

INFORMING PEOPLE ABOUT CLIMATE CHANGE

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Abstract

The article estimates the need to implement a strategy of sustainable development. It says that it is possible to achieve the premises of sustainable consumption by stimulating demand for products manufactured with the use of energy-efficient technologies, non-toxic materials, etc. The article also outlines the urgency of the problem of waste accumulation in Ukraine. The necessity of solving the problem of solid household waste management is determined. The quality of household waste management determines the living conditions of people and is an indicator of the maturity of a society. We strongly believe that promotion of sustainable consumption ideas will help to reduce the amount of solid waste and will help prevent climate change. The purpose of the present study was to identify the main points that climate change related organizations and initiatives can develop to increase people's knowledge about the topic. Informational and educational programs on climate change should be conducted to increase the level of ecological culture and awareness of the global problem. Several areas of activity have been identified: savings and restrictions on the use of fossil fuels; informing about renewable energy sources; sorting household solid waste, etc.

Key words: climate change, ecological education, solid waste, sustainable consumption.

Introduction

According to reports by the Intergovernmental Panel on Climate Change (IPCC), human activity has caused an increase of average global temperature in the world by 1°C [1]. The upper limit for raising the global temperature, enshrined in international agreements, is 1.5-2°C above pre-industrial levels [2]. It is believed that warming is caused by anthropogenic activity. Beyond this limit will have great negative consequences. The main reason for the increased temperature is that the concentration of greenhouse gases has changed. Scientists consider that concentration changes because of the use of fossil fuels, the destruction of forests, the accumulation of solid household waste, intensive agricultural activities, etc. Climate change will affect all areas of human activity.

Irreversible changes are transforming all of nature: air, water, and soils. For this reason, the issue of prevention and adaptation to climate change should be relevant to people, regardless of place of residence, education, or sphere of activity.

Materials and methods

On the basis of our research aim, we derived a few criteria for data collection and analysis. Free access to the results of the research on climate change was the first criteria. Therefore, the basic information on the topic was collected from open sources and included the reports of international research groups, including the NASA Goddard Institute for Space Studies and the Intergovernmental Panel on Climate Change. The data of the studies whose aim was to assess public awareness of environmental problems and the willingness to take certain actions to prevent it were also included in the analysis. Also, we should admit that the theoretical, methodical, and applied statements as for solid waste management, allowing for ecological and economic criteria, has been investigated.

There are many problems and obstacles that Ukraine faces in its path towards integration into the community of European countries. On the one hand, such problems should not prevent attempts to integrate environmental and social elements into economic development; on the other hand, such obstacles should be identified in order to develop appropriate measures, including the environmental problems of waste management in urban and rural areas. Scientists are focusing on resource conservation and minimizing the negative environmental impacts of waste. However, despite the large number of scientific papers and the relevance of the issue, the environmental and economic problems of waste management have not yet been resolved. A sociological method was used to demonstrate the need for the development of an organizational mechanism for solid waste management and adaptation to climate change.

The purpose of the present study was to identify the main points that climate-change-related organizations and initiatives can develop to increase people's knowledge about the topic. Accordingly, we designed questionnaires and got 385 valid responses.

Results

The state of the environment is the only indicator of the ecological consciousness of a population living in a certain territory, and the main factor in ensuring the health and well-being of people. Over the past ten years, a number of social studies connected with environmental problems have been carried out in Ukraine [3, 4, *etc.*]. The above-mentioned studies gave a fairly complete picture of the attitude of citizens towards the environment in the context of their willingness to support the environmental aspects of reforms within the framework of the implementation of the Association Agreement between Ukraine and the EU; or in the context of the implementation of the Agenda for Development

until 2030 – Sustainable Development Goals. Social studies demonstrate support for environmental values, which means that most Ukrainians regard environmental protection as an important area. In addition, most people are aware of the impact of environmental factors on the quality of their lives and health. At the same time, the readiness of Ukrainians to change their habits and to take action to protect the environment is quite low.

It has been proved that the spread of sustainable consumption is a way to preserve the environment and improve the quality of life. Sustainable consumption is the use of goods and services that satisfy basic needs and improve quality of life with minimal use of natural resources and with the least damage to the environment. The main purpose here is to draw attention to the problems of health and the environment.

Research shows that the main motive behind the introduction of environmental practices is the possibility of saving when paying for utilities (saving consumption of the main types of resources: water, gas, heat and electricity). In particular, the most commonly used practices of responsible consumption are reduction of energy consumption, the sorting of most of the waste for disposal, the choice of an environmentally friendly type of transport (walking, cycling), partial waiving of the purchase of disposable plastic products, reducing household water consumption, etc. [3, 4].

In some social studies, climate change as a global issue is considered in the context of the respondent's acquaintance with this tendency, as well as with reasons and its consequences. Thus, the survey shows that more than half of Ukrainians believe that climate change is the result of human economic activity [3]. Such results could be interpreted as a sufficient degree of awareness. But there is a rather negative tendency. In the last five years (in 2014 – the first study, 2018 – the second study), the share of Ukrainians who consider climate change as a result of natural processes has increased, while the proportion of those who believe that climate change is a result of human activity has decreased. This tendency is even more negative in the context of increasing the dissemination of information on climate change in the media, social networks, and so on.

