

## **ENVIRONMENTAL MANAGEMENT CERTIFICATION: SOCIAL AND ECONOMIC MONITORING**

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Modern ecological issues determine the necessity of new approaches to the implementation of production cycle, which determines the relevance of developing environmental management. The aim of the research is social and economic monitoring and recommendations on the design and implementation of the environmental management system in Ukraine. Research methodology: review of scientific articles (1991–2018), statistics on the number of certificates ISO 14001, GDP dynamics in Ukraine, study of Georgia and EU countries (2006–2016) and comparative analysis based on their correlation. Main research results: the economic and social impact of GDP growth per capita on the number of ecological certificates has been determined using the interpretation of Kuznets curve. In order to stimulate the development of the systems of environmental management certification in Ukraine, it is suggested to use: concessional loans, development of non-formal ecological education, as well as innovation and improvement of the investment policy.

*Keywords: ecological certification, management, social monitoring.*

*JEL Codes: M11, Q48; Q56.*

### **1. Introduction**

The ecological orientation of global ecologically safe production under its high economic and ecological efficiency conditions has become very topical today. Taking into account the current trends and requirements imposed by the competitive environment, leading business entities should not only produce high-quality products, but also be ecologically responsible. That is why producers have to direct their efforts to confirm the conformity and obtain the International Environmental Management System certificate ISO 14001. The international standards of the ISO 14001 series set requirements for environment management systems. It is an effective tool for policies aimed at reducing negative impacts on the development of the environment. Using this tool, producers have an opportunity to take additional competitive advantage and improve their image both at the regional and national level.

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Furthermore, under the modern conditions of community development, ecologically certified production could be considered as the latest technology that can meet consumers' needs, as well as improve the ecological situation in general. However, the advanced technology could be identified only as a potential, necessary condition that is insufficient for economic growth (Blackman, 2011).

Environmental management system certification (ISO 14001) in developing countries was explored by May (2010) and Melykh (2016). Some general aspects of the practical implementation of environmental management systems and ISO 14001 in construction industry and the factors that may contribute to the barriers to implementing ISO 14001 have been studied as well (Hesham, 2015). At the same time, the implementation of ISO 14001 in developing countries (an example of Ukraine) has not been researched enough. There is a number of specific issues in the field of implementation of environmental management system that are inherent in developing countries, such as a long transition period from the traditional intensive technologies to technologies that are environmentally friendly, significant additional costs of the transition period associated with the procedure of ecological certification, insufficient level of awareness and ecological consciousness of consumers etc. It requires the monitoring of the economic and social effects of the ISO 14001.

The aim of this research is to analyse the dynamics and development trends of environmental management systems in the world and compare them with Ukraine; to determine the connection between the number of ISO 14001 certificates and the level of the well-being of population based on the hypothesis of S. Kuznets and correlation analysis; to highlight the trends and key tools for stimulating the development of certification of management systems in Ukraine.

The object of the research is the monitoring processes of economic and social effects of the development of certification of management systems. The subject of the research is the dynamics of GDP and the number of certificates according to ISO 14001 with the use of such approaches as Kuznets curve hypothesis and correlation analysis, and also determination of the future trends in the growth of ISO 14001 certificates in Ukraine.

## **2. Research methodology**

The methodology of this research includes a wide range of theoretical and empirical scientific methods. The methods of theoretical study are presented by analysis and synthesis that help to generalize and systematize information about different aspects of ecologically certified production. Induction and deduction were used to create the new approaches based on the similar trends in ecologically certified production and GDP in different countries. Moreover, extrapolation and formalisation were used during the scientific research. The empirical methods that reduce bias and increase reliability were used as well. Statistical method aimed at quantitative accounting of the number of ISO 14001 certificates in the world and some countries was used. Econometric methods such as correlation analysis helped to investigate the connection between the GDP and the number of ISO 14001 certificates, while regres-

sion analysis was aimed at predicting the future trends in the development of environmental management systems in Ukraine. Furthermore, empirical study based on the Kuznets curve hypothesis was conducted and the impact of the pace of economic development of society on the state of the environment in different countries of the world was studied. The ecological and economic interpretation of the Kuznets curve from the standpoint of ecologically certified production has not been used before. It makes the relevance of this study. The graphical method was used to compare the volumes of certain statistical aggregates and to present the results. The usage of these methods provides high level of validity, reliability and representativeness of the research results. The sources of statistical data include mostly secondary sources: reports, annual information from Governmental Statistical Services, articles, thesis, etc.

