GAHP
GLOBAL ALLIANCE ON HEALTH AND POLLUTION

HEALTH AND POLLUTION ACTION PLAN

Azerbaijan Republic

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List of Abbreviations

ADB	Asian Development bank
CEP	Caspian Environment Program
CSO	Civil Society Organization
DDT	Dichlorodiphenyltrichloroethane
EU	European Union
GDP	Gross Domestic Product
GEF	Global Environment Facility
HCB	Hexachlorobenzene
HPAP	Health Pollution and Action Planning
IHME	Institute for Health Metrics and Evaluation
IPEN	International Pesticide Elimination Network
MENR	Ministry of Ecology and Natural Resources of Azerbaijan
MIA	Ministry of Agriculture of Azerbaijan
MOES	Ministry of Emergency Situations of Azerbaijan
NGO	Non-Governmental Organization
NIP	National Implementation Plan 2007-2020
PCB	Polychlorinated biphenyl
POP	Persistent organic pollutant
SAICM	Strategic Approach to International Chemicals Management
SAS	Sumgait Surface Active Substances Factory
SOCAR	State Oil Company of the Azerbaijan Republic
UNDP	United Nations Development Program
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Program
VOC	Volatile Organic Compound

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EXECUTIVE SUMMARY

The Health and Pollution Action Plan (HPAP) program assists governments of low and middle-income countries in developing and implementing solutions to pollution-related health challenges. The HPAP program brings together national Ministries of Environment, Health, Industry, Transport, Energy, Mining, Agriculture, and other international actors to advance concrete actions to solve pollution and health problems.

The HPAP program is a collaborative process of researching, prioritizing, and planning pollution management actions. The HPAP process is driven by national agencies and facilitated and supported by GAHP.

The goals of the HPAP program are to:

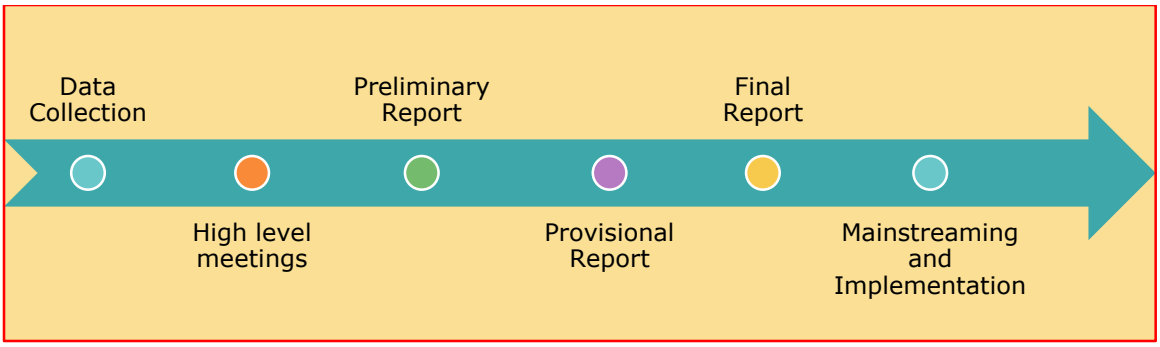
- Assist governments in identifying, evaluating, and prioritizing existing pollution issues based on health impacts
- Establish pollution as a priority for action within national agencies and development plans
- Define and advance concrete projects to reduce pollution exposures and related illnesses

HPAP process in Azerbaijan

The HPAP process began in 2020 after GAHP invited various ministries and organizations in Azerbaijan to establish the HPAP working group. In bilateral meetings, members of the Working Group outlined each stage to be considered in the HPAP process and the role of their organization in this phase.

The tentative HPAP process (figure 1) will be continued with the preparation of the Final Report, mainstreaming and implementation of the projects. For mainstreaming, GAHP members will work closely with potential partners to identify possible interventions and projects.

Figure 1. HPAP process in Azerbaijan



Main pollution sources and pollutants

The development of oil production and the petrochemical industry, rapid urbanisation, and the existence of various legacy pollution sources from the Soviet era make environmental pollution quite problematic in Azerbaijan.

Air pollution is one of the main environmental and health problems in Azerbaijan. According to the World Health Organization's guidelines, the air quality in Azerbaijan is considered moderately unsafe and according to IHME, air pollution is one of the leading causes of death in Azerbaijan. In urban areas, motorized vehicles, construction and household waste are the main sources of ambient air pollution. The second source of air pollution is industry, specifically from oil refining, chemical, and energy activities. The problem of indoor air quality is more common in offices and dwellings. Indoor air pollution comes from a variety of sources, including furniture, carpeting, flooring, paint, pets, smoking, cooking, and gas burning. In addition, the use of various perfumes and fragrances, detergents, and insecticides contribute to indoor air pollution.

Old oil wells are the main sources of soil pollution in Absheron peninsula, which is highly urbanized. These oil wells are located very close to residential areas and the areas around the wells are not closed off to people.

In mountainous areas, mines are the main source of pollution. Most of the mines in Azerbaijan have been under occupation for a long time and have been used without any regulations. In rural areas, legacy POPs pesticide sites are the major sources of pollution.

Clean drinking water is a challenge for most parts of Azerbaijan. The main water sources in Azerbaijan are the transboundary Kura and Araz rivers, that are affected by permanent pollution and excessive water withdrawals in the territory of neighboring upstream countries.

Pollution of lakes is common for the Absheron region. For many years these lakes were the last destinations for industrial and household wastewater and studies confirm high levels of pollution from oil products, VOCs, PAHs, and heavy metals. Boyukshor, Khojohasan, Binigadi, Girmizigoller, Lokbatan, Zabrat, Bulbula, Zig and Gu are considered as the more contaminated lakes.

Chemicals are widely used in every step of food production, including harvesting, processing and packaging. Several studies confirm that the potential for PAH exposure in food is very high. The main source of this risk is related to soil contamination from oil and chemical waste. High levels of carcinogenic chemicals have been detected in products such as bread, pastries, milk, eggs and fish products. High concentrations of PAH were also found in fish and other types of water species. However, to date, there are no comprehensive action plans in place to detect toxic contaminants in food.

Transboundary pollution is one of the main environmental problems in the country. Transboundary rivers are polluted by countries upstream from the Kura River basin. Over the past 50 years, metal (Cu, Fe, Al) concentrations in some small streams of the Kura basin have been increasing due to the growth of the mining industry in neighboring countries. These rivers are also polluted by the discharge of poorly treated or untreated waste water from the 11 million people living in the catchment area. Ammonia and nitrates from the fertilizer industry also contribute to pollution of the Kura basin. Pollution of the Caspian Sea by transboundary river flows also remains a problem for the country. Currently, the Caspian Sea is polluted both by rivers and by oil production.

Pollution is associated with a broad range of diseases including lung diseases, lung cancer and cardiovascular diseases. Currently, respiratory diseases, various types of cancer, skin diseases and several allergic diseases in the country can be associated with toxic pollutants in the environment and food.

The main objective of Azerbaijan's environmental policy is the protection of the health of people and existing ecological systems, increasing economic potential, and promoting the efficient use of natural resources to meet the needs of present and future generations. There is a broad array of environmental laws that provide general and focused guidance on problems and management of the environment. The country has adopted many laws related to environmental protection and management that regulate POPs and other industrial waste.

The institutional situation concerning management of toxic wastes and public health in Azerbaijan is characterized by independently operating ministries and entities that form a coordinated group of environmental pollution, safety, and public health related stakeholders. Relevant ministries and state agencies and state-owned companies are directly coordinated by the Cabinet of Ministers. These state organizations are the central executive bodies on the issues listed above. In addition, civil society institutions, local municipalities and executive authorities, as well as research and education institutes operate in this area.

Since 2004 Azerbaijan has been carrying out several projects related to the elimination and management of POPs and other toxic pollutants. Extensive work has been done in Baku Bay, the Bibi Heybat zone, around the International Airport, Lake Boyukshor, and on oil-contaminated soils and flooded areas. At the same time, the management of solid waste generated in Baku and Sumgait has improved in accordance with the solid waste management scheme. The Sumgait remediation project was implemented in 2015 as a partnership between Pure Earth and the site owner Azerikimya Joint Stock Company (Azerikimya) and supported by the government. Toxic waste containing 56,422 cubic meters of mercury was transported to the Hazardous Waste Landfill in 2007-2009 and neutralized. The State Oil Company of Azerbaijan (SOCAR) has implemented pilot projects to clean up oil-contaminated lands, including a project to clean part of Boyukshor Lake. The project envisages stopping sewage flowing into a part of the lake in the northern part of Baku and treating the lake. Currently, the lake has been partially cleared and the surrounding area has been landscaped. Azerbaijan adopted a National Implementation Plan 2007-2020 under the Stockholm Convention on POPs. The plan considers eliminating toxic pollution in Azerbaijan gradually. Two production sites of the Baku Iodine Plant and the areas of the Neftchala Iodine Bromine Plant exposed to radioactive contamination were cleared and transported to a special landfill for radioactive waste. In 2017 Pure Earth started to implement the Salyan cleanup project, which was supported by the Ministry of Agriculture. The project fulfilled the main objective of removing sources of contamination from the area; piles of pesticides and most contaminated soil underneath.

Azerbaijan has a good legal framework for hazardous waste management and has acceded to numerous conventions and agreements on this topic. Despite this the country still has both legal and institutional problems with hazardous waste management.

Implementing action plans to address environmental issues could remedy this. It is planned to work actively with international donor organizations to implement these action plans. Additionally, as part of the HPAP process several projects addressing air, soil, and water pollution have been proposed.

1 INTRODUCTION

Azerbaijan was one of the principal oil producing and processing countries in the world without adequate environmental management practices. Azerbaijan was also one of the main producers and users of toxic substances for industrial and agricultural production. Estimations and inventories confirmed that during the Soviet period approximately 25,000 tons of DDT pesticide were used in Azerbaijan yearly, which led to large scale and unmanageable toxic pollution in the country. The remaining polluted sites from the Soviet period have been found in nearly all parts of Azerbaijan, which include both large and small pollution hotspots.

After the country gained independence, a new era in environmental management began. First of all, a new legislative framework and institutional framework have been created. Numerous activities have been launched to improve the environment. These activities are mainly aimed at protecting and improving the use of water, soil and mountain ecosystems. At the same time, as a result of joint activities with international organizations, numerous projects have been implemented to clean and restore lands.

After the country gained independence, there have been dramatic changes in the lives of the population and the development of the economy. These changes are reflected in the oil, construction and transport sectors. The use of private cars in the country has increased several times, and at the same time there has been a construction boom. The concentration of the population in large cities and the increase in oil exports have begun to have an impact on environmental pollution. Thus, the transport and construction sectors are ahead of the chemical and petrochemical industries in terms of the amount of harmful substances emitted into the atmosphere. At the same time, despite numerous restoration works, pesticide contamination in rural areas remains a priority. Against the background of a sharp increase in population, problems related to clean water supply and household waste management have also increased.

All of these problems have a negative impact on the health of the population, and for these reasons there is an urgent need to continue the activities carried out over the past 30 years. In this regard, the HPAP project can be considered a new opportunity for Azerbaijan.

1.1 THE HEALTH AND POLLUTION ACTION PLAN IN AZERBAIJAN

1.1.1 General Information

The Health and Pollution Action Plan (HPAP) program was designed by the Global Alliance on Health and Pollution (GAHP) to assist governments of low and middle-income countries to prioritize, develop and implement solutions to a country's worst pollution and health challenges. The HPAP program brings together national Ministries of Environment, Health, Industry, Transport, Energy, Mining, Agriculture, and others to advance concrete actions to solve pollution and health problems.

The goals of the HPAP program are:

1. Assist governments to identify, evaluate and prioritize existing pollution issues based on health impacts
2. Establish pollution as a priority for action within national agencies and development plans
3. Define and advance concrete projects to reduce pollution exposures and related illnesses

The HPAP program is a collaborative process of research, prioritization and planning of pollution management actions. The HPAP process is driven by national agencies, facilitated and supported by GAHP. It is implemented at a Ministry's request, and typically at no cost to the host government.

The Action Plan does not have a tightly defined format and can be modified to meet the needs of the host government. It is a living document, subject to review and revision when circumstances change.

1.1.2 HPAP Process in Azerbaijan

The HPAP process in Azerbaijan was coordinated by GAHP and Pure Earth. The HPAP process started in August 2019, with an invitation to various ministries and organizations in Azerbaijan inviting them to participate in the HPAP working group. All invited parties responded positively to the letter and appointed their own representatives for the working group. Due to COVID19 restrictions, the working group was unable to meet as a group in 2020. Instead, bilateral meetings were held with individual members of the working group.

Drafting of an initial summary document began in early 2020, with initial input from the members of the working group. The draft was shared with individual members of the working group for comment. After considering these revisions and comments, the summary document was prepared.

The following ministries and organizations participated in the working group:

A working group on HPAP was established in August-September 2020. The following ministries and organizations are represented in the working group:

:

- The Ministry of Agriculture
- The Ministry of Ecology and Natural Resources
- The Ministry of Emergency Situations
- The Ministry of Health
- The Ministry of Energetics
- The Ministry of Economy
- The Ministry of Transport
- State Oil Company of Azerbaijan Republic (SOCAR)
- National Academy of Sciences
- World Health Organization Baku office
- World Bank Azerbaijan
- UNDP Azerbaijan
- Solidarity Among Women NGO
- Eco-life NGO
- Khazar University
- Baku State University
- Lenkoran State University
- Sumgait State University

The working group has 19 members from 18 organizations, and in addition to government representatives, academia and NGOs are represented in this group. Special attention was paid to gender equality in the working group. Currently, 8 out of 19 members are women.

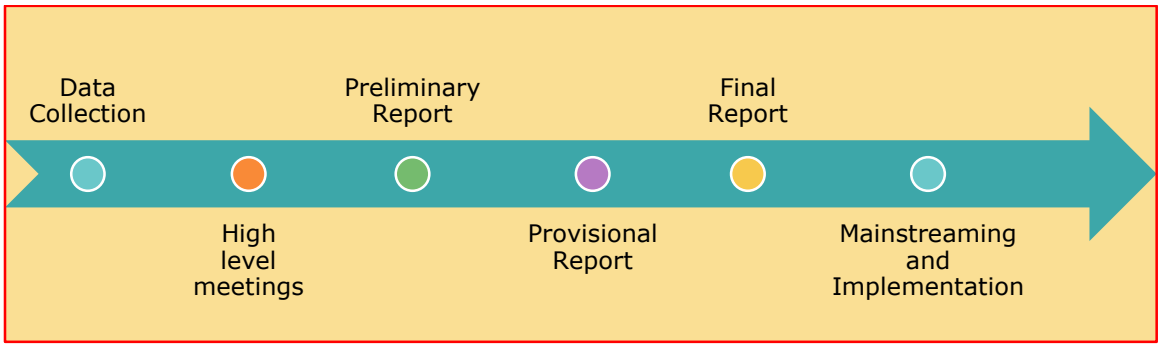
After the preparation of the summary document, high level meetings with the representatives of the above-mentioned organizations continued, followed by the development of the main HPAP document. In bilateral meetings, members of the Working Group outlined each stage to be considered in the HPAP process and the role of their organization in this phase. During the bilateral meetings, the main problems of pollution, the work to be done to address problems, and the features to be considered during this work were widely discussed.

During the data collection phase, all documents related to pollution in Azerbaijan were carefully analyzed. These documents consisted of the following:

- TSIP database assessments
- Documents of organizations
- Reports of implemented cleanup projects
- Existing scientific literature about health and pollution in Azerbaijan and region
- Reports of international organizations on Azerbaijan
- National reports of Azerbaijan
- Community information
- Results of previously conducted field surveys
- Monitoring data conducted by various organizations

The tentative anticipated HPAP process (Figure 1) will be continued with the preparation of a Final Report, followed by mainstreaming and implementation. During mainstreaming, part GAHP members will closely work with potential partners in order toto identify possible interventions and projects.

Figure 2: HPAP process in Azerbaijan



1.2 AZERBAIJAN TSIP PROJECT

One of the most robust sources of information about the location, contamination levels, and potential public health risks of chemical contamination hotspots in Azerbaijan is the database of the global Toxic Sites Identification Program (TSIP). TSIP is designed and managed by the non-profit organization Pure Earth and implemented in Azerbaijan in partnership with UNIDO. Information from TSIP has been an important tool in identifying and prioritizing priority pollution problems in Azerbaijan.

As part of the TSIP, more than 3,400 sites have been screened in 47 countries since 2009. In Azerbaijan, the goal of the TSIP program has been to provide reliable information and data that identifies locations of toxic sites and the level of toxic severity. TSIP is significant because it provides developing countries a database of ranked toxic sites identified as hazardous risk to human health. For example, Azerbaijan is one of the most polluted post-Soviet nations, but has limited resources to address and manage its polluted sites. The Azerbaijani TSIP database is the first reliable data source that identifies hazardous pollutants in the country. It is also the first data source in Azerbaijan that identifies which Soviet legacy toxic sites are affecting local communities. See Annex 1 and 2 for two lists derived from the TSIP program in Azerbaijan, Pollution sites, key pollutants, and pollution levels in urban regions and Legacy pesticide sites with high Pollution Index (PI) values in Azerbaijan identified through 2018.

The TSIP data established a reliable dataset that can identify human populations who are most vulnerable to pollution related health risks. Although there are some studies linking health effects to toxic sites in Azerbaijan, more research is needed to identify the linkages between health effects, from toxic pollutants and place-specific locations, such as air pollution and transboundary pollution in the Caucasus and within the Eurasian nations. The results of the TSIP collected data also confirmed that cleanup projects should be priority for the government during the next decades, since the country is severely polluted with broad range of toxic chemicals.

The TSIP uses a rapid assessment protocol known as the Initial Site Screening. The Initial Site Screening is completed on site over a period of 1-2 days by professionally trained investigators and is designed to collect information related to human health risk. Investigators collect various types of qualitative and quantitative data, including an analysis of soil and/or water samples collected from points of likely public exposure. Data from completed Initial Site Screenings are entered into an online password-protected database that is shared with relevant government agencies. The Initial Site Screening is not a comprehensive assessment tool designed to fully characterize health risks but is intended to be a tool used to prioritize sites for further analysis, regulatory inspections, and risk mitigation measures.

The main sources of soil pollution and contaminants identified as a result of the TSIP project are shown in the maps below.

Figure 2: Geographical distribution of pollution sources in Azerbaijan

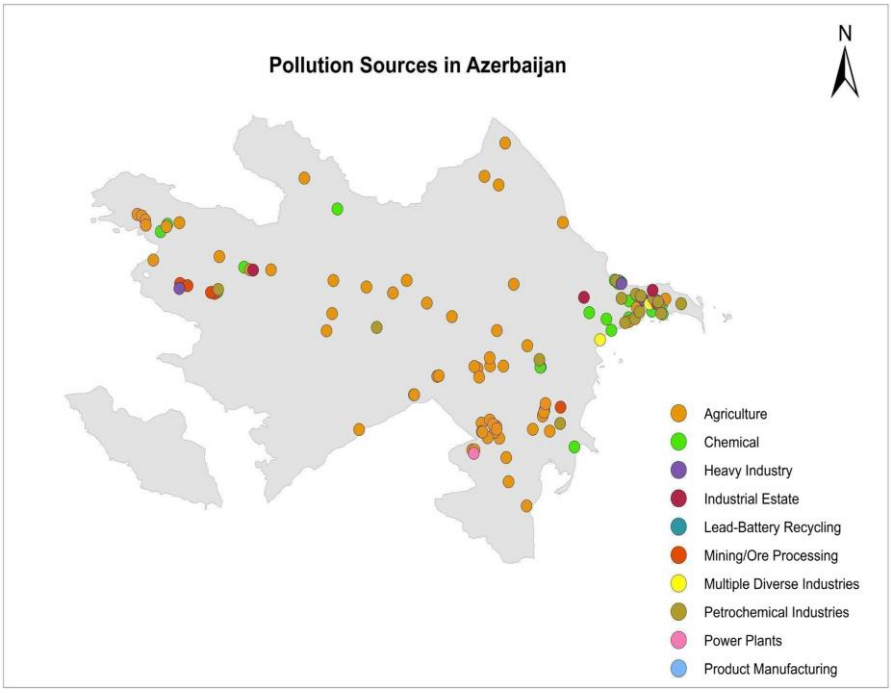


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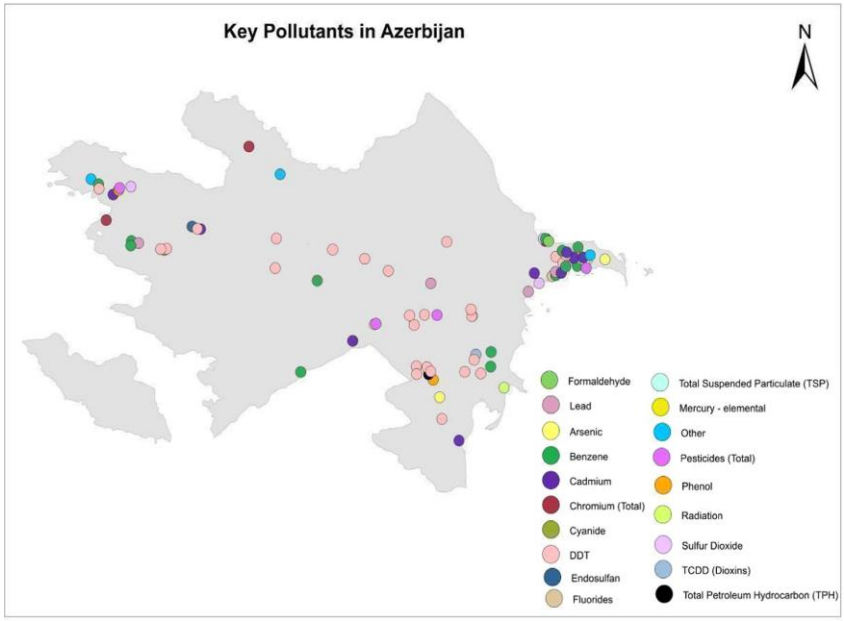
Figure 3: Geographical distribution of key pollutants in Azerbaijan



The inventory process conducted by Pure Earth, formerly the Blacksmith Institute, covers the entire country, except for Nakhchivan and the occupied Karabakh regions. During the inventory, the following priority regions were identified in the territory of Azerbaijan:

Absheron Peninsula

The Absheron Peninsula is the main industrial center of Azerbaijan and the location of two major cities. Oil pollution of soils here creates varying levels of pollution. Despite recent improvements in Sumgait, pollution remains. There is pollution with organic matter and heavy metals. Although the clean-up work carried out by various organizations in recent years has yielded good results, much remains to be done. In 2015-2016 Pure Earth together with Azerikimya has carried out clean-up work in Sumgait.

Ganja-Gazakh

Ganja-Gazakh region is one of the main industrial areas of the country. Production of ferrous and non-ferrous metallurgical raw materials and their primary processing enterprises are located in Ganja and Dashkasan. Typical industries are the production of sulfuric acid and potassium fertilizer in the plants operating in Ganja. The harmful effects of alunite cuttings created as a result of the Ganja Aluminum Plant and accumulated around the city are increasing. Recently, as a result of the activities of the Gadabay gold mines, pollution is increasing. The presence of toxic substances in production, such as arsenic and cyanide, has increased pollution. For this reason, serious evaluation of the work of Gadabay gold mines should be one of the main priorities. The same can be said about the Chovdar gold deposits in the Dashkesan region.

All rural areas

The main sources of pollution in all rural areas are residual pesticides. At present, 72 such pesticide stations have been identified in the country. However, experience shows that their number is much higher. Azerbaijan has also been the largest producer of pesticides. During historic periods of high production, all types of pesticides were widely used in Azerbaijan. Extensive information on pesticides is provided in this document. Studies show that the situation in most of these areas is very critical. Pesticide piles are not protected, and locals can go to pesticide disposal sites at any time. In many cases, pesticide stations are very close to children's playgrounds. Horadiz, Salyan, Jalilabad, Sarijallar and other areas are among the priority areas in need of cleaning.

1.3 PRIORITY POLLUTION PROBLEMS IN AZERBAIJAN

1.3.1 Main pollution sources and pollutants

The development of oil production and petrochemical industry in Azerbaijan, the concentration of the population in large cities, the existence of various legacy pollution sources of the Soviet era make this country quite problematic in terms of environmental pollution. The biggest problems exist is in the country's largest cities and densely populated areas. These areas mainly include Baku and Sumgait and other settlements located on the Absheron Peninsula.

The growing number of cars and trucks, developments in the construction sector, and past pollution in the petrochemical industry and agriculture are among the main sources of pollution in the country. Urban areas suffer more from air pollution and soil pollution. Pollution of drinking water is typical for both urban and rural areas.

In rural areas agriculture is the most important source of pollution. Pesticides and other types of chemicals are extensively being used in planting. The country was one of the preferred places of pesticide use until the early 1980s. All types of POPs pesticides that were later banned by the Stockholm Convention were used in Azerbaijan without any exception.

In Azerbaijan, the most notable types of pollution that affect health are:

- Air Pollution
- Soil Pollution
- Water Pollution

1.3.2 Air Pollution

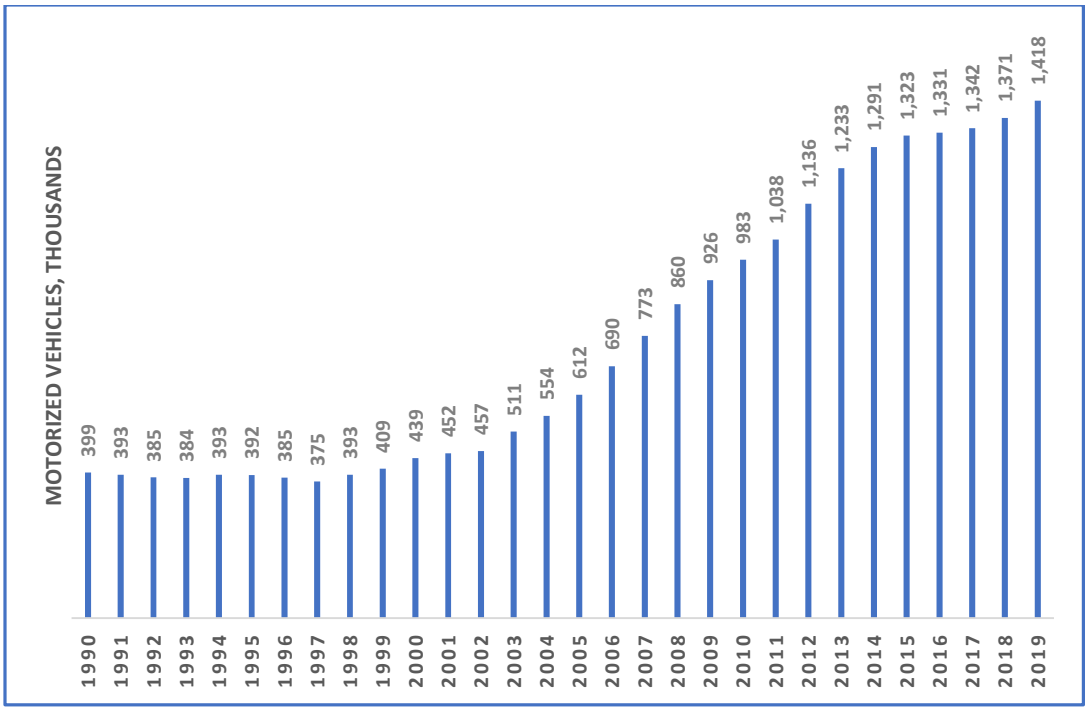
Air pollution is one of the main environmental problems in Azerbaijan. In accordance with the World Health Organization's guidelines, the air quality in Azerbaijan is considered moderately unsafe. The most recent data indicates the country's annual mean concentration of PM2.5 is 20 μg/m^3 which exceeds the recommended maximum of 10 μg/m^3. Although air pollution is relevant for both rural and urban areas, the main pollution is in urban and densely populated areas. The main sources of air pollution in urban areas are cars, industrial enterprises, and household waste. Both indoor and outdoor air pollution in urban areas is a major risk factor affecting human health. Pollutants entering the atmosphere from currently known sources easily enter the human body and cause diseases. From 1990 to 2017 the share of deaths from air pollution averaged 10%.

1.3.2.1 Ambient Air Pollution

Air pollution is more prevalent in large cities and settlements with oil production and industrial enterprises.

In urban areas, motorized vehicles and industrial facilities, as well as construction and household waste are the main sources of ambient air pollution. The number of pollutants emitted into the atmosphere from motor vehicles has been growing rapidly over the last 30 years and now account for almost 80% of air pollution in Azerbaijan. This trend is due to the rapid increase in the number of used cars imported into the country and the long-term use of new cars.. Government statistics show a dramatic increase in the number of vehicles in Azerbaijan (Figure 12). The studies showed that 70-75% of the city motor-vehicle stock is composed of old cars, namely those that have been used for 15 years or more. The state technical survey implemented by the Ministry of Transport in 2017 has revealed the fact that only 39.2% of buses as well as 25.4% of lorries were in environmentally satisfactory condition.

