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ANALYSIS OF WASTE CONTAMINATION IN AJARA REGION'S MOUNTAIN RIVERS AND ITS FINANCIAL EXPENSES

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Analysis of waste contamination in Ajara region's mountain rivers and its financial expenses
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ABSTRACT

Anthropogenic impact did not go beyond water resources therefore, the study of water resources and its rational use is of great importance for the development of the country.

Ajara is one of the most beautiful and strategically important regions of Georgia due to its location, wealth of flora and fauna, tourism and recreation. In this region we find a hydrological network of medium length and small rivers. As a result of anthropogenic influence, the river water is polluted both chemically and biologically.

The practical significance of this research is as follows: determination of the level of biological pollution for monitoring the quality of surface water in the Ajara region, laboratory analyzes and inspection of river basins, after which a plan and cost estimate will be developed, what financial resources will be needed for laboratory studies of existing pollution. As a result of the mentioned studies, the foundation will be laid for the creation of databases on the state of rivers in the Ajara region, based on which it will be possible to plan and carry out future works, which in turn will definitely have a positive impact on the local population and the interests of the country.

The Autonomous Republic of Ajara was selected for the study, where for the first time the main polluting circumstances and sources of a certain number of rivers are observed and the underlying causes determined. 10 independent catchment rivers were selected for pollution study using laboratory analysis. In each river, laboratory sampling points were selected and laboratory analyzes were carried out for pH, E. coli, nitrites, total coliform bacteria and streptococci parameters.

The article presents the results of the research process and the cost per sampling location, totaling the cost for 10 rivers that will be needed to continue the mentioned studies in the future.

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Introduction.

The main goal of surface water quality monitoring in Ajara region is determining the level of existing anthropogenic pollution (N, 2013), through laboratory analyzes and surveying river basins, in order to develop recommendations for the utilization of existing pollution centers and the prevention of future pollution (V., 2012).

The basis for monitoring in selected river basins are:

i. The need to determine the level of pollution of water in the river basin in the Ajara region Pollution in objects quality for assessment and management of the river basin plans month of development.

ii. information extraction the need of water resources pollution at first to prevent

iii. The need for obtaining information on rivers and water ecosystem Effective for management.

Ajara region on the rivers to be implemented monitoring concrete the goals are:

i. selected rivers in the pool possible pollution sources and reasons identification.

ii. state, regional and local governmental agencies, awareness of organizations and society increase Ajara region of rivers of water quality about.

iii. International from the borders taken out fecal pollution rate.

iv. Obtaining information about natural conditions long term changes to evaluate.

v. Based on the obtained information, anthropogenic caused by activity long-term changes rate.

vi. of water quality monitoring, forecasting and Effective for management Required information acceptance, processing, Archiving and distribution.

vii. Making recommendations based on the sources of pollution.

Rivers should be monitored provide:

i. Studying the centers of pollution, developing the form of their utilization and developing the method of protection against future pollution.

ii. Contribute to monitoring and management of water resources and of politics issues of priority in formation.

iii. Assist stakeholders in effectively designing future monitoring programs.

Main part.

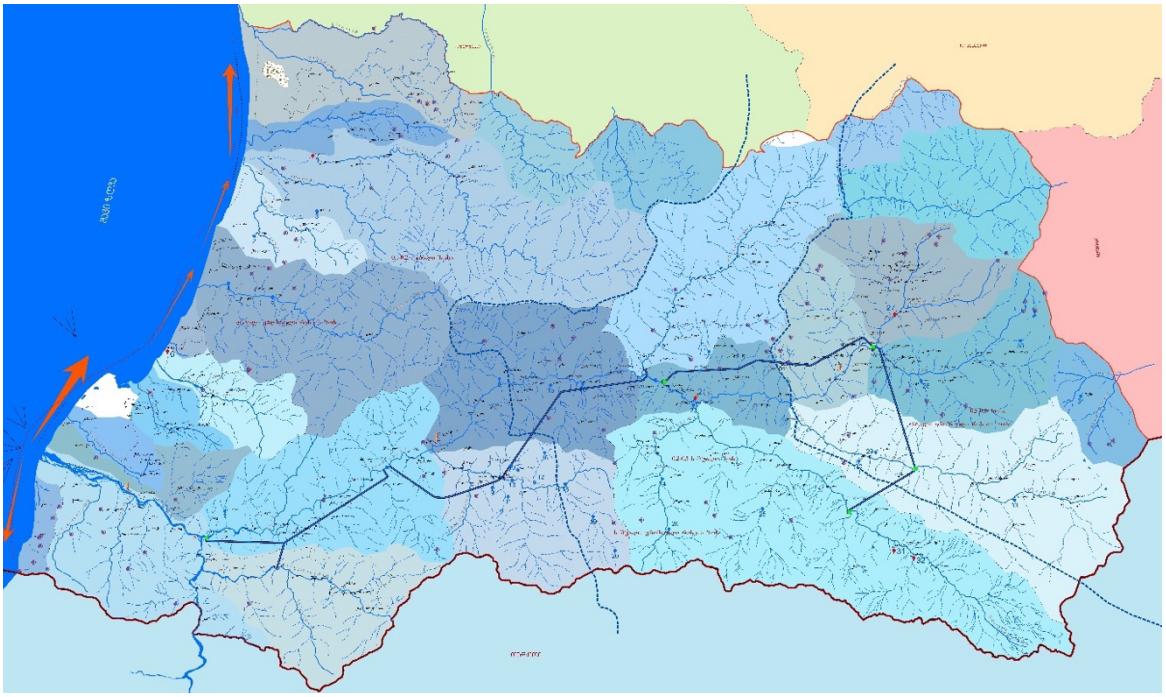
According to Ajara region's rivers hydrological mode it is possible Let's divide it into 3 big ones as a group (IORDANISHVILI I., 2018):