### **3. Study results**

National economies all over the world are influenced by global trends created by population growth, destroying of the ozone layer, poverty and hunger increase etc. This creates the necessity to implement new approaches to the economic and agricultural development, which is presented by environmentally friendly production.

According to the International Organization for Standardization (ISO), the dynamics of the number of ISO 14001 series certificates issued for enterprises worldwide is quite positive. According to official data from ISO, as of 2015, the number of such enterprises is 319.3 thousand, the annual increase amounts to 22.6 thousand certified enterprises (ISO, 2018). The ecological certification is a base for the balanced development of the majority of countries in the world. Region, as a relatively independent territorial unit, is an integral part of a state, and therefore, the regional division based on the implementation of ecoproduction standards under the conditions of dynamic economic development requires special attention (IOAFM, 2018). During the period under investigation, most regions showed the general increase in the share of ecologically certified production capacities including the ISO 14001 certified agricultural productions and land areas that prove the tendency of favourable preconditions for the implementation and increase of ecologically certified production. In particular, the share of the East Asian and Pacific regions has increased by 6%, but the share of the European region has a 7% decrease (Fig.1).

As for the sectorial composition of certified enterprises, it is the following: construction industry 16%; metal production enterprises 9%, electrical engineering and optics 9% (Fig.1).

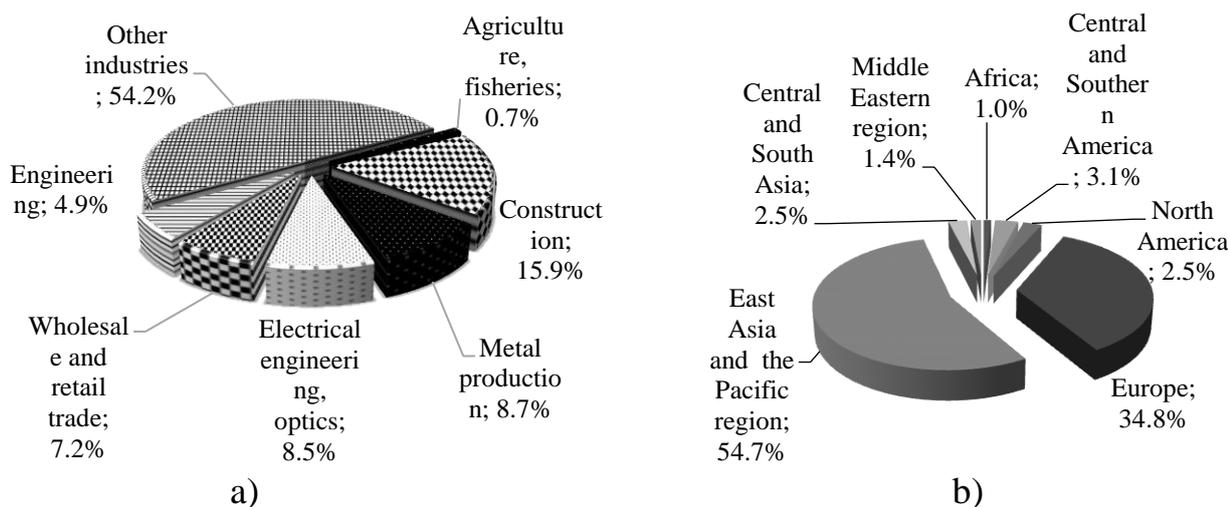


Fig. 1. The sectorial structure of the enterprises (a), which received certificates of the ISO 14001 series and the regional division of valid certificates of the ISO 14001 series (b), 2016, %

Originally, ISO 14001 series standards had been developed for European enterprises. The EU countries are leaders in the number of enterprises certified under the International Environmental Management System (Table 1). The largest number of valid certificates is in Italy, the United Kingdom and Spain. The long-standing practice of developed countries of the world demonstrates economical, ecological and social benefits of ecologically certified production, indicating the prospect of introducing such method of production by domestic enterprises.

