

## SOCIO-GEOGRAPHICAL STUDY OF THE ENVIRONMENTAL BEHAVIOR OF THE POPULATION OF CHERNIHIV IN RELATION TO THE TRANSFORMATIONAL CHANGES OF THE URBAN SPACE

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**Abstract:** Sustainable development has become a new worldview concept for all countries of the world, which are making the transition to finding an optimal balance between economic, environmental and social components. It is focused on people, improvement of socio-economic and ecological environment. The participation of citizens and in particular every person in ensuring sustainable development is an integral part of life on the planet, as the intellectual level, ecological behavior of the population and knowledge of the main problems help to solve them. In this study, we present the results of a survey of the population of one of the largest cities in the north of Ukraine. Chernihiv is an administrative, industrial and cultural center, an important transport hub. As part of the sociological study and comparison of environmental behavior of the population, a survey was conducted among the residents of Chernihiv in 2018 and 2021. It is established that more and more people are interested in the ecology of the city and are gradually introducing ecoattributive practices into their everyday life. The main measures used by the citizens of the city to preserve the environment are energy saving, use of public and bicycle transport, economical consumption of natural resources. Residents of Chernihiv and the authorities understand the need to build a waste processing plant. Garbage sorting is supported by the majority of the population, but there is a certain lack of awareness among people, as well as a lack of proper equipment. The article identified environmental problems that Chernihiv residents consider to be the most serious. They include the organization of waste management, air pollution, drinking water quality. The second stage of the research showed that more people are ready to take concrete actions to improve the state of the city and the environment in order to live in a comfortable space. An important role in solving problems depends on environmental education and environmental education of citizens.

**Key words:** sustainable development, ecological problems, pro-environmental behavior.

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## СУСПІЛЬНО-ГЕОГРАФІЧНЕ ДОСЛІДЖЕННЯ ЕКОЛОГІЧНОЇ ПОВЕДІНКИ НАСЕЛЕННЯ МІСТА ЧЕРНІГОВА ЩОДО ТРАНСФОРМАЦІЙНИХ ЗМІН МІСЬКОГО ПРОСТОРУ

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**Анотація:** У дослідженні розглянуто теоретичні основи екологічної поведінки людини. Визначено зміст поняття «екологічна поведінка». Проаналізовано основні чинники формування ставлення людини до навколишнього середовища. З'ясовано, від чого залежать зовнішні і внутрішні чинники екологічної поведінки населення, та як вони можуть впливати на інші сфери життя суспільства. Проведено соціологічні дослідження серед жителів м. Чернігова щодо сталого розвитку і екологічних проблем, які їх найбільше турбують. Здійснено порівняння результатів опитування респондентів, які були залучені до дослідження у 2018 і 2021 роках. Встановлено, що все більше людей цікавляться екологією міста і поступово вводять у своє повсякденне життя екоатрибутивні практики. В першу чергу, це стосується енергозбереження, використання громадського і велосипедного транспорту, ощадливого споживання природних ресурсів. Зростання зацікавленості та активності громадян у вирішенні екологічних проблем потребує державної підтримки і конкретних заходів з боку органів місцевого самоуправління. Визначено, які екологічні проблеми міста чернігівці вважають найбільш гострими. Серед них: організація поводження зі сміттям, забруднення атмосферного повітря, якість питної води. Проаналізовано заходи і конкретні дії, які жителі Чернігова готові робити для покращення стану довкілля. До них відносяться: використання для поїздок по місту велосипед або ходити пішки, розумне споживання електроенергії і води, задача на переробку батарейок, сортування сміття. Проведено порівняння результатів опитування в Чернігові з даними національного соціологічного опитування, яке було проведено у лютому-березні 2017 року. Сформульовано механізми стимулювання екологічної поведінки людини. Підкреслено важливість екологічного виховання і освіти громадян для покращення стану навколишнього середовища.

**Ключові слова:** сталий розвиток, екологічна поведінка, екологія міста, екологічні практики.

### Introduction

In the process of its development, the city expands its territory and occupies a sufficiently large area. As a result, human activity increases, urbanization processes accelerate, consumption of natural resources increases, because the population needs more water, food, raw materials and energy. The construction of residential areas, the expansion of the transport network, the location of infrastructure facilities and maintenance causes a decrease in the territory of natural landscapes and leads to changes in the ecological situation. This is accompanied by felling of forest areas, regulation of river flow, disappearance of swamps, formation of reservoirs. That is why there is a need to study the ecological state of the urban space, solve existing problems and avoid potential threats.

