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

GROUNDWATER SURVEY REPORT 2023

ARMENIA

Funded by
the European Union

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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 programme is principally funded by the European Union and co-funded by 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 Armenia

EMIC ..... Environmental Monitoring and Information Centre (until January 2020)

HMC..... Hydrogeological Monitoring Centre (since February 2020)

MNP..... Ministry of Nature Protection

RA ..... Republic of Armenia

SCWS..... State Committee on Water Systems

SWCIS..... State Water Cadastre Information System of Armenia

WRMA ..... Water Resources Management Agency

Key messages

The Northern RBD includes the river basins of Debed, Aghstev, Hakhum, Tavush, Khndzorut with their tributaries and covers an area of 7185 km^2.

The main goal of the survey is the development of the national network of groundwater monitoring in the Northern RBD of the Republic of ARmenia. Currently, there are only 2 observation posts in the Northern RBD.

Taking into consideration the scarcity of hydrogeological monitoring observation points in Northern RBD, under the initiative of EU4Enviroment, a survey covering 32 groundwater springs for quantitative and qualitative studies in 2023 was accomplished. Finally, 16 monitoring sites were recommended for inclusion into the national groundwater monitoring network.

Executive Summary

This report comprises a summary of a groundwater chemical survey, which took place in June 2023 in the Northern River Basin District (RBD) of Armenia. In the survey 32 wells and springs were sampled, aiming at finding appropriate, already existing wells and springs which could be candidates for their integration into the national groundwater monitoring network.

Each sample was analyzed for a comprehensive number of chemical substances and indicators. The groundwater chemical survey 2023 covered the following activities:

- Development of the survey manual;
- Field survey conducted by the hydrogeologists of the Hydrometeorology and Monitoring Centre (HMC) (19-23 June 2023);
- Laboratory analyses incl. laboratory reports by the HMC laboratory;
- Interpretation of the results by the HMC hydrogeologists;
- Preparation of this groundwater survey report.

The newly gathered data for a comprehensive set of parameters acts as gap filling and as a kind of screening (surveillance monitoring) contributing to the characterisation of groundwater bodies and the risk and status assessment. All results and documents that were elaborated under this contract are public and finally accessible at the EU4Env Water and Data project website (https://eu4waterdata.eu/en/).

1. Summary of the survey 2023

1.1. General geological-hydrogeological conditions of the Northern RBD

The Northern river basin district (RBD) of Armenia includes the Debed, Aghstev, Hakhum, Tavush, Khndzorut and Voskepar river basins and together with their tributaries occupies an area of about 7,185 km2 .

The area is mountainous. The steep mountain slopes, narrow and canyon-like river valleys, intermountain depressions with a limited surface area, large differences in hypsometric marks (430 m Debedavan, 3,081 m Maymekh L.) are characteristic of long-term average annual air temperatures (-2.5–12.3 °C), average annual precipitation (490–900 mm and more) and evaporation (300–500 mm).

Pre-Paleozoic and Meso-Cenozoic metamorphic, sedimentary, volcanic - sedimentary, volcanic, intrusive and volcanic rocks participate in the geological structure. Quaternary - modern lacustrine origin and loose debris and clay formations are common in intermountain hollows.

The mentioned rocks are represented by shales, limestones, sandstones, tufobreccias, tufosandstones, porphyrites, granitoids, andesites, basalts, tuffs and other varieties.

River boulders, gravel, granular sands, clays, loams are common in intermountain depressions and river valleys. Eluvial-deluvial sandy loams, loams and boulders of small thickness (up to 5 m) are widespread in the hillsides.

The structural structure, lithological composition, porosity and fracture of the mountain rocks in the vertical area together with the frequently changing complex bioclimatic conditions determine the complex hydrogeological conditions of the northern RBD.

In the conditions of cut relief, the main part of groundwater is discharged to the surface of the earth in the form of concentrated (springs) and scattered, linear, drainage flow.

In the Debed river basin, the waters of lacustrine formations formed in volcanic rocks and intermountain depressions are used for drinking water supply, and in Aghstev and other river basins, ground water of limestone formations, various tuffogens, granitoid rocks and pebble formations of narrow river valleys are used for drinking water supply.

1.2. Recommended observation points for improving groundwater monitoring

In the Northern RBD, in the Aghstevi river basin, there are currently 2 monitoring observation points, which are highly insufficient for the assessment of changes in the qualitative and quantitative indicators of groundwater in the described RBD.

In order to choose the right monitoring observation points, before the field research, we collected and summarized archival materials. From the 80 typical wells collected, 32 observation points were selected for field research, a brief description of which is given in Table 1.

It is planned to include at least 16 of the 32 observation points studied during the field research in the monitoring network, taking into account:

1. the presence of 22 water bodies separated in the monitoring network,
2. natural protection of observation points from possible pollution, and
3. possible mild changes of observed hydrodynamic parameters (flow, level).

2. General aspects

Date of survey	19-23. **June** 2023
Location	The survey is performed in the Northern River Basin District of Armenia
Overall responsibility.	Mr Harutyun Yeremyan, HMC
Scope of survey	In total 32 monitoring sites. The list of the monitoring sites and the passports of the sites are attached as Annex.
Objective of survey	To provide input for the delineation of groundwater bodies, the risk, status and trend assessment; To identify wells and springs which could be candidates for the upcoming monitoring network; To receive a first impression about geogenic background and effects of human pressures and impacts.
Sampling team	Ms Armine Hakobyan, Mr Gegham Muradyan Mr Gevorg Torosyan (all HMC)

2.1. Measured and analysed substances

Table 1: Field parameters – measured by the HMC hydrogeologists

Parameter/Indicator	Unit	Measurement device
Water temperature	°C	field device
Electrical conductivity	µS/cm	field device
Dissolved oxygen	mg/l	field device
pH value		field device / test strip
Odour		none
Colour		none
Taste		none
Turbidity		None
Depth to groundwater table	m	Field device
Water discharge	l/s	none

Table 2: Parameters analysed at HMC laboratory

Major ions	
Calcium Ca	mg/l
Magnesium Mg	mg/l
Sodium Na	mg/l
Potassium K	mg/l
Chloride Cl	mg/l
Nitrate NO3	mg NO3/l
Sulphate SO4	mg SO4/l
Hydrogen carbonate HCO3	mg/l
Total mineralisation	mg/l

Dissolved metals	
Iron Fe	mg/l
Manganese Mn	mg/l
Aluminium Al	mg/l
Arsenic As	mg/l
Lead Pb	mg/l
Cadmium Cd	mg/l
Chromium Cr	mg/l
Copper Cu	mg/l
Nickel Ni	mg/l
Zinc Zn	mg/l

2.2. Sampled wells and springs - 2023

Taking into consideration the scarcity of hydrogeological monitoring observation points in the Northern RBD, under the initiative of EU4Enviroment, in 2023 a survey of 32 groundwater springs was performed. Of the 32 points studied, 22 are springs, 6 are flowing wells, 2 are non flowing wells and 2 are ground wells.

During the field survey, the location, type, hydrogeological conditions, some physical and chemical indices, water consumption (level), temperature, purpose of use and other parameters were described. Water samples were taken for laboratory chemical analysis.

The present report briefly describes the sampled springs by sampling numbers. Sampling protocols of groundwater springs (Annex 1), as well as the results of laboratory chemical analysis (Annex 2) are presented in the annexes.

Taking into consideration the geological-hydrogeological conditions of the groundwater springs, the features of feeding, accumulation and discharge, 16 observation points are proposed to be include in the hydrogeological monitoring network of Northern River Basin District. They are the following sites: N1, N3, N6, N7, N8, N13, N14, N15, N18, N21, N22, N24, N26, N28, N29 և N30:.

2.2.1. Site N 1 (flowing well, Lernavan village)

The flowing well is located in the administrative territory of Lernavan village of Lori region. The well was drilled in 1969. The depth is 188 m. Inner diametr of the well is 168 mm.The aquifer is set up at a depth of 160–178 m and is presented by sandstone. Water level is at an altitude of 0.8 m above the Earth's surface. The discharge of the well is 0.4 l/s, water temperature is 20.0°C, the total mineralization is 346 mg/l, dissolved oxygen 6.73 mg/l, electrical conductivity is 532 µS/cm (at 25°C), pH is 7.18.

The water flows into the river and is used for irrigation. The nitrate concentration is 8.77 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the Armenian Ministry of Health.

2.2.2. Site N 2 ("Qung" spring, Katnadjur village)

The spring is located in the administrative territory of Katnadjur village of Lori region, above the cemetery. The outflow of water is observed from tuffogenic rocks. The spring is not captured.

The discharge of the spring is 0.52 l/s, water temperature is 10.0°C, the total mineralization is 214 mg/l, dissolved oxygen 8.84 mg/l, electrical conductivity is 329 µS/cm (at 25°C), pH-value is 7.8.

The spring is utilized for drinking water supply by several houses.The nitrate concentration is 3.83 mg/l, which does not exceed the Armenian drinking water norm (45 mg/l).

2.2.3. Site N 3 (flowing well, Mets Parni village)

The flowing well is located in the administrative territory of Mets Parni village of Lori region. The well was drilled in years of 1968–1969. The depth is 188.6 m. Inner diametr of the well is 168 mm. The aquifer is presented by pebble-boulders gravel and sand.

Water level is at an altitude of 0.6 m above the Earth's surface. The discharge of well is 0.28 l/s, water temperature is 12.9°C, the total mineralization is 251 mg/l, dissolved oxygen 8,19mg/l, electrical conductivity is 386,6 µS/cm (at 25°C), pH-value is 7.92.

The well is utilized for drinking water supply by several houses.The nitrate concentration is 16,08mg/l, which does not exceed the Armenian drinking water norm (45 mg/l).

2.2.4. Site N 4 (spring, Nor Khachakap village)

The spring is located in the administrative territory of Nor Khachakap village of Lori region, above the cemetery. The outflow of water is observed from porphyritic rocks. The spring is captured, but damaged.

The discharge of the spring is 0.15 l/s, water temperature is 9.9°C, the total mineralization is 223 mg/l, dissolved oxygen 7.46 mg/l, electrical conductivity is 346 µS/cm (at 25°C), pH-value is 7.76.

The well is utilized for drinking water supply by several houses.The nitrate concentration is 12.15 mg/l, which does not exceed the Armenian drinking water norm (45 mg/l).

2.2.5. Site N 5 (spring, Darbas village)

The spring is located in the administrative territory of Darbas village of Lori region, near the cemetery. The outflow of water is observed from volcanic- sedimentary rocks. The spring is captured.

The discharge of the spring is 0.03 l/s, water temperature is 13.1°C, the total mineralization is 356 mg/l, dissolved oxygen 8.38 mg/l, electrical conductivity is 559 µS/cm (at 25°C), pH-value is 7.69.

The water is used for livestock supply. The nitrate concentration is 33.83 mg/l, which does not exceed the Armenian drinking water norm (45 mg/l).

2.2.6. Site N 6 (flowing well, Saratovka village)

The flowing well is located in the administrative territory of Saratovka village of Lori region. The well is located the left side of the river. The well was drilled in years of 1967–1970. The depth is 100 m. Inner diametr of well is 168 mm. The aquifer is presented by volcanic rocks.

Water level is at an altitude of 1.2 m above the Earth's surface. The discharge of the well is 0.1 l/s, water temperature is 13.2°C, the total mineralization is 609 mg/l, dissolved oxygen 3.45mg/l, electrical conductivity is 937 µS/cm (at 25°C), pH-value is 7.08.

The water is not used.The nitrate concentration is 0.16 mg/l, which does not exceed the Armenian drinking water norm (45 mg/l).

2.2.7. Sample N 7 (spring, Saratovka village)

The spring is located in the administrative territory of Saratovka village of Lori region. The spring is located the right side of the river. The outflow of water is observed from volcanic- sedimentary rocks. The spring is captured.

The discharge of the spring is 0.25 l/s, water temperature is 10.8°C, the total mineralization is 385 mg/l, dissolved oxygen 4.75 mg/l, electrical conductivity is 592 µS/cm (at 25°C), pH-value is 7.14.

The water is not used. The nitrate is 1.60 mg/l, which does not exceed the Armenian drinking water norm (45 mg/l).

2.2.8. Sample N 8 (flowing well, Tashir city)

The flowing well is located in the administrative territory of Tashir city of Lori region. The well was drilled in early 1970s. The depth is 115 m. Inner diametr of the well is 230 mm.The aquifer is presented by volcanic rocks.

Water level is at an altitude of 1.35m above the Earth's surface. The discharge of the well is 6.5 l/s, water temperature is 10.6°C, the total mineralization is 418 mg/l, dissolved oxygen 6.40 mg/l, electrical conductivity is 643 µS/cm (at 25°C), pH-value is 7.32.

The water is not used and it flows into the Tashir River. The nitrate concentration is 33.28 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.9. Sample N 9 (flowing well, Getavan/Stepanavan village)

The flowing well is located in the administrative territory of Getavan/Stepanavan village of Lori region.

The well was drilled in early 1970s. The depth is 85 m. Inner diametr of the well is 219 mm. The aquifer is presented by volcanic rocks.

Water level is at an altitude of 1.4 m above the Earth's surface. The discharge of the well is 12 l/s, water temperature is 8.9°C, the total mineralization is 591 mg/l, dissolved oxygen 8.81 mg/l, electrical conductivity is 139.5 µS/cm (at 25°C), pH-value is 7.88.

The water is not used, flows into the river. The nitrate concentration is 2.52 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.10. Sample N 10 (flowing well, Getavan/Stepanavan village)

The flowing well is located in the administrative territory of Getavan/Stepanavan village of Lori region. The well was drilled in early 1970s. The depth is 93 m. Inner diametr of well is 219 mm. The aquifer is presented by volcanic rocks.

Water level is at an altitude of 2.8 m above the Earth's surface. The discharge of well is 62.0 l/s, water temperature is 7.9°C, the total mineralization is 83 mg/l, dissolved oxygen 9.35 mg/l, electrical conductivity is 131 µS/cm (at 25°C), pH-value is 7.9.

The water is not used, flows into the river. The nitrate concentration is 2.73 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.11. Sitee N 11 (" Lusaghbyur " spring, Lori Berd village)

The spring is located in the administrative territory of Lori Berd village of Lori region. The outflow of water is observed from volcanic rocks. The spring is not captured.

The discharge of the spring is 13 l/s, water temperature is 9.1°C, the total mineralization is 120 mg/l, dissolved oxygen 9.62 mg/l, electrical conductivity is 188 µS/cm (at 25°C), pH-value is 7.5.

The water is not used. The nitrate concentration is 4.36 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.12. Site N 12 ("Kobayr" spring, Tumanyan village)

The spring is located in the administrative territory of Tumanyan village of Lori region, in the canyon of Kobayr. The outflow of water is observed from volcanic rocks. The spring is captured.