Table 1. The dynamics of the existing certificate number according to ISO 14001 in the European countries-leaders in certification, 2011–2016

Country	Year						Ratio 2016 to 2011	
	2011	2012	2013	2014	2015	2016	+/-	%
Italy	17340	19512	21300	22616	22350	26655	9315	153.7
The United Kingdom	15231	15883	16879	16557	17824	16761	1530	110.1
Spain	16341	19470	16051	13868	13310	13717	-2624	83.9
Germany	6254	7015	7983	7702	8224	9444	3190	151.0
France	7771	7094	7940	8302	6847	6695	-1076	86.2
Czech Republic	4451	4215	4792	5830	3832	4183	-268	94.0
Sweden	4049	3885	3690	3982	3689	3448	-601	85.2
Turkey	1297	1602	1733	2300	2868	1752	455	135.1
Ukraine	160	166	196	187	155	422	262	263.8

In the developed countries new ecologically oriented values, consumer and industrial practices are being formed. Nowadays, the demand for ecological benefits is increasing with higher incomes per capita (Chaikin, 2014). According to the hypothe-

sis of the upward “U”-shape curve, which has been developed by S. Kuznets, the economic growth at the initial stage is causing a tendency to inequality of incomes. At the same time, with the further development of the economy, the curvature of this curve decreases, which leads to the elimination of the problem of uneven distribution of incomes.

S. Kuznets proves that advanced technology is the necessary source of economic growth. Furthermore, Grossman and Krueger (1991) interspersed this curve in order to demonstrate the relationship between the correlation of the environmental load level (on the example of emissions of sulfur dioxide concentration) and the increase level of GDP growth per capita. They believe that with the growth of trade profits, the severity of control over the state of the environment will increase. It is rather difficult to determine the critical point on the Kuznets’ curve, which reflects the level of income per capita, from which the emphasis is on the quality of the environment. It depends on a number of factors: the historically determined level of the population welfare, peculiarities of the economy, production and technological structure, types of pollution, etc. Since 1991 Kuznets’ hypothesis has received a new development – it was used to describe the relationship between the level of environmental load and the degree of GDP growth per capita.

The environmental hypothesis of Kuznets’ curve was tested by Zambrano-Monserrate and Troccoly-Quiroz in Iceland (2016), by Vlontzos and Niavis in the EU agricultural sector through an Eco-(in) Efficiency Index (2017) and others. From the standpoint of ecologically certified production, ideal conditions include the level of environmental education of consumers, corporate ecological and social responsibility of both producers and consumers, and the commitment of society to ecologically-conscious behaviour. Then S. Kuznets’ curve will represent the interconnection of income growth per capita and the number of ecologically certified products per person (or the share of certified products in their total number).

At the early stages of the country's economic development, the pressure on the environment grows faster than incomes. There is a tendency towards concentration of economic activity in types of production activity that do not take into account the ecological component. At the same time, low income leads to the fact that society prefers income growth, rather than the quality of products they consume and the conservation of the environment. At the later stages of development, economic activity shifts towards ecologically certified production. An increase in income contributes to increasing the requirements for the quality of products and the environment itself. Enterprises actively use the availability of ecological certificates as a competitive advantage. For a time lag on the Kuznets’ curve, the inability to enter the market without corresponding ecological certificates proves to be a characteristic feature. At this stage, revision and improvement of existing ecological requirements and standards, as well as search for and development of innovative technologies for the production is a requirement.

The efficiency of S. Kuznets' findings in the sphere of environmental management certification is based on the graphical analysis of the relationship between GDP dynamics and the number of issued ISO 14001 certificates per capita in the countries of the world, such as Ukraine, and Georgia. The increase in GDP per capita is accompanied by an increase in the number of the certificates issued, which is presented on Figure 2.

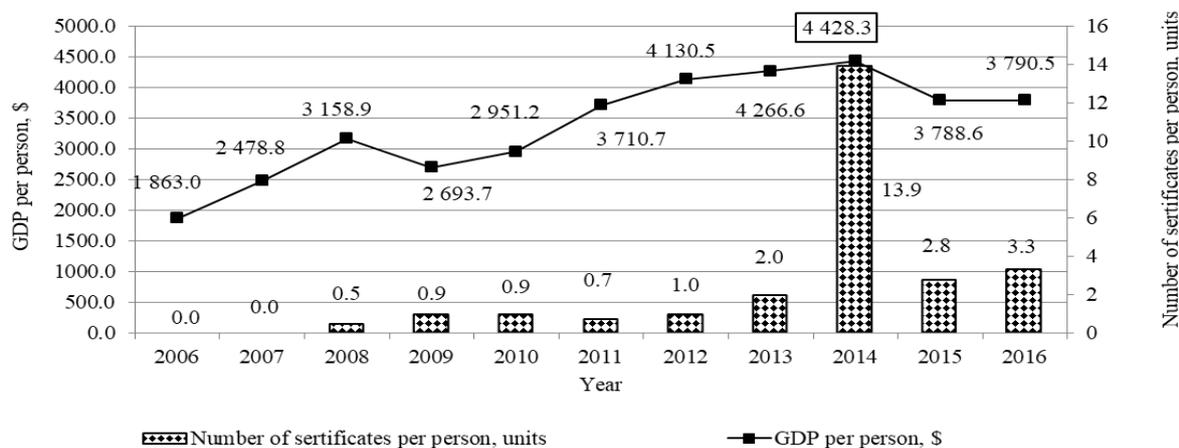


Fig. 2. Practical application of the Kuznets' curve from the standpoint of ecologically certified production, the example of Georgia

