

Emerging environmental sciences: addressing the pressing ecological issues of our time

*Nataly Sergievskaya**

Moscow State University of Civil Engineering, Moscow, Russia

Abstract. The gist of this article boils down to various problems related to ecology. Special attention is paid to the problem of “garbage”, since it is more or less relevant for all countries. A conceptual model of the interdependence of the state, specialized organizations and the population in solving the “garbage” problem is also proposed. A survey of the population is proposed on what they consider the most serious threat to their country. The authors provided data regarding the share of various areas of activity of enterprises and households in waste generation. Information about the cities considered the cleanest in the world in 2024 is provided.

1 Introduction

Relevance of this work. Currently, environmental problems are very acute and cause concern throughout the world not only for scientists, but also for ordinary citizens. These include:

- deterioration of the environmental situation in cities;
- the emergence of diseases and the birth of less healthy children due to environmental problems;
- disappearance or being on the verge of extinction of various representatives of the flora and fauna;
- pollution of water, soil, air due to the actions of unscrupulous entrepreneurs;
- the occurrence of fires, one of the reasons for which is flammable waste that is not disposed of or not disposed of properly, and much more.

The purpose of the study is to consider various environmental problems and pay special attention to the “garbage” problem, which is relevant for all countries of the world to a greater or lesser extent. This is not just about household waste. A model of the interdependence of the state, specialized organizations and the population in solving the “garbage” problem is also proposed and discussed in some detail.

This problem concerns not only household waste, but also various fields of activity. For example, after major sporting events there is usually a lot of trash left behind that both staff and volunteers have to clean up. Waste arises from human activities, which include both industrial production and the provision of various services, such as restaurants, transport, tourism, etc. Nguyen Duc Thanh suggests dividing waste according to the following criteria: 1. their origin, for example, household, construction, etc.

* Corresponding author: nadina2350@mail.ru

2. their chemical properties;
3. biodegradable waste;
4. level of their toxicity [1].

2 Materials and methods

This article uses theoretical methods of analysis, as well as comparison and synthesis of data.

In the modern world, environmental issues play a significant role in the life of society. We constantly read information about ecology and environmental issues. There are a lot of them. Let us look at some of them.

1. People travel and make trade trips to different countries. It would seem that these actions for the environment are harmless, but it is not always the case. Ships use ballast water. It is sometimes necessary to ensure safe swimming, but sometimes it can cause serious problems, both environmental and medical, depending on what the water contains. Various microbes, bacteria, larvae, etc. can get here. They enter other countries and begin their destructive effect. They act as invaders. They can destroy local flora and this leads to serious consequences. Unfortunately, such phenomena are not as rare now as they used to be. Many scientists are very concerned about this problem [2].

2. Related to the above is another problem that all countries also face and which is no less acute. This is when people in rural areas declare war on a species of animal and begin to exterminate it. Often such an animal is a wolf. Therefore, in one area the shooting of wolves began. As a result, the moose population has increased. This led to too much grazing in coastal areas, which, in turn, caused a reduction in vegetation and significantly disrupted the ecosystem of the area [3].

3. Also no less, and perhaps more acute, is the issue of air pollution due to heavy traffic in cities. This leads to soil contamination with heavy metals. Soil testing shows high levels of lead and zinc [4]. It is also noted that in many developing countries, traffic congestion and air pollution create serious environmental problems. In a number of countries, PM2.5 has reached high concentrations and can be fatal [5]. Exhaust gases cause very serious damage to public health. Anyone who travels outside the city immediately notices a significant difference in the air. The further away from cities, the cleaner the air and the healthier the population.

4. Air pollution can cause various diseases, such as respiratory diseases and cardiovascular diseases. This also has a negative impact on the activities and behavior of residents of the area [6]. In addition, it is believed that the cause of greenhouse gases and air pollution in general can be both cars and coal-fired power plants, which emit substances harmful to human health into the air [7]. Another reason for the emergence of greenhouse gases is considered to be the rapid pace of industrialization and urbanization [8].

5. Another problem is the pollution of rivers, reservoirs, and seas. Some unscrupulous entrepreneurs dump waste into nearby rivers or lakes. Fish and all living organisms die. People cannot drink water, i.e. the local population not only breathes harmful fumes, but also remains without the most necessary things. Clean water. In addition, nitrogen and phosphorus promote the growth of microorganisms and reduce oxygen in the water. In addition, their excessive amount can lead to the release of poisons [2]. As a result, most countries have introduced strict regulations for businesses to protect the environment.

