

Addressing environmental pollution: solutions for the Bukhara region at local and regional levels

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Abstract. Environmental pollution remains a critical global issue, with effects manifesting at various scales—from local to global. In particular, the Bukhara region faces significant environmental challenges, due to pollution of air, water, soil, and waste management. This study aims to address environmental pollution specifically in the Bukhara region by identifying key local and regional challenges and proposing practical solutions to mitigate these issues. The study employs a combination of qualitative and quantitative methods, including environmental assessments and stakeholder interviews. It reviews existing data on pollution sources and impact in the Bukhara region and examines case studies of successful pollution control measures. Key findings reveal that pollution in the Bukhara region significantly impacts public health and local ecosystems. Air and water quality are particularly affected, with notable pollution sources including industrial emissions and inadequate waste management. The study identifies several effective strategies implemented in similar contexts that could be adapted for the Bukhara region. Addressing environmental pollution in the Bukhara region requires a multifaceted approach involving local and regional strategies. The findings highlight the need for improved pollution control measures, enhanced regulatory frameworks, and community engagement. Implementing these solutions could significantly mitigate environmental impacts and contribute to sustainable development in the region.

1 Introduction

In primitive society, man was completely defenseless against nature and natural phenomena, and his survival depended on his submission to nature and adaptation to the environment. Although the nomadic people influence their environment to a certain extent, they are far from shaping nature for their own benefit, from understanding the nature of natural phenomena, and therefore from controlling their environment. Humanity's transition to a settled agricultural society, especially the emergence of cities at the end of the Neolithic period, made it abundantly clear that humans were managing and shaping their environment.

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(E.Turdikulov, 2009; 89) Thus, from this period on, human knowledge and technical stock grew rapidly, and in parallel with this development, man began to process nature more and more and affect the environment more and more. opened the way to show the secret. every day. (E.Turdikulov, 2009; 89) It is known that environmental problems have entered the world agenda, especially since the 1970s, and research in this regard has accelerated. Environmental problems know no borders; Environmental problems at the local and regional levels are merging and becoming global. Local and regional environmental problems are at least as serious as global environmental problems.

Population growth in Uzbekistan puts pressure on urban habitats along with energy use, and accordingly, water use and wastewater generation increase the sources and concentration of air pollutants, increase the variety and amount of waste, adversely affect natural resources and land use, which affects the quality of our air, water and soil. Is described as a receiving environment. Some regions of Uzbekistan have faced transboundary environmental problems due to their geographical location. Among these, Orol can be cited as an example. However, Uzbekistan has been dealing with local and regional environmental problems such as pollution, erosion and destruction of the natural environment. It is known from the studies conducted on the priority areas of environmental problems that problems such as air pollution and water pollution are encountered.

The topic of this research, based on the literature review, is devoted to the problems of environmental pollution in the Bukhara region. The study primarily examines the environment, environmental problems and environmental pollution in a conceptual framework. Next, within the framework of the research topic, the trend of cross-border pollution in the atmospheric air of the Bukhara region is very high. This is caused by various gases and carcinogenic substances emitted from the oil, gas, and chemical industries. These problems are discussed in general terms.

2 Material and methods

In general, the environment can be expressed as a set of physical, chemical, biological and social factors that can directly or indirectly affect human activities and living beings at a given time. (Haniza Artiqova, 2009; 51) Environmental problems cannot be ignored when the pollution of environmental elements that make up the living environment reaches a visible and dangerous level. (E. Turdikulov, 2009; 37) It is impossible to consider and evaluate ecological problems separately. (H. Artikova, 1998:6) Environmental problems: water pollution, air pollution, soil pollution, radioactive pollution and waste. Pollution, global warming and climate change, extinction of natural vegetation, extinction of animal species, depletion of earth's water resources, depletion of natural resources, along with erosion and desertification, acid rain, and depletion [1-5]. Environmental problems such as the ozone layer, rain, and deforestation are among the environmental problems that threaten the world. However, it is argued that global environmental problems can actually be expressed as a collection of environmental problems that appear one by one. It is added that problems identified as local or regional may eventually lead to global damage, such as ozone depletion or global climate change. While environmental problems such as ozone depletion or global warming are seen as global environmental problems, air and water pollution are regional. Waste also appears to be a local problem.

