

## Management of Pollution Prevention and the Impact on Population Health

Greta Angjeli<sup>a</sup>, Jona Marashi<sup>b</sup>, Mirela Lika<sup>c</sup>

<sup>a</sup>Mediterranea University of Albania, Faculty of Economy; Alabina

<sup>b</sup>Human Resource in Action, Boston, USA

<sup>c</sup>University of Tirana, Faculty of Natural Sciences, Department of Biology, Albania

---

### Abstract

Pollution prevention reduces the amount of pollution generated by a process, whether it is consumer consumption, driving, or industrial production. In contrast to most pollution control strategies, which seek to manage a pollutant after it is formed and reduce its impact upon the environment, the pollution prevention approach seeks to increase the efficiency of a process, thereby reducing the amount of pollution generated at its source. Although there is wide agreement that source reduction is the preferred strategy, some professionals also use the term pollution prevention to include pollution reduction.

This study aims has been to analyze all the elements of the environment; such as air, acoustic pollution, the quantity of the surface water, waste residue as well as to determine the hot regions in the Durres city, Albania.

The air pollution is the biggest environmental problem in the Durres city. The levels of the PM and LGS are very high, respectively  $95 \mu\text{g}/\text{m}^3$  and  $209 \mu\text{g}/\text{m}^3$ . The acoustic pollution is one part of the air pollution. We have observed the higher level, 76,5 dB, in the middle of the day, caused by the large number of old cars, and this situation is aggravated by inappropriate infrastructure conditions.

The waste collection, transportation and disposal, is performed in a non proper manner, causing large amounts of pollution, especially during the summer. The waste volume per inhabitant is increasing every year, due to the overpopulation of this city. The waste has been left in open fields without any treatment, causing another environmental pollution in the Durres city.

**KEYWORDS:** environmental pollution, air pollution, surface water, waste residue, acoustic pollution, Durres.

---

### INTRODUCTION

Governments, scientists, businesses and industries, agriculture, environmental organizations, and individuals can all help to control pollution. Pollution management, which specifically involves reducing and cleaning up pollution, is expected to be one of the fastest growing industries of the future.

Environment health refers to characteristics of environmental conditions which affect the quality of health. Environmental health is that aspect of public health that is concerned with those forms of life, substances, forces and conditions in the surrounding of man that may exert an influence on human health and well being (Balcanov, 2001; Spengler & Sextonk, 1993; Pilarczyk, 2003). This definition includes other people as part of a person's surroundings, that contribute to the status

of environmental health. The interacting system may be depicted as follows: man ↔ environment, where not only does man and his environment interact, but man is shown to be a vital factor of his own environment.

More recently, according to the concept of the WHO definition, this effects the quality of life as well. This latter concept could be extended to include ecological and aesthetic values, as well as health in a strict sense (NEA/AKM, 1999; Barker, 2002).

The quality of life is directly related to the quality of the environment. The quality of the environment throughout history has been used as a measure of the character of a civilization – a way of life.

The research in the field of detections of some pollutants compounds (in air, water and soil) helps us to relate them to the diseases which are caused from the different pollution factors. One of the great contributions of the special program has been the development of the concept of a complex system approach to the solution of complex problems (Boyles, 2002; ESCAP, 1994; Kukkonen et al., 2005; Mills, 1985). Mechanisms to examine the events and their consequences have yet to be established in any effective way.

Levels of concern for environmental quality have been classified roughly as follows (1) bare survival-control of major epidemics of diseases and violent death, minimum food and water; (2) control of disease and injury-control of epidemic and dietary diseases and accidental injury; (3) efficient performance-adequate and proper diet, the maintaining of the environment for efficient use of manpower; and (4) comfort-stimulating environment, aesthetic satisfactions and comfort control.

Due to concern in recent years for the rapid growth of world population, recognition that there are limits to resources to sustain unlimited populations and that human activities have reached a scale capable of altering life support systems, has increased. Consequently, one may add another level of environmental health to the four listed above: the survival of the human species.

## **MATERIALS AND METHOD**

The subject of this study has been to monitor the environmental quality in the Durres city, Albania. Through the proper methods, we have studied the levels of pollution in the air, and at the same time we have observed the pollutions caused by wastes, the pollution in the surface and underground water, sewages, the pollution on the soil, etc.

This study was performed during the years 2012 to 2013 in the city of Durres.

