Journal of Geology, Geography and Geoecology

Journal home page: geology-dnu.dp.ua

ISSN 2617-2909 (print)
ISSN 2617-2119 (online)

Journ. Geol. Geograph. Geology, 31(3), 427-439.
doi:10.15421/112239

Public good of ecology: results of international survey

Oleksandr V. Dluhopolskyi[1,2], Yuriy P. Ivashuk[2], Tetiana H. Zatonatska[3], Oksana F. Myhal[2], Antonina I. Farion-Melnyk[2], Andrii P. Kolesnikov[2]

[1] Higher School of Economics and Innovation (WSEI), Lublin, Poland, dlugopolsky77@gmail.com
[2] West Ukrainian National University, Ternopil, Ukraine
[3] Taras Shevchenko National University of Kyiv, Kyiv, Ukraine

Received 21.04.2022;
Received in revised form 04.07. 2022;
Accepted 09.08. 2022

Abstract. Based on an author's survey of citizens living in different countries, the hypothesis of low demand for the public good «clean environment» for developing countries and for high demand – for developed countries was tested. The attitude of representatives of different nations to the environment as a public good was studied based on the results of a survey of 564 respondents from different countries (228 from Ukraine and 336 from abroad). k-means method was used for clustering, which allows the creation k-groups from a set of data. It was determined that the respondents of the 1st cluster are more satisfied than others with the level of personal awareness of the state of the environment in their countries than the respondents of the 2nd cluster. Most of the population in all surveyed groups receives information about the environmental situation from the Internet. Representatives of both clusters are aware of environmental human rights at the average level (65-75%). Representatives of both clusters are ready to take an active part in solving environmental problems, but among the representatives of the 1st cluster there are much more people who know about the existence of international environmental organizations. Only about half of the respondents from both clusters believe in the threat of a global environmental crisis. Representatives of the 2nd cluster and Ukrainians see the greatest threat to the environment in the transport and manufacturing spheres, while representatives of the 1st cluster pay considerable attention to other factors. Approximately the same number of respondents in both clusters acknowledge that corruption affects the environment. The situation in the survey on the destructive impact of financial-industrial groups on the environment is similar. About 90% of respondents in the 1st cluster and over 95% of Ukrainians consider environmental protection a public good, while in the 2nd cluster only 75% hold a similar opinion. The analysis of the survey results confirms the hypothesis about the sociality of the choice of the public good «clean environment», important for the design of environmental policy tools in the long run. Underestimation of the public good «clean environment» indicates a potentially weak public pressure to form a model of economic policy that corresponds to the modern understanding of sustainable development.

Keywords: Ecology; Public Good; Governance; Cluster; Ecological Crisis; Evaluation.

Суспільне благо екології: результати міжнародного опитування

О.В. Длугопольський[1,2], Ю.П. Івашук[2], Т.Г. Затонацька[3], О.Ф. Мигаль[2], А.І. Фаріон-Мельник[2], А.П. Колєсніков[2]

[1] Вища школа економіки та інновацій, Люблін, Польща, dlugopolsky77@gmail.com
[2] Західноукраїнський національний університет, Тернопіль, Україна
[3] Київський національний університет імені Тараса Шевченка, Київ, Україна

Анотація. На основі проведеного авторського опитування серед громадян, що проживають у різних країнах, протестована гіпотеза щодо низького попиту на суспільне благо «чисте довкілля» для країн, що розвиваються, і високого – для розвинених країн. Ставлення представників різних націй до екології як суспільного блага було вивчено за результатами анкетування 564 респондентів з різних країн (228 з України та 336 з-за кордону). Для кластеризації використовувався метод k-середніх, що дозволяє створювати k-групи з набору даних. Визначено, що респонденти 1-го кластеру більше за інших задоволені рівнем особистої обізнаності про стан навколишнього середовища у своїх країнах, ніж респонденти 2-го кластеру. Більшість населення в усіх опитаних групах отримує інформацію про екологічну ситуацію з Інтернету. Представники обох кластерів обізнані з екологічними правами людини на середньому рівні (65-75%). Представники обох кластерів готові брати активну

участь у вирішенні екологічних проблем, але серед представників 1-го кластеру набагато більше людей, які знають про існування міжнародних екологічних організацій. Лише близько половини респондентів з обох кластерів вірять у загрозу глобальної екологічної кризи. Найбільшу загрозу для довкілля представники 2-го кластеру та українці бачать у транспортній та виробничій сферах, тоді як представники 1-го кластеру приділяють значну увагу іншим факторам. Приблизно однакова кількість респондентів в обох кластерах визнає, що корупція впливає на навколишнє середовище. Схожа ситуація і в опитуванні щодо деструктивного впливу фінансово-промислових груп на навколишнє середовище. Близько 90% респондентів 1-го кластеру та понад 95% українців вважають охорону навколишнього середовища суспільним благом, тоді як у 2-му кластері аналогічної думки притримуються лише 75%. Аналіз результатів опитування дозволяє підтвердити гіпотезу щодо соціальності вибору суспільного блага «чисте довкілля», важливого для проектування інструментарію екологічної політики на тривалу перспективу. Недооцінка суспільного блага «чисте довкілля» свідчить про потенційно слабкий суспільний тиск на формування моделі економічної політики, що відповідає сучасному розумінню сталого розвитку.

Ключові слова: екологія; суспільне благо; управління; кластер; екологічна криза, оцінювання.

Introduction.

The role of ecology in rating the social well-being and the separate individual has radically changed under the influence of increasing requests for qualitative life and the awareness of the destructive impact of increasing technological pressure on the environment. Environmental quality has been becoming an increasingly important characteristic of state welfare. The environmental factor is especially important in the context of achieving the long-term goals of sustainable development (17 Goals to Transform Our World, 2022; Sustainable local development, 2013). Environmental initiatives have long been on the agenda of many first-world countries but have also intensified in recent decades in second- and third-world countries with varying degrees of success. Russia's full-scale war against Ukraine, launched by the aggressor country on February 24, 2022, also exacerbated the problem of nuclear security and nuclear terrorism in the 21st century, as well as the numerous migration problems associated with it (Vergano, 2022; Koshulko and Dluhopolskyi, 2022; Dluhopolskyi, Zatonatska et al., 2019). The dependence of European countries on energy carriers from the Russia of the 21st century has led to the inability of many of them to form their own environmental policy in the international arena (Dyke et al., 2021). The unique state policy on the economy's ecologization (greening), which provides introduction and implementation of the principles of rational environmental management and minimization of the negative impact on environmental objects during anthropogenic activities, was also not systematically conducted in Ukraine, in contrast to the EU countries (Martyniuk, 2017). Only, the Concept of Implementation of the State Policy in the sphere of climate change for the period up to 2030 was approved on 7 December 2016 (Ukraine 2030, 2017; Concept, 2016; On the Main Principles), which became a key document for inherence in the public plane of environmental security problem.

Literature review.