Environmental problems did not appear suddenly but accumulated over time and made their presence known. (H. Artikova, 2009:36) Environmental problems have increased with urbanization, industrialization, population growth, and technology. Industrialization and urbanization are factors that accelerate the emergence of environmental problems. Perhaps environmental problems have existed before, but industrialization, urbanization, and rapidly developing technology have turned environmental pressure, degradation, and loss into

problems, negatively affecting the balance of people and the environment. 'took over the display function. today's societies and nature. [6-9] Environmental problems are problems that should be evaluated taking into account ecological, economic, political, legal, scientific and technological aspects.

It was emphasized that the first place in environmental problems should be given to pollution. (V.I. Vernadsky, 1998:2) Because the problem of pollution of the three main environmental elements (air, water and soil), especially in the form of air pollution, appeared in very ancient times in the countries that experienced the industrial revolution and in England, which was a leader in this context, and at that time it was even recognized as a problem. (V.I. Vernadsky, 1998:2) The industrializing Western world, in addition to rapidly increasing pollution in places where industrial production takes place, has also polluted all the places it uses to meet its resource needs while processing resources scattered in many parts of the world. the world and transport them to their countries. (V.I. Vernadsky, 2009:156) Along with urbanization and industrialization, the environmental impact of activities aimed at providing city services increased, and urbanization became an important process that pollutes the receiving environment. (V.I. Vernadsky, 2009:156) However, no problem of pollution has made it easier to understand the state of the planet as threats related to the loss of the ozone layer and global warming. (A.L. Chizhevsky, 2002:28) In this context, pollution gradually grows and accumulates, deteriorating the properties of the habitat. The general definition of pollution is "the presence in the environment of substances such as chemicals, radioactive elements, or solid or biological waste, including unwanted amounts of heat energy, light and sound." [10-14]

3 Overview of environmental pollution problems in Bukhara region

Due to the complex structure and different parts of the problem of environmental pollution, the study was focused on it as a whole, and we tried to take into account the studies and reports made specifically in the Bukhara region, which is the subject of the study. In the province, air pollution, water pollution, waste, soil pollution and noise pollution are listed in order of pollution.

"Air pollution" is the accumulation of pollutants in the atmosphere in the form of dust, smoke, gases, odors, and impure water vapors to a level that harms people, other living things, and property. This is how it is described. (H. Artikova, 2011:552) It is known that the type and level of damage caused to living beings change depending on the nature of pollutants. (H. Artikova, 2011:552) Air pollution sources are divided into two groups according to their main characteristics: "natural air pollution sources and anthropogenic air pollution sources". (Shamedin Pardaev, 2011: 553) Volcanoes, dust, forest fires, ocean sprays and evaporation are considered natural resources. Human-made sources of anthropogenic air pollution are urbanization and industrialization. (Shamedin Pardaev, 2011:553)

It is natural that various gases and carcinogenic substances coming out of the oil and gas and chemical industries located in the regions of Navoi region, Kashkadarya region, and Lebob region of neighboring Turkmenistan, located in the northern, southeastern and southern parts of the province, enter without any obstacles. In addition, since the Bukhara region is located in the Qizilkum desert, the presence of dust and salt residues blown from the desert has a negative impact on its air, water and soil, flora and fauna, and ecosystems, as well as on people's health.

Toxic substances released into the atmosphere from the sources of industrial enterprises:

- 52 percent carbon monoxide;
- 17 percent are hydrocarbons;
- 16 percent are sulfur dioxides;

- 9 percent nitrogen oxides;
- 5.4 percent corresponds to solids and other toxic carcinogens.