The discharge of the spring is 1.0 l/s, water temperature is 15.6°C, the total mineralization is 528 mg/l, dissolved oxygen 9.09 mg/l, electrical conductivity is 812 µS/cm (at 25°C), pH-value is 8.45.

The spring is utilized for drinking water. The nitrate concentration is 26.23 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.13. Site N 13 ("Kakali taki" spring, Shamlugh village (Bendik district))

The spring is located in the administrative territory of Shamlugh village (Bendik district) of Lori region. The outflow of water is observed from volcanic- sedimentary rocks. The spring is captured.

The discharge of the spring is 0.2 l/s, water temperature is 10.5°C, the total mineralization is 474 mg/l, dissolved oxygen 6.9 mg/l, electrical conductivity is 730 µS/cm (at 25°C), pH-value is 7.12.

The spring is near the cemetery, and utilized for drinking water supply. Only 15–20 people live in the village. The nitrate concentration is 33.81 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.14. Sample N 14 (well, Bagratashen village)

The flowing well is located in the administrative territory of Bagratashen village of Tavush region. The well was drilled in 1960s. The depth is 26 m. Inner diametr of well is 273 mm. The aquifer is presented by pebble-boulders gravel and sand.

Water level is at an altitude of 8 m below the Earth's surface. ECW 10 brand submersible pump is installed in the 16m depth of the well.The discharge of well is 10.0 l/s, water temperature is 14.0°C, the total mineralization is 165 mg/l, dissolved oxygen 6.85 mg/l, electrical conductivity is 254 µS/cm (at 25°C), pH-value is 8.01.

The water is not used. The nitrate concentration is 4.72 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.15. Sample N 15 (ground well, Berdavan village)

The flowing well is located in the administrative territory of Berdavan village of Tavush region. The well was drilled in 1980s. The depth is 5 m. Inner diametr of well is 480mm. The aquifer is presented by pebble-boulders gravel and sand.

Water level is at an altitude of 0 m the Earth's surface. The pump is missing. ECW 10 brand submersible pump is installed in the 16m depth of the well.The discharge of well is 10.0 l/s, water temperature is 12.4°C, the total mineralization is 594 mg/l, dissolved oxygen 5.2 mg/l, electrical conductivity is 914 µS/cm (at 25°C), pH-value is 7.12.

The water is not used. The nitrate concentration is 31.58 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.16. Site N 16 ("Darbnants" spring, Jujevan village)

The spring is located in the administrative territory of Jujevan village of Tavush region. The outflow of water is observed from volcanic- sedimentary rocks. The spring is captured.

The discharge of the spring is 1.0 l/s, water temperature is 12.0°C, the total mineralization is 578 mg/l, dissolved oxygen 7.3 mg/l, electrical conductivity is 889 µS/cm (at 25°C), pH-value is 7.16.

The spring is not used. The nitrate concentration is 43.56 mg/l, which is high, but does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.17. Site N 17 (spring, Voskevan village)

The spring is located in the administrative territory of Voskevan village of Tavush region. The outflow of water is observed from tuffaceous sandstones, volcanic- sedimentary rocks. The spring is captured.

The discharge of the spring is 0.3 l/s, water temperature is 13.6°C, the total mineralization is 482 mg/l, dissolved oxygen 7.96 mg/l, electrical conductivity is 742 µS/cm (at 25°C), pH-value is 7.43.

The spring is not used. The nitrate concentration is 35.17 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.18. Site N 18 ("Gharasui" spring, Voskepar village)

The spring is located in the administrative territory of Voskepar village of Tavush region. 10m away from the right bank of the Voskepar River. The outflow of water is observed from tuffogenic and limestone rocks. The spring is captured.

The discharge of the spring is 9.6 l/s, water temperature is 12.6°C, the total mineralization is 195 mg/l, dissolved oxygen 7.09 mg/l, electrical conductivity is 320 µS/cm (at 25°C), pH-value is 7.2.

The spring is utilized for drinking water supply. The nitrate concentration is 20.95 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.19. Site N 19 ("Gyol" spring, Aygehovit village)

The spring is located in the administrative territory of Aygehovit village of Tavush region. The outflow of water is observed from volcanic- sedimentary rocks. The spring is captured.

The discharge of the spring is 0.02 l/s, water temperature is 14.0°C, the total mineralization is 571 mg/l, dissolved oxygen 9.14 mg/l, electrical conductivity is 897 µS/cm (at 25°C), pH-value is 7.37.

The spring is utilized for drinking water supply. The nitrate concentration is 35.19 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.20. Site N 20 ("Yolomi" spring, Vazashen village)

The spring is located in the administrative territory of Vazashen village of Tavush region. The outflow of water is observed from volcanic-sedimentary rocks. The spring is captured.

The discharge of the spring is 0.15 l/s, water temperature is 15.7°C, the total mineralization is 701 mg/l, dissolved oxygen 4.2 mg/l, electrical conductivity is 1078 µS/cm (at 25°C), pH-value is 7.09.

The spring is temporary, utilized for drinking water supply. The nitrate concentration is 1.98 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.21. Site N 21 (spring, Paravakar village)

The spring is located in the administrative territory of Paravakar village of Tavush region. The outflow of water is observed from limestone, sedimentary rocks. The spring is captured.

The discharge of the spring is 1.98 l/s, water temperature is 13.2°C, the total mineralization is 1233mg/l, dissolved oxygen 8.03 mg/l, electrical conductivity is 1898 µS/cm (at 25°C), pH-value is 7.23.

The spring is not used. Spring water is polluted by anthropogenic inputs of the settlement, the nitrate concentration exceeds 56.0 mg/l.

2.2.22. Site N 22 ("Alposi" spring, Verin Tsaghkavan village)

The spring is located in the administrative territory of Verin Tsaghkavan village of Tavush region. The outflow of water is observed from volcanic-sedimentary rocks. The spring is not captured.

The discharge of the spring is 0.16 l/s, water temperature is 13.6°C, the total mineralization is 686 mg/l, dissolved oxygen 7.3 mg/l, electrical conductivity is 1055 µS/cm (at 25°C), pH-value is 7.23.

The spring is utilized for drinking water supply. The nitrate concentration is 27.48 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.23. Site N 23 ("Medz" spring, Navur village)

The spring is located in the administrative territory of Navur village of Tavush region. The outflow of water is observed from limestone rocks. The spring is captured.

The discharge of the spring is 1.0 l/s, water temperature is 9.6°C, the total mineralization is 847 mg/l, dissolved oxygen 8.3 mg/l, electrical conductivity is 950 µS/cm (at 25°C), pH-value is 7.29.

The spring is not used. Spring water is polluted by anthropogenic inputs of the settlement, the nitrate concentration exceeds 66.0 mg/l.

2.2.24. Site N 24 ("Miji" spring, Berd city)

The spring is located in the administrative territory of Berd city of Tavush region. The outflow of water is observed from volcanic-sedimentary rocks. The spring is captured.

The discharge of the spring is 0.7 l/s, water temperature is 11.0°C, the total mineralization is 302 mg/l, dissolved oxygen 8.78 mg/l, electrical conductivity is 501 µS/cm (at 25°C), pH-value is 7.49.

The spring is utilized for drinking water supply. The nitrate concentration is 27.13 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.25. Site N 25 ("Zani" spring, Lusadzor village)

The spring is located in the administrative territory of Luszdzor village of Tavush region. The outflow of water is observed from volcanic- sedimentary rocks. The spring is captured.

The discharge of the spring is 0.2 l/s, water temperature is 13.0°C, the total mineralization is 357 mg/l, dissolved oxygen 7.78 mg/l, electrical conductivity is 550 µS/cm (at 25°C), pH-value is 7.34.

The spring is utilized for drinking water supply. The nitrate concentration is 7.29 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.26. Site N 26 (ground well, Lusadzor village)

The flowing well is located in the administrative territory of Lusadzor village of Tavush region. The well is located in the area of Vigen Nerkararyan. The well was drilled in 2019. The depth is 5 m. Inner diametr of well is 400 mm. The aquifer is presented by sedimentary rocks.

Water level is at an altitude of 3.6 m bellow the Earth's surface. The discharge of well is 5.3 l/s, water temperature is 13.6°C, the total mineralization is 302 mg/l, dissolved oxygen 7.11 mg/l, electrical conductivity is 525 µS/cm (at 25°C), pH-value is 7.27.

The well is utilized for fish farming. The nitrate concentration is 13.43 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.27. Site N 27 ("Dudinants" spring, Gandzaqar village)

The spring is located in the administrative territory of Gandzaqar village of Tavush region, in the yard of Samvel Hovhannisyan. The outflow of water is observed from volcanic- sedimentary rocks. The spring is not captured and flows into the river.

The discharge of the spring is 0.06 l/s, water temperature is 12.2°C, the total mineralization is 305 mg/l, dissolved oxygen 7.8 mg/l, electrical conductivity is 469 µS/cm (at 25°C), pH-value is 7.25.

The spring is not used. The nitrate concentration is 13.19 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.28. Site N 28 ("Shnqar" spring, Hovq village)

The spring is located in the administrative territory of Hovq village of Tavush region. The outflow of water is observed from volcanic- sedimentary rocks.

The discharge of the spring is 0.3 l/s, water temperature is 10.9°C, the total mineralization is 257 mg/l, dissolved oxygen 9.28 mg/l, electrical conductivity is 392 µS/cm (at 25°C), pH-value is 7.32.

The spring is not captured and not used. The nitrate concentration is 7.18 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.29. Site N 29 ("Medz" spring, Verin Chambarak village)

The spring is located in the administrative territory of Verin Chambarak village of Gegharkunik region. The outflow of water is observed from volcanic- sedimentary rocks. The spring is captured.

The discharge of the spring is 0.17 l/s, water temperature is 8.1°C, the total mineralization is 420 mg/l, dissolved oxygen 8.21 mg/l, electrical conductivity is 647 µS/cm (at 25°C), pH-value is 7.22.

The spring is not used. The nitrate concentration is 41.29 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.30. Site N 30 (ground well, Margahovit village)

The well is located in the administrative territory of Margahovit village of Tavush region, in the yard of Arsen Bekchyan. The well was drilled in 2020. The depth is 30 m. Inner diametr of well is 124 mm. The aquifer is presented by volcanic- sedimentary rocks.

Water level is at an altitude of 11.92 m bellow the Earth's surface. The discharge of well is 0.06 l/s, water temperature is 9.4°C, the total mineralization is 248 mg/l, dissolved oxygen 6.65 mg/l, electrical conductivity is 382 µS/cm (at 25°C), pH-value is 7.8.

The well is utilized for drinking and irrigation water by the owner. The nitrate concentration is 37.14 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.31. Site N 31 ("Qor" spring, Dilijan city)

The spring is located in the administrative territory of Dilijan city of Tavush region, at Aygestan street in Shamaghyan district. The outflow of water is observed from volcanic- sedimentary rocks. The spring is captured.

The discharge of the spring is 0.05 l/s, water temperature is 12.7°C, the total mineralization is 286 mg/l, dissolved oxygen 7.32 mg/l, electrical conductivity is 440 µS/cm (at 25°C), pH-value is 7.39.

The spring is utilized for drinking water and livestock supply. The nitrate concentration is 18.92 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.32. Site N 32 ("Artzruni" spring, Dilijan city)

The spring is located in the administrative territory of Dilijan city of Tavush region, in the yard of Arshak Markosyan. The outflow of water is observed from volcanic- sedimentary rocks. The spring is captured, but needs repair.

The discharge of the spring is 0.02 l/s, water temperature is 13.1°C, the total mineralization is 587 mg/l, dissolved oxygen 6.40 mg/l, electrical conductivity is 903 µS/cm (at 25°C), pH-value is 7.47.

The spring is utilized for drinking water by the owner. The nitrate concentration is 39.14 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

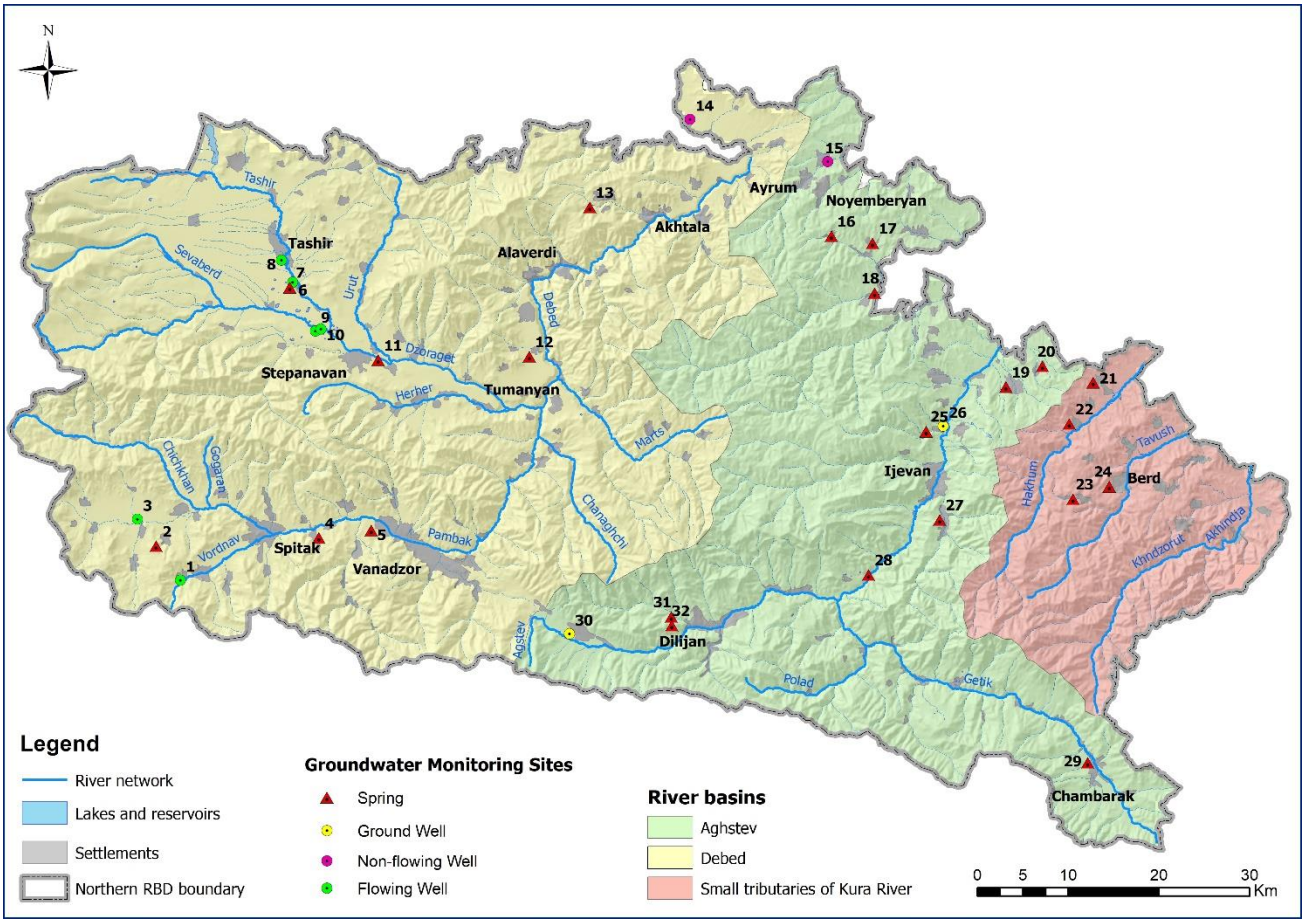
Table 3: Monitoring sites subject to the GW survey 2023. Recommended sites for inclusion into the GW monitoring network are indicated.

