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

GROUNDWATER SURVEY REPORT 2022

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

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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 30 groundwater springs for quantitative and qualitative studies in 2022 was accomplished. Finally, 13 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 September 2022 in the Northern River Basin District (RBD) of Armenia. In the survey 30 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 2022 covered the following activities:

- Development of the survey manual;
- Field survey conducted by the hydrogeologists of the Hydrometeorology and Monitoring Centre (HMC) (29 August – 2 September 2022);
- 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 2022

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 73 typical wells collected, 30 observation points were selected for field research, a brief description of which is given in Table 1.

It is planned to include at least 13 of the 30 observation points studied during the field research in the monitoring network, taking into account:

1. the presence of 13 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	29. Aug–02. Sep 2022
Location	The survey is performed in the Northern River Basin District of Armenia
Overall responsibility.	Mr Harutyun Yeremyan, HMC
Scope of survey	In total 30 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 Harutyun Yeremyan (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 - 2022

Taking into consideration the scarcity of hydrogeological monitoring observation points in the Northern RBD, under the initiative of EU4Enviroment, in 2022 a survey of 30 groundwater springs was performed. Of the 30 points studied, 21 are springs, 7 are 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, 13 observation points are proposed to be include in the hydrogeological monitoring network of Northern River Basin District. They are the following sites: N1, N2, N6, N10, N11, N12, N13, N14, N15, N20, N25, N27 and N29.

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 1.1 m above the Earth's surface. The discharge of the well is 0.5 l/s, water temperature is 19.9°C, the total mineralization is 499.48 mg/l, dissolved oxygen 5.99 mg/l, electrical conductivity is 545 µS/cm (at 25°C), pH is 7.21.

The water flows into the river and is used for irrigation. The nitrate concentration is 10 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 (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 0.65 m above the Earth's surface. The discharge of well is 0.33 l/s, water temperature is 12.6°C, the total mineralization is 345.86 mg/l, dissolved oxygen 6.79 mg/l, electrical conductivity is 395 µS/cm (at 25°C), pH-value is 7.95.

The well is utilized for drinking water supply by several houses.The nitrate concentration is 18.18 mg/l, which does not exceed the Armenian drinking water norm (45 mg/l).

2.2.3. Site N 3 ("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 0.7 l/s, water temperature is 10.4°C, the total mineralization is 253.99 mg/l, dissolved oxygen 7.39 mg/l, electrical conductivity is 395 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 4.36 mg/l, which does not exceed the Armenian drinking water norm (45 mg/l).

2.2.4. Site N 4 (flowing well, Geghasar village)

The flowing well is located in the administrative territory of Geghasar village of Lori region. The well was drilled in years of 1967–1969. The depth is 30 m. Inner diametr of well is 150 mm. The aquifer is presented by pebble-boulders.

Water level is at an altitude of 0.15 m above the Earth's surface. The discharge of well is 0.6 l/s, water temperature is 14.0°C, the total mineralization is 364.9 mg/l, dissolved oxygen 5.87 mg/l, electrical conductivity is 419 µS/cm (at 25°C), pH-value is 7.87.

The well is utilized for drinking water supply. The nitrate concentration is 21.57 mg/l, which does not exceed the Armenian drinking water norm (45 mg/l).

2.2.5. Site N 5 (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 0.2 l/s, water temperature is 11.2°C, the total mineralization is 302.9 mg/l, dissolved oxygen 5.52 mg/l, electrical conductivity is 343 µS/cm (at 25°C), pH-value is 7.96.

The well is utilized for drinking water supply by several houses.The nitrate concentration is 13.96 mg/l, which does not exceed the Armenian drinking water norm (45 mg/l).

2.2.6. Site N 6 (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 0.22 l/s, water temperature is 12.4°C, the total mineralization is 474.9 mg/l, dissolved oxygen 7.11 mg/l, electrical conductivity is 560 µS/cm (at 25°C), pH-value is 7.8.

The water is used for livestock supply. The nitrate concentration is 40.19 mg/l, which does not exceed the Armenian drinking water norm (45 mg/l).

2.2.7. Site N 7 ("Avagenc" spring, Darbas village)

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

The discharge of the spring is 0.18 l/s, water temperature is 11.4°C, the total mineralization is 592.14 mg/l, dissolved oxygen 4.87 mg/l, electrical conductivity is 725 µS/cm (at 25°C), pH-value is 7.5.

The spring is used for drinking water supply. Spring water is polluted by anthropogenic impacts from the settlement; the nitrate concentration exceeds 47 mg/l, which is above the drinking water norm (45 mg/l).

2.2.8. Sample N 8 (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 0.19 l/s, water temperature is 10.4°C, the total mineralization is 403,8 mg/l, dissolved oxygen 5.55 mg/l, electrical conductivity is 480 µS/cm (at 25°C), pH-value is 7.61.

The water is not used. The nitrate is 7.7 mg/l, which does not exceed the drinking water norm.

2.2.9. Site N 9 (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 13.4°C, the total mineralization is 1,074.63 mg/l, dissolved oxygen 1.65 mg/l, electrical conductivity is 1,276 µS/cm (at 25°C), pH-value is 7.33.

The water is not used.The nitrate concentration is 0.92 mg/l, which is below the drinking water norm.

2.2.10. Sample N 10 (''Xarlanov'' or ''Garniki'' spring, Saratovka village)

The spring is located in the administrative territory of Saratovka village of Lori region.

The outflow of water is observed from volcanic rocks. The spring is captured.

The discharge of the spring is 8.5 l/s, water temperature is 8.9°C, the total mineralization is 162.9mg/l, dissolved oxygen 6.17mg/l, electrical conductivity is 194 µS/cm (at 25°C), pH-7.81.

The water is not used. The nitrate concentration is 5.69mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.11. Sample N 11 (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 1.3m above the Earth's surface. The discharge of the well is 4.0 l/s, water temperature is 10.7°C, the total mineralization is 535.5 mg/l, dissolved oxygen 4.86 mg/l, electrical conductivity is 646 µS/cm (at 25°C), pH-value is 7.4.

The water is not used and it flows into the Tashir River. The nitrate concentration is 36.6 mg/l, which does not exceed the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.12. Sample N 12 (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 2.6 m above the Earth's surface. The discharge of well is 60.0 l/s, water temperature is 8.0°C, the total mineralization is 104.7 mg/l, dissolved oxygen 6.34 mg/l, electrical conductivity is 129 µS/cm (at 25°C), pH-value is 7.91.

The water is not used, flows into the river. The nitrate concentration is 3.19 mg/l.

2.2.13. Sample N 13 (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 1.7 m above the Earth's surface. The discharge of the well is 14.0 l/s, water temperature is 9.1°C, the total mineralization is 116.67 mg/l, dissolved oxygen 6.25 mg/l, electrical conductivity is 140 µS/cm (at 25°C), pH-value is 7.97.

The water is not used, flows into the river. The nitrate concentration is 2.91 mg/l.

2.2.14. Sitee N 14 (" 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 9.5°C, the total mineralization is 158.59 mg/l, dissolved oxygen 5.93 mg/l, electrical conductivity is 194 µS/cm (at 25°C), pH-value is 7.84.

The water is not used. The nitrate concentration is 4.89 mg/l.

2.2.15. Site N 15 ("Agaraki" spring, Lori Berd village)

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

The discharge of the spring is 5.5 l/s, water temperature is 9.8°C, the total mineralization is 212 mg/l, dissolved oxygen 7.8 mg/l, electrical conductivity is 267 µS/cm (at 25°C), pH-value is 8.2.

The water is not used. The nitrate concentration is 8.47mg/l.

2.2.16. Sitle N 16 ("Kendanarar" spring, Odzun village)

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

The discharge of the spring is 0.22 l/s, water temperature is 10.4°C, the total mineralization is 135.1 mg/l, dissolved oxygen 7.58 mg/l, electrical conductivity is 179 µS/cm (at 25°C), pH-value is 8.07.

The spring is utilized for drinking water supply. The nitrate concentration is 4.19 mg/l.

2.2.17. Site N 17 ("Vardumyanneri" spring, Madan village)

The spring is located in the administrative territory of Madan village of Lori 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 13.2°C, the total mineralization is 1,341.2 mg/l, dissolved oxygen 5.55 mg/l, electrical conductivity is 1,581 µS/cm (at 25°C), pH-value is 7.16.

The spring is near the cemetery, and utilized for drinking water supply. Only 15 people live in the village. Spring water is polluted by anthropogenic inputs of the settlement, nitrate concentration exceeds 176 mg/l, which exceeds the drinking water norm (45 mg/l) approved by the RA Ministry of Health.

2.2.18. Site N 18 ("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 0.19 l/s, water temperature is 11.4°C, the total mineralization is 643.3 mg/l, dissolved oxygen 5.22 mg/l, electrical conductivity is 748 µS/cm (at 25°C), pH-value is 7.35.

The spring is near the cemetery, and utilized for drinking water supply. Only 15–20 people live in the village. The nitrate concentration is 39.5 mg/l.

2.2.19. Site N 19 (spring, Tumanyan village (Kobayr Monastery))

The spring is located in the administrative territory of Tumanyan village (Kobayr Monastery) of Lori region. The outflow of water is observed from volcanic rocks. The spring is not captured. The outflow of the spring is through the church wall and is considered Holy water.

The discharge of the spring is 0.01 l/s, water temperature is 14.1°C, the total mineralization is 696.65 mg/l, dissolved oxygen 6.45 mg/l, electrical conductivity is 855 µS/cm (at 25°C), pH-value is 8.13.