According to the metrology center, the level of natural humidity in the air in the region is insufficient. The annual amount of atmospheric precipitation is 90-150 mm. The moisture that evaporates from the ground level reaches up to 2000 mm. In this respect, the Bukhara region belongs to the extremely arid zone.

4 Discussion

In fact, the transboundary water problem dominates the water system of the Bukhara region. The main water source in our province is the Amudaryya, which is the Ambukhoromashinakanali (ABMK). Its design capacity is equal to 320 cubic meters per second, and 280–290 cubic meters per second of water are taken. Every year, 3.5–3.7 million cubic meters of water are used for the needs of the region, so 99 percent of this Amudaryya water. There are more than 900 underground wells in the region for reducing underground water and using it for irrigation; 70% of them are in working condition.

In such a situation, finding a solution to problems such as drought and water shortages is on the agenda in our region.

Therefore, in 2017-2022, regarding the introduction of advanced water-saving technologies, drip irrigation was launched on a total of 71,200 hectares, and as a result, 200 million cubic meters of water were saved.

1.8–2.0 billion is annually transported from the agricultural fields to the Ayoag-Ogitma, Karaqir, Zamonbobob, Dengizkol, Devkhana, Zikri, Khadicha, Kumsultan lakes through 17,000 km-long ditches. cubic meter of waste and waste water is discharged.

Due to climate change and drought, the amount of water discharged into natural lakes has decreased sharply over the last 10 years, the area of lakes has decreased, and the amount of dissolved salts in water has increased to 20–30 g/liter. This situation has a negative impact on the reduction of food supply in the lakes, the loss of biodiversity, and the reproduction and development of fish.

90 percent of the region's soil is saline

The total land area of Bukhara region is 4 mln. It is 183.1 thousand hectares. From this:

- 229.2 thousand irrigated lands;
- 99.2 thousand cotton fields;
- 60.6 thousand grain areas;
- 36,400 vegetable plots/potato fields;
- 33 thousand hectares of orchards and vineyards.

According to scientists, 90 percent of the region's soil is saline in varying degrees. Of this, the non-saline soil area is 24,000 hectares (10.4%), the low-saline soil is 125,800 hectares (54.8%), the moderately saline soil is 48,200 hectares (21.2%), and the highly saline soil is 31,000 hectares. It is 2 thousand hectares (13.6 percent).

This situation is mainly caused by the salts that come to the territory of the region. 5 mln. The direction of toxic dust and salt particles rising into the atmosphere from the hectare Arol desert salt mines was monitored through experiments and analysis. According to the results of observation and analysis, it was found that 200–400 kg of salt are deposited on each hectare of our region in a year.

During the chemical analysis of atmospheric precipitation by experts, it was noted that mineral salts and organic substances in the precipitation are 5-7 times higher than the standard level. It was noted that the rains that fell in the spring months caused great damage to grass and pasture plants.

In the conditions of the Bukhara region, the growth of cotton, grain and other plants is severely affected not only by soil salinity, but also by other adverse environmental factors

(drought, water shortage, high temperature, heat). For example, cotton is often affected by a lack of water in the soil, high and low relative humidity in the air, heat and other unfavorable factors in the summer months.

Especially in the summer months, in the middle and lower regions of the Zarafshan oasis, a sharp rise in air temperature (45-50 °C), an extension of the summer chill to 20-30 days, low relative humidity (10-15 percent) leads to maximum evaporation of water through plant leaves and from the soil surface, causing large amounts of salt to accumulate.

Animal protection is also an urgent issue in our region at this time when ecological problems are becoming serious. In 1971, the Qizilqum state reserve was established on the territory of our region on the territory of 10.3 thousand hectares in order to protect rare plants and animals included in the Red Book of Uzbekistan. In 1976, the area of the nursery intended for the breeding of gazelles was 16 thousand hectares, and in 2001, the area of the Dengizkol Ornithological State Order Office included in the list of the International Ramsar Convention is 50 thousand hectares.