N	Region	Location of observation point	Type of observation point	Coordinates	Water-bearing layer of RBD /geological index	code and number of RBD	Consumption, l/s	Temp °C	TDS fild, mg/l	pH	Recommended (+)
1	Lori	Lernavan	Flowing borehole	X=40^{O} 47' 01.2" Y=44^{O} 09' 57.7" H= 1746	fragmented tufo-breccias P_2	6G-1	0.5	19.9	0.5	7.3	+
2	Lori	Katnadjur	spring («Qung»)	X=40^{O} 49' 01.5" Y=44^{O} 08' 01.2" H= 1798	tuffogenic rocks P_2	6G-4	0.7	10.4	0.25	8.0	
3	Lori	Mets Parni	Flowing borehole	X=40^{O} 50' 38.1" Y=44^{O} 06' 27.5" H= 1673	pebble-boulders gravel, sand Q	6G-2	0.33	12.6	0.35	7.9	+
4	Lori	Nor Khachakap	spring	X=40^{O} 49' 36.5" Y=44^{O} 21' 11.5" H= 1660	porphyritic rocks P_2	6G-4	0.2	11.2	0.3	7.9	
5	Lori	Darbas	spring	X=40^{O} 50' 05.1" Y=44^{O} 25' 25.0" H= 1384	volcanic- sedimentary rocks N_1	6G-4	0.22	12.4	0.47	7.9	
6	Lori	Saratovka	Flowing borehole	X=41^{O} 04' 29.7" Y=44^{O} 18' 42.0" H= 1457	volcanic N_2	6G-5	0.1	13.4	1.07	7.6	+
7	Lori	Saratovka	spring	X=41^{O} 04' 30.6" Y=44^{O} 18' 39.5" H= 1481	volcanic rocks (bazalt) N_2	6G-6	0.19	10.4	0.4	7.7	+
8	Lori	Tashir	Flowing borehole	X=41^{O} 06' 07.6" Y=44^{O} 17' 56.8" H= 1481	volcanic N_2	6G-5	4.0	10.7	0.53	7.8	+
9	Lori	Stepanavan	Flowing borehole	X=41^{O} 02' 01.5" Y=44^{O} 21' 12.4" H= 1403	volcanic N_2	6G-5	14.0	9.1	0.12	7.7	
10	Lori	Getavan	Flowing borehole	X=41^{O} 02' 03.0" Y=44^{O} 21' 12.8" H= 1421	volcanic N_2	6G-5	60.0	8.0	0.1	7.9	

N	Region	Location of observation point	Type of observation point	Coordinates	Water-bearing layer of RBD /geological index	code and number of RBD	Consumption, l/s	Temp °C	TDS fild, mg/l	pH	Recommended (+)
11	Lori	Lori berd	spring ''Lusaghbyur''	X=41^{O} 00’ 13.3” Y=44^{O} 25’ 52.3” H= 1402	volcanic N_2	6G-7	13.0	9.5	0.16	8.2	
12	Lori	Tumanyan	spring ''Kobayr''	X=41^{O} 00’ 28.3” Y=44^{O} 38’ 10.4” H= 937	volcanic N_2	6G-11	0.5	16.0	0.69	8.5	
13	Lori	Shamlugh (Bendik)	spring ''Kakali taki''	X=41^{O} 09’ 22.7” Y=44^{O} 43’ 03.5” H= 1217	volcanic- sedimentary rocks J	6G-11	0.19	11.4	0.64	7.8	+
14	Tavush	Bagratashen	well	X=41^{O} 14’ 14.3” Y=44^{O} 49’ 02.1” H= 459մ	pebble-boulders gravel and sand Q_3	6G-12	10	14	0.16	8.01	+
15	Tavush	Berdavan	ground well	X=41^{O} 12’ 08.2” Y=45^{O} 00’ 25.3” H= 664մ	pebble-boulders gravel and sand Q	6G-22	0	12.4	0.59	7.12	+
16	Tavush	Jujevan	spring («Darbnants»)	X=41^{O} 07’ 41.3” Y=45^{O} 00’ 43.0” H= 1039մ	volcanic- sedimentary K	6G-21	1.0	12.0	0.58	7.16	
17	Tavush	Voskevan	spring	X=41^{O} 07’ 15.6” Y=45^{O} 04’ 06.4” H= 926մ	tuffaceous sandstones, volcanic- sedimentary r K	6G-21	0.3	13.6	0.48	7.43	
18	Tavush	Voskepar	spring («Gharasu»)	X=41^{O} 04’ 17.5” Y=45^{O} 04’ 14.8” H= 710մ	limestone, sedimentary K	6G-21	9.6	12.6	0.19	7.2	+
19	Tavush	Aygehovit	spring («Gyoli»)	X=40^{O} 58’ 41.7” Y=45^{O} 14’ 53.7” H= 709	volcanic- sedimentary rocks J	6G-16	1.2	15.1	0.84	8.2	
20	Tavush	Vazashen	spring («Yolomi»)	X=40^{O} 59’ 54.8” Y=45^{O} 17’ 52.4” H= 704	volcanic- sedimentary rocks J	6G-16	0.05	14.8	1.14	7.7	
21	Tavush	Paravakar	spring	X=40^{O} 58’ 56.3” Y=45^{O} 21’ 59.5” H= 762մ	limestone, sedimentary J	6G-18	1.98	13.2	1.23	7.23	+

N	Region	Location of observation point	Type of observation point	Coordinates	Water-bearing layer of RBD /geological index	code and number of RBD	Consumption, l/s	Temp °C	TDS fild, mg/l	pH	Recommended (+)
22	Tavush	Verin Tsaghkavan	spring («Alposi»)	X=40° 56' 28.3" Y=45° 20' 3.0" H= 796մ	volcanic- sedimentary rocksJ	6G-18	0.16	13.6	0.68	7.23	+
23	Tavush	Navur	spring («Medz»)	X=40° 51' 59.7" Y=45° 20' 19.6" H= 1438մ	limestone, sedimentary K	6G-18	1	9.6	0.95	7.29	
24	Tavush	Berd	spring («Miji»)	X=40° 52' 44.5" Y=45° 23' 16.5" H= 939մ	volcanic- sedimentary rocks J	6G-19	0.7	11.0	0.3	7.49	+
25	Tavush	Lusadzor	spring («Zani»)	X=40° 56' 03.3" Y=45° 08' 25.3" H= 706	volcanic- sedimentary rocks J	6G-16	0.4	13.5	0.62	8.3	
26	Tavush	Lusadzor	ground well	X=40° 56' 22.8" Y=45° 09' 47.7" H= 594	sedimentary Q	6G-16	5.3	15.0	0.79	8.3	+
27	Tavush	Gandzaqar	spring («Dudinyants»)	X=40° 50' 47.3" Y=45° 09' 30.3" H= 894	volcanic- sedimentary rocks J	6G-18	0.08	13.4	0.51	7.6	
28	Tavush	Hovq	spring («Shnqar»)	X=40° 47' 30.7" Y=45° 03' 43.4" H= 881	volcanic- sedimentary rocks J	6G-18	0.3	11.4	0.37	7.7	+
29	Gegharkunik	Verin Chambarak	spring («Medz»)	X=40° 36' 17.3" Y=45° 21' 26.1" H= 1849մ	volcanic- sedimentary rocks J	6G-17	0.17	8.1	0.42	7.22	+
30	Tavush	Margahovit	well	X=40° 43' 59.2" Y=44° 41' 30.5" H= 1737	volcanic- sedimentary rocks N_1	6G-13	0.06	9.6	0.42	7.3	+
31	Tavush	Dilijan /Shamaghyan/	spring («Qor spring»)	X=40° 45' 0.01" Y=44° 49' 45.6" H= 1465	volcanic- sedimentary rocks N_1	6G-23	0.05	13.7	0.39	7.8	
32	Tavush	Dilijan	spring «Artsruni»	X=40° 44' 29.1" Y=44° 49' 47.7" H= 1345	volcanic- sedimentary rocks N_1	6G-23	0.01	13.4	0.81	7.7	

Table 4: Location of monitoring sites in the Northern RBD in 2023



Annex I: Sampling protocols composed in Northern RBD in 2023

SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point: Armenia, Lori Region, Lernavan village				
The coordinates of the sampling point X=40^0 47' 01.2" Y=44^0 09' 57.7" H= 1746m				
Sampling Date: June 19, 2023	Time (hh:mm): 10:45	Sample ID: **N1**		
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N1	Type of sampling site: **Flowing well**			
Inner diameter of well (mm): 168	Distance between land surface and well head (m): 0.95			
Calm water level (m below well head): +0.8	Final depth of well (m below well head): 188			
Further information of the sampling site (e.g. coordinates): **The well was drilled in 1969. The water flows into the river and is used for irrigation**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **plastic bucket**			
Pumping duration (min):	Abstraction rate / discharge (l/sec): **0.4 l/sec**			
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor
Measuring device:				
pH-value: 7.18	Water temperature (°C): 20.0	Dissolved oxygen (mg/l): 6.73	TDS (mg/l) 346	
Electrical conductivity incl. reference temperature (µS/cm): 532 µS/cm	□ **at 25 °C**			
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: Head of Lernavan administrative district: Nelson Beglaryan (Tel +37493-161-163)				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				

SAMPLING PROTOCOL – GROUNDWATER

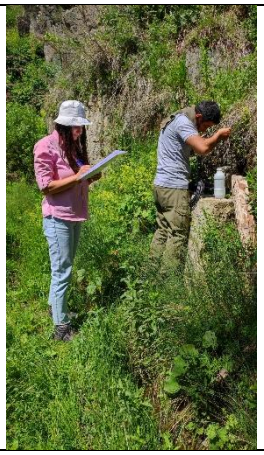
Project:	"EU4Environment - Water Resources and Environmental Data" Project

General

The location of the sampling point: Armenia, Lori Region, **Katnadjur** village

The coordinates of the sampling point

X=40^0 49' 01.5"
Y=44^0 08' 01.2"
H= 1798m



Sampling Date: June 19, 2023	Time (hh:mm): 11:30	Sample ID: **N2**

Sampling person: Ms Armine Hakobyan
Mr Gegham Muradyan
Mr Gevorg Torosyan
of Nature Protection
'Hydrometeorology and Monitoring Center

Sampling site

Sampling site ID: N2	Type of sampling site: **Spring** («Qung»)
Inner diameter of well (mm): -	Distance between land surface and well head (m): -
Calm water level (m below well head): -	Final depth of well (m below well head): -

Further information of the sampling site (e.g. coordinates): **The spring is not captured. the head of the spring is open, and the spring is utilized for drinking water supply by several houses. The spring is above the cemetery**

Sampling

Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **plastic bucket**
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **0.52 l/sec**

Field parameters (at the sampling)

Weather:	**Colour:**	**Turbidity:**	**Sediment:**	**Smell:**
□ **sunny**	□ **colourless**	□ **no**	□ **no**	□ **odorless**
□ cloudy	□ slight	□ low	□ low	□ putrid
□ changing	□ strong	□ moderate	□ moderate	□ fishy
□ rain	□ brown	□ strong	□ strong	□ chemical
□ heat	□ grey	□ ……..	□ ……..	□ chlor
□ frost	□ yellow			□ gasoline/oil

Measuring device:

pH-value:	Water temperature (°C):	Dissolved oxygen (mg/l):	TDS (mg/l)
7.8	10.0	8.84	214

Electrical conductivity incl. reference temperature (µS/cm): **329** µS/cm □ **at 25 °C**

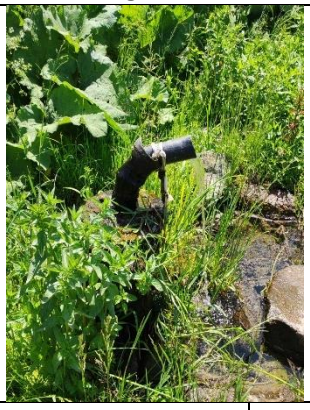
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid

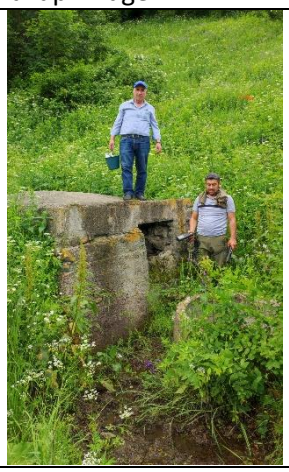
Contacts: Head of Katnadjur administrative district: Armen Papoyan (Tel +37499-000-302)

Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory.