Environmental issues are objects of numerous works conducted by different researchers from different countries of the world (Brown et al., 2007; Brych et al., 2021; Callan et al., 2000; Galeotti et al., 2006; Haase et al., 2017; He et al., 2007; Pauli, 2010; Uitto, 2014). A group of authors from Ukraine (Koziuk et al., 2018; Koziuk et al., 2019; Koziuk et al., 2020; Dluhopolskyi, Koziuk et al., 2019a; Dluhopolskyi, Koziuk et al., 2019b) systematically researches the level of well-being and greening of economic development.

The article (Söderholm, 2020) focuses on overcoming global environmental risks, achieving radical sustainable technological change, and addressing problems of distribution and impact. The author argues that sustainable and long-term technological change requires a reassessment of the role of large industrial businesses and the government, and future research will develop the idea of introducing a new design of policy instruments in different institutional contexts.

The studies (Prysyazhnyuk and Mikhel, 2019; Hongjun et al., 2017) focus on the key principles of coexistence of the ecological and economic systems, suggests areas of ecological modernization of the national economy, and analyzes «green growth» in the context of the development of public policy tools. The paper (Panova, 2018) summarizes the key aspects of the process of greening economic development as a major factor in optimizing relations in the system «human – nature» in the environmental crisis condition. In the paper (Abanina et al., 2021) authors consider the category of «greening» as a new way to ensure environmental safety in the transition to sustainable development.

Despite numerous works on the ecological development of the economy (Ecological Portrait of the Ukrainian Citizen, 2018a; Ecological Portrait of the Ukrainian Citizen, 2018b), research on the attitude of the international community to ecology as a pub-

lic good at the national and local levels in individual countries remains relevant. Such problems have not found proper analysis in the works of modern ecologists and economists, and therefore in this article, we put forward the hypothesis that the demand of citizens for a clean environment in developing economies is rather low, while the public good «clean environment» may become more demanded only with the growth of GDP and real citizens' incomes (the logic of the Kuznets curve). The purpose of the research is the detection of environmental factors perception of individual well-being of the population in several regions of the world (compared with Ukraine), and to demonstrate of difference in demand for the qualitative environment among citizens of different countries of the world that were grouped into two clusters, and highlighted Ukraine separately.

Materials and methods.

This article continues and deepens our previous studies (Dluhopolskyi et al., 2019a; Dluhopolskyi et al., 2019b; Dluhopolskyi and Ivashuk, 2018; Dluhopolskyi et al., 2021). We have expanded the focus group of the previous survey by surveying an additional 130 respondents in 2020-2021, some of whom represented 36 countries (Dluhopolskyi and Ivashuk, 2018), and some from an additional 6 countries (questionnaires from Russia and Belarus were excluded). Thus, the new number of respondents is 336 people from 40 countries and 228 people – from Ukraine, like in the study (Dluhopolskyi et al., 2019). The average error for groups of respondents is 3%. The countries and corresponding clusters are shown in the Figure 1.

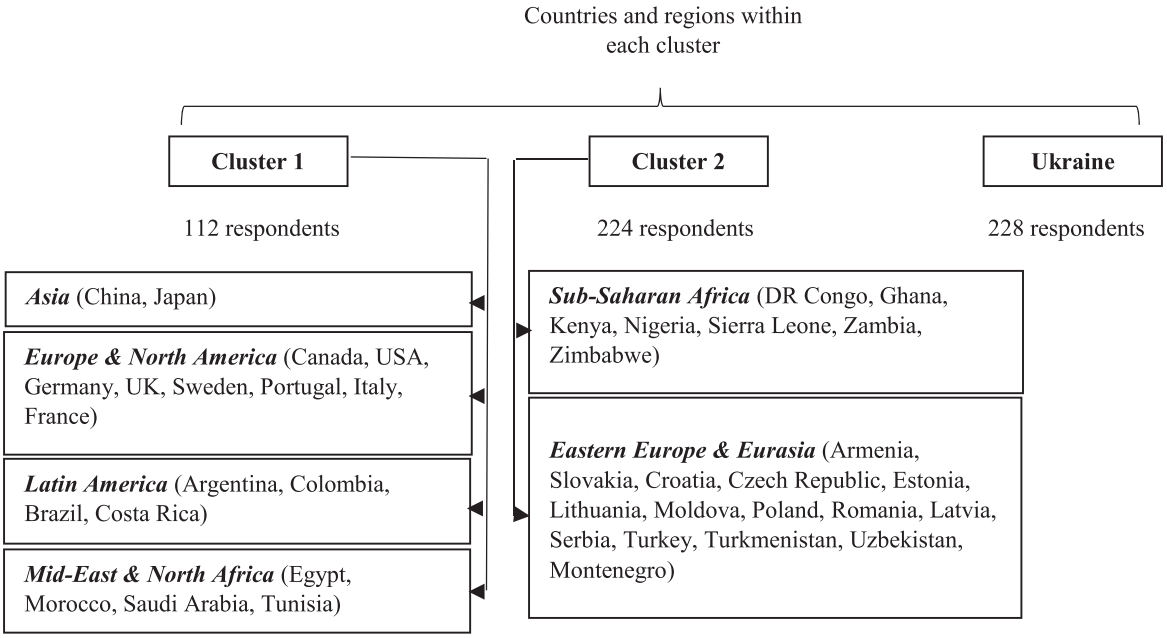


Fig. 1. Cluster groups and studied countries

As the objects of the anonymous questionnaires are characterized by unclearly set data, so the k-means method was used for clustering, which allows the creation of k-groups from a set of data (n-objects) in such a way that the group members become the most homogeneous. Two clusters were obtained in the result of modeling:

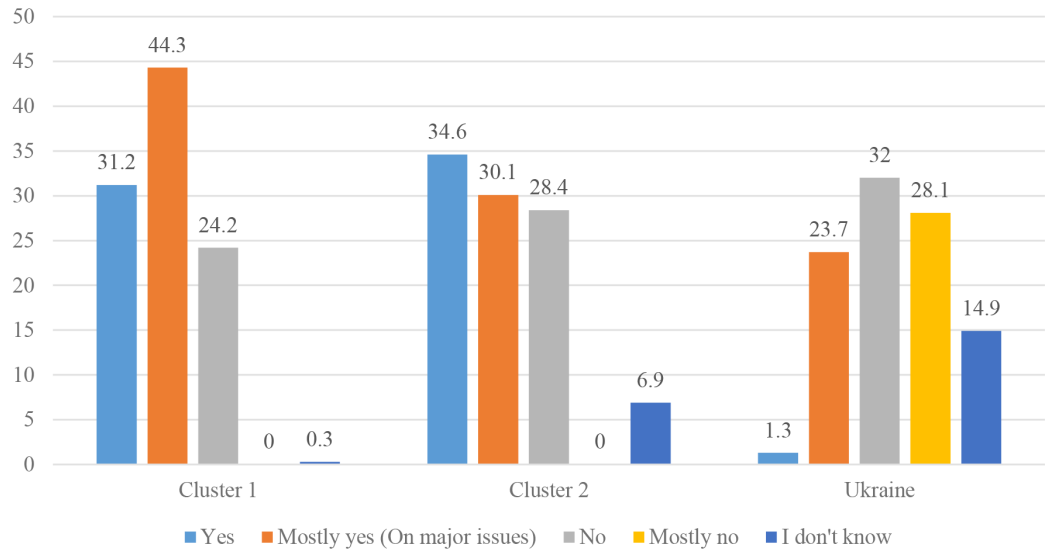
1) the 1st cluster includes the countries of Asia, Latin America, Central, and Western Europe, North America, Middle East, and North Africa;

2) the 2nd cluster includes the countries of East Europe, and Eurasia, also Sub-Sahara Africa.

