

TRASH OR TREASURE: AWARENESS OF THE POPULATION ON THE USE OF SEPARATE COLLECTION SYSTEMS AND RECYCLING OF WASTE

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Abstract

By studying the literature and the information available on various sites, we noticed that Sweden is the country with the most advanced and efficient waste collection and recycling system. Sweden is a top performer when it comes to sorting and recycling its waste and is in the rare situation of lacking garbage at its incineration centres, which produce enough electricity to supply 250,000 homes and heating for 950,000 homes. Swedish municipalities are individually investing in futuristic waste collection techniques, like automated vacuum systems in residential blocks, removing the need for collection transport, and underground container systems that free up road space and get rid of any smells. In the Romania, each local authority has its own system, making it difficult for residents to be confident about what they can recycle and where. We think we need more of a coherent national strategy in Romania to the collection of recyclable materials, rather than the current approach, whereby it is largely left to individual local authorities to determine their own collection policies.

Don't waste more time and money – let's get started! A holistic mindset is the key! Getting the whole system and industry involved creates the best conditions for the changes and actions needed to make waste management truly sustainable. It means getting the municipal sector (where the infrastructure is, or should to be) and the private sector (which sells the technology and services) to work together. Both inside municipalities and between municipalities!

Making this happen creates scope for long-term planning – and short-term action. For getting priorities right and starting at the right end of the chain. And for agreeing who should do what and why.

This paper aims to draw the attention of all people to the importance of separate collection of waste and reuse. For this purpose we created two questionnaires which we addressed to all categories of people in terms of age and social status. Surveys have accumulated a total of 154 and 117 responses, respectively.

Keywords: opinion poll, questionnaire, waste management.

INTRODUCTION

Just over 40 years ago Sweden was one of the most oil-dependent countries in the world. Not surprisingly, the oil crises of the 1970s triggered calls for domestic energy alternatives that were economically sustainable. This led them to decide to collect and incinerate waste on a bigger scale than ever before. Political pressure for less waste to be sent to landfill forced them to take a long and hard look at their waste management system. And so the transition began. Working to national targets and a commitment to progress, they started searching for methods and solutions to minimize and recycle waste and to harness the resources in the waste left over. Gradually, they

succeeded in introducing a resource-efficient waste management system that maximize benefits on all levels: environmental, economic and social.

Today they have one of the world's best waste management systems. A system that's constantly evolving and always focused on making the best use of resources. Less than 1% of household waste goes to landfill nowadays! In fact, the system is so effective that they have the capacity to help countries that don't yet share the opportunities they do. They can assist them by importing and handling their waste.

Their vision is to reduce waste volume even more. By 2030 they want Sweden to be the world leader in waste minimization and at using – through energy recovery and recycling

– the waste that is produced. By 2050 they expect their net greenhouse gas emissions to be zero.

In the last few decades they've acquired unique experience and know-how. Their technical solutions are world class along every step of the waste management chain. But their knowledge and technological innovation are not the most important things they've learnt about sustainable, resource-efficient waste management. The complexity lies not in technical solutions but in understanding the system and then figuring out how all parts of the system can work together.

Sweden is so good at recycling that, for several years, it has imported rubbish from other countries to keep its recycling plants going. Less than 1 per cent of Swedish household waste was sent to landfill last year or any year since 2011.

We can only dream of such an effective system in the Romania. Their system is so far ahead because of a culture of looking after the environment. Sweden was one of the first countries to implement a heavy tax on fossil fuels in 1991 and now sources almost half its electricity from renewables. "Swedish people are quite keen on being out in nature and they are aware of what we need do on nature and environmental issues. We worked on communications for a long time to make people aware not to throw things outdoors so that we can recycle and reuse," says Anna-Carin Gripwall, director of communications for Avfall Sverige, the Swedish Waste Management's recycling association.

Over time, Sweden has implemented a cohesive national recycling policy so that even though private companies undertake most of the business of importing and burning waste, the energy goes into a national heating network to heat homes through the freezing Swedish winter. "That's a key reason that we have this district network, so we can make use of the heating from the waste plants. In the southern part of Europe they don't make use of the heating from the waste, it just goes out the chimney. Here we use it as a substitute for fossil fuel," Ms Gripwell says. Ms Gripwall says the aim in Sweden is still to stop people sending waste to recycling in the first place. A national campaign called the "Miljönär-vänlig"

movement has for several years promoted the notion that there is much to be gained through repairing, sharing and reusing.

She describes Sweden's policy of importing waste to recycle from other countries as a temporary situation. "There's a ban on landfill in EU countries, so instead of paying the fine they send it to us as a service. They should and will build their own plants, to reduce their own waste, as we are working hard to do in Sweden," Ms Gripwall says. "Hopefully there will be less waste and the waste that has to go to incineration should be incinerated in each country. But to use recycling for heating you have to have district heating or cooling systems, so you have to build the infrastructure for that, and that takes time," she adds.