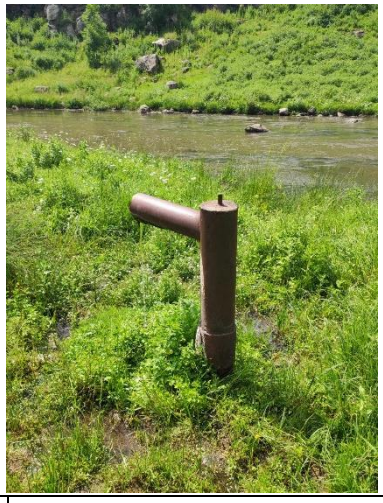
Signature of sampler: _____Date:_____

Name of sampler:_____

SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point: Armenia, Lori Region, **Mets Parni** village				
The coordinates of the sampling point X=40^0 50' 38.1" Y=44^0 06' 27.5" H= 1673m	 			
Sampling Date: June 19, 2023	Time (hh:mm): 12:15	Sample ID: **N3**		
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N3	Type of sampling site: **Flowing well**			
Inner diameter of well (mm): 168	Distance between land surface and well head (m): 0.45			
Calm water level (m below well head): +0.6	Final depth of well (m below well head): 188.6			
Further information of the sampling site (e.g. coordinates): **The well was drilled in years of 1968-1969** **The well is utilized for drinking water supply by several houses.**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **plastic bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **0.28 l/sec**			
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 7.92	Water temperature (°C): 12.9 °C	Dissolved oxygen (mg/l): 8.19 mg/l	TDS (mg/l) 251	
Electrical conductivity incl. reference temperature (µS/cm): **386,6** µS/cm	□ **at 25 °C**			
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: Head of Mets Parni administrative district: Gor Ashughatoyan (Tel +3749380-69-50)				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				

SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point:	Armenia, Lori Region, Nor Khachakap village			
The coordinates of the sampling point X=40^0 49' 36.5" Y=44^0 21' 11.5" H= 1660m				
Sampling Date: June 19, 2023	Time (hh:mm): 13:36	Sample ID: **N4**		
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N4	Type of sampling site: **Spring**			
Inner diameter of well (mm): -	Distance between land surface and well head (m): -			
Calm water level (m below well head): -	Final depth of well (m below well head): -			
Further information of the sampling site (e.g. coordinates): **The spring is captured, but damaged. The spring is utilized for drinking water supply by several houses. The spring is above the cemetery**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **plastic bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **0.15 l/sec**			
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 7.76	Water temperature (°C): 9.9	Dissolved oxygen (mg/l) 7.46	TDS (mg/l) 223	
Electrical conductivity incl. reference temperature (µS/cm): **346** µS/cm	□ **at 25 °C**			
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: Head of Nor Khachakap administrative district: Martik (Tel +37494-88-82-24)				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				

SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point: Armenia, Lori Region, Darbas village				
The coordinates of the sampling point X=40^{O} 50' 05.1" Y=44^{O} 25' 25.0" H= 1384մ				
Sampling Date: June 19, 2023	Time (hh:mm): 15:30	Sample ID: **N5**		
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N5	Type of sampling site: **Spring**			
Inner diameter of well (mm): -	Distance between land surface and well head (m): -			
Calm water level (m below well head): -	Final depth of well (m below well head): -			
Further information of the sampling site (e.g. coordinates): **The spring is captured. The water is used for livestock supply. The spring is near the cemetery.**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **plastic bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **0.03 l/sec**			
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 7.69	Water temperature (°C): 13.1	Dissolved oxygen (mg/l): 8.38	TDS (mg/l) 356	
Electrical conductivity incl. reference temperature (µS/cm): **549** µS/cm	□ **at 25 °C**			
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: Head of Nor Khachakap administrative district: Martik (Tel +37494-88-82-24)				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				

SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point Armenia, Lori Region, Saratovka village				
The coordinates of the sampling point X=41^{O} 04' 29.7" Y=44^{O} 18' 42.0" H= 1457m				
Sampling Date: June 20, 2023	Time (hh:mm): 09:45		Sample ID: **N6**	
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N6	Type of sampling site: **Flowing well**			
Inner diameter of well (mm): 168	Distance between land surface and well head (m): 1.0			
Calm water level (m below well head): +1.2	Final depth of well (m below well head): 100			
Further information of the sampling site (e.g. coordinates): **The well was drilled in years of 1969-1970. The well is located the left side of the river.**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **0.1 l/sec**			
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 7.08	Water temperature (°C): 13.2	Dissolved oxygen (mg/l): 3.45	TDS (mg/l) 609	
Electrical conductivity incl. reference temperature (µS/cm): 537 µS/cm		□ **at 25 °C**		
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: Head of Saratovka administrative district: Garnik Martoyan (Tel +37499-04-55-50)				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				

SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point: Armenia, Lori Region, Saratovka village				
The coordinates of the sampling point X=41^{O} 04' 30.6" Y=44^{O} 18' 39.5" H= 1481m				
Sampling Date: June 20, 2023	Time (hh:mm): 10:15	Sample ID: **N7**		
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: **N7**	Type of sampling site: **Spring**			
Inner diameter of well (mm): -	Distance between land surface and well head (m): -			
Calm water level (m below well head): -	Final depth of well (m below well head): -			
Further information of the sampling site (e.g. coordinates): **The spring is captured.** **The spring is located the right side of the river.**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **0.25 l/sec**			
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 7.14	Water temperature (°C): 10.8	Dissolved oxygen (mg/l) 4.75	TDS (mg/l) 385	
Electrical conductivity incl. reference temperature (µS/cm): **592** µS/cm	□ **at 25 °C**			
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: Head of Saratovka administrative district: Garnik Martoyan (Tel +37499-04-55-50)				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				

SAMPLING PROTOCOL – GROUNDWATER

Project:	"EU4Environment - Water Resources and Environmental Data" Project

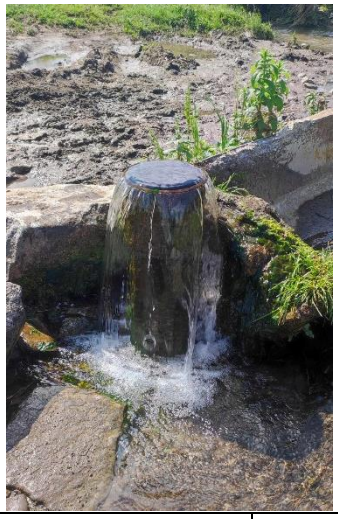
General

The location of the sampling point

Armenia, Lori Region, Tashir city

The coordinates of the sampling point

X=41^{O} 06' 07.6"
Y=44^{O} 17' 56.8"
H= 1481m



Sampling Date: June 20, 2023	Time (hh:mm): 12:20	Sample ID: **N8**
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center	

Sampling site

Sampling site ID: N8	Type of sampling site: **Flowing well**
Inner diameter of well (mm): 230	Distance between land surface and well head (m): 0.8
Calm water level (m below well head): +1.35	Final depth of well (m below well head): 115

Further information of the sampling site (e.g. coordinates): **The well was drilled in early 1970s. The water is not used, flows into the Tashir River.**

Sampling

Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **6.5 l/sec**

Field parameters (at the sampling)

Weather:	**Colour:**	**Turbidity:**	**Sediment:**	**Smell:**
□ **sunny**	□ **colourless**	□ **no**	□ **no**	□ **odorless**
□ cloudy	□ slight	□ low	□ low	□ putrid
□ changing	□ strong	□ moderate	□ moderate	□ fishy
□ rain	□ brown	□ strong	□ strong	□ chemical
□ heat	□ grey	□ ……..	□ ……..	□ chlor
□ frost	□ yellow			□ gasoline/oil

Measuring device:

pH-value:	Water temperature (°C):	Dissolved oxygen (mg/l):	TDS (mg/l)
7.32	10.6	6.40	418

Electrical conductivity incl. reference temperature (µS/cm): **643** µS/cm □ **at 25 °C**

Sample treatment: □ **chilled** □ filtrated □ stabilised with acid

Contacts: Head of Tashir Urban Planning and Agriculture Department, Chief Architect
Slavik Anakhasyan (Tel +37494-39-48-08)

Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory.
Signature of sampler: _____Date:_____
Name of sampler:_____

SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point Armenia, Lori Region, Getavan/Stepanavan village				
The coordinates of the sampling point X=41^{O} 02' 01.5" Y=44^{O} 21' 12.4" H= 1403m				
Sampling Date: June 20, 2023	Time (hh:mm): 13:48		Sample ID: **N9**	
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N9	Type of sampling site: **Flowing well**			
Inner diameter of well (mm): 219	Distance between land surface and well head (m): 1.0			
Calm water level (m below well head): +1.4	Final depth of well (m below well head): 85			
Further information of the sampling site (e.g. coordinates): **The well was drilled in early 1970s. The well is not used.**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **12 l/sec**			
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 7.88	Water temperature (°C): 8.9	Dissolved oxygen (mg/l): 8.81	TDS (mg/l) 591	
Electrical conductivity incl. reference temperature (µS/cm): **139.5** µS/cm	□ **at 25 °C**			
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: -				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				

SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point Armenia, Lori Region, Getavan/Stepanavan village				
The coordinates of the sampling point X=41^{O} 02' 03.0" Y=44^{O} 21' 12.8" H= 1421m				
Sampling Date: June 20, 2023	Time (hh:mm): 14:15	Sample ID: **N10**		
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N10	Type of sampling site: **Flowing well**			
Inner diameter of well (mm): 219	Distance between land surface and well head (m): 0.35			
Calm water level (m below well head): +2.8	Final depth of well (m below well head): 93			
Further information of the sampling site (e.g. coordinates): **The well was drilled in early 1970s. The well is planned to be used for energy purposes by ˝Stepdzor'' LTD.**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **62 l/sec**			
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 7.67	Water temperature (°C): 7,9	Dissolved oxygen (mg/l): 9,35	TDS (mg/l) 583	
Electrical conductivity incl. reference temperature (µS/cm): **131** µS/cm	□ **at 25 °C**			
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: -				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				

SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point: Armenia, Lori Region, Lori Berd village				
The coordinates of the sampling point X=41^{O} 00' 13.3" Y=44^{O} 25' 52.3" H= 1402m				
Sampling Date: June 20, 2023	Time (hh:mm): 17:20	Sample ID: **N11**		
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N11	Type of sampling site: **Spring «Lusaghbyur»**			
Inner diameter of well (mm): -	Distance between land surface and well head (m): -			
Calm water level (m below well head): -	Final depth of well (m below well head): -			
Further information of the sampling site (e.g. coordinates): **The spring is not captured.**				
Sampling				
Type of sampling: □ **with float** □ with pump □ at a tap	Abstraction device: **float**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **7.8 l/sec**			
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 7.5	Water temperature (°C): 9.1	Dissolved oxygen (mg/l): 9.62	TDS (mg/l) 120	
Electrical conductivity incl. reference temperature (µS/cm): **188** µS/cm	□ **at 25 °C**			
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts:				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				

SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point: Armenia, Lori Region, Tumanyan village (In the canyon of Kobayr)				
The coordinates of the sampling point X=41^{O} 00' 28.3" Y=44^{O} 38' 10.4" H= 937 				
Sampling Date: June 21, 2023	Time (hh:mm): 10:00	Sample ID: **N12**		
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N12	Type of sampling site: **Spring**			
Inner diameter of well (mm): -	Distance between land surface and well head (m): -			
Calm water level (m below well head): -	Final depth of well (m below well head): -			
Further information of the sampling site (e.g. coordinates): **The spring is captured.** **The spring is utilized for drinking water supply.**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): 1.0 **l/sec**			
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 8.45	Water temperature (°C): 15.6	Dissolved oxygen (mg/l): 9.09	TDS (mg/l) 528	
Electrical conductivity incl. reference temperature (µS/cm): **812** µS/cm	□ **at 25 °C**			
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts:				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				

SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point: Armenia, Lori Region, Shamlugh village (Bendik district)				
The coordinates of the sampling point X=41^{O} 09' 22.7" Y=44^{O} 43' 03.5" H= 1217				
Sampling Date: June 21, 2023	Time (hh:mm): 12:20	Sample ID: **N13**		
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N13	Type of sampling site: **Spring «Kakali taki»**			
Inner diameter of well (mm): -	Distance between land surface and well head (m): -			
Calm water level (m below well head): -	Final depth of well (m below well head): -			
Further information of the sampling site (e.g. coordinates): **The spring is captured.** **The spring is near the cemetery, and utilized for drinking water supply.** **Only 15 people live in the village**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **0.19 l/sec**			
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 7.12	Water temperature (°C): 10.5	Dissolved oxygen (mg/l): 6.9	TDS (mg/l) 474	
Electrical conductivity incl. reference temperature (µS/cm): 730 µS/cm	□ **at 25 °C**			
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: Head of Shamlugh administrative district: (Tel +37477-535376, +37495-535376) resident of the village: Sos Aghababyan (Tel +37498-42-31-27)				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				
SAMPLING PROTOCOL – GROUNDWATER				

Project:	"EU4Environment - Water Resources and Environmental Data" Project

General

The location of the sampling point Armenia, Tavush Region, Bagratashen village

The coordinates of the sampling point

X=41^{O} 14' 14.3"
Y=44^{O} 49' 02.1"
H= 459m

Sampling Date: June 21, 2023	Time (hh:mm): 13:45	Sample ID: **N14**
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center	

Sampling site

Sampling site ID: N14	Type of sampling site: Non f**lowing well**
Inner diameter of well (mm): 273	Distance between land surface and well head (m): 0.95
Calm water level (m below well head): (-8.0)	Final depth of well (m below well head): 26

Further information of the sampling site (e.g. coordinates): **The well was drilled in 1960s.** ECW 10 brand submersible pump is installed in the 16m depth of the well, but now t**he well is not used.**

Sampling

Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**
Pumping duration (min): -	Abstraction rate / discharge (l/sec): 1**0 l/sec**

Field parameters (at the sampling)

Weather:	**Colour:**	**Turbidity:**	**Sediment:**	**Smell:**
□ **sunny**	□ **colourless**	□ **no**	□ **no**	□ **odorless**
□ cloudy	□ slight	□ low	□ low	□ putrid
□ changing	□ strong	□ moderate	□ moderate	□ fishy
□ rain	□ brown	□ strong	□ strong	□ chemical
□ heat	□ grey	□ ……..	□ ……..	□ chlor
□ frost	□ yellow			□ gasoline/oil

Measuring device:

pH-value:	Water temperature (°C):	Dissolved oxygen (mg/l):	TDS (mg/l)
8.01	14	6.85	165

Electrical conductivity incl. reference temperature (µS/cm): **254** µS/cm	□ **at 25 °C**

Sample treatment: □ **chilled** □ filtrated □ stabilised with acid

Contacts: - Edik (Tel +37477-857549)

Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory.
Signature of sampler: _____Date:_____
Name of sampler:_____

SAMPLING PROTOCOL – GROUNDWATER

Project:	"EU4Environment - Water Resources and Environmental Data" Project
General	
The location of the sampling point Armenia, Tavush Region, Berdavan village	
The coordinates of the sampling point X=41^{O} 12' 8.2" Y=45^{O} 00' 25.3" H= 664m	

Sampling Date: June 21, 2023	Time (hh:mm): 14.25	Sample ID: **N15**
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center	

Sampling site	
Sampling site ID: N15	Type of sampling site: **ground well**
Inner diameter of well (mm): 480	Distance between land surface and well head (m): 0
Calm water level (m below well head): (0.0)	Final depth of well (m below well head): 5
Further information of the sampling site (e.g. coordinates): **The well was drilled in 1960s. The well is not used.**	

Sampling	
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**
Pumping duration (min): -	Abstraction rate / discharge (l/sec): --- **l/sec**

Field parameters (at the sampling)				
Weather:	**Colour:**	**Turbidity:**	**Sediment:**	**Smell:**
□ **sunny**	□ **colourless**	□ **no**	□ **no**	□ **odorless**
□ cloudy	□ slight	□ low	□ low	□ putrid
□ changing	□ strong	□ moderate	□ moderate	□ fishy
□ rain	□ brown	□ strong	□ strong	□ chemical
□ heat	□ grey	□ ……..	□ ……..	□ chlor
□ frost	□ yellow			□ gasoline/oil

Measuring device:			
pH-value:	Water temperature (°C):	Dissolved oxygen (mg/l):	TDS (mg/l)
7.12	12.4	5.2	594

