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ENVIRONMENTAL TAXES IMPACT ON THE POPULATION HEALTH PROTECTION: CROSS-COUNTRY ANALYSIS

Abstract. With each passing year, solving the demographic problem and the problem of population health is becoming more urgent, posing new challenges to politicians, producers and society. It has been proven that a person who cares about the quality of food, monitors the daily needs of vitamins and trace elements, consumes clean water, lives in an environmentally friendly area (away from industrial enterprises) is healthier than those who are unscrupulous in these aspects. The consequences of carelessness in health are the emergence of chronic diseases, the development of diabetes, obesity, cardiovascular disease, and more. In some places, the lack of a balanced diet and living in industrial regions also increases the mortality rate. The systematization of scientific background showed that both domestic and international scientists explore the role of environmental policy in public health. Existing theoretical and empirical research shows that the effective use of environmental tools could positively impact public health and life expectancy. However, the theoretical findings showed that foreign scholars have a more extensive interest in issues of environmental disasters and crises spreading in their countries. This article aims to confirm or refuse the hypothesis on the impact of environmental taxes and the environmental pollution level on people's lives and health. The correlation-regression analysis allowed identifying a list of indicators that directly and inversely affect health and life expectancy. In the study, the dependent variable is the environmental tax revenues, which in most cases had a significant impact on health and life indicators (including the incidence of tuberculosis, cancer, diabetes, unintentional poisoning mortality, and life expectancy). It should be noted that environmental taxation should be considered in terms of ensuring the compensatory function and the amount of environmental damage which currently affects the living conditions. The obtained results could be provided as a scientific basis for further research on key determinants of improving public health and lives using the environmental taxation tools (environmental tax payments, additional financing of entrepreneurial activities that imitate green production, promotion of healthy eating, etc.).

Keywords: environmental taxation, life expectancy, demography, ecology, environment, morbidity.

Introduction. Clean water, fresh air, and fertile soil directly impact the lives and health of the population. In turn, environmental pollution affects the dynamics of fertility and mortality (Nature, 2012). About 17 surveyed Nobel laureates emphasized the need for prompt and effective decisions to address the greatest threats to humanity, such as population growth and environmental degradation (United Nations, 2021). It is believed population growth is typical of low-income countries, while the demographic situation in countries with primarily middle and high incomes remains difficult and declines (Environment and health, 2022). The above is primarily due to the spread of infectious diseases and limited access to quality food. Some experts emphasized a close connection between the level of anthropogenic impact, compensated by the environmental payments, and the public health and life (Suchek, 2018). It is very important for modern society to increase literacy in the field of eco-health. This will not only increase life expectancy but also have a positive impact on the quality of the environment (Li, 2017).

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Given the different views on the impact of the environment and the amount of accumulated environmental payments on public health and life expectancy, further research should be based on rejecting or confirming this hypothesis.

Literature review. The dependence of the impact of environmental factors on public health is quite debated among foreign researchers. Therefore, this study considered the papers indexed in the Scopus scientometric database. The search for the most relevant articles regarding the research topic was based on a search query for the keywords «environmental», «environmental tax», «environmental policy», and «health». Table 1 presents the sample of research on the subject of this study.

Table 1. The study sample of researchers by keywords «environmental», «environmental tax», «environmental policy», and «healthy»