Romania is the country with the lowest recycling rate: only 5% of the waste is subject to recycling processes. The causes are multiple. Among these: poor waste management, low landfill taxes, and household waste payment system different from other EU countries, say market specialists. Municipal waste contains all types of waste and only in Bucharest are generated over 2,000 tons of mixed household waste per day. Of these, only 20% is waste that can be recycled.

In Romania, besides the lack of sorting waste, the collection fees for garbage are very low compared to those in the EU. A Romanian pays 18 euros per year for waste collection, while a Swedish pays six times more.

Compared with other European countries such as Sweden, the latter is the first to selective waste collection, recycling about 100% of household waste.

In Sweden, 50% of household waste is burned and used to produce energy at incineration plants.

Swedish households keep separate newspapers, plastic, metal, glass and electrical appliances, bulbs and batteries. They are collected by machines that sort them by color. Many municipalities also encourage consumers to separate food waste. And all of these are reused, recycled or composted.

The households in Târgoviște place their waste at the pre-selection centers located in the neighborhoods, markets, central areas. They are collected by road vehicles that transport them

to landfills where they are sorted for recycling in recycling centers.

Aninoasa garbage can't produce energy. This process recycles only 1% of the quantity of waste taken over.

Due to the lack of citizen education to sort and recycle household waste, there is this discrepancy between the quantities of recycled waste, between heavily developed countries such as Sweden and economically underdeveloped countries such as Romania.

The town of Târgoviște does not have an advanced technological system for collecting, sorting or recycling household waste from the population or other institutions.

In the town of Târgoviște is collected on average 1 kg of household waste per day, per person.

Aninoasa garbage collector collects 1% propylene recyclable waste. Most of these are PETs, collecting 100 tons/ month. They are transported to Green Tech Buzău for recycling. Cardboard and paper collected, with a mass of 100 tons / month, are transported to Suceava for recycling.

The collected ferrous metals represent 20-30 tons per month and are recycled with the help of the Târgoviște Steelwork.

The collected glass has a mass of 3-4 tons / month and is transported to recycling centers in the country.

The green waste resulting from the greening of green areas in the city is 300 tons/ year. They are composted - they are chopped and stored in the form of prisms, and after 5-6 months they pass through a sorting machine and are sold.

Waste transport in Sweden is carried out with self-propelled trucks that consume biogas obtained from waste recycling, and in Târgoviște it is made with truckloads that use fossil fuel.