Ukraine has been selected as a separate region to provide a more accurate comparison and correlation with the previous clusters.

Results and analysis.

The growing the so-called «green mood» in developed countries demonstrates the bias toward a new interpretation of welfare and its components. Increasing environmental standards and the growing burden of environmental regulation are considered the elements of a new model of an inclusive economy. Inclusiveness in such an environment is understood as the availability of «clean ecology» to all, as it is not only conferred with the power to generate positive externalities, but also allows for a natural increase in individual wellbeing through a concomitant reduction in health care costs, increasing of life expectancy, reduction in the burden of occupational diseases, etc.

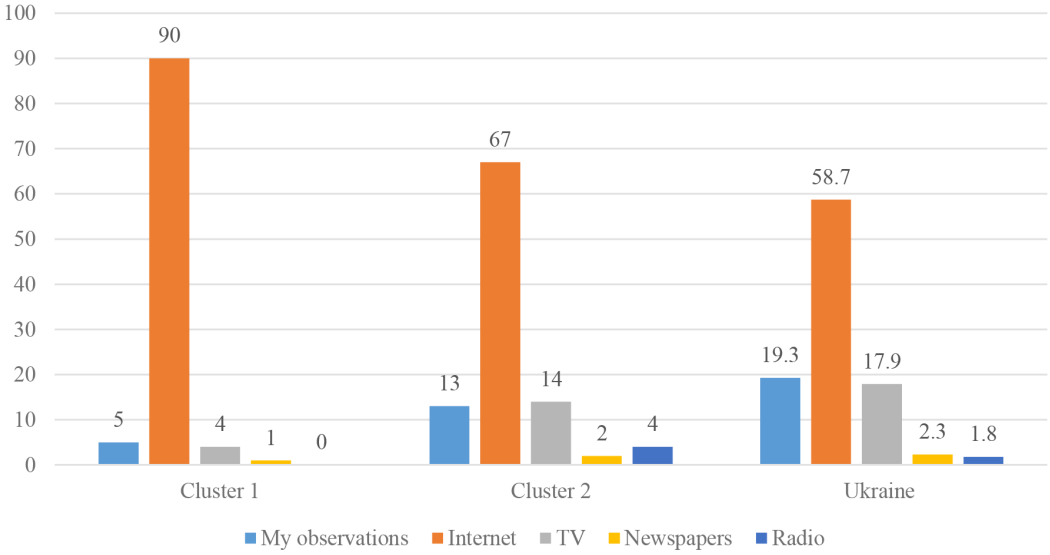


* Build by the authors based on the questionnaires analysis

Fig. 2. Results of answering the question «Are you satisfied with the level of personal awareness about the environmental situation in your country?», %

The Figure 2 shows that respondents in the 1st cluster were mainly satisfied with the level of awareness about the environmental situation in the country (the responses «yes» and «mostly yes» were given by 75.5% of respondents), whereas only 24.2% of respondents said «no». In the 2nd cluster, 6.9% of respondents gave the answer «I do not know», but there are considerably fewer «yes» and «mostly yes» answers – 64.7% and the majority of them are «no» (28.4%). For Ukraine, only 25% of respondents were satisfied with the level of personal awareness of the environmental situation, 60.1% were not satisfied, and 14.9% could not say.

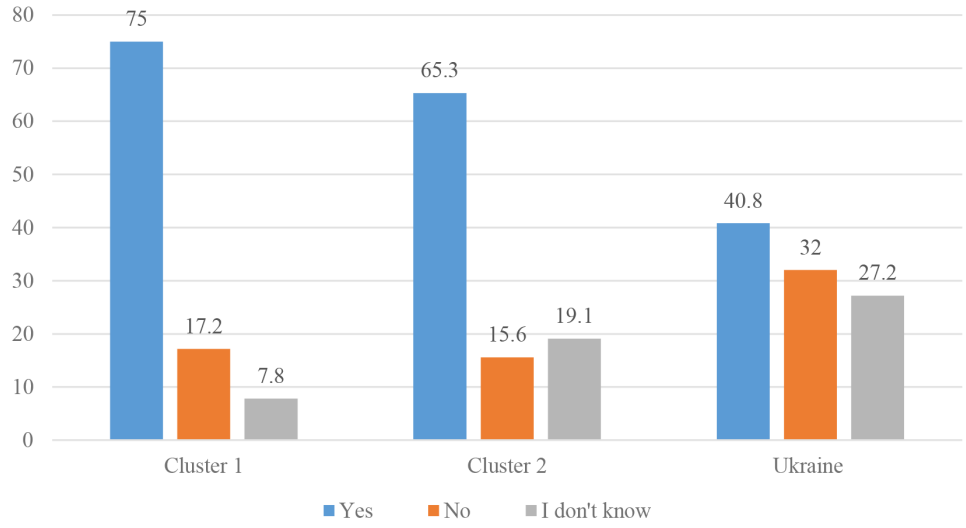
The Figure 3 demonstrates that in the1st cluster 90% of respondents receive information from the Internet, only 5% by means of their own observations, and 4% – from television. In the 2nd cluster, approximately 67% of respondents trust the Internet, while television and personal observations are trusted by nearly 13-14%. Respondents in this cluster also receive information about the condition of the environment from newspapers – (2%) and radio (4%). Just over 2% of surveyed Ukrainians receive information about the environmental situation in the country from newspapers, less than 2% – from radio, nearly 18% – from TV, 19.3% – their own observations, and over 59% – from the Internet.



* Build by the authors based on the questionnaires analysis

Fig. 3. Results of answering question «What is the main source of information about the environmental situation in your country?», %

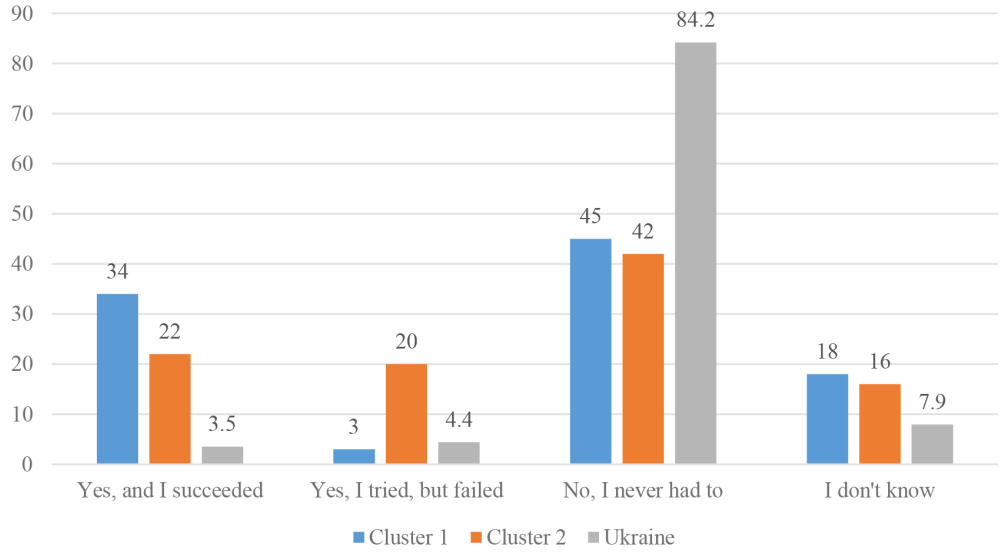
In the 1st cluster there are 75% of respondents are well known about environmental rights and 17.2% know nothing about it. In the 2nd cluster, a lower share of both those who are aware (65.3%) and those who are not aware (15.6%) regarding their environmental rights, while the share of those who find it difficult to answer is 19.1%. However, only 41% of Ukrainians know about environmental rights, 32% do not know, and slightly more than 27% find it difficult to answer the question (Figure 4).