In addition, the natural lakes of Karaqir and Kumsultan are also included in the protected reservation areas. Protected areas of the province make up 2.5 percent of the total area.

As a result of the drying up of the Aral Sea, millions of birds wintering in the sea settled in the natural lakes of Dengizkol, Devkhana, Khadicha, Zilri, Kumsultan, Ayakogitma. The number of wintering birds in Dengizkol alone is 1.5-2 million. It is planned to increase the area of protected areas in the region to 7.5-10% in the State programs.

At this point, the scientists of Bukhara State University believe that it is appropriate to include 20 thousand hectares of land in the area of Ayakogitma Lake in the protected areas. Turkestan moustache, included in the Red Book of Uzbekistan, is well-developed in the lake, and a lot of rare birds (white swan, marbled duck, white duck) have found a place in the lake.

Around the lake there are herds of gazelles, goats, and yorga tuvalok included in the "Red Book". Lake Ayakogitma and its surroundings are considered to be free from anthropogenic factors.

Water pollution is the addition of unwanted, harmful substances to water in such quantities and concentrations that they measurably impair water quality. Water is polluted as a result of various human activities. Agricultural activities, industrialization and settlements are among the main sources of water pollution. Water pollution, caused by agriculture, is an important element. Fertilizers and pesticides used in agriculture can leach into surfaces and groundwater. These pollutants can cause soil contamination in agricultural areas and eutrophication in aquatic environments as a result of water transport. Unfortunately, agricultural pollution is not easy to measure. In addition to agricultural inputs, pollution from soil cultivation and animal husbandry is also among the causes of water pollution. Agricultural pollution can result from soil erosion, but it can also occur as water pollution through soil mixing and cycling of plant nutrients such as nitrogen and phosphorus. Among the causes of water pollution should be pollution caused by animal waste and pesticides. Water pollution caused by industrial activities can be chemical, physical, physiological, biological or radioactive pollution, depending on the nature of the pollutants. On the other hand, another source of water pollution is urban and rural areas where people live. As urban populations and cities grow, so does the amount of solid waste, such as garbage, and liquid waste, such as sewage. Depending on the geographical location of the settlement, liquid waste is discharged directly into the sea, lakes and streams or underground to mix with groundwater.

They are commonly used for large bodies of water, recreation, fishing, transportation, and wastewater treatment or treatment. If these waters are clean, they are also used as drinking, irrigation and cooling water. Oil is also extracted from some lakes and seas. In addition to being ecologically important because large bodies of water contain many species, people and other creatures living around these waters are also affected by these waters. In addition to

influencing the climate, they also carry various nutrients and pollutants in the hydrological cycle. It is known that these are again mixed with soil, underground and surface water. Some pollutants evaporate and mix with water in the atmosphere, are transported to distant places, and are released from the air by precipitation.

Due to the fact that the Bukhara region is located close to the Aral region (550–200 km) and borders the desert and deserts, its air is becoming polluted with natural dust, sand and salt particles. It is known that 120 mln. More than a ton of dust, sand and salt particles are rising and polluting the environment. Due to the drying up of the Aral Sea, the constant wind in our region has increased by 40% over the next 10 years. Every year, 400 kg of harmful salts are brought to each hectare of land under the influence of the wind. 50% of it is made up of salt particles rising into the air from the bottom of the island. In addition, there are 33 salt mines and salt mines in our region. Their total area is 120 thousand hectares of land. 14,000 tons of salt and salty soil particles are added to the atmosphere from this area. The amount of salt particles that tend to rise into the air is 160-170 million tons. As a result of this, the ephemeral spring grasses in the pastures decreased, and the total yield from them decreased by 2-3 times. For example, if in 1980 an average yield of 1.5-2.5 quintals was obtained from each hectare of pastures, by 1992 the yield decreased by 0.5 quintals. The air of the province is especially polluted by industrial enterprises (gas industry enterprises, heat networks, oil extraction plants, construction enterprises, asphalt and cotton factories, etc.). The total amount of waste released into the atmosphere in our region is 130 thousand tons. Of this, 70,000 tons correspond to the share of vehicles, and the remaining 60,000 tons correspond to the share of immovable waste sources. There are 90,000 motor vehicles in our region. In the city of Bukhara, vehicles pollute the air by 70-80%, only in 1996, when 3 thousand vehicles were inspected, 750 of them were found to be emitting more than normal emissions.