MATERIALS AND METHODS

Creating the form and questionnaire with Google Drive

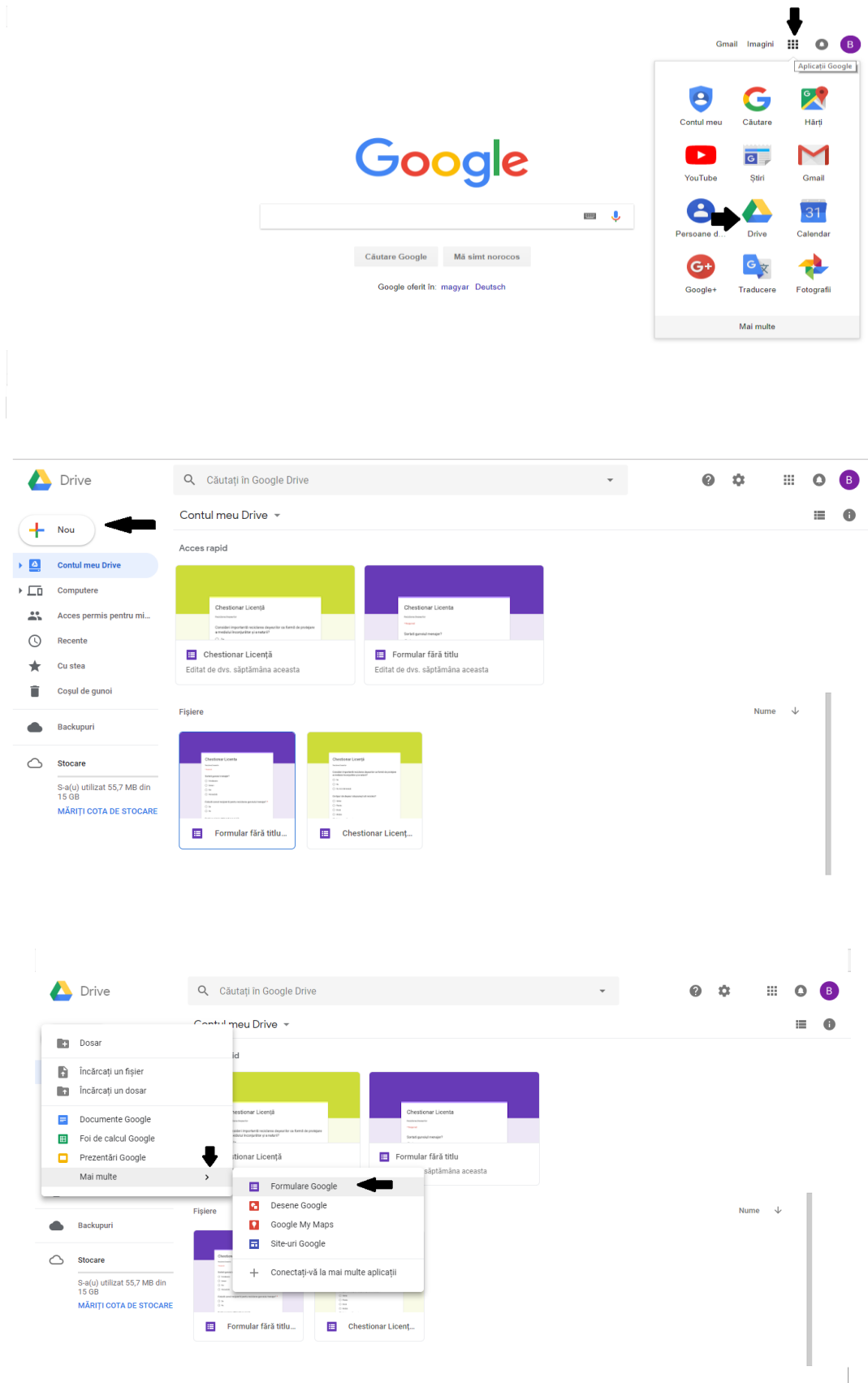
Step 1

We have created a Google user account as a browser, we have accessed Gmail and then the "Create an account" window to enter the required information for registration as user of all Google services.

Step 2

We went to Google Drive and then the New window that offers the submenus: "Folder", "Upload a file", "Upload a folder", "Google Docs", "Google Sheets", "Google Presentations", "More".

We chose the "More" window that offers the options: "Google Forms", "Drawings Google", "Google My Maps", "Google Sites", and "Sign in to multiple apps". We chose the "Google Forms" window.



Step 3

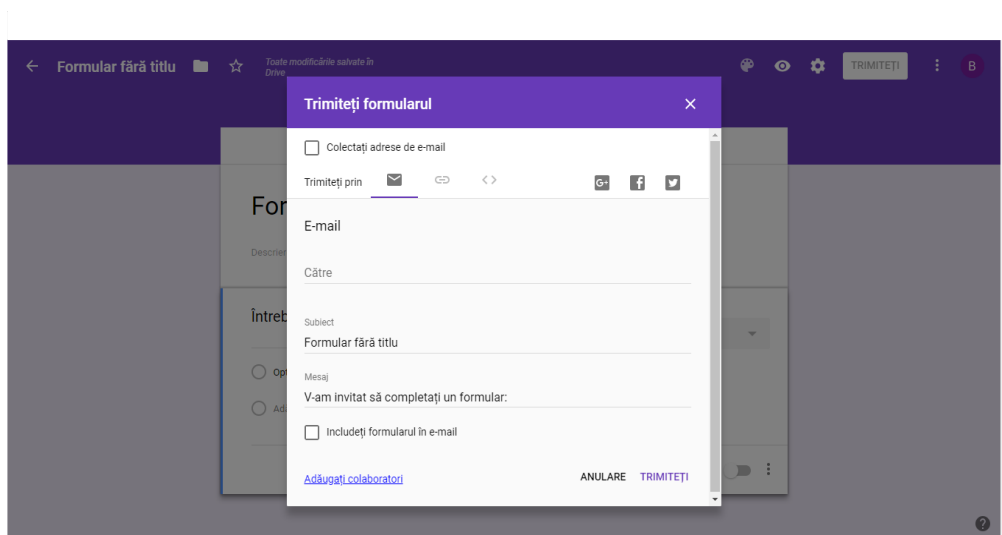
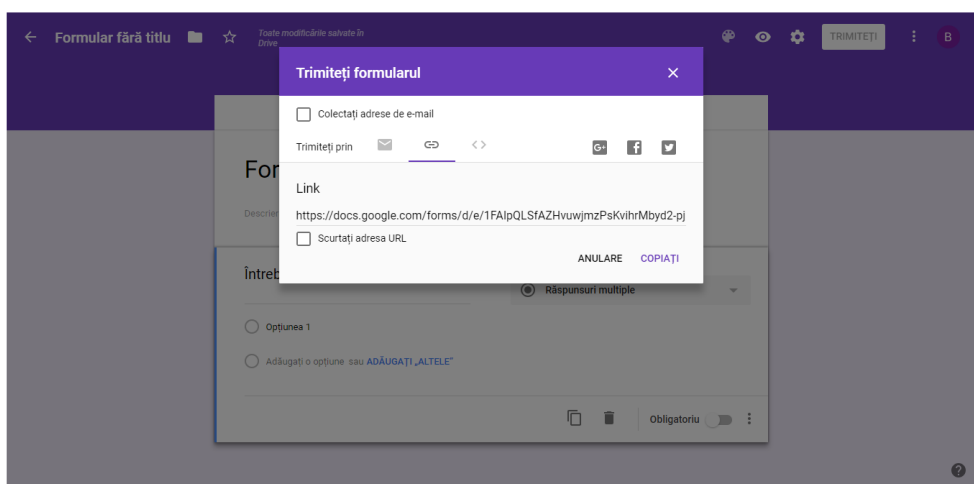
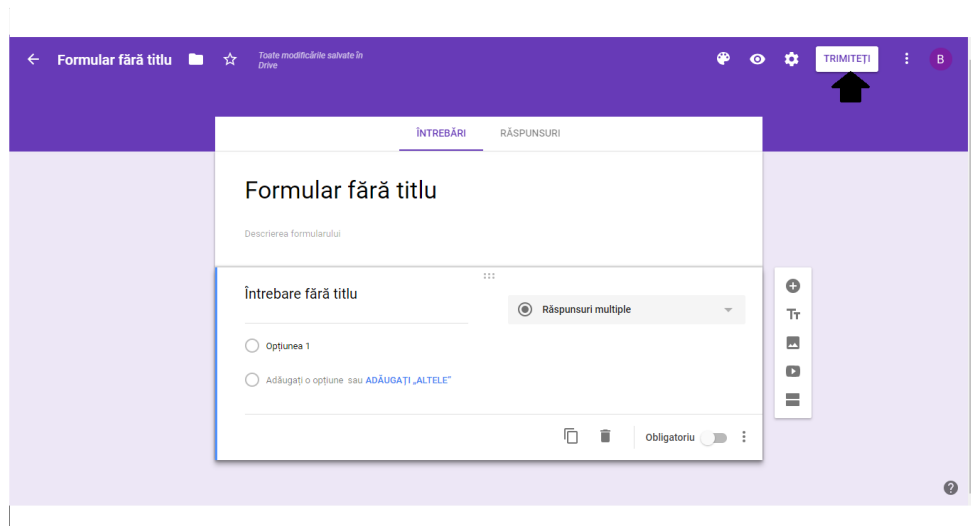
We filled out the title of the form, the form description and we asked the first question with multiple response variants. To add another