The nitrate concentration is 31.5 mg/l, which does not exceed the drinking water norm (45 mg/l).

2.2.20. Site N 20 (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 0.5 l/s, water temperature is 16.0°C, the total mineralization is 693.48 mg/l, dissolved oxygen 7.78 mg/l, electrical conductivity is 820 µS/cm (at 25°C), pH-value is 7.81.

The spring is utilized for drinking water. The nitrate concentration is 32.2 mg/l.

2.2.21. Site N 21 (spring, Dsegh village)

The spring is located in the administrative territory of Dsegh village of Lori region. The outflow of water is observed from volcanic- sedimentary rocks. The spring is captured, but needs repair.

The discharge of the spring is 0.15 l/s, water temperature is 13.0°C, the total mineralization is 433.4 mg/l, dissolved oxygen 7.17 mg/l, electrical conductivity is 472 µS/cm (at 25°C), pH-value is 8.48.

The spring is utilized for drinking water by «Shakaryan Rancho» LTD. The nitrate concentration is 0.94 mg/l, which does not exceed the drinking water norm (45 mg/l).

2.2.22. Site N 22 (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 9.6°C, the total mineralization is 416.48 mg/l, dissolved oxygen 5.12 mg/l, electrical conductivity is 460 µS/cm (at 25°C), pH-value is 7.12.

The well is utilized for drinking and irrigation water by the owner. Spring water is polluted by anthropogenic input of the settlement, nitrate concentration exceeds 50.0 mg/l.

2.2.23. Site N 23 ("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 0.01 l/s, water temperature is 13.4°C, the total mineralization is 812.3 mg/l, dissolved oxygen 5.59 mg/l, electrical conductivity is 500 µS/cm (at 25°C), pH-value is 7.49.

The spring is utilized for drinking water by the owner. Spring water is polluted by anthropogenic inputs of the settlement, nitrate concentration exceeds 45.0 mg/l.

2.2.24. Site N 24 ("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 13.7°C, the total mineralization is 389.3 mg/l, dissolved oxygen 6.2 mg/l, electrical conductivity is 400 µS/cm (at 25°C), pH-value is 7.52.

The spring is utilized for drinking water and livestock supply. The nitrate concentration is 22.0 mg/l.

2.2.25. Site N 25 ("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 11.4°C, the total mineralization is 373.8 mg/l, dissolved oxygen 8.03 mg/l, electrical conductivity is 427 µS/cm (at 25°C), pH-value is 7.6.

The spring is not captured and not used. The nitrate concentration is 10.5 mg/l.

2.2.26. Site N 26 ("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 0.08 l/s, water temperature is 13.4°C, the total mineralization is 512.5 mg/l, dissolved oxygen 5.81 mg/l, electrical conductivity is 593 µS/cm (at 25°C), pH-value is 7.27.

The spring is not used. The nitrate concentration is 26.6 mg/l.

2.2.27. Site N 27 ("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 0.4 l/s, water temperature is 13.5°C, the total mineralization is 622.4 mg/l, dissolved oxygen 6.69 mg/l, electrical conductivity is 690 µS/cm (at 25°C), pH-value is 7.43.

The spring is utilized for drinking water supply. The nitrate concentration is 12.4 mg/l.

2.2.28. Site N 28 (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 15.0°C, the total mineralization is 791.8 mg/l, dissolved oxygen 5.13 mg/l, electrical conductivity is 840 µS/cm (at 25°C), pH-value is 7.3.

The well is utilized for fish farming. The nitrate concentration is 22.7 mg/l.

2.2.29. Site N 29 ("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 1.2 l/s, water temperature is 15.1°C, the total mineralization is 844.5 mg/l, dissolved oxygen 5.91 mg/l, electrical conductivity is 925 µS/cm (at 25°C), pH-value is 7.59.

Spring water is polluted by anthropogenic inputs of the settlement, the nitrate concentration exceeds 46.0 mg/l.

2.2.30. Site N 30 ("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 0.05 l/s, water temperature is 14.8°C, the total mineralization is 1,140.7 mg/l, dissolved oxygen 4.56 mg/l, electrical conductivity is 1,210 µS/cm (at 25°C), pH-value is 7.09.

The spring is temporary, utilized for drinking water supply. The nitrate concentration is 7.3 mg/l.

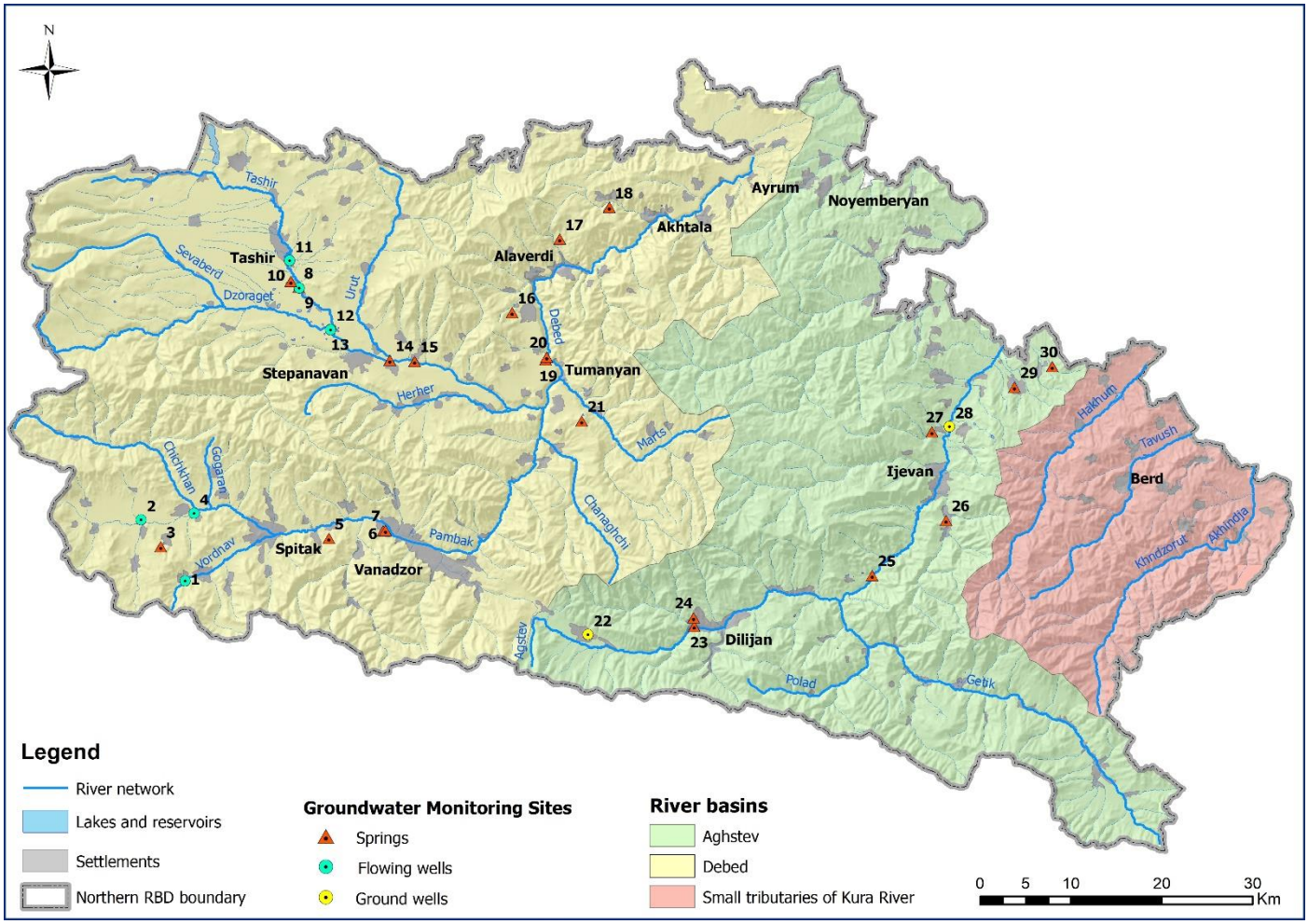
Table 3: Monitoring sites subject to the GW survey 2022. Recommended sites for inclusion into the GW monitoring network are indicated.