The development of the city of Chernihiv and the main directions of the city's activities are based on the concept of sustainable development and are based on the Sustainable Development Strategy of Ukraine. This is important, because a modern city, first of all, should be safe and comfortable for human life. City authority of Chernihiv and citizens strive to make it.

### Materials and methods of research

The relevance of the study of sustainable development and ecological behavior of the population is confirmed by the scientific work of Ukrainian and foreign researchers. Theoretical foundations of sustainable development, its components and problems are considered in numerous works conducted by different scientists (Brundtland, 1987; Meadows & Meadows, 1972; Register, 1987; Rogers, 1997; Hald, 2009). Ecological movement in the 21st century covered all spheres of human life and influenced the development of the urban environment. It is important for our country to use the practical experience of greening and ecologization the cities of the world. There are a lot of publications on this topic among Ukrainian researchers (Kononenko, 2014; Lisowski, 2008; Melnyk, 2006). The theoretical foundations of pro-ecological behavior are described in articles and works (Hyunsook, 2013; Kollmuss, 2002; Steg & Vlek 2009).

### Presenting main material.

Sustainable development is inextricably linked with human pro-ecological behavior. For the past 30 years, psychologists and sociologists have been interested in studying the question "Why did a person begin to think about ecology and act ecologically in relation to the environment?" Pro-ecological behavior is the conscious actions of a person who seeks to minimize the consequences of his negative actions in relation to the environment and man-made objects (minimizing the use of resources and energy, using non-toxic substances in production and consumption, reducing the generation of waste) (Kollmuss, 2022). We can form a list specific actions of a person that will characterize his behavior as pro-ecological:

1. Purchase of environmentally friendly food and household goods;

2. Economical use of water, electricity, gas in everyday life;

3. Garbage sorting;

4. Use of electric transport, bicycles, giving preference to public transport for trips around the settlement (Hyunsook, 2013; Holub, 2019; Zapototskyi *et al.*, 2019).

The study of human behavior in its attitude to the environment is concerned with Conservation psychology. This field studies the interrelationship between humanity and the environment, with a focus on encouraging the preservation of natural landscapes (Lehman & Geller, 2014). Factors of environmental behavior can be divided into groups: external (arising from environmental conditions) and internal (physical and mental characteristics of a person). Some factors have an impact on several social groups (environmental taxation, areal installation of containers for waste sorting), while others have an impact on individuals (description in works of literature of the nature of the native land) (Krajhanzl, 2010).

External factors include social, cultural, economic, legal and other components. Their conditions are constantly changing, they influence other components (for example, economic interact not only in their circle, but also affect the social, cultural and ecological environment). The implementation of certain ecological actions of a person depends on the presence of the necessary infrastructure: a developed network of public transport, bicycle paths, places for sorting and processing waste (Kollmuss, 2022).

Internal factors of environmental behavior depend on character qualities, motivational attitudes, values and mental characteristics of a person in his attitude to the environment. Motivation is one of the causes of behavior or a strong internal incentive. Researchers distinguish primary motives (they determine several actions that are related to each other, for example, the desire to follow an ecological lifestyle) and selective (motives that influence a specific action - "If it rains today, should I go by public transport or everything use a bicycle?") However, very often pro-ecological behavior is hindered by non-ecological motivations. A person chooses his own income and comfort, ignoring the ecological safety of society. Then the main motives (ecological values) overlap with selective ones (personal satisfaction) (Krajhanzl, 2010).

In 2018 and 2021, we conducted research among residents of the city of Chernihiv. Sociological research is an effective means of involving the population in solving the city's problems, and the use of the results of sociological analysis of various microdistricts proves the relevance of these works.

The field stage of information collection can be divided into 2 stages: I - from July 15 to August 15, 2018 and II - from August 23 to September 23, 2021. It was held in 2 districts of the city of Chernihiv: Desnyanskyi and Novozavodskyi. During the survey, respondents gave answers to 10 questions. As a result of the work performed,

300 people were interviewed in each period (Table 1). The social structure of the Chernihiv population involved in the study is as follows: persons studying in 2018 – 19.3%, in 2021 – 27.7%; employed in 2018 – 57.4%, in 2021 – 57.3%; unemployed in 2018 – 7.3%, in 2021 – 8%; pensioners in 2018 – 16%, in 2021 – 7%.

