.

- The depth of the well from the ground surface to the water mirror
-
- There are wells with following depth: about 10 meters-8; about 15 meters-7; more than 15 meters-3.
-
- Try type of the wellhead:
-
    - Wooden ring -2
    - metal cover -1
    - Metal mesh -10
    - reinforced concrete closure-4
-

EASTERN PARTNERSHIP
CIVIL SOCIETY FORUM

Funded by
the European Union

ECO-TIRAS

Wellhead equipment:

- Booth-7
- Shed – 3
- None-10

- The bottom of the well body is covered with clay, brick and concrete- all of them are covered
- What is the body of the well? Concrete.
- The condition of the soil around the well
  - It is paved -14
  - It's not paved-4
- If not, the well is cleaned once a year: 6 yes, 12 no.
- Does they provide cleaning?
- 4 well owners provided, chlorine treatment
- 14 well owners do not provide treatment
- Well owners provided, chlorine treatment subsequent washing

EASTERN PARTNERSHIP
CIVIL SOCIETY FORUM

Funded by
the European Union

ECO-TIRAS

Results of Chemical Analyses

- **AKHALDABA, KVIBISI, ZANAVI**
- **Location: Akhaldaba** (Georgian: is adaba in Borjomi Municipality in the Samtskhe–Javakheti region of Georgia. The daba has a population of 1,800, as of 2020. However EPA lists common conditions or nearby activities that well owners should be aware of and the substance(s) that you should consider testing for to ensure your well is safe. Not all of the substances listed pose an immediate or long term health problem, some impact quality of life only such as appearance, taste, and odor.
- **Location:** Akhaldaba (Georgian: is adaba in Borjomi Municipality in the Samtskhe–Javakheti region of Georgia. The daba has a population of 1,800, as of 2020. However EPA lists common conditions or nearby activities that well owners should be aware of and the substance(s) that you should consider testing for to ensure your well is safe. Not all of the substances listed pose an immediate or long term health problem, some impact quality of life only such as appearance, taste, and odor.
- **Location:** Akhaldaba (Georgian: is adaba in Borjomi Municipality in the Samtskhe–Javakheti region of Georgia. The daba has a population of 1,800, as of 2020. However EPA lists common conditions or nearby activities that well owners should be aware of and the substance(s) that you should consider testing for to ensure your well is safe. Not all of the substances listed pose an immediate or long term health problem, some impact quality of life only such as appearance, taste, and odor.

EASTERN PARTNERSHIP
CIVIL SOCIETY FORUM

Funded by
the European Union

ECO-TIRAS

	Test for:	Extended range pH	pH	Manganize check	Nitrite	Nitrate	Phospate	Amonia
AKHALDABA	Well-1	4, 7,5	7	0-01	5	0,3	0	0
	Well-2	7,5, 7	7	0,02	0,5	0,3	0	0
	Well-3	7,5, 7	7	0,03	0,5	0,3	0	0
	Well-4	7,7	7	0,02	0,3	2	0	0
	Well-5	6,5, 7	7	0.02	0,5	0,15	0	0
	Well-6	6,5, 7	7	0.02	0,5	0,15	0	0
	Well-7	7	8	0.4	2	0,3	0	0
	Well-8	7	7	0,02	0	0,3	0	2.0
	Well-9	6,5	7	0.05	2	0.3	0	0
	Well-10	6,5	7	0.05	2	0.3	0	0
	Well-11	6,5	7	0.05	0,5	0,3	0	0
KVIBISI	Well-1	6.5, 7	7	0.02	2	0,15	10-20	0
	Well-2	7	8	0.02	0	0,15	10-20	0
	Well-3	7,5, 7	7		0.5	0,3	0	0
	Well-4	7,7	7	0,02	0.3	2	0	0
ZANAVI	Well-1	6,5	7	0.05	0,5	0,3	0	0
	Well-2	7	7	0.05	2	0,15	10-20	0
	Well-3	7	7	0.05	2	0,15	10-20	0
	Well-4	7	7	0.02	2	0,15	10-20	0

EASTERN PARTNERSHIP
CIVIL SOCIETY FORUM

Funded by
the European Union

ECO-TIRAS

Exam report# - 10/23
Results of microbiological analysis of water:
Sample - 1.0 l. volume of water

Microorganisms to be determined	**Permissible quantitative value of the indicator***	**(Drinking water) the actual quantitative value of the indicator**
Mesophilic aerobes and facultative anaerobes at 37°C for 24 hours.	<20 Colony / ml	**1** Colony / ml
Mesophilic aerobes and facultative anaerobes at 22°C 48 h.	<100 Colony / ml	**20**Colony / ml
Total coliforms	0 cell / 300 ml	**0** cell/300ml
Fecal coliforms/E.coli	0 cell / 300 ml	**1 ? ? ?** / 300 ml
Fecal streptococci	0 cell / 250 ml	**0**/ 250 ml
Fecal streptococci	0 unit. / 100 ml	**0**/ 100 ml

EASTERN PARTNERSHIP
CIVIL SOCIETY FORUM

Funded by
the European Union

ECO-TIRAS

Exam report# - 10/23 Results of microbiological analysis of water: sample - 500 ml l.