Today, there are 900 vehicles converted to ecologically clean natural gas, which is 4.5%. It should be noted that only 24% of gasoline and 83% of diesel fuel burn in the internal combustion engine. The rest is released into the atmosphere as a gas. Gasoline contains lead compounds, which cause cancer. There are major air pollution problems in our province (Table 5). Over the past 5 years, the amount of toxic substances released into the atmosphere has decreased from 180,000 tons to 130,000 tons. By 2001, this figure was 109,000 tons. 50,000 tons of non-stationary (permanent) waste sources, and 59,000 tons (54%) of toxic substances from mobile sources are released into the atmosphere. Currently, 75 kg of toxic substances per head of population of our region. In order to reduce toxic substances released into the atmosphere in our region, the cotton ginning plant, UNR-985 enterprise and JBIK-6 plant's expanded clay workshop were moved out of the city. As a result of these measures, emissions from stationary sources have decreased by almost 50%.

30% of motor vehicles emit more gas than the norm. During the next 20 years, as a result of the drying up of the Aral Sea, the weather in our region changed dramatically. The negative impact of Harmful winds on crops has increased dramatically. In such difficult conditions, it is important to establish "Green Shield" plantations around irrigated agricultural lands. Judging by the data, Ikhota tree plantations greatly help in increasing the yield of cotton. For example, ikhota plantations increase cotton yield by an average of 5-10 tons per hectare of heavily eroded land and 2.5-3.0 tons of lightly eroded land. In addition, tree groves change the climate, increase air humidity, reduce wind power by 25-75%, reduce water evaporation from plants and prevent warming. Only in 2002, "Green Shield" plantations were established on the territory of our region on an area of 1,000 hectares. Expanding the area of tree plantations, planting more of them in deserts, around irrigated lands and in cities should be the duty of every citizen.

Ecological condition of land fund and soil of Bukhara region. It is known that the Bukhara region is located between Kyzylkum and Karakum, and its total land area is 4.2 million

hectares or only 9% of the republic's area. Out of this, 273,000 hectares, or 5%, of irrigated farming areas, and 2.8 million hectares, or 67% of pastures (see Table 6). 20,000 hectares of cultivated land in our region are not saline, 167,000 hectares are weakly saline, and 58,700 hectares are moderately saline (see Table 7). Therefore, the level of underground water rose from 0.2 m to 5 m. Over the next 40 years, more than 60% of cultivated areas in our region were affected by soil salinization and wind erosion. As a result of the rise of the underground water level and the evaporation of water under the influence of high temperature, harmful salts have accumulated on the surface layer of the soil. According to the data, annual precipitation amounts to 205 mm in Navoi region and 125 mm in Bukhara region. The soil thickness (agro-irrigation layer) formed as a result of land irrigation is 2-3 m. According to the data, 3-year alfalfa accumulates 600 kg of nitrogen and 20 tons of humus in the soil. In order to improve soil physical properties (ie soil density, water permeability and water capacity), the size of soil particles should be larger than 0.25 mm. But due to cotton alone, the amount of humus in the soil has decreased by 40%. Humus is one of the main factors of soil fertility. Plants get most of their nutrients from humus. The amount of humus in the driving layer of the soil is 0.5-1.5%, phosphorus is 0.13-0.16%, and nitrogen is 0.05-0.09%. Currently, only 8-10% of fields are fertilized. In cotton fields, the earthworm has almost disappeared, resulting in increased soil density. Effective use of manure allows saving 20-25% of water in plants. To achieve high productivity, it is necessary to add local fertilizers to the soil at a depth of 15-20 cm and water it. As a result, the manure rots well for 3-4 months and the humus layer of the soil improves.