About half of the participants of the first stage of the survey admitted that they had never heard of the Sustainable Development Goals, about 35% had superficial information and only 8% had a sufficient idea. In 2021, the situation did not change significantly: 52% of respondents had never heard of the Sustainable Development Goals, 39% had superficial information, and 9% of respondents had a sufficient idea.

According to the received data, the population is characterized by insufficient information about the Sustainable Development Goals. Less than half of the interviewed women and men have sufficient and superficial knowledge. Among the age groups, the category of citizens aged 31-50 stands out, among whom more than half are aware of this information. Survey participants with basic higher education and incomplete higher education most believe in the possibility of the Sustainable Development Goals to stimulate development and transformation in our country. At the same time, respondents with complete secondary education were the least interested and skeptical in their answers.

When asked about responsibility for damage caused to the environment in 2018, almost 46% of respondents answered that citizens themselves should monitor the state of the environment. 15.7% and 17% of Chernihiv citizens believed that it should be taken care of by the government and local self-government bodies, respectively. About 14% of respondents hesitated and could not give an answer. Most of them pointed out that both citizens and governing bodies should deal with this issue. As for business structures, more than 7% answered that they should bear full responsibility for the damage, because it is their activities that have the greatest impact on the state of environmental pollution. In 2021, more than a third of respondents admitted that citizens themselves should be responsible for environmental pollution. Compared to the first stage, more interviewees indicated that local self-government bodies and business structures should deal with this issue (Table 2).

According to the survey participants, the city government should implement measures to improve the environment. During the two stages of the survey, the majority of respondents noted that in recent years there have been significant changes in the landscaping of the city, reconstruction of city parks, creation of public squares, renewal of the rolling stock of city transport, work of communal structures. Almost half of Chernihiv residents pointed to the effective work of the city authorities in the direction of improving the environment. About 30% of the city's residents could not answer clearly, because they saw both positive changes on the one hand (increasing energy efficiency in city institutions, cleaning the bed of the Stryzhen River, planting trees, restoring park areas), and negative ones (the absence of a waste processing plant). In 2018,

19% of citizens did not recognize the work of the city government as effective, and about 10% believe that the situation in the city is worsening, and the government is not responding to it. However, in 2021, the number of such respondents became smaller and amounted to 13.7% and 7%, respectively (Table 3).

An analysis of the city's environmental problems revealed that the organization of waste management is the most urgent issue according to survey participants in 2018 - 41%, and the quality of drinking water in 2021 - 37%. City residents and the authorities understand the need to build a waste processing plant, but this issue is only being discussed. Garbage sorting is supported by the majority of the population, but there is a certain lack of awareness among people, as well as a lack of proper equipment. A quarter of the population in two stages of the survey recognized the acute problem of atmospheric air pollution. Regarding the item "greenhouse gas emissions and climate change", only 3% of citizens chose this option in 2018 and about 2% in 2021. This can be explained by the lack of sufficient knowledge about the sources and consequences of greenhouse gases. The least important for the respondents were the problems of the state and area of green spaces (only 0.1% in 2021) and the risk of man-made disasters – 1.5% (Table 4).

Among all survey participants, half of the respondents answered that they are ready to make changes in their environmental behavior. Most of them noted that it is necessary to involve all residents of the city in actions, only then there will be appropriate results. In 2021, in contrast to 2018, almost twice as many people answered that they are taking concrete steps to improve the state of the environment. Residents of the city indicated that they already understand the need to protect the environment, and this is mainly represented by reducing the use of plastic, installing energy-saving equipment, using environmentally friendly products and goods, giving preference to bicycles or walking. In 2018, less than 7% of the citizens surveyed were not ready to go for a change, in 2021 the number of such people decreased to 3.9%. They explained their position by the fact that the government and business exert much greater pressure on the environment, and their small contribution will not change anything (Table 5).