№	Author (year)	Bibliometrics	Quotation
1.	Ashe, M., Feldstein, L. M., Graff, S., Kline, R., Pinkas, D., & Zellers, L. (2007)	Local venues for change: Legal strategies for healthy environments. Journal of Law, Medicine and Ethics, 35(1), 138-147.	38
2.	Bowen, D. J., Barrington, W. E., & Beresford, S. A. A. (2015)	Identifying the effects of environmental and policy change interventions on healthy eating	41
3.	Brownell, K. D., Kersh, R., Ludwig, D. S., Post, R. C., Puhl, R. M., Schwartz, M. B., & Willett, W. C. (2010)	Personal responsibility and obesity: A constructive approach to a controversial issue. Health Affairs, 29(3), 379-387	317
4.	Chen, C., Chaudhary, A., & Mathys, A. (2019)	Dietary change scenarios and implications for environmental, nutrition, human health and economic dimensions of food sustainability. Nutrients, 11(4)	57
5.	Moran, A. J., Gu, Y., Clynes, S., Goheer, A., Roberto, C. A., & Palmer, A. (2020)	Associations between governmental policies to improve the nutritional quality of supermarket purchases and individual, retailer, and community health outcomes: An integrative review. International Journal of Environmental Research and Public Health, 17(20), 1-23	10
6.	Perdue, W. C., Stone, L. A., & Gostin, L. O. (2003)	The built environment and its relationship to the public's health: The legal framework. American Journal of Public Health, 93(9), 1390-1394	139
7.	Sturm, R., & An, R. (2014)	Obesity and economic environments. CA Cancer Journal for Clinicians, 64(5), 337-350	61

Sources: developed by the author.

Brownell et al. (2010) emphasized the dynamic of the growing number of obese people directly depends on the environmental deterioration. Indeed, pollution is not a universal remedy for combating obesity. These researchers noted that food taxes is one of the tools correlating with the level of morbidity and the environment.

Perdue et al. (2003) mentioned that regional productive capacity growth is a significant threat to public health. Besides, the scholars noted that the production scale-up factor is characterized by an overpopulation of urban areas and excessive concentration of industrial emissions and discharges in the air, water, and soil. In turn, the above result in infectious disease spread. Such industrialized regions have been called built-up areas. They influence the public lifestyle, increasing diabetes progress, coronary heart disease, and asthma.

Along the same line, Sturm and An (2014) highlighted the need to recognize the role of environmental factors in obesity growth. The evidence base is body weight gain in different socio-demographic groups and geographical regions with economic and technological changes in the environment. Sturm and An

(2014) recommended adopting taxes for food with low nutritional value and introducing discounts on healthier foods. The current study considers the above an effective tool to make a difference in public health and the rise in demand for eco-friendly products. Moreover, it could result in the green transformation of production methods. While Samuel S. Myers et al. (2013) proposed the use of an integrated approach to address the imbalance between accelerated changes in environmental quality and health policy. this approach is based on making informative decisions about land use and environmental protection.

Chen et al. (2019) confirmed that the transition to a healthy diet (based on the Swiss diet) would reduce the overall environmental impact by 36% and the negative health consequences by 2.67%. These scholars claimed that a diet is an effective tool for achieving the Sustainable Development Goals. According to their forecasts, a sustainable diet would reduce the demand for animal products, vegetable oils, cereals, and legumes. On the other hand, it would significantly expand the demand for nuts, vegetables, and fruits. However, the diet should be adequate. Despite the restrictions on consuming the specific food, it is essential to fully compensate for the required amount of protein, fat, carbohydrates, and vitamins with other foods.

Bowen et al. (2015) enhanced the need to intervene in public nutrition since half the world's population is overweight. Indeed, according to the World Health Organization (WHO) statistical data, more than 1 billion people are overweight, while 30% of the population is obese (NAMS, 2021). Therefore, the authors suggested developing and implementing environmental strategies to minimize air, water, and soil pollution as an effective tool for creating a healthy environment. It would positively affect the quality of crops and increase the supply, significantly reducing the cost of eco-friendly products.

Ashe et al. (2010) found that the American experience of implementing legal strategies to promote healthy eating has been unsuccessful. The above resulted from the strategy's lack of taxes and levies on unhealthy food. Therefore, the author noted the need to introduce additional environmental tax payments and include them in the unhealthy food costs to reduce consumption. Consequently, it is critical to establish a mechanism of state support for those enterprises that have reduced demand for their products (due to environmental taxes), changed production technology, and began to use ecologically pure raw materials to produce less unhealthy products.