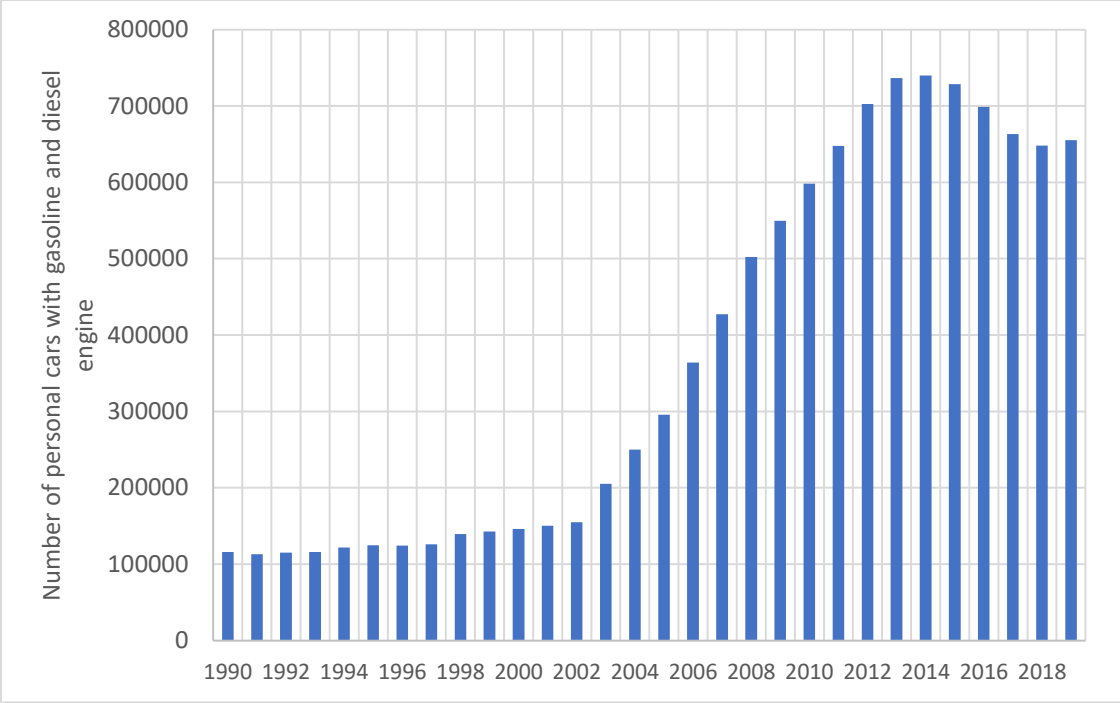
Figure 4: Number of motorized vehicles in Azerbaijan (1990-2019)



Currently, more than 50 percent of cars in the country are concentrated in Baku, surrounding settlements and the nearby city of Sumgait as high unemployment rates drive people to the urban centers. At present, the main urban transport issues are concentrated in Baku. The density of the city streets is 0,9 km/km^2 which is much lower than the average European city. Such a high density often leads to traffic jams and, as a result, more air pollution. Figure 13 below shows the increasing trend in the number of gasoline and diesel cars in Baku and nearby settlements in 1990-2019.

Available data indicates that Baku and Sumgait have consistently high levels of air pollution; the average annual mass of toxic substances emitted into the atmosphere of Baku by cars has reached 600,000 tons

Figure 5: Number of cars in Baku with internal combustion engines



Lead containing smog is poorly distributed in the lower atmosphere on windless days. In such weather, strong air masses prevail in the central streets of the city, and smog is not dispersed. Most of the smog accumulates between tall buildings and in the lowest parts of the city.

In 2015, the number of stationary sources of air pollutants was 9839. The majority of air pollution from stationary sources is from construction 26.6%, petrochemical industry 16.9%, energy 16.9%, gas industry 15.7%, oil industry 7.3%, and non-ferrous metallurgy 4.7%. More than 80% of the amount of emissions in the country falls on these 5 cities: Baku (66.1%), Sumgait (4.5%), Ganja (3%), Mingachevir (2.5%), Shirvan (5%) falls on hazardous waste.

The main contributors to urban air pollution are old equipment, non-implementation of environmental protection measures, and lack of funding for environmental protection.

The second main source of air pollution is industry. The main industrial emissions are from oil refining, chemical and energy. These enterprises are mainly located in Baku and Sumgait. In many cases, the proximity of homes to emissions sources exacerbates the negative effects of poor air quality. Pollutants that evaporate from oil-contaminated areas on hot days are the main sources of air pollution around the places where oil polluted lands exist. Such sources are found around Baku, Sabunchu, Balakhani, Ramana, Sumgait, and Bibiheybat.

Another source of pollution is the extensive building construction works. Construction work is often carried out on the site of old buildings that have been demolished. Therefore, construction work is always initially accompanied by demolition work, which is a more serious threat. In most cases, construction companies do not pay attention to clean air and do not follow construction standards.

One of the main sources of deteriorating air quality in large cities is solid waste. Solid waste management is a major problem in medium and small settlements, and in most cases waste is piled up and incinerated. There is a solid waste incineration plant in Baku. However, there are still serious problems with waste collection and processing in Baku and Sumgait.

Currently, the main pollutants that worsen air quality in the country, mainly in large cities, are:

- Particulate matter (PM2.5 and PM10)
- Nitrogen oxides (NOx)
- Carbon monoxide (CO)
- Sulfur dioxide (SO_2)
- Methane
- Volatile Organic Compounds (VOCs)
- Polycyclic Armoric Hydrocarbons (PAHs)

1.3.2.2 Indoor Air Pollution

The problem of indoor air quality is more common in schools, offices and apartments and homes. Indoor air pollution comes from a variety of sources, mostly from furniture, carpets, floor and wall colors, cooking and gas burning. In addition, the use of various perfumes and fragrances, detergents and insecticides are sources of indoor air pollution.

In addition to the above, the main sources of air pollution in offices are printing and copying equipment. Glues, paints, varnishes, wood-plastic composites (wood products combined with plastic and chemicals) are the products that can release chemicals into the air in a closed space.
The main sources of indoor air pollution in rural areas are the burning of firewood and gas to heat homes, keeping animals and birds in the habitat, and other sources listed above. Although wood burning has declined in recent decades, wood stoves have been replaced by artisanal gas stoves in rural areas. On the other hand, in many rural areas, firewood is still the main source of heating.
The most common indoor air pollutants in Azerbaijan are as follows:

- Volatile organic Compounds (VOCs)

    - Toluene
    - Benzene
    - Formaldehyde
    - Ethylene glycol
    - Methylene chloride
    - Tetrachloroethylene
    - Xylene
    - 1,3-butadiene.
- Carbon Monoxide (CO)
- Nitrogen Oxides (NOx)
- Particulate matters (PM2.5 and PM 10)
- Pollens and allergens

No regular observations are conducted on indoor air quality. There are no efforts in Azerbaijan for controlling indoor air quality in schools and kindergartens. A rapid survey conducted in several schools of Baku and Sumgait showed that teachers and school children did not have sufficient information regarding indoor air pollutants, their sources, and management. The schools do not have enough capacity to detect and control levels of indoor air pollutants.

1.3.3 Soil Pollution

Azerbaijan was one of the first oil-producing countries in the world, as discussed in section X, poor extraction practices has led to a legacy of soil pollution. In most oil-contaminated areas, oil contamination covers several meters of soil. Absheron Peninsula in particular (including the coastal areas) suffers from oil, mercury, and other types of chemical contamination. The problem of abandoned industrial facilities, with their legacy waste, is found in many other places in Azerbaijan, but not on the same scale. The remedial activities have been on a pilot scale, so far, and have not fundamentally changed the situation.

Arbitrary exploitation of the Zod and Vejnali gold deposits in the occupied Karabakh region in 1992-2020 caused heavy metal pollution in the Kalbajar and Zangilan regions. Such exploitation of mining has led to pollution of both land and groundwater and surface water.

1.3.3.1 Soil Pollution with POP Pesticides

Azerbaijan was one of the main POP pesticide producing and consuming countries in the former Soviet Union. POP pesticides include 12 organic compounds: aldrin, chlordane, DDT, dieldrin, dioxins, endrin, furans, heptachlor, hexachlorobenzene (HCB), mirex, polychlorinated biphenyls (PCBs), and toxaphene. In Azerbaijan, these chemicals have been widely used as pesticides and industrial chemicals and still pose risks to human health and ecosystems.

DDT was used in agriculture as the cheapest and most effective method of controlling plant diseases. Despite the ban of DDT, the Soviet government decided to continue use of DDT in Azerbaijan until 1988. It is worth noting that DDT was banned in all over the Soviet Union, except Azerbaijan. In terms of pesticide loads per hectare, Azerbaijan was among leaders in the former USSR.

Household DDT use was very popular in Azerbaijan between 1950-1985. In rural places of Azerbaijan DDT was accessible to everybody. Because collective farms used it, small DDT piles can be seen in many places, around agricultural fields. DDT was used for household needs to control household pests. Local people liked to use DDT because it was very effective in preventing pests. Unfortunately, health effects of DDT in Azerbaijan are not well studied. Most recent studies show that there are high concentrations of DDT in rural areas, also in Sumgait and the Caspian Sea. In rural areas of Azerbaijan DDT concentrations may reach high rates that are several times higher than maximum allowable concentrations.

In general, there were 19 big inter-district and district chemical supply facilities in Azerbaijan (Figure 14). Despite the recent efforts to clean DDT sites, there are still large amounts of pesticides in rural areas. All the chemicals are open to the environment and may easily migrate to residential areas via air, soil, and foods. Many sites are very close to water bodies and winds take powder and dust over the houses and water sources very easily. For example, at the Horadiz site, one may see animals grazing around the site and children playing. Regular winds take DDT and other dangerous pesticides over the houses that are very close to the area. Also, DDT may migrate into distant places through the reservoir and river that are rather close.

Effects of POPs on the health of the population and the environment are a global issue of concern. These chemicals may accumulate in the human body for a long time, changing metabolic processes in the body and causing direct and indirect effects on health. As these chemicals move up the food chain, they concentrate to levels that are harmful to humans, wildlife, and fish.

The main POPs producing industry is in the area of Sumgait city. Sumgait city was founded in the 1950s as a typical Soviet industrial centre. There was a rapid growth of chemical and petrochemical sectors of industry in Sumgait from 1970 to 1985. The Sumgait Surface-Active Substances Plant (SAS) was one of the first chemical enterprises of Azerbaijan, beginning operations in 1956. In 1958 The Sumgait Surfactants Production Plant started to manufacture DDT and produced 480,549 tons of DDT until 1980 (Aliyeva et al, 2013). 1000 m^2 land was used for 22 years for different production operations, associated with production of technical DDT dust. Additionally, 24,000 tons of DDTs were imported from the Russian Federation. More than 500,000 tons of DDT were used between 1958-1988.

Results of inventory works suggest that about 40-50 tons of DDT are still scattered within the production zone. Analytical measurements confirm that content of DDT in the DDT mixed soils sometimes reaches up to 90–92% . The studies conducted by Pure Earth (2016) confirm that there is still a high amount of the DDT scattered within the huge areas in the Absheron Peninsula. While the concentrations of DDT in some cases are below the recommended levels, it is still one of the main factors that threaten the health of local populations and wildlife. Many studies have also confirmed high concentrations of organochlorine pesticides (OCPs) and polychlorinated biphenyls (PCBs) in different areas of Azerbaijan. The Absheron Peninsula including Baku and Sumgait is considered the main location of contamination and serves as a source of persistent organic pollutants (POPs) to the local environment as well as to the Caspian Sea.

At the of SAS property, 1000 m^2 of area was used for 22 years for different production operations, associated with production of technical DDT dust. A large amount of DDT was emitted into the atmosphere through ventilation systems. Many years of production in the area and mishaps in processing enabled DDT to penetrate the ground and into groundwater. DDT and other OSPs were spilled into the soil and migrated into areas rather far from Sumgait. It is highly probable that both the volume of DDT and the areas utilized for production within the plant are considerably larger than these initial estimates indicate.

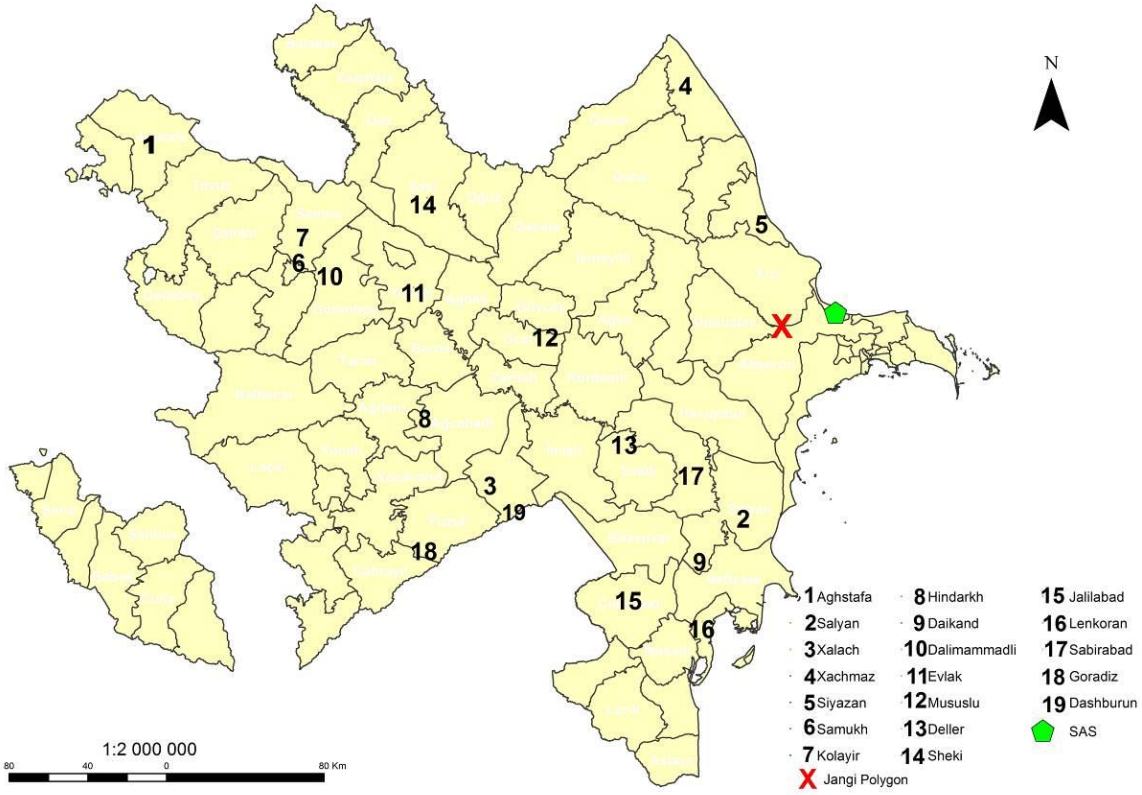
Estimations of Pure Earth confirm that 40-50 tons of DDT have been scattered in the areas close to Sumgait city. Statistics of occupational diseases show that cancer rates among the workers and residents that live close to the factory are very high. Recently, large amounts of DDT were found in the Caspian Sea that had concentrated in the bodies of Caspian seals, frogs, and sturgeons as well. POPs pesticides have been identified as a priority problem for the Caspian region.

Inventories of DDT sites in Azerbaijan have been prepared. As noted, the inventories showed more than 40 DDT sites and 30 sites in Azerbaijan with other pesticides included on the list of Stockholm

Convention. These sites are located mainly in rural areas of Azerbaijan and pose a threat to the natural environment and public health. Unfortunately, there are former pesticide sites that are unidentified and require further investigation and studies.

High levels of DDT were measured in Agjabedi near the former pesticide distribution site. Also, high concentrations of DDE were observed at other urban sites including Salyan, Ganja and Mingechevir. This case provides evidence that old pesticide storage facilities continue to influence levels in ambient air. The mean concentrations of DDT and DDE in air were 0.03 ng/m^3 and 0.29 ng/m^3 respectively. High levels of DDT have been measured in coastal sediments of the Caspian Sea, including DDT (0.160– 7.40 ng g−1), DDE (0.110–1.30 ng g−1) and DDD (0.210–3.40 ng g−1) (de Mora et al. 2004), with high levels of DDT components reported in Caspian seals and sturgeon.

Figure 6: Distribution of Major Pesticide sites in Azerbaijan



In 1980 SAS started to manufacture all types of hexachloride-cyclo-hexanes, including gamma-Hexachlorocyclohexane (gamma-HCH), known also as Lindane. Lindane is a known carcinogen, and has been widely used in agriculture of Azerbaijan. Between 1951-1978, about 30.5 thousand tons of technical grade Lindane were produced, while in the period from 1986 to 1988, 181 tons of lindane were produced. Lindane production stopped in 1988. In 2010 Lindane was included to the

list of substances defined by the Stockholm Convention. High concentrations of beta-HCH (>10 ng/g dry weight) were measured in soil from Khachmaz, Lankaran, and Ganja. High concentrations of gamma-HCH in Sumgait have been reported as well, that may be related to technical Lindane production in the area. Unfortunately, there is no information regarding the HCH pollution in Baku.

As noted, the National Implementation Plan 2007-2020 (NIP) considers inventory, collection and destruction of obsolete toxic pesticides and agrochemicals. Through the NIP, there was considerable improvement of the Jangi pesticide burial polygon. The Jangi pesticide polygon was constructed in 1989 and has been in use since 1991. The main purpose of construction was to reduce DDT dispersion to the environment and reduce health effects of DDT contamination. This site holds pesticides brought from the different inter-district chemical supply facilities of Azerbaijan. This site is located at 53 km from Baku, in Gobustan district, nearby Jangi village. The site is very close to the main road of Baku-Shamakhi. The distance between the site and Jangi village is nearly 2.5 km. The territory of the site is nearly 12 hectares. There are 298 concrete containers that are fully filled by DDT, HCH, and calcium cyanamide and calcium arsenide (MIA, 2013).

By 1996, 8000 tons of pesticides (mainly DDT, HCH and many other POPs) were transferred to the polygon and buried. However, during first years of operation the polygon was not managed well. In the past, people got access to the storage bunkers, some bunkers were opened and most the pesticides were released to the environment. Between 1996-2005 local people illegally picked up and used more than 4000 tons of pesticides from the polygon (MIA, 2013). Official data says that five bunkers of the storage site contain more than 100 tons of DDT, while the other 177 bunkers contain large amounts of mixtures of DDT and other pesticides. During the years 2008-2010, more than 3084 tons of toxic pesticide were transferred to the burial polygon. In 2008, 2048 tons of toxic pesticides were transferred from the Yevlakh, Zardab, Ujar, and Agjabedi sites to the polygon. Nearly 1200 of barrels of liquid toxaphene were repacked and transported to polygon from Ganja site. These pollutants will be kept there until they are fully utilized. Also, 113 m^3 of DDT polluted soil were transported to Ganja from the Zardab site. There are still some concerns with Jangi site. A small creek crosses the area very close to the site. This creek is used to provide water for domestic animals. Nearby lands are used as winter pastures and open to domestic animals. The site is at a high elevation and rain may easily wash contaminants, releasing them into the small stream that is used by domestic animals. A strong smell of DDT is detected in nearby areas. There are large cracks on six concrete containers. A very strong smell of pesticides is detectable through these cracks.

Many DDT sites in Azerbaijan are still not formally identified. These types of sites are in small villages and remote areas, where mainly there were no buildings and in most cases pesticides were

stored under the open sky. In most cases, these pesticides were simply buried and can be found only after excavating (Figure 15). Contaminants at sites like these may have easy pathways to the human body. Many of these areas are used as pastures and agricultural fields.

Figure 7: "Underground" DDT site in the rural area, Aribatan, Jalilabad

The Former Ujar (Mususlu) Pesticide Storage is in the west part of Azerbaijan, 302 km from the capital city of Baku. It was known as the distribution point of pesticides and fertilizers for the Ujar (Mususlu) District of Azerbaijan. The size of the storage site is nearly 4 hectares. The area is not isolated from residential and agricultural lands. It is very easy to enter the area and pick up pesticides. People use this area as a cattle pasture. Children use this area as a playground. The area is a permanent source of pollution for the residents of Mususlu (Figure 16). Mususlu is the closest residential area, with 3200 residents. The site stopped operations in 1988. Despite a partial cleanup 3 years ago, it is very easy to see residual pesticides, among which are DDT and Aldrin. Some of the pesticides were transported to the burial site, but most of them were simply buried at the Mususlu site. The high hydraulic conductivity of grey soils potentially allows contaminants to be transported into groundwater, where contamination could migrate over a large area. The area is known for its DDT odour that is easily detectable. Because the area is open, winds may readily transport residual pesticides into the villages and surrounding pastures. It is an open and abandoned area where children play and cattle may enter easily. There is no evidence that this site directly causes cancer, but official statistics demonstrate that in this region stomach cancer rates have doubled over the past 20 years. Because the area is located among agricultural lands, the risk of uptake of pesticides to the human body is very high. Going forward, to complete cleaning or isolating the area is not an easy task. Soils must be excavated and pesticides treated using special technology. After that, remediation may be continued via bioremediation. For this purpose, we should first isolate area with fencing and plant special plants that may absorb pesticides.

Figure 8: The Former Ujar (Mususlu) pesticide distribution point

The country was also one of the main producers and users of the persistent organic pollutants (POPs) (such as DDT, Gamma HCH or Lindane, Aldrin, Dieldrin, etc.) as well. Estimations and inventories confirm during the Soviet period, approximately twenty-five thousand tons of DDT pesticide were used in Azerbaijan yearly. POPs pollution can be considered one of the main problems of Azerbaijan that requires a rapid solution. Despite countless efforts, legacy POPs sites in Azerbaijan still pose a danger to the health of people.

The Absheron Peninsula is the most polluted region of Azerbaijan. The area is polluted with various types of petroleum products, POPs, including DDT, and hexachlorobenzene (HCB). Crude oil pollution that includes pollution with benzene and Volatile Organic Compounds (VOCs) is caused by old-fashioned technologies that neglect environmental protection.

The main sources of soil pollution and contaminants identified as a result of the TSIP project are shown in the maps below (Figures 17 and 18).

Figure 9: Geographical distribution of pollution sources in Azerbaijan

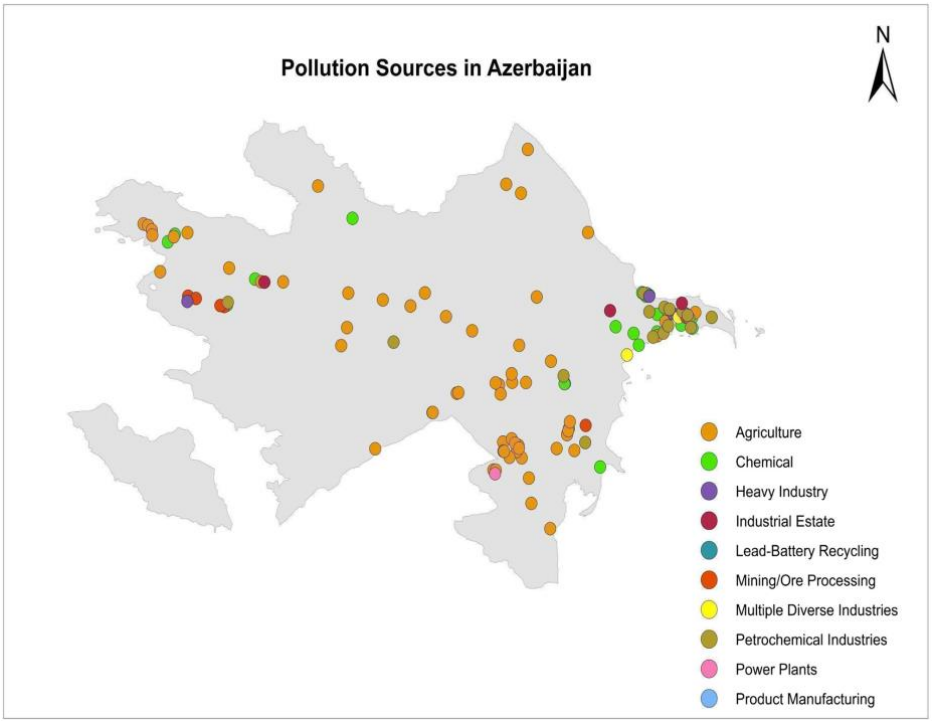
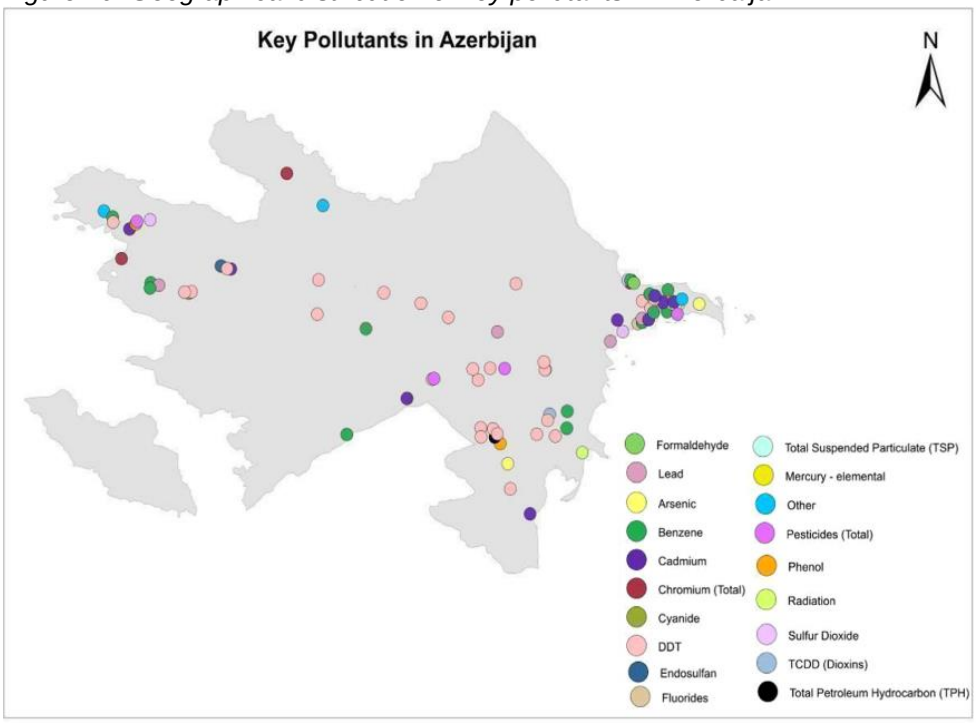


Figure 10: Geographical distribution of key pollutants in Azerbaijan



1.3.4 Mining Industry

Currently, the main sources of pollution in the mining industry are located in Gadabay, Dashkasan, Kalbajar and Zangilan districts. As a result of the exploitation of the Vejnali gold deposits in the Zod

and Zangilan districts of the Kalbajar region, the concentration of all heavy metals in the surrounding soil and water exceeded the accepted norms. It should be noted. One of the reasons for the high concentrations of heavy metals in these areas is that these areas have been under Armenian occupation for a long time (about 30 years). As a result of exploration of Zod gold mines, water quality in the Tartar river became poor and not usable for any purposes without treatment. Currently, the damage caused to the environment during illegal exploitation in the area is being calculated.

Hundreds of millions of cubic meters of toxic industrial waste continue to have a negative impact on the environment in the Dashkesan region, where large-scale exploitation works have been carried out, and in the area where the ore refinery is located, as well as in the Zeylik alunite field and Ganja clay-soil plant. As a result of spontaneous exploitation of limestone deposits in Absheron and Gobustan, sand deposits on the Caspian coast, sand and gravel deposits in river valleys, the quality of atmospheric air has decreased significantly. In these regions, in dry climates and strong winds, dusty aerosols spread throughout the Absheron Peninsula.

1.3.5 Water Pollution

Azerbaijan is not well supplied its own water resources as more than 70 percent of the country's water resources come from outside of the country. With 937 cubic meters for each person every year of internal renewable water resources, Azerbaijan is classified to near stress level when using international comparators (e.g. World Bank). This low availability of water is roughly explained by the difference between the average precipitation of 447 mm/year and average evaporation of 1200 mm/year. Water scarcity has been a major problem in the country and has worsened in recent decades.

Clean drinking water is a challenge for most parts of Azerbaijan. The amount of water per unit area and per capita in Azerbaijan is less than its neighboring Georgia by 7.7 and 8.3 times, and in Armenia by 2.2 and 1.7 times, respectively.

The main water sources in Azerbaijan are the transboundary Kura and Araz rivers, which are affected by permanent pollution in the countries of neighboring Turkey, Iran, Georgia and Armenia. Kura and Araz are polluted by discharges of poorly treated or untreated wastewater from the 11 million people living in the catchment area. These rivers, which are the main sources of water supply for the country, are highly polluted with several contaminants, in most cases exceeding threshold values by 4-5 times. For example, concentrations of phenols and nutrients in the Araz river were 11.8 -151.3 mg/l, which is more than two times higher than the threshold levels . These

waters cannot be used without proper treatment. Runoff from the usage of fertilizers and pesticides, as well as factory waste dumped into rivers, has heavily polluted the water in the Kura river.

Most of the small streams of the Kura basin are highly polluted by the mining industry. Over the past 50 years, metal (Cu, Fe, Al) concentrations in some streams have been increasing due to the growth of the mining operations in Azerbaijan and Armenia. Due to heavy pollution in upstream regions of the Kura basin, waterborne diseases in the downstream regions of the Kura basin have ravaged the health of thousands of rural people and resulted in huge economic losses.

Groundwater pollution is common for the Absheron region. Groundwater pollution from oil spillage and leakage from pipeline and storage tanks results in petroleum, heavy metals and possibly radiation contamination spoiling the water in Azerbaijan.

The Shirvan and Karabakh canals are not only major sources of irrigation water, but also the main sources of drinking water in most of places of the Aran Economic District they cross. Nearly 18 districts depend on water withdrawn from these canals.

The Kura and Araz are claimed to be among the most turbid in the world, with high turbidity increasing the cost of treatment for drinking water. Sediment flows of these rivers are conspicuous, so that the water quality of the rivers requires large facilities to reduce the sediment load near the withdrawal site and conventional treatment to meet drinking water standards. The Kura withdrawal sites were built just downstream of the junction of the Kura and the Araz rivers.

About 80% of the houses and school buildings in rural areas are not connected to centralized sewage networks. Wastewater and sewerage systems are only provided in half of the secondary towns. Poor wastewater management has created serious hardships in many of the towns, with sewage discharging through ditches into town irrigation systems or nearby streams. The problems are the similar in mountain and lowland areas.

