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Environmental Pollution

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Abstract

The problems related to guaranty a sustainable environment in the city of Elbasan are numerous and appear quite complex. The environmental problems of Elbasan are significantly related to the pollution of the land and water, as well as to the damage of the biodiversity. The inherited pollution in Elbasan is related to the strong industrial development that has experienced this city before the years 1990. The inherited waste of these industrial units consist in large quantities of fine powders, iron concentrates, ferry-chromium slag and other solid residue and contaminants in the water resources of the zone. Air pollution has as source not only the industry but also the urban transport and infrastructure damaged roads, burning of solid waste, construction sector, combustion of propane and butane gases for heating and cooking, the existing way of clearance squares, pavements and roads. The main source of pollution in the agricultural lands of Elbasan in the years is considered Metallurgical industry and less other industrial agents. Taking into consideration these problems this paper is focused in the study of the quality of the air and groundwater in the areas of Elbasan Municipality for the period January-November 2014. There are analyzed PM-10, NO₂, CO, O₃, SO₂ content and the results are compared with the European Union standards and national regulations in purpose to show if are in the limits recommended by the European Union or Albanian regulations and if the effectiveness of the mitigation measures limit emissions from the most important sources.

Keywords: Elbasan, air, industries, pollution, water.

I. Air Pollution

Air pollution is one of the forms which refers to the contamination of the air, irrespective of indoors or outside. A physical, biological or chemical alteration to the air in the atmosphere can be termed as pollution. It occurs when any harmful gases, dust, smoke enters into the atmosphere and makes it difficult for plants, animals and humans to survive as the air becomes dirty. Sulfur dioxide emitted from the combustion of fossil fuels like coal, petroleum and other factory combustibles is one of the major cause of air pollution.



The pollution emitting from vehicles including trucks, jeeps and cars cause immense amount of pollution. We repose in material on them to fulfill our daily basic needs of transportation. But, there over use is killing our environment as dangerous gases are polluting the environment.

Carbon Monoxide caused by improper or incomplete combustion and generally emitted from vehicles is another major pollutant along with Nitrogen Oxides that is produced from both natural and manmade processes. Manufacturing industries release large amount of carbon monoxide, hydrocarbons, organic compounds and chemical into the air thereby depleting the quality of air.

Also the suspended particulate matter and especially the breathed dust are considered more dangerous for the health because being transported easily by the wind and weather proofs, not only reduce the viewership and increase the impurity in the building, but are deposited in the airways of the breath damaging particularly the lungs being sources of the cancer.

The suspended particulate matter together with other gases such as SO₂ and NO_x, in addition to the health risk, brings damage to buildings and cultural monuments especially in gradually reducing their quality and hardness.

The sources of these pollutants as well as Pb are the industries, the transportation, the metals systems, the production/distribution of electricity, the waste ecc.

In our country, air pollution is an industry source, urban transport and road infrastructure damaged, burning of solid waste, construction sector, the burning of propane and butane gas for heating and cooking, cleaning existing mode of squares, sidewalks and roads etc.

Among industrial factors mentioned, "Kurum" International, former "DARFO" today ACR (ferry) ECF, etc. Monitoring of urban air quality indicators realized for PM₁₀, NO₂, SO₂, O₃, CO, benzene.

Air quality monitoring is realized for indicators urban PM₁₀, NO₂, SO₂, O₃, CO, benzene, and is performed through its digital automatic equipment placed in three stations in the city of Elbasan one in the city center (yard of municipality), the other at the entrance of combine (semiautomatic device) and a "DOKO" complex (area combine).

Data indicator of gaseous NO₂, O₃ measured every 30 minutes while SO₂ data recorded every 5 minutes, namely measurements performed on 100% of annual time. For powders sampling frequency is 16 days/month (approximately 50% of annual time).

From the data it shows that in all the monitored stations by 6 indicators selected 5 of them: SO₂, NO₂, O₃, CO, and benzene are established norms of the Standard Albanian and EU. Their values do not exceed in any case these rates.