Moran et al. (2020) suggested implementing additional ecological measures such as calorie labeling of finished products, promotion of healthy products (commercials, newspapers, the operation of small exhibition spaces for healthy eating, etc.), financial incentives to buy vegetables and fruit, additional taxes on sweet carbonated beverages, etc. Implementation of at least some ecological measures is believed to contribute the public health. It would result in life expectancy growth and compensation for the excessive anthropogenic impact on the environment. Moreover, it could reduce the amount of garbage, such as containing packaging with a long decomposition period, reducing the number of PET bottles, developing organic production, etc.

Methodology and research methods. The theoretical analysis showed that most of the previous studies addressing the investigated topic rest on the hypothesis of a direct correlation between environmental factors (mechanisms) and public health. However, there are no studies with mathematical calculations on the existence of a direct or inverse relationship between these indicators. Therefore, this paper proposes to conduct mathematical calculations to check the hypothesis on the direct impact of the number of environmental tax payments on health and life indicators.

The World Bank Data and Eurostat databases are the source of data on environmental tax (ET), the incidence of malaria (MAL), incidence of tuberculosis (TUB), life expectancy at birth (LB), mortality from cardiovascular diseases, cancer, diabetes (MorCVD), unintentional poisoning mortality rate (MUP), nitrous oxide emissions (NO), CO2 emissions (CO2), total greenhouse gas emissions (GGE), methane emissions (ME).

This study involved the correlation-regression modeling tools (generalized least squares method with random effects) in assessing the relationship between environmental taxes and life and health indicators. All calculations were conducted using Stata software. The study sample covers several regions as follows: Europe (France), Asia (China), Africa (Kenya), Australia, North America (Canada), and South America (Argentina). The study period covers 2000-2019. The structure of the study sample allows considering all the specific factors that may distinguish countries, such as climatic conditions, living standards, etc. The descriptive statistics method was applied to summarize the collected data set (Table 2).

Table 2. The descriptive statistics findings for analyzed variables

Variable		Mean	Std.Dev.	Min	Max	Observations
ET	Overall	26882.730	28630.580	457.674	133623,5	N=122
	Between		24067.260	885.181	63673.420	n=6
	Within		18430.900	-3.22e+04	96832.810	T-bar = 20.333
MAL	overall	32.773	59.156	0	241.661	N=60
	between		59.275	0.021	102.924	n=3
	within		34.354	-13.700	171.510	T-bar = 20
TUB	overall	97.781	176.946	4.6	646	N=122
	between		190.884	5.548	488.474	n=6
	within		47.500	-123.693	255.308	T-bar = 20.333
LB	overall	75.731	7.800	51.101	82.900	N=122
	between		8.295	59.881	81.437	n=6
	within		2.347	66.951	82.549	T-bar = 20.333
MorCVD	overall	15.462	4.612	44720	23	N=119
	between		4.772	10.325	21.747	n=6
	within		1.518	11.987	19.087	T-bar = 19.833
MUP	overall	1.007	0.950	1	44564	N=119
	between		1.037	0.215	2.679	n=6
	within		0.122	0.728	1.428	T-bar = 19.833
NO	overall	116345	1.63e+05	10000	546990	N=113
	between		1.76e+05	15224.440	4.72e+05	n=6
	within		23615.870	30671.360	1.92e+05	T-bar = 18.833
CO_2	overall	8.170	6.417	0.188	18.503	N=113
	between		6.947	0.282	17.228	n=6
	within		0.891	5.283	9.987	T-bar = 18.833
GGE	overall	1893866	3446556	39200	1.24e+07	N=113
	between		3546117	60381.110	9101941	n=6
	within		1114562	-2610645	5147165	T-bar = 18.833
ME	overall	2.48e+05	358100	21280	1242150	N=113
	between		3.82e+05	32212.220	1021955	n=6
	within		69633.240	41945.620	4.68e+05	T-bar = 18.833

Sources: developed by the author.