Electrical conductivity incl. reference temperature (µS/cm): **914** µS/cm	□ **at 25 °C**
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid	
Contacts: resident of the village: Aram Zobabyan (Tel +37477-20-27-57)	
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____	

SAMPLING PROTOCOL – GROUNDWATER	
Project:	"EU4Environment - Water Resources and Environmental Data" Project

General			
The location of the sampling point: Armenia, Tavush Region, Jujevan village			
The coordinates of the sampling point X=41^{O} 07' 41.3" Y=45^{O} 00' 43.0" H= 1039			
Sampling Date: June 21, 2023	Time (hh:mm): 15.35	Sample ID: **N16**	
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center		
Sampling site			
Sampling site ID: N16	Type of sampling site: **Spring «Darbnants»**		
Inner diameter of well (mm): -	Distance between land surface and well head (m): -		
Calm water level (m below well head): -	Final depth of well (m below well head): -		
Further information of the sampling site (e.g. coordinates): **The spring is captured.** **The spring is not used.**			
Sampling			
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**		
Pumping duration (min): -	Abstraction rate / discharge (l/sec): 1.0 **l/sec**		
Field parameters (at the sampling)			
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:			
pH-value: 7.16	Water temperature (°C): 12.0	Dissolved oxygen (mg/l): 7.3	TDS (mg/l) 578
Electrical conductivity incl. reference temperature (µS/cm): 889 µS/cm	□ **at 25 °C**		
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid			
Contacts:			
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____			

SAMPLING PROTOCOL – GROUNDWATER	
Project:	"EU4Environment - Water Resources and Environmental Data" Project

General				
The location of the sampling point: Armenia, Tavush Region, Voskevan village				
The coordinates of the sampling point X=41^{O} 07' 15.6" Y=45^{O} 04' 6.4" H= 926				
Sampling Date: June 21, 2023	Time (hh:mm): 16:20		Sample ID: **N17**	
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N17	Type of sampling site: **Spring**			
Inner diameter of well (mm): -	Distance between land surface and well head (m): -			
Calm water level (m below well head): -	Final depth of well (m below well head): -			
Further information of the sampling site (e.g. coordinates): **The spring is captured.** **The spring is not used.**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): 0.3 **l/sec**			
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 7.43	Water temperature (°C): 13.6	Dissolved oxygen (mg/l): 7.96	TDS (mg/l) 482	
Electrical conductivity incl. reference temperature (µS/cm): 742 µS/cm	□ **at 25 °C**			
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts:				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				

SAMPLING PROTOCOL – GROUNDWATER	
Project:	"EU4Environment - Water Resources and Environmental Data" Project

General			
The location of the sampling point: Armenia, Tavush Region, Voskepar village			
The coordinates of the sampling point X=41^{O} 04' 17.5" Y=45^{O} 04' 14.8" H= 710			
Sampling Date: June 21, 2023	Time (hh:mm): 17:45	Sample ID: **N18**	
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center		
Sampling site			
Sampling site ID: N18	Type of sampling site: **Spring ''Gharasu''**		
Inner diameter of well (mm): -	Distance between land surface and well head (m): -		
Calm water level (m below well head): -	Final depth of well (m below well head): -		
Further information of the sampling site (e.g. coordinates): **The spring is captured. The spring is not used.**			
Sampling			
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**		
Pumping duration (min): -	Abstraction rate / discharge (l/sec): 9.6 **l/sec**		
Field parameters (at the sampling)			
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:			
pH-value: 7.2	Water temperature (°C): 12.6	Dissolved oxygen (mg/l): 7.09	TDS (mg/l) 195
Electrical conductivity incl. reference temperature (µS/cm): 320 µS/cm	□ **at 25 °C**		
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid			
Contacts:			
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____			

SAMPLING PROTOCOL – GROUNDWATER	
Project:	"EU4Environment - Water Resources and Environmental Data" Project

General				
The location of the sampling point: Armenia, Tavush Region, Aygehovit village				
The coordinates of the sampling point X=40^{O} 58' 41.7" Y=45^{O} 14' 53.7" H= 709				
Sampling Date: June 22, 2023	Time (hh:mm): 10:00		Sample ID: **N19**	
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N19	Type of sampling site: **Spring «Gyol»**			
Inner diameter of well (mm): -	Distance between land surface and well head (m): -			
Calm water level (m below well head): -	Final depth of well (m below well head): -			
Further information of the sampling site (e.g. coordinates): **The spring is captured. The spring is utilized for drinking water supply.**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **0.02 l/sec**			
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 7.37	Water temperature (°C): 14.0	Dissolved oxygen (mg/l): 9.14	TDS (mg/l) 571	
Electrical conductivity incl. reference temperature (µS/cm): 925 µS/cm			□ **at 25 °C**	
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: Head of Aygehovit administrative district: Levon Grigoryan (Tel +37493-433-182)				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				

SAMPLING PROTOCOL – GROUNDWATER	
Project:	"EU4Environment - Water Resources and Environmental Data" Project

General			
The location of the sampling point: Armenia, Tavush Region, Vazashen village			
The coordinates of the sampling point X=40^{O} 59’ 54.8” Y=45^{O} 17’ 52.4” H= 704			
Sampling Date: June 22, 2023	Time (hh:mm): 11:10	Sample ID: **N20**	
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center		
Sampling site			
Sampling site ID: N20	Type of sampling site: **Spring «Yolomil»**		
Inner diameter of well (mm): -	Distance between land surface and well head (m): -		
Calm water level (m below well head): -	Final depth of well (m below well head): -		
Further information of the sampling site (e.g. coordinates): **The spring is captured.** **The spring is temporary, utilized for drinking water supply.**			
Sampling			
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**		
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **0.15 l/sec**		
Field parameters (at the sampling)			
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:			
pH-value: 7.18	Water temperature (°C): 15.7	Dissolved oxygen (mg/l): 4.2	TDS (mg/l) 701
Electrical conductivity incl. reference temperature (µS/cm): 1078 µS/cm			□ **at 25 °C**
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid			
Contacts: Head of Vazashen administrative district: Lorik Badiryan (Tel +37477-06-09-55)			
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____			

SAMPLING PROTOCOL – GROUNDWATER

Project:	"EU4Environment - Water Resources and Environmental Data" Project
General	
The location of the sampling point: Armenia, Tavush Region, Paravakar village	
The coordinates of the sampling point X=40^{O} 58' 56.3" Y=45^{O} 21' 59.5" H= 762m	
Sampling Date: June 22, 2023	Time (hh:mm): 12:30 — Sample ID: **N21**
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center
Sampling site	
Sampling site ID: N21	Type of sampling site: **Spring**
Inner diameter of well (mm): -	Distance between land surface and well head (m): -
Calm water level (m below well head): -	Final depth of well (m below well head): -
Further information of the sampling site (e.g. coordinates): **The spring is captured.** **The spring is not used.**	
Sampling	
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**
Pumping duration (min): -	Abstraction rate / discharge (l/sec): 1.98 **l/sec**

Field parameters (at the sampling)				
Weather:	**Colour:**	**Turbidity:**	**Sediment:**	**Smell:**
□ **sunny**	□ **colourless**	□ **no**	□ **no**	□ **odorless**
□ cloudy	□ slight	□ low	□ low	□ putrid
□ changing	□ strong	□ moderate	□ moderate	□ fishy
□ rain	□ brown	□ strong	□ strong	□ chemical
□ heat	□ grey	□ ……..	□ ……..	□ chlor
□ frost	□ yellow			□ gasoline/oil

Measuring device:			
pH-value: 7.23	Water temperature (°C): 13.2	Dissolved oxygen (mg/l): 8.03	TDS (mg/l) 1233
Electrical conductivity incl. reference temperature (µS/cm): 1898 µS/cm			□ **at 25 °C**
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid			
Contacts: Sargis (Tel +37493-11-51-81)			
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____			

SAMPLING PROTOCOL – GROUNDWATER

Project:	"EU4Environment - Water Resources and Environmental Data" Project

General

The location of the sampling point: Armenia, Tavush Region, Verin Tsaghkavan village

The coordinates of the sampling point

X=40° 56' 28.3"
Y=45° 20' 3.0"
H= 796m

Sampling Date: June 22, 2023	Time (hh:mm): 13.45	Sample ID: **N22**
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center	

Sampling site

Sampling site ID: N22	Type of sampling site: **Spring "Alposi"**
Inner diameter of well (mm): -	Distance between land surface and well head (m): -
Calm water level (m below well head): -	Final depth of well (m below well head): -

Further information of the sampling site (e.g. coordinates): **The spring is not captured.**
The spring is not used.

Sampling

Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**
Pumping duration (min): -	Abstraction rate / discharge (l/sec): 0.16 **l/sec**

Field parameters (at the sampling)

Weather:	**Colour:**	**Turbidity:**	**Sediment:**	**Smell:**
□ **sunny**	□ **colourless**	□ **no**	□ **no**	□ **odorless**
□ cloudy	□ slight	□ low	□ low	□ putrid
□ changing	□ strong	□ moderate	□ moderate	□ fishy
□ rain	□ brown	□ strong	□ strong	□ chemical
□ heat	□ grey	□ ……..	□ ……..	□ chlor
□ frost	□ yellow			□ gasoline/oil

Measuring device:

pH-value:	Water temperature (°C):	Dissolved oxygen (mg/l):	TDS (mg/l)
7.23	13.6	7.3	686

Electrical conductivity incl. reference temperature (µS/cm): 1055 µS/cm □ **at 25 °C**

Sample treatment: □ **chilled** □ filtrated □ stabilised with acid

Contacts: Head of Verin Tsaghkavan administrative district: Aghasi (Tel +37493-66-64-63)

Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory.
Signature of sampler: _____Date:_____
Name of sampler:_____

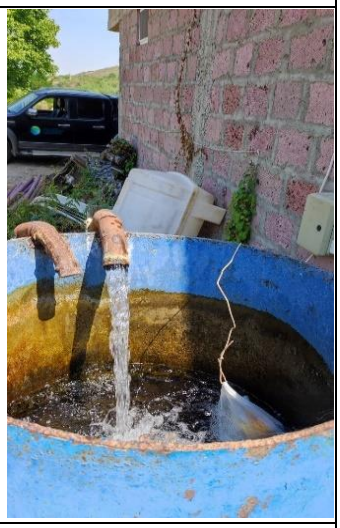
SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point: Armenia, Tavush Region, Verin Tsaghkavan village				
The coordinates of the sampling point X=40^{O} 56' 28.3" Y=45^{O} 20' 3.0" H= 796m				
Sampling Date: June 22, 2023	Time (hh:mm): 15:15	Sample ID: **N23**		
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N22	Type of sampling site: **Spring "Medz"**			
Inner diameter of well (mm): -	Distance between land surface and well head (m): -			
Calm water level (m below well head): -	Final depth of well (m below well head): -			
Further information of the sampling site (e.g. coordinates): **The spring is captured.** **The spring is not used.**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): 1.0 **l/sec**			
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 7.29	Water temperature (°C): 9.6	Dissolved oxygen (mg/l): 8.3	TDS (mg/l) 847	
Electrical conductivity incl. reference temperature (µS/cm): 950 µS/cm			□ **at 25 °C**	
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: Armen (Tel +37493-181-171)				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				

SAMPLING PROTOCOL – GROUNDWATER	
Project:	"EU4Environment - Water Resources and Environmental Data" Project

General				
The location of the sampling point: Armenia, Tavush Region, Berd city				
The coordinates of the sampling point X=40^{O} 52' 44.5" Y=45^{O} 23' 16.5" H= 939m				
Sampling Date: June 22, 2023	Time (hh:mm): 16:40	Sample ID: **N24**		
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N24	Type of sampling site: **Spring "Miji"**			
Inner diameter of well (mm): -	Distance between land surface and well head (m): -			
Calm water level (m below well head): -	Final depth of well (m below well head): -			
Further information of the sampling site (e.g. coordinates): **The spring is captured.** **The spring is utilized for drinking water.**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): 0.7 **l/sec**			
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 7.49	Water temperature (°C): 11.0	Dissolved oxygen (mg/l): 8.78	TDS (mg/l) 302	
Electrical conductivity incl. reference temperature (µS/cm): 501 µS/cm			□ **at 25 °C**	
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts:				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				

SAMPLING PROTOCOL – GROUNDWATER

Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point: Armenia, Tavush Region, Lusadzor village				
The coordinates of the sampling point X=40^{O} 56' 03.3" Y=45^{O} 08' 25.3" H= 706m				
Sampling Date: June 22, 2023	Time (hh:mm): 17:22	Sample ID: **N25**		
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N25	Type of sampling site: **Spring «Zani»**			
Inner diameter of well (mm): -	Distance between land surface and well head (m): -			
Calm water level (m below well head): -	Final depth of well (m below well head): -			
Further information of the sampling site (e.g. coordinates): **The spring is captured.**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **0.2 l/sec**			
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 7. 34	Water temperature (°C): 13.0 °C	Dissolved oxygen (mg/l): 7.78	TDS (mg/l) 357	
Electrical conductivity incl. reference temperature (µS/cm): 550 µS/cm	□ **at 25 °C**			
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts:				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				
SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			

General				
The location of the sampling point Armenia, Tavush Region, Lusadzor village				
The coordinates of the sampling point X=40^{O} 56’ 22.8” Y=45^{O} 09’ 47.7” H= 594				
Sampling Date: June 22, 2023	Time (hh:mm): 17:55	Sample ID: **N26**		
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N26	Type of sampling site: **Well**			
Inner diameter of well (mm): 400	Distance between land surface and well head (m): 0.40			
Calm water level (m below well head): (-3.6)	Final depth of well (m below well head): 5			
Further information of the sampling site (e.g. coordinates): **The well was drilled in 2019. The well is located in the area of Vigen Nerkararyan.The well is utilized for fish farming.**				
Sampling				
Type of sampling: □ **with pump** □ with bailer □ at a tap	Abstraction device: **bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **5.3 l/sec**			
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 7.27	Water temperature (°C): 13.6	Dissolved oxygen (mg/l): 7.11	TDS (mg/l) 302	
Electrical conductivity incl. reference temperature (µS/cm): **525** µS/cm	□ **at 25 °C**			
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: land owner: Vigen Nerkararyan (Tel +37498-500-897)				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				
SAMPLING PROTOCOL – GROUNDWATER				
Project:	“EU4Environment - Water Resources and Environmental Data” Project			

