

Water Cleaning

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Abstract: Our planet is suffering under pressure of plenty ecological problems. There are a lot of big problems, but the main is that of household solid wastes. The number of solid wastes is growing constantly. In a day one earth's inhabitant produces 2-4 kilograms of rubbish, this means that the daily average on planet is 8-16 millions tones. Hence in a year we get the number of 3-6 milliards of tones of household wastes.

Keywords: Ecology, Solid Wastes, Rubbish.

Introduction

Solid waste presents not just losses of natural resources, but also springs of pollutions and acute diseases, not only for humans, but for all living things of the ecosphere too.

The Republic of Moldova is not an exception, so it beares this problem as all the countries do. In our country this problem consists of:

- 1) Pollution of soil and underground waters by municipal solid waste.
- 2) Throwing down of household rubbish especially in rural regions.
- 3) Uncountable lacks in infrastructure of household wastes collection, or even its absence in some localities.
- 4) Lack of necessary quantity or recycling stations.

The only efficient method to reduce the wastes volume is the recycling of used materials, what means introducing them into new production circles.

Therefore, in our project, we provide a concrete plan with a topical solution for overcoming the present situation in our republic.

Description of Problem

Nowadays in Republic of Moldova there are 1700 legal garbage dumps from which just 301 correspond to standards. Total surface of garbage depositories area constitutes to 1144 ha, where are located approximately 29,4 mil. m³ of wastes, or 6.8 m³/inhabitant. Those are statistics which do not count the garbage which collects illegally in forbidden places. Results of this are evident: awful smell, infection

vectors attracted by rubbish (rats, gnats, flies etc.) and sewage channels blocked with wastes. This situation established because the mayoralities are in shortage of money and even don't own sufficient amount of transport and fuel for garbage evacuation, hence in a lot of localities appear spontaneous and illegal garbage dumps.

The majority of landfills from Moldova are not any more capable to accumulate wastes, but their exploitation reaches or overcomes admissible ecological standards. But other garbage dumps cannot be built, because of lack in financial sources and available territories. Although our country is not so big, but making an implementation plan to cover the whole republic is very hard, and sometimes impossible. That's why for our project we had chosen one region of Moldova, Strasheni.

The district of Strasheni is located in the very center of R.M. 25km straight away from Chishinau. The district includes 27 mayoralities with 37 viliages and 2 towns in which there are approximately 80 000 people living. Strasheni is one of most polluted areas in Moldova. You can notice garbage everywhere: on the streets, at shops, on trees, and especially in ravines. The mayorality carries out some actions for cleaning the district, but after a while the garbage appears again. What is the reason?

Dust gathering in regional centre Strasheni is made 3 times per week. The problem is that in the town has established only 52 refuse bins which could serve only 15 blocks of flats, in the best case. Only 85% of the population of the district exports the garbage independently, but unfortunately not all of it gets to the landfill.

On the territory of the district there are a lot of water resources like: r.Bic; r. Ichel; r. Işnovăţ. Bic flows into Gidighici, one of the greatest water reservoirs of Moldova, from which the city of Chisinau partially fills up its water resources. Together with sewage in the rivers penetrates toxic results of decomposition of rubbish, and non degradable garbage: plastic, polyethylene, glass.

How you probably observed, Moldova, but especially the district of Strasheni, faced a great garbage crisis and for its suppression we need to know our enemy's structure. So let's discuss about the garbage composition and its hazard. It is clear that no so much people sked them selves which is composition of garbage. If to think deeply, it is evident, who is interested in his garbge bin's content? This fact makes up the biggest problem of humanity, the indifference, we never think of what's really important. So let's correct our mistakes, and take a look inside our litter bin!

In general the garbage consists of: food waste- 28-45%, paper and cardboard- 20-30%, wood- 1,5-4%, black metal - 1,5-4%, colour metal - 0,2-0,3%, textile 4-7%, glass-3-7%, leather, rubber- 1-4%, rock's, highly glazed plottery- 1-3%, plastic-8-11%, dust- 7-18%. If a wise man would look at the upper statistics, he would say that 70% of rubbish can be recycled. It sounds to be true!