There are seven lakes located on the Absheron peninsula that are highly contaminated with industrial and municipal wastewater. Samples were collected that identified seven lakes (Binagadi, Boyukshor, Masazir, Khojasan, Bulbula, Zabrat, Lokbatan, Girmizi, and Gu), as serious health hazards. This is due to the high rates of cancer (e.g., lung, stomach), chronic asthma, and skin diseases in people that live and work nearby. The polluted lakes are now considered by the Azerbaijani government as top priority locations for future remediation project agendas.

1.3.5.1 Pollution of Absheron Lakes

There are over 200 lakes in the peninsula with an overall area of 3,325 hectares. Most of these lakes have marine and groundwater origins. For many years these lakes were the last destinations for industrial and household wastewater. According to World Bank estimates, 41.5 million cubic meters of wastewater are discharged into these lakes annually. Most of the lakes are primarily located in the areas of oil production. Long-term wastewater discharges from oil fields have heavily polluted these lakes. In most cases pollutants migrated into the lakes through groundwater.

Pure Earth made assessments on nearly 15 lakes, within its Toxic Site Identification Program. Targeted and composite samples were taken from these lakes and sent for analysis to various local laboratories. The studies done by Pure Earth confirm high-level pollution with oil products, VOCs, PAHs, heavy metals. Boyukshor, Khojohasan, Binigadi, Girmizigoller, Lokbatan, Zabrat, Bulbula, Zykh and Gu are considered the more contaminated lakes. VOCs, crude oil products, benzene, and toluene are the most common chemicals in these lakes. Arsenic pollution is found in the untreated part of lake Boyukshor. Lakes of Bulbula, Girmizi, Zabrat and Lokbatan are heavily polluted with municipal wastewater as well. Pollution of these lakes has many negative environmental impacts on the surrounding areas such as soil degradation, salinization, and emission of harmful substances into the atmosphere as a result of evaporation processes, and inundated lands due to the rising level of lakes. The pollution of the lakes not only poses a threat to the health of those living in its neighbourhoods, but also creates conditions for the emergence of different diseases.

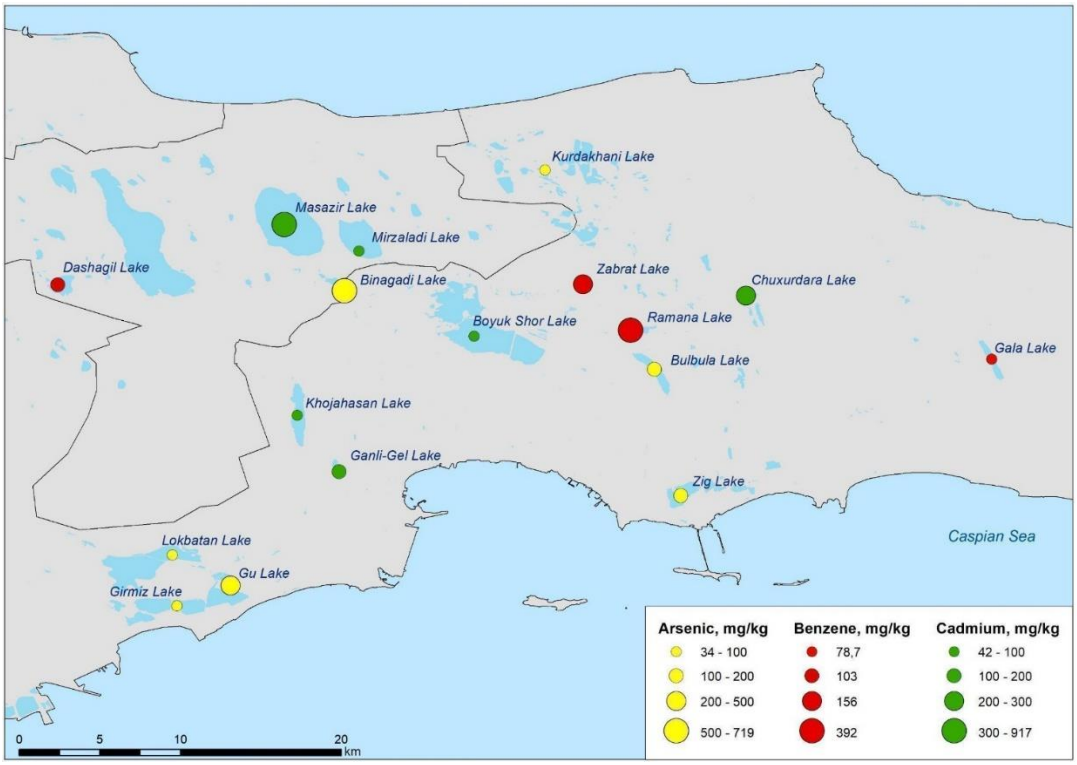
Sabunchu and Balakhani are located 3-4 km from Boyukshor Lake in the central part of the Absheron peninsula. These were historically oil producing areas, and oil production continues today. The town is surrounded by oil fields, where pollution with oil products is rather high (Figure 19; Figure 20) and polluted areas are easily seen by the naked eye. Oil has been produced here since the 19th century. During the first 50 years of oil production, methods were very basic and primitive; it was enough to excavate wells 10-15 meters deep to extract oil. The Soviet period did not see much advancements in methods; in most cases 25-30% of the extracted oil spilled on the ground. The extracted oil, which was moved with high pressure, went directly to small open ponds, and was kept there. During World War II, oil production methods were especially primitive.

Figure 11: Sampling process in the polluted lake

This area is more than 200 hectares, with oil ponds located between residential houses. The area is publicly accessible. Some people gather free oil from the surface, to use in houses. However, it is known that crude oil is a mixture of many kinds of organic compounds, many of which are highly toxic and carcinogenic. The acrid smell of oil products is readily detected, and is known as the smell of VOCs and PAHs. Also in some areas, a faint smell resembles motor oil. There are old transformers that were being used to supply oil wells with electricity. Local oil workers confirm that leakage from transformers was common. The main pollutants here are VOCs and oil products. In addition to cadmium, benzene and arsenic, high concentrations of lead have been identified in all lakes. Lead pollution was several times higher than normal for most lakes.

High temperatures cause oil evaporation, which can easily result in nitrate-based acid rains. The area is lifeless and there is no flora or fauna in the area. During the summertime, life conditions become very hard (Figure 11; Figure 12).

Figure 12: Concentrations of key pollutants in sediments of lakes



1.3.6 Toxic substances in food

Chemicals are used in every step of food production, including harvesting, processing and packaging and it is a fair assumption that the food consumed by the population contains many chemicals. Several academic studies confirm that In Azerbaijan the potential for PAH and lead exposure in food is very high. High concentrations of PAH were found in fish and other types of water species.

The main source of this risk is related to soil contamination with oil and chemical wastes. High carcinogenesis is observed in products such as bread, pastries, milk, eggs. Another study confirms that PAHs are also found in fish products.

However, to date, the country has not implemented any comprehensive action program to detect toxic contaminants in food. Today, there is no accurate information about the harmful substances in the products used by the population and their levels. Given that studies in neighboring countries have identified many toxic pollutants (e.g lead) in spices, the same situation is likely to be observed in Azerbaijan. However, several studies have confirmed high levels of lead in the Caspian's Absheron sector and lakes.

1.3.7 Transboundary Pollution

Azerbaijan is located in a downstream part of the international Kura-Araz river basin. Turkey, Georgia, Armenia and Iran are located in the upstream part of this basin. This means that all pollutants entering the Kur-Araz network eventually enter the territory of Azerbaijan.
According to the data of the MENR, most of the small streams of the Kura basin are highly polluted by the mining industry. Over the past 50 years, metal concentrations in some streams have been increasing due to the growth of the mining operations in neighboring upstream countries. The major pollutants are heavy metals (i.e.; Copper, Zinc, Cadmium) from mining and the leather industry (see “Water Pollution” section), and ammonia and nitrates from the fertilizer industry (see “Water Pollution” section). Concentrations exceed norms up to nine times. Phenols exceed the norms six times and mineral oil, two to three times.

The Kura withdrawal sites were built just after the junction of the Kura and the Araz rivers. Like the Kura, the Araz river also is highly polluted by nitrates and heavy metals. Many industrial enterprises are situated in the basins of the rivers Hrazdan, Mehrichay, Okhchuchay, Bazarchay, Arpachay, and Basitchay (Tsav) that flow to Azerbaijan and the Araz river from neighboring Armenia. All these rivers deliver toxic heavy metals, including arsencic, selenium, mercury, thorium, and uranium, that in turn to flow to Azerbaijan.

Pollution of the Caspian Sea by transboundary river flows also remains a problem for the country, along with oil pollution. At present, almost the entire waters of the Caspian Sea and all the rivers flowing into it are polluted with oil. Currently, oil pollution is widespread throughout the sea. It is estimated that a total of 2.5 million tons of crude oil has flowed into the Caspian Sea. The most dangerous pollution for the Caspian Sea is from wastes containing harmful chemicals. These include petroleum hydrocarbons, hydrocarbons, PAHs, organic chlorine compounds and heavy metals. Petroleum hydrocarbons play a major role in marine pollution.

2 HEALTH EFFECTS OF POLLUTION

Pollution is associated with a broad range of diseases including lung diseases, lung cancer and cardiovascular diseases (Wang et al, 2019; Cohen et al, 2015). A United Nations study has found that air and water pollution cause millions of premature deaths each year. Air pollution is responsible for about 7 million deaths this year, and pathogen-contaminated water kills nearly 1.5 million (GEO 6).

At present, no research has been conducted in Azerbaijan on the impact of air pollution on public health. However, data on the causes of diseases provided by the State Statistics Committee confirm that many of these diseases are caused by air pollution. This is evidenced by the increase in respiratory diseases, lung cancer and cardiovascular diseases in urban areas in recent decades. For example, the number of people with respiratory diseases in 2018 increased to 760,000 from 608,000 in 2000.

According to the State Statistics Committee and results of field investigations, the following diseases have been increasing in Azerbaijan in recent years:

- Diseases of the circulatory system
- Respiratory diseases
- Diseases of the digestive system
- Diseases of the skin and subcutaneous tissue

During the implementation of the TSIP project, field investigators from Pure Earth collected preliminary data on the population living around toxic sources and its health status. Although these data are not the results of any medical research, they reflect the health status of the population living in contaminated areas (Abbasov et al, 2019). During all assessments, field investigators met with representatives of local medical departments and doctors from nearby hospitals in the area and conducted a health information survey. For each site, the number of people exposed to pollution to one degree or another was calculated. For example, in Azerbaijan, about 400,000 people live near the site of an old pesticide residue, and they are exposed to various levels of pollution.

As a result of field investigations, the possible effects of pollution on human health have been identified. Currently, respiratory diseases, various types of cancer, birth defects, skin diseases and a number of allergic diseases in the country can be associated with toxic pollutants in the environment and food. Table 2 lists the various contaminants and the diseases they cause.

During the site screenings field investigators met local doctors, municipality representatives, and collected information through interviews regarding health impacts of each identified toxic site. In addition, field notes taken at local hospitals confirm high stomach and skin cancers and asthma in Sumgait. TSIP confirms that nearly 300,000 people in the Sumgait area are subject to the impact of the TSIP-identified toxic sites. In Baku, people are at greatest health risks to total petroleum hydrocarbons (TPH) and air pollutants.. TSIP field assessments confirmed that nearly 2 million people in Baku are exposed to the different types of pollution. The majority of health concerns are cancer, bronchial asthma, skin diseases, and other bronchial diseases. In addition, interviews with local hospitals in the small towns and villages, confirmed that residents near Soviet legacy pesticide sites, more often suffer from high rates of cancer and bronchial diseases. However, additional research focused on health impacts from the local toxic sites is needed.

Table 1: Source and health effects of most common pollutants

Pollutant	Source	Health effect
Suspended particulate matter (SPM, PM10, PM2.5)	Mobile sources, construction sites and quarries	Disrupts lung's gas exchange function and causes respiratory illness Mixture of solid and liquid organic plus inorganic materials including sulfate, nitrates, ammonia, sodium chloride, carbon, mineral dust and water
Nitrogen oxides (NOx)	Combustion of fuels	Asthma attack, sensitivity of the bronchi to infections in children.
Surface ozone (O_3)	NOx and hydrocarbons transformation by solar radiation	Increases respiratory infections (colds, pneumonia), breathing difficulties and asthma Part of photochemical smog produced by the interaction of sunlight and air pollutants
Benzene Toluene Xylene (BTX)	Transport, industry, nature	Nervous system disorders, loss of consciousness
VOCs	Petrochemical industry, oil fields, solid wastes	Nose and throat irritation, shortness of breath, headaches, fatigue, nausea, dizziness and skin problems. Higher concentrations may cause irritation of the lungs, as well as damage to the liver, kidney, or central nervous system.

Carbon monoxide (CO)	Incomplete combustion of natural gas, fuel combustion	Lowers blood oxygen levels, slows reflexes, increases confusion and sleepiness. Chronic poisoning, headache, dizziness, cardiovascular problems
Sulfur dioxide (SO_2)	Fuel and coal combustion	Decreases pulmonary function. Causes eye irritation and respiratory inflammation (coughing, infections, mucus secretion, asthma attacks, bronchitis) Burning fossil fuels and industrial processes
Carbon dioxide (CO_2)	Burning coal, wood, oil and natural gases and fuels	Lowers oxygen levels, reduces respiratory and brain functions, causes vision defects
Lead	Petrol, diesel, lead batteries, paints, and coloring agents	Impairs development of nervous system in children; adverse effects on gestational age and foetal weight; blood pressure.
Arsenic	Gold mining etc.	Carcinogenic (skin and internal cancers) Nitrates and nitrites Methaemoglobinaemia (blue baby syndrome)
Mercury	Chemical industry, petroleum industry etc.	Kidney damage, some irreversible. Increased cancer risk, reproductive disorders, alteration of the immune system, neurobehavioral impairment, endocrine disruption, genotoxicity and increased birth defects
POPs including DDT and other POPs pesticides	Legacy pesticide sites, chemical enterprises	Increased cancer risk, reproductive disorders, alteration of the immune system, neurobehavioural impairment, endocrine disruption, genotoxicity and increased birth defects

According to the State Statistics Committee, respiratory diseases are the most common diseases in Azerbaijan, and these diseases are growing. Of course, there are no clinical studies that assess the role of pollution in the development of these diseases. However, it is safe to say that declining air quality can lead to this type of disease (Figure 21).

Figure 13. Respiratory diseases in Azerbaijan

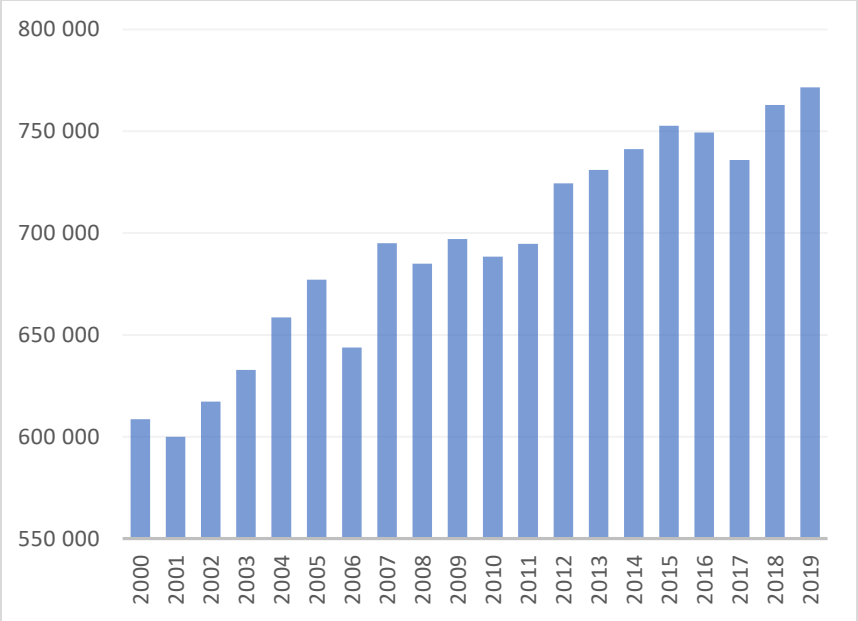


Table 3 below provides information on selected diseases observed in the country in 2010-2020.

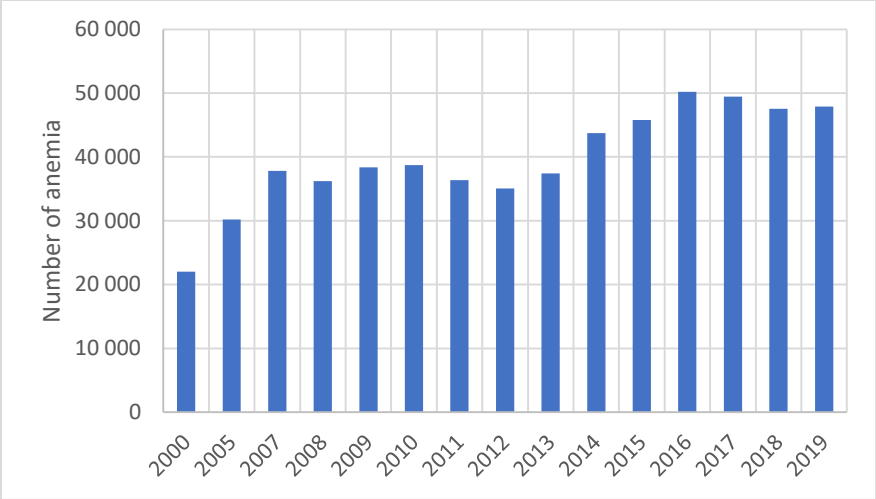
Table 2: Some diseases observed in Azerbaijan in 2010-2020 (thousands)

	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**Trend**

All diseases	**1604.6**	**1618.0**	**1686.9**	**1739.6**	**1852.9**	**1824.0**	**1867.0**	**1875.6**	**1895.9**	**1936'7**	
Infectious and parasitic diseases	129	121	118	112	123	115	117	125	120	120	↔
neoplasms	8. 9	9.6	10. 1	10.9	11.0	11.1	11.8	12.1	11.9	13.1	↗
blood diseases	45.2	44.8	45.9	48. 2	59.5	64.0	67.8	67.8	66.2	69.9	↗
mental and behavioral disorders	11.2	11.5	10.5	10.8	12.7	7.7	10.0	10.3	9.8	11.7	↔
nervous system diseases	53.8	54.7	58.7	63.3	74.4	73.0	73.0	72.3	65.5	69.2	↔
eye and adnexa diseases	42.6	43.2	44.9	51.1	66.1	62.3	67.6	69.3	76.9	80.4	↗
circulatory diseases	113.7	113.7	122.0	130.0	140.0	134.2	142.3	143.2	144.7	149.3	↗
diseases of the respiratory system	688.3	694.7	724.3	731.0	741.3	752.7	749.5	736.0	762.8	771.5	↗
diseases of the digestive system	114.8	118.3	131.5	138.5	152.4	156.2	163.1	160.8	164.5	169.2	↗
diseases of skin and subcutaneous tissues	52.6	50.0	50.6	51.8	52.3	43.7	44.0	43. 0	41.3	43.9	↘

The same trend is observed in anemia, which may be one of the pollution-caused disases in Azerbaijan. It is worthy to note that Azerbaijan has one of the highest rates of anemia among women (Figure 22).

Figure 14. Total anemia rates in Azerbaijan


60 000
50 000
40 000
30 000
20 000
10 000
0
Number of anemia
2000
2005
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

3 LEGAL AND INSTITUTIONAL FRAMEWORKS

3.1 LEGAL FRAMEWORKS CONCERNING HAZARDOUS POLLUTION

Azerbaijan's main objective of its environmental policy is the protection of the health of people, existing ecological systems, economic potential, and efficient use of natural resources to meet the needs of present and future generations. There is a broad palette of environmental laws that provide general and focused guidance on problems and management of the environment. The country has adopted many laws related to environmental protection and management that regulate management of POPs and other industrial wastes.

Below are short descriptions of some laws that reflect Azerbaijan's environmental policies.

The Law of the Republic of Azerbaijan on obtaining information on the environment

The Law on Obtaining Environmental Information establishes everyone's rights to obtain environmental information. According to Article 4, any person may use the right to obtain environmental information. The information obtaining, which is limited, includes the information assumed to be of state/public importance. According to Article 6, the state body collecting information (For example, the MENR) shall provide openness of registers and archives in their possession for a requestor, and delivery of the data connected with the registers and archives.

The law on industrial and domestic waste

The law on industrial and domestic waste (1998) establishes the state policy in the area of environmental protection from industrial and domestic waste generated in the Azerbaijan Republic as a result of human activity in the form of substances and things. The law also aims to decrease the dangerous impact of a given waste, maintain ecological balance in nature, promote use of waste as secondary raw material, and regulate the responsibility connected to waste. The law does not apply to harmful gases, polluted waters and radioactive waste.

The Law of the Azerbaijan Republic on accession to the Stockholm Convention on Persistent Organic Pollutants

In 2003, a separate law was adopted on the accession of the Republic of Azerbaijan to the Stockholm Convention. This law recognizes and adopts all the provisions of the Stockholm Convention on the Management and Use of POPs in Azerbaijan. Despite being a very short and concise law, this is a very important document that sets out the country's position on the management of POPs in the country.

The Law about radiation safety of the population

The law about radiation safety of the population (1997) determines the legal basis of accident-free activities in the field of sources of radioactive radiation, protection against radiation hazards and public health care. Article 4 stipulates that ensuring radiation safety requires the provision of the following measures: package of organizational measures of legal, technical, sanitary and hygienic, medico-preventive, instructive and educational nature; measures for observance of rules, regulations and standard rates in the field of radiation safety for the state and local self-government, public associations, legal entities and physical persons; measures for informing the population on the radiation situation and radiation safety.

The Law on Phytosanitary control

The law on Phyto-sanitary control (2006) determines a legal basis for tests, registration, use of pesticides and agrochemical substances and organization of the agrochemical service in agriculture. According to the law, production, sale and use of toxic chemical substances that are not relevant to the officially known international, regional, and intergovernmental standards of the country and are hazardous for human life, health, and property as well as for the environment are not permitted.

The Law on Ecological safety

This Law on Ecological safety (1999) governs the relations in the field of ecological safety when implementing activities by legal entities and physical persons, state bodies and local government bodies, and their officials. The purpose of this Law is establishment of the legal basis for protection of life and health of the person, society, its material and moral values, and the environment. This includes protecting atmospheric air, space, water bodies, subsoil of the earth, the earth, natural landscapes, and plant and animal life against the danger resulting from impacts of natural and anthropogenic factors.

The Law on Environmental safety

The objective of the law on Environmental safety (1999) is to identify the legal basis to prevent harm from dangerous natural and manmade influences on human life and health; society with its material and spiritual values; and environment, including atmospheric air, cosmic space, water sources, land, soil, natural landscapes, flora and fauna. This law regulates actions of legal entities and individuals, state and local self-management bodies and their officials in the field of environmental safety during implementation of their activities. The Law determines a legal basis for protection from threats caused by natural and human impacts in relation to human life and health,

the tangible and moral values of society, the environment including atmosphere, space, water bodies, subsoil, soil, natural landscape, flora, and fauna.

Law on Soil Fertility

The law on Soil fertility (1999) sets out legal principles of recovery, improvement and protection of soil fertility in lands belonging to state, private sector, and municipalities. In accordance with the law, soil fertility means an ability to provide vital elements for nutrition of plants and sufficient moisture in morphological, physical, and chemical, mechanical, and biological conditions.

Law on protection of the environment

The Law on protection of the environment (1999) is an essential component of the national environmental legislation. The Law on the Protection of the Environment establishes the legal, economic, and social grounds of the environmental protection. The issues that have been addressed in the law include roles and responsibilities of government, citizens, public associations, and local authorities; use of natural resources; and economical regulation of environmental protection. Article 10 envisages the determination of the maximum limits of the use of natural resources and the deployment of the harmful items, household and production wastes discharged into the environment, which is entrusted to the relevant body of executive power. The MENR is determined as the relevant body of executive power.

One of the key goals of the law is to ensure an efficient use of natural resources. Article 3 of the Law establishes the main principles of the use of environment. These principles envision efficient use and restoration of natural resources. Article 10 envisages the determination of the maximum limits of the use of natural resources and the deployment of the harmful items, household and production wastes discharged into the environment, which is entrusted to the relevant body of executive power. According to the Regulation on the Ministry of Ecology and Natural Resources of the Republic of Azerbaijan, this Ministry is determined as the relevant body of executive power.
Articles 4, 5, 6 and 7 establish the rights and responsibilities of the state, local self-governing bodies, citizens and public unions in the field of environmental protection.

Water code

This water code (1999) determines the internal water resources (rivers, lakes, ground water etc.) of the Republic of Azerbaijan as national wealth. The Water Code constitutes the basis of the water legislation and regulates the relations regarding the use of water bodies, their water resources and their protection. All the water bodies constitute the water fund of the country. According to the law, the water bodies can be under public, municipal and private ownership.
The state/public responsibilities in the use and protection of water bodies include the following:

- ✓ Organize control on the use of water resources;
- ✓ Protect the water sources;
- ✓ Set standards on the use and protection of water bodies;
- ✓ Implement numerous measures against the risks of natural disasters etc.

The small water bodies located at the areas of municipalities are under ownership of the municipalities. According to the law, the municipalities can exercise management of water bodies and they are fully entitled to do so. The municipalities determine the water intake points in the rivers, the locations where use of water is not allowed, and protection of the water bodies. The municipalities can also take necessary measures to reduce the flood and mudflow risks.

The management of water bodies also envisages the protection of environment in addition to the development of the economy and provision of the population with quality water. According to the accepted standards of the State Committee for Urban Planning and Architecture of the Republic of Azerbaijan , the specific average daily water demand per capita per year depends on the characteristics of the residential building and varies between 125-350 l / day.

The Water Code approves the rules for water use and the right to use water. The articles of this chapter determine all kinds of the water use and recognize the users' rights. Besides, the Code sets out the circumstances that can limit the use of water bodies and determines the relevant bodies of executive power. Discharge of wastewater into water bodies is allowed only in cases when the concentrations of pollutants in water bodies have been determined not to exceed the maximum allowable concentration levels. Discharge of wastewater into the drinking water sources is strictly prohibited.

The law on public health care

According to the law on public health care (1997) public health care consists of the complex of the political, economic, legal, scientific, medical, sanitary and hygienic measures directed to protection of the physical and mental health of each person, to increase his active longevity, and to provide with medical care. This Law regulates the relations arising between citizens and state bodies, and also subjects of the state and non-state health care systems. Article 3 confirms that one of the obligations of the state in public health care is environmental protection and providing ecological safety of Azerbaijani citizens.

The Law on Civil Defense

The law on civil defense was adopted in 1997. The Law of the Azerbaijan Republic on Civil Defense stipulates the legal grounds and principles of civil defense in the Azerbaijan Republic and regulates public relations in the field of civil defense. According to Article 5, the aim of civil defense is making

preventive measures to prevent and manage emergency situations, minimizing the possible damage and losses due to emergencies and mitigation of emergencies and their consequences. According to the law, emergency situation means a situation occurring in a certain area due to acts of war, accidents, or natural or other disasters, which may cause or have caused loss of or damage to the life and health of people and environment, serious material losses and disturbance of everyday activities of people.

The article 6 defines the responsibilities of the state, companies, communities and individuals in the field of civil defense. According to this this article, all interested parties in the field of civil defense in emergencies are responsible for minimizing the effects of the state of emergency.

The law about sanitary and epidemiologic wellbeing

The law establishes the legal framework for sanitary and epidemiological wellbeing of the Azerbaijani population. According to the law (1992) sanitary and epidemiologic wellbeing of the population is the condition of public health and the habitat of people in which there are no dangerous and adverse effects of its factors on the human body and there are favorable conditions for its activity. The main objectives of the sanitary legislation of the Azerbaijan Republic are the establishment in this area of the rights and obligations of state bodies, public associations, companies, organizations, irrespective of subordination and pattern of ownership, officials, and citizens.

This law is also the base law governing the disposal of wastewater, the use and disposal of hazardous chemicals, radioactive and other substances.

Land Code

One of the main objectives of the Land Code (1999) of the Republic of Azerbaijan is to prevent pollution of lands, and to create a legal basis for the cleanup, restoration and re-use of contaminated lands. According to the Land Code of the Republic of Azerbaijan, there are three types of land ownership in the country, and they are as follows:

- ✓ Private lands
- ✓ Municipal lands
- ✓ State lands

According to the Land Code, all types of landowners must protect their land from pollution when using it and ensure sustainable use of the land. Landowners, users and lessees should take measures in the field of land protection in the following areas:

- ✓ protection, restoration and increase of soil fertility and other useful properties;

- ✓ protection of lands from industrial and domestic wastes, pollution by chemical and radioactive substances, desertification, landslides, erosion and other destructive processes;

Lands exposed to radioactive and chemical pollution, which may endanger the life and health of the population, as well as those lands that do not meet sanitary requirements, relevant norms, or rules and standards for production, are withdrawn from agricultural use and transferred to the state reserve land fund for conservation. Production of agricultural products is prohibited on such lands until reclamation works are carried out and the land is rehabilitated.