General				
The location of the sampling point: Armenia, Tavush Region, Gandzaqar village				
The coordinates of the sampling point X=40^{O} 50' 47.3" Y=45^{O} 09' 30.3" H= 894				
Sampling Date: June 23, 2023	Time (hh:mm): 10:00		Sample ID: **N27**	
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N27	Type of sampling site: **Spring «Dudinants»**			
Inner diameter of well (mm): -	Distance between land surface and well head (m): -			
Calm water level (m below well head): -	Final depth of well (m below well head): -			
Further information of the sampling site (e.g. coordinates): **The spring is not captured and not used. The spring is located the right side of the river. The spring is located in the yard of Samvel Hovhannisyan.**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **0.06 l/sec**			
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 7.25	Water temperature (°C): 12.2 °C	Dissolved oxygen (mg/l): 7.8	TDS (mg/l) 305	
Electrical conductivity incl. reference temperature (µS/cm): **469** µS/cm	□ **at 25 °C**			
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: Head of Gandzaqar administrative district: Vardges Dovlatbekyan (Tel +37494-60-60-41) resident of the village: Samvel Hovhannisyan (Tel +37493-38-82-10)				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				
SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			

General				
The location of the sampling point: Armenia, Tavush Region, Hovq village				
The coordinates of the sampling point X=40^{O} 47’ 30.7” Y=45^{O} 03’ 43.4” H= 881				
Sampling Date: June 23, 2023	Time (hh:mm): 10:45		Sample ID: **N28**	
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan		Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center		
Sampling site				
Sampling site ID: N28		Type of sampling site: **Spring «Shnqar»**		
Inner diameter of well (mm): -		Distance between land surface and well head (m): -		
Calm water level (m below well head): -		Final depth of well (m below well head): -		
Further information of the sampling site (e.g. coordinates): **The spring is not captured and not used.**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap		Abstraction device: **bucket**		
Pumping duration (min): -		Abstraction rate / discharge (l/sec): **0.3 l/sec**		
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 7.32	Water temperature (°C): 10.9 °C	Dissolved oxygen (mg/l): 9.28	TDS (mg/l) 257	
Electrical conductivity incl. reference temperature (µS/cm): **392** µS/cm			□ **at 25 °C**	
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: Head of Hovq administrative district: Hovhannes Naghdalyan (Tel +37477-05-15-51) resident of the village: Marat (Tel +37498-76-54-93)				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				
SAMPLING PROTOCOL – GROUNDWATER				
Project:	“EU4Environment - Water Resources and Environmental Data” Project			

General				
The location of the sampling point: Armenia, Gegharghunik Region, Chambarak village				
The coordinates of the sampling point X=40^{O} 36' 17.3" Y=45^{O} 21' 26.1" H= 1849m				
Sampling Date: June 23, 2023	Time (hh:mm): 12.30	Sample ID: **N29**		
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N29	Type of sampling site: **Spring «Medz»**			
Inner diameter of well (mm): -	Distance between land surface and well head (m): -			
Calm water level (m below well head): -	Final depth of well (m below well head): -			
Further information of the sampling site (e.g. coordinates): **The spring is captured and not used.**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **0.17 l/sec**			
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 7.22	Water temperature (°C): 8.1	Dissolved oxygen (mg/l): 8.21	TDS (mg/l) 420	
Electrical conductivity incl. reference temperature (µS/cm): **647** µS/cm	□ **at 25 °C**			
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: Tughtaryan Arshak (Tel +374-91-99-10-37)				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				

The location of the sampling point Armenia, Tavush Region, Margahovit village

The coordinates
of the
sampling point
X=40^{O} 43' 59.2"
Y=44^{O} 41' 30.5"
H= 1737

Sampling Date: June 23, 2023	Time (hh:mm): 14:10	Sample ID: **N30**
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center	

Sampling site

Sampling site ID: N22	Type of sampling site: **Well**
Inner diameter of well (mm): 124	Distance between land surface and well head (m): 0.36
Calm water level (m below well head): (-11.92)	Final depth of well (m below well head): 30

Further information of the sampling site (e.g. coordinates): **The well was drilled in 2020. The well is located in the yard of Arsen Bekchyan.The well is utilized for drinking and irrigation water by the owner.**

Sampling

Type of sampling: □ **with pump** □ with bailer □ at a tap	Abstraction device: **bucket**
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **0.06 l/sec**

Field parameters (at the sampling)

Weather:	**Colour:**	**Turbidity:**	**Sediment:**	**Smell:**
□ **sunny**	□ **colourless**	□ **no**	□ **no**	□ **odorless**
□ cloudy	□ slight	□ low	□ low	□ putrid
□ changing	□ strong	□ moderate	□ moderate	□ fishy
□ rain	□ brown	□ strong	□ strong	□ chemical
□ heat	□ grey	□ ……..	□ ……..	□ chlor
□ frost	□ yellow			□ gasoline/oil

Measuring device:

pH-value:	Water temperature (°C):	Dissolved oxygen (mg/l):	TDS (mg/l)
7.8	9.4	6.65	248

Electrical conductivity incl. reference temperature (µS/cm): **382** µS/cm □ **at 25 °C**

Sample treatment: □ **chilled** □ filtrated □ stabilised with acid

Contacts: land owner: Arsen Bekchyan (Tel +37477-705-809)

Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory.
Signature of sampler: _____Date:_____
Name of sampler:_____

SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point: Armenia, Tavush Region, Dilijan city, Shamaghyan, Str.Aygestan				
The coordinates of the sampling point X=40^{O} 45' 0.01" Y=44^{O} 49' 45.6" H= 1465				
Sampling Date: June 23, 2023	Time (hh:mm): 16:00	Sample ID: **N31**		
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N31	Type of sampling site: **Spring «Qor»**			
Inner diameter of well (mm): -	Distance between land surface and well head (m): -			
Calm water level (m below well head): -	Final depth of well (m below well head): -			
Further information of the sampling site (e.g. coordinates): **The spring is captured.** **The spring is utilized for drinking water and livestock supply.**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **0.03 l/sec**			
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 7.39	Water temperature (°C): 12.7	Dissolved oxygen (mg/l): 6.2	TDS (mg/l) 286	
Electrical conductivity incl. reference temperature (µS/cm): **440** µS/cm			□ **at 25 °C**	
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: resident of the village: Rustam Davtyan (Tel +37496-04-43-76)				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				

SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point: Armenia, Tavush Region, Dilijan city, Str.Kalinin				
The coordinates of the sampling point X=40^{O} 44' 29.1" Y=44^{O} 49' 47.7" H= 1345				
Sampling Date: June 19, 2023	Time (hh:mm): 17:20	Sample ID: **N23**		
Sampling person: Ms Armine Hakobyan Mr Gegham Muradyan Mr Gevorg Torosyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N23	Type of sampling site: **Spring «Artzruni»**			
Inner diameter of well (mm): -	Distance between land surface and well head (m): -			
Calm water level (m below well head): -	Final depth of well (m below well head): -			
Further information of the sampling site (e.g. coordinates): **The spring is captured. The spring is located in the yard of Arshak Markosyan.The spring is utilized for drinking water by the owner.**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **0.01 l/sec**			
Field parameters (at the sampling)				
Weather: □ **sunny** □ cloudy □ changing □ rain □ heat □ frost	**Colour:** □ **colourless** □ slight □ strong □ brown □ grey □ yellow	**Turbidity:** □ **no** □ low □ moderate □ strong □ ……..	**Sediment:** □ **no** □ low □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 7.47	Water temperature (°C): 13.1	Dissolved oxygen (mg/l): 6.40	TDS (mg/l) 587	
Electrical conductivity incl. reference temperature (µS/cm): 903 µS/cm			□ **at 25 °C**	
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: land owner: Arshak Markosyan (Tel +37494-94-30-39)				
Execution of the sampling and of the above works according to the sampling manual and the requirements of the laboratory. Signature of sampler: _____Date:_____ Name of sampler:_____				

Annex II: The results of laboratory analysis conducted in Northern RBD in 2023

Table 5: The results of laboratory analysis conducted in Northern RBD in 2023

Sample ID	Provience	Location of observation point	Type of observation point	Sampling date	Water temp. (°C) field	EC µS/cm (at 25°C) field	Dissolved oxygen mg/l, field	pH field	pH Lab.	Transparency	Suspended particles. mg/l	Color: degree	Smell
1	Lori	Lernavan	Flowing borehole	6/19/2023	19.9	532	6.7	7.3	7.57	31	1.9	10	0
2	Lori	Katnadjur	spring («Qung»)	6/19/2023	10.4	329	8.84	8.0	8.03	31	1.1	10	0
3	Lori	Mets Parni	Flowing borehole	6/19/2023	12.6	386.6	8.19	7.9	8.03	31	1.6	10	0
4	Lori	Nor Khachakap	spring	6/19/2023	11.2	346	7.46	7.9	7.98	31	3.7	10	0
5	Lori	Darbas	spring	6/19/2023	12.4	549	8.38	7.9	7.95	31	0.9	10	1
6	Lori	Saratovka	Flowing borehole	6/20/2023	13.4	537	3.45	7.6	7.47	31	5.5	10	0
7	Lori	Saratovka	spring	6/20/2023	10.4	592	4.75	7.7	7.34	31	5.2	40	0
8	Lori	Tashir	Flowing borehole	6/20/2023	10.7	643	6.4	7.8	7.56	31	3.4	10	0
9	Lori	Stepanavan	Flowing borehole	6/20/2023	9.1	139.5	8.81	7.7	7.91	31	1.2	15	0
10	Lori	Getavan	Flowing borehole	6/20/2023	8.0	131	9.35	7.9	7.88	31	1	15	0
11	Lori	Lori berd	spring ''Lusaghbyur''	6/20/2023	9.5	188	9.62	8.2	7.9	31	0.8	15	0
12	Lori	Tumanyan	spring ''Kobayr''	6/21/2023	16.0	812	9.09	8.5	8.47	31	2.9	10	0
13	Lori	Shamlugh (Bendik)	spring ''Kakali taki''	6/21/2023	11.4	730	6.9	7.8	7.55	31	1.3	10	0
14	Tavush	Bagratashen	well	6/21/2023	14	254	6.86	8.01	8.05	31	25.3	20	0
15	Tavush	Berdavan	ground well	6/21/2023	12.4	914	5.2	7.12	7.48	31	4	10	1
16	Tavush	Jujevan	spring («Darbnants»)	6/21/2023	12.0	889	7.3	7.16	7.45	31	2.5	15	0
17	Tavush	Voskevan	spring	6/21/2023	13.6	742	7.96	7.43	7.76	31	3.7	10	0
18	Tavush	Voskepar	spring («Gharasu»)	6/21/2023	12.6	320	7.09	7.2	7.72	31	1.4	10	1
19	Tavush	Aygehovit	spring («Gyoli»)	6/22/2023	15.1	879	9.14	8.2	7.83	31	5.5	15	0
20	Tavush	Vazashen	spring («Yolomi»)	6/22/2023	14.8	1078	4.2	7.7	7.57	31	3.1	10	0

Sample ID	Provience	Location of observation point	Type of observation point	Sampling date	Water temp. (°C) field	EC µS/cm (at 25°C) field	Dissolved oxygen mg/l, field	pH field	pH Lab.	Transparency	Suspended particles. mg/l	Color: degree	Smell
21	Tavush	Paravakar	spring	6/22/2023	13.2	1898	8.03	7.23	7.83	31	7.4	10	0
22	Tavush	Verin Tsaghkavan	spring («Alposi»)	6/22/2023	13.6	1055	7.3	7.23	7.67	31	3.4	10	0
23	Tavush	Navur	spring («Medz»)	6/22/2023	9.6	950	8.3	7.29	7.75	31	1.9	10	0
24	Tavush	Berd	spring («Miji»)	6/22/2023	11.0	501	8.78	7.49	7.86	31	1.6	10	0
25	Tavush	Lusadzor	spring («Zani»)	6/22/2023	13.5	550	7.78	8.3	7.72	31	2.5	10	0
26	Tavush	Lusadzor	ground well	6/22/2023	15.0	525	7.11	8.3	7.66	31	2	10	1
27	Tavush	Gandzaqar	spring («Dudinyants»)	6/23/2023	13.4	459	7.8	7.6	7.62	31	1.5	10	0
28	Tavush	Hovq	spring («Shnqar»)	6/23/2023	11.4	392	9.28	7.7	7.65	31	1.8	10	0
29	Gegharkunik	Verin Chambarak	spring («Medz»)	6/23/2023	8.1	647	8.21	7.22	7.62	31	1.1	10	0
30	Tavush	Margahovit	well	6/23/2023	9.6	382	6.65	7.3	7.18	31	2.6	10	0
31	Tavush	Dilijan /Shamaghyan/	spring («Qor spring»)	6/23/2023	13.7	440	7.32	7.8	7.65	31	6.8	10	0
32	Tavush	Dilijan	spring «Artsruni»	6/23/2023	13.4	903	6.4	7.7	7.7	31	8.6	10	0

Sample ID	Provience	Location of observation point	Type of observation point	Sampling date	Hydrogen Carbonate, HCO_3 g/L	Sulfate, SO_4. mg/L	Chloride, Cl. mg/L	Nitrate NO_3, mg/L	Nitrite NO2, mg/L	Ammonia, NH4, mg/L	Total Mine-ralization, mg/L
1	Lori	Lernavan	Flowing borehole	6/19/2023	353.916	9.5955	3.3063	8.77	0.011559	0.007926	346
2	Lori	Katnadjur	spring («Qung»)	6/19/2023	207.468	15.6699	2.5543	3.8261	0.008902	0.007926	214
3	Lori	Mets Parni	Flowing borehole	6/19/2023	244.08	4.955	3.8773	16.0821	0.016209	0.079255	252
4	Lori	Nor Khachakap	spring	6/19/2023	219.672	5.9526	2.726	12.1517	0.00837	0.295886	225
5	Lori	Darbas	spring	6/19/2023	274.59	29.0655	3.8967	33.8286	0.024978	0.042269	357
6	Lori	Saratovka	Flowing borehole	6/20/2023	451.548	71.0079	63.5872	0.1635	0.063907	0.528896	609
7	Lori	Saratovka	spring	6/20/2023	305.1	21.3804	17.3718	4.9246	0.010363	0.686878	384.8
8	Lori	Tashir	Flowing borehole	6/20/2023	317.304	23.2547	15.6741	33.2765	0.008636	0.082425	417.95
9	Lori	Stepanavan	Flowing borehole	6/20/2023	85.428	1.8162	2.9324	2.5232	0.008237	0.03223	90.35
10	Lori	Getavan	Flowing borehole	6/20/2023	79.326	2.4446	2.633	2.7295	0.009035	0.05178	85.15
11	Lori	Lori berd	spring ''Lusaghbyur''	6/20/2023	106.785	3.7539	3.6941	4.3575	0.010762	0.047025	122.2
12	Lori	Tumanyan	spring ''Kobayr''	6/21/2023	341.712	122.1803	13.2309	26.2256	0.009832	0.268939	527.8
13	Lori	Shamlugh (Bendik)	spring ''Kakali taki''	6/21/2023	372.222	52.0657	11.1042	33.8102	0.008769	0.097748	474.5
14	Tavush	Bagratashen	well	6/21/2023	115.938	27.4182	3.3745	4.7205	0.066962	0.152698	165.1
15	Tavush	Berdavan	ground well	6/21/2023	463.752	93.3513	17.9584	31.5829	0.008237	0.150585	594.1
16	Tavush	Jujevan	spring («Darbnants»)	6/21/2023	433.242	64.1828	23.0153	43.5645	0.006909	0.072386	577.85
17	Tavush	Voskevan	spring	6/21/2023	360.018	57.4546	12.3472	35.272	0.01023	0.108844	482.3
18	Tavush	Voskepar	spring («Gharasu»)	6/21/2023	292.896	48.3116	9.572	20.9474	0.009566	0.08401	387
19	Tavush	Aygehovit	spring («Gyoli»)	6/22/2023	500.364	31.6516	14.2801	35.1926	0.017936	0.234595	571.35
20	Tavush	Vazashen	spring («Yolomi»)	6/22/2023	512.568	231.7334	18.0023	1.9781	0.004517	0.318606	700.7
21	Tavush	Paravakar	spring	6/22/2023	402.732	681.7128	27.1414	56.8174	0.007573	0.022191	1233.7