The findings showed China is a leader in the number of accumulated environmental tax payments (133623.5$) due to the exceeding the number of industrial enterprises compared to other countries. However, China's economic entities generate the most considerable amount of nitrogen emissions (546900 thousand tons in 2016), greenhouse gas emissions (1235524 in 2018), and methane emissions (1242150 kg in 2016). Furthermore, Australia generated the largest number of CO2, which in quantitative terms amounted to 18,503 metric tons in 2007.

In terms of quality and life expectancy, Australia has the biggest life expectancy at almost 83 years, while Kenya has the opposite situation. The above could result from the environmental situation in these

countries. Thus, the difficult environmental situation in Kenya makes it impossible to consume clean water and clean food, affecting the country's highest mortality rate due to unintentional poisoning as recorded in 2000. The calculations confirmed that each country has different indicators. First of all, this is evidenced by the indicators of minimum, maximum and average indicators for overall (generalized indicator), between (average for countries), and within conditions (average value for the number of observations). Therefore, all possible conditions that may affect the research quality were considered.

This study conducted a statistical analysis of the relationship between previously identified variables in the next stage. Table 3 shows a direct and inverse correlation between indicators. For example, there is a high direct connection between the environmental tax amount and nitrogen oxide, greenhouse gas, and methane emissions. Tuberculosis incidence correlates with malaria incidence, while there is an inverse relationship between life expectancy and malaria incidence. Therefore, the malaria incidence growth reduces the population's living standards. Besides, there is a high correlation between greenhouse gas and methane emissions for total nitrogen emissions due to excessive energy emissions. Moreover, CO2 emissions directly impact life expectancy. Thus, the general representation of stochastic relationships between indicators indicates that the hypothesis of the dependence of environmental factors on public health could be confirmed.

Table 3. The correlation analysis between environmental taxes, pollution level, and public health and living indicators

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) ET	1.000									
(2) MAL	-0.350	1.000								
(3) TUB	-0.370	0.849	1.000							
(4) LB	0.436	-0.937	-0.967	1.000						
(5) MorCVD.	-0.497	0.505	0.676	-0.704	1.000					
(6) MUP	0.086	0.660	0.802	-0.758	0.642	1.000				
(7) NO	0.819	-0.444	-0.434	0.468	-0.199	0.135	1.000			
(8) CO2	0.792	-0.716	-0.819	0.838	-0.734	-0.461	0.750	1.000		
(9) GGE	0.910	-0.399	-0.394	0.444	-0.296	0.163	0.977	0.781	1.000	
(10) ME	0.853	-0.452	-0.448	0.485	-0.248	0.114	0.997	0.776	0.986	1.000

Sources: developed by the author.

This study conducted the regression analysis using the random-effects model of the generalized least squares method. The dependent factor variable is the income from the environmental tax, while the control variables are indicators of environmental pollution. The performance indicator characterizes a separate indicator of health and life expectancy. Table 4 presents the findings on assessing environmental pollution's impact on the malaria incidence. The impact of the environmental tax on malaria incidence is insignificant, but some control factors are closely related. In particular, increasing CO2 emissions would reduce the malaria incidence by 26.5 points, while methane and greenhouse gas emissions increase such incidence. Therefore, it could be stated that there is no direct impact of the environmental tax amount on malaria incidence. However, the environmental tax amount influences malaria incidence through individual factors.

Table 4. The findings on assessing the environmental tax influence on the malaria incidence

MAL	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
ET	0.000	0.001	-0.06	0.952	-0.001	0.001	
NO	0.000	0.001	-0.52	0.604	-0.001	0.001	
CO2	-26.514	3.738	-7.09	0.000	-33.841	-19.187	***
GGE	0.000	0.000	2.39	0.017	0.000	0.000	**

Continued Table 4

ME	0.000	0.000	-0.27	0.786	-0.001	0.000	
Constant	118.723	9.652	12.30	0.000	99.807	137.640	***
Mean dependent var		34.106	SD dependent var			60.690	
Overall r-squared		0.681	Number of obs			56.000	
Chi-square		106.840	Prob > chi2			0.000	
R-squared within		0.042	R-squared between			1.000	
*** p<0.01, ** p<0.05, * p<0.1							

Sources: developed by the author.

