EU4Environment in Eastern Partner Countries:
Water Resources and Environmental Data (ENI/2021/425-550)

GROUNDWATER SURVEY 2022

Georgia

Funded by
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ABOUT THIS REPORT

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ABOUT EU4ENVIRONMENT – WATER RESOURCES AND ENVIRONMENTAL DATA

This Programme aims at improving people's wellbeing in EU's Eastern Partner Countries and enabling their green transformation in line with the European Green Deal and the Sustainable Development Goals (SDGs). The programme's activities are clustered around two specific objectives: 1) support a more sustainable use of water resources and 2) improve the use of sound environmental data and their availability for policy-makers and citizens. It ensures continuity of the Shared Environmental Information System Phase II and the EU Water Initiative Plus for Eastern Partnership programmes.

The Programme is implemented by five Partner organisations: Environment Agency Austria (UBA), Austrian Development Agency (ADA), International Office for Water (OiEau) (France), Organisation for Economic Co-operation and Development (OECD), United Nations Economic Commission for Europe (UNECE). The action is co-funded by the European Union, the Austrian Development Cooperation and the French Artois-Picardie Water Agency based on a budget of EUR 12,75 million (EUR 12 million EU contribution). The implementation period is 2021-2024.

https://eu4waterdata.eu

CONTENTS

List of abbreviations

ADA ..... Austrian Development Agency
BQE ..... Biological Quality Elements
DoA ..... Description of Action
DG NEAR ..... Directorate-General for Neighbourhood and Enlargement Negotiations of the European Commission
EaP ..... Eastern Partners
EC ..... European Commission
EECCA ..... Eastern Europe, the Caucasus and Central Asia
EMBLAS ..... Environmental Monitoring in the Black Sea
EPIRB ..... Environmental Protection of International River Basins
ESCS ..... Ecological Status Classification Systems
EU ..... European Union
EUWI+ ..... European Union Water Initiative Plus
GEF ..... Global Environmental Fund
ICPDR ..... International Commission for the Protection of the Danube River
INBO ..... International Network of Basin Organisations
IOW/OIEau ..... International Office for Water, France
IWRM ..... Integrated Water Resources Management
NESB ..... National Executive Steering Board
NFP ..... National Focal Point
NGOs ..... Non-Governmental Organisations
NPD ..... National Policy Dialogue
OECD ..... Organisation for Economic Cooperation and Development
RBD ..... River Basin District
RBMP ..... River Basin Management Plan
Reps ..... Representatives (the local project staff in each country)
ROM ..... Result Oriented Monitoring
ToR ..... Terms of References
UBA ..... Umweltbundesamt GmbH, Environment Agency Austria
UNDP ..... United Nations Development Programme
UNECE ..... United Nations Economic Commission for Europe
WFD ..... Water Framework Directive

Country Specific Abbreviations Georgia

MENRP..... Ministry of Environment and Natural Resources Protection

NEA..... National Environment Agency

NWP..... National Water Partnership

Key messages

- Groundwater quality assessment is one of the important components for the preparation of the River Basin Management Plan (RBMP). Accordingly, the project envisaged the implementation of field hydrogeological works in the territory of River Basin District of Georgia;
- Field work included finding water points, testing field parameters, taking water samples and transporting to the laboratory;
- The report presents the results of field hydrogeological works in the Rioni River Basin, which was carried out by the specialists of the Department of Geology of the LEPL National Environmental Agency;
- The survey will be used for the improvement of the fresh groundwater monitoring network in the area of the Rioni River Basin;
- Based on the survey results, water points will be selected, where the NEA will continue to groundwater quality monitoring.

Executive Summary

The report - **"Groundwater Survey - 2022"** was prepared on the basis of field hydrogeological works, which were carried out on November 8-14, 2022 in the **Rioni River Basin District of Georgia**. During the mentioned period, 20 samples were taken, in which chemical parameters were determined according to the survey manual. Laboratory analysis were performed in Kutaisi and Tbilisi laboratories of the LEPL National Environmental Agency.