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	Total Mineralization, mg/l	Total Hardness	pH	Recommended (+)
1	Lori	Lernavan	Flowing borehole	X=40° 47' 01.2" Y=44° 09' 57.7" H= 1746	fragmented tufo-breccias P_2	6G-1	0.5	19.9	0.5	5.83	7.3	+
2	Lori	Mets Parni	Flowing borehole	X=40° 50' 38.1" Y=44° 06' 27.5" H= 1673	pebble-boulders gravel, sand Q	6G-2	0.33	12.6	0.35	3.31	7.9	+
3	Lori	Katnadjur	spring («Qung»)	X=40° 49' 01.5" Y=44° 08' 01.2" H= 1798	tuffogenic rocks P_2	6G-3	0.7	10.4	0.25	2.69	8.0	
4	Lori	Geghasar	Flowing borehole	X=40° 51' 01.9" Y=44° 10' 37.7" H= 1627	pebble-boulders Q	6G-2	0.6	14.0	0.36	3.23	7.9	
5	Lori	Nor Khachakap	spring	X=40° 49' 36.5" Y=44° 21' 11.5" H= 1660	porphyritic rocks P_2	6G-3	0.2	11.2	0.3	2.87	7.9	
6	Lori	Darbas	spring	X=40° 50' 05.1" Y=44° 25' 25.0" H= 1384	volcanic- sedimentary rocks N_1	6G-4	0.22	12.4	0.47	4.25	7.9	+
7	Lori	Darbas	spring («Avagenc»)	X=40° 50' 06.3" Y=44° 25' 37.0" H= 1360	volcanic- sedimentary rocks N_1	6G-4	0.18	11.4	0.59	6.1	7.7	
8	Lori	Saratovka	spring	X=41° 04' 30.6" Y=44° 18' 39.5" H= 1481	volcanic rocks (bazalt) N_2	6G-5	0.19	10.4	0.4	4.46	7.7	
9	Lori	Saratovka	Flowing borehole	X=41° 04' 29.7" Y=44° 18' 42.0" H= 1457	volcanic N_2	6G-5	0.1	13.4	1.07	11.09	7.6	
10	Lori	Saratovka	spring («Kharlanov»)	X=41° 04' 51.7" Y=44° 18' 02.9" H= 1488	volcanic rocks N_2	6G-5	8.5	8.9	0.16	1.65	7.7	+

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	Total Mineralization, mg/l	Total Hardness	pH	Recommended (+)
11	Lori	Tashir	Flowing borehole	X=41° 06' 07.6" Y=44° 17' 56.8" H= 1481	volcanic N_2	6G-5	4.0	10.7	0.53	6.03	7.8	+
12	Lori	Getavan	Flowing borehole	X=41° 02' 03.0" Y=44° 21' 12.8" H= 1421	volcanic N_2	6G-6	60.0	8.0	0.1	1.01	7.9	+
13	Lori	Stepanavan	Flowing borehole	X=41° 02' 01.5" Y=44° 21' 12.4" H= 1403	volcanic N_2	6G-7	14.0	9.1	0.12	1.18	7.7	+
14	Lori	Lori berd	spring «Lusaghbyur»	X=41° 00' 13.3" Y=44° 25' 52.3" H= 1402	volcanic N_2	6G-8	13.0	9.5	0.16	1.71	8.2	+
15	Lori	Agarak	spring	X=41° 00' 10.5" Y=44° 27' 48.6" H= 1260	volcanic N_2	6G-8	5.5	9.8	0.21	2.38	7.9	+
16	Lori	Odzun	spring («Kendanarar»)	X=41° 03' 6.3" Y=44° 35' 26.5" H= 1282	volcanic N_2	6G-8	0.22	11.2	0.13	1.54	7.9	
17	Lori	Madan	spring «Vardumyanneri»	X=41° 07' 29.2" Y=44° 39' 09.6" H= 1099	volcanic- sedimentary rocks J	6G-9	0.15	13.2	1.34	16.45	7.3	
18	Lori	Shamlugh (Bendik)	spring «Kakali taki»	X=41° 09' 22.7" Y=44° 43' 03.5" H= 1217	volcanic- sedimentary rocks J	6G-9	0.19	11.4	0.64	7.79	7.8	
19	Lori	Tumanyan	spring	X=41° 00' 17.9" Y=44° 38' 05.4" H= 910	volcanic N_2	6G-10	0.01	14.1	0.7	4.89	8.2	
20	Lori	Tumanyan	spring	X=41° 00' 28.3" Y=44° 38' 10.4" H= 937	volcanic N_2	6G-10	0.5	16.0	0.69	4.75	8.5	+
21	Lori	Dsegh	spring	X=40° 56' 40.0" Y=44° 40' 57.1" H= 914	volcanic- sedimentary rocks J	6G-11	0.15	13.0	0.43	5.43	8.3	

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	Total Mineralization, mg/l	Total Hardness	pH	Recommended (+)
22	Tavush	Margahovit	well	X=40° 43' 59.2" Y=44° 41' 30.5" H= 1737	volcanic- sedimentary rocks N_1	6G-12	0.06	9.6	0.42	4.90	7.3	
23	Tavush	Dilijan	spring «Artsruni»	X=40° 44' 29.1" Y=44° 49' 47.7" H= 1345	volcanic- sedimentary rocks N_1	6G-12	0.01	13.4	0.81	6.55	7.7	
24	Tavush	Dilijan /Shamaghyan/	spring («Qor spring»)	X=40° 45' 0.01" Y=44° 49' 45.6" H= 1465	volcanic- sedimentary rocks N_1	6G-12	0.05	13.7	0.39	4.75	7.8	
25	Tavush	Hovq	spring («Shnqar»)	X=40° 47' 30.7" Y=45° 03' 43.4" H= 881	volcanic- sedimentary rocks J	6G-12	0.3	11.4	0.37	4.79	7.7	+
26	Tavush	Gandzaqar	spring («Dudinyants»)	X=40° 50' 47.3" Y=45° 09' 30.3" H= 894	volcanic- sedimentary rocks J	6G-12	0.08	13.4	0.51	6.41	7.6	
27	Tavush	Lusadzor	spring («Zani»)	X=40° 56' 03.3" Y=45° 08' 25.3" H= 706	volcanic- sedimentary rocks J	6G-12	0.4	13.5	0.62	8.2	8.3	+
28	Tavush	Lusadzor	ground well	X=40° 56' 22.8" Y=45° 09' 47.7" H= 594	sedimentary Q	6G-13	5.3	15.0	0.79	8.75	8.3	
29	Tavush	Aygehovit	spring («Gyoli»)	X=40° 58' 41.7" Y=45° 14' 53.7" H= 709	volcanic- sedimentary rocks J	6G-12	1.2	15.1	0.84	8.71	8.2	+
30	Tavush	Vazashen	spring («Yolomi»)	X=40° 59' 54.8" Y=45° 17' 52.4" H= 704	volcanic- sedimentary rocks J	6G-12	0.05	14.8	1.14	11.85	7.7	

Table 4: Location of monitoring sites in the Northern RBD in 2022



Annex I: Sampling protocols composed in Northern RBD in 2022

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: Aug 29, 2022	Time (hh:mm): 10:00	Sample ID: **N1**		
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	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): +1.1	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): **0.5 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: 7.21	Water temperature (°C): 19.9 °C	Dissolved oxygen (mg/l): 5.99 mg/l (67.7%)		
Electrical conductivity incl. reference temperature (µS/cm): 545 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, **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: Aug 29, 2022	Time (hh:mm): 11:00	Sample ID: **N2**		
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N2	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): +0.65	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): **0.33 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: 7.95	Water temperature (°C): 12.6 °C	Dissolved oxygen (mg/l): 6.79 mg/l (69.1%)		
Electrical conductivity incl. reference temperature (µS/cm): **395** 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, **Katnadjur** village				
The coordinates of the sampling point X=40^0 49' 01.5" Y=44^0 08' 01.2" H= 1798m	 			
Sampling Date: Aug 29, 2022	Time (hh:mm): 12:50	Sample ID: **N3**		
Sampling person: Mr Harutyun Yeremyan, Ms Armine Hakobyan Mr Gegham Muradyan	of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N3	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): **0.7 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: 7.92	Water temperature (°C): 10.4 °C	Dissolved oxygen (mg/l): 7.39 mg/l (71.3%)		
Electrical conductivity incl. reference temperature (µS/cm): **327** 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, **Geghasar** village				
The coordinates of the sampling point X=40^0 51' 01.9" Y=44^0 10' 37.7" H= 1627m				
Sampling Date: Aug 29, 2022	Time (hh:mm): 14:05	Sample ID: **N4**		
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N4	Type of sampling site: **Flowing well**			
Inner diameter of well (mm): 150	Distance between land surface and well head (m): 0.0			
Calm water level (m below well head): +0.15	Final depth of well (m below well head): 30 m			
Further information of the sampling site (e.g. coordinates): **The well was drilled in years of 1967-1969. The well is utilized for drinking water supply.**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **plastic bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **0.6 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: 7.87	Water temperature (°C): 14.0 °C	Dissolved oxygen (mg/l): 5.87 mg/l (60.6%)		
Electrical conductivity incl. reference temperature (µS/cm): **419** µS/cm	□ **at 25 °C**			
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: Head of Geghasar administrative district: Varazdat (Tel +37477-799-399)				
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: Aug 29, 2022	Time (hh:mm): 15:10	Sample ID: **N5**		
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	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, 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): **0.2 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: 7.96	Water temperature (°C): 11.2 °C	Dissolved oxygen (mg/l): 5.52 mg/l (56%)		
Electrical conductivity incl. reference temperature (µS/cm): **343** 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:_____				

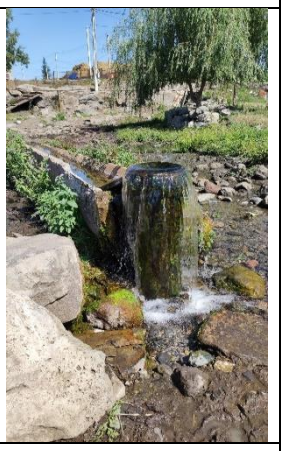
SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point: Armenia, Lori Region, Darbas village				
The coordinates of the sampling point X=40^{O} 50' 05.1" Y=44^{O} 25' 25.0" H= 1384մ				
Sampling Date: Aug 29, 2022	Time (hh:mm): 15:55	Sample ID: **N6**		
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N6	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): **0.22 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: 7.8	Water temperature (°C): 12.4 °C	Dissolved oxygen (mg/l): 7.11 mg/l (71.1%)		
Electrical conductivity incl. reference temperature (µS/cm): **560** 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' 06.3" Y=44^{O} 25' 37.0" H= 1360m				
Sampling Date: Aug 29, 2022	Time (hh:mm): 16:25	Sample ID: **N7**		
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N7	Type of sampling site: **Spring** («Avagenc»)			
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. The spring is located in the yard of Gulnaz Zaqaryan.**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **plastic bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **0.18 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): 11.4 °C	Dissolved oxygen (mg/l): 4.87 mg/l (49.3%)		
Electrical conductivity incl. reference temperature (µS/cm): **725** 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' 30.6" Y=44^{O} 18' 39.5" H= 1481m				
Sampling Date: Aug 30, 2022	Time (hh:mm): 10:20	Sample ID: **N8**		
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N8	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): **0.19 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: 7.61	Water temperature (°C): 10.4 °C	Dissolved oxygen (mg/l): 5.55 mg/l (83.4%)		
Electrical conductivity incl. reference temperature (µS/cm): **480** 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:_____				