On the other hand, Table 5 shows the environmental tax rise could reduce the tuberculosis incidence by 0.005 points. Besides, the control factors significantly impact the tuberculosis incidence rate. Therefore, based on the above, it could be concluded that increasing the level of tax payments could protect people from spreading tuberculosis.

Table 5. The findings on assessing the environmental tax influence on the tuberculosis incidence

TUB	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
ET	-0.005	0.001	-6.88	0.000	-0.007	-0.004	***
NO	0.001	0.001	1.03	0.302	-0.001	0.003	
CO2	-14.006	1.859	-7.53	0.000	-17.650	-10.362	***
GGE	0.000	0.000	6.13	0.000	0.000	0.000	***
ME	-0.002	0.001	-3.47	0.001	-0.003	-0.001	***
Constant	386.758	27.147	14.25	0.000	333.550	439.966	***
Mean dependent var		101.844	SD dependent var			181.909	
Overall r-squared		0.580	Number of obs			113.000	
Chi-square		147.887	Prob > chi2			0.000	
R-squared within		0.005	R-squared between			0.747	
*** p<0.01, ** p<0.05, * p<0.1							

Sources: developed by the author.

Table 6 demonstrates the findings on the impact of environmental tax and control factors on life expectancy. Therefore, it could be stated that the growth of environmental tax amounts increases life expectancy. Since the environmental tax has a compensatory function, it maintains a moderate anthropogenic impact on the environment by installing sewage treatment plants, additional funding for organic farming, subsidies for green production, etc.

Table 6. The findings on assessing the environmental tax influence on the life expectancy

LB	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
ET	0.000	0.000	9.35	0.000	0.000	0.000	***
NO	0.000	0.000	0.66	0.512	0.000	0.000	
CO2	0.689	0.067	10.31	0.000	0.558	0.820	***
GGE	0.000	0.000	-5.98	0.000	0.000	0.000	***
ME	0.000	0.000	1.86	0.063	0.000	0.000	*
Constant	63.174	0.976	64.72	0.000	61.261	65.087	***
Mean dependent var		75.490	SD dependent var			7.934	
Overall r-squared		0.715	Number of obs			113.000	
Chi-square		268.009	Prob > chi2			0.000	
R-squared within		0.046	R-squared between			0.854	
*** p<0.01, ** p<0.05, * p<0.1							

Sources: developed by the author.

Table 7 indicates that environmental payments directly depend on cancer and/or diabetes mortality rate because the environmental payment rise often depends on the increase in the total amount of human damage. On the other hand, cancer prevention depends both on the person (abstinence from alcohol, smoking, etc.) and on factors uncontrolled by a person. In particular, this applies to the state of the environment because the adverse effect of technological progress is the constant environmental deterioration and increasing carcinogenic effects on each person, which affects the increase in the incidence of cancer worldwide (Ecobusiness, 2015).

Table 7. The findings on assessing the environmental tax influence on cancer and/or diabetes mortality rate

MorCVD	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
ET	0.000	0.000	-14.26	0.000	0.000	0.000	***
NO	0.000	0.000	-3.42	0.001	0.000	0.000	***
CO2	-0.456	0.022	-20.45	0.000	-0.500	-0.412	***
GGE	0.000	0.000	3.61	0.000	0.000	0.000	***
ME	0.000	0.000	2.25	0.024	0.000	0.000	**
Constant	20.999	0.326	64.48	0.000	20.361	21.637	***
Mean dependent var			15.563	SD dependent var		4.603	
Overall r-squared			0.906	Number of obs		113.000	
Chi-square			1027.037	Prob > chi2		0.000	
R-squared within			0.331	R-squared between		0.986	
*** p<0.01, ** p<0.05, * p<0.1							

Sources: developed by the author.