6. Another very serious problem is fires. They can destroy not only forests, but also populated areas, causing irreparable damage to both people and flora and fauna [9].

7. Many scientists are concerned about climate change and global warming. They are sounding the alarm because this process has recently accelerated very sharply. The reason for this is the activities of people who, in pursuit of commercial interests, cause irreparable

harm to the environment. The result could be relatively active melting of the Arctic and Antarctica. The consequences can be catastrophic and irreversible for all humanity.

In 2020, a survey was conducted in 14 countries such as the UK, USA, France, Germany, Spain, Sweden and other countries by the Pew Research sociological center about what residents consider the biggest threat to their country.

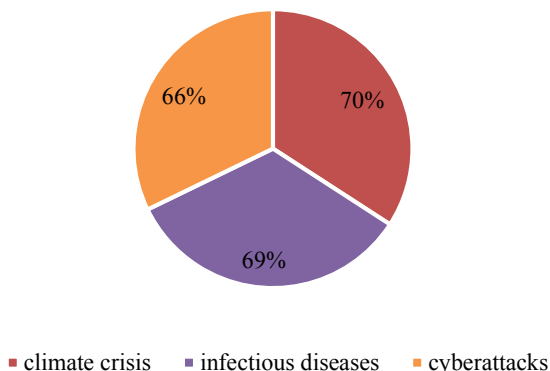


Fig. 1. The greatest threat to the country [10].

From the figure you can see that people are most concerned about the climate crisis.

1. We will also touch on one of the very serious problems - the “garbage” problem. Several questions arise here:

- how to properly dispose of waste;
- responsibility of the population;
- responsibility of organizations dealing with this problem.

In some cases, landfills are starting to move closer to cities, or people have bought a house in a rural area and after a while set up a landfill nearby. Garbage plants contribute to solving this problem on the one hand, but on the other hand, everyone who has to live next to this plant is forced not only to constantly smell the stench, but also harms their health. Let us look at EUROSTAT data in 2020 regarding the share of various areas of activity of enterprises and households in waste generation [11].

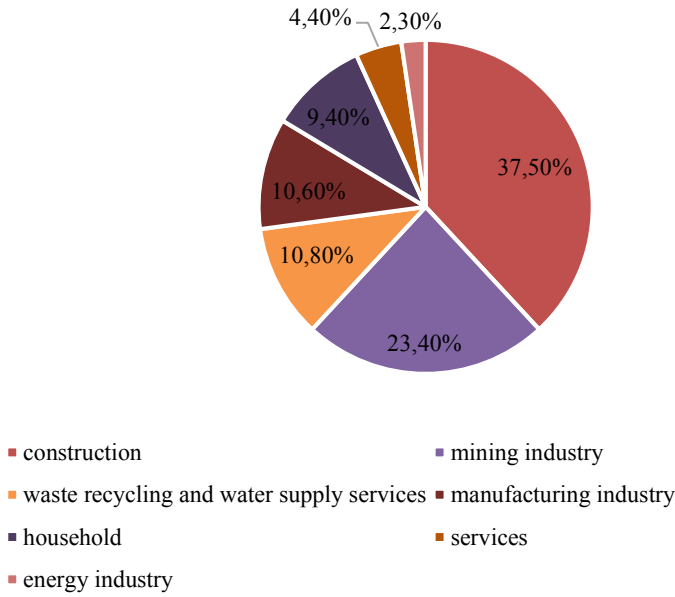


Fig. 2. Share of different activities in waste generation in the EU in 2020.

In this figure you can see that the largest amount of waste comes from construction and the mining industry, and the smallest from services and energy. For households – 9.4%

Best Life also analyzed the 200 largest cities in the world in order to rank the cleanest cities in the world in 2024.

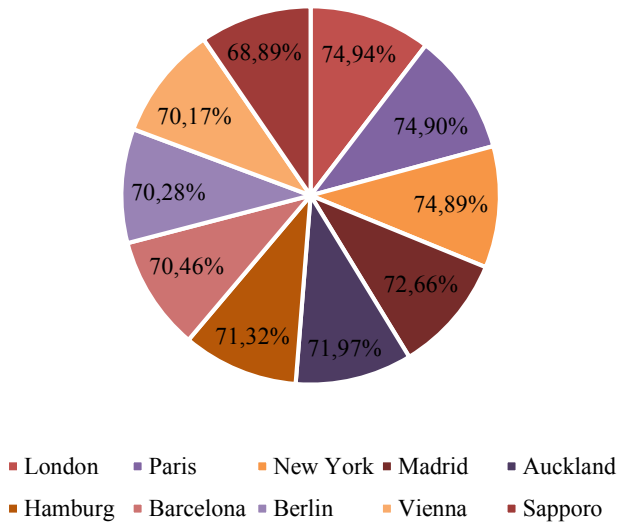


Fig. 3. The world's cleanest cities in 2024. [12].