The report is accompanied by all relevant materials - survey manual, monitoring site passports - catalog sampling sites, chemical data, sampling protocols, hand-over protocols, sampling sites locations (shp. File) and metadata;

The report and relevant annexes are prepared in Georgian and English languages.

The annexes are available as separate documents.

1. Introduction and Scope

The work to be carried out within the framework of the project included the following activities:

- Preparation of the survey manual;
- Processing of stock-historical materials (hydrogeological maps and catalogues);
- Preparation of topographic and hydrogeological maps for field work;
- preparation of sampling protocols;
- Signing an agreement with the laboratory of the National Environment Agency of for the chemical analysis of groundwater samples;
- Implementation of field survey;
- Measurement of field parameters and completion of sampling protocols;
- Transportation of samples to the laboratory in the appropriate period;
- Performing laboratory analysis according to the chemical substances specified in the survey manual;
- Preparing the report.

1.1. Preparatory and Performed Works for the Survey

- During the preparation for the survey, the relevant responsibilities, the equipment needed for sampling, the capabilities of the laboratories were discussed and the "Groundwater Survey Manual - 2022" was prepared (Annex 1);
- Stock-historical materials were searched - hydrogeological maps and catalogues of water points;
- Topographic and hydrogeological maps for field work were prepared and printed;
- Sampling protocols were prepared;
- Appropriate bottles and field measurement device were prepared.

1.2. List of Measured Parameters and Analysed Substances

The list of parameters was selected based on the available capabilities of the laboratories. Field Parameters are listed in Table 1, and substances analysed in the laboratory are listed in Table 2.

Table 1: Groundwater Survey 2022 - Field Parameters

Parameter/Indicator	Unit	Measurement device
Water temperature	°C	Field device / WTW Multi 3630 IDS
Electrical conductivity	µS/cm	Field device / WTW Multi 3630 IDS
TDS	ppm	Field device / WTW Multi 3630 IDS
pH value	-	Field device / WTW Multi 3630 IDS
Dissolved oxygen	mg/l, %	Field device / WTW Multi 3630 IDS
Air temperature	°C	-

Table 2: Groundwater Survey 2022 - Substances analysed in the laboratory

Parameter / Indicator	Unit	Sample treatment / Conservation
Sodium Na	mg/l	No sample treatment ; This parameter was determined in Kutaisi laboratory
Potassium K	mg/l	No sample treatment ; This parameter was determined in Kutaisi laboratory
Calcium Ca	mg/l	No sample treatment ; This parameter was determined in Kutaisi laboratory
Magnesium Mg	mg/l	No sample treatment ; This parameter was determined in Kutaisi laboratory
Chloride Cl	mg/l	No sample treatment ; This parameter was determined in Kutaisi laboratory
Sulphate SO_4	mg SO_4/l	No sample treatment ; This parameter was determined in Kutaisi laboratory
Hydrogen carbonate HCO_3	mg/l	No sample treatment ; This parameter was determined in Kutaisi laboratory
Nitrate NO_3	mg NO_3/l	No sample treatment ; This parameter was determined in Kutaisi laboratory
Nitrite NO_2	mg NO_2/l	No sample treatment ; This parameter was determined in Kutaisi laboratory
Ammonium NH_4	mg NH_4/l	No sample treatment ; This parameter was determined in Kutaisi laboratory
Phosphate PO_4	mg PO_4/l	No sample treatment ; This parameter was determined in Kutaisi laboratory