* Build by the authors based on the questionnaires analysis

Fig. 4. Results of answering the question «Do you know about people's environmental rights?», %

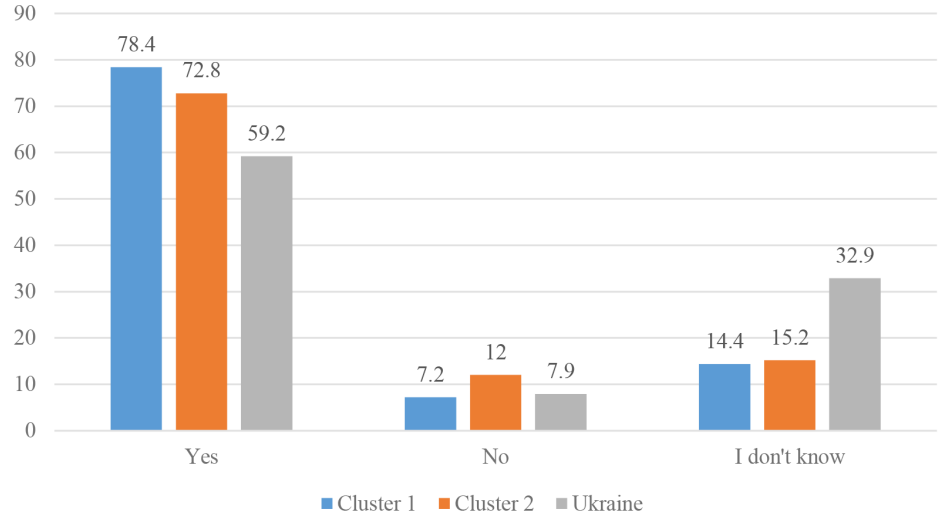
The Figure 5 shows that in the 1st cluster, nearly 34% of respondents successfully defended their environmental rights, less than 3% failed, while 46.5% of the respondents had no such experience. In the 2nd cluster, only 23.5% of respondents had successfully defended their environmental rights, 21.2% had unsuccessful attempts, and 45.5% had no such experience. Most Ukrainian respondents had no prosecution experience of their environmental rights (84.2% of the Ukrainians surveyed indicated this), 4.4% had such attempts but failed and only 3.5% were able to defend their environmental rights.



* Build by the authors based on the questionnaires analysis

Fig. 5. Results of answering the question «Have you had experience in protecting your environmental rights?», %

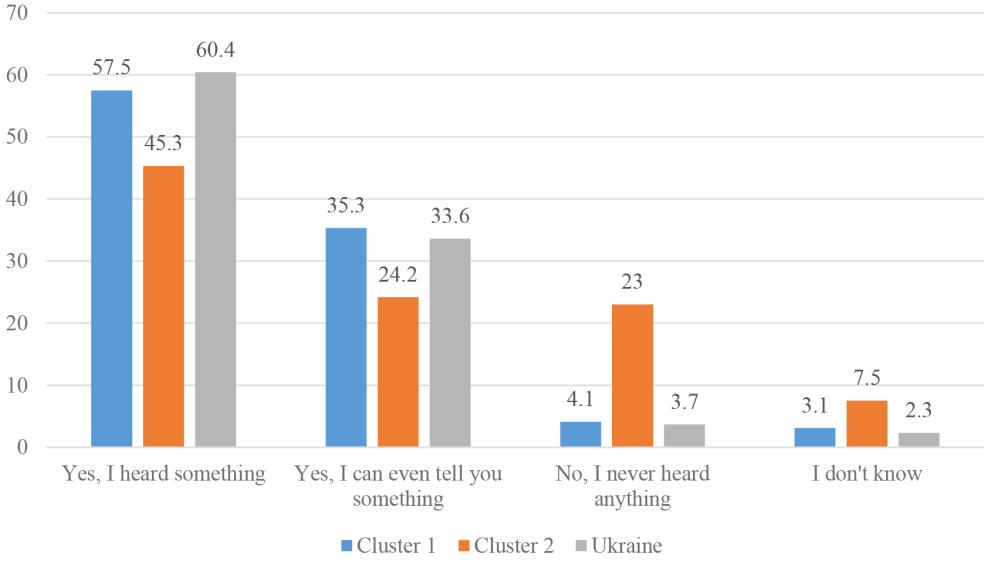
The Figure 6 shows that about 70% of the respondents in both clusters are ready to join to solving environmental problems (in the 1st cluster 78.4%, while in the 2nd cluster – 72.8%). However, in the 2nd cluster 12% of respondents do not want to take part in environmental initiatives, while in the 1st cluster – just 7.2% declare their unwillingness to environmental initiatives. In Ukraine, only 59.2% of Ukrainians interviewed were ready to work towards solving environmental problems, while around 8% were not, and 32.9% of respondents felt difficulty to answer the question.



* Build by the authors based on the questionnaires analysis

Fig. 6. Results of answering the question «Are you ready to work on solving environmental problems?», %

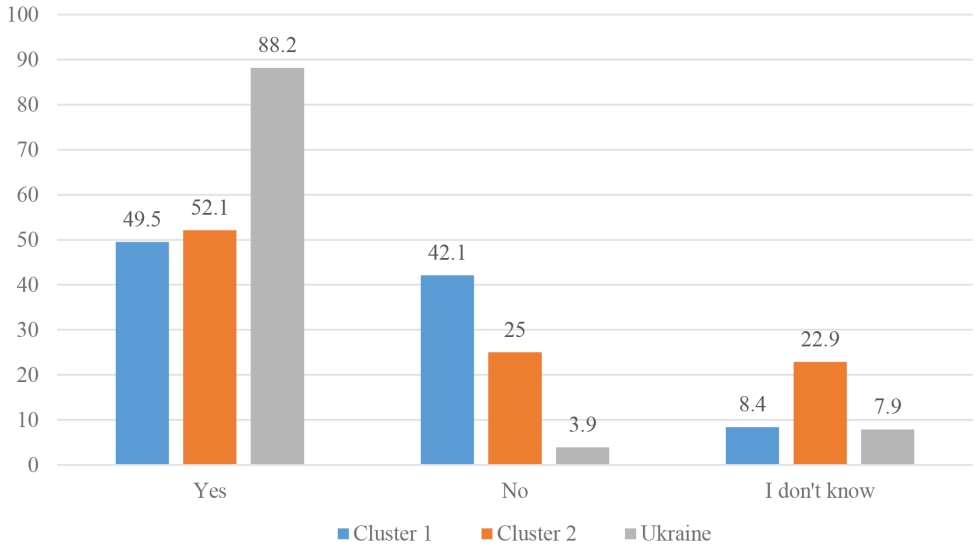
The Figure 7 shows that 57.5% of the respondents in the 1st cluster and 60.4% of Ukrainians have something heard about the existence of international environmental organizations, also 35.3% of above-mentioned 1st cluster and 33.6% of Ukrainian respondents can say something about environmental organizations, 4.1% of respondents in the 1st cluster were never aware of their existence. In the 2nd cluster, significantly fewer respondents are informed about the existence of international environmental activities, and organizations (45.3%), only one-fourth of them can talk about it and 23% of them have never been informed.