Sample ID	Provience	Location of observation point	Type of observation point	Sampling date	Hydrogen Carbonate, HCO_3 g/L	Sulfate, SO_4. mg/L	Chloride, Cl. mg/L	Nitrate NO_3, mg/L	Nitrite NO2, mg/L	Ammonia, NH4, mg/L	Total Mine-ralization, mg/L
22	Tavush	Verin Tsaghkavan	spring («Alposi»)	6/22/2023	360.018	188.3558	15.273	27.4778	0.009035	0.290602	685.75
23	Tavush	Navur	spring («Medz»)	6/22/2023	402.732	30.6992	22.8529	66.4926	0.01023	0.587016	550.55
24	Tavush	Berd	spring («Miji»)	6/22/2023	366.12	23.6195	10.7323	27.1251	0.014349	0.159567	450
25	Tavush	Lusadzor	spring («Zani»)	6/22/2023	347.814	21.1334	4.6001	7.2923	0.015412	0.415297	358
26	Tavush	Lusadzor	ground well	6/22/2023	353.916	105.0452	15.2203	13.4313	0.017671	0.347666	508
27	Tavush	Gandzaqar	spring («Dudinyants»)	6/23/2023	237.978	36.411	4.6823	13.191	0.007839	0.10356	305
28	Tavush	Hovq	spring («Shnqar»)	6/23/2023	256.284	16.3502	3.3871	7.1802	0.00651	0.091936	269
29	Gegharkunik	Verin Chambarak	spring («Medz»)	6/23/2023	280.692	30.3966	17.2364	41.2868	0.007175	0.168549	421
30	Tavush	Margahovit	well	6/23/2023	219.672	31.3463	13.3941	37.1421	0.01302	0.078727	308
31	Tavush	Dilijan /Shamaghyan/	spring («Qor spring»)	6/23/2023	250.182	12.3848	4.1377	18.9187	0.006776	0.088237	286
32	Tavush	Dilijan	spring «Artsruni»	6/23/2023	439.344	62.3591	17.8506	39.1445	0.016873	0.212932	587

Sample ID	Provience	Location of observation point	Type of observation point	Sampling date	phosphate, PO_4, mg/L	silicon Si, mg/L	total biological oxygen requirement, mg/L	Bichromate oxidation,	Li mg/L	Be mg/L	B mg/L
1	Lori	Lernavan	Flowing borehole	6/19/2023	0.015107	6.101481	2.2	10	0.004656	<0.0001	0.050478
2	Lori	Katnadjur	spring («Qung»)	6/19/2023	0.026132	10.63536	3.03	10	0.000695	<0.0001	0.037079
3	Lori	Mets Parni	Flowing borehole	6/19/2023	0.082479	14.70752	2.12	10	0.001809	<0.0001	0.059376
4	Lori	Nor Khachakap	spring	6/19/2023	0.003675	6.540679	2.17	10	0.000249	<0.0001	0.043493
5	Lori	Darbas	spring	6/19/2023	0.038789	8.430359	2.78	10	0.000159	<0.0001	0.122499
6	Lori	Saratovka	Flowing borehole	6/20/2023	0.066146	18.95986	2.72	30	0.023266	<0.0001	0.099325
7	Lori	Saratovka	spring	6/20/2023	0.700252	16.61296	2.18	40	0.002455	<0.0001	0.076031
8	Lori	Tashir	Flowing borehole	6/20/2023	0.127393	19.75492	1.58	15	0.004982	<0.0001	0.083107
9	Lori	Stepanavan	Flowing borehole	6/20/2023	0.166999	18.95536	2.89	10	0.00458	<0.0001	0.073949
10	Lori	Getavan	Flowing borehole	6/20/2023	0.174757	17.4756	2.48	10	0.004725	<0.0001	0.067292
11	Lori	Lori berd	spring ''Lusaghbyur''	6/20/2023	0.168224	13.81336	2.21	10	0.004851	<0.0001	0.079913
12	Lori	Tumanyan	spring ''Kobayr''	6/21/2023	0.110652	7.367273	3.26	10	0.006569	<0.0001	0.444482
13	Lori	Shamlugh (Bendik)	spring ''Kakali taki''	6/21/2023	0.095545	10.72095	1.98	10	0.002968	<0.0001	0.065923
14	Tavush	Bagratashen	well	6/21/2023	0.131884	5.416782	2.15	20	0.001702	<0.0001	0.049159
15	Tavush	Berdavan	ground well	6/21/2023	0.101669	8.551983	1.01	15	0.007765	<0.0001	0.25775
16	Tavush	Jujevan	spring («Darbnants»)	6/21/2023	0.194356	9.306504	1.56	20	0.01235	<0.0001	0.176329
17	Tavush	Voskevan	spring	6/21/2023	0.031848	10.32454	2.27	10	0.002731	<0.0001	0.169799
18	Tavush	Voskepar	spring («Gharasu»)	6/21/2023	0.036748	9.031723	2.28	10	0.001693	<0.0001	0.178685
19	Tavush	Aygehovit	spring («Gyoli»)	6/22/2023	0.019599	11.30204	2.45	10	0.002509	<0.0001	0.387646
20	Tavush	Vazashen	spring («Yolomi»)	6/22/2023	0.047772	11.95746	2.86	35	0.008575	<0.0001	0.339614
21	Tavush	Paravakar	spring	6/22/2023	0.05553	10.21643	1.91	20	0.000399	<0.0001	0.970765

Sample ID	Provience	Location of observation point	Type of observation point	Sampling date	phosphate, PO_4, mg/L	silicon Si, mg/L	total biological oxygen requirement, mg/L	Bichromate oxidation,	Li mg/L	Be mg/L	B mg/L
22	Tavush	Verin Tsaghkavan	spring («Alposi»)	6/22/2023	0.059613	11.82458	1.63	15	0.001792	<0.0001	0.292471
23	Tavush	Navur	spring («Medz»)	6/22/2023	0.294392	11.49349	2.85	25	0.00084	<0.0001	0.080485
24	Tavush	Berd	spring («Miji»)	6/22/2023	0.073904	13.08136	2.36	15	0.002197	<0.0001	0.25479
25	Tavush	Lusadzor	spring («Zani»)	6/22/2023	0.03144	5.536153	2.48	15	0.005141	<0.0001	0.096435
26	Tavush	Lusadzor	ground well	6/22/2023	0.037973	8.84253	1.24	15	0.003737	<0.0001	0.314344
27	Tavush	Gandzaqar	spring («Dudinyants»)	6/23/2023	0.058797	10.42139	1.53	15	0.001093	<0.0001	0.091119
28	Tavush	Hovq	spring («Shnqar»)	6/23/2023	0.016332	6.889786	2.24	10	0.000147	<0.0001	0.101222
29	Gegharkunik	Verin Chambarak	spring («Medz»)	6/23/2023	0.620631	13.55885	2.54	15	0.009373	<0.0001	0.122122
30	Tavush	Margahovit	well	6/23/2023	0.116777	8.187111	1.08	15	0.002145	<0.0001	0.050088
31	Tavush	Dilijan /Shamaghyan/	spring («Qor spring»)	6/23/2023	0.009799	6.265899	1.87	10	0.013321	<0.0001	0.047893
32	Tavush	Dilijan	spring «Artsruni»	6/23/2023	0.010616	9.423623	1.34	20	0.014707	<0.0001	0.236828

Sample ID	Provience	Location of observation point	Type of observation point	Sampling date	Na mg/L	Mg mg/L	Al mg/L	P mg/L	K mg/L	Ca mg/L	Ti mg/L
1	Lori	Lernavan	Flowing borehole	6/19/2023	6.711203	8.652233	<0.01	0.010913	1.033805	103.2205	0.001635
2	Lori	Katnadjur	spring («Qung»)	6/19/2023	15.85157	4.838512	<0.01	0.01266	0.210334	48.54106	0.002153
3	Lori	Mets Parni	Flowing borehole	6/19/2023	22.42252	6.896819	<0.01	0.049715	1.225369	54.67389	0.003189
4	Lori	Nor Khachakap	spring	6/19/2023	17.58742	11.71987	<0.01	<0.01	0.920637	42.06435	0.002021
5	Lori	Darbas	spring	6/19/2023	34.49066	13.20895	<0.01	0.023532	1.086359	61.91994	0.002218
6	Lori	Saratovka	Flowing borehole	6/20/2023	45.14466	53.51254	<0.01	<0.01	5.222936	71.21534	0.003117
7	Lori	Saratovka	spring	6/20/2023	14.01148	16.72555	0.099015	0.537517	20.47993	82.91589	0.010827
8	Lori	Tashir	Flowing borehole	6/20/2023	16.09749	19.94049	<0.01	0.069152	2.630254	95.88677	0.005201
9	Lori	Stepanavan	Flowing borehole	6/20/2023	5.942796	5.893677	0.021257	0.08521	1.140294	14.06553	0.004551
10	Lori	Getavan	Flowing borehole	6/20/2023	5.47777	5.221703	0.050228	0.082779	1.082349	12.53137	0.005048
11	Lori	Lori berd	spring ''Lusaghbyur''	6/20/2023	6.260329	7.59787	0.033821	0.079645	1.317626	21.11437	0.004849
12	Lori	Tumanyan	spring ''Kobayr''	6/21/2023	95.63704	38.79416	<0.01	0.052285	2.303753	25.25912	0.003072
13	Lori	Shamlugh (Bendik)	spring ''Kakali taki''	6/21/2023	8.507212	21.63671	0.020294	0.082865	0.803379	105.5778	0.003612
14	Tavush	Bagratashen	well	6/21/2023	6.875856	7.614042	0.695705	0.108417	2.431604	37.56808	0.015267
15	Tavush	Berdavan	ground well	6/21/2023	44.03372	37.818	<0.01	0.091346	4.601651	125.4821	0.003892
16	Tavush	Jujevan	spring («Darbnants»)	6/21/2023	17.25742	27.5602	<0.01	0.155629	13.18273	146.3847	0.00324
17	Tavush	Voskevan	spring	6/21/2023	34.04707	22.13037	0.027547	0.052266	1.185488	89.08797	0.003884
18	Tavush	Voskepar	spring («Gharasu»)	6/21/2023	29.50209	16.52898	0.014025	0.037293	1.676628	67.60496	0.002768
19	Tavush	Aygehovit	spring («Gyoli»)	6/22/2023	59.19306	36.66476	0.024012	0.058973	1.675081	80.94594	0.004751
20	Tavush	Vazashen	spring («Yolomi»)	6/22/2023	82.68039	58.30742	0.01659	0.092516	3.843044	128.0616	0.005103
21	Tavush	Paravakar	spring	6/22/2023	208.5152	42.31734	<0.01	0.07481	1.940143	199.8037	0.003796

Sample ID	Provience	Location of observation point	Type of observation point	Sampling date	Na mg/L	Mg mg/L	Al mg/L	P mg/L	K mg/L	Ca mg/L	Ti mg/L
22	Tavush	Verin Tsaghkavan	spring («Alposi»)	6/22/2023	112.355	14.64683	<0.01	0.025262	2.137753	75.90258	0.00185
23	Tavush	Navur	spring («Medz»)	6/22/2023	11.31572	29.9645	<0.01	0.219216	3.281575	110.1421	0.004005
24	Tavush	Berd	spring («Miji»)	6/22/2023	76.1111	20.30611	<0.01	0.067032	2.185732	42.92426	0.004156
25	Tavush	Lusadzor	spring («Zani»)	6/22/2023	6.297938	28.32583	0.071872	0.047482	2.279554	68.01303	0.004414
26	Tavush	Lusadzor	ground well	6/22/2023	47.94545	34.01613	0.018103	0.063644	2.355427	86.75162	0.003256
27	Tavush	Gandzaqar	spring («Dudinyants»)	6/23/2023	6.468908	12.90147	<0.01	0.055614	1.940967	70.88986	0.003434
28	Tavush	Hovq	spring («Shnqar»)	6/23/2023	6.140474	13.53009	0.012266	0.03176	0.749544	61.66918	0.002556
29	Gegharkunik	Verin Chambarak	spring («Medz»)	6/23/2023	20.93941	17.08478	<0.01	0.463405	8.971763	86.27819	0.004918
30	Tavush	Margahovit	well	6/23/2023	16.94674	14.85971	<0.01	0.096592	0.858939	60.39676	0.003376
31	Tavush	Dilijan /Shamaghyan/	spring («Qor spring»)	6/23/2023	6.797736	14.39948	<0.01	0.011908	0.651091	68.64376	0.002819
32	Tavush	Dilijan	spring «Artsruni»	6/23/2023	104.0611	22.92059	0.030499	0.036869	1.449817	84.9006	0.004976