“Porto Palermo” is the main point of the collection of urban waste in Durres. The greatest part of urban garbage non-industrial and hospital garbage are collected and burned in Porto Palermo. The drop-off place is located in a valley side, in the water collection basin of Adriatic Sea in the southwest of Durres. Even though this place is set up on clay layers, the bed of the valley contains sand and gravel, and it does not have a protection layer in the lower part or in the side parts. There is also no drainage system for the flow and filtering of the garbage (Boyles, 2002; Mills, 1985; Pilarczyk 2003). On the other hand, solid garbage pollutes the air through the production of smells, of methane, particles of dust containing heavy metals and burnings associated with emissions with inorganic and organic content (dioxin, furan, etc). Nowadays the drop-off location presents an enormous threat for the health of the habitants of the

area as well as for the adults and children, who collect and recycle garbage from this place.

We have monitored surroundings of crossroads of vehicles. The monitoring and the provision of results of air quality were carried out by the Institute of Public Health. Air monitoring was carried out in the points and terms determined on the study which were based on the methods of receipt and analysis of samples as well as on the calculation of average values (Kukkonen et al., 2005). Based on the norms, the comparison of the real condition and the results are discussed.

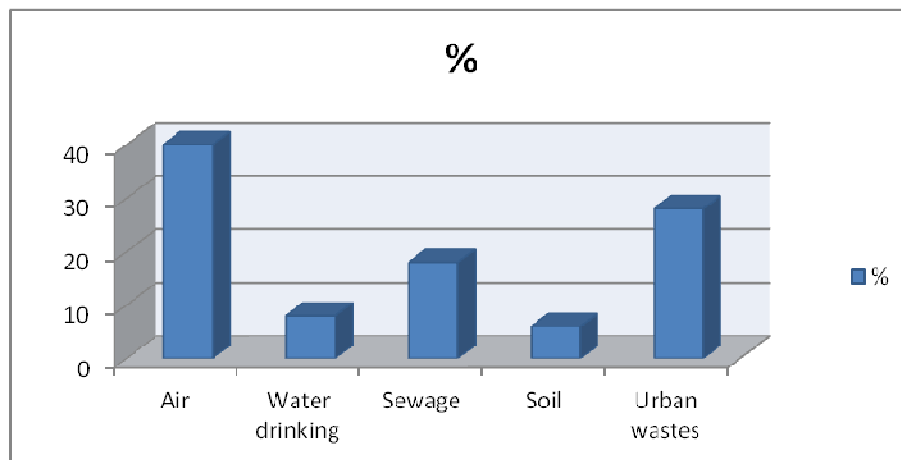
The most important polluters continue to be the total dust LGS and the respiratory one, PM10. Durres continues to be on the top, exceeding almost twice the average. The point of under crossing is considered dangerous for the health of the people, exceeding the average over 6 times.

## RESULTS AND DISCUSSION

The economic and social developments during the last years have been significant and have greatly influenced the environmental situation of Durres.

Some important data are presented in the follow charts.

The main pollution sources in Durres are:



**Figure 1: The percentage of the environmental pollutions in Durres.**

It is important to stress that some of the people are conscious about their role in the environmental pollutions as well as their role in solving the pollution problems.

Our main aim has been: (1) how to determine main problems; (2) how to solve these environmental problems in their region.

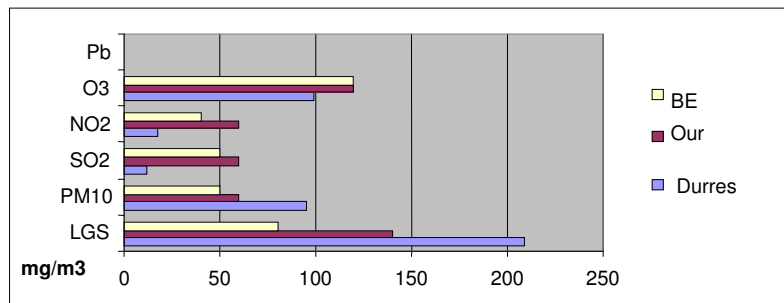
As a result of expeditious social-economical changes in our country, important changes occurred in air pollution after 1990. The concentration of population in large urban areas, especially in Durres and Tirana (the capital of Albania), was accompanied by increasing air pollution issues. Durres is in the most critical situation

in terms of the suspended particulate matter. According to the data, it results as one of the most PM10 and soot polluted cities in Europe.

**Table 1. Annual average results of the air pollution elements.**

	<b>LGS</b> $\mu\text{g m}^{-3}$	<b>PM10</b> $\mu\text{g m}^{-3}$	<b>SO<sub>2</sub></b> $\mu\text{g m}^{-3}$	<b>NO<sub>2</sub></b> $\mu\text{g m}^{-3}$	<b>O<sub>3</sub></b> $\mu\text{g m}^{-3}$	<b>Pb</b> $\mu\text{g m}^{-3}$
<b>Durres</b>	209	95	12	18	99	0.34
<b>Our norm</b>	140	60	60	60	120	1
<b>BE Norma</b>	80	50	50	40	120	0.5

**Figure 2: The level of the total dust and respiratory dust. LGS - Total Dust; PM10- Respiratory Dust.**



Samples of dusts were collected in street sites in various parts of Durres with different urbanization and traffic levels.