* Build by the authors based on the questionnaires analysis

Fig. 7. Results of answering the question «Are you informed about the existence of international environmental organizations?», %

The Figure 8 shows that the respondents of both clusters only in 42-50% believe in the threat of a global environmental crisis, while there are over 88% of Ukrainians share this statement. About 42% of respondents in the 1st cluster, 25% in the 2nd cluster, and only about 4% of Ukrainian respondents have a skeptical attitude towards the existence of an environmental crisis. Approximately 8.4% of respondents in the 1st cluster, around 23% of respondents in the 2nd cluster and around 8% of Ukrainians hesitate to answer.



* Build by the authors based on the questionnaires analysis

Fig. 8. Results of answering the question «Do you think there is a threat of a global environmental crisis today?», %

The Table 1 shows that respondents in the 1st cluster only in 19% of cases, respondents in the 2nd cluster – in 32% of cases, and respondents from Ukraine – in 41% of cases consider transport as a factor in the global environmental crisis. 18% of respondents in the 1st cluster, 21% in the 2nd cluster, and 32% of Ukrainians consider industry as a threat to the environment. Population growth is considered the threat to the environmental development of the countries by about 11% of the respondents in the 1st cluster, over 17% – in the 2nd cluster, and only about 5% of Ukrainians. Respondents in the 1st cluster pointed to the growth of natural anomalies and other factors affecting the population in 12 and 21% of cases, while for the respondents in the 2nd cluster and Ukraine these factors are negligible.

Table 1. Results of answering the question «Name the most important factors of the global environmental crisis», %

	Cluster 1	**Cluster 2**	**Ukraine**
Transport	19	32	41
Population growth	11	17	5
Increasing number of natural anomalies	12	5	5
Agriculture	8	5	0
Impact of financial and production groups	7	15	15
Production sector	18	21	32
Other	21	3	2
I don't know	4	2	0

* Build by the authors based on the questionnaires analysis

The influence of financial and industrial groups on environmental policy is considered a threatening factor only by more than 7% of respondents in the 1st cluster, and only by 15% in the 2nd cluster and Ukraine. 8% of respondents in the 1st cluster and 5% in the 2nd cluster consider agriculture as a threat to environmental development. Ukrainians do not point to agricultural production as a factor threat the global environmental crisis, while respondents in the 2nd cluster point to other factors.

The Table 2 shows the attitudes of respondents from both clusters to how effectively public authorities respond to environmental issues. Apparently, 54% of respondents in the 1st cluster and 42% in the 2nd cluster consider the activity of institutions to be effective, while in Ukraine only 2.2%.

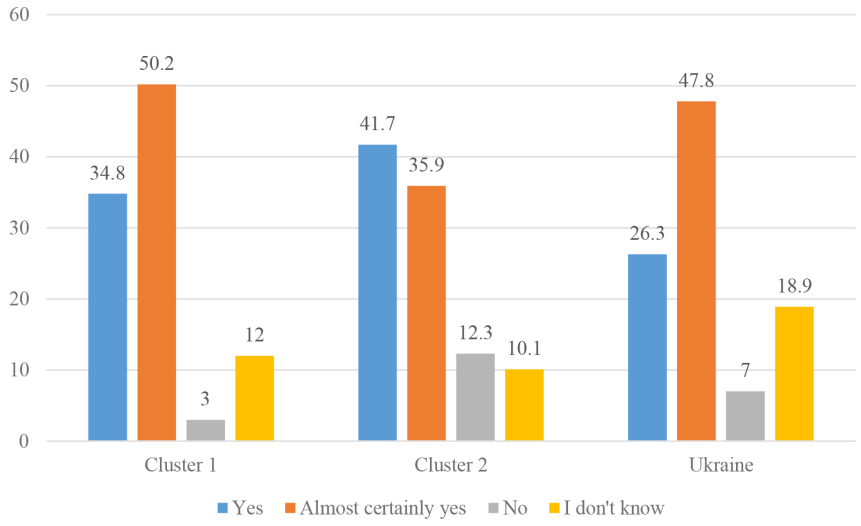
Table 2. Results of answering the question «Are the measures taken by the authorities today enough to improve the environmental situation in the country?», %

	Cluster 1	Cluster 2	Ukraine
Yes	13	12	1.3
On major issues	41	30	0.9
No	43	48	92.5
I don't know	3	10	5.3

* Build by the authors based on the questionnaires analysis

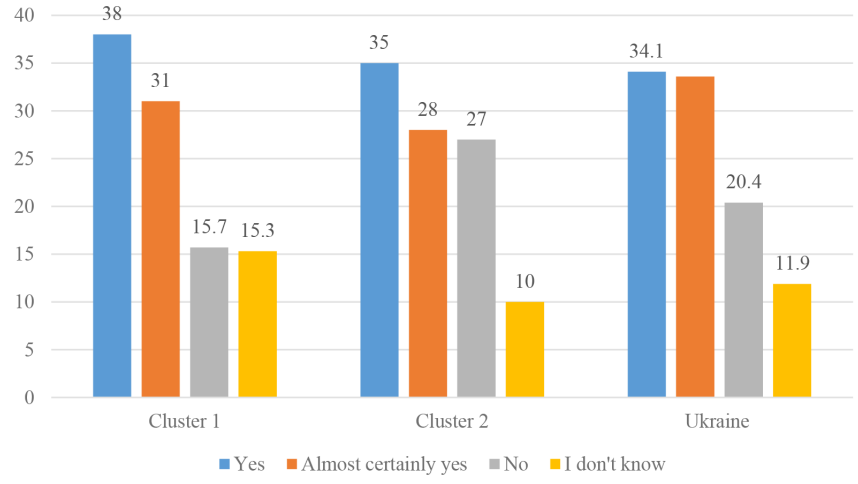
The Figure 9 shows that 85% of respondents in the 1st cluster link the environmental situation with the efficiency of governing in the country, in the 2nd cluster this opinion is shared by 78% of respondents and in Ukraine – 74%. Answer «no» to this question is given by 3% of the respondents in the 1st cluster, 12.3% of the respondents in the 2nd cluster, and 7% of Ukrainians. The largest share of those who are not convinced is among Ukrainians (18.9%).