Then one question is appearing: "why in developed countries in best case are recycled 15% of wastes, but in poor countries (Third World's countries) nobody even talks about recycling? There are a lot of reasons of such lacks in wastes recycling industry : absence of investitions and government's suport, citizen's indifference, but the biggest one is the intermixing of municipal solid waste. Rubbish represent serious menace for the environment, if it isn't stored, kept and eliminated coresponding to standards.

As an example we can take some things that we throw away. Iron cans are made of zinc, tin and iron which are poisonous for many organisms. Batteries for instance are very poisonous consisting of zinc, coal, alkali and manganoxide (this substances are extremely harmful).

Thus we get closer to the most widespread, harmful and difficult collected pollutant - plastic.

Because it:

- 1) Slows down gas exchange in soil and allocates toxic substances.
- 2) Its mass fraction in municipal solid waste is of 4-6 %.
- 3) Is the most durable material (average speed of decomposition of 250 years).
- 4) Requires significant quantities of resources, primarily fossil fuels, 4% of the world's annual oil production is used as a feedstock for plastics production.

Plastics production also involves the use of potentially harmful chemicals, which are added as stabilizers. Many of these have an impact on human health, for example: phthalates, which are used in the manufacture of toys for young children and there has been a concern that phthalates may be released when these toys are sucked (come into contact with saliva). That's why in our project we are going to pay the greatest attention on the plastics and it's recycling. The world's annual consumption of plastic materials has increased from around 5 million tones in the 1950s to nearly 100 million tones today. We produce and use 20 times more plastic today than we did 50 years ago!

There are about 50 different types of plastics, with hundreds of different varieties. All types of plastic are recyclable. To make sorting and thus recycling easier, there were developed a standard marking code. These types and their most common uses are on our table you can observe it anytime. By means of our technology from all of these plastics we can get by recycling qualitative roofing material and tile.

Objectives

- 1) Ecological education of the population.
- 2) 100% informing all population of the district about necessity of regular centralized waste gathering and the importance of the garbage separation in each house.
- 3) Liquidation of old incorrectly constructed and administrated landfills .
- 4) Creation of a new dump which will correspond to all ecological standards
- 5) Instalation on the district's territory of 460 special garbage separating refuse bins .
- 6) Adjustment of the constant, centralized gathering and waste exporting sistem.
- 7) Creating of plastic recycling factory, which will produce qualitative and cheap roofing materials.

- 8) Exporting other recyclable wastes (glass, paper, metall) to the factories as raw materials.
- 9) Improving of living standards of population.

Strategy of Project

Our project will begin, as it is necessary to any action, from a theoretical part, by means of propaganda at schools and at public meetings, by workers of ecological service and volunteers. Volunteers will be students of 9-12. We and ecological department will provide trainings with them after which they, during 3 months, will work with population. The second part consists of leaflets sticking and distribution, or mailing them. We also will get connected to this business whenever possible. The main goal of the propagation part will be ecological education of the population, which will help them to realize the necessity of separate gathering of garbage under all ecological standards, and attraction of local investors.

***** For attraction of investors, we plan to release the new recycling factory from taxes for 3 years that will allow the investors to return back faster primary expenses (this privilege certainly should be achieved by the mayoralty of Strasheni).

***** Keeping to our project townspeople will have a new duty to sort the trash and in exchange for it they will be released from taxes for exporting the trash. But those who are not observing rules will be punished by administrative penalties.

Only after heavy informational work and finding of the investor it is possible to start directly a practical part of the project.