While with regard pollution from the solids in pending situation, poses a major problem for urban air quality in our country. This pollution comes mainly from vehicle emissions and is characteristic for older cars with diesel engine.

Also the construction section and infrastructure in construction are contributing to the increase of PM10. From all points monitored most problematic is noticed the metallurgical area where PM10 values were 61.97 g/m³ of 40 g/m³, which is the standard of the EU and 60 g/m³, which is Albanian standard.

This is explicitly linked to industrial pollution discharges relevant area, where the main sources of importance are melting steel plant KURUM, ferrochrome smelter DARFO, ext . In Elbasan center PM10 values were 49.13 g/m³ of 40 g/m³, which is the standard of the EU and 60 g/m³, which is Albanian standard.

1.1. Gaseous air pollutants: their sources and effects.

Particulate matter – are particles that form soot which have the source from factories, plants and machines. They have impact in the human health adversely increasing respiratory diseases, tumor diseases and premature births.

Ozone – is the main ingredient of smog in the industrial areas, created by the action of sunlight on nitrogen oxides and various organic ingredients. The ozone brings the continuous and gradual damage to the respiration system.

Air pollution continues to cause cardiovascular and respiratory illnesses. Air pollution has both acute and chronic effects on human health, affecting a number of different systems and organs.

It ranges from minor upper respiratory irritation to chronic respiratory and heart disease, lung cancer, acute respiratory infections in children and chronic bronchitis in adults, aggravating pre-existing heart and lung disease, or asthmatic attacks. In addition, short- and long-term exposures have also been linked with premature mortality and reduced life expectancy.

II. Water pollution

The city of Elbasan has some reserves of water for drinking water. The level of groundwater in the city of Elbasan average is 20m. Elbasan is supplied with drinking water from four sources which are: Mengel, Refrigerator, Krasta e Vogel and Griqan.

In the area of Elbasan there are two important aquifer. The complex: of reservoir and the complex of Quaternary alluvial gravels and complex carbonate reservoir. The complex of alluvial gravel huge reserves of food from the river of Shkumbin and rainfall and meets and exceeds all needs of the area for drinking water and technological.



In the utilization of the western part of the watershed there is a risk of pollution from industrial discharges. According to the groundwater basin and these are considered as vulnerable to contamination. The risk of contamination is high because of almost total lack of screening coverage aquifers. The risk is constituting especially industrial discharges and wastewater of infiltration from waste pollutants from urban areas.

Contamination of surface waters affected by parts of solid source from unpaved roads and buildings. The industry is an important factor of water pollution through uncontrolled discharge of product lines.

The risk from underground water contamination may presents and the existence of public cemetery near Shkumbin River. The cemetery is flooded several times by the flow of the river, which is favored by the lack from trees along in its bed (terraces).

2.1 Materials and methods

We have monitored 3 drilling: drilling No. 3/90 Krasta e Madhe, drilling No.2/90 Krasta e Vogel and No. 17 in Vidhas. It monitored the frequency three times in June, September and November.

The total Quantity of water used is about 1250 l/sec, to supply the city of Elbasan drinking water mainly from Krasta e Madhe and Krasta e Vogel and metallurgical industry from Vidhas area ecc. Utilization coefficient is $K = 0.25-0.3$.

The risk of contamination is high because of the total lack of screen cover to aquifers, especially in Krasta e Madhe and e Vogel, the population of sanitary protection areas in 2 Krastas and emissions of Vidhas industrial area.

2.2. Results of monitoring

UN quality monitoring is performed in the most important areas of use for the intensive purposes of UN for supplying of drinking and Krasta's industrial water in the area of Krasta e Madhe, Krasta e Vogel and Vidhas ecc. Quality monitoring in those areas for people who have specific conditions:

In the area of Krasta e Vogel the protective cover thickness of the aquifer is small or absent.

The entire area is populated without complying the areas with sanitary protection.

In the area of Vidhas with restoring the metallurgical industry, compromised the quality of UN disruption from industrial discharges.

Opportunities present pollution and the fertilization of agricultural lands.