Microorganisms to be determined	Permissible quantitative value of the indicator*	(Drinking water) the actual quantitative value of the indicator
Mesophilic aerobes and facultative anaerobes at 37°C for 24 hours.	<20 col/ml	**50** col/ ml
Mesophilic aerobes and facultative anaerobes at 22°C 48 h.	<100 col/ml	**1500** col/ ml
Total coliforms	0 cell / 300 ml	****0/** cell/300ml
Fecal coliforms/E.coli	0 cell / 300 ml	**94 cell /**300 ml
Fecal streptococci	0 cell / 250 ml	**60/** 250 ml
Fecal streptococci	0 un./ 100 ml	**0** /100 ml

Microorganisms to be determined	Permissible quantitative value of the indicator*	(drinking water) the actual quantitative value of the indicator
Mesophilic aerobes and facultative anaerobes at 37°C for 24 hours.	<20 colony 1 ml	1 col/ ml
Mesophilic aerobes and facultative anaerobes at 22°C 48 h.	<100 colony 1ml	20col/ ml
Total coliforms	0 cell / 300 ml	0 cell/300ml
Fecal coliforms/E.coli	0 cell / 300 ml	1 cell/ 300 ml
Fecal streptococci	0 cell / 250 ml	0/ 250 ml
Coliphage (enrichment method)	0 un. / 100 ml	0/ 100 ml

Annex-4-1 Results of microbiological analysis of water in Quibisi
Exam report # 11- 10/23
Results of microbiological analysis of water:
sample - 0.5 l. volume of water (+ 50 ml of Intestiphag)

Microorganisms to be determined	**Permissible quantitative value of the indicator***	**(Drinking water) the actual quantitative value of the indicator**
Mesophilic aerobes and facultative anaerobes at 37°C for 24 hours.	<20 Colony / ml	**24 000** Colony / ml
Mesophilic aerobes and facultative anaerobes at 22°C 48 h.	<100 Colony / ml	**35 000** Colony / ml
Total coliforms Fecal coliforms/E.coli	0 cell / 300 ml 0 cell / 300 ml	** 2160 cell/300ml 9000 cell/ 300 ml
Fecal streptococci	0 cell / 250 ml	1200/ 250 ml
Fecal streptococci	0 unit. / 100 ml	200/100 ml

Annex-4-2Between school and village council
Exam report # 12- 10/23
Results of microbiological analysis of water:
sample - 0.5 l. volume of water (+ 50 ml of Intestiphag)

Microorganisms to be determined	**Permissible quantitative value of the indicator***	**(Drinking water) the actual quantitative value of the indicator**
Mesophilic aerobes and facultative anaerobes at 37°C for 24 hours.	<20 Colony / ml	**10 000** Colony / ml
Mesophilic aerobes and facultative anaerobes at 22°C 48 h.	<100 Colony / ml	**3400** Colony / ml
Total coliforms	0 cell / 300 ml	** 1500 cell/300ml
Fecal coliforms/E.coli	0 cell / 300 ml	1800 cell/ 300 ml
Fecal streptococci	0 cell / 250 ml	960/ 250 ml
Fecal streptococci	0 unit. / 100 ml	800/100 ml

Exam Minutes# 1- 10/23 Results of microbiological study of bacterial isolates

Growth on microbiological areas **API Tests Phagosensisivity**	Name of Sample							
	1 Kvibisi 2(FCC)	2 Kvibisi 2(FCC)	3 Kvibisi 2+ phages (FCC)	4 Kvibisi 2+ phages (FCC)	5 Zenavi (ENT)	6 Zenavi (ENT)	7 Zenavi+Phage (ENT)	8 Zenavi+Phage (ENT)
Growth on microbiological areas								
Mac Endo								
Sim TSA MSA KOH								
OX Cat Bile Esculin agar Gram paint								
Identification by API System								
Api 20E, 20 NE, STREP	E.coli	E.coli	E.coli	E.coli	Enterococus faecium	Enterococus faecium	Risobacterium radiobacter	Agrobacterium radiobacter
Sensitivity Towards Phages (Biopreparations of Eliava Institute)								
F Ses F Enco								
F Fersis								
F Pio				40tv				
F Staf								
F Intesti		ntv	+	+	+	+		