In this figure you can see that the largest amount of waste comes from construction and the mining industry, and the smallest from services and energy. For households – 9.4%

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3 Results

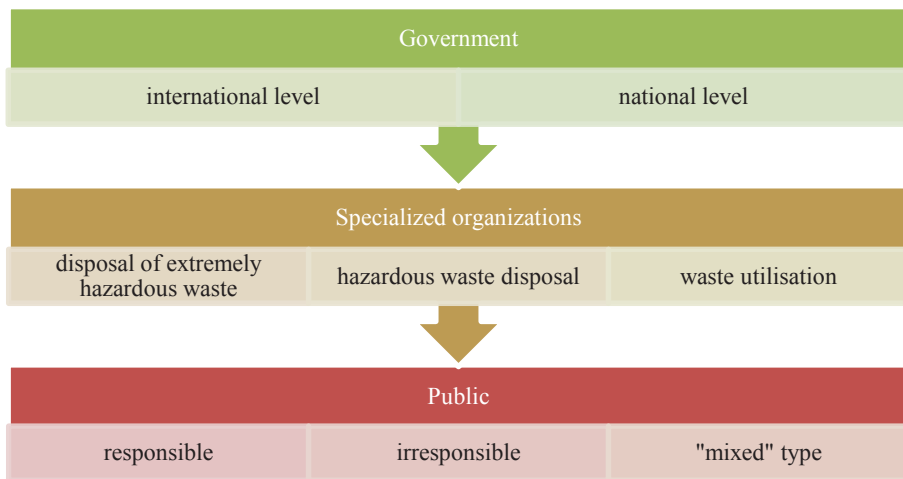


Fig. 4. A model of interdependence between the Government, specialized organizations and the population in solving the "garbage" problem.

From the government's point of view, there are several problems associated with the "garbage" problem:

3.1 Government

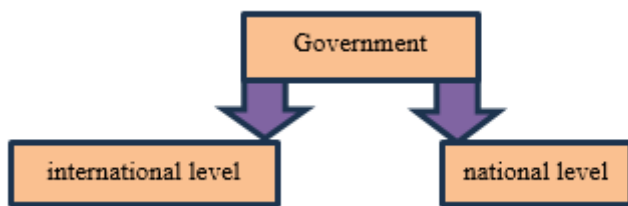


Fig. 5. "Garbage" problem at the government level.

1. Problems at the state (international) level. The attitude of countries towards the disposal of nuclear and other deadly waste. Let us roughly divide them into four types:

- Countries pay money to other countries to dispose of this waste at home.
- Countries partially recycle at home, partially as in the first case
- Countries dispose of their waste locally
- Countries recycle other people's waste at home

The reasons why countries act in one way or another are different. We will also conditionally divide them into several types:

- territorial. No place for disposal
- financial. The country's ability to obtain the financing it needs.
- medical. Countries are afraid to store such waste and care about the health and lives of their citizens.

- technical. The country cannot build burial sites of the required level
 - psychological. The population is rebelling against such waste in their country, etc.
2. Problems at the state (national) level.
- Laws and normative legal acts are needed. They exist in every state. Their strict implementation must be monitored.
 - Interaction between government agencies and specialized organizations that collect and dispose of waste.
 - Work with the population. People must strictly follow all rules for storage and disposal of waste, etc.

3.2 Specialized organization

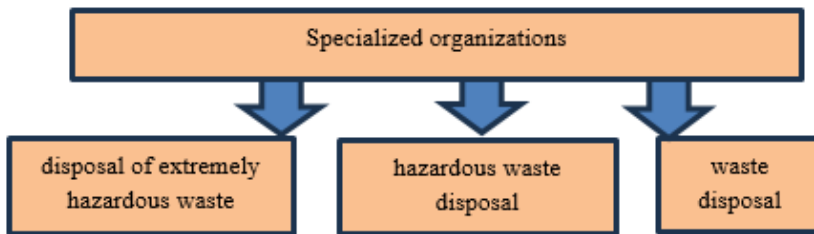


Fig. 6. The "garbage" problem at the level of specialized organizations.