The Law on Water Supply and Sewage

The purpose of the The Law of Azerbaijan Republic on Water Supply and Sewage (1999) consists in regulation of the relations in the field of providing consumers with the necessary quantity of high-quality water meeting the requirements of state standards, and removal of sewage. Physical persons and legal entities as provided by this Law and other regulatory legal acts have the right to use water resources and for this purpose to build and operate water supply systems and sewer facilities to dump sewage and waste. Table 4 below lists laws in Azerbaijan concerning environmental protection

Table 3: List of laws of Azerbaijan concerning environmental protection and hazardous pollution

Law	Year Enacted	Scope
Obtaining information on the environment	2002	Rules for getting proper information about the state of the environment and environmental pollution
Protection of atmospheric air	2001	Rules for permitting emissions; introduction of technical norms and standards; rules for compensation from environmental damage
Industrial and domestic waste	1998	Control harmful impact of waste; protect ecology from impact of waste; use of waste as secondary raw material
Water supply and sewage	1999	Consumer protections for clean water and sewage services meeting state standards; standards for builders and operators of water supplies and sewage systems
Water code	1999	Regulates and sets standards on water use and protection; establishes management of water

		resources by national, municipal, and private owners
Radiation safety of the population	1997	Legal basis of accident-free activities in the field of sources of radioactive radiation, protection against radiation hazard and public health care.
Phytosanitary control	2006	Determines a legal basis for tests, registration, use of pesticides and agrochemical substances and organization of agrochemical service in agriculture.
Ecological Safety	1999	Establishment of the legal basis for protection of life and health of the person, society, its material and moral values, the environment, including atmospheric air, space, water objects, subsoil of the earth, the earth, natural landscape, plant and animal life against the danger resulting from impact of natural and anthropogenic factors.
Environmental Safety	1999	Identification of the legal bases to prevent human life and health; society with its material and spiritual values; environment, including atmospheric air, cosmic space, water sources, land, soil, natural landscape, flora and fauna from the results of dangerous natural and manmade influences.
Soil Fertility	1999	Main legal principles of recovery, increasing and protection of soil fertility in lands belonging to state, private sector, and municipality.
Protection of the Environment	1999	Identification of roles and responsibilities of government, citizens, public associations, and local authorities; use of natural resources; economical regulation of environmental protection.
Public healthcare	1997	Rules for regulating the relations arising between citizens and state bodies, and also subjects of the state and non-state health care systems.
Civil Defense	1997	Rules for protection of population during emergencies raised as a result of manmade and natural hazards such as floods, fires, wars and environmental hazards
Sanitary and epidemiologic wellbeing	1992	Rules for controlling conditions of sanitary and epidemiologic wellbeing

Land Code	1999	Rules for preventing pollution of lands, implementing cleanups, restoration, and re-use of contaminated lands. İdentification of types of land ownerships
Water Supply and Sewage	1999	Control on water quality and sewage networks. Right to clean water and provision with sewage

3.2 INSTITUTIONAL FRAMEWORK CONCERNING MANAGEMENT OF ENVIRONMENTAL POLLUTION AND PUBLIC HEALTH

The institutional situation concerning management of environmental pollution and public health in Azerbaijan is characterized by independently operating ministries and entities that form a coordinated group of environmental pollution, safety, and public health related stakeholders. Government, private sector, local communities, and civil society are the main stakeholders in Azerbaijan that are related to these activities.

Relevant ministries and state agencies and state-owned companies are directly coordinated by the Cabinet of Ministers. There are also bilateral relations between government agencies to address issues related to the field.

These state organizations are the central executive bodies on the issues listed above. In addition, civil society institutions, local municipalities and executive authorities, as well as research and educational institutes operate in this area.

The following sections provide information on environmental protection and pollution management, as well as government and public institutions related to public health and food safety.

Ministry of Ecology and Natural Resources of the Republic of Azerbaijan

The Ministry of Ecology and Natural Resources (MENR) is in charge of protection of the environment in the territory of the Republic of Azerbaijan, including the Caspian Sea sector of Azerbaijan; organization of the use of nature; efficient use of groundwater, mineral resources and surface natural resources and their restoration; and observation of hydrometeorological processes. The rules on protection of land, forest, water bodies, and prevention of environmental pollution are established by MENR. MENR conducts regular monitoring activities on water bodies, land and air in order to assess pollution levels. MENR implements permanent environmental monitoring of all natural bodies, including land, rivers, lakes etc. MENR also is in charge of managing all protected areas in Azerbaijan, which includes national parks, nature reserves and sancturies. Pollution monitoring is one of the main functions of the ministry. To this end, the ministry conducts stationary observations and inspections throughout the country, and creates and manages pollution databases.

The National Environmental Monitoring Department, which reports to the Ministry, constantly assesses the quality of air, water and soil in the country by conducting stationary observations. The State Environmental Expertise Department, which is a subordinate body of the Ministry, monitors

the activities of enterprises operating in the country, and carries out the certification and management of industrial facilities.

Ministry of Emergency Situations of the Republic of Azerbaijan

The Ministry of Emergency Situations (MES) is the central executive body responsible for the prevention of accidents related to the discharge of toxic, chemical, radioactive and biologically hazardous substances in the country, reducing their impact and eliminating their consequences, and exercising state control over accident management. Currently, the Ministry has the Office of Emergency Awareness, the Office of Emergency Response, as well as the State Agency for Safe Work in Industry and Mining. A number of clean-up operations were carried out in the country under the close participation and control of the Ministry. The most successful of these clean-ups was the treatment of radioactive waste from the Baku Iodine Plant. The ministry has its own landfill for hazardous waste.

The State Agency for Industrial Safety and Mining Control of the MES participates in the development of a unified state policy and regulation on technical safety in industry and mining within its competence and ensures the implementation of this policy. The state control body is the executive body, which together with other structural units of the Ministry, together with the relevant state bodies, participates in the organization of the prevention of emergencies by carrying out its functions.

The MES also controls the work of the “The Isotope” special enterprise which takes measures againists radioactive pollution. “The Isotope” special enterprise is responsible for receiving, neutralizing, long-term storage and burial of radioactive sources and wastes in Azerbaijan. This organizaiton also carries out transportation of radioactive sources, materials and radioisotope devices, decontamination of special clothing and personal protective equipment, radiological monitoring and decontamination in areas, organizations and enterprises operating radiation facilities, and radioecological monitoring.

Ministry of Agriculture of the Republic of Azerbaijan

The Ministry of Agriculture (MoA) of the Republic of Azerbaijan is the central executive body implementing state policy in the agrarian sector, including production and processing of agricultural products, provision of necessary services to producers, veterinary, plant protection and quarantine, and efficient use of lands.

The Agrarian Services Agency operates under the MoA. The Agrarian Services Agency (ASA) provides plant disease control, pesticide and application and plant treatment services in the country. All former pesticide sites included into the TSIP database are governed by ASA. This

service monitors the current state of obeselete pesticides in the country, and the transportation and placement of them in the burial site. Currently, the Jangi Pesticide Landfill is managed by ASA. Obeselete pesticides are currently being brought in and buried here. At the same time, empty containers containing pesticides are brought to the landfill and stored there.

Currently, the ASA controls the use of pesticides in the country. ASA regularly works with farmers, organizes training, monitors the use of pesticides, and collects and burys empty pesticide containers.

ASA has various laboratories to monitor the quality of agricultural lands and constantly monitors their pollution levels. It is possible to study all levels of pollution in these laboratories.

Ministry of Energy of the Republic of Azerbaijan

The Ministry of Energy of the Republic of Azerbaijan is the central executive authority implementing state policy and regulations in the fuel and energy sectors. In its activities, the ministry is guided by the Constitution of the Republic of Azerbaijan, laws of the Republic of Azerbaijan, decrees and orders of the President of the Republic of Azerbaijan, resolutions and orders of the Cabinet of Ministers of the Republic of Azerbaijan, and international treaties to which the Republic of Azerbaijanis a party.

Ministry of Health of the Republic of Azerbaijan

The Ministry of Health of the Republic of Azerbaijan is the central executive body implementing state policy and regulation in the field of public health protection. In performing its duties and exercising its rights, the Ministry interacts with other executive authorities, local self-government bodies and non-governmental organizations.

The activities of the Ministry are as follows: Ensuring the implementation of the policy of participation in the formation of a unified state policy in the relevant field; and preparation and implementation of various programs realted to public health. The Ministry performs the following tasks in accordance with its activities: provides medical care to the population; ensures the implementation of state programs and development concepts within its competence; maintains state control over its areas of expertise, including the activities of institutions included in the state health system, medical education, management and control of scientific research in the field of medicine, the implementation of compulsory medical examination of children, control over the activities of non-state medical institutions and the state to carry out sanitary-epidemiological control.

Food Safety Agency of the Azerbaijan Republic

The Food Safety Agency of the Republic of Azerbaijan (FSA) is the central executive body implementing state policy and regulation in the field of food production and consumption. FSA regulates normative regulations on food safety, veterinary and phytosanitary control, registration of entities operating in the field of food safety, issuance of food safety, phytosanitary and veterinary certificates, primary production, supply, production, processing of food, state control over the safety of food at all stages of the food chain, including packaging, storage, transportation, distribution (including import-export operations), as well as the protection of the rights of consumers of food products and goods under state veterinary and phytosanitary control. In order to perform its duties the FSA interacts with state and local self-government bodies, international and non-governmental organizations, and other legal entities and individuals.

International agreements, treaties, and other national obligations

Azerbaijan is a country with many environmental problems. Many of the current pollution problems are transboundary in nature. Therefore, the current environmental problems in the country cannot be solved only at the expense of the internal resources of the Republic of Azerbaijan. This problem can be particularly relevant to cross-border constraints. Thus, the country is located in the downstream part of the Kura and Araz rivers, and restrictions from neighboring countries are brought to the country through these rivers. On the other hand, the country is located on the shores of the Caspian Sea and the Caspian Sea is polluted by the five countries that surround it, and these pollutants migrate with sea currents and are brought to the coastal areas of Azerbaijan. Therefore, Azerbaijan is actively cooperating in the international arena to address the problems of pollution in its territory.

At this time, the Republic of Azerbaijan has acceded to the following international conventions to facilitate the protection of the environment and its individual components, as well as the management of toxic substances polluting the environment at the national, regional and global levels (Table 5).

Table 5. Environmental treaties of Azerbaijan

Official Title of treaty	**Date Signed**	**Type**
Paris Agreement adopted under the United Nations Framework Convention on Climate Change	12/12/2015	Multilateral
European Convention for the Protection of Animals during International Transport (revised) (No 193, Council of Europe)	25/06/2004	Multilateral
Stockholm Convention on Persistent Organic Pollutants	22/05/2001	Multilateral

Cartagena protocol on biosafety to the convention on biological diversity	24/05/2000	Multilateral
Convention on access to information, public participation in decision making and access to justice in environmental matters	24/06/1998	Multilateral
Kyoto Protocol to the UN Framework Convention on Climate Change	11/12/1997	Multilateral
International Plant Protection Convention - New revised text approved by Resolution 12/97 of the 29th Session of the FAO Conference in November 1997 - Declaration	07/11/1997	Multilateral
Amendment to the Montreal Protocol on substances that deplete the ozone layer, adopted at the ninth meeting of the Parties	17/09/1997	Multilateral
Energy Charter Protocol on energy efficiency and related environmental aspects	17/12/1994	Multilateral
Energy Charter Treaty (ECT)	17/12/1994	Multilateral
United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa	17/06/1994	Multilateral
Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer	25/11/1992	Multilateral
Convention on biological diversity	05/06/1992	Multilateral
United Nations Framework Convention on Climate Change	09/05/1992	Multilateral
Convention on the Transboundary Effects of Industrial Accidents	17/03/1992	Multilateral
Convention on the protection and use of transboundary watercourses and international lakes	17/03/1992	Multilateral
Convention on environmental impact assessment in a transboundary context (Espoo Convention)	25/02/1991	Multilateral
Amendment to the Montreal protocol on substances that deplete the ozone layer (London Amendment)	29/06/1990	Multilateral
Basel Convention on the control of transboundary movements of hazardous wastes and their disposal	22/03/1989	Multilateral
Vienna Convention for the protection of the ozone layer	22/03/1985	Multilateral
Convention on the physical protection of nuclear material	03/03/1980	Multilateral

Convention on long-range transboundary air pollution (Geneva Convention 1979)	13/11/1979	Multilateral
Convention on the conservation of European wildlife and natural habitats (No 104, Council of Europe)	19/09/1979	Multilateral
International Convention for the Protection of New Varieties of Plants, as revised at Geneva on 19 March 1991	02/12/1961	Multilateral
Constitution of the Food and Agriculture Organization of the United Nations (FAO)	16/10/1945	Multilateral

4 CURRENT EFFORTS TO REDUCE POLLUTION

Beginning in 2004 Azerbaijan started to carry out several projects related to the elimination and management of POPs and other toxic pollutants. These projects were mainly directed at the reduction of POPs pollution in the country, increasing capacity of the pesticide landfill (polygon) in Jangi, transfer of residual pesticides to the Jangi polygon and increasing public awareness. International institutions (e.g. FAO, GEF with UNDP, Pure Earth) supported all these projects.

To systematically address the existing environmental problems in the country, the President of the Republic of Azerbaijan implemented the "Comprehensive Action Plan for 2006-2010 to improve the environmental situation in the Republic of Azerbaijan" on September 28. This action plan was of great importance in improving the environmental situation in Baku and the Absheron Peninsula.

The Comprehensive Action Plan reflects all the main activities aimed at restoring the existing state of the environment. According to this plan, extensive work has been done in Baku Bay, the Bibi Heybat zone, around the International Airport, Lake Boyukshor, oil-contaminated soils, and flooded areas. At the same time, there have been improvements in the management of solid waste generated in Baku and Sumgait in accordance with the solid waste management scheme.

In order to improve the ecological situation of the Caspian Sea, in accordance with the order of the President of the Republic of Azerbaijan "Measures to protect the Caspian Sea from pollution," water treatment plants were installed to prevent the discharge of wastewater into the sea.

Sumgait Remediation

The Sumgait remediation project was implemented in 2015 as a partnership between Pure Earth and the site owner Azerikimya Joint Stock Company (Azerikimya) in Sumgait City, Azerbaijan Republic, about 30 km northwest of Baku. The project was financed by the European Commission and supported by the Ministry of Ecology and Natural Resources (MENR) and Sumgait Municipality. The site is a place on the Caspian Sea coast that was formerly an industrial area highly contaminated with various pollutants and particularly benzo(a)pyrene, benzene, and polychlorinated biphenyls (PCBs). The remediation project involved the removal of 804 m^3 of contaminated soil and disposal of the contaminated soil at the MENR Hazardous Waste Landfill. Approximately 1200 locally grown native tree species were planted, and a drip irrigation system was installed. The area is now a park close to the beach (Figure 15).

Figure 15: Cleaned industrial area in Sumgait, Azerbaijan

Absheron Peninsula

To improve the ecological situation of the Absheron Peninsula, the Ministry of Environmental Protection has developed a "Program of ecological condition of the Absheron Peninsula and necessary measures to improve it" and "Program of necessary measures to improve the ecological condition of Bibiheybat zone."

In 2007-2009 56,422 cubic meters of toxic waste containing mercury, which caused serious pollution of the environment of Sumgait, was transported to the Hazardous Waste Landfill and neutralized.

The State Oil Company of Azerbaijan (SOCAR) has implemented pilot projects to clean up oil-contaminated lands. As a result of reclamation works carried out in the Bibiheybat area, which is an old oil field and polluted with oil wastes, the lands were cleared and landscaping measures were taken.

In 2015, a project to clean part of Boyukshor Lake was implemented. The project envisages stopping sewage flowing to a part of the lake in the northern part of Baku and treating the lake. Currently, the lake has been partially cleared and the surrounding area has been landscaped. Since 2017, numerous feasibility assessments have been carried out to clean other lakes around Baku. However, work has not yet begun to clean up these lakes.

The Absheron Lakes Cleanup and Rehabilitation project to be implemented by the World Bank and the Ministry of Economy of Azerbaijan, was to start in 2015, but in 2017 the project was postponed. The objective of the proposed project was to support the Government of Azerbaijan in its efforts to reduce the Greater Baku population’s exposure to and health risks from pollution hazards in and around selected project lakes. The project had an innovative, area-based plan and mechanisms

for land redevelopment that could be scaled up and sustained in the future. It also had plans for strengthening the capacity of implementing agencies.

Jangi Pesticide Landfill and POPs Pesticides

Azerbaijan's National Implementation Plan 2007-2020 was adopted under the Stockholm Convention on POPs. The plan considers eliminating toxic POPs pollution in Azerbaijan gradually. Under this plan more than 2000 tonnes of obsolete pesticides have been collected from the regions of Azerbaijan, packed, and transferred to a special burial site of pesticides located near the Jangi village, Azerbaijan. The NIP was prepared in close cooperation of government organizations and international institutes that are concerned with pollution.

According to the "Comprehensive Action Plan for 2006-2010 to improve the environmental situation in the Republic of Azerbaijan" the Jangi pesticide landfill was completely reconstructed and its protection was organized. In order to identify pesticide residues in the regions, an Inventory Commission was established consisting of representatives of the ministries of Emergency Situations, Ecology and Natural Resources, Health and Agriculture. As a result of these monitoring activities, up to 3084 tons of old, highly toxic, banned powder pesticides and their containers were found in 2008-2010 (in 2008 from Agjabedi, Yevlakh, Ujar, Zardab districts - 2048 tons, in 2010 - 1036 tons from Agjabadi region) was repackaged and transported to the Jangi pesticide landfill.

The 4-year GEF funded "Lifecycle Management of Pesticides and Disposal of POPs Pesticides in Central Asian Countries and Turkey" project launched in 2019. The project objective is to reduce POPs releases from obsolete pesticide stockpiles and contaminated sites and strengthen the capacity for the sound management of pesticides. Specific objectives of each component are to: safely destroy POPs and obsolete pesticides and remediate pesticide-contaminated sites; strengthen the institutional and regulatory framework for managing pesticides through their life cycle; and increase the successful uptake of alternatives to chemical pesticides on key crops.

Radioactive Waste Sites

Two production sites of the Baku Iodine Plant and the areas of the Neftchala Iodine Bromine Plant exposed to radioactive contamination were cleared and wastes were transported to a special landfill for burial of radioactive wastes. At present, landscaping works have been carried out in these areas and bioremediation works are underway.

Salyan Remediation

In 2017 Pure Earth started to implement the Salyan cleanup project, which was supported by the Ministry of Agriculture. The project fulfilled the main objective of removing the source of

contamination from the area – piles of pesticides and the most heavily contaminated soil underneath. At the end of the remediation 510 m^3 of contaminated materials were removed from the site and placed in the Jianji hazardous waste facility. This action significantly lowered the potential exposure of people to obsolete pesticides in Salyan. A follow up assessment is necessary to determine the extent of remaining contamination in soil and proper ways of dealing with it (Figure 16).

Figure 16: Removal of old pesticides in Salyan

4.1 GAPS AND RECOMMENDATIONS CONCERNING HAZARDOUS POLLUTION MANAGEMENT IN AZERBAIJAN

Azerbaijan has a good legal framework for hazardous waste and pollution management and has acceded to numerous conventions and agreements on this type of waste management. However, despite all this, the country still has both legal and institutional problems with hazardous waste and pollution management. These problems can be classified as follows

4.1.1 Improving institutional coordination between organizations

As can be seen from the analysis of the institutional framework, a large number of institutions and organizations are currently involved in the management and control of hazardous waste and pollution in the country. In many cases, poor coordination between institutions creates various problems in achieving their goals.

The Ministry of Agriculture is the main government agency responsible for transporting, storing and isolating pesticides. The Ministry of Agriculture also oversees the Jangi Pesticide Landfill, which operates to bury pesticides.

The Ministry of Emergency Situations controls the management of radioactive waste. The Ministry currently operates a radioactive waste landfill near Baku.
The Ministry of Ecology and Natural Resources is responsible for monitoring the environment and studying the levels of pollution. The Ministry is also responsible for the transportation and burial of toxic waste. The Toxic Waste Landfill created for this purpose is under the control of the ministry.
Improved coordination begins with strengthening the pollution monitoring capacity of the Ministry of Ecology and Natural Resources. Coordination between organizations should be established in such a way that the monitoring, use and management of all types of pollutants is under the control of a single organization.

4.1.2 Low public awareness of hazardous wastes and pollution

Although there are various laws on public awareness of hazardous wastes and pollution, people still have no proper information about their danger. For example, the TSIP project found that even people living very close to a source of pollution often have no information about the dangers of these pollutants to human health. In many cases, due to such ignorance, the population buys plots of land and builds houses in places very close to the source of pollution. It has also been found that many public buildings such as schools and kindergartens are built close to sources of pollution. For example, many schools and playgrounds are very close to pollution sites.

The same can be said about food consumed by the population. Altough the country has a special law on food safety, there is no systematic monitoring system for the levels of hazardous contaminants in food. Buyers have no idea about the composition of the food they buy. This leads to a decrease in trust between both buyers and sellers.

In most cases, the population has some knowledge about these pollutants, but does not know how to deal with them. Therefore, it is important to take the following measures to raise awareness about pollutants:

- Involvement of civil society institutions in pollutant management processes
- Extensive use of community-based schemes to address pollution problems
- Installation of information boards in areas with dangerous pollutants
- Closure of areas with dangerous pollution

- Regularly inform the population living in large cities about the daily air quality
- Provide detailed information on the impact of hazardous emissions on human health
- Provide extensive information to users about hazardous substances used in agriculture
- Systematically inform buyers about the content of pesticides and other chemicals in food products sold in the country, especially in agricultural products
- Organization of sale of agricultural products without pesticides and fertilizers under the organic food brand

4.1.3 Health and pollution data

As discussed in the “Health effects of pollution” section, respiratory, cardiovascular and cancer diseases have been growing rapidly in Azerbaijan in recent decades. However, activities to help identify the true causes of these diseases have not yet been implemented.

At present, Azerbaijan is an unexplored area in terms of the impact of hazardous waste on health. Although there is extensive information on the different classes of disease, the relationship between these diseases and contamination has not yet been studied at the clinical level.

Therefore, extensive clinical and biometric studies are needed to close this gap. These studies would not only explore the relationship between pollution and health risks, but also help to develop a better understanding of the effects of pollution on different segments of society.

The following activities are required to fill this information gap:

- Develop and implement a special action plan to measure the levels of various contaminants in individual foods
- Carry out activities that will allow the study of the level of pollutants in the bodies of children
- Increase support for both statistical and medical research to study the health effects of major priority pollutants
- Identify diseases and health consequences of pollution in the country
- Develop and implement action plans to reduce contaminants in food
- Create conditions that allow determination of the levels of chemical pollution in food products at points of sale
- Initiate future research to determine risk values for children and adults using concentration values obtained from analyzed food product samples from local markets
- Carry out medical and toxicity examination of the population living in contaminated areas and nearby areas

- Carry out new scientific research that allows to study the relationship between pollution and health
- Optimize the work of scientific funds related to health and pollution, and increase of state support in this direction
- Strengthen international cooperation in science

4.1.4 Training and awareness programs

There is a need for a comprehensive training program to strengthen the capacity of all organizations and communities currently monitoring pollution. These training programs are important to improve the skills of monitoring staff. It is important to further assist training programs in improving the monitoring procedures and, in addition, in resolving technical issues related to the organization of monitoring. Another problem is the low level of awareness of existing pollution. To strengthen the organization of this type of work, it is important to organize various training sessions at the community level.

4.1.5 Monitoring of contaminated areas and strengthening pollution monitoring

Although many monitoring projects have been implemented in the country, permanent monitoring of pollution sources and monitoring of the quality of the environment have not been conducted yet. This is especially true for continuous monitoring of air quality. For example, to date, no city in Azerbaijan regularly monitors air quality and no city is included to the system of real-time air quality indexes.

4.1.6 Implementation of cleanup projects

Despite the measures taken, toxic pollution remains as one of the main environmental issues in the country. A considerable volume of obsolete pesticides continues to contaminate residential areas of Azerbaijan. A notable volume of POPs is still in existence in both rural and urban areas. According to the results of the TSIP project, more than 130 contaminated sites remain in Azerbaijan. All these areas are a source of pollution and are very harmful to human health. Pollution sites are mainly around oil products, industrial waste, and old pesticide depots.

First, the implementation of relatively small-scale and middle but more effective cleaning projects should be promoted. This type of cleaning project can be carried out in the following places:

- ✓ In old pesticide stations
- ✓ Around small sources of pollution
- ✓ In small enterprises
- ✓ In residential areas adjacent to large industrial enterprises

The following measures should be taken with regard to large and operating large enterprises:

- ✓ Replacement of old technologies with new technologies that are and less harmful to the environment
- ✓ Retirement of large industrial enterprises outside of residential areas
- ✓ Carrying out remediation works on the sites of old industrial enterprises
- ✓ Improvement of waste management in industrial enterprises

4.1.7 Additional measures

The TSIP project has played a significant role in the inventory and identification of toxic waste sources in the country, and a good database is currently being developed. However, there is still no regular monitoring of air, water, and soil pollutants in the country. For example, large cities do not have modern air quality monitoring systems. In the city of Baku, where the air is significantly polluted, air quality is not measured regularly.

Except for some small-scale activities, there are no surveillance systems in the country today that can fully monitor toxic pollution. Observations and monitoring of air, soil and water pollution are not performed routinely and there are not stationary (fixed) monitoring locations.

In large cities, there is a need for regulation and registration of toxic pollution around industrial enterprises and multifaceted work to determine the levels of pollution.

- ✓ İmprovement of stationary observations of toxic pollution
- ✓ İncreased research related to health impacts of toxic pollution
- ✓ Installation of devices for measuring the level of carbon monoxide and other pollutants in homes to strengthen the routine control of indoor air quality

4.2 ACTIONS PROPOSED TO ADDRESS PRIORITY POLLUTION ISSUES

4.2.1 Air pollution

- Establish of a network of air monitoring stations to improve air quality monitoring in major cities
- Develop a mechanism to keep the general public informed about air pollution
- Ensure access of specialists and the general public to air quality information in Baku, Ganja and Sumgait
- Establish solid waste sorting and processing systems in Baku, Ganja and Sumgait and improve the existing solid waste systems
- Establish a regulatory control system to reduce dust emissions into the atmosphere at construction sites
- Establish a new mechanism for rehabilitation of old oil-contaminated areas and reduction of hazardous waste
- Reduce the use of private cars with internal combustion engines by improving public transportation and encouraging use of bicycles and electric vehicles in large cities
- Restrict the use of old cars in large cities
- Reduce customs and taxes on new generation cars, particularly hybrid and electric
- Support schools so that they can independently monitor and control ambient and indoor air quality through regular air testing using portable equipment.
- Develop short and easy to perform guidelines for urban schools to inform teachers and schoolchildren on how to behave in polluted environments.
- Establish indoor air quality control systems in multi-story houses and public buildings
- Support organizations, schools, offices and workplaces to monitor indoor air quality

4.2.2 Water Pollution

In recent years, the country has implemented numerous projects to improve water quality and management, which resulted in better water supplies for major cities and increased water quality. However, important problems with drinking water quality remain and need to be addressed. The following activities could help improve water quality and increase water supply:

- Strengthen coordination between stakeholders using water resources and make the transition to integrated water use schemes
- Make institutional improvements in water resources management
- Commission water treatment plants and prevent water pollution in settlements along rivers

- Upgrade and renovate water supply networks in Baku, Ganja, Sumgait and other large cities to prevent re-contamination of water in the water distribution network
- Establish community control over water quality
- Reduce water demand by employing water saving technologies e.g. through water saving irrigation methods
- Reduce losses of water in the supply system. (The existing losses on the other hand are not lost from the water cycle as the water recharges the groundwater.)
- Introduce market-based incentives to save water. The current water market provides little or no incentive for consumers to save water.
- Establish a system to provide people with free high quality drinking water in public buildings, schools and offices.

4.2.3 Soil Pollution

Currently, the number of projects dedicated to the rehabilitation of lands contaminated with oil and obsolete pesticides is growing, and important work is being done in this direction. However, given the scale of the pollution, the visible work is not enough, and it is important to do the following:

- Continue identification of sources of pollution
- Continue reclamation of oil-contaminated lands in Baku and surrounding areas
- Assess the volumes of residual pesticide stocks and the costs of their repackaging and transportation to the landfill
- Implement POPs/pesticide repackaging and removal projects
- Isolate areas contaminated with pesticides and restrict access of people
- Increase awareness of people living in or near highly contaminated areas
- Organize community-based monitoring through support of civil society organizations
- Strengthen state control over the use of pesticides and fertilizers

The following actions could improve POPs use and management:

- Establish a regular POPs monitoring programme in Azerbaijan, including equipping and building the capacity of a suitable laboratory and field sampling teams in one of the ministries
- Extend the inventory of POPs sources and contaminated sites, to identify and assess locations, disposal sites and migration of pesticide and PCB pollution
- Develop an EU-compatible legal framework and national standards and align with international environmental governance approaches

- Raise community awareness of POP issues and increase participation of general public and civil societies in environmental projects

4.2.4 Food safety

In recent years, the use of modern cultivation methods in the agricultural sector is growing rapidly. The share of large companies in the production of agricultural products is growing fast. At the same time, the use of modern technology has in many cases increased the use of pesticides and fertilizers. The Food Safety Agency has been established in Azerbaijan to increase control over food safety, and this agency is working in this direction. The draft law on food safety is ready and is expected to be approved soon. However, much remains to be done to improve food security, and this work may include:

- Development of schemes for checking the concentrations of chemicals in all types of food products at the point of purchase
- Inspection for hazardous contaminants in all types of food
- Strengthening control over the use of chemicals in agricultural production
- Strengthening control over the standards adopted in the production of all types of food products

4.2.5 Lakes in the Absheron Peninsula

The state has taken significant steps to stop the pollution of Absheron lakes and restore ecosystem functions. Currently, part of Boyukshor Lake has been cleaned and new schemes have been developed for restoration work in other lakes. However, these efforts are not enough, and larger projects are needed to restore the lakes of Absheron. The following measures could help restore the lakes:

- Stop the flow of wastewater into the lakes
- Establish relationships with donor organizations for the implementation of treatment projects
- Plan actions to restore ecosystem services
- Restore Khojasan lake and establish a green belt for its protection
- Rehabilitate Zykh and Bulbula lakes and establish green belts around them

5 POTENTIAL DONORS FOR CLEANUP PROJECTS

Environmental management in Azerbaijan was based on outdated Soviet-era approaches and methods, and it was only after the collapse of the Soviet Union that new perspectives began to emerge. Only a few years after the country gained independence in 1992, leading international organizations began to open offices in Azerbaijan. Projects aimed at environmental management, pollution reduction and rehabilitation of polluted areas began to be implemented in the mid-1990s. Even the first donors have been interested in Azerbaijan since then, and therefore the history of existing donor activities in the field of environmental protection, management and pollution reduction in Azerbaijan does not have a long history. Since 1992, numerous international financial organizations and national donors started to provide technical and expert support to the environmental sector of the country.