- big rivers - Chorokhi, Adjaristskal, Machakhelastskal;
- medium rivers - Korolistskal, Chakvistskal, Kintrish;
- small rivers - Bartskhana, Kubistskal, Dekhva, Achkva, Choloki and others.

Black of the sea of rivers in the pool of Ajara in the region of municipalities according to laboratory sample to pick up and for monitoring was selected next 10 river (Abashidze I., 2009):

Korolistskali, Barckhana, Dekhva, Kubistskali, Chakvistskali, Kintrishi, Ajaristskali, Chirukhistskali, Ajaristskali, Skhalta, Ajaristskali, Gorjomi and Ajaristskali (Kifiani G., Darchidze G., 2022) (Darchidze G. Chkhubiani D., 2022).

On the mentioned rivers laboratory studies of Total coliform bacteria, E-Coli, Streptococcus were carried out and to understand the level of fecal contamination level. After a preliminary inspection of the riverbeds, sampling points were determined that corresponded to the riverside settlements and the overall length of the river.



Picture 1. Ajara of the region rivers (Darchidze G., 2023).

The results of the first laboratory study are presented in the form of table 1 (Darchidze G., 2023). The first laboratory study confirmed that the pollution level in the rivers was higher than the permissible norm. After a detailed inspection of river beds, the types of pollution centers were identified. These were manure in the form of fecal mass on arable land, pastures for cattle on the banks of the river, water polluted by domestic use, and water from the toilet, which in most cases is not recycled and is often discharged directly into the river (Kiphiani G., Darchidze G., Chkhubiani G., 2022).

Based on the mentioned fact, it was decided to conduct laboratory analyzes repeatedly, the results of the mentioned research are presented in the form of Table 2 (Darchidze G., 2024).

These studies were conducted twice in one year. Sampling points were determined on each stream, where turbidity and discharge were also determined.

Table 1. Results of the first laboratory study.

#	River name	Date of first sampling	Sample number	Laboratory analysis results				
				Flow rate (l/s)	Turbidity (3.5)	Total coliform bacteria	E. coli	Streptococcus faecalis
1	2	3	4	5	6	7	8	9
1	Korolistskali	12/6/23	1	1914.3	1.2	1300	620	60
			2	1956.1	1.2	7000	620	60
			3	2093.2	1.3	24000	7000	1300

Table 2. Continuation.

1	2	3	4	5	6	7	8	9
2	Barckhana	12/6/23	1	29.5	1.1	5000	2400	60
			2	569.9	1.5	240,000	70000	13000
			3	678.1	4.7	240,000	24000	13000
3	Dekhva	24/4/23	1	1109.0	1.4	7000	2400	<50
			2	1223.7	2.0	7000	2400	<50
			3	9994.9	2.3	7000	2400	<50
4	Kubistskali	24/4/23	1	30.6	5.8	70000	7000	<50
			2	286.7	2.6	700,000	70000	<50
			3	305.9	2.8	210,000	620	<50
5	Chakvistskali	9/6/23	1	4698.5	3.7	7000	620	620
			2	4276.2	2.0	24000	1300	230
			3	5068.9	2.2	2100	1300	620
6	Kintrishi	9/6/23	1	7248.7	1.5	70000	7000	1300
			2	9115.9	8.0	2400	230	230
			3	12245.8	4.5	240,000	13000	1300
7	Ajaristskali	19/5/23	3	117729.1	57.5	7000	2400	<50
		19/5/23	4	155329.9	60.5	7000	<50	<50
		31/5/23	2	64990.2	78.3	2400	2400	<50
		31/5/23	1	27404.6	20.1	2400	2400	<50
8	Chirukhistskali	6/6/23	1	1895.2	268.0	2400	2400	<50
			2	739.4	49.9	7000	7000	<50
			3	4994.6	19.8	2400	620	<50
7	Ajaristskali	6/6/23	5	7822.5	40.7	7000	2400	<50
9	Skhalta	7/6/23	1	2118.4	75.0	2400	2400	<50
			2	425.4	661.0	70000	7000	1300
7	Ajaristskali	6/6/23	6	3723.0	259.0	24000	70000	2400
10	Gorjomi	30/5/23	1	407.7	16.2	70000	7000	<50
			2	3948.4	24.5	1300	500	<50
7	Ajaristskali	30/5/23	7	6900.5	31.1	2400	620	<50

Table 3. Secondary laboratory research results.