1. Disposal of extremely hazardous waste. It is necessary to comply with all rules and requirements on all points. This applies to labeling, storage methods, transportation and disposal of waste. The more dangerous the waste, the stricter the rules, because Failure to comply with them or incomplete implementation can lead to the death of the employee and the population around. In some cases, even the air from some waste becomes deadly poisonous. In addition to catastrophic consequences for humans, irreparable damage is caused to soil, water, etc. It is also saturated with poison and cannot be used for a certain period.

2. Disposal of hazardous waste. They are also subject to increased demands. They are very dangerous, but do not have catastrophic consequences as in the first case. Such waste causes serious damage to human health and the environment, but usually does not cause death.

3. Waste disposal. It is not fatal to humans and does not lead to serious illness. The requirements for them are no longer so stringent, but still, failure to comply with the rules can lead to unpleasant consequences, for example, rats, which are known to be carriers of various diseases.

The work of people involved in waste collection and disposal is usually associated with greater or lesser risk. Unfortunately, most citizens are not even aware of this and are quite careless towards the employees of these organizations. They do not understand that they fight every day for their lives and health. This especially applies to those who collect and dispose of hazardous and highly hazardous waste.

Specialized organizations coordinate their actions with both government agencies and the population. As stated above, they comply with all orders and requirements that the state imposes on the activities of these organizations. As for the population, when taking out daily garbage, they are faced with the fact that people have different understandings of their responsibility for removing garbage. Someone disposes of it according to established rules and puts only what is needed in each container. Someone throws everything into one trash can. Someone does not bring it to the right place and throws it away next to the container. This creates a number of difficulties for employees of organizations.

3.3 Public

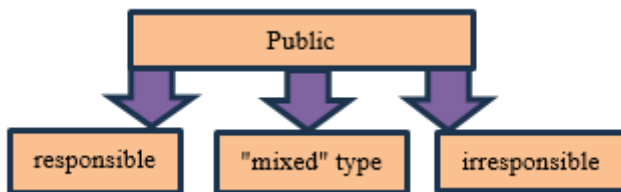


Fig. 7. "Garbage" problem at the public level.

The population can be divided roughly into responsible and irresponsible from the point of view of the "garbage" problem.

1. Responsible population. Usually everyone is taught from childhood that he should not litter. Already as adults, they teach this to their children and strictly comply with all requirements for garbage disposal. Everything is laid out in containers as expected. Unfortunately, there are not as many such people as we would like.

2. Basically, the "mixed" type predominates. They are neat, do not litter on the streets, and throw everything into containers. However, they may or may not sort the garbage. It depends on your mood and how busy you are.

3. Irresponsible population. There are few of them, but they exist. People do not want to follow generally accepted rules. They can take the garbage to the trash heap, or they can throw it on the street. This leads to homeless (and sometimes domestic) dogs and cats tearing through garbage bags, wanting to find food for themselves. Sometimes crows or other birds do this. As a result, rats appear that can show aggression towards passers-by and spread various diseases. In addition, such people may not take out the trash for long periods of time, which leads to the appearance of cockroaches, from which other residents of the house suffer. That is why there are rules of behavior in apartment buildings, and neighbors have the right to complain if there is a danger of such a problem.

Another problem is garbage dumps near cities. Usually all household waste from the city is brought here. They are located far from the city limits and do not cause disturbance to the local population. The location of landfills is regulated clearly by law and is monitored to ensure that there are no violations. However, sometimes (rarely) a situation arises that, for various reasons, is out of control. There can be several situations: people lived in a holiday village and a landfill was installed not far from it, or a village was erected on the site of a former landfill; violated the permissible boundaries and made it near the city at an unacceptable distance, etc. Most often, it happens due to the fault of unscrupulous organizations. For them, personal and commercial gain is more important than other people are. This is where the help of the state and government bodies that can quickly solve this problem and punish the perpetrators is needed.

4 Discussions

Based on the above information, we will consider the interdependence of the state, specialized organizations and the population in solving the "garbage" problem.