The implemented projects are mostly dedicated to increasing the capacity of landfills, ongoing monitoring of pollution, creation of databases, cleanup projects, capacity building and the training of staff etc. In many cases, these organizations have partnered with non-governmental organizations to strengthen civil society and increase the role of local government.

The most active international organizations that have provided support to the environmental sector of the country are as follows:

- World Bank (WB)
- Green Growth Foundation
- Asian Development Bank
- Eurasian Development Bank (EDB)
- İslamic Bank for Development
- European Bank for Reconstruction and Development (EBRD)
- United Nations Development Program (UNDP)
- Global Environment Facility (GEF)
- European Union/European Commission (EU/EC)
- United Nations Economic Commission for Europe (UNECE)
- Organization for Economic Co-operation and Development (OECD)
- Organization for Security and Co-operation in Europe (OSCE)

At the same time, national organizations of many donor countries have begun to provide various levels of assistance to the water sector of Azerbaijan.

These national organizations are:

- United States Agency for International Development (USAID)
- KfW Development Bank (KfW)
- German Agency for International Cooperation (GIZ)
- Japanese International Cooperation Agency (JICA)
- Swedish International Development Cooperation Authority (Sida)
- Turkish İnternational Development Agency (TİKA)
- Kuwait Fund for Arab Economic Development (KF)
- Government of Norway (GoN)

In the final stage of the HPAP process, it is proposed to implement several projects dedicated to environmental issues. These projects are mainly related to air, water and soil pollution.

6 PROPOSED PROJECTS

6.1 PROJECT PROPOSAL 1: REDUCTION OF POLLUTION FROM OLD PESTICIDE SOURCES IN RURAL AREAS AND CREATION OF NEW PESTICIDE MANAGEMENT SCHEMES

6.1.1 Project Summary

The proposed project aims to reduce POPs/pesticide contamination in rural areas of Azerbaijan, increase public awareness on POPs management and health risks, and increase capacity of government and community institutions to reduce exposure of people to obsolete pesticides.
The project has four components:

1. Conducting field assessments and baseline studies of pesticide/POPs contamination in Azerbaijan
2. Building institutional capacity of partner organizations
3. Public awareness raising on pesticide/POPs pollution in Azerbaijan
4. Implementation of cleanups of sites contaminated with pesticides

Specific objectives of the project are as follows:

- To continue detection of old and abandoned POPs/pesticide sites in rural areas of Azerbaijan
- To implement cleanup and remediation of at least 20 old pesticide sites in Azerbaijan
- To raise public awareness about the danger and pathways of POPs exposure in rural places
- To implement capacity building activities for government institutions related to POPs pesticides
- To complete re-packing and isolation work at all identified sites (approximately 80 sites)

6.1.2 Relevant Background

Agricultural and household POPs pesticide use was widespread in Azerbaijan and materials were easily accessible. It is estimated that there are more than 70 POPs pesticide sites in the country that require immediate environmental intervention; many have already been identified and

recorded. It is believed that there are still sites, most likely in rural locations, which have not been identified. In most sites, the POPs are uncontained and may easily migrate to sensitive environmental receptors. The situation has been exacerbated by the accessibility of old pesticide sites. The population may be impacted directly (via pollution of air, water, and land) and indirectly (by ingesting contaminated products).

Several burial sites for disposal of chemicals were established or improved. Under Azerbaijan's 2007-2020 National Implementation Plan more than 2000 tons of obsolete pesticides have been collected, repackaged and transferred to special burial sites. The FAO-led GEF project aims to remove and destroy part of the pesticides and improve pesticide management in Azerbaijan.
Despite these efforts, there are still many concerns over the management of POPs. According to FAO, more than 10000 tons of POPs pesticides in Azerbaijan exist in publicly accessible places.

According to Pure Earth's TSIP 70 more than 70 pesticide sites have been identified and assessed and many remain unidentified and need investigations. All the chemicals are open to the environment and may easily migrate to residential areas via air, soil, and foods. Many sites are very close to water bodies and winds take powder and dust over the houses and water sources very easily. These sites are open to domestic animals for grazing. Regular winds take DDT and other dangerous pesticides over the houses that are very close to the area. Also, if rivers and reservoirs are close, DDT may migrate and be carried to distant places. Currently, about 400,000 people in rural areas of Azerbaijan are known to be directly or indirectly affected by residual pesticides.

Pesticides can migrate into the human body very readily through direct contact, the respiratory tract, and consumption of meat, milk and other foods. The TSIP found that there are many cancers, skin diseases, respiratory diseases and disability in children in the areas close to pesticide stations. According to medical research, in the body, DDT is converted into several breakdown products called metabolites, including the metabolite DDE. DDT and DDE are stored in the body's fatty tissues. In pregnant women, DDT and DDE can be passed to the foetus. Both chemicals are found in breast milk, resulting in exposure to nursing infants.

Currently, pesticide POPs are banned and other pesticides are used instead. However, recent poisonings show that these pesticides and other agricultural chemicals are also dangerous and require special handling. There are no conditions in rural areas for the management of chemical containers. Therefore, the project also includes activities related to the management of pesticides and chemicals and disposal of containers.

The proposed project will reduce exposure to POPs, increase the capacity to manage residual pesticides at both the community and national levels and break pathways between these contaminants and the population. The project will also help to improve chemical management in agriculture and reduce exposure of people to agricultural chemicals that are currently used.

6.1.3 Project Description

The project will be implemented in all rural places of Azerbaijan where obsolete POPs pesticides are found. The project will help to re-assess and create a new database of pesticide sites and assess current amounts of pesticides and locations of sites. The project will also help to improve capacity of the current pesticide burial site in Jangi and transport pesticides from at least 20 locations to the burial site. Remaining sites will be isolated from public access in various ways. Moreover, the project will increase community knowledge about pesticides and ways to manage them. The duration of the project will be 4 years, beginning in 2022.

6.1.4 Project Beneficiaries

- Direct beneficiaries: Populations of the cities and villages where pesticide sites are found (10 cities and 90 villages), approximately, 150,000 people
- Indirect beneficiaries: Populations of cities which consume food from the areas of pesticide sites
- Government institutions (Ministries, laboratories, etc.) will increase their capacity in terms pf pesticide management
- Individuals: Increased knowledge will help local people and families to individually to get protected from negative impacts of POPs pesticides

6.1.5 Intervention Strategy

To change the current situation, the project activities envisage several main directions. The most important of these is public awareness. People in Azerbaijan do not know much about pesticide POPs contamination and its health effects. Therefore, if one goal of the project is to reduce this type of pollution, another goal is to provide people with accurate information about this pollution. Awareness-raising will help radically change the current situation. The problem will become more public and will lead to interventions in the future through various activities.

One of the main intervention strategies will be to conduct active cleanups in many areas and to close the rest areas as public places. This type of isolation and cleaning will have a direct effect on reducing pesticide contamination. All activities will be open and public. This will help to change the situation radically.

Improving institutional capacity, providing farmers in rural areas with equipment, and strengthening ministry laboratories are also interventions aimed at solving the problem.

6.1.6 Implementation Partnerships

The table below provides information on the main project partners and their roles and responsibilities.

Key Institutions	Role and Responsibility
Ministry of Agriculture	Main project partner, coordination of the project
Ministry of Ecology and Natural Resources	Conduct Monitoring of pesticide sites
Ministry of Health	Project evaluation
Khazar University	Provide technical assistance
Local Executive Power/ Municipality	Project partner in community-based activities

6.1.7 Project Outputs

1. Public knowledge regarding POPs pesticide exposure is increased
    a. Targeted groups (people who live near or on contaminated areas) have increased knowledge about POPs pollutants and their health impacts
    b. General public is aware of POPs pollution issues in Azerbaijan and ways to manage existing problems
    c. Government Institutions' staff have more knowledge about POPs pesticides and their negative effects
    d. Targeted groups (Individuals and families, communities) have more knowledge regarding ways to neutralize negative effects of POPs pollution

2. The capacities of relevant institutions on pesticide pollution are improved
    a. Technical conditions of laboratories related to detection of pesticide exposure and pollution are improved
    b. Laboratories of Ministry of Agriculture, Ministry of Ecology and Natural Resources and Ministry of health have POPs detector devices

c. Local communities are provided with portable pesticide detectors
d. Capacity of the Jangi Pesticide Polygon is increased
e. 2 Training sessions on pesticide and container management are conducted
f. 2 New container disposal places are constructed

3. Field assessments of sites are conducted for pesticide sites not included into the TSIP database and a baseline study on pesticide POPs in Azerbaijan is conducted
    a. Field assessments of sites (not included into the TSIP database) are done
    b. Baseline study on pesticide POPs pollution in Azerbaijan is conducted
    c. High level workshop on pesticide POPs pollution in Azerbaijan is organized

4. Level of the pesticide pollution in rural areas are lowered
    a. At least 20 new site assessments were done
    b. At least 20 sites (or 2000 tones) of pesticides were transferred to the burial site in Jangi
    c. Approximately in 80 sites re-packing and insulation works done

6.1.8 Key Project Activities

Component	Activities	Locations	Timeline (Y-Year, Q-quater)	Partners
Component 1. Public awareness raising on pesticide POPs pollution in Azerbaijan				
Output 1 Public knowledge regarding POPs pesticide exposure is increased	Prepare awareness materials and distribute	Baku, target regions	Y1 (Q1-Q2)	Local Municipalities and Executive Power
	Dissemination of information in social media, TV radio	Online, TV, radio	Y1 (Q3-Q4), Y2, Y3, Y4	Ministry of Ecology and Natural resources, Ministry of Agriculture
	Disseminate awareness activities in trainings and seminars for target groups	Target areas	Y2, Y3, Y4	Local Municipalities and Executive Power

Component 2 Conduct field assessments and baseline study on pesticide POPs in Azerbaijan				
Assessment of new pesticide sites Baseline study is conducted	Assessment of new pesticide sites not included into TSIP database	Target areas	Y1, Y2	Local Municipalities and Executive power
	Baseline study on the current situation of pesticide POPs pollution in Azerbaijan	Baku	Y2	Khazar University, National Academy of Sciences
	High Level workshop on pesticide POPs pollution and management in Azerbaijan	Gabala	Y3 (Q4)	All stakeholders
Component 3 Increase institutional capacity of partner organizations				
The capacities of relevant institutions on pesticide pollution and management are improved	One-week training on pesticides for government employees and community members	Baku	Y3	
	Modernization of laboratories of the Ministry of Agriculture and Ecology and Natural Resources	Baku, targeted regions	Y2, Y3	
	Local communities provided with portative pesticide detectors	Target areas	Y1 (Q2-Q4)	Local community members in target areas
	Construction of additional cells and increase capacity of the Jangi Burial Polygon	Jangi	Y1 (Q4), Y2, Y3 (Q1, Q2)	

	Construction of new pesticide container disposal places in 2 pilot districts	Target regions	Y3, Y4	Ministry of Agriculture, Local agricultural department
	Organization of one week farmer training on pesticide and container management	Pilot district	Y2	Ministry of Agriculture, Local agricultural department, local municipalities
Component 4 Implementation of cleanup and insulation activities in pesticide sites				
Level of the pesticide pollution in rural areas were lowered	Identification of sites subject to cleanup	Target regions	Y1 (Q3-Q4, Y2	Local Communities, Ministry of Agriculture Ministry of Ecology and Natural Resources
	Identification of sites subject to repackaging and insulation	Target regions	Y1 (Q3-Q4), Y2	Local Communities, Ministry of Agriculture Ministry of Ecology and Natural Resources
	Cleanup and Transfer of contaminants to burial site	Target regions, Jangi pesticide burial site	Y3, Y4 (Q1, Q2)	Local Communities, Ministry of Agriculture
	Repackaging and Insulation	Target regions	Y3, Y4 (Q1, Q2)	Local Communities, Ministry of Agriculture

6.1.9 Project Budget (Euro)

Budget Line	Total	Year 1	Year 2	Year 3	Year 4
National	200000	50000	50000	50000	50000
International Consultants	200000	50000	50000	50000	50000
National consultants	1000000	250000	250000	250000	250000
Lab equipment for ministries and pilot municipalities		100000	100000	100000	
Subcontracts (cleanup, construction and insulation)	1400000	350000	350000	350000	350000
Meetings	60000	15000	15000	15000	15000
Workshops	30000	-	-	50000	-
Trainings			30000	30000	
Other direct costs	100000	25000	25000	25000	25000
Total Project costs	3290000	840000	870000	920000	740000

6.1.10 Gender Mainstreaming

During the project, special attention will be paid to the active participation of women in all project activities. Women's participation will also be included in the selection of the project working group and consultants. In addition, special attention will be paid to the equal participation of women in trainings and seminars. At the same time, separate consultations will be held with women on the participation of women in working with state and civil society organizations. The number of female participants will be noted as one of the project indicators. All project activities will consider SDG5 (Achieve gender equality and empower all women and girls).

6.1.11 Sustainability of the Project Results

Sustainability should be one of the key outcomes of the proposed project. All ministries, civil society institutions, local municipalities and executive authorities will have important mechanisms to take into account the results of the project in their future activities. To this end, the project has a special component to increase the capacity of partner organizations. This component takes into account the training and preparation of the staff of the partner organization and the representatives of the local community.

The following aspects will fully ensure the sustainability of the project:

- Raising awareness of beneficiaries will provide a full and comprehensive picture of the effects of pollution on target groups. As a result, people's self-advocacy skills and knowledge will increase. People who previously had no knowledge of the pollution they were exposed to will now be able to learn more about pollution.
- The capacity of state and community members who are project partners will be increased. Government agencies will be provided with laboratory equipment to detect pesticide contamination. This will help to quickly identify toxins and carry out the necessary activities, both now and in the future.
- For the first time, a comprehensive study on the effects of pesticides on human health will be conducted in the country. This will make it possible to implement possible preventive measures in areas affected by pesticides.
- Preliminary steps will be taken to manage pesticide containers in the country, and the pilot activities to be implemented will set a good example for similar activities in the future. Pesticide management will be improved in the country.
- Reducing pollution and exposure to pollution will contribute to a healthier generation in the future.
- A very effective mechanism will be developed and implemented to address the problem of pesticide pollution in the country.

6.1.12 Monitoring, Reporting and Evaluation

To monitor and evaluate the project a Results Framework and Monitoring (RFM) will be prepared and used. The RFM will have project indicators which include:

- Project reports and certifications.
- Number of old pesticide sites cleaned and volume of pollutants removed from sites.
- Number of old sites isolated.
- Numbers and types of equipment purchased in installed in laboratories.
- Number of training workshops and awareness seminars conducted, list of participants attended the training sessions.
- Number and content of the dissemination materials, including brochures, videos, radio broadcasts etc

A Monitoring and Evaluation Specialist will monitor these indicators using the M&E system that will be developed. Results will be regularly reported in the implementation progress reports. Implementation progress reports will be prepared and submitted to the Government and the project donor in an agreed format. The project coordinator will also ensure that progress by component

and a technical summary are included in those progress reports. At the end of the project, it will be subjected to a formal evaluation. Depending on agreements between the Government and the donor(s), it could also be subjected to a midterm evaluation halfway through the project.

6.1.13 Communication and Visibility

Information about the project will be disseminated using all possible means. Public meetings, seminars, and training sessions provide information about the project to a wide audience. Brochures, leaflets, and other publications will help make the project accessible to the general public. In addition, the project will have its own information page on social networks. It is planned to deliver information to people through television and radio.

Donor information will be provided to participants and beneficiaries throughout the project. It will be important to include information about donors in all advertisements, banners and other activities.

6.2 PROJECT PROPOSAL 2. IMPROVING AIR QUALITY IN BAKU AND SUMGAIT CITIES

6.2.1 Project Summary

The proposed project aims to reduce air pollution in the cities of Baku and Sumgait in Azerbaijan, increase public awareness of air pollution and its health effects and increase the *c*apacity of government and community institutions to reduce exposure to air pollutants. In Baku and Sumgait there are major issues of air pollution due to improper emission management from mobile sources, solid wastes, construction sites and production units.

The project has four components:

1. Public awareness raising on air pollution and its health effects in Azerbaijan
2. Develop a roadmap to reduce air pollution and submit it to the government
3. Increase institutional capacity of partner organizations
4. Carry out pilot activities to reduce air pollution from various sources

6.2.2 Relevant Background

Industrialization and urbanization over the past 30 to 35 years have resulted in significant deterioration of ambient air quality in urban areas of Azerbaijan. According to data, 96% of the

atmospheric pollution emissions are concentrated in 3 main cities of Azerbaijan Baku, Ganja and Sumgait.

Currently, the major pollution sources in Baku and Sumgait cities are as follows:

- **Motor vehicles:** The number of pollutants emitted into the atmosphere from motor vehicles has been growing rapidly over the last 30 years. This trend is due to the rapid increase in the number of used cars imported into the country and the long-term use of new cars. According to official data, more than 75% of cars used in Azerbaijan are cars have been in service for more than 10 years. Mobile sources are accountable for almost 80% of air pollution in Azerbaijan. Although one of the reasons for the toxic gases emitted into the air from transport sources is the abundance of traffic, another reason is the weak general road network and the poor functioning of public transport.
- **Solid waste:** Solid waste is currently one of the main sources of deterioration of air quality in major cities. Although there are improvements in waste management in large cities, there are serious problems in waste reduction, sorting and processing.
- **Construction sites:** Over the past 20 years, the volume of construction work in major cities of the country has increased more than 20 times; in 2019 alone the value of construction exceeded 11 billion manat. Intensive construction work is carried out mainly in the form of housing construction in large cities. Norms are often not followed during construction. Dust and solid particles enter the air during excavations, material transportation and demolition works.
- **Stone quarries:** Stone quarries near Baku and Sumgait are also a major source of dust. Thus, large volumes of dust from these quarries can be carried to cities by wind.
- **Oil, gas, and petrochemical industries:** Although the share of the oil, gas and petrochemical industries in air pollution is currently declining, enterprises in Baku and Sumgait continue to pollute the air. Another source is old oil wells, which also cause various pollutants to enter the atmosphere.
- **Chemical and petrochemical, steel entities; and power plants; and small and medium-size enterprises:** Although the share of these areas in air pollution is relatively small, solid particulate pollution mainly affects the areas around the facilities.
- **Other sources include:**
    - oil and gas extraction installations and oil refineries;
    - electric and heating energy production entities;
    - fugitive emissions from the commercial and residential sector.

The aforementioned sources are considered to be the main sources of air pollution, responsible for increase in NOx, PM2.5, PM10, organic chemical, and CO emissions. Historically, the proportion of emissions from transport in Azerbaijan was 30-40%. Because of economic growth the number of vehicles is steadily increasing, and the problem is also due to an increase in poorly maintained

old vehicles using low-quality fuel. More than 90% of all vehicles are more than five years old (foreign models, mostly used cars), and the average age of vehicles is around 15 years.
In addition, the system of vehicle inspection for checking vehicle emissions (qualified staff, technical equipment; lack of finance; low salary of inspectors) is very poor. Heavy traffic; bad road conditions; lack of bypasses in most cities also contribute to increased vehicle emissions.

In general, the ambient air quality in Azerbaijan has improved in recent years as a consequence of the sharp decrease in air emissions from stationary sources. The Ministry of Ecology and Natural Resources has commissioned nine stationary air monitoring centers meeting modern standards in major cities of the country and plans to increase their number in the near future. At the same time, the transition to Euro 4 environmental emissions standards has been applied since 2014 on harmful substances emitted into the atmosphere from vehicles produced in the country. Beginning in 2021, Azerbaijan plans to start producing fuel that meets Euro 5 standards.
Despite the measures taken, urban air pollution remains a matter of ongoing concern. Air quality data in Azerbaijan is collected by the Monitoring Department of the Ministry of Ecology and Natural Resources. According to official data, the air pollution emissions peaked in 1991 – 2,1 million tons; and has declined since that time (about 0,4 million – 0,2 million tons). Despite lower total emissions, air pollution is still perceived as critical. The annual mean concentration level of soot in air in Baku at 60-90 µg/m^3 (depending on the source of information) is three to five times higher than World Health Organization standards. İt is projected that current and projected economic growth will further result in unsustainable deterioration of urban air quality because of lack of the proper management schemes.

The project persented aims to reduce emissions from various sources and is aimed at solving existing problems in this area. The project aims to make both practical and policy improvements in transport, solid waste management, and waste reduction, and to create new opportunities for the government in this area.

6.2.3 Project Description

The projec will be implemented in Baku and Sumgait. The project will assist local governments, transport departments and ministries, owners of the construction sites and enterprises to reduce hazardous pollutant emissions to air.
Specific project goals are as follows:

- Raise public awareness about air pollutants and their health effects
- Conduct a baseline study on the health effects of atmospheric emissions in Azerbaijan

- Develop a roadmap to reduce emissions from the transport sector and submit it to the government
- Prepare proposals to strengthen the legislative framework for air protection
- Develop and submit a roadmap to the government to improve solid waste management
- Develop and submit to the government a roadmap to reduce emissions from businesses and construction sites
- Carry out pilot activities to reduce emissions from all sources
- Implement pilot activities to improve air quality, transport movement and solid waste recycling

6.2.4 Intervention Strategy

To change the current situation, the project activities envisage several main directions. The most important of these is public awareness. People in Azerbaijan do not know much about negative effects of air pollution on public health and there are no studies that reflect the current situation. Support of studies on the health effects of air pollution will help the public to understand the problem properly.

Another important goal of the study is to develop roadmaps for various sectors that will enable them to reduce emissions. The roadmap will include both policy and structural solutions. Policy solutions will include improvement of the legal basis and fiscal mechanisms driven by government and cap and trade policies.

One of the main intervention strategies will be to conduct active interventions in the form of pilot projects. These activities will include construction of pilot sites for solid waste accumulation, improvement of transport in the road network, designing of new road mechanisms and implementation of new technologies.

Improving institutional capacity, providing organizations with monitoring equipment, and additional capacity building activities (trainings, seminars, and workshops) are also interventions aimed at solving the problem.

6.2.5 Implementation Partnerships

The table provides information on the main project partners and their roles and responsibilities.

Key Institutions	Role and Responsibility
Ministry of Ecology and Natural Resources	Main project partner, coordination of the project
Ministry of Transport	Project partner, coordination of the project on transport issues
Baku Transport Agency	Project partner in Baku, coordination of the project on transport issues
Sumgait Executive Power	Project partner in Sumgait, coordination of the project on transport issues and solid waste management
Baku Executive Power	Project Partner on Solid Waste Management
Tamiz Shahar (Clean city)	Project partner on solid waste recycling
Ministry of Health	Project evaluation
Khazar University	Provide technical assistance

6.2.6 Project Outputs

1. **Public knowledge regarding air pollution and its health effects of air pollution is increased**
    a. Baseline study on health effects of air pollution is conducted
    b. Targeted groups (Baku and Sumgait city residents who are exposed to negative effects of air pollution) have improved knowledge about air pollutants and their health impacts
    c. General public is aware of air pollution issues in Azerbaijan and ways to manage existing problems
    d. Government institutions' staff have more knowledge about air pollutants and their negative effects
    e. Targeted groups (Individuals and families, communities) have more knowledge regarding reduction of negative effects of air pollution

2. **Roadmap to reduce air pollution for various sectors are developed and introduced to the government**
    a. Roadmap and recommendations to reduce air pollution from enterprises and construction sites are developed and introduced to partner organizations
    b. Field assessment, roadmap, and recommendations to reduce air pollution from mobile sources are developed and introduced to partner organizations

c. High level workshop on air pollution and its health effects in Azerbaijan is organized

3. **The capacities of relevant institutions on air pollution are improved**
    a. Technical Conditions for stationary monitoring of air pollution in Baku and Sumgait cities are improved
    b. Laboratories of Ministry of Ecology and Natural Resources and the Ministry of Transport have mobile air pollution detectors
    c. Companies in a pilot program are provided with portable air pollutant detectors
    d. The capacity of the Balakhani landfill is increased
    e. Ten new solid waste sorting and disposal facilities are constructed
    f. Three training sessions on air quality management, modelling and its health effects for government employees are conducted
    g. Partner organizations (Baku Transport Agency and Sumgait Executive Power) have air quality modelling software

4. **Levels of air pollution in Baku and Sumgait cities are reduced**
    a. Pilot activities on improvement of public transport in Baku and Sumgait are done
    b. Pilot activities on improvement of road network in Baku and Sumgait are done
    c. Pilot activities on construction of new waste disposal and sorting sites are done
    d. Pilot activities on recycling and reuse of solid wastes are done

6.2.7 Key project activities

Component	Activities	Locations	Timeline (Y-Year, Q-quater)	Partners
Component 1. Public awareness raising on air pollution and its health effects in Azerbaijan				
Output 1 Public knowledge regarding air pollution and its health effects is increased	Prepare awareness materials and distribute	Baku, Sumgait	Y1 (Q1-Q2)	Local Municipalities and Executive Power
	Baseline study on air pollution and its health effects is conducted	Baku, Sumgait	Y1, Y2 (Q1, Q2)	All stakeholders

	Dissemination of information in social media, TV radio	Online, TV, radio	Y1, Y2, Y3, Y4	All stakeholders
	Disseminate awareness activities in trainings and seminars for target groups	Baku, Sumgait	Y2 (Q3, Q4), Y3, Y4	All stakeholders
Component 2. Develop a roadmap to reduce air pollution and submit it to the government				
Roadmap to reduce air pollution for various sectors are developed and introduced to government	Roadmap and recommendations to reduce air pollution from enterprises and construction sites are developed and introduced to partner organizations	Baku, Sumgait	Y2	Ministry of Ecology and Natural resources, Ministry of Transport Baku Transport Agency Sumgait Executive Power
	Field assessment, roadmap, and recommendations to reduce air pollution from mobile sources are developed and introduced to partner organizations	Baku, Sumgait	Y2	Ministry of Transport Baku Transport Agency Sumgait Executive Power
	High level workshop on air pollution and its health effects in Azerbaijan is organized	Baku, Sumgait	Y3 (Q1)	All stakeholders
Component 3. Increase institutional capacity of partner organizations				
Capacity of partner organizations are increased	3 trainings on air quality management, modelling, and its health effects for government employees	Baku	Y3 (Q1, Q2, Q3)	
	Provision of partner organizations air quality modelling software	Baku, Sumgait	Y3	Baku Transport Agency and Sumgait Executive Power

				Ministry of Ecology and Natural resources
	Improvement of technical Conditions on stationary monitoring on air pollution in Baku and Sumgait cities with installment of 20 stationary monitoring stations	Baku, targeted regions	Y2, Y3	
	Provision of laboratories of Ministry of Ecology and Natural resources, Ministry of Transport and pilot companies with portative air pollutant detectors	Target areas	Y2 (Q2-Q4)	Local community members in target areas
Component 4. Carry out pilot activities to reduce air pollution from various sources				
Level of the air pollution in Baku and Sumgait is lowered	Identification of places for pilot constructions of waste sites sorting	Target regions	Y1 (Q3-Q4, Y2	Local Communities, Ministry of Agriculture Ministry of Ecology and Natural Resources
	Construction of 10 New pilot solid waste sorting and disposal places	Target regions	Y1 (Q3-Q4), Y2	Tamiz Shahar OJSC Sumgait Municipality
	Increase capacity of the Balakhani and Sumgait landfills	Balakhani, Sumgait	Y1 (Q4), Y2, Y3 (Q1, Q2)	Tamiz shahar OJSC Sumgait Executive Power

	Pilot improvements in road transport in Baku and Sumgait	Baku, Sumgait	Y3, Y4 (Q1, Q2)	Baku Transport Agency Sumgait Executive power
	Pilot activities on recycling and reuse of organic and paper based solid wastes	Baku, Sumgait	Y3, Y4	Local Companies

6.2.8 Project Budget (Euro)

Budget Line	Total	Year 1	Year 2	Year 3	Year 4
Staff	240000	60000	60000	60000	60000
International Consultants	320000	80000	80000	80000	80000
National consultants	600000	150000	150000	150000	150000
Air pollution detectors and stationary air pollution devices	1000000		500000	500000	
Subcontracts (trainings, software installment and construction)	1600000	400000	400000	400000	400000
Meetings	60000	15000	15000	15000	15000
Workshops	30000			50000	
Trainings	90000			90000	
Other direct costs	100000	25000	25000	25000	25000
Total Project costs	4040000	730000	1230000	1370000	730000

6.2.9 Gender Mainstreaming

During the project, special attention will be paid to the active participation of women in all project activities. Women's participation will also be included in the selection of the project working group and consultants. In addition, special attention will be paid to the equal participation of women in trainings and seminars. At the same time, separate consultations will be held with women on the participation of women in working with state and civil society organizations. The number of female participants will be noted as one of the project indicators. All project activities will consider SDG5 (Achieve gender equality and empower all women and girls).

6.2.10 Sustainability of the Project Results

Sustainability should be one of the key outcomes of the proposed project. All ministries, civil society institutions, local municipalities and executive authorities will have important mechanisms to take into account the results of the project in their future activities. To this end, the project has a special component to increase the capacity of partner organizations. This component takes into account the training and preparation of the staff of the partner organization and the representatives of the local community.