The Figure 10 shows that respondents of all clusters and Ukraine give almost identical answers to the question about the link between the environmental situation and the level of corruption: more than 65% are sure about this, about 20% consider it is not true, and from 10 to 15% do not agree with the answer.



* Build by the authors based on the questionnaires analysis

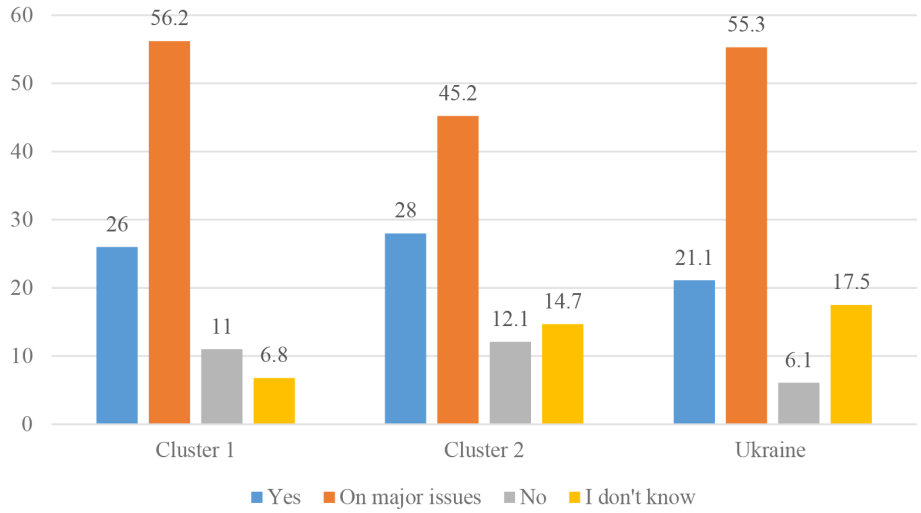
Fig. 9. Results of answering the question «Do you think the environmental situation is related to the efficiency of the management?», %



* Build by the authors based on the questionnaires analysis

Fig. 10. Results of answering the question «Do you think the environmental situation is related to the level of corruption?», %

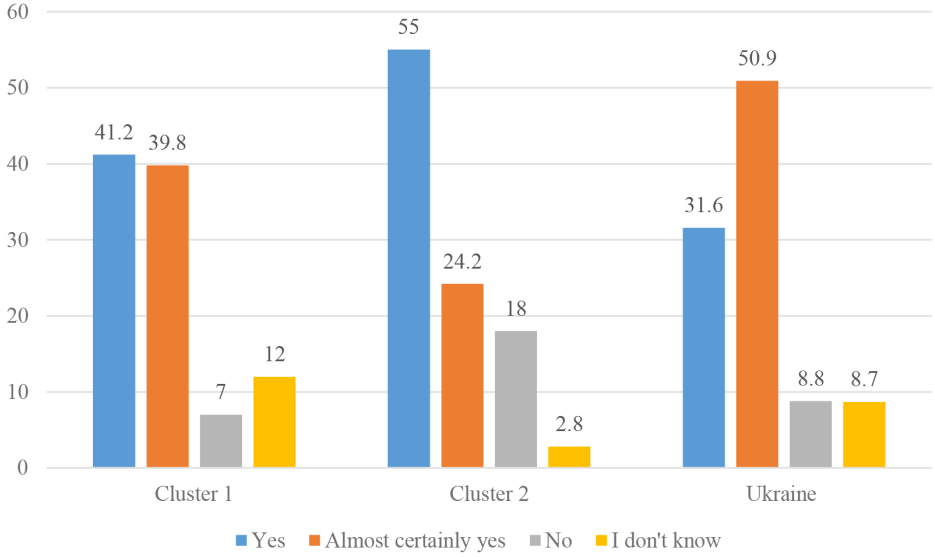
The Figure 11 shows that most respondents, who are convinced that financial and industrial groups are the main factor in the deterioration of the environmental situation are in the 1st cluster (82.2%), among Ukrainians these are 76.4%, and a little less in the 2nd cluster (73.2%). 12.1% of respondents in the 2nd cluster and 11% in the 1st cluster oppose the decisive influence of financial and industrial groups while Ukrainians constitute only 6.1%. The largest number of those who hesitate with the right answer is among the Ukrainians (17.5%). The results of this question correlate with the answers to the question about the global environmental crisis among the groups of respondents.



* Build by the authors based on the questionnaires analysis

Fig. 11. Results of answering the question «Do you think that financial and industrial groups are the main reason for the deterioration of the environmental situation?», %

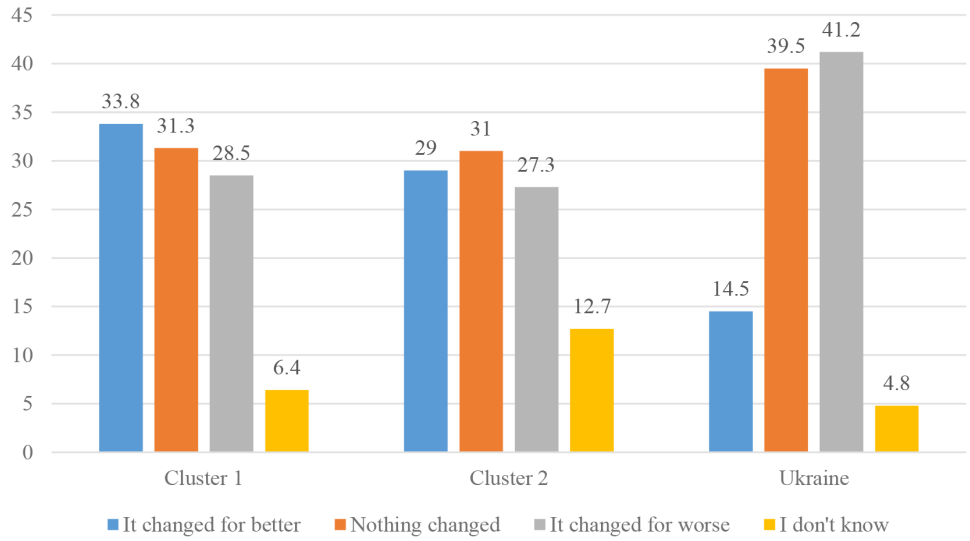
The Figure 12 shows that 41.2% of respondents in the 1st cluster, 55% of respondents in the 2nd cluster, and almost 32% of Ukrainian respondents believe that corporations engaged in plant growth and animal husbandry can offer non-organic production in conditions of low quality of institutions. Approximately 40% of respondents in cluster 1 and 24,2% of respondents in cluster 2, and almost 51% of Ukrainians agree with this opinion. Only 7% of respondents in cluster 1, 18% of respondents in cluster 2, and almost 9% of the Ukrainians who were interviewed did not think so.