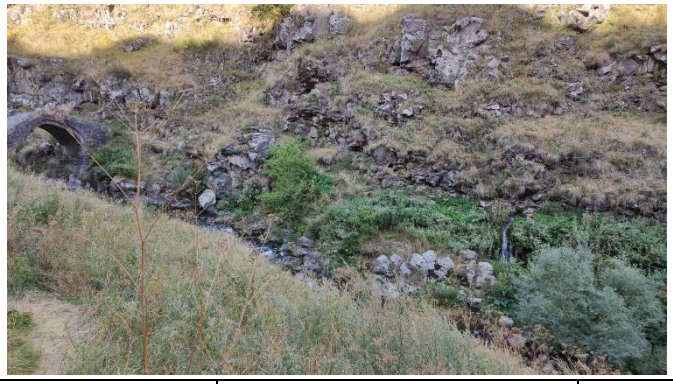
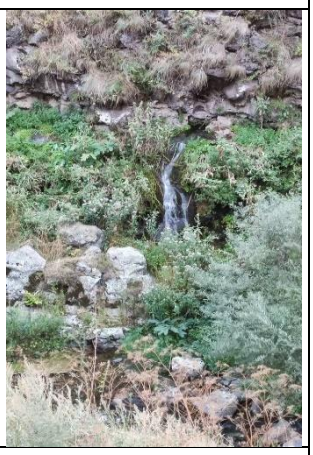
SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point Armenia, Lori Region, Saratovka village				
The coordinates of the sampling point X=41^{O} 04' 29.7" Y=44^{O} 18' 42.0" H= 1457m				
Sampling Date: Aug 30, 2022	Time (hh:mm): 10:40	Sample ID: **N9**		
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	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): 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: 7.33	Water temperature (°C): 13.4 °C	Dissolved oxygen (mg/l): 1.65 mg/l (15.3%)		
Electrical conductivity incl. reference temperature (µS/cm): **1276** 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:_____				

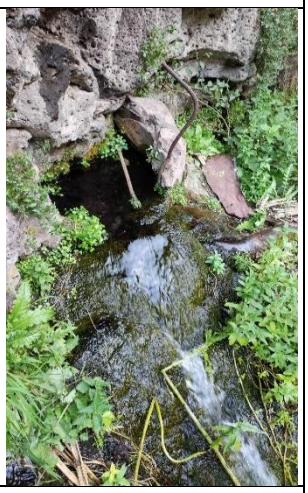
SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point: Armenia, Lori Region, Saratovka village				
The coordinates of the sampling point X=41^{O} 04' 51.7" Y=44^{O} 18' 02.9" H= 1488m				
Sampling Date: Aug 30, 2022	Time (hh:mm): 11:20		Sample ID: **N10**	
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N10	Type of sampling site: **Spring «Xarlanov» or «Garniki»**			
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): **8.5 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: 7.81	Water temperature (°C): 8.9 °C	Dissolved oxygen (mg/l): 6.17 mg/l (60.2%)		
Electrical conductivity incl. reference temperature (µS/cm): **194** 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:_____				

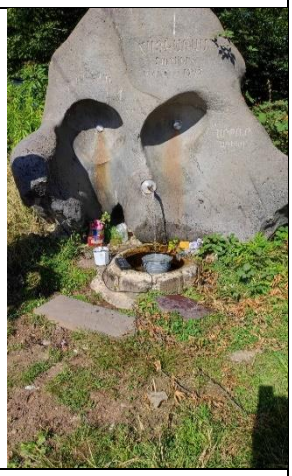
SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point Armenia, Lori Region, Tashir city				
The coordinates of the sampling point X=41^{O} 06' 07.6" Y=44^{O} 17' 56.8" H= 1481m				
Sampling Date: Aug 30, 2022	Time (hh:mm): 12:20		Sample ID: **N11**	
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N11	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): +1.3	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): **4.0 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: 7.4	Water temperature (°C): 10.7 °C	Dissolved oxygen (mg/l): 4.86 mg/l (48.2%)		
Electrical conductivity incl. reference temperature (µS/cm): **646** 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' 03.0" Y=44^{O} 21' 12.8" H= 1421m				
Sampling Date: Aug 30, 2022	Time (hh:mm): 15:05		Sample ID: **N12**	
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N12	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): +2.6	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 not used.**				
Sampling				
Type of sampling: □ **with bailer** □ with pump □ at a tap	Abstraction device: **bucket**			
Pumping duration (min): -	Abstraction rate / discharge (l/sec): **60 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: 7.91	Water temperature (°C): 8.0 °C	Dissolved oxygen (mg/l): 6.34 mg/l (63%)		
Electrical conductivity incl. reference temperature (µS/cm): **129** 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' 01.5" Y=44^{O} 21' 12.4" H= 1403m				
Sampling Date: Aug 30, 2022	Time (hh:mm): 15:45		Sample ID: **N13**	
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N13	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): +1.7	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): **14 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: 7.97	Water temperature (°C): 9.1 °C	Dissolved oxygen (mg/l): 6.25 mg/l (62.7%)		
Electrical conductivity incl. reference temperature (µS/cm): **140** 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:_____				

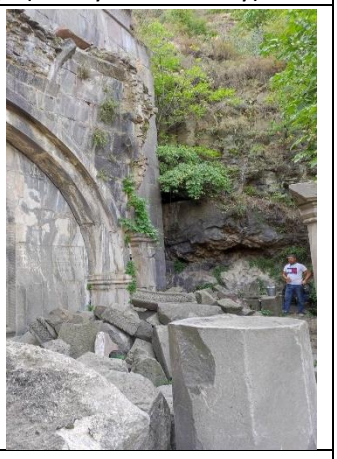
SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point: Armenia, Lori Region, Lori Berd village				
The coordinates of the sampling point X=41^{O} 00' 13.3" Y=44^{O} 25' 52.3" H= 1402m				
Sampling Date: Aug 31, 2022	Time (hh:mm): 10:10		Sample ID: **N14**	
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N14	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): **13 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: 7.84	Water temperature (°C): 9.5 °C	Dissolved oxygen (mg/l): 5.83 mg/l (61.7%)		
Electrical conductivity incl. reference temperature (µS/cm): **194** 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, Agarak village				
The coordinates of the sampling point X=41^{O} 00' 10.5" Y=44^{O} 27' 48.6" H= 1260m				
Sampling Date: Aug 31, 2022	Time (hh:mm): 11:30		Sample ID: **N15**	
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N14	Type of sampling site: **Spring «Agaraki»**			
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): **5.5 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: 8.2	Water temperature (°C): 9.8 °C	Dissolved oxygen (mg/l): 7.8 mg/l (75.7%)		
Electrical conductivity incl. reference temperature (µS/cm): **267** 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:_____				

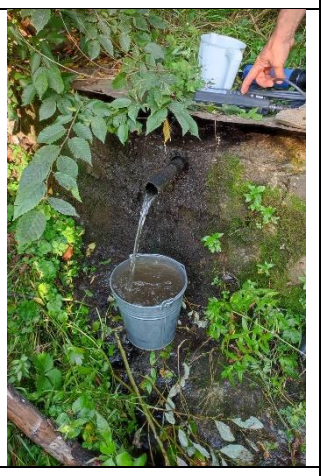
SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point: Armenia, Lori Region, Odzun village				
The coordinates of the sampling point X=41^{O} 03' 6.3" Y=44^{O} 35' 26.5" H= 1282m				
Sampling Date: Aug 31, 2022	Time (hh:mm): 12:45	Sample ID: **N16**		
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N16	Type of sampling site: **Spring «Kendanarar»**			
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): **0.22 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: 8.07	Water temperature (°C): 10.4 °C	Dissolved oxygen (mg/l): 7.58 mg/l (81.1%)		
Electrical conductivity incl. reference temperature (µS/cm): **179** µS/cm	□ **at 25 °C**			
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: Chief of staff of Odzun community: Harutyun Galstyan (Tel +37443-56-67-20)				
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, Madan village				
The coordinates of the sampling point X=41^{O} 07' 29.2" Y=44^{O} 39' 09.6" H= 1099m				
Sampling Date: Aug 31, 2022	Time (hh:mm): 14:20	Sample ID: **N17**		
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N17	Type of sampling site: **Spring «Vardumyanneri»**			
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): **0.15 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: 7.16	Water temperature (°C): 13.2 °C	Dissolved oxygen (mg/l): 5.55 mg/l (56.3%)		
Electrical conductivity incl. reference temperature (µS/cm): **1581** µS/cm	□ **at 25 °C**			
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: resident of the village: Juliya Grigoryan (Tel +37495-78-06-22)				
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° 09′ 22.7″ Y=44° 43′ 03.5″ H= 1217				
Sampling Date: Aug 31, 2022	Time (hh:mm): 16:20	Sample ID: **N18**		
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N18	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: 7.35	Water temperature (°C): 11.4 °C	Dissolved oxygen (mg/l): 5.22 mg/l (51.6%)		
Electrical conductivity incl. reference temperature (µS/cm): 748 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, Lori Region, Tumanyan village (Kobayr Monastery)				
The coordinates of the sampling point X=41^{O} 00' 17.9" Y=44^{O} 38' 05.4" H= 910				
Sampling Date: Sep 01, 2022	Time (hh:mm): 10:11		Sample ID: **N19**	
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N19	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 not captured. The output of the spring is through the church wall and is considered Holy water.**				
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: 8.13	Water temperature (°C): 14.1 °C	Dissolved oxygen (mg/l): 6.45 mg/l (74.8%)		
Electrical conductivity incl. reference temperature (µS/cm): **855** 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: Sep 01, 2022	Time (hh:mm): 11:10	Sample ID: **N20**		
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N20	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): **0.5 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: 7.81	Water temperature (°C): 16.0 °C	Dissolved oxygen (mg/l): 7.78 mg/l (83%)		
Electrical conductivity incl. reference temperature (µS/cm): **820** 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:_____				