Currently, 12-15% of phosphorus fertilizers (superphosphate, amphos, nitrophos), 30% of nitrogen fertilizers (ammonium nitrate, urea, ammonium sulfate), 30% of potassium fertilizers (potassium salt, potassium chloride salt, potassium phosphate) 40% is absorbed by plants, and the rest pollutes the environment. In some developed countries, 2 kg of pesticides are used per hectare of cultivated area, while 11 kg were used in our region. Due to excessive use of cultural fertilizers and the use of toxic chemicals in the fight against pests, the amount of humus in the soil is decreasing from the normal 1.5-2.0% to 0.3-0.5%. This, in turn, indicates soil poisoning, traces of biological and biochemical processes. In 1991-1995, the amount of organic fertilizers applied to each hectare of land in the farms of our region was 6-11 tons, and the amount of gross prepared fertilizers was 1.9-2.5 million. increased by tons. In addition, accumulation of organic and local fertilizers, preparation of biohumus, and crop rotation do not meet today's requirements. Currently, there are more than 70 biolaboratories on the scale of our region, and 350,000 hectares of agricultural crops are biologically treated against pests per year. This, in turn, reduces poisoning from toxic chemicals.

Water problems in Bukhara region and prospects of wastewater treatment using plants. It is known that the Zarafshan river crosses the Turkestan mountain and separates the Nurato and Zirbulok-Ziyo Muddin mountains. The Zarafshan River fully provided the drinking water needs of the region's residents until the 60s of the 20th century. To date, 15 km long river, and the rest is the central ditch. Currently, the Zarafshan River, the Chirchiq River and the Salor Stream, as well as other water sources, are completely polluted in the territory of Samarkand. In addition, waste and sewage from many livestock complexes built on the banks of the riverbed in the Navoi region further pollutes the Zarafshan River. River water is also used for cooling Navoi GRES pipes. This contaminates river waters with bacteria and chemicals as pipes and other equipment are cleaned with aqueous acids. So, the wastewater flowing into the river from GRES pollutes the Zarafshan river. Navoi GRES i discharges up to 30 tons of acidic wastewater per week into the Zarafshan River. As a result, Harkhur and Shokhrud canals, which are sources of clean drinking water of Bukhara city, became polluted, and even the chemical composition of underground water completely changed and became unfit for consumption. In recent years, the waters of the Zarafshan River have been polluted 2-3 times compared to the norm: after the Navoi GRES water, magnesium - 2 times, phenol

and iron compounds - 4 times, chromium - 5 times, petroleum products - 5.3 times, sulfates - 6. times, and copper - 26 times higher. In the Bukhara region, underground water is also polluted to a depth of 70 m. Therefore, providing drinking water to residents of Navoi city, Kyzilteppa and Navbahor districts, as well as Bukhara region has become a big problem. In order to improve the normal sanitary-hygienic condition of the Zarafshon river, 30-35 thousand m³ of water should be discharged into the river. But in recent years, this indicator is only 20,000 m³ of water. Bukhara region has 18,900 km of irrigation systems. 10% of inter-farm canals and 8.3% of intra-farm canals are concreted. In 1990, 16.9 thousand m³ of water was used to irrigate 1 hectare of arable land. The efficiency of channels in our province is 57%, and in the republic it is 64%. In the USA, this indicator is 86%. Only 34% of the population of the region and 6% of the rural population have tap water. In this region, 22 collective farms were connected with water pipes. 45% of the population is provided with sewage. Regional industrial enterprises have 60 treatment facilities, half of which do not work at full capacity, 8 do not work at all, and 32 enterprises have no treatment facilities at all. In 1990, the volume of wastewater in the region was 30 million m³. Currently, 10 million m³ of wastewater is being discharged into collector ditches without treatment. An average of 300 l of water is used per day for each person living in apartment buildings. In the future, this indicator is planned to reach 400 l. Achieving these goals requires the use of water-saving irrigation methods, concreting of irrigation networks and rational use of available water in the region. In addition, it is necessary to establish protection zones around 50 m along main irrigation canals (more than 10 m³ per second) and not to use mineral fertilizers and pesticides on crops in the protection zones. Currently, 96% of the drinking water consumed by the residents of the region does not meet the requirements of state standards. Even groundwater contains pesticides, toxic substances and water hardness 10 times higher than normal. Therefore, every household should be provided with water purification equipment.