* Build by the authors based on the questionnaires analysis

Fig. 12. Results of answering the question «Do you think that corporations engaged in animal husbandry and plant growing are able to offer non-organic production due to the low quality of institutions?», %

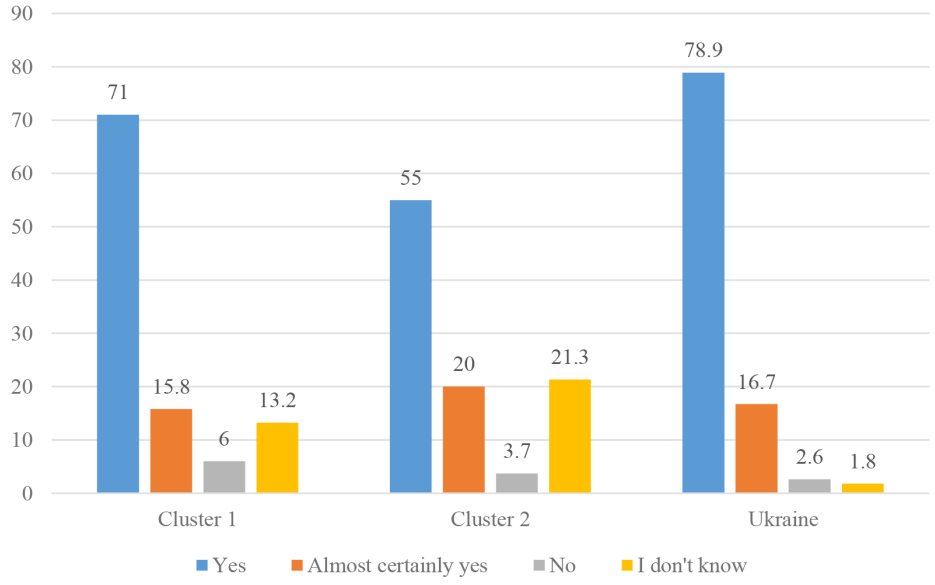
The Figure 13 shows that approximately 34% of respondents in the 1st cluster notice the changes in the environmental situation of their place of residence for the better, 31.3% do not see any changes and about 28.5% notice changes for the worse. In the 2nd cluster 29% of respondents mentioned positive changes, 31% did not see any changes, and about 27.3% noted deterioration of the ecological situation. The situation in Ukraine is as follows: 14.5% of the respondents note improvement in the environmental situation in the places where they live, almost 40% do not see any changes and about 41% think the situation will deteriorate.



* Build by the authors based on the questionnaires analysis

Fig. 13. Results of answering the question «How has the environmental situation in your place of residence changed in the last 5 years?», %

The Figure 14 shows that approximately 87% of the respondents in the 1st cluster consider environmental protection as a public good, 75% of the respondents in the 2nd cluster and over 96% of Ukrainians share a similar opinion. Respondents in the 2nd cluster (21.3%) and the 1st cluster (13.2%) are most not sure about it.



* Build by the authors based on the questionnaires analysis

Fig. 14. Results of answering the question «Do you think that good ecology is a public good?», %

Therefore, the conducted survey confirms our hypothesis that the demand of citizens for a clean environment in developed economies is significantly higher than in developing economies, and the public good «clean environment» becomes in demand only with the growth of GDP per person and real incomes of citizens.

Discussion.

Presented data analysis allows us to see the confirmation of a certain set of hypotheses regarding the social choice of the good «clean environment», which is important for understanding the design of environmental policy tools. In particular, the results of the conditionality of income level preferences for a good «clean environment» are unambiguous. In the case of Ukraine, this pattern creates a certain problem, considering the level of economic development and the nature of income distribution. Underestimating a good «clean environment» due to «chronic poverty» indicates a potential weak public pressure on the formation of the model of economic policy, consistent with modern understanding of sustainable development. In light of European integration processes, this raises the problem of functional asymmetry with the structure of preferences in the EU. However, the war of 2022, in our opinion, will significantly smooth out these differences very soon. Another observation demonstrates a significant gap between the representatives from different countries in relation to the environment, sources of environmental pollution, and readiness to pay for environmental goods. The nature of access to information is also important.

Conclusion.

The developed author's questionnaire allows to determine the similarity in the individual perception of environmental factors of the well-being of respondents from around the world, grouped into two clusters.

Respondents of the 1st cluster are more satisfied with the level of personal awareness of the environmental conditions in their countries than respondents of the 2nd cluster and Ukrainians. Most of the population in all surveyed groups receives information about the environmental situation from the Internet (especially the high share of such population is in the 1st cluster).

Representatives of both clusters are aware of environmental human rights at the middle level (65-75%), but Ukrainians know much less about this issue (about 41%). That is why the representatives of the 1st and the 2nd clusters had a positive experience of protecting their environmental rights (32 and 22% of expenditures, respectively).

Representatives of both clusters are ready to take an active part in solving environmental problems, but among the representatives of Ukraine and the 1st cluster, there are much more persons who are aware of the existence of international environmental organizations.

Only about half of the respondents from both clusters believe in the threat of a global environmental crisis, while almost 90% of Ukrainians believe in it. Representatives of the 2nd cluster and Ukrainians see the greatest threat to the environment in the transport and manufacturing sectors, while representatives of the 1st cluster pay considerable attention to other factors. Representatives of both groups are mostly dissatisfied with the level of environmental management by the official authorities, but all agree that the quality of public management in this area will attract the quality of the environment.

Approximately the same number of respondents admit that corruption affects the environment in all surveyed groups. The situation is similar in the survey on the destructive impact of financial and industrial groups on the environment. A much smaller number of respondents from the 2nd cluster treat the environment as a public good than from the 1st cluster and Ukrainians.

Acknowledgment.

The authors express their gratitude to the Ministry of Education and Science of Ukraine, Project «Ecologization in a new paradigm of welfare state» 2017-2019 (state registration number 0117U000412).

References

17 Goals to Transform Our World. (2022). Retrievied from: https://www.un.org/sustainabledevelopment.

Abanina, E.N., Sergeenko, Y.S., Sukhova, E.A., Ukraintseva, V.S., Levitanus, B.A., Ermolovich, G.P. (2021). Ecologization of economic activity as a way to ensure environmental safety in the context of the transition to sustainable development. IOP Conference Series: Earth and Environmental Science, 1010. doi:10.1088/1755-1315/1010/1/012112.

Brown T.C., Bergstrom J.C., Loomis J.B. (2007). Defining, valuing, and providing ecosystem goods and services. Natural Resources Journal, 47(2), 329-376. Retrievied from: https://www.fs.usda.gov/treesearch/pubs/29469.

Brych, V., Zatonatska, T., Dluhopolskyi, O., Borysiak, O., Vakun, O. (2021). Estimating the efficiency of the green energy services' marketing management based

on segmentation. Marketing and Management of Innovations, 3, 188-198. doi:10.21272/mmi.2021.3-16.

Callan, S.J., Thomas, J.M. (2000). Environmental Economics and Management: Theory, Policy, and Applications. London: The Dryden Press. 708 p. ISBN-13: 978-1111826673.