Table 8 shows the significant dependence of the unintentional poisoning mortality rate on all dependent and control factors, except emissions of nitrogen oxides. Moreover, there is a high dependence between environmental tax amount and unintentional poisoning mortality. It stands to mention that unintentional poisoning could be caused by consuming poor quality food or living in ecologically-dangerous areas (e.g., industrial areas). The producing areas are the most significant environmental polluters. In turn, their emissions and discharges into the environment affect the environmental payment amount to pay the budget. Thus, the rise of environmental payments could negatively impact the number of unintentional poisoning deaths.

Table 8. The findings on assessing the environmental tax influence on the unintentional poisoning

MUP	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
ET	0.000	0.000	-8.27	0.000	0.000	0.000	***
NO	0.000	0.000	1.52	0.129	0.000	0.000	
CO2	-0.080	0.008	-10.24	0.000	-0.095	-0.064	***
GGE	0.000	0.000	7.28	0.000	0.000	0.000	***
ME	0.000	0.000	-3.76	0.000	0.000	0.000	***
Constant	2.187	0.114	19.25	0.000	1.964	2.410	***
Mean dependent var			1.013	SD dependent var		0.953	
Overall r-squared			0.732	Number of obs		113.000	
Chi-square			292.207	Prob > chi2		0.000	
R-squared within			0.033	R-squared between		0.831	
*** p<0.01, ** p<0.05, * p<0.1							

Sources: developed by the author.

Conclusions. The study hypothesized the direct impact of environmental factors (mechanisms) on public health. The above is characterized by the environmental damage reduced through environmental taxes and fees paid by businesses. The effectiveness of the environmental taxes and their compensatory function level influence the environmental pollution level. Moreover, it affects public morbidity.

The findings determined whether the environmental tax amount and fees improve public health and life expectancy. Besides, this study defined the critical role of environmental payments to ensure a sufficient level of environmental protection and compensation for the anthropical damage.

The study recommended analyzing and using the best practices in forming environmental food policy. For example, additional taxation of unhealthy foods could effectively reduce demand for such products, especially in North and South America. It is believed that the well-established ecological shops (social advertising, tax labeling of calories, etc.) would be effective because the trend of «healthy people» is now gaining popularity among the European population. In turn, the Asian countries should implement environmental measures such as fast delivery of organic products to the office or home, which is associated with the amount of time the Asian population spends at work. For other countries, it is crucial to spread and improve organic production technology.

Therefore, introducing the essential environmental tools would positively impact the environment quality and directly affect the life quality and public life expectancy.

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References

Ashe, M., Feldstein, L. M., Graff, S., Kline, R., Pinkas, D., & Zellers, L. (2007). Local venues for change: legal strategies for healthy environments. *The Journal of Law, Medicine & Ethics*, *35*(1), 138-147. [Google Scholar] [CrossRef]

Bowen, D. J., Barrington, W. E., & Beresford, S. A. A. (2015). Identifying the effects of environmental and policy change interventions on healthy eating. Retrieved from [Link]

Brownell, K. D., Kersh, R., Ludwig, D. S., Post, R. C., Puhl, R. M., Schwartz, M. B., & Willett, W. C. (2010). Personal responsibility and obesity: a constructive approach to a controversial issue. *Health affairs*, *29*(3), 379-387. [Google Scholar] [CrossRef]

Chen, C., Chaudhary, A., & Mathys, A. (2019). Dietary change scenarios and implications for environmental, nutrition, human health and economic dimensions of food sustainability. *Nutrients*, *11*(4), 856. [Google Scholar] [CrossRef]

Ecobusiness. (2015). The impact of the environmental conditions on the cancer formation. Retrieved from [Link]

Environment and health. (2022). European Environment Agency. Retrieved from [Link]

Li, A. M. (2017). Ecological determinants of health: food and environment on human health. *Environmental Science and Pollution Research*, *24*(10), 9002-9015. [Google Scholar] [CrossRef]

Moran, A. J., Gu, Y., Clynes, S., Goheer, A., Roberto, C. A., & Palmer, A. (2020). Associations between governmental policies to improve the nutritional quality of supermarket purchases and individual, retailer, and community health outcomes: An integrative review. *International journal of environmental research and public health*, *17*(20), 7493. [Google Scholar] [CrossRef]