question, we went to the right icon "Add a question".

Step 4

After completing the questionnaire, we viewed it by visiting the "View" icon at the top right of the function bar. By tapping the "Send" icon on

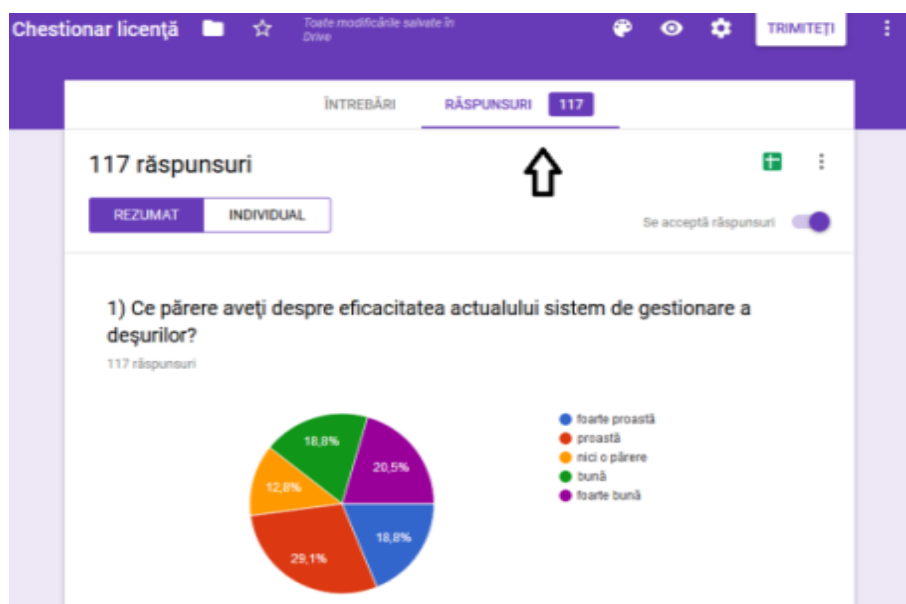
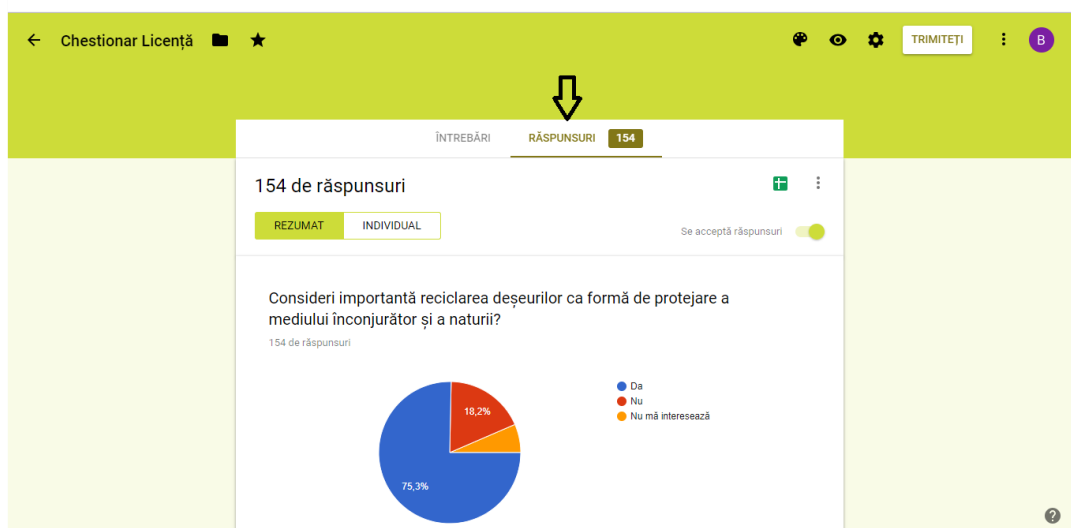
the function bar, we have submitted the questionnaire via E-mail and accessing the Link.