Dluhopolskyi, O., Ivashuk Y. (2018). Spriynyatta ekologii yak suspilnogo blaga: komparatyvnyi analiz [Perception of ecology as a public good: a comparative analysis]. Herald of Odesa I.I. Mechnikov National University. Series: Economy, 23, 5(70), 120-124. Retrievied from: http://nbuv.gov.ua/UJRN/Vonu_econ_2018_23_5_27. (In Ukrainian)

Dluhopolskyi, O., Koziuk, V., Ivashuk, Y., Klapkiv, Y. (2019). Environmental welfare: quality of policy vs. society's values. Problemy Ekorozwoju / Problems of Sustainable Development, 14(1), 19-28. Retrievied from: https://ekorozwoj.pollub.pl/index.php/number-1412019/environmental-welfare-quality-of-policy-vs-societys-values.

Dluhopolskyi, O., Koziuk, V., Ivashuk, Y., Panukhnik, O., Virkovska, A. (2019). Empirical evaluation of preferences by ecological factors of individual welfare of Ukrainians. *Journal of Geology, Geography and Geoecology, 28(1), 39-50. doi:10.15421/111905.*

Dluhopolskyi, O., Martyniuk, V., Oleksiv, I., Gliszczyński, G. (2021). How the economic complexity of a national economy affects the environment? European Research Studies Journal, XXIV(SI2), 322-334. doi:10.35808/ersj/2228.

Dluhopolskyi, O., Zatonatska, T., Lvova, I., Klapkiv, Y. (2019). Regulations for returning labour migrants to Ukraine: international background and national limitations. *Comparative Economic Research. Central and Eastern Europe, 22(3), 45-64.* doi:10.2478/cer-2019-0022.

Dyke, J., Watson, R., Wolfgang, K. (2021). Climate scientists: concept of net zero is a dangerous trap. The Conversation. Retrievied from: https://theconversation.com.

Ekologichniy portret ukrainskogo gromadyanyna. (2018) [Ecological Portrait of the Ukrainian Citizen, 2018]. Resource and Analytical Center «Society and Dovkillia». 26 p. (In Ukrainian)

Ekologichniy portret ukrainskogo gromadyanyna. (2018): porivnyanna z ES ta rekomendacii [Ecological portrait of the Ukrainian Citizen, 2018: EU comparison and recommendations]. Analytical document. Resource and Analytical Center «Society and Dovkillia». 42 p. (In Ukrainian)

Galeotti, M., Lanza, A., Pauli, F. (2006). Reassessing the Environmental Kuznetz Curve for CO_2 Emissions: a Robustness Exercise. Ecological Economics, 57, 152-163. doi:10.1016/j.ecolecon.2005.03.031.

Haase, D., Kabisch, S., Wolff, M., Haase, A. (2017). Greening cities – to be socially inclusive? About the alleged paradox of society and ecology in cities. Habitat International, 64, 41-48. doi:10.1016/j.habitatint.2017.04.005.

He, J., Makdissi, P., Wodon, Q. (2007). Corruption, inequality and environmental regulation. Working Paper, 7(13), 1-40. Retrievied from: http://gredi.recherche.usherbrooke.ca/wpapers/GREDI-0713.pdf.

Hongjun, C., Haohao, S., Xuesen, C. (2017). Analysis of environmental law enforcement mechanism based on economic principle. IOP Conference Series: Earth and Environmental Science, 94. doi:10.1088/1755-1315/94/1/012188.

Konzepciya realizacii derzavnoyi polityky u sfery zminy klimatu na period do 2030 roku. (2016) [Concept of realization of State Policy in the sphere of climate change for the period up to 2030, 2016]. Order of the Cabinet of Ministers of Ukraine, December 7, №932-r. Retrievied from: http://zakon2.rada.gov.ua/laws/show/932-2016-p. (In Ukrainian)

Koshulko, O., Dluhopolskyi, O., (2022). Exploring the nature of women's resistance against occupation and war. Revista Estudos Feministas, Vol.30(1), e75862. doi:10.1590/1806-9584-2022v30n175862.

Koziuk, V., Hayda, Y., Dluhopolskyi, O., Klapkiv, Y. (2019). Stringency of environmental regulations vs. global competitiveness: empirical analysis. *Economics and Sociology*, 12(4), 264-284. doi:10.14254/2071-789X.2019/12-4/17

Koziuk, V., Hayda, Y., Dluhopolskyi, O., Martynyuk, V., Klapkiv, Y. (2020). Efficiency of environmental taxation in EU countries: comparative analysis. Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu, 5, 115-121. doi:10.33271/nvngu/2020-5/115

Koziuk, V.V., Dluhopolskyi, O.V., Farion, A.I., Dluhopolska, T.I. (2018). Crony sectors as a barrier to economic well-being and ecologization (case of Ukraine). *Economics and Sociology,* 11(3), 113-132. doi:10.14254/2071-789X.2018/11-3/7

Martyniuk, O. (2017). Vprovadzenna mekhanizmu ekologizacii innovacijnoji diyalnosty Ukrainy: derzavnyi ta regionalnyi vimir rozvitku [Implementation the mechanism of ecologization of the Ukrainian innovation activity: state and regional dimension of development]. Economic Innovations, 19, 1(63), 165-173. doi:10.31520/ei.2017.19.1(63).165-173. (In Ukrainian)

Panova I.O. (2018). Ekologizacija ekonomichnogo rozvytku v umovah ekologichnoyi kryzi [Ecologization of the economic development in conditions of ecological crisis]. Business Inform, 12, 251-255. (In Ukrainian)

Pauli, G. (2010). Blue economy. 10 years, 100 innovations, 100 million jobs. Paradigm Pubns, 336 p. ISBN-13: 978-0912111902.

Pro osnovni zasady (strategiju) derzavnoyi ekologichnoji polityky Ukraini na perion do 2020 roku [On the Main Principles (Strategy) of the National Environmental

Policy of Ukraine for the Period until 2020]: Law of Ukraine. Retrievied from: https://zakon.rada.gov.ua/laws/show/2697-19#Text. (In Ukrainian)

Prysyazhnyuk, Y., Mikhel, R. (2019). Models of economic space ecologization under the conditions of sustainable development. Historia i Polityka, 30(37), 25-36.

Söderholm, P. (2020). The green economy transition: the challenges of technological change for sustainability. Sustainable Earth, 3(6). doi:10.1186/s42055-020-00029-y.

Stalyi lokalnyi rozvitok. (2013). Zbirka symuliatsiynyh vprav dla formuvannya systemy znan ta kompetentsij dla realyzacii strategii lokalnogo stalogo rozvitku [Sustainable local development, 2013. Collection of simulative tasks for formulation knowledge and competitiveness system to realization the sustainable development strategy of local development]. K. (In Ukrainian)

Uitto, J.I. (2014). Evaluating environment and development: Lessons from international cooperation. Evaluation, 20(1), 44-57. doi:10.1177/1356389013517443.

Ukraina 2030. (2017). Doktrina zbalansovanogo rozvytku [Ukraine 2030, 2017. The Doctrine of balanced development]. Lviv, 168 p. (In Ukrainian)

Vergano, D. (2022). Russia ratchets up the danger at Ukraine's Zaporizhzhia nuclear power plant. Retrievied from: https://www.grid.news/story/science/2022/08/04