Sample ref.no	Provie nce	Location of observation point	Type of observation point	Sampling date	V mg/L	Cr mg/L	Fe mg/L	Mn mg/L	Co mg/L	Ni mg/L	Cu mg/L
1	Lori	Lernavan	Flowing borehole	6/19/2023	0.000668	0.002163	0.499688	<0.0001	0.000283	0.00349	0.000363
2	Lori	Katnadjur	spring («Qung»)	6/19/2023	0.008179	0.000887	0.238462	0.0001163	0.000131	0.00156	0.000331
3	Lori	Mets Parni	Flowing borehole	6/19/2023	0.011556	0.002683	0.266394	0.0001979	0.000144	0.001515	0.000224
4	Lori	Nor Khachakap	spring	6/19/2023	0.008635	0.000941	0.204152	0.0002507	0.000116	0.001468	0.000943
5	Lori	Darbas	spring	6/19/2023	0.007029	0.001675	0.317282	0.0006219	0.000172	0.001937	0.000483
6	Lori	Saratovka	Flowing borehole	6/20/2023	0.000635	0.001874	0.234552	0.0744396	0.00051	0.004021	0.000791
7	Lori	Saratovka	spring	6/20/2023	0.00798	0.002797	0.505237	0.0111925	0.000589	0.007511	0.006632
8	Lori	Tashir	Flowing borehole	6/20/2023	0.012076	0.003307	0.49333	<0.0001	0.000278	0.003424	0.000661
9	Lori	Stepanavan	Flowing borehole	6/20/2023	0.015803	0.001539	0.061407	0.0002842	<0.0001	0.000527	0.000183
10	Lori	Getavan	Flowing borehole	6/20/2023	0.013299	0.001029	0.063873	0.0003511	<0.0001	0.000621	0.000468
11	Lori	Lori berd	spring ''Lusaghbyur''	6/20/2023	0.013394	0.001288	0.108427	0.0003107	<0.0001	0.000926	0.00044
12	Lori	Tumanyan	spring ''Kobayr''	6/21/2023	0.021256	0.009753	0.112524	0.0002032	<0.0001	0.000763	0.000817
13	Lori	Shamlugh (Bendik)	spring ''Kakali taki''	6/21/2023	0.001013	0.001742	0.732146	0.00114	0.000379	0.004327	0.001419
14	Tavush	Bagratashen	well	6/21/2023	0.005776	0.001452	0.824593	0.0477147	0.000888	0.003532	0.045448
15	Tavush	Berdavan	ground well	6/21/2023	0.006826	0.003573	0.719532	0.0009638	0.0004	0.004892	0.001674
16	Tavush	Jujevan	spring («Darbnants»)	6/21/2023	0.001464	0.002343	0.851125	0.0002986	0.000476	0.005164	0.002517
17	Tavush	Voskevan	spring	6/21/2023	0.024799	0.001909	0.652058	0.0009904	0.000358	0.004228	0.002448
18	Tavush	Voskepar	spring («Gharasu»)	6/21/2023	0.00373	0.002346	0.499795	0.0003954	0.000266	0.003171	0.001596
19	Tavush	Aygehovit	spring («Gyoli»)	6/22/2023	0.010643	0.00399	0.593552	0.0014014	0.000368	0.00372	0.003079
20	Tavush	Vazashen	spring («Yolomi»)	6/22/2023	0.00419	0.002726	0.744085	0.0014814	0.000379	0.004706	0.002732

Sample ref.no	Provie nce	Location of observation point	Type of observation point	Sampling date	V mg/L	Cr mg/L	Fe mg/L	Mn mg/L	Co mg/L	Ni mg/L	Cu mg/L
21	Tavush	Paravakar	spring	6/22/2023	0.010583	0.00276	1.200334	0.0010662	0.000603	0.007076	0.004088
22	Tavush	Verin Tsaghkavan	spring («Alposi»)	6/22/2023	0.004649	0.000718	0.286174	0.0003918	0.000188	0.002203	0.001322
23	Tavush	Navur	spring («Medz»)	6/22/2023	0.041336	0.002427	0.797948	0.0002366	0.000428	0.004936	0.00145
24	Tavush	Berd	spring («Miji»)	6/22/2023	0.058703	0.004596	0.307408	<0.0001	0.000185	0.002037	0.000931
25	Tavush	Lusadzor	spring («Zani»)	6/22/2023	0.003838	0.002248	0.552163	0.0010052	0.000321	0.003794	0.002746
26	Tavush	Lusadzor	ground well	6/22/2023	0.004339	0.002905	0.664739	0.000274	0.000349	0.004171	0.002846
27	Tavush	Gandzaqar	spring («Dudinyants»)	6/23/2023	0.003489	0.001844	0.535813	0.0002679	0.000295	0.003214	0.002426
28	Tavush	Hovq	spring («Shnqar»)	6/23/2023	0.002572	0.00179	0.465933	0.0015558	0.000234	0.002647	0.000753
29	Gegharkunik	Verin Chambarak	spring («Medz»)	6/23/2023	0.004282	0.002837	0.637634	0.0001213	0.00037	0.004089	0.001347
30	Tavush	Margahovit	well	6/23/2023	0.002224	0.00243	0.459223	0.0009022	0.000258	0.002972	0.001032
31	Tavush	Dilijan /Shamaghyan/	spring («Qor spring»)	6/23/2023	0.005743	0.001665	0.502019	0.0006306	0.000263	0.002987	0.002308
32	Tavush	Dilijan	spring «Artsruni»	6/23/2023	0.01122	0.003855	0.644661	0.00147	0.000354	0.00366	0.002862

Sample ID	Provience	Location of observation point	Type of observation point	Sampling date	Zn mg/L	As mg/L	Se mg/L	Sr mg/L	Mo mg/L	Cd mg/L	Sn mg/L
1	Lori	Lernavan	Flowing borehole	6/19/2023	0.0002307	0.000648	0.000956	0.49253	0.001511	<0.0001	<0.001
2	Lori	Katnadjur	spring («Qung»)	6/19/2023	<0.0001	0.001034	0.000957	0.088104	0.001109	<0.0001	<0.001
3	Lori	Mets Parni	Flowing borehole	6/19/2023	0.0000915	0.00166	0.000918	0.105488	0.001313	<0.0001	<0.001
4	Lori	Nor Khachakap	spring	6/19/2023	0.0031733	0.000264	0.0006	0.244976	0.000779	<0.0001	<0.001
5	Lori	Darbas	spring	6/19/2023	0.0002946	0.000367	0.001672	0.45869	0.001207	<0.0001	<0.001
6	Lori	Saratovka	Flowing borehole	6/20/2023	0.0001977	0.000979	<0.0001	0.457745	0.00099	<0.0001	<0.001
7	Lori	Saratovka	spring	6/20/2023	0.0057041	0.002596	0.000841	0.474196	0.001852	<0.0001	<0.001
8	Lori	Tashir	Flowing borehole	6/20/2023	0.0003746	0.002568	0.000863	0.65161	0.001233	<0.0001	<0.001
9	Lori	Stepanavan	Flowing borehole	6/20/2023	<0.0001	0.003886	<0.0001	0.071096	0.000849	<0.0001	<0.001
10	Lori	Getavan	Flowing borehole	6/20/2023	<0.0001	0.003356	<0.0001	0.068256	0.000669	<0.0001	<0.001
11	Lori	Lori berd	spring ''Lusaghbyur''	6/20/2023	0.0003737	0.003197	0.000158	0.127164	0.000902	<0.0001	<0.001
12	Lori	Tumanyan	spring ''Kobayr''	6/21/2023	0.0005844	0.002168	0.001616	0.352969	0.00709	<0.0001	<0.001
13	Lori	Shamlugh (Bendik)	spring ''Kakali taki''	6/21/2023	0.003078	0.000463	0.001042	0.836307	0.001459	<0.0001	<0.001
14	Tavush	Bagratashen	well	6/21/2023	0.0380557	0.002635	0.00055	0.18296	0.002202	0.000197	<0.001
15	Tavush	Berdavan	ground well	6/21/2023	0.0008934	0.00135	0.001951	0.837972	0.003067	<0.0001	<0.001
16	Tavush	Jujevan	spring («Darbnants»)	6/21/2023	0.0009358	0.000952	0.00157	1.547515	0.003398	<0.0001	<0.001
17	Tavush	Voskevan	spring	6/21/2023	0.0028692	0.001136	0.002262	0.823687	0.00218	<0.0001	<0.001
18	Tavush	Voskepar	spring («Gharasu»)	6/21/2023	0.0019854	0.000701	0.001235	0.45517	0.001526	<0.0001	<0.001
19	Tavush	Aygehovit	spring («Gyoli»)	6/22/2023	0.0080314	0.000794	0.00239	0.986748	0.006013	<0.0001	<0.001
20	Tavush	Vazashen	spring («Yolomi»)	6/22/2023	0.002529	0.001146	0.002724	1.101839	0.006907	<0.0001	<0.001
21	Tavush	Paravakar	spring	6/22/2023	0.0044145	0.001041	0.005035	0.986737	0.003859	<0.0001	<0.001

Sample ID	Provience	Location of observation point	Type of observation point	Sampling date	Zn mg/L	As mg/L	Se mg/L	Sr mg/L	Mo mg/L	Cd mg/L	Sn mg/L
22	Tavush	Verin Tsaghkavan	spring («Alposi»)	6/22/2023	0.0006243	0.000463	<0.0001	0.217132	0.004565	<0.0001	<0.001
23	Tavush	Navur	spring («Medz»)	6/22/2023	0.0002788	0.000759	0.00149	0.697539	0.001214	<0.0001	<0.001
24	Tavush	Berd	spring («Miji»)	6/22/2023	0.0002763	0.002378	0.001166	0.613379	0.00992	<0.0001	<0.001
25	Tavush	Lusadzor	spring («Zani»)	6/22/2023	0.001458	0.001454	0.001603	0.313737	0.001291	<0.0001	<0.001
26	Tavush	Lusadzor	ground well	6/22/2023	0.0021448	0.001095	0.002668	0.677773	0.002732	<0.0001	<0.001
27	Tavush	Gandzaqar	spring («Dudinyants»)	6/23/2023	0.0004931	0.000985	0.001175	0.590173	0.001661	<0.0001	<0.001
28	Tavush	Hovq	spring («Shnqar»)	6/23/2023	0.0310793	0.000264	0.001149	0.231137	0.000381	<0.0001	<0.001
29	Gegharkunik	Verin Chambarak	spring («Medz»)	6/23/2023	0.0003714	0.015435	0.001651	0.63548	0.001893	<0.0001	<0.001
30	Tavush	Margahovit	well	6/23/2023	0.0010771	0.000569	0.000953	0.324394	0.001001	<0.0001	<0.001
31	Tavush	Dilijan /Shamaghyan/	spring («Qor spring»)	6/23/2023	0.0058271	0.000488	0.000639	0.606628	0.002101	<0.0001	<0.001
32	Tavush	Dilijan	spring «Artsruni»	6/23/2023	0.0017132	0.00145	0.001718	1.056164	0.006008	<0.0001	<0.001

Sample ID	Provience	Location of observation point	Type of observation point	Sampling date	Sb mg/L	Ba mg/L	Pb mg/L	F mg/L	Br mg/L	Salinity ppt
1	Lori	Lernavan	Flowing borehole	6/19/2023	<0.0001	0.125492	<0.0001	0.0779	<0.03	0.26
2	Lori	Katnadjur	spring («Qung»)	6/19/2023	<0.0001	<0.01	<0.0001	0.0429	<0.03	0.15
3	Lori	Mets Parni	Flowing borehole	6/19/2023	<0.0001	<0.01	<0.0001	0.0579	<0.03	0.18
4	Lori	Nor Khachakap	spring	6/19/2023	0.000319	0.000387	<0.0001	0.0559	<0.03	0.16
5	Lori	Darbas	spring	6/19/2023	<0.0001	0.021228	<0.0001	0.0601	0.0357	0.26
6	Lori	Saratovka	Flowing borehole	6/20/2023	<0.0001	0.026209	<0.0001	0.0787	0.1784	0.62
7	Lori	Saratovka	spring	6/20/2023	0.000238	0.103138	0.000255	0.0457	<0.03	0.29
8	Lori	Tashir	Flowing borehole	6/20/2023	<0.0001	0.04904	<0.0001	0.0845	0.0394	0.31
9	Lori	Stepanavan	Flowing borehole	6/20/2023	<0.0001	0.00097	<0.0001	<0.03	<0.03	0.07
10	Lori	Getavan	Flowing borehole	6/20/2023	<0.0001	<0.01	<0.0001	<0.03	<0.03	0.06
11	Lori	Lori berd	spring ''Lusaghbyur''	6/20/2023	<0.0001	<0.01	<0.0001	<0.03	<0.03	0.09
12	Lori	Tumanyan	spring ''Kobayr''	6/21/2023	<0.0001	<0.01	<0.0001	0.1068	0.0654	0.39
13	Lori	Shamlugh (Bendik)	spring ''Kakali taki''	6/21/2023	<0.0001	0.030112	<0.0001	0.11	<0.03	0.36
14	Tavush	Bagratashen	well	6/21/2023	0.000161	0.028655	0.001866	<0.03	<0.03	0.12
15	Tavush	Berdavan	ground well	6/21/2023	<0.0001	0.111994	<0.0001	0.0917	0.0518	0.44
16	Tavush	Jujevan	spring («Darbnants»)	6/21/2023	<0.0001	0.049203	<0.0001	0.0901	0.034	0.43
17	Tavush	Voskevan	spring	6/21/2023	<0.0001	0.034158	0.000294	0.0813	<0.03	0.36
18	Tavush	Voskepar	spring («Gharasu»)	6/21/2023	<0.0001	0.0188	<0.0001	0.0572	<0.03	0.29
19	Tavush	Aygehovit	spring («Gyoli»)	6/22/2023	0.000233	0.017019	<0.0001	0.0909	<0.03	0.43
20	Tavush	Vazashen	spring («Yolomi»)	6/22/2023	0.000152	0.047645	<0.0001	0.1221	0.0484	0.53
21	Tavush	Paravakar	spring	6/22/2023	0.000122	0.021551	<0.0001	0.1536	0.116	0.95

Sample ID	Provience	Location of observation point	Type of observation point	Sampling date	Sb mg/L	Ba mg/L	Pb mg/L	F mg/L	Br mg/L	Salinity ppt
22	Tavush	Verin Tsaghkavan	spring («Alposi»)	6/22/2023	<0.0001	<0.01	<0.0001	0.1133	<0.03	0.52
23	Tavush	Navur	spring («Medz»)	6/22/2023	<0.0001	<0.01	<0.0001	0.0824	<0.03	0.42
24	Tavush	Berd	spring («Miji»)	6/22/2023	<0.0001	<0.01	<0.0001	0.0546	<0.03	0.34
25	Tavush	Lusadzor	spring («Zani»)	6/22/2023	0.00013	0.025071	<0.0001	0.0463	<0.03	0.27
26	Tavush	Lusadzor	ground well	6/22/2023	0.00011	0.054447	<0.0001	0.0642	0.0383	0.38
27	Tavush	Gandzaqar	spring («Dudinyants»)	6/23/2023	0.000109	0.043499	<0.0001	0.0471	<0.03	0.22
28	Tavush	Hovq	spring («Shnqar»)	6/23/2023	<0.0001	0.018564	0.000775	0.0443	<0.03	0.2
29	Gegharkunik	Verin Chambarak	spring («Medz»)	6/23/2023	<0.0001	0.056072	<0.0001	0.122	0.0319	0.31
30	Tavush	Margahovit	well	6/23/2023	<0.0001	0.023897	<0.0001	0.0337	0.0357	0.23
31	Tavush	Dilijan /Shamaghyan/	spring («Qor spring»)	6/23/2023	<0.0001	<0.01	<0.0001	0.0927	<0.03	0.21
32	Tavush	Dilijan	spring «Artsruni»	6/23/2023	0.000168	0.035881	0.000309	0.1736	0.0381	0.44

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