The following aspects will fully ensure the sustainability of the project:

- Raising awareness of beneficiaries will provide a full and comprehensive picture of the effects of pollution on target groups. As a result, people's skills and knowledge of how to protect themselves from harmful effects will increase. People who previously had no knowledge of the air pollution health effects will now be able to learn more about it and how to protect themselves during hazardous days.
- The capacity of state and community members who are project partners will be increased. Government agencies will be provided with nessesary equipment to detect air pollutants. Companies will be able to use pollutant detectors at their sources and take action to reduce pollutants. This will help to quickly identify toxins and carry out the necessary activities, both now and in the future.
- For the first time, a comprehensive study on the effects of air pollutants on human health will be conducted in the country. This will make it possible to implement possible preventive measures in areas affected by air pollutants.
- Preliminary steps will be taken to manage air pollution and forecast it in big cities. Air pollution management will be improved in the country.
- Reducing pollution and exposure to pollution will contribute to a healthier generation in the future.
- A very effective mechanism will be developed and implemented to address the problem of air pollution in the country.
- The developed in the process will help government to imrove air quality and reduce air pollution from various sources

6.2.11 Monitoring, Reporting and Evaluation

To monitor and evaluate the project Results Framework and Monitoring (RFM) will be prepared and used. The RFM will have project indicators which include:

- Project reports and certifications
- Roadmaps developed to manage air pollution and reduce it

- Number of pilot projects
- Project partners provided with air quality modeling software
- Workshops on air pollution and its health effects completed
- Baseline study on air pollution and its health effects completed
- Number of stationary monitoring equipment that are purchased and installed
- Number of training workshops and awareness seminars conducted, including lists of participants attending the training sessions.
- Number and content of the dissemination materials, including brochures, videos, radio broadcasts, etc.

A Monitoring and Evaluation Specialist will monitor these indicators using the M&E system that will be developed. Results will be regularly reported in the implementation progress reports. Implementation progress reports will be prepared and submitted to the Government and the project donor(s) in an agreed format. The project coordinator will also ensure that progress by component and a technical summary are included in those progress reports. At the end of the project, it will be subjected to a formal evaluation. Depending on agreements between the Government and the donor(s), it could also be subjected to a midterm evaluation halfway through the project.

6.2.12 Communication and Visibility

Information about the project will be disseminated using all possible means. Public meetings, seminars, and training sessions will also provide information about the project to a wide audience. Brochures, leaflets, and other publications will help make the project accessible to the general public. In addition, the project will have its own information page on social networks. It is planned to deliver information to people through television and radio.

Donor information will be provided to participants and beneficiaries throughout the project. It will be important to include information about donors in all advertisements, banners and other activities.

6.3 PROJECT PROPOSAL 3: REMEDIATION OF OIL CONTAMINATED AREAS ON THE ABSHERON PENINSULA, INCLUDING THE PILOT SITE NEAR THE ZYKH LAKE

6.3.1 Project Summary

The proposed project aims to clean 100 hectares of land around Lake Zykh on the Absheron Peninsula from oil products and other pollutants. The area is very close to the Gunashli residential area of Baku. The smell of various chemicals is easily detected in the area. PAHs, heavy metals and a broad range of toxic chemicals are the normal constituents of crude oil, which have many types of health effects. High levels of cadmium, copper, detergents, manganese, and petroleum products are found in the ground and bottom sediments of Lake Zykh. Measurements confirm that the radiation level in the area is five to ten times higher than the accepted norms. Local research shows that this pollution causes various diseases among people living nearby.

The project has three components:

1. Prepare a master plan with the Ministry of Ecology and Natural Resources to continue cleaning up oil-contaminated areas of Azerbaijan
2. Implement cleanup and isolation activities in the Zyhk Lake area and clean at least 100 ha of contaminated land
3. İmplement capacity building activities for stakeholders and project partners and increase public awareness of oil pollution in Azerbaijan

Specific objectives of the project are as follows:

- To assess oil contaminated areas of the Absheron Peninsula to identify the scale and area of the pollution
- To implement cleanup and remediation in the Zyhk Lake area (100 ha)
- To obtain modern survey and monitoring devices and sampling technologies for soil, water and air
- To raise public awareness about the danger and pathways of contaminants from oil polluted areas
- To implement capacity building activities for government institutions related to soil management in the Absheron Peninsula

6.3.2 Relevant Background and Project Description

Old oil wells are the main sources of pollution on the Absheron Peninsula, which is most urbanized area of Azerbaijan. Over 30,000 hectares may have been contaminated by oil products, according to the World Bank.

Oil production in the Absheron Peninsula is at least 150 years old and no environmental standards have been met during this time. Oil production has been based on artisanal methods for at least 100 years, and such production continued during the Soviet era, until 1993. Currently, large-scale oil pollution is observed on the Absheron Peninsula. Oil-contaminated areas can be found both in and around Baku. In many cases, produced water from old oil wells flows directly into the Caspian Sea and has a negative impact on marine ecology. In recent years, as a result of numerous initiatives, the area of about 1,000 hectares has been cleared of oil. However, according to preliminary estimates of the World Bank, the total area of oil-contaminated lands is more than 30,000 hectares. In these places, oil products and heavy metals exceed the norms by several factors. At the same time, radiation levels in the area are very high. The potentail for health impacts from oil pollution is high. A large number of diseases are observed in the population living in oil-contaminated areas. Cancer, respiratory diseases, nervous problems, and stunted growth in children are among the main symptoms of oil pollution. However, more comprehensive studies are needed to identify this impact.

Remediation of oil contaminated sites on the Absheron Peninsula is a priority for the government of Azerbaijan. During the HPAP process the Ministry of Ecology and Natural Resources proposed to include this project idea as a priority action.

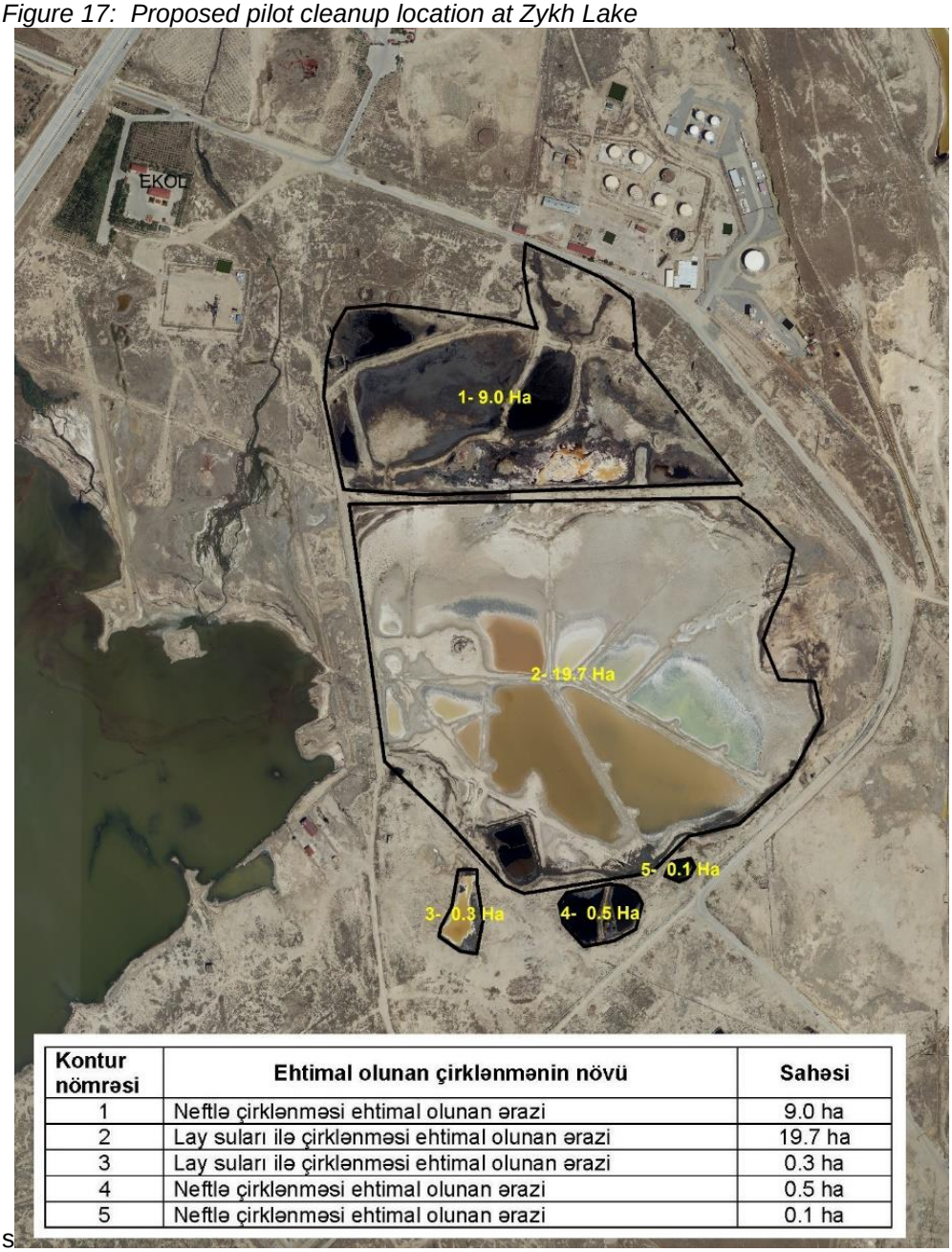
The proposed project will enable the reduction of exposure to oil PAHS, heavy metals and other petroleum components and improve public health on the Absheron Peninsula, which is highly urbanized. The project will also help to create a foundation for further actions regarding cleanups and public awareness activities. Within this project cleanup of 100 ha of the land is considered. The project will help to clearly identify the scale of oil pollution in Azerbaijan, including the presence of POPs; increase the capacity of institutions managing oil contaminated areas; and increase public awareness about oil contamination. The project will also support a study of health impacts of oil pollution.

The project will be implemented on the Absheron Peninsula of Azerbaijan, where cleanup of oil contaminated lands is a high priority for the government of Azerbaijan.

6.3.3 Information on the Area around Zykh Lake, where the Water is Polluted with Salt and Oil Wastes

The pilot cleanup area is located near Zykh Lake on the Absheron Peninsula (Figure 25). The Azerbaijani government has attempted several times to complete a cleanup in the area, but due to funding limitations support of the project was declined.

Figure 17: Proposed pilot cleanup location at Zykh Lake



Kontur nömrəsi	Ehtimal olunan çirklənmənin növü	Sahəsi
1	Neftlə çirklənməsi ehtimal olunan ərazi	9.0 ha
2	Lay suları ilə çirklənməsi ehtimal olunan ərazi	19.7 ha
3	Lay suları ilə çirklənməsi ehtimal olunan ərazi	0.3 ha
4	Neftlə çirklənməsi ehtimal olunan ərazi	0.5 ha
5	Neftlə çirklənməsi ehtimal olunan ərazi	0.1 ha

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The total area of the area is 73.0 hectares
Oil-contaminated area -9.6 ha
Area contaminated with produced water -20.0 ha
Depth of contaminated area -1 m-3 m
Probable volume of oil sludge – 250,000-340,000 m3
Probable volume of soil impacted by saline produced water -400,000-550,000 m3

6.3.4 Project Beneficiaries:

- Direct beneficiaries: Population of the Baku, Zykh and Gunashli residential areas. An approximate number of beneficiaries is 1 500,000 people.
- Indirect beneficiaries: Population of Azerbaijan, which consumes food (fish) from the Caspian Sea.
- Government institutions (Ministries, laboratories, etc.): Will increase their capacity in terms of sampling and surveying contaminated areas
- Individuals: Improved knowledge will help local people and families to individually protect themselves from negative impacts of oil pollution

6.3.5 Intervention Strategy

To change the current situation, the project activities envisage several main directions. The project team intends to work in parallel in all these areas. The first direction will be to study the scale of oil pollution on the Absheron Peninsula and adjacent areas. For this purpose, a large-scale sampling program will be carried out and contaminated areas will be identified, mapped and classified according to the level of pollution.

Another direction is to study the impact of oil pollution on the public health. For this purpose, the partner organization will collect biometric information about diseases among the population in the area. If necessary, in partnership with the of Ministry of Health, blood samples will be collected and tested from residents living in the oil polluted areas.

The third main direction is the implementation of a cleanup project on an area of 100 hectares. For this purpose, at least 30 ha of the land will be cleared from contaminants and remediated. Firstly, soil from 30 ha of area will be excavated and placed in special membrane-lined cells and buried.

This will enable to isolation of contaminated soil from the area so that other remediation steps can proceed.

The fourth important direction is to increase public awareness. People in Azerbaijan do not know much about the consequences of oil contamination and its health effects. Therefore, if one goal of the project is to reduce this type of pollution, another goal is to provide people with accurate information about the pollution. Awareness-raising will help radically change the current situation. The problem will become more public and will lead to interventions in the future through various activities.

6.3.6 Implementation Partnerships

The table below provides information on the main project partners and their roles and responsibilities.

Key Institutions	Role and Responsibility
Ministry of Ecology and Natural Resources	Conduct Monitoring of oil contaminated areas Implementation of cleanup project
Ministry of Health	Conduct field samplings and assess impact of contaminants on the health
Khazar University	Technical backstopping in a health study activity
Local Executive Power/ Municipality	Project partner in community-based activities

6.3.7 Project Outputs

1. **The level of oil pollution in the whole territory of Absheron will be determined, classified and mapped**
    a. The level of oil pollution will be measured in and around the Absheron area
    b. All contaminated areas will be classified and mapped
    c. Priority areas for cleanup will be identified for the future
    d. A baseline study of oil pollution and its negative health effects will be conducted
    e.
2. **The capacities of relevant institutions and public knowledge regarding oil pollution will be increased**
    a. Targeted groups (people who live near polluted sites) will have sufficient knowledge about pollutants and their health impacts

b. The general public will be aware of oil pollution issues in Azerbaijan and ways to manage existing problems
c. Government Institutions' staff will have more knowledge regarding oil contaminants and their negative effects
d. Technical conditions of laboratories related to assessing pollution will be improved
e. Laboratories of the Ministry of Ecology and Natural Resources and Ministry of Health will have advanced field instruments for detecting contamination

3. **Nearly 100 ha of the oil contaminated land is restored**
   a. Polluted soil from 30 ha of land will be collected and insolated using membrane-lined cells and buried
   b. Drought and pollution tolerant trees will be planted on an area of 100 hectares
   c. All trees in the area of 100 hectares will be irrigated by modern drip irrigation
   d. The level of the pollution in the area after the cleanup will be measured

6.3.8 Key Project Activities

Component	Activities	Locations	Timeline (Y-Year, Q-quater)	Partners
Component 1. Preparation of a master plan with the Ministry of Ecology and Natural Resources to continue cleaning oil-contaminated areas of Azerbaijan in the future				
Output 1 The level of oil pollution in the whole territory of Absheron was determined, classified, and mapped	The level of oil pollution was measured in and around the Absheron area	Target areas	Y1 (Q2-Q4)	Ministry of Ecology and Natural Resources
	All contaminated areas have been classified and mapped	Target areas	Y1 (Q3-Q4)	Ministry of Ecology and Natural resources,
	Priority cleaning areas have been identified for the future	Target areas	Y2, Y3	Ministry of Ecology and Natural resources

	Baseline study on oil pollution and its negative effects is conducted		Y1, Y2	Ministry of Ecology and Natural resources Ministry of Health Khazar University
İmplement capacity building activities for stakeholders and project partner and increase Public awareness raising on oil pollution in Azerbaijan				
The capacities of relevant institutions and public knowledge regarding oil pollution is increased	Targeted groups (people who live nearby of polluted sites) have sufficient knowledge about pollutants and their health impacts	Baku	Y2, Y3	Local residents Public
	Laboratories of Ministry of the Ministry of Ecology and Natural Resources and Ministry of health have advanced field detectors and sampling technologies	Baku, targeted regions	Y1 (Q1-Q2)	Ministry of Ecology and Natural Resources Ministry of Health
	Construction of membrane cells and increase capacity of the Toxic substances Polygon	Jangi	Y2	Ministry of Ecology and Natural Resources
	General public are aware of oil pollution issues in Azerbaijan and ways to manage existing problems		Y2,Y3	Local residents
	Government Institutions' staff have more knowledge regarding oil contaminants and their negative effects		Y2	Ministry of Ecology and Natural Resources Ministry of Health
Component 3. Implementation of cleanup and insulation activities in the Zykh Lake area and clean at least 100 ha of contaminated land				

Levels of the oil pollution in the target area were lowered	Pollutants from 30 ha of land is collected and insulated using membrane-cells and buried	Target regions	Y2, Y3	Ministry of Ecology and Natural Resources
	Drought and pollution tolerant trees have been planted on an area of 100 hectares	Target regions	Y3, Y4	Ministry of Ecology and Natural Resources
	All trees in 100 hectares are irrigated by modern drip irrigation	Target regions	Y3, Y4 (Q1, Q2)	Ministry of Ecology and Natural Resources
	Level of the pollution was measured in the area after the cleanup	Target regions	Y4 (Q1, Q2)	Ministry of Ecology and Natural Resources

6.3.9 Project Budget (Euro)

Budget Line	Total	Year 1	Year 2	Year 3	Year 4
National	200000	50000	50000	50000	50000
International Consultants	160000	40000	40000	40000	40000
National consultants	300000	100000	100000	100000	
Lab equipment for ministries and pilot municipalities	600000	200000	200000	200000	
Subcontracts (cleanup, construction and insulation)	1500000	400000	400000	400000	300000
Meetings	60000	15000	15000	15000	15000
Workshops	30000	-	-	50000	-
Trainings			30000	30000	
Other direct costs	100000	25000	25000	25000	25000
Total Project costs	2950000	830000	860000	910000	430000

6.3.10 Gender Mainstreaming

During the project, special attention will be paid to the active participation of women in all project activities. Women's participation will also be included in the selection of the project working groups and consultants. In addition, special attention will be paid to the equal participation of women in training and seminars. At the same time, separate consultations will be held with women on the participation of women in working with state and civil society organizations. The number of female participants will be noted as one of the project indicators. All project activities will consider SDG5 (Achieve gender equality and empower all women and girls).

6.3.11 Sustainability of the Project Results

Sustainability should be one of the key outcomes of the proposed project. All ministries, civil society institutions, local municipalities and executive authorities will have important mechanisms to take into account the results of the project in their future activities. To this end, the project has a special component to increase the capacity of partner organizations. This component takes into account the training and preparation of the staff of the partner organizations and the representatives of the local community.

The following aspects will fully ensure the sustainability of the project:

- Raising awareness of beneficiaries will provide a full and comprehensive picture of the effects of pollution on target groups. As a result, people's skills and knowledge about how to protect themselves will increase. People who previously had no knowledge of the pollution they were exposed to will now learn more about pollution.
- The capacity of state and community members who are project partners will be increased. Government agencies will be provided with laboratory equipment to detect oil contamination. This will help to quickly identify toxins and carry out the necessary activities, both now and in the future.
- For the first time, a comprehensive study on the effects of oil pollutants on human health will be conducted in the country. This will make it possible to implement possible preventive measures in areas affected by oil contaminants.
- A pilot project will be implemented to reduce oil contamination in the target area. These pilot activities will set a good example for similar activities in the future. Oil pollution management will be improved in the country.
- Reducing pollution and exposure to pollution will contribute to a healthier generation in the future.

- A very effective mechanism will be developed and implemented to address the problem of oil pollution in the country.

Monitoring, Reporting, and Evaluation

To monitor and evaluate the project a Results Framework and Monitoring (RFM) will be prepared and used. The RFM will have project indicators which include:

- Project reports and certifications.
- The size of the remediated pilot area and the volume or mass of waste and polluted soil removed from the site and isolated
- Number of priority sites identified for future action
- Type and amount of equipment purchased in installed in laboratories
- Number of training workshops and awareness seminars conducted, including lists of participants attending the training sessions.
- Number and content of the dissemination materials, including brochures, videos, radio broadcasts, etc.

A Monitoring and Evaluation Specialist will monitor these indicators using the M&E system that will be developed. Results will be regularly reported in the implementation progress reports. Implementation progress reports will be prepared and submitted to the Government and the project donor(s) in an agreed format. The project coordinator will also ensure that progress by component and a technical summary are included in the progress reports. At the end of the project, it will be subjected to a formal evaluation. Depending on agreements between the Government and the donor(s), it could also be subjected to a midterm evaluation halfway through the project.

6.3.12 Communication and Visibility

Information about the project will be disseminated using all possible means. Public meetings, seminars, and training sessions will also provide information about the project to a wide audience. Brochures, leaflets, and other publications will help make the project accessible to the general public. In addition, the project will have its own information page on social networks. It is planned to deliver information to people through television and radio.

Donor information will be provided to participants and beneficiaries throughout the project. It will be important to include information about donors in all advertisements, banners and other activities.

6.4 PROJECT PROPOSAL 4. LEAD PROGRAM FOR AZERBAIJAN

6.4.1 Project Summary

The proposed project aims to test lead concentration levels in environment, food and reduce lead pollution in Azerbaijan, increase public awareness of lead pollution and its health effects and increase the capacity of government and community institutions to reduce exposure to the lead. For this purpose, it is planned to take samples from various receptors, staple foods, household items, children's toys, air, soil, water bodies and anything that can be contaminated with lead. This activity will allow to study the levels of lead pollution in Azerbaijan. The main sources of lead pollution in Azerbaijan are believed to be mines, ore refineries, imported products, lead-acid batteries, and household waste. The main components of the project are:

1. Public awareness raising on lead pollution and its health effects in Azerbaijan
2. Develop a roadmap to reduce lead pollution and submit it to the government
3. Increase institutional capacity of partner organizations
4. Carry out pilot activities to reduce lead pollution from various sources

6.4.2 Relevant Background

Currently, lead pollution is one of the world's major environmental problems. Lead pollution has a huge impact on health and primarily causes diseases of the nervous system, kidneys and cardiovascular system. Lead exposure also affects the oxygen carrying capacity of the blood. The lead effects most likely to be encountered in current populations are neurological effects in children. Infants and young children are especially sensitive to lead exposures, which may contribute to behavioral problems, learning deficits and lowered IQ.

Although numerous projects have been implemented in Azerbaijan to identify pollutants, the level of lead pollution has been relatively poorly studied. During the TSIP project, high levels of lead were identified in all lakes around Baku, in the mines in the Dashkesan region, as well as in the lands in the industrial zone of Baku and Ganja. During the TSIP project, two lead-contaminated sites were registered in Ganja and 15 in Baku. However, lead levels in receptors such as food, household items, and children's toys have not been studied. At the same time, studies in neighboring countries (eg, Iran and Georgia) have identified high concentrations of lead contamination in all types of food (e.g, dairy, meat and fish products, spices), children's toys, household items, and so on. At the same time, high levels of lead were found in the waters of transboundary rivers coming to Azerbaijan from neighboring countries.

Based on both research in neighboring countries and the current situation in Azerbaijan, it can be concluded that a complete and comprehensive study of lead pollution in Azerbaijan is necessary.

Currently, the main sources of lead pollution in Azerbaijan are believed to be:

- Mining and ore processing enterprises. Studies show that lead pollution is many times higher than normal in the mines of the Karabakh region, as well as in many areas where lead pollution occurs in the territory of the old ore refinery in the Dashkesan region.
- Used lead-acid batteries. At present, there is no centralized enterprise in Azerbaijan engaged in the collection and recycling of used car batteries. These types of batteries are very poorly controlled or regulated and are often recycled by hand. During the TSİP, two unsound lead-acid battery recycling sites were identified in Ganja city of Azerbaijan.
- Imported items (children's toys, dishes, etc.). At present, no samples have been taken from imported items. However, research in neighboring countries suggests that such items may contain lead.
- Imported food. Recent research shows that most countries in the region are exposed to lead-contaminated foods, mainly baby food, spices and so on that are imported. At the same time, lead can be found in the meat of fish in the lakes around Baku, which are polluted with lead.
- Landfills. Lead also enters the atmosphere, soil and water during the incineration of household waste. If we take into account that there are few landfills in Azerbaijan that meet the standards and waste is incinerated in small and medium towns and villages, then these landfills can also potentially be a source of lead exposures.
- Other potential sources are expected to be identified within the project.

6.4.3 Project Description

The projec will cover all territories of Azerbaijan, including Karabakh region. The project will assist local governments, agencies, business representatives catering facilities, homeowners, residents and enterprises to reduce lead hazard levels and risks of exposure to the lead pollution.
Specific project goals are as follows:

- Conduct rapid market assessment to identify potential lead-contaminated products
- Conduct a baseline study on blood lead levels and health effects of lead pollution in Azerbaijan

- Based on the above sampling projects, conduct a source analysis study to identify major lead pollution and exposure sources
- Raise public awareness about lead pollution and its health effects
- Develop a roadmap to reduce lead pollution and submit it to the government
- Prepare proposals to strengthen the legislative framework for pollution with lead
- Develop and submit a roadmap to the government to improve solid waste management
- Carry out pilot activities to reduce lead exposure from certain sources

6.4.4 Intervention Strategy

To change the current situation, the project activities envisage several main directions. The most important of these is public awareness. People in Azerbaijan have no information about lead pollution and its negative effects on public health and there are no studies that reflect the current situation related to lead pollution. Support of studies on the health effects of lead pollution will help the public to understand the problem properly. Therefore, the project aims to make lead exposure assessment based on massive samplings on food, daily items and everything that may be contaminated with lead.

Another important goal of the study is to develop roadmaps for various sectors that will enable them to reduce pollution levels and exposure to lead. The roadmap will include both policy and structural solutions. Policy solutions will include improvement of the legal basis and fiscal mechanisms driven by government and cap and trade policies.

One of the main intervention strategies will be to conduct active interventions in the form of pilot projects. These activities will include construction of pilot sites for collection of lead-acid batteries, support state food agency to increase its capacity on control to lead pollution.
Improving institutional capacity, providing organizations with monitoring equipment, and additional capacity building activities (trainings, seminars, and workshops) are also interventions aimed at solving the problem.

6.4.5 Implementation Partnerships

The table provides information on the main project partners and their roles and responsibilities

Key Institutions	**Role and Responsibility**
Ministry of Ecology and Natural Resources	Main project partner, coordination of the project
State Agency on Food Safety	Project partner, coordination of the project on control of food
Sumgait Executive Power	Project partner in Sumgait
Ganja Executive Power	Project partner in Ganja
Baku Executive Power	Project Partner in Baku city
Tamiz Shahar (Clean city)	Project partner on solid waste recycling
Ministry of Education	Project partner on pilot activities in schools
Ministry of Health	Project evaluation
Khazar University	Provide technical assistance

6.4.6 Project Outputs

1. Public knowledge regarding health effects of lead and lead pollution is increased

a) Baseline blood lead level study and rapid market assessment are conducted
b) Targeted groups (individuals, communities, women, children, youth) have improved knowledge about health effects of lead and lead pollution
c) General public is aware of lead pollution issues in Azerbaijan and ways to manage existing problems
d) Government institutions' staff have more knowledge about lead sources and their negative effects and locally available data on contaminated products in the market place and baseline blood lead levels.

2. Develop a roadmap to reduce exposure to lead is developed and introduced to the government

a) Roadmap and recommendations to reduce lead sources are developed and introduced to partner organizations
b) Field assessments are conducted to identify lead pollution introduced to partner organizations
    i. Lead detectors are obtained and distributed to partner organizations
    ii. Samples from the main receptors (foods, spices, toys, carpets, air, water, soil etc.) are taken and analyzed
c) High level workshop on lead sources and its health effects in Azerbaijan is organized

3. Institutional capacity to monitor lead pollution is improved

a) Technical Conditions of for permanent monitoring of potential lead sources are improved
b) Laboratories of Ministry of Ecology and Natural Resources and the State Agency of Food Safety are provided with lead detector devices and testing equipment and supplies
c) Pilot communities and schools are regularly tested for lead
d) Investment secured for creation of a facility for the sound recycling of used lead-acid batteries is created

4. Carry out pilot activities to reduce exposure to lead from lead sources

a) Pilot activities in collection of lead-acid batteries done
b) Pilot activities on risk reduction practices from lead pollution is carried out
    i. Pilot communities are taught how to reduce risk of lead exposure
    ii. School children are educated how to reduce risk of lead exposure

6.4.7 Key project activities

Component	Activities	Locations	Timeline (Y-Year, Q-quater)	Partners
Component 1. Public knowledge regarding lead pollution and its health effects is increased				
Output 1 *Public knowledge regarding lead and its health effects is increased*	Prepare awareness materials and distribute	Azerbaijan	Y1 (Q1-Q2)	Ministry of Ecology and Natural resources. State Agency on Food Safety, Ministry of Health
	Baseline study and rapid market assessment conducted	Azerbaijan	Y1, Y2 (Q1, Q2)	Ministry of Ecology and Natural resources. State

				Agency on Food Safety, Ministry of Health
	Targeted groups (individuals, communities, women, children, youth) have improved knowledge about health effects of lead and lead pollution	Target groups	Y1, Y2, Y3, Y4	All stakeholders
	Disseminate awareness activities in trainings and seminars for target groups	Baku, Ganja, Sumgait	Y2 (Q3, Q4), Y3, Y4	All stakeholders
Component 2. Develop a roadmap to reduce exposure to lead is developed and introduced to the government				
Roadmap and recommendations to reduce lead sources are developed and introduced to partner organizations	Roadmap and recommendations to reduce lead sources are developed and introduced to partner organizations	Baku, Sumgait	Y2	Ministry of Ecology and Natural resources. State Agency on Food Safety, Ministry of Health
	Source analysis study: Field assessments are conducted to identify lead pollution introduced to partner organizations. Samples from the main receptors (foods, toys, carpets, air, water, soil etc.) are taken and analyzed	Baku, Sumgait	Y2, Y3	State Agency on Food Safety, Ministry of Ecology and Natural Resources
	High level workshop on lead sources and its health effects in Azerbaijan is organized	Baku, Sumgait	Y3 (Q1)	All stakeholders
Component 3. The capacities of relevant institutions to monitor lead pollution are improved				

Technical Conditions of for permanent monitoring of potential lead sources are improved	Technical Conditions of for permanent monitoring of potential lead sources are improved	Baku	Y3 (Q1, Q2, Q3)	
	Laboratories of Ministry of Ecology and Natural Resources and the State Agency of Food Safety are provided with lead detector devices, equipment and supplies	Baku, Sumgait	Y3	State Agency on Food Safety, Ministry of Ecology and Natural Resources
	Pilot communities and schools are tested for lead contamination (including inside and outside)	Baku, targeted regions	Y2, Y3	Ministry of Education, target municipalities
	Secure investment for sound used lead-acid batteries recycling facility - create sound ULAB recycling facility	Target areas	Y2, Y3	Ministry of Ecology and Natural Resources
Component 4. Carry out pilot activities to reduce exposure to lead from lead sources				
Pilot activities in collection of lead-acid batteries done				
	Trainings for pilot communities Trainings for pilot schools	Target regions	Y1 (Q3-Q4), Y2	Municipalities
Pilot activities on risk reduction practices from lead pollution carried out	School children and communities traied how to implement best practices for lead exposure risk reduction	Target regions	Y1 (Q4), Y2, Y3 (Q1, Q2)	Ministry of Educaiton

6.4.8 Project Budget (Euro)

Budget Line	Total	Year 1	Year 2	Year 3	Year 4
Staff	200000	50000	50000	50000	50000

International Consultants	200000	50000	50000	50000	50000
National consultants	480000	120000	120000	120000	120000
Lead detectors	200000		100000	100000	
Subcontracts (trainings, software installment and construction)	480000	120000	120000	120000	120000
Meetings	80000	20000	20000	20000	20000
Workshops	100000		50000	50000	
Trainings	50000			50000	
Construction of the pilot polygon			250000	150000	
Other direct costs	100000	25000	25000	25000	25000

6.4.9 Gender Mainstreaming

During the project, special attention will be paid to the active participation of women in all project activities. Women's participation will also be included in the selection of the project working group and consultants. In addition, special attention will be paid to the equal participation of women in trainings and seminars. At the same time, separate consultations will be held with women on the participation of women in working with state and civil society organizations. The number of female participants will be noted as one of the project indicators. All project activities will consider SDG5 (Achieve gender equality and empower all women and girls).