Water temperature T - Temperature of water in three stages of monitoring varies $T = 14.7 - 18.8$ o Celsius, in the past year varies $T = 14.7 - 16.5$ o Celsius (8-15 rate, up 20).



UN of pH - UN of pH monitoring in three stages ranging from 7.25 - 7.74, in 2013 it ranged from 7.66 - 8.07, the rate of water allowed this indicator is within the norm (pH = 6.5 - 8, 5).

According to the pH value (hydrogen ion concentration) are typed of alkaline waters weak pH = 7 - 9.

Changes of pH values in the monitoring stages are small, they vary from 0:01 to 0:26. The average pH values for the years 2010 - 2014 range in 7.63 - 7.83.

Micronutrient Analysis - analysis for microelements were performed in drilling no. 17 no 17 Vidhas, Elbasan for Ni, Mn, Zn, Pb, Cu, Co, Cr, Cd.

In this analysis has content microelement in three stages of monitoring: Ni = 0015-0017 mg/l, Mn = 0006 to 0008 mg/l, Zn = 0013-0033 mg/l Pb = 0019-0023 mg/l, Cu = 0.003 - 0.004 mg/l, Co = 0.016 - 00:02 mg/l, Cr = 0.006 - 0.009 mg/l Cd = 0.003 mg/l. The content of micronutrients is in recommended content to PML.

III. Conclusions

For air pollution: From the data it shows that in all the monitored stations by 6 indicators selected 5 of them: SO₂, NO₂, O₃, CO, and benzene are established norms of the Standard Albanian and EU.

Their values do not exceed in any case these rates. While with regard pollution from the solids in pending situation, poses a major problem for urban air quality in our country. This pollution comes mainly from vehicle emissions and is characteristic for older cars with diesel engine.

Also the construction section and infrastructure in construction are contributing to the increase of PM₁₀. From all points monitored most problematic is noticed the metallurgical area where PM₁₀ values were 61.97 g/m³ of 40 g/m³, which is the standard of the EU and 60 g/m³, which is Albanian standard.

This is explicitly linked to industrial pollution discharges relevant area, where the main sources of importance are melting steel plant KURUM, ferrochrome smelter DARFO, ecc. In Elbasan center PM₁₀ values were 49.13 g/m³ of 40 g/m³, which is the standard of the EU and 60 g/m³, which is Albanian standard.

For water pollution: In the area of Krasta e Vogel the risk of pollution from residential homes and ways of removing wastewater septic tanks. Regarding the qualitative classification of surface waters, they are part of the first category and the second, being considered with a good quality.



They are neutral pH. While terms of the basin groundwater and these are considered as vulnerable to contamination. The risk of contamination is high because of the total lack of screening coverage aquifers.

Risk constitutes especially industrial discharges and sewage infiltration of the waste pollutants from urban areas. Contamination of surface waters affected by part of the solid source of unpaved roads and buildings.

The industry is an important factor of water pollution through uncontrolled discharge of product lines. The content of sulfates in drilling no. 17 Vidhas, has changes - fluctuations from one stage to another and growing trend, changes may be related to the activity of Metallurgic. Intervention needed is in the embankment of the river to Zaranika (also a forestation), and lower in the stream bed to Manazderes.

Since during the high flows, these two streams cause damage, especially in the first case damage informal residential areas. Recommended utilization of water resources in Mengel and Fridge but not in Krasta e Vogel because of greater opportunities pollution. Major interventions should be made in the system of wastewater treatment in the field of waste and to avoid infiltration pollutants from these two sources.

There is a plan for a new place of deposit urban waste to be removed from the shore of Shkumbin. The infiltration route industrial pollutants in groundwater should be cut. The observations made earlier by Ihe and NEA current laboratory, show that the values of pollution are higher in the direction of flow Shkumbin, fleeing the city, which shows the impact on the quality of the waters of urban and industrial discharges. Cemetery of the city should be moved from the current location while Shkumbin terraces should be planted avoiding this phenomenon such as erosion and flooding.

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