Step 5

After completing the form, viewing the answers is done by going to the "Answers"

icon. This was the last step completed for observing the results and using them for the case study.



RESULTS AND DISCUSSIONS

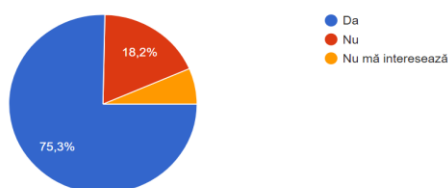
In this first case study we will present a questionnaire addressed to all age and social categories. This study will show to what extent people are accustomed to recycling waste and what would motivate them to do it more often.

154 responses to the questionnaire were collected, these were:

The first question was to what extent waste recycling is considered to be important as a way of protecting the environment and nature.

Consideri importantă reciclarea deșeurilor ca formă de protecție a mediului înconjurător și a naturii?

154 de răspunsuri

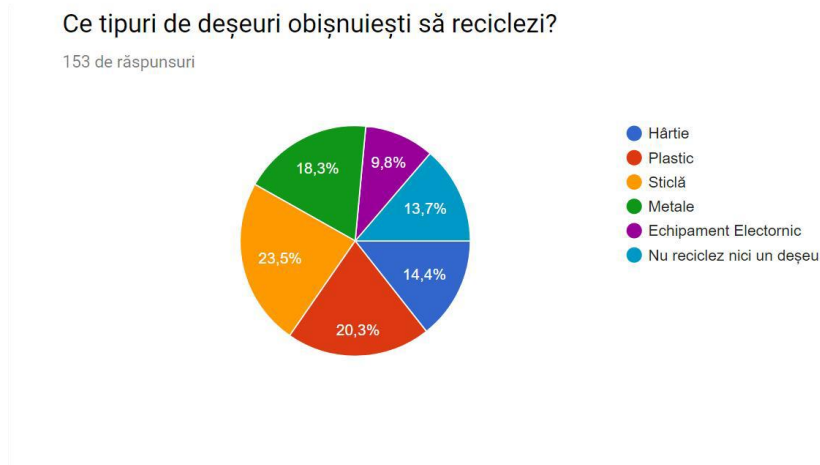


75.3% of responses considered waste recycling to be a form of environmental and nature protection.

18.2% of the responses considered it is not important to recycle waste as a way of protecting the environment and nature.

6.5% of respondents felt they were not interested in recycling waste.

The second question looked at the types of waste that people used to recycle and the answers were as follows:



23.5% of respondents replied that they typically recycle the bottle.

20.3% of respondents said they used to recycle plastic.

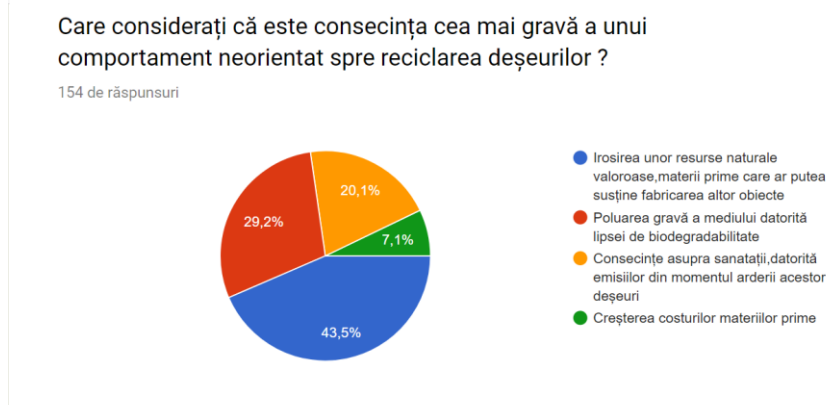
18.3% of respondents said they used to recycle metals.

14.4% of respondents said they used to recycle paper.

13.7% of respondents said they did not get used to recycling waste.

9.8% of respondents said they used to recycle electronic equipment.

The third question asked the awareness of the consequences of uncoordinated behaviour towards waste recycling. The answers were the following:



43.5% of responses show that the most serious consequence of uncoordinated behaviour recycling of waste is the wasting of valuable natural resources, raw materials that would be able to support the manufacture of other objects.