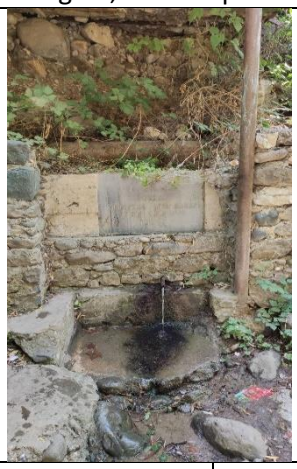
SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point: Armenia, Lori Region, Dsegh village				
The coordinates of the sampling point X=40^{O} 56' 40.0" Y=44^{O} 40' 57.1" H= 1596				
Sampling Date: Sep 01, 2022	Time (hh:mm): 13.15	Sample ID: **N21**		
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	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, but need repair. The spring is utilized for drinking water by «Shakaryan Rancho» LTD.**				
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:** □ **brown** □ colourless □ slight □ strong □ grey □ yellow	**Turbidity:** □ **low** □ no □ moderate □ strong □ ……..	**Sediment:** □ **low** □ no □ moderate □ strong □ ……..	**Smell:** □ **odorless** □ putrid □ fishy □ chemical □ chlor □ gasoline/oil
Measuring device:				
pH-value: 8.48	Water temperature (°C): 13.0 °C	Dissolved oxygen (mg/l): 7.17 mg/l (72.4%)		
Electrical conductivity incl. reference temperature (µS/cm): **472** µS/cm	□ **at 25 °C**			
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: Director of «Shakaryan Rancho» LTD : A.Shaqaryan (Tel +37455-00-41-21)				
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:_____				

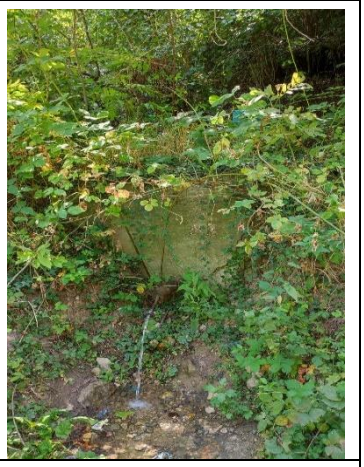
SAMPLING PROTOCOL – GROUNDWATER				
Project:	"EU4Environment - Water Resources and Environmental Data" Project			
General				
The location of the sampling point Armenia, Tavush Region, Margahovit village				
The coordinates of the sampling point X=40^{O} 43' 59.2" Y=44^{O} 41' 30.5" H= 1737				
Sampling Date: Sep 01, 2022	Time (hh:mm): 16:40		Sample ID: **N22**	
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	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: 7.12	Water temperature (°C): 9.6 °C	Dissolved oxygen (mg/l): 5.12 mg/l (49.7%)		
Electrical conductivity incl. reference temperature (µS/cm): **460** 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, Str.Kalinin				
The coordinates of the sampling point X=40^{O} 44' 29.1" Y=44^{O} 49' 47.7" H= 1345				
Sampling Date: Sep 01, 2022	Time (hh:mm): 17:20	Sample ID: **N23**		
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	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: 7.49	Water temperature (°C): 13.4 °C	Dissolved oxygen (mg/l): 5.59 mg/l (57.4%)		
Electrical conductivity incl. reference temperature (µS/cm): **500** 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:_____				

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: Sep 02, 2022	Time (hh:mm): 09:30	Sample ID: **N24**		
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N24	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): **0.05 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: 7.52	Water temperature (°C): 13.7 °C	Dissolved oxygen (mg/l): 6.2 mg/l (62.6%)		
Electrical conductivity incl. reference temperature (µS/cm): **140** 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, Hovq village				
The coordinates of the sampling point X=40^{O} 47' 30.7" Y=45^{O} 03' 43.4" H= 881				
Sampling Date: Sep 02, 2022	Time (hh:mm): 10:40		Sample ID: **N25**	
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N25	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: 7.6	Water temperature (°C): 11.4 °C	Dissolved oxygen (mg/l): 8.03 mg/l (77.8%)		
Electrical conductivity incl. reference temperature (µS/cm): **427** 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, 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: Sep 02, 2022	Time (hh:mm): 11:50	Sample ID: **N26**		
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N26	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): **0.08 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): 13.4 °C	Dissolved oxygen (mg/l): 5.81 mg/l (59.1%)		
Electrical conductivity incl. reference temperature (µS/cm): **593** 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, Lusadzor village				
The coordinates of the sampling point X=40^{O} 56' 03.3" Y=45^{O} 08' 25.3" H= 706				
Sampling Date: Sep 02, 2022	Time (hh:mm): 13:00	Sample ID: **N27**		
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N27	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): **0.4 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): 13.5 °C	Dissolved oxygen (mg/l): 6.69 mg/l (67.6%)		
Electrical conductivity incl. reference temperature (µS/cm): 690 µS/cm	□ **at 25 °C**			
Sample treatment: □ **chilled** □ filtrated □ stabilised with acid				
Contacts: Head of Lusadzor administrative district: Vardan Sardaryan (Tel +37494-55-86-59) employee of the village administration: Tetevik (Tel +37477-31-39-29)				
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: Sep 02, 2022	Time (hh:mm): 13:40	Sample ID: **N28**		
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N28	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: 7.3	Water temperature (°C): 15.0 °C	Dissolved oxygen (mg/l): 5.13 mg/l (54.2%)		
Electrical conductivity incl. reference temperature (µS/cm): **840** 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, Aygehovit village				
The coordinates of the sampling point X=40^{O} 58' 41.7" Y=45^{O} 14' 53.7" H= 709				
Sampling Date: Sep 02, 2022	Time (hh:mm): 14:30		Sample ID: **N29**	
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N29	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): **1.2 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: 7.59	Water temperature (°C): 15.1 °C	Dissolved oxygen (mg/l): 5.91 mg/l (64.2%)		
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° 59′ 54.8″ Y=45° 17′ 52.4″ H= 704				
Sampling Date: Sep 02, 2022	Time (hh:mm): 16:20	Sample ID: **N30**		
Sampling person: Mr Harutyun Yeremyan Ms Armine Hakobyan Mr Gegham Muradyan	Institute: Ministry of Nature Protection 'Hydrometeorology and Monitoring Center			
Sampling site				
Sampling site ID: N30	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): **0.05 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: 7.09	Water temperature (°C): 14.8 °C	Dissolved oxygen (mg/l): 4.56 mg/l (50%)		
Electrical conductivity incl. reference temperature (µS/cm): 1210 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:_____				