6.4.10 Sustainability of the Project Results

Sustainability should be one of the key outcomes of the proposed project. All ministries, civil society institutions, local municipalities and executive authorities will have important mechanisms to take into account the results of the project in their future activities. To this end, the project has a special component to increase the capacity of partner organizations. This component takes into account the training and preparation of the staff of the partner organization and the representatives of the local community.

The following aspects will fully ensure the sustainability of the project:

- Raising awareness of beneficiaries will provide a full and comprehensive picture of the effects of pollution on target groups. As a result, people's skills and knowledge of how to

protect themselves from harmful effects of lead will increase. People who previously had no knowledge of the health effects of lead will now be able to learn more about it and how to protect themselves during hazardous days.

- The capacity of state and community members who are project partners will be increased. Government agencies will be provided with nessesary equipment to detect lead in food, air, soil and items. This will help to quickly identify toxins and carry out the necessary activities, both now and in the future.
- For the first time, a comprehensive study on the effects of lead will be conducted in the country. This will make it possible to implement possible preventive measures in areas affected by lead.
- Preliminary steps will be taken to manage lead exposure.
- Reduction of lead pollution and its health will contribute to a healthier generation in the future.
- A very effective mechanism will be developed and implemented to address the problem of lead in the country.

6.4.11 Monitoring, Reporting and Evaluation

To monitor and evaluate the project Results Framework and Monitoring (RFM) will be prepared and used. The RFM will have project indicators which include:

- Project reports and certifications
- Roadmaps developed to manage lead pollution and reduce it
- Number of pilot activities
- Workshops on lead exposure and its health effects completed
- Baseline study on lead pollution and its health effects completed
- Number of lead detectors that are purchased and distributed
- Number of training workshops and awareness seminars conducted, including lists of participants attending the training sessions.
- Number and content of the dissemination materials, including brochures, videos, radio broadcasts, etc.

A Monitoring and Evaluation Specialist will monitor these indicators using the M&E system that will be developed. Results will be regularly reported in the implementation progress reports. Implementation progress reports will be prepared and submitted to the Government and the project

donor(s) in an agreed format. The project coordinator will also ensure that progress by component and a technical summary are included in those progress reports. At the end of the project, it will be subjected to a formal evaluation. Depending on agreements between the Government and the donor(s), it could also be subjected to a midterm evaluation halfway through the project.

6.4.12 Communication and Visibility

Information about the project will be disseminated using all possible means. Public meetings, seminars, and training sessions will also provide information about the project to a wide audience. Brochures, leaflets, and other publications will help make the project accessible to the general public. In addition, the project will have its own information page on social networks. It is planned to deliver information to people through television and radio.

Donor information will be provided to participants and beneficiaries throughout the project. It will be important to include information about donors in all advertisements, banners and other activities.

6.5 PROJECT PROPOSAL 5. ORGANIZATION OF E-WASTE MANAGEMENT

6.5.1 Project Summary

E-waste is a source of hazardous pollutants such as arsenic, cadmium, chromium, mercury, and lead entering the environment, because of which contamination of soil, air, and water occurs. As is well known, these pollutants can cause numerous health problems as hazardous wastes. The main sources of electronic waste in Azerbaijan are the business sector, educational enterprises, personal computer users, and small computer, refrigerator, and tv repair shops. Until today, no activities related to the reception, processing, and disposal of electronic waste have been carried out in Azerbaijan. Therefore, refrigerators, televisions, computers, LED screens, and solar panels are thrown away or, at best, processed together with other waste.

The main goal of the proposed project is to organize e-waste management in Azerbaijan for the first time and consequently prevent the risks of danger arising from e-waste pollution. For this purpose, it is planned to identify the main polluting pathways of e-waste in Azerbaijan and organize their collection and management. The main components of the project are:

5. Public awareness-raising on e-waste pollution and its health effects in Azerbaijan
6. Develop a roadmap to reduce e-wastes and submit it to the government
7. Increase the institutional capacity of partner organizations
8. Carry out pilot activities to reduce e-waste pollution from various sources
9. Building institutional capacity to organize the collection, processing, and processing of e-waste

6.5.2 Relevant Background

E-waste is a source of hazardous pollutants such as arsenic, cadmium, chromium, mercury, and lead entering the environment, because of which contamination of soil, air, and water occurs. The main sources of electronic waste in Azerbaijan are the business sector, educational enterprises, personal computer users, and small computer, refrigerator, and tv repair shops. Until today, no activities related to the reception, processing, and disposal of electronic waste have been carried out in Azerbaijan.

E-waste may cause a broad range of health effects and its management is still questioned in Azerbaijan. On the one hand, the lack of tradition in the management of e-waste, and on the other hand, the low institutional capacity creates various problems in the collection and management of e-waste.

Toxic e-waste exposure during pregnancy can have long-term consequences for the health and development of her unborn child. Changes in lung function, respiratory and respiratory effects, DNA damage, impaired thyroid function, and an increased risk of some chronic diseases later in life, such as cancer and cardiovascular disease, are all associated with e-waste. Workers attempting to

recover valuable materials such as copper and gold are exposed to hazardous substances, including lead, mercury, nickel, brominated flame retardants, and polycyclic aromatic hydrocarbons (PAHs).

Currently, the main sources of e-wastes in Azerbaijan are believed to be:

- In consumers' homes and gardens. Preliminary studies have shown that used computers in consumers' homes can accumulate in gardens for years, polluting the soil, a,ir and even water.
- Small repair shops that repair computers, refrigerators, and TVs. The e-waste accumulated in these areas is later disposed of in unknown directions, thus causing environmental pollution.
- Landfills. E-waste is not collected separately and is therefore disposed of in containers with other waste and often burned openly in municipal landfills. E-waste pollutants also enter the atmosphere, soil, and water during the incineration of household waste. If we consider that there are few landfills in Azerbaijan that meet the standards and waste is incinerated in small and medium towns and villages, then these landfills can also be considered a source.
- Other potential sources are expected to be identified within the project.

6.5.3 Project Description

The project will cover all territories of Azerbaijan. The project will assist local governments, agencies, business representatives catering facilities, homeowners, residents, and enterprises to reduce e-waste hazard levels and risks of exposure to e-waste pollution.

Specific project goals are as follows:

- Raise public awareness about e-waste pollution and its health effects
- Based on the detailed research, to identify major pollution and exposure sources
- Develop a roadmap to reduce pollution with e-wastes and submit it to the government
- Prepare proposals to strengthen the legislative framework for e-waste management
- Develop and submit a roadmap to the government to establish and improve e-waste management in the country

- Carry out pilot activities to reduce exposure from the existing e-waste sources

6.5.4 Intervention Strategy

To change the current situation, the project activities envisage several main directions. The most important of these is public awareness. People in Azerbaijan have no information about the hazards of e-waste pollution and its negative effects on public health and there are no studies that reflect the current situation. Support of studies on the health effects of pollution will help the public to understand the problem properly.

The project aims to make e-waste assessments and support the government of Azerbaijan to establish advanced e-waste management systems. Another important goal of the study is to develop roadmaps for the government that will enable them to reduce pollution levels and exposure to e-waste pollutants. The roadmap will include both policy and structural solutions. Policy solutions will include improvement of the legal basis and fiscal mechanisms driven by government and cap and trade policies.

One of the main intervention strategies will be to conduct active interventions in the form of pilot projects. These activities will include construction of pilot sites for collection of lead-acid batteries, support state food agency to increase its capacity on control to pollution.

Improving institutional capacity, providing organizations with monitoring equipment, and additional capacity building activities (trainings, seminars, and workshops) are also interventions aimed at solving the problem.

6.5.5 Implementation Partnerships

The table provides information on the main project partners and their roles and responsibilities

Key Institutions	Role and Responsibility

Ministry of Ecology and Natural Resources	Main project partner, coordination of the project
State Agency on Food Safety	Project partner, coordination of the project on control of food
Sumgait Executive Power	Project partner in Sumgait
Ganja Executive Power	Project partner in Ganja
Baku Executive Power	Project Partner in Baku city
Tamiz Shahar (Clean city)	Project partner on solid waste recycling
Ministry of Education	Project partner on pilot activities in schools
Ministry of Health	Project evaluation
Khazar University	Provide technical assistance

6.5.6 Project Outputs

5. Public knowledge regarding e-wastes and their health effects is increased
    a. Baseline study on the current situation related to e-waste pollution is conducted
    b. Targeted groups (individuals, communities, women, children, youth) have improved knowledge about the health effects of e-wastes
    c. General public is aware of e-waste issues in Azerbaijan and ways to manage existing problems
    d. Government institutions' staff have more capacity to manage e-wastes and their negative effects

6. Developing a roadmap to reduce e-wastes and organize their management is developed and introduced government
    a. Roadmap and recommendations to reduce e-wastes are developed and introduced to partner organizations
    b. Field assessments are conducted to identify e-waste sources and pollution introduced to partner organizations
        i. Samples were taken from the soil and water and analyzed
    c. High-level workshop on e-waste and its health effects in Azerbaijan is organized

7. The capacities of relevant institutions for e-waste management are improved
    a. Pilot activities in the collection of e-wastes done

b. The capacity of the hazardous management landfill of the Ministry of Ecology is increased to store e-wastes
c. A roadmap for the establishment of e-waste processing facilities is developed

8. Carry out pilot activities to collect e-waste and reduce exposure to e-wastes
    a. Pilot activities (collection of e-wastes in designated places) in the collection of e-wastes done
    b. Pilot activities on self-protection from e-waste exposure are done
        i. Pilot communities are taught how to manage e-wastes
        ii. School children are thought how to manage e-wastes

6.5.7 Key project activities

Component	**Activities**	**Locations**	**Timeline (Y-Year, Q-quater)**	**Partners**
Component 1. Public knowledge regarding e-wastes and their health effects is increased				
Output 1 *Public knowledge regarding e-wastes and their health effects is increased*	Prepare awareness materials and distribute	Azerbaijan	Y1 (Q1-Q2)	Ministry of Ecology and Natural resources
	A baseline study on the current situation related to e-waste pollution and management is conducted	Azerbaijan	Y1, Y2 (Q1, Q2)	Ministry of Ecology and Natural Resources
	Targeted groups (individuals, communities, women, children, and youth) have improved knowledge about e-wastes and their health effects	Target groups	Y1, Y2, Y3, Y4	All stakeholders
	Disseminate awareness activities in training and seminars for target groups	Baku, Ganja, Sumgait	Y2 (Q3, Q4), Y3, Y4	All stakeholders

Component 2. Developing a roadmap to reduce e-wastes and organize their management is developed and introduced government				
Developing a roadmap to reduce e-wastes and organize their management is developed and introduced government	Roadmap and recommendations to reduce e-wastes and develop e-waste management developed and introduced to partner organizations	Baku, Sumgait	Y2	Ministry of Ecology and Natural resources
	Field assessments are conducted to identify e-waste sources and pollution introduced to partner organizations. Samples were taken from the soil and water and analyzed	Baku, Sumgait	Y2, Y3	State Agency on Food Safety, Ministry of Ecology and Natural Resources
	High-level workshop on e-waste and its health effects in Azerbaijan is organized	Baku, Sumgait	Y3 (Q1)	All stakeholders
Component 3. The capacities of relevant institutions for e-waste management are improved				
The capacities of relevant institutions for e-waste management are improved	Pilot activities in the collection of e-wastes done	Baku	Y3 (Q1, Q2, Q3)	
	The capacity of the hazardous management landfill of the Ministry of Ecology is increased to store e-wastes	Baku, Sumgait	Y3	Ministry of Ecology and Natural Resources
	A roadmap for the establishment of e-waste processing facilities is developed	Baku, targeted regions	Y2, Y3	Ministry of Education, target municipalities
	The pilot polygon for used lead-acid batteries is created	Target areas	Y2, Y3	Ministry of Ecology and Natural Resources
	Review of the legislative framework concerning e-waste	Target areas	Y2, Y3	Ministry of Ecology and

	management and develop recommendations			Natural Resources
Component 4. Pilot activities in the collection and management of e-wastes done				
Pilot activities in the collection and management of e-wastes done				
	Training for pilot communities Training for pilot schools	Target regions	Y1 (Q3-Q4), Y2	Municipalities
	School children are thought how to get protected from the exposure of e-wastes	Target regions	Y1 (Q4), Y2, Y3 (Q1, Q2)	Ministry of Education

6.5.8 Project Budget (Euro)

Budget Line	Total	Year 1	Year 2	Year 3	Year 4
Staff	200000	50000	50000	50000	50000
International Consultants	200000	50000	50000	50000	50000
National consultants	480000	120000	120000	120000	120000
Works in hazardous pollutants landfill	200000		100000	100000	
Subcontracts (training, software installment, and construction)	480000	120000	120000	120000	120000
Meetings	80000	20000	20000	20000	20000
Workshops	100000		50000	50000	
Training	50000			50000	
Construction of the pilot polygon			250000	150000	
Other direct costs	100000	25000	25000	25000	25000

6.5.9 Gender Mainstreaming

During the project, special attention will be paid to the active participation of women in all project activities. Women's participation will also be included in the selection of the project working group and consultants. In addition, special attention will be paid to the equal participation of women in training and seminars. At the same time, separate consultations will be held with women on the participation of women in working with state and civil society organizations. The number of female participants will be noted as one of the project indicators. All project activities will consider SDG5 (Achieve gender equality and empower all women and girls).

6.5.10. Sustainability of the Project Results

Sustainability should be one of the key outcomes of the proposed project. All ministries, civil society institutions, local municipalities and executive authorities will have important mechanisms to take into account the results of the project in their future activities. To this end, the project has a special component to increase the capacity of partner organizations. This component takes into account the training and preparation of the staff of the partner organization and the representatives of the local community.

The following aspects will fully ensure the sustainability of the project:

- Raising awareness of beneficiaries will provide a full and comprehensive picture of the effects of pollution on target groups. As a result, people's skills and knowledge of how to protect themselves from the harmful effects of e-waste will increase. People who previously had no knowledge of the health effects of e-wastes will now be able to learn more about it and how to protect themselves during hazardous days.
- The capacity of state and community members who are project partners will be increased. The capacity of government agencies will be increased to manage e-wastes..
- For the first time, a comprehensive study on the effects of e-waste will be conducted in the country. This will make it possible to implement possible preventive measures in areas affected by e-wastes.
- Preliminary steps will be taken to manage exposure to e-waste contaminants.

- Reduction of e-wastes and their health effects will contribute to a healthier generation in the future.
- A very effective mechanism will be developed and implemented to address the problem of e-wastes in the country.

6.5.11 Monitoring, Reporting, and Evaluation

To monitor and evaluate the project Results Framework and Monitoring (RFM) will be prepared and used. The RFM will have project indicators which include:

- Project reports and certifications
- Roadmaps developed to manage e-wastes and reduce it
- Number of pilot activities
- Workshops on e-wastes and their health effects completed
- Baseline study on e-wastes in Azerbaijan and health effects completed
- Capacity of the hazardous waste landfill of the Ministry of the Ecology and Natural Resources are increased.
- Number of training workshops and awareness seminars conducted, including lists of participants attending the training sessions.
- Number and content of the dissemination materials, including brochures, videos, radio broadcasts, etc.

A Monitoring and Evaluation Specialist will monitor these indicators using the M&E system that will be developed. Results will be regularly reported in the implementation progress reports. Implementation progress reports will be prepared and submitted to the Government and the project donor(s) in an agreed format. The project coordinator will also ensure that progress by component and a technical summary are included in those progress reports. At the end of the project, it will be subjected to a formal evaluation. Depending on agreements between the Government and the donor(s), it could also be subjected to a midterm evaluation halfway through the project.

6.5.12. Communication and Visibility

Information about the project will be disseminated using all possible means. Public meetings, seminars, and training sessions will also provide information about the project to a wide audience. Brochures, leaflets, and other publications will help make the project accessible to the public. In addition, the project will have its own information page on social networks. It is planned to deliver information to people through television and radio.

Donor information will be provided to participants and beneficiaries throughout the project. It will be important to include information about donors in all advertisements, banners, and other activities.

7 ANNEXES

7.1 ANNEX 1. POLLUTION SITES, KEY POLLUTANTS, AND POLLUTION LEVELS IN URBAN REGIONS

#	Site name	Lat; Long	Pollutant 1	Value	Pollutant 2	Value, mg/kg
1	Ethylene polyethylene plant	40.607;49.622	Cadmium	33.00	Benzopyrene	235.00
2	Surface-active substances plant	40.602; 49.614	Mercury elemental	3250.00	Benzene	305.00
3	Synthetic rubber plant	40.607; 49.616	Benzene	5.27	Benzene	196.00
4	Baku steel company	40.430;49.887	PM 10	2356	Pyrene	11200
5	Technical rubber product plant	40.461;49.935	Benzene	335.60	Benzopyrene	25.50
6	Azerneftyag plant	40.372;49.909	Benzene	98.30	Phenol	451.00
7	Sabunçu town polluted areas	40.453;49.953	Total petroleum hydrocarbon	1925.00	Benzene	195.50
8	Balakhani polluted areas	40.474;49.919	Benzene	323.23	Benzo(a)pyrene	31.00
9	Lokbatan lake	40.321;49.707	Arsenic	42.00	Cadmium	71.00
10	Bulbula lake	40.425;49.976	Arsenic	123.00	Benzene	1245.00
11	Boyukshor lake	40.443;49.876	Cadmium	82.00	Toluene	76.00
12	Khojohasan lake	40.399;49.777	Cadmium	91.00	Phenol	240.50
13	Zykh lake	40.354;49.991	Arsenic	194.00	Benzene	151.00
14	Zabrat lake	40.473;49.936	Benzene	156.00	Phenol	190.00
15	Binagadi lake	40.469;49.803	Total petroleum hydrocarbon	1060.00	Arsenic	241.00
16	Gu lake	40.312;49.760	Arsenic	84.00	Cadmium	11.50
17	Masazir lake	40.506;49.759	Cadmium	917.00	Arsenic	78.00
18	Kurdakhani lake	40.536;49.915	Arsenic	1060.00	Benzene	311.00
19	Mirzaladi lake	40.491;49.818	Cadmium	57.80	Benzo(a)pyrene	71.50

20	Gala lake	40.430;50.165	Benzene	134.00	Pyrene	4700.00
21	Ganli-Gel lake	40.368;49.800	Cadmium	561.00	Benzopyrene	35.00
22	Ramana lake	40.447;49.963	Benzene	3790.00	Phenol	191.00
23	Chuxurdara lake	40.466;50.027	Cadmium	34.00	Benzene	181.00
24	Dashagil lake	40.472;49.643	Benzene	121.00	Toluene	123.50
25	Fatmai lake	40.311;49.511	Cadmium	17.00	Toluene	67.00

7.2 ANNEX 2. LEGACY PESTICIDE SITES WITH HIGH PI VALUES IN AZERBAIJAN IDENTIFIED UNTIL 2018

#	Site Name	Lat	Ling	Pollutant	Pollutant Value, mg/kg	PI	Affected population
1	Jangi Pesticide Polygon	40.481	49.314	DDT	1200	7	0.85
2	Horadiz Chemical Supply Facility	39.447	47.348	DDT	1546	8	3.22
3	Shamakhi Chemical Union	40.584	48.701	DDT	66.5	7	25.1
4	Sarijallar Railway Station	39.946	48.494	DDT	521	8	1.22
5	Jalilabad Inter-District Pesticide Union	39.227	48.635	DDT	2664	8	19.3
6	Salyan Pesticide Airdrome	39.449	48.868	DDT	319	7	11.5
7	Masalli Agricultural Union	39.037	48.656	DDT	324	7	9.34
8	Barda Pesticide Storage	40.354	47.112	DDT	584	6	13.2
9	Laki Fertilizers' Storage	40.562	47.412	DDT	9.62	6	6.71
10	Ujar (Mususlu) Pesticide Storage	40.516	47.644	DDT	870	9	13.5
11	Yevlakh Pestiside Storage	40.613	47.122	DDT	12.1	5	17.6
12	Tar-tar Pesticide Storage	40.219	47.063	DDT	195	6	9.21
13	Siyazan Pesticide Department	41.068	49.130	Pesticides	1420	5	6.71
14	Beyleqan Pesticide Storage	39.719	47.830	DDT	1074	6	8.92
15	Gusar Pesticide Storage	41.430	48.444	Pesticides	102	5	7.11
16	Quba Pesticide Storage	41.362	48.568	Pesticides	2456	6	12.1
17	Hajigabul Pesticide Storage	40.102	48.820	Pesticides	975	6	7.86
18	Garadagh Gas Refining Plant	40.283	49.675	Fluorides	4670	9	87.4
21	Kazakh Pesticide Storage	41.132	45.407	Pesticides	14.6	5	16.5
22	Kurdamir Pesticide Storage	40.330	48.159	Pesticides	13.2	6	9.56
23	Goycay Pesticide Storage	40.614	47.765	DDT	19.1	6	3.42
24	Akstafa Pesticide Storage	41.120	45.446	Pesticides	33.1	6	4.78
25	Qax (Alibayli) Fertilizers' Storage	41.416	46.869	Pesticides	245	5	0.87
26	Alimardanli Pesticide Storage	41.036	45.662	DDT	3217.7	6	1.45
27	Dalmammadli Pesticide Residuals	40.697	46.577	DDT	2077.1	8	2.56

28	Salyan Agricultural Chemical Union	39.553	48.954	DDT	117	8	5.45
29	Nohun Pesticide Site	41.066	45.776	DDT	2537.7	4	0.45
30	Vurgun Pesticide Site	41.087	45.477	Endosulfan	4.254	4	0.54
31	Ganja Alabaster Production Area	40.718	46.342	Lead	1220	7	34.2
32	Lenkaran (Marso) Pesticide Storage	38.848	48.813	DDT	10723	7	0.98
33	Bilasuvar Pesticide Storage	39.379	48.575	Pesticides	1978	8	9.21
34	Lower Gurali Pesticide Aerodrome	39.427	48.532	DDT	2391	6	0.87
35	Nasimi Pesticide Aerodrome	39.497	48.418	Pesticides	1150	6	0.45
36	Takla Pesticide Storage	39.260	48.351	DDT	112.3	5	0.34
37	Abazalli Pesticide Aeroground	39.287	48.337	Pesticides	891	7	1.34
38	Goyceli and Tatli Pesticide Points	41.048	45.481	Pesticides	4362	7	2.35
39	Qaratapa Pesticide Storage, Sabiradad	39.944	48.610	DDT	129	5	3.42
40	Moldai Aerodrome (Saatli)	39.927	48.385	Pesticides	1240	6	2.31
41	Sugarishan Aerodrome (Sabirabad)	40.008	48.490	DDT	1876.1	7	1.65
42	Dada Gorgud Pesticide Distribution Point	39.858	48.398	Pesticides	453	6	1.78
43	Aribatan Aerodrome, Salyan	39.583	48.965	Pesticides	3070	5	1.32
44	Amankend Pesticide Distribution Point	39.383	48.471	DDT	2021	6	0.89
45	Khirmandali Pesticide Point	39.429	48.421	Pesticides	2089	8	1.21
46	Fromer Yuxari Agali Pesticide Point	39.427	48.427	DDT	1891.4	7	0.34
47	Gunashli Pesticide Point (Bilasuvar)	39.521	48.491	DDT	1564.4	7	1.78
48	Chuxanli Aerodrome (Salyan)	39.649	48.978	DDT	1121.2	8	2.39
49	Zahmatabad Pesticide (Bilasuvar)	39.471	48.548	DDT	365.2	8	1.76
50	Chayli Pesticide Point (Bilasuvar)	39.489	48.517	Pesticides	2567.2	8	1.03

51	Fromer Saatli Chemical Union	39.941	48.356	Pesticides	1765.3	8	6.71
52	Qaraxanli pesticide estakada	41.054	45.671	DDT	1873.2	8	2.13
53	Mukhatariyat Pesticide (Shamkir) Point	40.801	46.125	DDT	2346.4	7	0.56
54	Halach Pesticide Storage	39.719	47.828	DDT	4689.34	8	3.02
55	Dayikend Pesticide Storage	39.449	48.868	DDT	1875.2	9	0.78
56	Bilasuvar Chemical Union	39.451	48.552	DDT	198.21	8	11.3
57	Neftchala Pesticide Storage	39.434	49.016	DDT	3056.34	7	2.34
58	Imishli Central Pesticide Storage	39.868	48.045	DDT	4652.11	8	4.53
59	Korpukend Pesticide Aero ground	40.245	47.501	DDT	145.3	9	0.34

7.3 GENERAL INFORMATION

7.3.1 Geography of Azerbaijan

Azerbaijan occupies the southeast of the Caucasus region and the western coastlines of the Caspian Sea. The total area of the country is 86.6 thousand km^2. The capital city of Azerbaijan is Baku. Azerbaijan consists of the Nakhchivan Autonomous Republic, 66 districts, 77 cities, 257 small towns, 1719 municipalities, and 4260 villages. Azerbaijan is bordered by the Russian Federation to the north, the Republic of Georgia to the northwest, the Republic of Armenia and Turkey to the west, and the Iran to the south. To the east, the country has 825 km of coastline along the Caspian Sea. In addition to Azerbaijan, the Caspian Sea is bordered by Iran, Kazakhstan, Russia and Turkmenistan.

Forty percent of the country's territory is plain, and sixty percent is mountainous. The lowest point is 28 m above sea level, on the shores of the Caspian Sea, and the highest point is in the Greater Caucasus Mountains, at an altitude of 4466 m on Mount Bazarduzu.

The main terrain structures in the country are the Greater Caucasus Mountains in the northeast, the Lesser Caucasus Mountains in the west, the Talysh Mountains in the southeast and the Kur-Araz lowland located located between the Greater and Lesser Caucasus Mountains and covering 1/3 of the country's territory .

Azerbaijan's Caspian coast forms the country's Caspian sector. The Caspian sector is divided between the seabed and the Caspian littoral states. Azerbaijan's Caspian sector is rich in oil and gas reserves, which are currently being actively extracted.

7.3.2 Water resources of Azerbaijan

The internal renewable water resources amount to about 8.12 km^3/year (Table 1). Annual surface runoff is estimated at 5.96 km^3 and groundwater recharge at 6.51 km^3, of which 4.35 km^3 constitute the base flow of the rivers. The estimated incoming surface flow is 25.38 km^3/year, of which 11.91 km^3 originate from Georgia, 7.50 km^3 from the Islamic Republic of Iran and 5.97 km^3 from Armenia/Turkey. The total renewable surface water resources (RSWR), including incoming and bordering flows, are therefore estimated at 32.52 km^3/year. In the case of the Kura and Araks Rivers, which flow through Turkey, Georgia, Armenia, the Islamic Republic of Iran and Azerbaijan, discussions are under way on a water sharing agreement. The four major river basins in Azerbaijan are:

1. The basin of the Kura and Araks Rivers is the largest basin in the country, forming the largest transboundary river system of the southern Caucasus. It originates in Turkey and flows through Georgia and Azerbaijan into the Caspian Sea, while the Araks also crosses Armenia and Iran. The total length of the Kura River system is 1 515 km, of which 900 km is located within Azerbaijan. The total annual inflow of the Kura River from Georgia is estimated at 11.91 km^3. The total inflow of the main branch of the Araks River and its tributaries from Armenia and Iran is estimated at 13.47 km^3/year, bringing the total inflow into Azerbaijan to an estimated 25.38 km^3/year.

2. The Samur River Basin, located in the northeast of the country, forming the border with Russia. The Samur River rises in the Russian Federation and then forms its border with Azerbaijan. Its estimated annual discharge is 2.36 km^3, less than half of which is considered to be available for Azerbaijan.