29.2% of responses show that the most serious consequence of uncoordinated behaviour the recycling of waste is the serious environmental pollution due to the lack of biodegradability.

20.1% of responses show that the most serious consequence of uncoordinated behaviour waste recycling is health, due to emissions from burning of these wastes.

7.1% of responses show that the most serious consequence of uncoordinated behaviour the

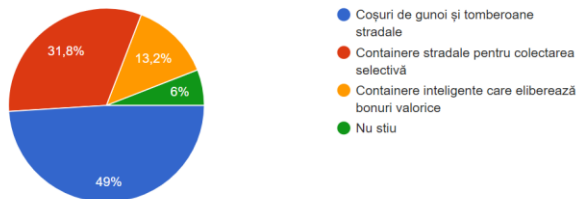
recycling of waste is the increase in the cost of raw materials.

The fourth question in the questionnaire concerned the knowledge of the waste collection containers of the city of residence.

The answers were the following:

Ce tipuri de containere de colectare a deșeurilor cunoașteți în orașul dumneavoastră?

151 de răspunsuri



49% of responses show that subjects know the types of collection containers waste garbage bins and street litter.

31.8% of the responses show that subjects know the types of collection containers street container waste for selective collection.

13.2% of the responses show that subjects know the types of collection containers

intelligent container waste releasing value vouchers

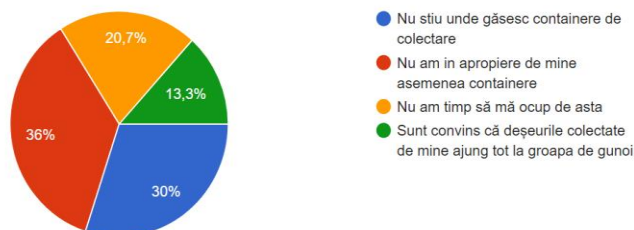
6% of responses show that subjects do not know types of collection containers waste.

The fifth question of the questionnaire refers to the main reasons for the questionnaire prevents the subjects from collecting the waste.

The answers were the following:

Care sunt motivele principale care v-ar împiedica să colectați?

150 de răspunsuri



36% of the answers show that the subjects do not collect the waste because they are not in the vicinity housing their collection containers.

30% of responses show that subjects do not collect waste because they do not know where they are he could find collection containers.

20.7% of responses show that subjects do not collect waste because they do not have time enough to handle their collection.

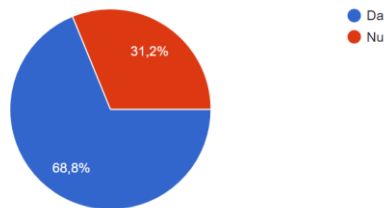
13.3% of responses show that subjects do not collect waste because they are convinced that the waste they collect reaches the garbage dump.

The last question is whether the financial reward would help to collect more efficient waste.

The answers were the following:

Credeți că ar trebui să fiți recompensați financiar pentru colectarea deșeurilor?

154 de răspunsuri



68.8% of responses showed that subjects considered they should be rewarded financially for waste collection.

31.2% of responses showed that subjects did not consider it necessary to be rewarded financially for waste collection.

In this second case study we will present a questionnaire addressed to all people.

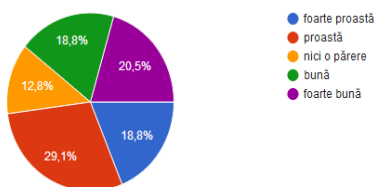
This study will show to what extent they are accustomed to recycling and collecting household waste.

As a result of the inquiries we find that 117 responses were collected, these being the following:

The first question was to find people's opinion about the effectiveness of the current waste management system and the answers are as follows: 1) What do you think about the effectiveness of the current waste management system?

1) Ce părere aveți despre eficacitatea actualului sistem de gestionare a deșeurilor?

117 răspunsuri



18.8% of responses considered the effectiveness of the very poor waste management system

29.1% of responses considered the effectiveness of the bad waste management system

12.8% of respondents had no opinion of how effective the waste management system.

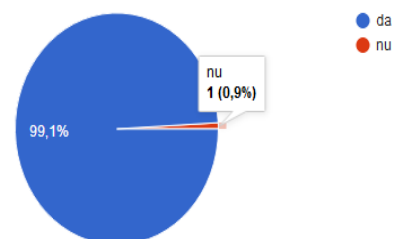
18.8% of responses considered the effectiveness of the good waste management system.

And last but not least, 20.5% of responses considered the effectiveness of the management system to be very good.

The second question focused on the importance of selective collection and the answers were: 2) Do you think it is important to collect selectively?

2) Considerați că este important să colectăm selectiv?

117 răspunsuri



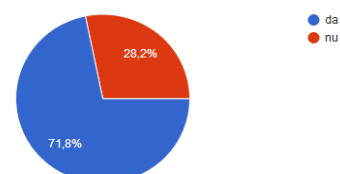
99.1% of responses believe it is important to collect selectively and only 0.9% of responses believe it is not important to collect selectively.