Annex II: The results of laboratory analysis conducted in Northern RBD in 2022

Table 5: The results of laboratory analysis conducted in Northern RBD in 2022

Sample ID	Province	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.	Hydrogen Carbonate, HCO_3 g/L	Sulfate, SO_4. mg/L	Chloride, Cl. mg/L	Nitrate NO_3, mg/L
1	Lori	Lernavan	Flowing well	8/29/2022	19.9	545	5.99	7.21	7.3	356.97	10.98	3.406	10.078
2	Lori	Mets Parni	Flowing well	8/29/2022	12.6	395	6.79	7.95	7.9	231.88	5.43	4.089	18.183
3	Lori	Katnadjur	spring («Qung»)	8/29/2022	10.4	327	7.39	7.92	8.0	167.81	16.76	2.809	4.362
4	Lori	Geghasar	Flowing borehole	8/29/2022	14. 0	419	5.87	7.87	7.9	231.88	19.18	6.009	21.577
5	Lori	Nor Khachakap	spring	8/29/2022	11.2	343	5.52	7.96	7.9	213.57	6.83	3.307	13.962
6	Lori	Darbas	spring	8/29/2022	12.4	560	7.11	7.8	7.9	286.79	31.51	4.194	40.194
7	Lori	Darbas	spring («Avagenc»)	8/29/2022	11.4	725	4.87	7.5	7.7	356.97	42.08	13.751	47.217
8	Lori	Saratovka	spring	8/30/2022	10.4	480	5.55	7.61	7.7	280.69	20.33	7.738	7.717
9	Lori	Saratovka	Flowing well	8/30/2022	13.4	1276	1.65	7.33	7.6	677.32	86.57	70.738	0.925
10	Lori	Saratovka	spring («Kharlanov»)	8/30/2022	8.9	194	6.17	7.82	7.9	115.94	3.82	2.130	5.692
11	Lori	Tashir	Flowing well	8/30/2022	10.7	646	4.86	7.4	7.7	332.56	26.32	16.371	36.647
12	Lori	Getavan	Flowing well	8/30/2022	8. 0	129	6.34	7.91	7.8	73.22	2.11	2.860	3.196
13	Lori	Stepanavan	Flowing well	8/30/2022	9.1	140	6.25	7.97	7.9	82.38	1.94	3.002	2.912
14	Lori	Lori berd	spring («Lusaghbyur»)	8/31/2022	9.5	194	5.83	7.84	7.7	109.84	3.86	3.966	4.898
15	Lori	Agarak	spring	8/31/2022	9.8	267	7.8	8.2	8.2	143.40	7.10	5.073	8.471
16	Lori	Odzun	spring («Kendanarar»)	8/31/2022	11.2	179	7.58	8.07	7.9	73.22	22.23	1.773	4.194
17	Lori	Madan	spring («Vardumyanneri»)	8/31/2022	13.2	1581	5.55	7.16	7.3	356.97	429.25	47.877	176.467
18	Lori	Shamlugh (Bendik)	spring («Kakali taki»)	8/31/2022	11.4	748	5.22	7.35	7.8	381.38	60.12	13.215	39.594
19	Lori	Tumanyan	spring	8/31/2022	14.1	855	6.45	8.13	8.2	326.46	145.81	16.656	31.540
20	Lori	Tumanyan	spring	8/31/2022	16. 0	820	7.78	7.81	8.5	332.56	143.24	16.155	32.263
21	Lori	Dsegh	spring	9/1/2022	13	472	7.17	8.48	8.3	299.00	25.02	2.546	0.943
22	Tavush	Margahovit	ground well	9/1/2022	9.6	460	5.12	7.12	7.3	210.52	34.55	15.009	50.026
23	Tavush	Dilijan	spring («Artsruni»)	9/1/2022	13.4	500	5.59	7.49	7.7	463.75	68.82	17.450	45.846

Sample ID	Province	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.	Hydrogen Carbonate, HCO_3 g/L	Sulfate, SO_4. mg/L	Chloride, Cl. mg/L	Nitrate NO_3, mg/L
24	Tavush	Dilijan/Shamaghyan/	spring («Qor spring»)	9/1/2022	13.7	140	6.2	7.52	7.8	256.28	14.63	3.857	22.003
25	Tavush	Hovq	spring («Shnqar»)	9/1/2022	11.4	427	8.03	7.6	7.7	247.13	19.01	3.945	10.506
26	Tavush	Gandzaqar	spring («Dudinyants»)	9/1/2022	13.4	593	5.81	7.27	7.6	302.05	45.85	11.989	26.604
27	Tavush	Lusadzor	spring («Zani»)	9/2/2022	13.5	690	6.69	7.43	8.3	427.14	28.43	8.005	12.401
28	Tavush	Lusadzor	ground well	9/2/2022	15. 0	840	5.13	7.3	8.3	396.63	144.55	19.406	22.732
29	Tavush	Aygehovit	spring («Gyoli»)	9/2/2022	15.1	925	5.91	7.59	8.2	527.82	41.63	15.797	46.105
30	Tavush	Vazashen	spring («Yolomi»)	9/2/2022	14.8	1210	4.56	7.09	7.7	555.28	257.21	27.812	7.397

Sample ID	Province	Location of observation point	Type of observation point	Sampling date	Nitrite NO2, mg/L	Ammonia, NH4, mg/L	Calcium, Ca, mg/L	Magnesium, Mg, g/L	Sodium, Na, mg/L	Potassium, K, mg/L	Na+K, mg/L
1	Lori	Lernavan	Flowing borehole	8/29/2022	0.0	0.0	101.9	8.9	6.2	1.0	7.23
2	Lori	Mets Parni	Flowing borehole	8/29/2022	0.0	0.0	54.5	7.1	23.5	1.2	24.72
3	Lori	Katnadjur	spring («Qung»)	8/29/2022	0.0	0.0	46.0	4.7	11.3	0.2	11.48
4	Lori	Geghasar	Flowing borehole	8/29/2022	0.0	0.0	51.3	8.0	25.2	1.8	26.95
5	Lori	Nor Khachakap	spring	8/29/2022	0.0	0.1	39.0	11.0	14.4	0.9	15.27
6	Lori	Darbas	spring	8/29/2022	0.0	0.1	62.0	13.8	35.3	1.1	36.40
7	Lori	Darbas	spring («Avagenc»)	8/29/2022	0.0	0.1	89.2	19.7	15.5	7.7	23.24
8	Lori	Saratovka	spring	8/30/2022	0.0	0.1	65.7	14.1	5.8	1.7	7.57
9	Lori	Saratovka	Flowing borehole	8/30/2022	0.0	0.8	97.2	74.7	59.6	7.5	67.11
10	Lori	Saratovka	spring («Kharlanov»)	8/30/2022	0.0	0.1	21.8	6.7	5.3	1.5	6.80
11	Lori	Tashir	Flowing borehole	8/30/2022	0.0	0.1	89.8	18.5	12.8	2.5	15.31
12	Lori	Getavan	Flowing borehole	8/30/2022	0.0	0.0	11.7	5.1	5.4	1.1	6.50

Sample ID	Provience	Location of observation point	Type of observation point	Sampling date	Nitrite NO2, mg/L	Ammonia, NH4, mg/L	Calcium, Ca, mg/L	Magnesium, Mg, g/L	Sodium, Na, mg/L	Potassium, K, mg/L	Na+K, mg/L
13	Lori	Stepanavan	Flowing borehole	8/30/2022	0.0	0.1	13.5	6.1	5.7	1.1	6.79
14	Lori	Lori berd	spring («Lusaghbyur»)	8/31/2022	0.0	0.1	20.9	8.0	5.8	1.3	7.08
15	Lori	Agarak	spring	8/31/2022	0.0	0.1	30.1	10.5	5.9	1.4	7.28
16	Lori	Odzun	spring («Kendanarar»)	8/31/2022	0.0	0.1	24.4	3.9	5.0	0.4	5.42
17	Lori	Madan	spring («Vardumyanneri»)	8/31/2022	0.0	0.4	259.1	41.9	18.9	10.6	29.53
18	Lori	Shamlugh (Bendik)	spring («Kakali taki»)	8/31/2022	0.0	0.3	116.5	23.6	8.1	0.7	8.87
19	Lori	Tumanyan	spring	8/31/2022	0.0	0.4	30.0	40.7	102.0	3.4	105.43
20	Lori	Tumanyan	spring	8/31/2022	0.0	0.4	25.3	41.8	99.7	2.4	102.10
21	Lori	Dsegh	spring	9/1/2022	0.0	0.4	84.9	14.3	6.2	0.5	6.71
22	Tavush	Margahovit	well	9/1/2022	0.0	0.1	71.1	16.2	18.2	0.8	19.06
23	Tavush	Dilijan	spring («Artsruni»)	9/1/2022	0.0	0.2	91.7	23.5	100.1	1.1	101.16
24	Tavush	Dilijan/Shamaghyan/	spring («Qor spring»)	9/1/2022	0.0	0.1	71.3	14.2	6.6	0.5	7.03
25	Tavush	Hovq	spring («Shnqar»)	9/1/2022	0.0	0.1	71.1	14.8	6.6	0.7	7.27
26	Tavush	Gandzaqar	spring («Dudinyants»)	9/1/2022	0.0	0.1	98.7	17.7	7.5	2.1	9.64
27	Tavush	Lusadzor	spring («Zani»)	9/2/2022	0.0	0.3	95.3	41.2	7.9	2.1	9.97
28	Tavush	Lusadzor	ground well	9/2/2022	0.0	0.3	106.7	41.0	58.3	2.4	60.72
29	Tavush	Aygehovit	spring («Gyoli»)	9/2/2022	0.0	0.5	98.4	45.5	67.6	1.6	69.25
30	Tavush	Vazashen	spring («Yolomi»)	9/2/2022	0.0	0.6	134.2	61.8	93.0	3.9	96.99