Myers, S. S., Gaffikin, L., Golden, C. D., Ostfeld, R. S., Redford, K. H., Ricketts, T. H., ... & Osofsky, S. A. (2013). Human health impacts of ecosystem alteration. *Proceedings of the National Academy of Sciences*, *110*(47), 18753-18760. [Google Scholar] [CrossRef]

National Academy of Medical Sciences of Ukraine (2021). Retrieved from [Link]

Nature Education. (2012). Population ecology. Retriewed from [Link]

Perdue, W. C., Stone, L. A., & Gostin, L. O. (2003). The built environment and its relationship to the public's health: the legal framework. *American journal of public health*, *93*(9), 1390-1394. [Google Scholar]

Sturm, R., & An, R. (2014). Obesity and economic environments. *CA: a cancer journal for clinicians*, *64*(5), 337-350. [Google Scholar] [CrossRef]

Suchek, C. (2018). Environmental taxation: European experience and prospects for its application in Ukrainian realities. *Economic Journal Lesya Ukrainka Eastern European National University*, (3), 85–93. [Google Scholar]

United Nations. (2021). Population growth, environmental degradation and climate change. Retrieved from [Link]

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Вплив екологічних податків на захист здоров'я населення: крос-аналіз країн

З кожним роком вирішення демографічної проблеми та проблеми оздоровлення населення стають все актуальнішими, ставлячи перед політиками, виробниками та соціумом нові виклики. Доведено, що людина, яка піклується якістю харчових продуктів, слідкує за дотриманням добової потреби вітамінів та мікроелементів, споживає чисту воду, мешкає на екологічно чистій території (подалі від промислових підприємств) є більш здоровішою, у порівнянні з тими хто недобросовісно відноситься до перелічених аспектів. Наслідком необережного відношення до здоров'я є виникнення хронічних захворювань, розвиток цукрового діабету, ожиріння, серцево-судинних захворювань, та інше. Подекуди відсутність збалансованого харчування, проживання у промислових регіонах також впливає на підвищення рівня смертності населення. Питаннями ролі ефективної екологічної політики на стан здоров'я населення опікували як вітчизняні так і міжнародні науковці. Тому стаття присвячена підтвердженню чи спростуванню гіпотези щодо впливу екологічних податків та рівня забруднення навколишнього природнього середовища на показники життя та здоров'я населення. Систематизація літературних джерел засвідчила, що поміж закордонних науковців дане питання є більш досліджуваним, та актуалізується внаслідок поширення екологічних катастроф та криз на території їх країн. Існуючі теоретичні та емпіричні дослідження засвідчують, що ефективне використання екологічних інструментів здатне позитивно впливати на здоров'я населення та тривалість їх життя. Тоді як під екологічними інструментами варто розуміти: екологічні податкові платежів, додаткове фінансування підприємницької діяльності, яка наслідує зелене виробництво, пропаганда здорового харчування, тощо. Проведений кореляційно-регресійний аналіз дозволив виокремити перелік тих показників, які мають прямий та обернений вплив на показники здоров'я та тривалості життя населення. Так. основною факторною ознакою стали суми податкових екологічних надходжень, яка у більшості спостережень мала значний вплив на показники здоров'я та життя населення (зокрема рівень захворюваності на туберкульоз, рак та цукровий діабет, смертності внаслідок ненавмисного отруєння, тривалість життя населення). Визначимо, що екологічне оподаткування варто розглядати не лише з точки зору забезпечення компенсаційної функції, але й розміру завданої шкоди довкіллю, яка впливає на екологічні умови життя населення у поточний час та на поточний момент. Результати проведеного аналізу створюють науковий базис для проведення подальших досліджень ключових детермінант підвищення здоров'я та життя населення, за допомогою інструментарію екологічного оподаткування.

Ключові слова: екологічне оподаткування, тривалість життя, демографія, екологія, навколишнє природнє середовище, захворюваність.