3. The Caspian Sea coastal river basins in the northeast, between the Samur and Kura River Basins.

4. The Caspian Sea coastal river basins in the Lankaran region in the southeast, south of the Kura River Basin.

Groundwater resources are mainly concentrated in the low mountain areas and foothills. In general, groundwater is of high quality. However, in the densely populated Absheron Peninsula, groundwater is polluted with oil and oil products, as well as industrial waste.
Groundwater resources are mostly used in agriculture, to meet the needs of the population for drinking water, as well as in industry. According to the annual water balance of the Republic of Azerbaijan, the volume of groundwater resources in the country in 2019 amounted to 8.66 billion m^3. However, the groundwater in the lowlands is mainly poorly drained and has a certain high salinity. In some areas, groundwater is close to the surface and poorly protected. One-fifth of the water consumed is obtained from groundwater.

Natural factors such as population growth and climate change are expected to reduce water resources. According to research, water resources have been assessed as one of the sectors most vulnerable to the effects of climate change. According to projections, the water amount in the rivers is expected to decrease in the coming years.

Table 4: Azerbaijan's water resources

Renewable freshwater resources	

Precipitation (long-term average)	***39 km^3/yr***
Internal renewable water resources (long-term average)	***8.12 km^3/yr***
Total actual renewable water resources	***32.5 km^3/yr***
Water sources and use	
Water withdrawal (yr 2005)	
Total water withdrawal	***12.2 km^3/yr***
irrigation + livestock	***0.9 km^3/yr***
municipalities	***0.5 km^3/yr***
industry	***0.2 km^3/yr***
Surface water and groundwater withdrawal	***12.2 km^3/yr***
Non-conventional sources of water	
Produced wastewater	***0.7 km^3/yr***
Treated wastewater	***0.2 km^3/yr***
Reused treated wastewater	***0.2 km^3/yr***
Irrigation and drainage	
Irrigation potential	***3,200,000 ha***
Full or partial control irrigation: equipped area (yr 2003)	***1,426,000 ha***
surface irrig	***1,302,000 ha***
sprinkler irrig	***149,000 ha***
localized irrig	***2,618 ha***
Urban water supply (Baku)	
Baku water supply (from wellfields and reservoirs)	***16 m^3/s***
Storage / Reservoirs	
total capacity of operating water reservoirs	***20.6 km^3***
net storage volume	***12.4 km^3***
total capacity of hydroelectric power station (HPS)	***979 MW***

Mainly, decreases have been observed in winter rainfall and snow, as well as in spring rainfall. This also has led to a decrease in both surface and ground water. According to the analyses after the First and Second National data reviews, reductions in river water resources has continued.

Climate change influences are expected to stress water resources. Surface water is predicted to decrease by 23% from 2021 to 2050, and water resources are predicted to decrease by 29% from the baseline year (1960-1990) level from 2071 to 2100.

As a result of climate change, there will be an increased demand for water due to dry and hot weather, especially in the country's main irrigation areas. Increasing withdrawal of water from rivers threatens their ecosystem. Many floods occur both in Azerbaijan and in neighboring countries. For example, the construction of large reservoirs on the Kura River in neighbouring upstream countries has significantly reduced the amount of water in the Kura River. As a result, long-term droughts occur in the Kura and Araz rivers, the largest rivers in the South Caucasus, during the summer months. As a result of the drying up of the Kura River in 2020, serious problems have arisen in the supply of drinking water to many parts of Azerbaijan, mainly in the Salyan and Neftchala regions. It should be noted that the drying of the Kura River was not observed in Azerbaijan until 2020.

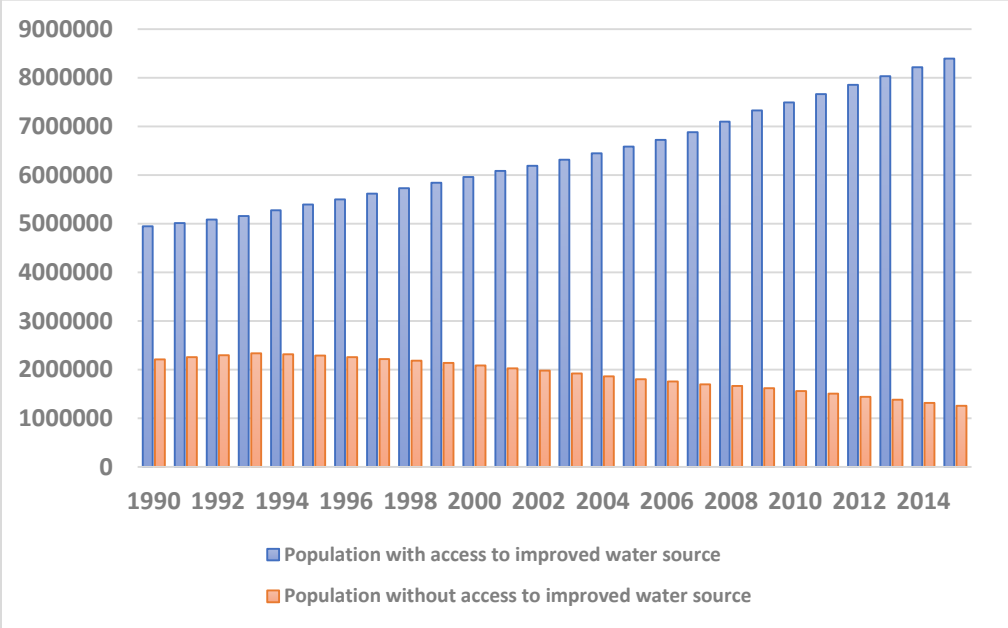
The Kura and Araz are claimed to be one of the most turbid in the world, with high turbidity increasing the cost of treatment for drinking water. Sediment flows of these rivers are conspicuous, so that the water quality of the rivers requires large facilities to reduce sediment load near the withdrawal site and conventional treatment to meet drinking water standards. The Kura withdrawal sites were built just after the junction of the Kura and the Araz rivers.

The government has made notable efforts to improve water supply and sewage systems in the country. In 2017 a new water treatment plant for the city of Mingechevir was built. In 2000, the centralized water supply system in Baku, covered only 1.56 million people, while in 2014 2.366 million people have access to running water. Because of various projects between 2011 and 2013, 600,000 more people have gained access to an uninterrupted water supply. Currently, seventy-eight per cent of urban Baku’s population is continuously provided with running water. However, a 2018 survey confirms that 90% of Baku families would still prefer to use bottled water, since tap water still does not meet basic quality standards. A considerable part of the Baku population still depends on Kura water. Nearly 25% of the Greater Baku area that has more than 4 million of residents is supplied by water withdrawal facilities located in a downstream part of the Kura river.

Pollution of the Kura and Araz rivers creates environmental tensions and reduce level of access to clean drinking water. Discharge of untreated wastewater into the Kura River by neighboring countries has a broad range of negative impacts which mainly includes increased treatment costs, ecosystem degradation and worsened quality of drinking and irrigation waters.
Pollution of transboundary rivers in neighboring countries poses serious problems. On the one hand, deteriorating water quality has a negative impact on ecosystems, on the other hand, it creates serious complications in the supply of drinking water to the population.

Clean drinking water is a challenge for most parts of Azerbaijan. The amount of water per unit area and per capita in Azerbaijan is limited. Although there have been significant improvements in access to clean water in recent years, 1.2 million people still do not have access to clean water (Figure 18 below).

Figure 18: Population with and without access to clean water



About 80% of households in rural areas are not connected to centralized water and sewage networks. Wastewater and sewage systems are only provided in half of the secondary towns. Poor wastewater management has created serious hardships in many of the towns, with sewage discharging through ditches into town irrigation systems or nearby streams. The problems are similar in mountain and lowland areas.

7.3.3 Biodiversity

Azerbaijan is situated at the juncture of several bio-geographical areas (the Eastern Palaeartic, Turan, the Mediterranean, Asia Minor, and the Middle East) and contains species of European, Central Asian and Mediterranean origin. The country forms an integral part of the Caucasus Ecoregion, a region with exceptional levels of biodiversity (WWF's Global 200). Azerbaijan also shares the largest inland body of water in the world, the Caspian Sea, with four other countries (Russia, Iran, Turkmenistan and Kazakhstan). The biological diversity of the Caspian Sea and its coastal zone makes the region particularly significant.

Due to the diversity of natural conditions in the territory of the Republic of Azerbaijan, its fauna is very colorful; 97 species of mammals, 357 species of birds, 67 species of amphibians and reptiles,

1 species of roundworm, 97 species of fish, more than 15,000 species of invertebrates are known in the country.

The territory of also has a rich flora; there are more than 4,500 flowering, different varieties of plants and the plant species found in the republic make up 66% of the total number of plant species growing in the Caucasus. Thanks to this biodiversity, Azerbaijan is considered to be a centre of origin for a number of globally important food crops, including wild rye, wheat, barley, millet, wild pears, cherry, and more than 200 varieties of grapes. Four hundred and fifty-four species of graminaceous plants are found in Azerbaijan, 25 of which are cultivated. This includes: 15 varieties of the wheat; one species of maize, with 90 distinct genetic varieties; 10 species of barley, with 500 distinct varieties; five species of rye; and one species of rice, with more than 80 local varieties (including a number of traditional cultivars). Most of the native varieties are now either extinct, or in danger of extinction. Only one of these native varieties (Secale cereale) is still under cultivation.

The country is especially noted for fruit and nut trees. The forests of the Greater and Lesser Caucasus Mountains and the Talish Mountains contain wild ancestors of apples, persimmons, walnuts, chestnuts, pistachios and many other species that have been widely domesticated into many different varieties and strains. Approximately 800 indigenous plant species of medicinal value have been recorded in Azerbaijan, 150 of which are commercially used in pharmacological practice.

7.3.4 Caspian Sea

The Caspian Sea is the largest closed water body on earth and accounts for up to 45% of the total water in lakes around the world. The Caspian Sea level has rapid oscillations, and it is -28 meters below sea level (Figure 19).

The Caspian Sea has a broad range of environmental problems mainly related to industrial and municipal pollution. Causes of environmental problems include non-compliance with environmental requirements during exploration, production and transportation of oil and gas resources at sea, industrial wastes, import of various pollutants into the sea by river water, untreated discharge of domestic wastewater into the Caspian Sea, waste from floating vehicles, oil and agricultural fertilizers flowing into the sea through rivers and canals.

Currently, sturgeon stocks in the Caspian Sea are declining and are on the verge of losing their importance. Compared to the 1980s, the catch of sturgeon in 2009-2010 decreased by 30 times, and the catch of all Caspian littoral countries together amounted to about a thousand tons. Since 2011, according to the general agreement of all the Caspian littoral states, a technical moratorium

has been imposed on commercial fishing for sturgeon in the Caspian Sea, and commercial sturgeon fishing is not carried out, only small-scale fishing and fishing for research purposes.

The Caspian seal is the only marine mammal in the Caspian Sea and is endemic to it. At the beginning of the twentieth century, the number of Caspian seals was about 1 million individuals, but now there are data on its population ranging from 111,000 to 360,000 individuals.

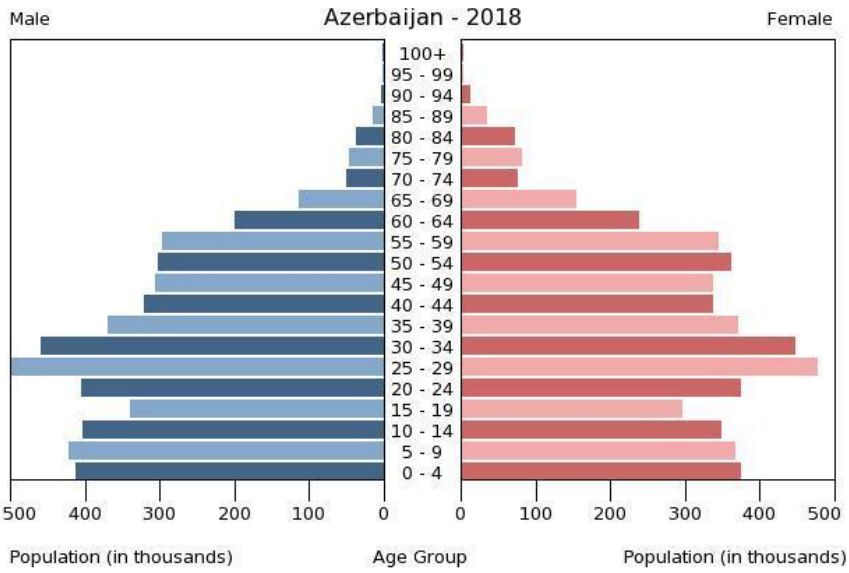
Figure 19: Azerbaijan and bordering countries in the Caspian Sea

Population

At the beginning of 2020, the population of the Republic of Azerbaijan was 10,067,100 people. 5,312,000 people or 52.8% of the population live in urban areas, 4,755,100 people or 47.2% in rural areas.

There are 5,028,000 men (49.9% of the population) and 5,039,1000 women (50.1% of the population). 22.4% percent of the total population are 0-14 years old, 70.4 percent are 15-64 years old, and 7.2 percent are 65 and older. Young people aged 14-29 make up 24 percent of the total population, and more than half of them live in urban areas (Figure 5).

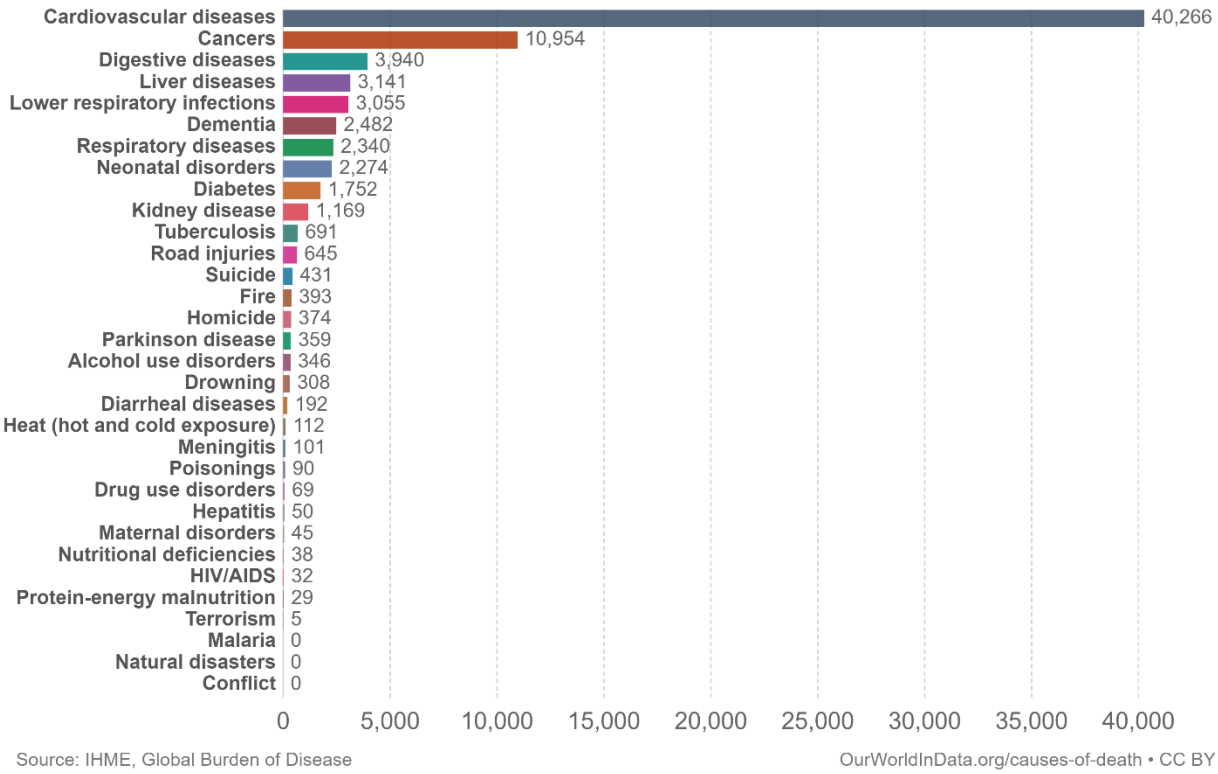
Figure 5. Azerbaijan population pyramid (source CIA factbook)



Over the past five years, an average of 150,000 people has been born in the country each year, or about 411 babies every day. The birth rate per 1,000 population in 2019 was 14.3. The death rate in the country is relatively low and stable.

Cardiovascular diseases are one of the leading causes of death in the population (Figure 6). Other main causes of death among the population are diseases of the circulatory system, neoplasms, diseases of the digestive system and respiratory system. In 2019, the number of deaths from these diseases was 317.8 per 100,000 population, respectively; and 89.0; 27.1 and 18.7 per 100,000 population, respectively.

Figure 6. Number of deaths by cause, 2017



Life expectancy for babies born last year is 76.4 years, including 74.0 years for boys and 78.7 years for girls.

The largest cities in the country are Baku, Ganja and Sumgait. Baku is the capital and largest city of Azerbaijan, as well as the largest city on the Caspian Sea and of the Caucasus region. Baku is the core town of the largest urbanized area in Azerbaijan. By the beginning of 2020, 3,100,000 people lived in Baku, surrounding settlements and Sumgait.

Agriculture

Agriculture is a traditional occupation of Azerbaijan. Historically, viticulture, silkworm breeding and fruit growing are widespread here. As a large part of the country's territory has a mountainous terrain, cattle breeding has always played an important role in the lives of the people living here. The development of cattle breeding, in turn, led to the development of handicrafts and carpet weaving. Figure 7 shows the trend in gross agricultural output from 2000-2019.

Of the total land area of 8,641,506 hectares, 4,919,100 hectares (56.9 percent) are state, 2,051,378 hectares (23.5 percent) are municipal, and 1,670,990 hectares (19.6 percent) are privately owned. Of the total area of the Unified Land Fund, 1,714,959 hectares are used for sowing, 161,081 hectares for perennial crops, 109,709 hectares for hayfields, 259,037 hectares for backyards, 2,538,318 hectares for pastures. The remaining 1,039,893 hectares are forests, and 2,820,509 hectares are other areas.

The Agricultural sector of Azerbaijan is highly dependent on irrigation. Most of the territory of Azerbaijan has a rather dry climate, and therefore, irrigation is very important in the Kura-Aras plain that occupies nearly 40% of the country's territory. Other areas that largely depend on irrigation are Absheron, Nakhichevan, Shaki-Zaqatala and Ganja-Gazakh. More than 80% of agricultural output comes from irrigated crops. In the middle and high mountainous areas, squash cultivation is widespread.

The country's main agricultural products are cotton, grapes, grain, tea, melons and fruits. These products are mainly produced by small and medium farms and companies. Fertilizer and pesticides are widely used in the implementation of agro-technical measures. The main livestock products of Azerbaijan are milk, butter and meat.

In 2019, Azerbaijan produced 3.7 billion Azerbaijan New Manat (AZN) worth of crops and 4.1 billion AZN worth of livestock products. Over the past 20 years, the production of agricultural products in the economy has been growing rapidly (Figure 7).

During the Soviet period, Azerbaijan was one of the big suppliers of agricultural products to markets of Russia, Ukraine, and Kazakhstan. More than 1 million tons of raw cotton and 3 million tons of grapes were produced in the country. The country's climate is very susceptible to dissemination of plant diseases by insects and other pests. Therefore, pesticides were widely used in cultivation of cotton, grapes, vegetables, etc. In the 1950s-1990s, cotton plantations covered 100 - 300 thousand hectares and pesticides were applied to protect them (IPEP, 2006).

Although POP pesticides are currently banned in the country, contamination with these pesticides continues. Various studies confirm that there are numerous old POP pesticide sites in the country. According to TSIP research, there are more than 70 such sites, and the volume of pesticides in these sites is about 40,000 tons. The TSIP also confirms that there are many pesticide sites that have not yet been registered or simply forgotten.

The level of use of non-POP pesticides is still very high in Azerbaijan. These pesticides are mainly used in the production of cotton and feed, as well as in the production of fruits and vegetables. The incidence of acute pesticide poisoning has been increasing in recent years. For example, in June 2018, more than 100 people were poisoned in a cotton field in the Imishli region. In the same year, more than 140 people were poisoned in Saatli district. Similar cases occurred in Sabirabad and Tartar districts as well. Another problem is that some additional work needs to be done in the country to collect and isolate empty pesticide containers. Currently, state control over the use of pesticides is carried out by the Ministry of Agriculture.

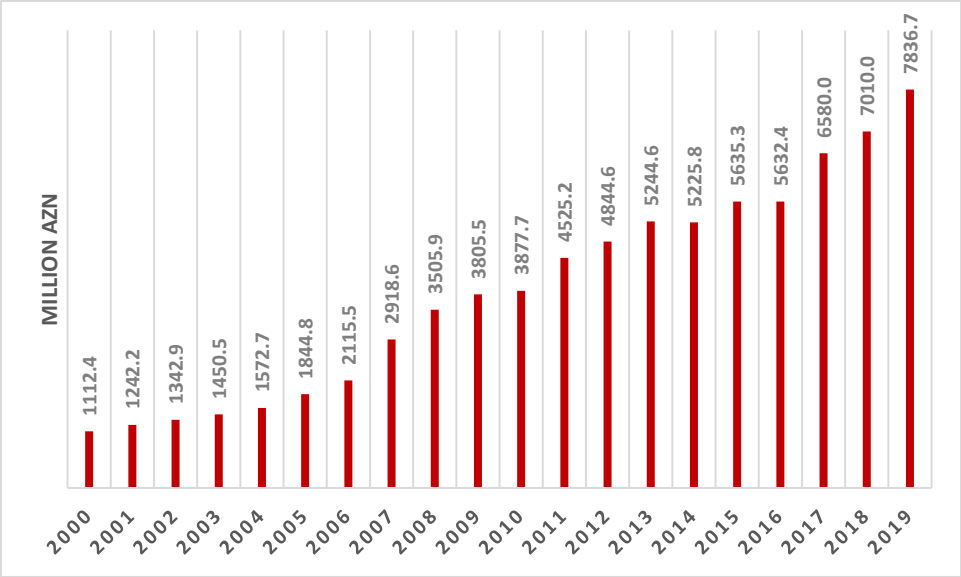
Industry

Industry is one of the main sectors of Azerbaijan's economy. Sixty percent of the country's industrial products are produced in Baku and Sumgait. Ganja-Dashkasan, Ali Bayramli-Salyan, Mingachevir-

Yevlakh, Goychay, Nakhchivan, Lankaran, Sheki, Khachmaz are the main industrial hubs in the republic.

The fuel and energy complex is based on local energy resources - oil. The main energy sources in the country are oil and gas and hydropower, solar and wind.

Figure 7. Gross agricultural output in Azerbaijan (2000-2019)



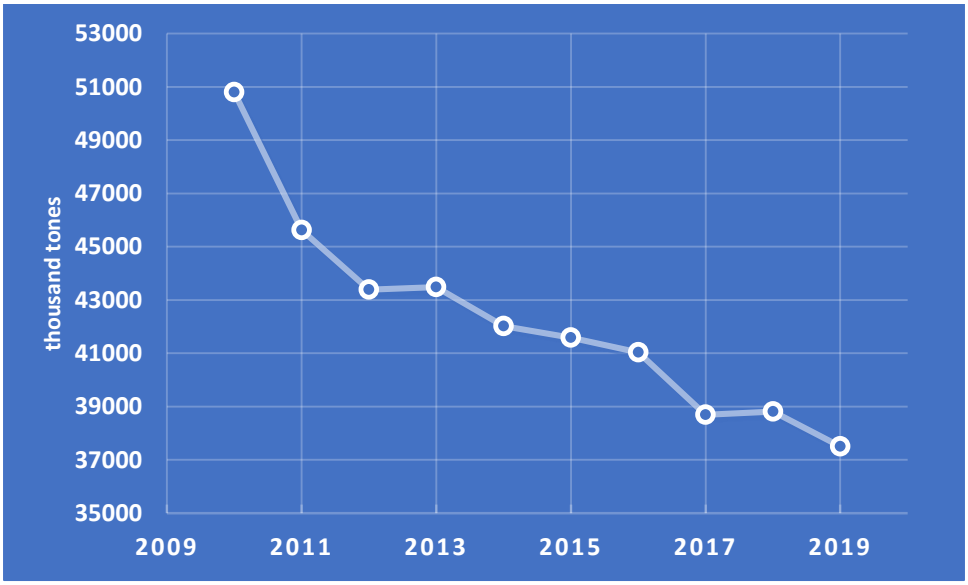
Oıl production is the main branch of Azerbaijan's industry. The history of oil production in Azerbaijan is very old. Oil production has been important in the country's history. At present, oil production is declining. Currently oil is mainly extracted in the Absheron Peninsula and in the Azerbaijani sector of the Caspian Sea. The extracted oil is exported via various pipelines mostly to European countries. Over the past decade, the country's oil production has declined significantly. In 2019, the oil produced in Azerbaijan was about 37 million tons. Figure 8 shows the main trend of oil production in Azerbaijan over the past decade.

Gas production in the country has increased over the past 20 years. This is due to the commissioning of the Shah Deniz gas field in Azerbaijan in 2006. To date, 445.2 billion AZN have been spent in Azerbaijan. To date, 320.1 billion cubic meters of gas extracted by Azerbaijan has been extracted at sea. Production from the Shah Deniz field, one of the richest gas and condensate fields in the world, began in December 2006. As of April 1, 2010, 18.8 billion cubic meters of gas was extracted from this field. In 2019 Azerbaijan produced about 35 billion cubic meters of gas.

The chemical industry in Azerbaijan is better developed than other industries. At present, there are more than 20 large chemical enterprises in Azerbaijan. These companies are mainly located in Baku, Sumgait and other cities of the country. The leading company is SOCAR and its subsidiary Azerikimya. At present, the Company's enterprises produce various brands of chemical products -

polyethylene, pyrolysis resin, propylene, technical and absolute isopropyl alcohol, propylene oxide, propylene glycol, various brands of polyesters, BDF (butylene-divinyl fraction), caustic soda and chlorine, technical sulfuric acid, etc. Some of the products are intended for domestic demand, and the vast majority are intended for export to near and far abroad.

Figure 8. Oil production in Azerbaijan 2010-2019



Among the industries, mechanical engineering ranks first in terms of the value of the product produced and the number of employees. Although there is a demand for various manufactured products in Azerbaijan, many areas of modern manufacturing have not developed. Until recent years, Azerbaijan specialized in the field of petroleum engineering and producing equipment for the peroleum industry. It accounts for one-quarter of the total output in manufacturing and engineering. One of the largest enterprises in oil engineering is Bashneflkimmash Union. The company exports its products to 40 countries.

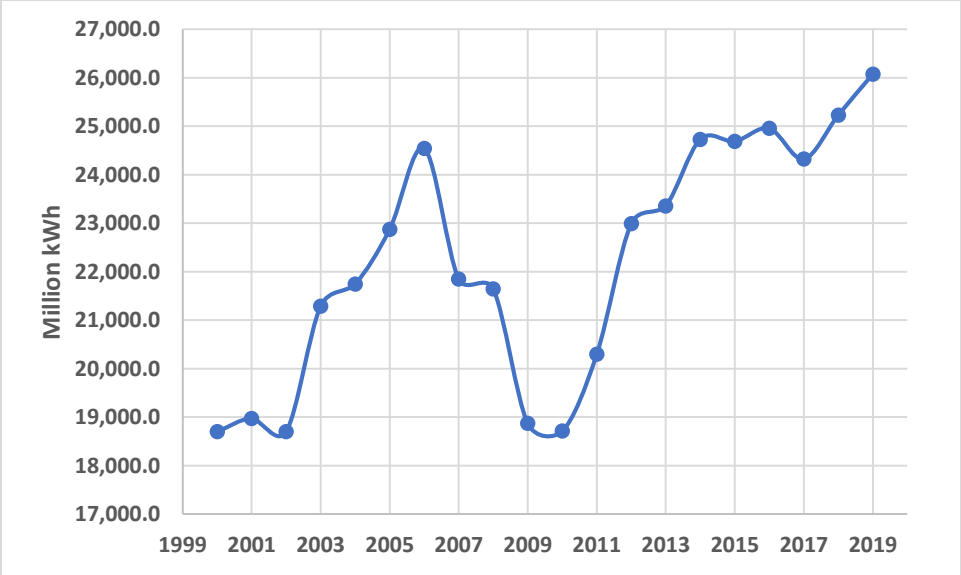
Although the oil industry developed in Azerbaijan during the Soviet era, the prevention of environmental pollution was never taken into account. Therefore, the level of pollution with oil products, heavy metals and other chemical compounds is high in the Absheron Peninsula and the Caspian Sea. This is explained in more detail in section x.

Power production

The power sector is important to the development of Azerbaijan's economy. Azerbaijan is fully electrified, and electrical power is the third most utilised energy source (first is natural gas and second is oil) for domestic and industrial use. It has an installed generating capacity of about 6,500 MW, of which thermal power stations contribute 5,500 MW and hydropower stations make up most of the balance. Until the recent past a significant portion of the installed capacity was not available; however, since the year 2000, investment efforts in generation and transmission have improved

conditions in the electricity power system. Converting power plants to natural gas has also provided an important leap forward in terms of improving power plant efficiencies and reducing their environmental impacts (Figure 9).

Figure 9. Electricity generation in Azerbaijan



Thermal power plants run on gas and fuel oil and are located mainly in Baku, Sumgait, Ganja, Mingachevir, Shirvan. The most powerful thermal power plants are located in Mingechevir and Shirvan cities.

In addition, there are hydropower plants in Azerbaijan, which are built on rivers with hydropower reserves. The country's first hydroelectric power plant (HPP) was built in the Gadabay region for a copper smelter in Galakand. Cascade HPPs have also been built on the Kura River. The most powerful HPP (360 thousand kW) is Mingachevir HPP. The reservoir provides for irrigation, flow regulation and flood prevention. Yevlakh HPP, Varvara HPP, Shamkir HPP, Yenikend HPP, Sarsang HPP (Tartar), Araz HPP do not fully use the energy of Azerbaijani rivers. Azerbaijan's electricity network is connected with Russia, Georgia, Iran and Turkey. The country has environmentally friendly, promising wind, solar and geothermal (hot water) sources.