Damkhoja-Bukhara water main and commissioning of fresh underground water reserves in Kutchi massif will greatly help to improve fresh water supply in our region. It is worth noting that it is necessary to determine the permissible limit concentrations of harmful substances in drinking water. It should be noted that 1 liter of drinking water contains 0.08 mg of nitrite nitrogen, 0.5 mg of ammonium nitrogen, 40 mg of nitrate nitrogen, water hardness is 6.8, and dry residues should not exceed 100 mg. Otherwise, all drinking water must be treated. The average annual amount of water used in the national economy of Bukhara region is 5.5-6.0 billion m³. Of this, 3.5 billion, m³ of water comes from Amudarya, 0.6-0.5 billion, m³ is taken from Zarafshan, and the rest is taken from underground water sources and collectors. 2.2-3.5 billion of the received water, m³ is spent on agriculture. Currently, 100 mln. m³ of water for agricultural supply, 80-100 mln. 170-200 million m³ of water for drinking and communal household services. m³ of water - for various purposes, 12-20 mln. m³ of water is reused. In addition, 2.2-2.5 mln. m³ of water is discharged into open water bodies and 1.5-2.5 mln. m³ of water is lost due to evaporation and absorption in ditches, streams, canals and rivers.

In the Bukhara region, the annual water intake is 470 m³ per person. Of this, 250-270 m³ is consumed, and 170-190 m³ is waste water and is discharged into the sewer. On average, 4.2-4.5 bln. m³ of water, or 98.5% of the total amount of water, is discharged from the Amudarya by means of pumps rising to a height of 100-120 m. 2.5 billion of the received water, m³ is discharged into natural lakes as polluted water. The total area of natural lakes of our region is more than 200 thousand hectares, and in addition to the seepage waters of our region, the seepage waters of the Samarkand, Navoi and Kashkadarya regions are added to them. As a result, 7-8 million tons of salt are added to the lakes along with the water from the ditches. Due to the impossibility of water in the natural lakes, the reclamation condition of the surrounding lands is deteriorating, the level of underground water is falling and the formation of salt layers is being observed. During the growth and development of agricultural

crops, there are cases of water shortage, and sometimes well water is used. As a result, 30-75 tons of salt is added to each hectare of irrigated land. Each liter of Zakhkash water contains about 3-8 g of salt. If the water used for irrigation contains a lot of salt, the productivity will decrease. For example, when there is 1-2 g of salt in every 1 l of water, the productivity of cotton and vegetables decreases by 4.5%, when there is 2-4 g of salt, by 11%, when there is 4-6 g of salt, by 32%. Within the territory of our province. There are 3,500 wells, of which 146 are used for drinking water supply, 650 for industrial purposes, 690 for irrigation systems, 320 for pastures, and more than 600 for lowering the groundwater level. Five wells are used for the treatment of diseases. Only in the city of Bukhara there are more than 80 wells, which are used to reduce the level of underground water. According to the data, each 1 l of rain and snow water contains 400-500 mg of salts, 140-160 mg of sulfates, 8 mg of organic compounds and 5 mg of ammonium salts. Therefore, the amount of these substances in precipitation exceeding their permissible limit concentrations has a great negative effect on the development of plants and, in particular, on the productivity of ephemeral pasture plants. It should be noted that there are 45 wastewater treatment facilities in our region, and 40-50 million m³ of wastewater are discharged into open water basins (reservoirs) after 45-60% of them are treated annually. Bukhara City Wastewater Treatment Center receives 90-120 thousand m³ of wastewater per day and achieves 60-70% purification.