To the question about concrete changes that the respondents are ready to make, the majority of citizens both in 2018 and in 2021 chose sorting garbage, recycling packaging, batteries, making remarks to people who pollute the environment and reducing daily water and electricity consumption. About 60% answered that they can use public transport for trips around the city and understandably submit to fines for throwing garbage on the street. The survey participants showed the least activity in the answers about participation in city cleaning and landscaping activities and addressing state administration bodies with a statement or letter. In addition, a small percentage of respondents are ready to refuse to use of synthetic detergents - 11.6% in 2018 and 15% in 2021. This was explained by high prices and the small distribution of ecological products.

If we compare the two stages of the survey, then in 2021 twice as many respondents are ready to participate

Table 1

## Distribution of respondents by sex and age

Representativeness criterion	Share			
	Number		%	
	2018	2021	2018	2021
Males	113	121	37,7	40,3
Females	187	179	62.3	59.7
Representativeness criterion (age)	Share			
	Number		%	
	2018	2021	2018	2021
18-30	127	141	42,3	47
31-50	108	101	36	33.7
50+	65	58	21.4	19.3

Table 2

Distribution of respondents in the answer to the question  
“Who should be responsible for the damage caused to the environment?”

Responsible persons	Share of respondents, %	
	2018	2021
Government	15.7	14
Local governments	17	22.3
The citizens themselves	45.7	37.8
Business structures	7.3	14.3
No one	0.6	0.6
Difficult to answer	13.7	11

Table 3

Distribution of respondents in the answer to the question  
“How do you assess the policy of the city authorities in the field of environmental protection?”

Evaluation of government policy	Share of respondents, %	
	2018	2021
The city authorities are taking certain measures and the state of landscaping is improving	42.3	47.3
The city authorities do not carry out effective work	19.3	13.7
The ecological situation in the city is deteriorating and the authorities are not responding to it	9.7	7.3
Difficult to answer	28.7	31.7

Table 4

## What is the most serious environmental problem in Chernihiv?

Environmental problems	Share of respondents who consider the problem to be the most serious, %	
	2018	2021
Air pollution	27.8	24.7
Drinking water quality	25.6	37
Condition and area of green spaces	0.6	0.1
Organization of waste management	41	35
Risk of man-made disasters (explosions, fires, etc.)	1.7	1.3
Greenhouse gas emissions and climate change	3.3	1.9

Table 5

Personal actions of citizens to improve the environment

Response options	Share of respondents, %	
	2018	2021
No, not ready	7	3.9
Not sure, maybe	23	15.8
Ready, but not done	52.3	48.2
Ready and already doing it	17.7	32.1

Table 6

Distribution of answers of respondents to the question “Changes in the lives of the citizens, which they are ready to make and are already making in order to improve the ecological situation of Chernihiv”

Response options	Share of respondents who are ready to do, %		Share of respondents who already do, %	
	2018	2021	2018	2021
Recycle packaging, batteries, sort garbage	77	76.3	9	9.3
Use a bicycle or walk for trips around the city	53	58	25	51.3
Use public transport for trips around the city	62	59.6	26.3	49.3
Clean up after pets	14.3	12.6	7	12.3
Participate in city cleaning and landscaping activities	7	16	3	10.6
Understand the introduction of fines for throwing garbage on the street	67	62.3	19.3	29
Reduce daily water and electricity consumption	63	83.6	15	76
Refuse to use synthetic detergents at home	11.6	15	4.6	3.6
Make remarks to people polluting the environment	67	64	15	9.3
Apply with a statement or letter to state administration bodies	10.3	12	4.3	0.3

Table 7

Measures of economical use of natural resources practiced by city residents

Response options	The share of respondents practicing these measures	
	2018	2021
Reducing electricity, water and gas consumption	26	54.7
Install energy-efficient windows	70.3	40.3
Installation of autonomous heating of the house	52.3	16
Installation of heat supply meters	29.6	36.3
Change of lighting devices to energy-efficient ones	57	58.7
Installation of alternative energy sources	1	0
Warming of the house	24	12.3
None of the above	1.3	1

Table 8

Activity in the public life of the city

Activity level	Share of respondents, %	
	2018	2021
Is a member of a public organization	0.6	0
Is a member of a public environmental organization	0	0
Participate in different environmental preservation activities	3.7	7
Support environmental ideas in absentia (signing petitions, spreading environmental information, etc.)	21	23
Do not participate	74.7	70

in landscaping the city. The percentage of people who can reduce their daily consumption of water and electricity and refuse to use synthetic detergents has also increased.