Sample ID	Provience	Location of observation point	Type of observation point	Sampling date	Suspended particles, mg/L	Total Hardness	Total Mine-ralization, mg/L	Iron, Fe, mg/L	Dry residue, mg/L	Color, rade
1	Lori	Lernavan	Flowing borehole	8/29/2022	17	5.834	499.48	0.44	311	15
2	Lori	Mets Parni	Flowing borehole	8/29/2022	17	3.314	345.86	0.23	212	15
3	Lori	Katnadjur	spring («Qung»)	8/29/2022	8	2.695	253.99	0.19	166	10
4	Lori	Geghasar	Flowing borehole	8/29/2022	8	3.233	364.93	0.21	227	10
5	Lori	Nor Khachakap	spring	8/29/2022	8	2.869	302.99	0.16	182	10
6	Lori	Darbas	spring	8/29/2022	11	4.253	474.98	0.26	291	15
7	Lori	Darbas	spring («Avagenc»)	8/29/2022	9	6.098	592.14	0.35	366	15
8	Lori	Saratovka	spring	8/30/2022	8	4.459	403.83	0.27	256	15
9	Lori	Saratovka	Flowing borehole	8/30/2022	14	11.088	1074.63	0.42	735	15
10	Lori	Saratovka	spring («Kharlanov»)	8/30/2022	10	1.654	162.98	0.09	99	15
11	Lori	Tashir	Flowing borehole	8/30/2022	11	6.032	535.52	0.37	333	15
12	Lori	Getavan	Flowing borehole	8/30/2022	9	1.010	104.71	0.04	65	15
13	Lori	Stepanavan	Flowing borehole	8/30/2022	9	1.182	116.67	0.05	73	15
14	Lori	Lori berd	spring («Lusaghbyur»)	8/31/2022	9	1.713	158.59	0.08	99	15
15	Lori	Agarak	spring	8/31/2022	10	2.385	212.02	0.12	132	15
16	Lori	Odzun	spring («Kendanarar»)	8/31/2022	8	1.543	135.14	0.12	94	15
17	Lori	Madan	spring («Vardumyanneri»)	8/31/2022	18	16.452	1341.20	1.05	986	15
18	Lori	Shamlugh (Bendik)	spring («Kakali taki»)	8/31/2022	12	7.794	643.31	0.48	413	15
19	Lori	Tumanyan	spring	8/31/2022	9	4.893	696.65	0.12	502	15
20	Lori	Tumanyan	spring	8/31/2022	11	4.751	693.48	0.10	495	15
21	Lori	Dsegh	spring	9/1/2022	13	5.435	433.42	0.40	283	20
22	Tavush	Margahovit	well	9/1/2022	22	4.905	416.48	0.33	261	15
23	Tavush	Dilijan	spring («Artsruni»)	9/1/2022	15	6.546	812.30	0.39	535	15
24	Tavush	Dilijan/Shamaghyan/	spring («Qor spring»)	9/1/2022	8	4.747	389.31	0.31	239	15
25	Tavush	Hovq	spring («Shnqar»)	9/1/2022	8	4.789	373.79	0.31	240	15

Sam ple ID	Provie nce	Location of observation point	Type of observation point	Sampling date	Suspended particles, mg/L	Total Hardness	Total Mine-ralization, mg/L	Iron, Fe, mg/L	Dry residue, mg/L	Color, rade
26	Tavush	Gandzaqar	spring («Dudinyants»)	9/1/2022	11	6.412	512.59	0.43	335	15
27	Tavush	Lusadzor	spring («Zani»)	9/2/2022	13	8.200	622.49	0.42	396	15
28	Tavush	Lusadzor	ground well	9/2/2022	11	8.756	791.84	0.46	571	15
29	Tavush	Aygehovit	spring («Gyoli»)	9/2/2022	12	8.713	844.56	0.43	535	15
30	Tavush	Vazashen	spring («Yolomi»)	9/2/2022	16	11.858	1140.70	0.60	856	15

Sam ple ID	Provie nce	Location of observation point	Type of observation point	Sampling date	Smell	Li mg/L	Be mg/L	B mg/L	Al mg/L	P mg/L	Ti mg/L
1	Lori	Lernavan	Flowing borehole	8/29/2022	0.00000	0.00433	<0.0001	0.03887	<0.01	<0.01	0.00155
2	Lori	Mets Parni	Flowing borehole	8/29/2022	0.00000	0.00179	<0.0001	0.04599	<0.01	0.02743	0.00346
3	Lori	Katnadjur	spring («Qung»)	8/29/2022	0.00000	0.00069	<0.0001	0.02883	<0.01	<0.01	0.00200
4	Lori	Geghasar	Flowing borehole	8/29/2022	1.00000	0.00253	<0.0001	0.10063	<0.01	<0.01	0.00322
5	Lori	Nor Khachakap	spring	8/29/2022	0.00000	0.00024	<0.0001	0.03438	<0.01	<0.01	0.00172
6	Lori	Darbas	spring	8/29/2022	0.00000	0.00018	<0.0001	0.09872	<0.01	<0.01	0.00199
7	Lori	Darbas	spring («Avagenc»)	8/29/2022	0.00000	0.00074	<0.0001	0.11176	<0.01	<0.01	0.00282
8	Lori	Saratovka	spring	8/30/2022	0.00000	0.00165	<0.0001	0.02934	<0.01	0.04273	0.00402
9	Lori	Saratovka	Flowing borehole	8/30/2022	0.00000	0.03638	<0.0001	0.12006	<0.01	0.00828	0.00589
10	Lori	Saratovka	spring («Kharlanov»)	8/30/2022	0.00000	0.00234	<0.0001	0.02373	<0.01	0.02812	0.00405
11	Lori	Tashir	Flowing borehole	8/30/2022	0.00000	0.00456	<0.0001	0.06110	<0.01	0.02380	0.00488
12	Lori	Getavan	Flowing borehole	8/30/2022	0.00000	0.00448	<0.0001	0.05248	<0.01	0.04165	0.00377
13	Lori	Stepanavan	Flowing borehole	8/30/2022	0.00000	0.00442	<0.0001	0.05630	<0.01	0.03765	0.00358
14	Lori	Lori berd	spring («Lusaghbyur»)	8/31/2022	0.00000	0.00484	<0.0001	0.06121	0.01116	0.04094	0.00370
15	Lori	Agarak	spring	8/31/2022	1.00000	0.00499	<0.0001	0.06590	<0.01	0.03804	0.00410

Sample ID	Provience	Location of observation point	Type of observation point	Sampling date	Smell	Li mg/L	Be mg/L	B mg/L	Al mg/L	P mg/L	Ti mg/L
16	Lori	Odzun	spring («Kendanarar»)	8/31/2022	0.00000	0.00149	<0.0001	0.01144	0.02344	<0.01	0.00249
17	Lori	Madan	spring («Vardumyanneri»)	8/31/2022	0.00000	0.00184	<0.0001	0.10831	0.01078	0.02062	0.00221
18	Lori	Shamlugh (Bendik)	spring («Kakali taki»)	8/31/2022	1.00000	0.00257	<0.0001	0.03860	0.01664	0.01069	0.00290
19	Lori	Tumanyan	spring	8/31/2022	1.00000	0.00600	<0.0001	0.35254	0.01005	0.03855	0.00304
20	Lori	Tumanyan	spring	8/31/2022	0.00000	0.00647	<0.0001	0.34995	0.01323	0.02085	0.00287
21	Lori	Dsegh	spring	9/1/2022	0.00000	0.00090	<0.0001	0.02113	0.05124	0.03576	0.00591
22	Tavush	Margahovit	well	9/1/2022	0.00000	0.00176	<0.0001	0.03168	0.03087	0.05452	0.00345
23	Tavush	Dilijan	spring («Artsruni»)	9/1/2022	0.00000	0.01147	<0.0001	0.14234	<0.01	0.01412	0.00355
24	Tavush	Dilijan/Shamaghyan/	spring («Qor spring»)	9/1/2022	0.00000	0.01028	<0.0001	0.02837	<0.01	0.00590	0.00211
25	Tavush	Hovq	spring («Shnqar»)	9/1/2022	0.00000	0.00012	<0.0001	0.06315	<0.01	0.01465	0.00184
26	Tavush	Gandzaqar	spring («Dudinyants»)	9/1/2022	1.00000	0.00107	<0.0001	0.06984	<0.01	0.03269	0.00295
27	Tavush	Lusadzor	spring («Zani»)	9/2/2022	0.00000	0.00604	<0.0001	0.07625	<0.01	0.01656	0.00174
28	Tavush	Lusadzor	ground well	9/2/2022	0.00000	0.00351	<0.0001	0.22182	<0.01	0.04073	0.00264
29	Tavush	Aygehovit	spring («Gyoli»)	9/2/2022	0.00000	0.00219	<0.0001	0.24669	<0.01	0.02601	0.00342
30	Tavush	Vazashen	spring («Yolomi»)	9/2/2022	0.00000	0.00875	<0.0001	0.22058	<0.01	0.03383	0.00343