It is known that the amount of waste water is different in each enterprise and is 28.1-80.7% of the total amount of water received. Treatment of waste water and ditch water with the help of plants is of great economic and ecological importance. The advantage of this method is that it can reduce the biological absorption of oxygen by 77-99%, chemical absorption by 60-96%, the amount of substances dissolved in water by 90-99.8%, and the amount of nitrogen by 45-94%. In addition, aquatic plants give 380 g to 1.5 kg of dry mass per 1 m² per day. One plant can have more than 80 branches. Therefore, plants absorb nitrogen and phosphorus compounds in water. Aquatic plants contain about 14-40 g of absorbable oxides and 0.12-0.27 nutrient units. In addition, water plants contain monosaccharides by 0.5-3.0%, disaccharides by 1.5-7.5%, protein by 4-11%, proteins by 12.3-19.9%, carbon and other vitamins will be more. Cook mass can be used as animal feed. One m² of algae-grown water can produce up to 42 kg of feed, or 4 kg of beef, or 7 kg of mutton. Treatment of wastewater with the help of aquatic plants for 6-8 months is of great economic and ecological importance. Using this method, wastewater can be purified by 90-99%. The method of purifying wastewater using plants is not new. This method is widely used in North America, South Africa, Asia and Australia. With the help of aquatic plants, 60% of nitrogen, 80% of nitrates, 4.0-50% of phosphorus, water salinity (when there is 5 g of salt in 1 l of water) by 50%, when 2 g of salt in 1 l of water, water salinity is reduced to 30%. % can be reduced. It was found that the content of the ditch water in our region is 2.0-4.5 g/Gl of salt and 0.58 g/Gl of pesticides. Nitrogen (8-15%), phosphorus (5%) and agrochemicals (10%) in the composition of Zovur waters have a negative effect on the animal world. In addition, the method of wastewater treatment with the help of aquatic plants greatly helps to solve the problems of food supply.

5 Conclusions

Not only global problems, but also regional and local environmental problems are of great importance. Due to the borderless nature of the environment and ecological problems, an environmental problem that occurs in a local area will make itself felt on a regional and then global scale. In this context, environmental problems are problems that need to be solved at the local and regional level and should be given careful attention.

In addition to finding solutions to environmental problems through interstate cooperation on a global scale, it is also important to achieve solutions through regulation adopted at

national and regional levels. Environmental pollution occurs when humans destroy the environment to such an extent that it cannot be restored or recycled. In addition to these, from local problems, regional and global problems, the life support systems necessary for the survival of living beings are threatened and this situation is increasing day by day. According to this research topic, environmental pollution starts at the local level and is felt in every area. Air pollution is one of the main environmental pollution problems in Elazig region. However, they are trying to prevent the problem with the measures taken. Efforts are also made to prevent water pollution by applying the measures taken in the air pollution regulations. The problem of waste, which is increasing day by day, of the population is being eliminated by regular landfill works of local administrations. The problem of soil pollution is an important problem today, where both soil misuse and soil loss are widespread and are being addressed at the regional level.

As a result, it is impossible to prevent the increase in pollution caused by the increase in population, the change in consumption habits of people and the development of technology. In addition to considering environmental pollution as an important problem outside the state, measures to prevent it should be in the form of interstate cooperation and internal regulations of states. It is true that this problem cannot be solved only by implementing or attempting to implement regulatory legal acts; This was also determined by literature review. It is necessary to solve the problem from the moral point of view, as well as from its legal, political, economic, scientific and technological aspects. In this context, it becomes clear what needs to be done to leave a healthier and safer environment for future generations. Once again, in solving the problem, it will be useful to act with the understanding that living in a healthy and safe environment is the basic right of every person to live, and the measures taken against environmental pollution.

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