Many people in the world realize the problem of climate change and all the consequences. Now we have to make changes in our everyday life to survive.

Conducted sociological surveys in Zhytomyr (Ukraine) showed that 88% of respondents are concerned about climate change. We asked them what consequences are the most manifested (Fig. 1). This research shows that the biggest part of Zhytomyr's population (75%) is concerned about drought. Half of respondents (50%) worry about drinking water and strongly believe that drought happens because of climate change. Only 7% of people feel temperature anomalies, which we find very interesting because people usually talk about temperatures that have never happened before.

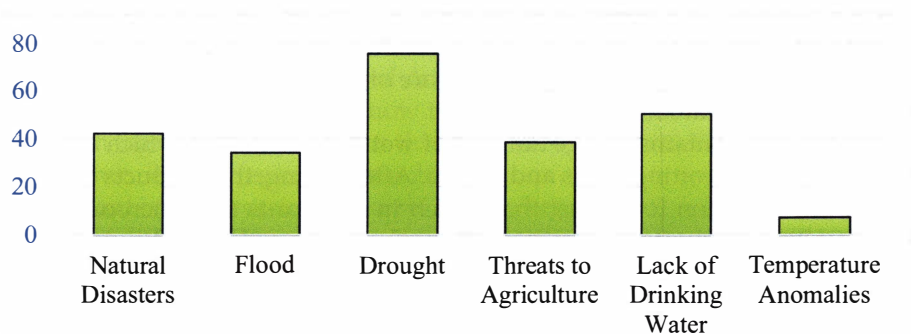


Figure 1. The consequences of climate change felt by the inhabitants of Zhytomyr

According to Eremenko I., Vynyarskaya M., Melnik Yu. the issues of adaptation to and prevention of climate change include measures in the sectors of energy, environmental protection, housing and communal services, agriculture, transport and other spheres of human activity. For Ukraine, energy efficiency and energy conservation are the most pressing. 67% of measures aimed at reducing greenhouse gas emissions are in this sector. It is precisely there that, according to the Energy Community, the scope of energy efficiency activities are the best for Ukraine [5].

The fact that in Ukraine for the last 4 years tariffs for domestic consumption of resources (in particular gas and heat) have been raised, plays a role in that achievement. Unfortunately, the reason for the introduction of energy and resource-saving measures by the Ukrainian population is not a transition in behavior according to the principles of responsible consumption. Therefore, the need to disseminate information on the consequences and dangers of climate change, as well as ways to adapt and prevent the deterioration of the situation, remains evident.

Solid waste is a common problem for all countries in the world. It is a great environmental threat, which causes climate change as well. We should admit that solid waste has an affect on water and air pollution. Also, garbage creates aesthetic problems. The amount of waste in Ukraine is rising every year. We strongly believe that sustainable consumption can solve the problem listed above. In this study, it is advisable to focus on the issue of solid waste management. Despite the fact that in the total amount of waste generated in the country, solid waste is less than 10%, the quality of its management, on the one hand, determines the living conditions of people and, on the other, is an indicator of the maturity of society.

Everybody knows about the Great Pacific Garbage Patch, which is the largest accumulation of plastic in the ocean. It contains about 80,000 tons of plastic or about 1.8 trillion plastic pieces [6]. In Ukraine, one person produces approximately 300 kg of solid waste in a year. However, there is a big difference in the amount of solid waste in rural and urban territories. The worst is that 98% of

it is not recycled and simply accumulates on piles of garbage. Currently, over 10,000 hectares of land are occupied by landfills (7,000) in the country. However, it should be noted that the data provided are official statistics that can be significantly underestimated.

Solid waste contains a large amount of wet organic matter, which while decomposing emits rotting odors and filtrate. After drying, the products of incomplete decomposition form dust that is rich in pollutants and microorganisms. As a result we have intense contamination of soil, air, surface and groundwater. Besides, in most rural areas of our country we do not have any garbage collection systems. In this case, household waste is stored in natural relief formations - beams, ravines, and river valleys. This poses an environmental risk because the pollutant-rich sewage enters the water bodies.

In Ukraine people throw away 20 million plastic bottles a year (that decompose over about 400 years). Therefore, we can assume that our country is part of the problem of The Great Pacific Garbage Patch. The main point is that we should not wait until the government will solve that problem; we should start right now and act.

Over the past 50 years, polymer manufacturing has accelerated by almost 200 times and is expected to double in the next 20 years [7]. Plastic is definitely dangerous for different groups of living organisms. However, we should emphasize that, under the sun, plastic emits methane and ethylene (greenhouse gasses). Dr. Sarah-Jeanne Royer says that for a long time we thought that the link between plastic and climate change was mainly focused on fossil fuels used to produce plastic. Now we are talking about greenhouse gasses emission from plastic degradation in the environment [8]. All of the polymer types tested by the scientists produce methane (CH_4) and ethylene (C_2H_4) when exposed to ambient solar radiation. The amount of greenhouse gasses produced depends on time under the sun [8]. Packaging and bottles are the main sources of polymer in everyday life. In the summer we have a great problem with disposable tableware that is usually burned or buried in the forest.