We plan implementation of our practical part by following steps:

- 1) The present dump will be back filled, as it does not correspond to ecological requirements. Will be created 2 new dumps which will match international ecological requirements.
- 2) On the territory of district will be established totally 460 complete sets. Each complete set consists of two containers. One of them will be divided into 4 cells, for glass, plastic, metal and paper. In second, simple container rest of garbage will be thrown: food rests, wood, etc.
- 3) With support of population's transport units, trash from the streets will be collected and exported to the new landfills.
- 4) For gathering of garbage from the sorting containers will be bought 9 specialized garbage gathering cars and 3 old will be converted. Trash from simple containers will be collected by 14 tractors which are owned by mayoralties. 52 people are required.
- 5) The garbage from sorting containers glass, metal, paper will be exported to the factories in Chishinau and Soroca for usage as prime material, but plastic will be taken by our factory, where tile will be produced.

- 6) Will be landed an ex boiler-house with total surface of 110 m² where will be placed the equipment for plastic recycling in tile, and other building materials placed.
- 7) The equipment allows us to produce 100-110 m² of production whether it is tile or thin slab.

Into the equipment set for producing tile enter 15 compounds their cost makes 180000 leis

Advantages of technology:

1) As raw materials can be used almost any kind of plastic.

2) Plastic does not demand preliminary cl

cleaning of dirt , labels, the rests of sauces and shampoos etc., do not stir producing process.

3) Low cost of production.

Approximate price of 1 m² of tile 43.65 lei/m²;

The sale price makes 100-150 lei/m²

4) Small amount of the personnel.

12 workers (two changes of 6 persons): for tile formation are necessary 3 persons, for unloading and loading of plastic - 3 persons.

5) High durability. Polymer-sand material is very strong. Service life of tile is not lesser than 150 years.

7) Polymer-sandy materials are almost twice easier than their concrete and clay contenders! It essentially reduces pressure on the building.

8) Polymer-sandy materials are resistant to difference of temperatures, and also keep all properties in a range from -65 to +200 °C.

Budget

1) Germane buttressed garbage trucks – 9 trucks * 90000lei = 810000 leis

2) Sets of refuse bins – 460 sets * 200lei = 92000 leis

3) Landing of 2 bulldozers and 2 trucks for building the new garbage dump, and demolishing the old one = 305000 leis

4) Plastic recycling factory 180000 leis

5) Paying human resources (Installing the recycling system, volunteers, garbage collectors) = 80000 leis

Timeline

Project implementation will be much more productive if it will be affected in between 15 of march and 25 of April 2009. Because in this period climatic conditions will not affect the work and population will not be occupied with agricultural works.

Works will occur parralel, after 3 months of propaganda effectuated by volunteers:

- 1) During the period of 15 -30 of march - 2009 the old garbage dump will be destroyed.
- 2) 15 march – 5 april - two new certified garbage dumps will be digged.
- 3) 15 march – 25 april - garbage collection from illegal garbage dumps.
- 4) 1-20 april – instalation of paired garbage bins.
- 5) 10 march – 20 april – reconstruction of the ex boiler- house, and installing of the equipment for plastic recycling.
- 6) 20 april – 5 may – instructive works with the further workers of the recycling station.

Advantages

- 1) Reduction of underground water and soil pollution.
- 2) It will help to rise the rate of water quality in river Bic and in Ghidighici lake.
- 3) This project will serve as a good example for other localities and will lead to the improving of the state's ecological situation.
- 4) There will be assured protection of natural areas from pollution.
- 5) Centralized accumulation of rubbish and transporting of it to the new garbage dump, that will correspond to all ecological standards.
- 6) Improving the living standards in the Strasheni district.
- 7) Our production is 100% recyclable. We will pay 107% from tile's price to customers when they will return it back. (For exemple you installed our roofing materials, but after some time you want to change it, you contact us , we will take it back and moreover we'll pay 10% of money that you spent. It's a great deal, better than throwing down the till into garbage bins.)
- 8) For emplementing the project , few time and efforts are necessary.

Conclusion

At ancient times, the locality of Strasheni was very famous throughout all of Moldova because of its big beautiful forests, clean rivers and picturesque landscapes. But nowadays the situation is completely different. So the main conclusion is that our project is easy to implement, it is relatively cheap, takes less time and gives a lot of advantages. By means of our project we'll try to change the situation, so there will be a chance to see the district of Strasheni as clean as it was at the times of Stefan the great.

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