For comparison, respondents were asked to indicate changes to improve the environmental situation in the city, which they already practice in their lives. The survey showed that the number of Chernihiv residents using public transport for trips around the city is increasing (26% in 2018 and 49% in 2021). These are mainly categories of people of the older age group and those who are studying. In 2018, one in four respondents used a bicycle or walked, and in 2021, there were twice as many such people among the respondents. Chernihiv residents attributed this to the increase in the number of bicycle lanes, leading a healthy lifestyle, as well as the increase in fuel prices. The city residents showed the least initiative in cleaning and greening the city (however, in 2021, this indicator increased 3 times), applying to state administration bodies with a statement (about 4% in 2018 and 0.3% in 2021) and refusal to use synthetic detergents - less than 5%. It is interesting that only 9% of citizens currently recycle packaging, batteries, and sort garbage, but 77% are ready to do so. Survey participants pointed to the lack of necessary equipment (Table 6).

According to the received data on the measures of economical use of resources by city residents in 2018, more than half installed energy-efficient windows, autonomous heating and changed lighting devices to energy-efficient ones. In 2021, twice as many respondents practiced measures to reduce electricity, gas, and water consumption. About 25% of those interviewed at the first stage of the study insulated their house, and at the second stage, such people turned out to be two times less. Regarding the installation of alternative energy sources and the "none of the above" option, they were chosen by the smallest number of respondents in both 2018 and 2021 - about 1% (Table 7).

After analyzing the data on the activity of the survey participants in the public life of the city, in general, we can talk about its low level. About 70% of respondents did not participate in public events during the two stages of the survey. More than 20% of residents support environmental ideas in absentia (voting in social networks, on city websites, signing local initiatives). There were no participants of public environmental organizations among those interviewed, but 3.7% participated in individual environmental actions in 2018 and 7% in 2021 (Table 8).

This survey makes it possible to trace correlations between the level of education and measures that respondents are ready to take and are already taking to improve the environmental situation of their city. A certain regularity is observed: the higher the level of education, the more activities and practices citizens are ready to use in everyday life. Respondents with a basic higher education chose the largest list of answer options and were active in the public life of cities. In addition, during the analysis of the survey results, it was found

that citizens with a basic higher education, who have an idea and superficial information about the Sustainable Development Goals, most indicate the responsibility of the citizens themselves for environmental pollution. At the same time, respondents who do not know anything or have never heard something about balanced development emphasized more the responsibility of local self-government bodies and the government.

If we compare the survey data with the results of the national sociological survey, which was conducted in February-March 2017 (Sotsys, 2017), we can note the common features of the two surveys:

- more than half of citizens both in the country and in the city are ready to take certain actions to improve the state of the environment;
- responsibility for environmental pollution, according to the majority's answers, should be borne by citizens and the government;
- almost all respondents practice measures for economical use of natural resources. The vast majority of respondents installed energy-efficient windows, heat meters and replaced lighting devices with more energy-efficient ones. Obviously, this is due to a significant increase in utility tariffs. Only a few citizens pointed out the need to be aware of the economical use of natural resources. The listed measures are typical for all categories of respondents, however, saving energy consumption is especially characteristic of the middle and older age groups;
- the level of personal readiness of citizens to implement specific measures to improve the natural environment is not significantly affected by gender and age. Regarding the level of education, the following pattern can be observed: the higher the level of education, the greater the share of those who understand the need and are ready to improve the state of the environment.

**Conclusions.** The cited results of the sociological research record the tendency of the gradual spread of ecoattributive practices among the population. First of all, it concerns energy saving, the use of bicycle transport and the economical use of natural resources. The growing interest and activity of citizens in solving environmental problems requires state support and specific measures from local self-government bodies.

Sustainable development is the driver of human development in XXI century. Ensuring the transition of cities to a model of balanced development is an important task of modern times science. This requires an integrated approach in an effective way planning, management, multilateral partnership and monitoring, as well as in the actions of every citizen. Human pro-ecological behavior is one of the main factors that can ensure sustainable development. In our study, city residents are considered as important participants in the necessary transformational processes of urban space. Their normal and comfortable life, as well as that of future generations, depends on their environmental awareness and behavior.

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