#	River name	Date of secondary sampling	Sample number	Laboratory analysis results				
				Flow rate (l/s)	Turbidity 3.5)	Total coliform bacteria	E. coli	Streptococcus faecalis
1	Korolistskali	28/09/23	1	736.6	0.49	7000	7000	230
			2	1015.3	1.09	13000	13000	<50
			3	955.1	3.23	2400	2400	60
2	Barckhana	27/9/23	1	93.1	0.5	2400	2400	<50
			2	175.1	0.85	700,000	240,000	7000
			3	281.8	3.16	240,000	70000	2400
3	Dekhva	31/10/23	1	356.4	3.81	1300	620	230
			2	1325.4	1.75	130,000	62000	7000
			3	2226.1	2.12	7000	7000	2400
4	Kubistskali	27/9/23	1	13.8	3.42	24000	2400	1300
			2	36.2	1.56	130,000	70000	7000
			3	167.6	3.63	70000	24000	1300
5	Chakvistskali	28/9/23	1	1204.4	0.84	2400	2400	<50
			2	4635.6	1.17	24000	24000	60
			3	9561.2	1.62	7000	7000	1300
6	Kintrishi	27/10/23	1	1480.1	1.07	2400	2400	<50
			2	11639.4	44.7	2400	2400	<50
			3	14845.8	50.6	24000	24000	7000
7	Ajaristskali	31/10/23	6	9748.3	22.7	7000	2400	230
		31/10/23	7	10680.6	9.23	7000	2400	1300
		25/10/23	5	10122.1	16.5	70000	13000	7000
		25/10/23	4	4103.9	20.1	70000	24000	7000
8	Chirukhistskali	24/10/23	1	183.9	40.2	620	620	230
			2	308.9	18.4	620	620	60
			3	30998.6	10.6	2400	2400	620
7	Ajaristskali	24/10/23	3	4360.4	20.4	130,000	62000	7000
9	Skhalta	3/11/23	1	968.2	6.49	2400	2400	620
			2	1489.0	9.02	7000	1300	230
7	Ajaristskali	3/11/23	2	2045.6	31.5	7000	7000	620
10	Gorjomi	1/11/23	1	228.9	46	1300	1300	1300
			2	177.3	6.14	2400	620	230
7	Ajaristskali	1/11/23	1	657.9	659	70000	70000	7000

The future continuation of these studies is related to many factors, such as: availability of certified personnel, laboratory studies, accredited laboratory services and technological bases. All this is related to finances. For the example of only one point laboratory Kvelava Ajara, the accredited laboratory performs the selected 3 parameters for a fee of 95 GEL (32.3 EUR).

The total cost incurred for 2 surveys of only 10 rivers carried out in the study is:

$$64 \times 95 = 6080\ GEL\ (2067.12\ EU)$$

To these costs are added other overhead costs, such as travel, transportation, fuel, storage of portable refrigerators and others. The mentioned overhead costs depend on the location of the studied rivers and its distance from the laboratory.

Current results of sresearch:

1. Laboratory analyzes were carried out on pre-selected rivers to determine the level of fecal pollution on physical and bacteriological indicators (Tables 1 and 2).
2. investigated sources, anthropological and residential foci of bacteriological contamination of pollution were identified.
3. The first laboratory monitoring of rivers showed us that the problem of water pollution in the Ajara region is a problematic issue and it is necessary to continue research.

Next development research:

Based on all of the above, it is necessary to:

1. Periodic repetition of conducted studies at least 2 times a year, preferably 4 times seasonally.
2. It is necessary to create rivers and their research bases so that the processing of received information is easy and fast.
3. It is necessary to solve the issues of their utilization in order to avoid future pollution of the polluting centers, which will contribute to the issues of environmental protection and To improve the health of river water.

Clean water and rivers, in addition to the ecological factor, are also an important factor for the development of the economy, in particular, tourism. One of the most important issues to ensure sustainable and harmonious development of the region is the creation, maintenance and development of well- tuned infrastructure (Katamadze G., 2021)

From all of the above, we can conclude that conducting the aforementioned laboratory research is necessary for the protection of water resources in the Ajara region, which is directly proportional to the improvement of people's existence and their living environment. on increasing their economic well-being, which is manifested both in the field of services and in entrepreneurial activities.

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