The third question was asked to find out if people are collecting selectively or not.

The answers were: 3) Do you collect selectively?

3) Dumneavoastră colectați selectiv?

117 răspunsuri



71.8% of responses responded that they collectively collected and 28.2% of responses said they did not collect selectively.

The fourth question was whether we need to protect the environment. 4) Do you think environmental protection is a necessity?

4) Credeți că protejarea mediului este o necesitate?

117 răspunsuri

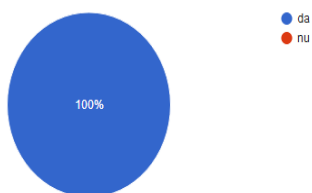


The answer was 100% that we need to protect the environment.

The fifth question is whether people are willing to recycle in order to prevent air, water and soil pollution. 5) To prevent air, water and soil pollution, are you willing to recycle?

5) Pentru a preveni poluarea aerului, apei și a solului, sunteți dispuși să reciclați?

117 răspunsuri

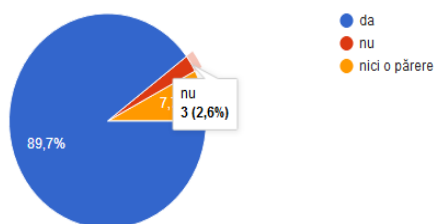


100% of the replies they thought would recycle to prevent pollution.

Question 6 is about reusing bottles and bottles from the supermarket to reduce costs. 6) Do you want to reuse bottles and jars purchased from the supermarket to reduce costs?

6) Doriți să reutilizați sticlele și borcanele achiziționate de la supermarket pentru a micșora cheltuielile?

117 răspunsuri

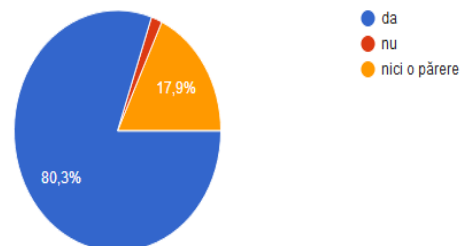


The answers are as follows: 89.7% of responses have agreed to reuse bottles and jars to reduce spending 2.6% of responses disagreed with the reuse of bottles and jars 7.7% of respondents had no opinion.

The seventh question is whether people agree with the "polluter pays" principle. 7) Do you agree with the polluter pays principle?

7) Sunteți de acord cu principiul "poluatorul plătește" ?

117 răspunsuri



The answers are as follows:

80.3% of responses agreed to this principle

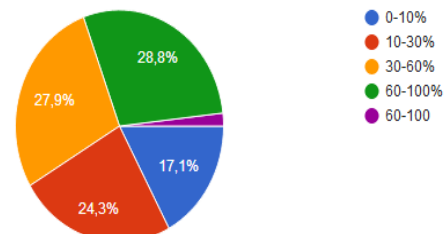
1.7% of respondents disagreed with this principle

17.9% of the answers had no opinion

Question eight focuses on how much people recycle. 8) How much do you recycle?

8) Cât de mult reciclați ?

111 răspunsuri



17.1% of responses responded that they recycle between 0-10%

24.3% of responses replied that it recycles between 10-30%

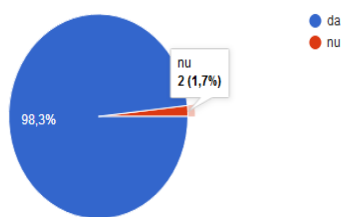
27.9% said they reclaim that they recycle between 30-60%

28.8% and 1.8% of responses said they recycle between 60-100%

The ninth question addresses the desire of people to recycle further if the sanitation would take selective waste. 9) If the sanitation would take selective waste, would you continue with recycling?

9) Dacă cei de la salubritate ar lua deșeurile selectiv, ați continua cu reciclarea?

117 răspunsuri



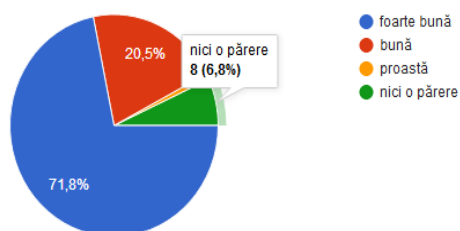
98.3% of responses agreed to continue recycling.

1.7% of responses did not agree to recycle.

And the last question, the tenth, is about waste reduction. 10) What do you think about reducing the amount of waste?

10) Ce părere aveți despre a reduce cantitatea de deșeuri ?

117 răspunsuri



71.8% of responses had a very good opinion to reduce the amount of waste

20.5% of the responses had a good opinion to reduce the amount of waste

0.9% of responses had a bad opinion to reduce the amount of waste

6.8% of the answers had no opinion.

CONCLUSIONS

Following the questionnaire applied to 154 subjects of Romanian nationality, different age and social categories, the conclusions are as follows:

For the vast majority of subjects surveyed, ie 75.3%, it is important to recycle waste as a form of environmental and nature protection, and 24.7% of the subjects consider it not important to recycle waste as a form of environmental protection and nature or do not know.