The high dust contents in Durres originate from natural local sources, but the anthropogenic sources play a significant role; one which consists mainly on vehicle emission, as well as long distance pollution from industrialized Western European country. In terms of the vehicle pollution, it is of great importance the fact that the greatest part of circulating vehicles are old and/or diesel engine. As a result of this greater amounts of particulate matter are emitted. The situation is aggravated by inappropriate infrastructure conditions, increased construction activities, unsuitable solid waste management and damaged green areas.

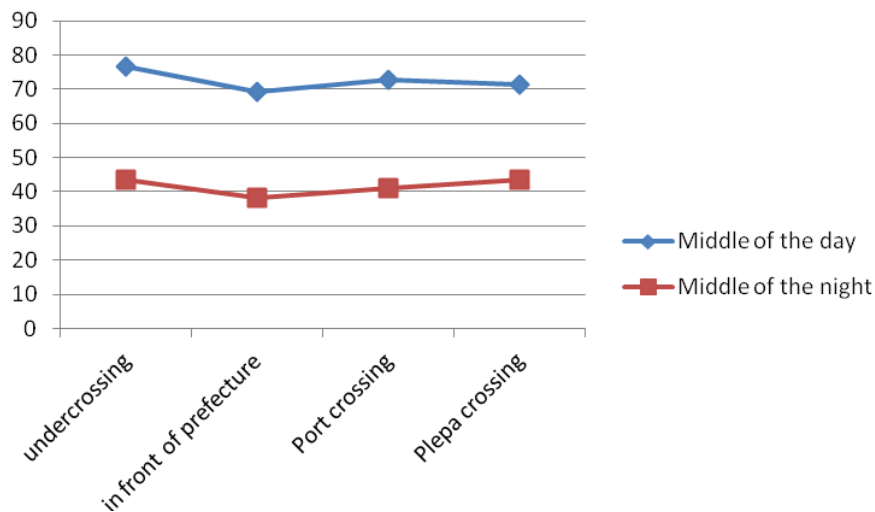
One part of the urban air pollution is the acoustic pollution, which is classified as one of the air pollutions. The awareness of the acoustic pollution level in the different locations of Durres gives us a chance to estimate the exposure of the population by noises.

During the monitoring time we observed the increase of this pollution level. The increasing level is especially caused by the great number of the cars during the day and in the evening.

The monitor is realized in 4 main locations in Durres.

**Table 2: The results of acoustic pollution.**

Monitoring areas	Middle of the day (dB)	Middle of the night (dB)
Undercrossing	76,5	43,5
In front of Prefecture	69,2	38,3
Cross of the harbour	72,6	41
Plepa crossing	71,4	43,4



**Figure 3. The levels of the acoustic pollution in dB.**

**Table 3. The permission acoustic level as WHO.**

The levels for industrial zones are		The levels for urban zones are	
The day	60 dB	The day	75 dB
The evening	55 dB	The evening	70 dB
The night	45 dB	The night	60 dB

The allowed levels of the noises in urban and industrial zones are decided by recommendation of the WHO.

The main causes of the acoustic pollution in Durres city are: (1) The different activities of the people; (2) The affluxes of the vehicles, especially of the old vehicles; (3) The absence of the electricity and the using of the electricity generators near the urban regions; (4) The absence of the legally laws in order to put the levels about the noises in urban zones, etc.

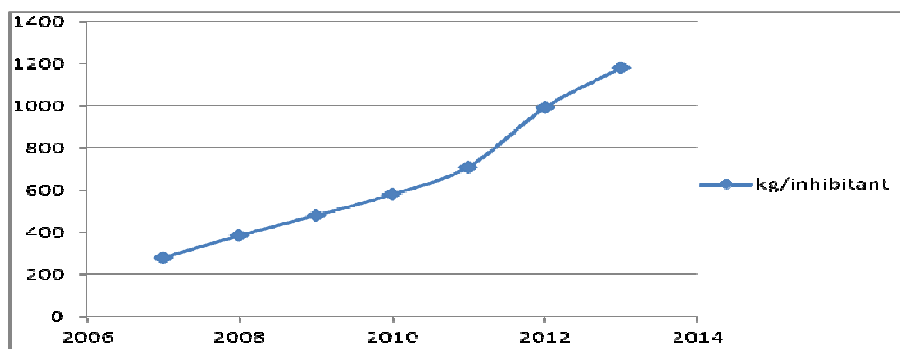
The main problems of the urban environment are as follows:

The overpopulation of the cities, especially Durres and Tirana, within a short period of time; the insufficient supplying of the houses with water for drinking water and other hygienic purposes; the irregular functioning of sewage water systems and canals, the lack of controlling maps and diagrams of the relevant network, the direct discharge of sewage waters without indemnifying the damage; the increase of urban solid waste in bulk and kind, due to the intensive development of private business trade and the application of no proper manners for their collection, transportation and especially for their disposal.