Parameter / Indicator	Unit	Sample treatment / Conservation
Total mineralization	mg/l	-
Aluminium Al	mg/l	Acidification with HNO_3; This parameter was determined in Tbilisi laboratory
Arsenic As	mg/l	Acidification with HNO_3; This parameter was determined in Tbilisi laboratory
Iron Fe	mg/l	Acidification with HNO_3; This parameter was determined in Tbilisi laboratory
Zinc Zn	mg/l	Acidification with HNO_3; This parameter was determined in Tbilisi laboratory
Cadmium Cd	mg/l	Acidification with HNO_3; This parameter was determined in Tbilisi laboratory
Chromium Cr	mg/l	Acidification with HNO_3; This parameter was determined in Tbilisi laboratory
Copper Cu	mg/l	Acidification with HNO_3; This parameter was determined in Tbilisi laboratory
Nickel Ni	mg/l	Acidification with HNO_3; This parameter was determined in Tbilisi laboratory
Lead Pb	mg/l	Acidification with HNO_3; This parameter was determined in Tbilisi laboratory
Manganese Mn	mg/l	Acidification with HNO_3; This parameter was determined in Tbilisi laboratory
Total pesticides content	mg/l	No sample treatment ; This parameter was determined in Tbilisi laboratory

1.3. ocation of Investigated Water Points and Initial Results of Field Survey

Detailed informations about the administrative location of the investigative water points and the primary characteristics of the water is presented below. At this stage, the delineation of groundwater bodies has not been completed, so the tables do not contain information about the codes of the groundwater body.

1.3.1. Administrative Location of Investigated Water Points

The types of investigated water points, their location - villages, regions, municipalities, coordinates are listed in Table 3. Coordinates are given in the WGS 1984 UTM system.

Table 3: Groundwater Survey 2022 – Monitored Sampling Sites

Sample ID	Type of water point	Location	Municipality	Region	X	Y	Elevation, m
1	Spring	Rikoti (On the left side of the Tbilisi-Senaki-Leselidze highway)	Kharagauli	Imereti	365712	4662047	446
2	Spring	Village Goresha	Kharagauli	Imereti	356403	4658686	460
3	Spring	Village Sargveshi	Kharagauli	Imereti	354707	4658843	544
4	Spring	Village Ubisa	Kharagauli	Imereti	353438	4661798	265
5	Spring	Village Ophitara	Tsageri	Racha-Lechkhumi and Kvemo Svaneti	305878	4708759	619
6	Spring	Spring near the "Green Theater" (on the left side of the Tsageri-Lentekh highway)	Tsageri	Racha-Lechkhumi and Kvemo Svaneti	317160	4725250	520
7	Spring	Left side of the Lentekhi-Ushguli highway	Lentekhi	Racha-Lechkhumi and Kvemo Svaneti	345351	4741429	1331
8	Spring	Between village Levsheri and Phanaga	Lentekhi	Racha-Lechkhumi and Kvemo Svaneti	329066	4744471	1058
9	Spring	Village Joneti	Tskaltubo	Imereti	310025	4695694	200
10	Spring	Village Alpana	Tsageri	Racha-Lechkhumi and Kvemo Svaneti	323797	4716735	489
11	Spring	Village Zudali	Oni	Racha-Lechkhumi and Kvemo Svaneti	367037	4714338	746
12	Spring	Village Khotevi	Ambrolauri	Racha-Lechkhumi and Kvemo Svaneti	347187	4703037	866
13	Spring	Nakerala Pass	Tkibuli	Imereti	336400	4694222	937
14	Household well	Zestaphoni (Uznadze St. #18)	Zestaphoni	Imereti	338479	4663942	192
15	Spring	Village Katskhi	Chiatura	Imereti	352085	4682494	543
16	Spring	Kharagauli district	Kharagauli	Imereti	351869	4652311	298
17	Spring	On the right side of the highway of Sameba-Jikheti Monastery	Lanchkhuti	Guria	264679	4661220	196
18	Spring	Village Burnati, "Berdznis tskaro"	Chokhatauri	Guria	275791	4659110	71
19	Spring	Village Kveda Mukedi	Vani	Imereti	290741	4661212	71
20	Spring	Village Shubani	Bagdati	Imereti	317695	4658688	391