The most important recycled materials as shown in the questionnaire are: glass (23.5%), plastic (20.3%), metals (18.3%), and the least recycled category: paper (14.4%) and electronic equipment (9.8%).

14.4% of the subjects said they did not get used to recycling waste.

Of the surveyed subjects, 43.5% consider that the most serious consequence of uncoordinated behavior towards waste recycling is the wasting of valuable natural resources, raw materials that could support the manufacture of other objects. This shows that they are aware of the risks of a behavior that neglects recycling of waste.

Of the surveyed subjects, 49.3% believe that the most serious consequence of uncoordinated behavior towards waste recycling is the serious pollution of the environment due to the lack of biodegradability. This shows that half of the subjects believe that the lack of waste recycling seriously pollutes the environment and has serious health consequences.

7.1% of the subjects consider that the most serious consequence of uncoordinated behavior towards waste recycling is the increase in raw material costs.

Half of the surveyed subjects (49%) know as garbage containers and garbage cans, so they do not use recyclable containers and do not have a waste recycling pipeline.

Approximately half of the subjects (45%) are aware of types of collection containers for selective or intelligent collection containers that release value vouchers, indicating that they are using selective waste collection containers or intelligent containers, so they have a recycling behavior waste.

6% of the subjects do not know types of waste collection containers and do not have a waste recycling pipeline.

One-third of the subjects (36%) do not collect the waste because they do not have containers to collect them.

30% of the subjects do not collect the waste because they do not know where to find collection containers.

20.7% of subjects do not collect waste because they do not have enough time to handle their collection.

13.3% of the subjects do not collect the waste because they are convinced that the waste they collect reaches the landfill.

In conclusion, most subjects believe they do not recycle waste as they do not have selective waste recycling containers in their homes.

Approximately 3/4 of the subjects (68.8%) consider that they should be rewarded for waste collection.

About one-quarter of the subjects (31.2%) do not consider it necessary to be financially rewarded for waste collection.

In conclusion, most of the subjects surveyed think they need to be rewarded financially for waste collection.

In my opinion, the Romanian state must intervene and achieve a better education of citizens regarding the selective collection of waste and the recycling of recyclable materials. With the use of financial resources from European funding, modern waste collection and recycling systems can be built, as they already exist in other European countries such as Sweden that recycles 100% of waste.

Otherwise, if this is not the case, Romania risks drastic sanctions in accordance with the European rules in force and dispenses with a significant financial resource.

The conclusions for the second questionnaire are the following:

Pollution is a global problem, mainly caused by the large amount of waste generated.

It affects the environment and people's health. Many animal species die due to choking, especially because of plastics.

We can significantly reduce waste if we are really involved. We can help if we collect selectively and recycle as much as we can.

Thus, by making the second questionnaire, we hope to learned people about selective collection and recycling.

According to the questionnaire we have the following results:

1. How do you feel about the effectiveness of this waste management system?

To this question, 29.1% of respondents had a bad opinion and only 20.5% had a very good opinion, the highest percentage being negative.

2. Do you think it is important to collect selectively?

Most people find it important to collect 99.1% and only one person does not agree.

3. Are you collecting selectively?

This question is important to see the involvement of residents in protecting the environment by reducing pollution.

We have a 71.8% answer with affirmative answer, which is very good that more people are aware of the impact of waste on biodiversity and act. And 28.2% are those who do not collect selectively.

4. Do you think that protecting the environment is a necessity?

It is great that all who have completed the questionnaire believe we have to protect the environment, here we have a 100%.

5. To prevent air, water and soil pollution, are you willing to recycle?

As with the earlier question, we have a 100% percentage of people willing to recycle to prevent pollution, which is a very good thing.

6. Do you want to reuse bottles and jars purchased from the supermarket to reduce costs. In this question, the highest percentage of 89.7% responded affirmatively and only 2.6% responded negatively.

7. Do you agree with the "polluter pays" principle?

Here we have 80.3% to which most responded that I agree with this principle. The principle means that if a company or person causing environmental damage is responsible for it and must take the necessary repair or preventive measures and bear all the related costs.

And only 1.7% disagrees with this principle.

8. How much do you recycle?

For this question, responses with the highest percentage of 28.8% recycle between 60-100% and with 17.1% recycle between 0-100%.

9. If the sanitation would take selective waste, would you continue with recycling?

Here most people agree to recycle, which means 98.3% and 1.7% do not agree to recycle.

10. What do you think about reducing the amount of waste?

This is the last question in the questionnaire.

71.8% have a very good opinion to reduce the amount of waste, 20.5% have a good opinion and only 0.9% have a bad opinion. It is important to remember that many want to get involved in order to keep the environment clean and to be an example for all.

Most people want to selectively collect and recycle, contribute as much as they can to keep the environment clean, being beneficial to our health.

In conclusion, by engaging us in improving the environment, by collecting and recycling, we

become an example for the future generation, providing them with a clean and healthy environment.

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