We assume that plastic causes a couple of problems:

- it increases the amount of solid waste;
- it emits greenhouse gasses in the process of degradation;
- it is dangerous for species;
- it creates aesthetic problems.

We conducted another sociological research in Zhytomyr (Ukraine) that showed that only 3.5% of inhabitants understand the reason why garbage should be recycled. The rest of the respondents do not realize the necessity and throw all waste in one dump. The main reason is that people see how all waste goes to the same container even when it is sorted. Moreover, all respondents said that they were not aware of the danger of luminescent bulbs and batteries. People throw that kind of garbage in the same dump.

The purpose of the present study was to identify the main points that climate-change-related organizations and initiatives can develop to increase people's knowledge about the topic. Our sample was composed of 385 respondents by the citizens of Zhytomyr. As told previously, most of our respondents were

concerned about climate change (88 per cent of our respondents were aware of climate change). Respondents were most concerned about the following effects of climate change: drought, lack of drinking water, and natural disasters. In addition, the results of the study show that it is better to inform the public about climate change adaptation actions through video reports in the media, posts on social networks, articles in print media.

The context of growing concern about climate change has increased the number of different climate and environmental organizations and initiatives in Ukraine. Their aim is to create a strong and high value for a clean environment in people's minds. Such organizations and initiatives bring much in climate activism as they make people willing to pay more attention to their contribution to climate problems.

We strongly believe that the main reason for the problem listed above is a lack of information. People do not realize the danger from the garbage that they produce every day. We can live without thousands of things that we buy (plastic packaging, bottles, disposable tableware etc.). It is possible to achieve sustainable development when the population's environmental awareness is raised. It is well-known that for profound change it is important to formulate restrictions, prohibitions, and changes in many behavioral habits that will be voluntarily accepted. Changes in the way of life of the population and the mechanisms of the economy are also necessary. It is important to start environmental education of the population at an early age.

Last year we started a "Climate Change Agents" campaign for 6-8th grade students, where we teach them the basics of sustainable consumption. They understand that their way of living can influence future generations' level of life. It was a great experience. High school students have been taught activities that they can carry out on a regular basis, namely: conservation of electricity; water conservation; sorting of plastic and paper waste; visits to shops and markets with reusable shopping bags; use of environmentally friendly types of transport; ecological tourism; garbage disposal after camping. During our classes, we teach students (climate agents) that we can use bottles, bags, and cups multiple times. That is the main step that society can take to reduce the amount of solid waste in the world. Moreover, we talked about the money economy while using non-disposable things (in Ukraine we pay for plastic bags in the supermarket).

The effects of climate change are manifested not only in violation of the normal state of natural ecosystems, but also in the changing living conditions of people. According to the State Statistics Service of Ukraine, more than 70% of the population live in the cities. Therefore, the problems and consequences of climate change are particularly relevant for urban areas. Cities of Ukraine, irrespective of their size and location, are more or less vulnerable to the effects of climate change. In addition, urban structures and energy sources can cause a worse effect and affect the research of the local warming [9].

Discussion and conclusions

Our results show that in recent years environmentally concerned organizations and initiatives have been developing rapidly in the largest cities of Ukraine (Kyiv, Poltava, Lviv, etc.). The case of Zhytomyr shows that climate and environmental organizations and initiatives are mainly represented by NGOs, individuals, and research institutions. At this point we realize that the population of our town is not ready to sort waste (one way to reduce the amount of solid waste). We specify a couple of common reasons such as governmental (conditions were not created) and educational (lack of information). We attribute some climate change with waste accumulation. Our research shows that people understand and feel climate changes. In addition, they can specify the consequences, which is why we have to show ways to solve the problem.

Then it could be said that the role of climate and environmental organizations and initiatives in informing people about climate change could have almost the same benefit as the official activities. NGOs and initiatives could generate the following effects:

- showing links between climate change and people's behavior;
- involving people in climate and environmental activism;
- involvement in providing strategies for embedding climate change adaptation in cities.

Obviously, it is necessary to develop and implement an integrated approach to addressing the problem of providing information and education actions on a regular basis and involving all stakeholders in their implementation. At this stage, we understand the necessity of ecological education and information availability. It is obvious that humanity must realize its responsibility for the impact of its activities on the environment. Promotion of sustainable consumption ideas among the population will achieve the goal.

We find that informational and educational programs on climate change are conducted to increase the level of ecological culture and awareness of the global problem. An international experience, such information support campaigns should include materials in the media, awareness-raising campaigns, involvement of educational institutions, and printed instructive materials. In Ukraine, in the field of climate change prevention, several areas of activity of civic organizations and international donors should be singled out:

- informing about the causes and consequences of climate change;
- saving and restrictions on the use of fossil fuels;
- informing about renewable energy sources;
- adopting and implementing programs and projects in the area of energy efficiency and transition to renewable energy sources. Our findings can be used as simple pieces of advice for organizations and initiatives related to climate.

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