1.3.2. Initial Results of Field Survey - Field Parameters

Table 4: Groundwater Survey 2022 - Field Parameters

Sample ID	Type of water point	Location	Temperature, °C		Water Cond., uS/cm	Water TDS, ppm	PH	Dissolved oxygen	
			Water	Air				%	mg/l
1	Spring	Rikoti (On the left side of the Tbilisi-Senaki-Leselidze highway)	9	10.90	126.90	64.00	7.95	99.60	10.57
2	Spring	Village Goresha	11	11.50	513.00	251.00	7.13	65.50	6.85
3	Spring	Village Sargveshi	11	12.20	449.00	221.00	7.12	81.20	8.02
4	Spring	Village Ubisa	12	12.20	628.00	309.00	7.93	57.30	5.67
5	Spring	Village Ophitara	6	11.50	485.00	239.00	7.53	98.30	10.44
6	Spring	Spring near the "Green Theater" (on the left side of the Tsageri-Lentekh highway)	10	10.70	393.00	195.00	7.27	95.60	9.97
7	Spring	Left side of the Lentekhi-Ushguli highway	11	10.60	699.00	340.00	7.63	93.20	8.98
8	Spring	Between village Levsheri and Phanaga	8	9.50	94.70	50.00	7.59	94.90	9.69
9	Spring	Village Joneti	5	12.10	129.50	65.00	7.75	97.30	10.27
10	Spring	Village Alpana	8	10.40	298.00	141.00	7.49	98.00	10.51
11	Spring	Village Zudali	10	10.20	499.00	245.00	7.52	87.20	8.96
12	Spring	Village Khotevi	10	9.90	443.00	219.00	7.10	92.60	9.63
13	Spring	Nakerala Pass	10	10.20	395.00	195.00	7.81	98.50	10.60
14	Household well	Zestaphoni (Uznadze St. #18)	12	16.10	956.00	469.00	6.28	84.20	7.98
15	Spring	Village Katskhi	10	14.00	542.00	271.00	7.03	91.50	8.99
16	Spring	Kharagauli district	12	13.10	402.00	198.00	7.70	95.60	9.83
17	Spring	On the right side of the highway of Sameba-Jikheti Monastery	8	12.80	129.50	66.00	7.07	90.20	9.53
18	Spring	Village Burnati, "Berdznis tskaro"	13	12.80	171.00	87.00	7.20	94.80	10.17
19	Spring	Village Kveda Mukedi	15	14.30	466.00	230.00	6.82	46.10	4.78
20	Spring	Village Shubani	17	12.30	96.80	49.00	7.44	96.70	10.02

1.3.3. Some Typical Pictures of the Field Work

2. Summary of results

Field survey were carried out in accordance with the planned activities by three specialists of the Department of Geology (NEA). There were no difficulties during the survey period.

- Samples were taken from 20 water points (Annex 2, Annex 6);
- In field conditions, water characteristic parameters were measured and sampling protocols were filled (Annex 4);
- The samples were delivered to the Kutaisi laboratory on November 8, 10, 11, 12, and to the Tbilisi laboratory on November 14 (Annex 5);
- Information on chemical data was prepared based on laboratory results (Annex 3);
- Based on the performed works, a report - "Groundwater Survey - 2022" and relevant annexes was prepared.

The information collected in the field will be used for the expansion of fresh groundwater monitoring network in Georgia (**Rioni River Basin District)** and the data of the survey results will be one of the constituent components for the creation of the groundwater qualitative database.

Annexes

Annex 1: Survey Manual (in word and pdf format);

Annex 2: Monitoring site passports - Catalog sampling sites (in pdf format);

Annex 3: Chemical data (in Excel format);

Annex 3.1: Laboratory analyses - Anions and Cations (in word format);

Annex 3.2: Laboratory analyses - Heavy metals (in word format);

Annex 3.3: Laboratory analyses - Pesticides (in word format);

Annex 4: Sampling protocols (in pdf format);

Annex 5: Hand-over protocols (in pdf format);

Annex 6: Sampling Sites Locations (shp. file)

Annex 7: Metadata (in pdf format)

Annexes are available as separate documents

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