The wastes of Durres in landfills near the Porto Romano region did not undergo any treatments, but were rather left in the open air under the influence of the atmospheric conditions. During the hot periods they became a source for the evolution of insects and environmental pollution. This has created two difficult situations: (1) Scattered domestic become a source of air pollution by the smells of fermentation which incite the increase of flies and ovaries of intestine parasites, rats, dogs and cats which wander in these sites to look for food. This does not exclude the cases of the waste touching by children of Porto Romano region who play in these environments, possessing in this way a great risk to human health and the pollution of the surrounding environment; (2) the activities of waste collection are not effective. The street cleaning is performed by manual labor, by means of gorse brooms.

Until there wasn't a designated land for the waste in Durres. The waste is gathered in an area which is close to a lot of house inhabited from people who have come to the city during the last 15 years. Now new land field is projected in the same place, but the strategy includes a plan of action including all the chains of the treatment of the waste and its management (collection, transport, selection, recycling, composting and disposal). This will result in a possible solution for such a great and vital problem.

The waste volume has increased from year to year because of the population increase in Durres town.



**Figure 4: Increasing of the waste volume generate per inhabitant.**

The importance of clean water to the health of the community can hardly be overstressed, and it remains a substantial public health problem worldwide.

It is obvious that the drinking water must be of high quality and present no risks to the consumer by its chemical, biological or microbiological contents. Only a small portion of daily water consumption is attributable to drinking, but personal washing, laundering and food preparation all require pure water supply for the protection of health.

The complete elimination of diseases producing organisms is not guaranteed by sewage treatment and whilst direct links between sludge disposal and human diseases are not totally established, regard must be paid to the possible risks of direct contact and the contamination of water courses by run-off from the land. Much more positive evidence exists to link the transmission of parasitic conditions in this way because of the vast number of eggs excreted by infected humans, and their resistance to hostile environments. Sewage sludge is a proven vehicle in the cycle of the bovine infestation cysticercoids.

The water drinking supplies and the sewage supplies are so old in Durres. Time after time, the sewage and drinking water are mixed and the gastro-enteritis diseases are outbreak, for example, there was the type A Hepatite outbreak and many people suffer from dysentery during the summer.

## CONCLUSION

Some of the problems are :

- A low level of knowledge about environmental health education in Albania.
- It's better to built new inter-institutional relations within local government and between local groups and government bodies. This can be effective but it would not be enough.
- A public information element should be an integral part of very environmental management effort.
- Any national environmental health policy must take into account and try to accommodate the range of technical and economic resources in metropolitan areas.

## REFERENCES

BALKANOV, A. 2001: The mixing height in urban areas – a review, COST 715 Expert Workshop “Mixing Height and Inversions in Urban Areas”, Toulouse, France, 3-4 October, 2001.

BARKER, A. V. 2002: Bioremediation of heavey metals and organic toxicants by compositing. - *The Scientific World Jornual*, [www.ummass.edu/umext/soilsandplant/](http://www.ummass.edu/umext/soilsandplant/) (August 14, 2002).

BOYLES, S. 2002: Livestock and water. *The Scientific World Jornual*, [www.ummass.edu/umext/soilsandplant/](http://www.ummass.edu/umext/soilsandplant/) (March 5, 2002).

ESCAP, 1994: Expert Group Meeting on Water Resources, Water Quality and Aquatic Ecosystems. Bangkok, 17-21 October, 1994.

KUKKONEN, J., POHJOLA, M., SOKHI, R. S., LUHANA, L., KITTIWIROON, N., RANTAMAKI, M., BERGE, E., ODEGAARD, V., SLORDAL, L. H., DENBY, B., & FINARDI, S. 2005: Analysis and evaluation of selected local-scale PM10 air pollution episodes in four European cities. – *Atmospheric Environment*, 37. 2759-2773.

MILLS, W.B.198 5: Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants, EPA-600/6-82-004 a & b. Volumes I and II. U.S. Environmental Protection Agency, Washington DC.

NEA/AKM, 1999: Convention of Biological Diversity. Biodiversity Strategy and Action Plan (national Report). National Environment Agency (NEA), Tirana, Albania 1999: 100pp.

PILARCZYK, K. 2003: Alternative System for Coastal Protection on Overview. International Conference on Estuaries and Coasts. November 9-11, 2003. Hanzhou,China.

SPENGLER, J., SEXTON, K. 1983: Indoor Air pollution: A Public Health Perspective. *Science* 221: 9-17.