Sample ref.no	Provie nce	Location of observation point	Type of observation point	Sampling date	V mg/L	Cr mg/L	Mn mg/L	Co mg/L	Ni mg/L	Cu mg/L	Zn mg/L
1	Lori	Lernavan	Flowing borehole	8/29/2022	0.00059	0.00112	<0.0001	0.00020	0.00214	0.00019	0.000345
2	Lori	Mets Parni	Flowing borehole	8/29/2022	0.01102	0.00217	<0.0001	0.00010	0.00095	<0.0001	<0.0001
3	Lori	Katnadjur	spring («Qung»)	8/29/2022	0.00731	0.00036	<0.0001	<0.0001	0.00080	0.00016	<0.0001
4	Lori	Geghasar	Flowing borehole	8/29/2022	0.01211	0.00242	0.00038	0.00010	0.00093	0.00034	0.004179
5	Lori	Nor Khachakap	spring	8/29/2022	0.00756	0.00041	0.00011	<0.0001	0.00068	0.00026	0.002156
6	Lori	Darbas	spring	8/29/2022	0.00641	0.00089	0.00051	0.00013	0.00122	0.00038	0.001578
7	Lori	Darbas	spring («Avagenc»)	8/29/2022	0.00586	0.00095	0.00010	0.00019	0.00160	0.00099	0.000919
8	Lori	Saratovka	spring	8/30/2022	0.00565	0.00095	0.00080	0.00015	0.00149	0.00043	<0.0001
9	Lori	Saratovka	Flowing borehole	8/30/2022	0.00097	0.00225	0.11195	0.00065	0.00468	0.00091	0.000855
10	Lori	Saratovka	spring («Kharlanov»)	8/30/2022	0.00850	0.00105	0.00043	<0.0001	0.00052	0.00013	0.000347
11	Lori	Tashir	Flowing borehole	8/30/2022	0.01047	0.00196	0.00014	0.00018	0.00206	0.00037	0.000449
12	Lori	Getavan	Flowing borehole	8/30/2022	0.01277	0.00087	0.00010	<0.0001	0.00031	<0.0001	<0.0001
13	Lori	Stepanavan	Flowing borehole	8/30/2022	0.01454	0.00100	0.00010	<0.0001	0.00029	<0.0001	<0.0001
14	Lori	Lori berd	spring («Lusaghbyur»)	8/31/2022	0.01217	0.00099	0.00017	<0.0001	0.00052	<0.0001	<0.0001
15	Lori	Agarak	spring	8/31/2022	0.01104	0.00121	0.00014	<0.0001	0.00068	<0.0001	0.000227
16	Lori	Odzun	spring («Kendanarar»)	8/31/2022	0.00057	0.00021	0.00083	<0.0001	0.00049	0.00073	0.000279
17	Lori	Madan	spring («Vardumyanneri»)	8/31/2022	0.00050	0.00145	0.00031	0.00052	0.00472	0.00867	0.004167
18	Lori	Shamlugh (Bendik)	spring («Kakali taki»)	8/31/2022	0.00074	0.00090	0.00024	0.00022	0.00210	0.00093	0.003260
19	Lori	Tumanyan	spring	8/31/2022	0.02011	0.00833	0.00013	<0.0001	0.00056	0.00155	0.003452
20	Lori	Tumanyan	spring	8/31/2022	0.01997	0.00832	0.00021	<0.0001	0.00058	0.00191	0.004498
21	Lori	Dsegh	spring	9/1/2022	0.00882	0.00036	0.04106	0.00026	0.00191	0.00070	0.000277
22	Tavush	Margahovit	well	9/1/2022	0.00182	0.00082	0.00366	0.00019	0.00150	0.00068	0.000751
23	Tavush	Dilijan	spring («Artsruni»)	9/1/2022	0.00787	0.00158	0.00052	0.00021	0.00155	0.00050	0.000336
24	Tavush	Dilijan/Shamaghyan/	spring («Qor spring»)	9/1/2022	0.00409	0.00044	0.00027	0.00015	0.00126	0.00031	0.000215
25	Tavush	Hovq	spring («Shnqar»)	9/1/2022	0.00192	0.00042	0.00015	0.00014	0.00137	0.00122	0.000359

Sample ref.no	Provie nce	Location of observation point	Type of observation point	Sampling date	V mg/L	Cr mg/L	Mn mg/L	Co mg/L	Ni mg/L	Cu mg/L	Zn mg/L
26	Tavush	Gandzaqar	spring («Dudinyants»)	9/1/2022	0.00284	0.00077	0.00030	0.00021	0.00188	0.00278	0.001384
27	Tavush	Lusadzor	spring («Zani»)	9/2/2022	0.00297	0.00072	0.00015	0.00019	0.00204	0.00110	0.000321
28	Tavush	Lusadzor	ground well	9/2/2022	0.00345	0.00106	0.00013	0.00023	0.00216	0.00246	0.002276
29	Tavush	Aygehovit	spring («Gyoli»)	9/2/2022	0.00839	0.00151	0.00019	0.00026	0.00211	0.00081	0.001621
30	Tavush	Vazashen	spring («Yolomi»)	9/2/2022	0.00310	0.00056	0.00058	0.00029	0.00291	0.00200	0.006417

Sam ple ID	Provie nce	Location of observation point	Type of observation point	Sampling date	As mg/L	Se mg/L	Sr mg/L	Mo mg/L	Cd mg/L	Sn mg/L	Sb mg/L	Ba mg/L	Pb mg/L
1	Lori	Lernavan	Flowing borehole	8/29/2022	0.0005521	0.0007919	0.50758	0.00137	<0.0001	<0.001	<0.0001	0.11475	<0.0001
2	Lori	Mets Parni	Flowing borehole	8/29/2022	0.0015082	0.000718	0.10640	0.00121	<0.0001	<0.001	<0.0001	<0.01	<0.0001
3	Lori	Katnadjur	spring («Qung»)	8/29/2022	0.000895	0.000735	0.08608	0.00096	<0.0001	<0.001	<0.0001	<0.01	<0.0001
4	Lori	Geghasar	Flowing borehole	8/29/2022	0.0017036	0.0007463	0.15126	0.00151	<0.0001	<0.001	<0.0001	<0.01	<0.0001
5	Lori	Nor Khachakap	spring	8/29/2022	0.0002112	0.0005364	0.24776	0.00066	<0.0001	<0.001	<0.0001	<0.01	<0.0001
6	Lori	Darbas	spring	8/29/2022	0.0003233	0.0013579	0.46453	0.00120	<0.0001	<0.001	<0.0001	0.01950	<0.0001
7	Lori	Darbas	spring («Avagenc»)	8/29/2022	0.0006996	0.0008746	0.63276	0.00177	<0.0001	<0.001	<0.0001	0.03493	<0.0001
8	Lori	Saratovka	spring	8/30/2022	0.0008592	0.0002836	0.41489	0.00120	<0.0001	<0.001	<0.0001	0.03110	<0.0001
9	Lori	Saratovka	Flowing borehole	8/30/2022	0.0019212	0.002351	0.78471	0.00153	<0.0001	<0.001	<0.0001	0.04059	<0.0001
10	Lori	Saratovka	spring («Kharlanov»)	8/30/2022	0.001039	0.0002161	0.14175	0.00075	<0.0001	<0.001	<0.0001	<0.01	<0.0001
11	Lori	Tashir	Flowing borehole	8/30/2022	0.0020827	0.0008148	0.64357	0.00109	<0.0001	<0.001	<0.0001	0.04301	<0.0001
12	Lori	Getavan	Flowing borehole	8/30/2022	0.0032387	0.0001596	0.06665	0.00068	<0.0001	<0.001	<0.0001	<0.01	<0.0001
13	Lori	Stepanavan	Flowing borehole	8/30/2022	0.0035137	0.0001581	0.07337	0.00079	<0.0001	<0.001	<0.0001	<0.01	<0.0001

Sample ID	Provience	Location of observation point	Type of observation point	Sampling date	As mg/L	Se mg/L	Sr mg/L	Mo mg/L	Cd mg/L	Sn mg/L	Sb mg/L	Ba mg/L	Pb mg/L
14	Lori	Lori berd	spring («Lusaghbyur»)	8/31/2022	0.0028493	0.00024	0.12920	0.00080	<0.0001	<0.001	<0.0001	<0.01	<0.0001
15	Lori	Agarak	spring	8/31/2022	0.0025566	0.0005259	0.20133	0.00088	<0.0001	<0.001	<0.0001	<0.01	<0.0001
16	Lori	Odzun	spring («Kendanarar»)	8/31/2022	0.0008014	0.0004159	0.15185	0.00050	<0.0001	<0.001	<0.0001	0.01208	<0.0001
17	Lori	Madan	spring («Vardumyanneri»)	8/31/2022	0.0016527	0.0024849	0.77638	0.00070	<0.0001	<0.001	0.00024	0.04860	<0.0001
18	Lori	Shamlugh (Bendik)	spring («Kakali taki»)	8/31/2022	0.0003634	0.0008408	0.79825	0.00128	0.00011	<0.001	<0.0001	0.02712	0.00078
19	Lori	Tumanyan	spring	8/31/2022	0.0020826	0.0021498	0.39092	0.00713	<0.0001	<0.001	<0.0001	<0.01	<0.0001
20	Lori	Tumanyan	spring	8/31/2022	0.0019144	0.0021178	0.36738	0.00672	<0.0001	<0.001	<0.0001	<0.01	0.00019
21	Lori	Dsegh	spring	9/1/2022	0.001358	0.0003478	0.47233	0.00069	<0.0001	<0.001	<0.0001	0.03079	<0.0001
22	Tavush	Margahovit	well	9/1/2022	0.0004648	0.0009538	0.33249	0.00103	<0.0001	<0.001	<0.0001	0.02327	<0.0001
23	Tavush	Dilijan	spring («Artsruni»)	9/1/2022	0.0012454	0.0014517	0.99533	0.00474	<0.0001	<0.001	<0.0001	0.03277	<0.0001
24	Tavush	Dilijan/Shamaghyan/	spring («Qor spring»)	9/1/2022	0.000367	0.0006172	0.54693	0.00183	<0.0001	<0.001	<0.0001	<0.01	<0.0001
25	Tavush	Hovq	spring («Shnqar»)	9/1/2022	0.0002109	0.0010267	0.22827	0.00040	<0.0001	<0.001	<0.0001	0.01326	<0.0001
26	Tavush	Gandzaqar	spring («Dudinyants»)	9/1/2022	0.0008474	0.0007794	0.67731	0.00153	<0.0001	<0.001	0.00015	0.04931	<0.0001
27	Tavush	Lusadzor	spring («Zani»)	9/2/2022	0.0012103	0.0016635	0.39356	0.00132	<0.0001	<0.001	<0.0001	0.02570	<0.0001
28	Tavush	Lusadzor	ground well	9/2/2022	0.0009104	0.002454	0.70619	0.00245	<0.0001	<0.001	<0.0001	0.05453	<0.0001
29	Tavush	Aygehovit	spring («Gyoli»)	9/2/2022	0.0006296	0.0018136	0.96936	0.00543	<0.0001	<0.001	<0.0001	0.01483	<0.0001
30	Tavush	Vazashen	spring («Yolomi»)	9/2/2022	0.0009282	0.0032931	1.24326	0.00387	<0.0001	<0.001	<0.0001	0.05137	<0.0001

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