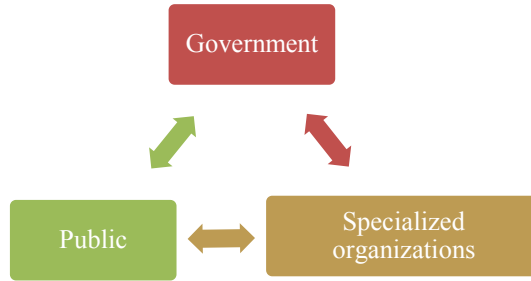


Fig. 8. The interdependence between the government, specialized organizations, and the population.

Let us consider the influence of the state on specialized organizations and the population.



Fig. 9. The influence of the government, on specialized organizations and the population.

It is impossible to carry out any actions without the state. At the state level, laws, normative and legal acts are issued. They are binding on both citizens and organizations. Only the state at the national level can solve any global problems. The state regulates and controls the activities of specialized organizations. This does not allow unscrupulous citizens to commit unlawful acts. Thanks to this, the health and lives of citizens are safe. As for the population, there are also rules of conduct here. How to dispose of household waste. For example, everyone knows that if a thermometer breaks, you cannot simply throw it in the trash. It is classified as hazardous waste. You need to call a special service that will check whether the house is safe and dispose of the thermometer itself. Citizens are also taught to dispose of household waste responsibly by providing various containers for separate waste. For the fact that some citizens do not comply with generally accepted rules established by law, fair punishment follows. For example, a fine is charged for the fact that a person, instead of throwing household waste into a trash container, threw it on the lawn.

Let us consider the influence of specialized organizations on the state and population.

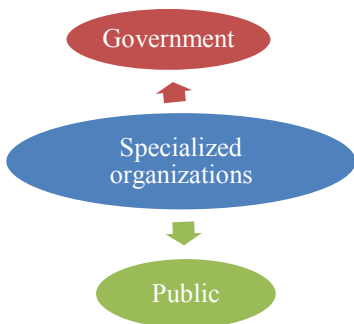


Fig. 10. The influence of specialized organizations on the state and population.

Specialized organizations. Now in some countries, certain waste that is harmless to humans is disposed of and processed in such a way that it can be used as recyclable materials. This situation is controversial. There are supporters, there are those who are perplexed, but in some cases, this can be beneficial. Specialized organizations work for the benefit of society and the state, if these organizations comply with all the rules. They can also express their wishes to government officials about improving waste collection and disposal based on their experience. As for the population, it depends on the work of these organizations. As you know, on cold days at temperatures below - 5 degrees, household waste can be collected once every three days. Every day in warm weather. If workers do not follow these rules, there will be a stench and local residents will suffer due to the bad smell, and there is the danger of rats. Also, as mentioned above, if hazardous and extremely hazardous waste is not properly disposed of, there is a very great danger that serious or even irreparable harm will be caused to the health and life of the local population, water, air, and soil.

Let us consider the influence of the population on the state and specialized organizations.

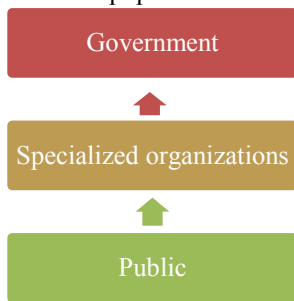


Fig. 11. Influence of the population on the state and specialized organizations.

Citizens can also influence the activities of the state. As mentioned earlier, for example, a state, for a number of reasons, decided to allow another country to bury its waste. Citizens found out about this and began to object actively, going on strikes and demanding not to do this.

As for specialized organizations. If residents of a given area are not satisfied with the work of specialized organizations, they can file a complaint or make claims to them. If the demands of citizens are fair, then at a minimum, an employee who performs poorly or does not do his job will be punished. On the other hand, the population of cities is asked to distribute and throw away garbage in certain containers. Each has its own color and an

inscription of what it is intended for. If a person is lazy and does not do what he should, he creates difficulties for employees of organizations and complicates their work.

5 Conclusion

In modern society, we are all interconnected. Government bodies, entrepreneurs, waste treatment and disposal workers, the population. If someone at any level stops performing his duties properly, it will immediately affect everyone. For example, an enterprise does not comply with environmental safety rules, discharges waste into water, allows hazardous substances to be released into the air, and the population suffers. People do not pick up trash after themselves or throw it everywhere, which is bad for all residents of nearby houses and passers-by. Therefore, one should not assume that someone is to blame for environmental problems, but the person himself is not. We are all, to a greater or lesser extent, responsible for the situation that exists. The more responsible each person at his own level approaches solving this problem, the faster we will be able to solve it. Moreover, the role of the state, which is dominant in this issue.

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