Nikitenko (2011) believes that the research done by S. Kuznets is the fundamental one for the creation of a model of innovative socially oriented reproduction of capital. This kind of reproduction, taking into account the ecological component, involves the implementation of relevant ecological and quality standards (ISO 9001, ISO 14001, ISO 22000, ISO 26000), as well as TQM system. The principle of full reproduction contributes to the introduction of innovations, the improvement of the organization of social and economic activity, increasing the efficiency of production and ensuring satisfaction of evolutionary ecological needs of consumers. Let us analyse the possibility of using the Kuznets curve from the standpoint of ecologically certified production in Ukraine (Fig. 3).

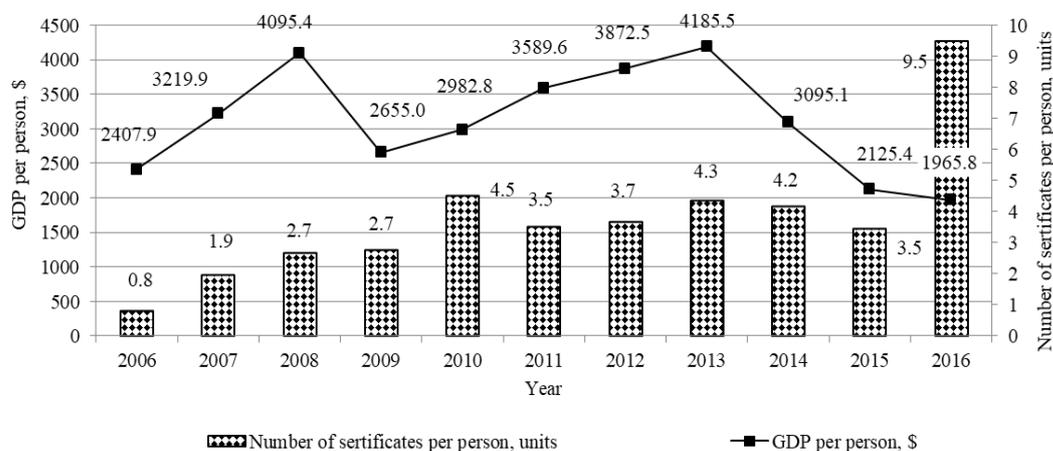


Fig. 3. Practical application of the Kuznets curve from the standpoint of ecologically certified production, the example of Ukraine

The graphic data obtained, having a sinusoidal character, however, suggest that in the long term there is the trend of increasing of ecologically certified productions along with an increase in GDP per capita. However, in the short run, the GDP growth rate per capita in Ukraine and the dynamics in increase of ecologically certified domestic industries do not coincide.

Analysing the results obtained, the following assumptions can be made: 1) the global financial and economic crisis of 2007–2008 explains the reduction of the number of certificates issued in 2008; 2) the decline in the period of 2010–2012 is caused by the political crisis of these years and the lack of full-fledged market relations. At the same time, in 2016 for the first time in the past 3 years, GDP per capita in Ukraine had a positive dynamics and showed an increase of 3.3%.

In addition, to study the dependence of GDP in the country and the number of ISO 14001 certificates (on the example of Ukraine) correlation analysis has been conducted. Correlation coefficient between GDP in actual prices, billion UAH and the number of ISO 14001 certificates is 0.831 which indicates the close connection. Coefficient of correlation between available income per one person in thousand UAH and number of certificates per capita is 0.797, which reflects a similar close relationship. This can state that there is a direct relationship between the number of ISO 14001 certificates, that is, the quality of environmental management and indicators of the population welfare. Therefore, stimulating the development of ecological certification is important for the further development of Ukraine.

Based on the previous periods regarding the number of ISO 14001 certificates in Ukraine using the trend line we have carried out the forecasting of the number of ISO 14001 certificates in the medium-term until 2020. Application of linear, exponential and polynomial trend lines allow us to conclude that we will observe an increase in the number of certificates on average up to 814 units (Fig.4).

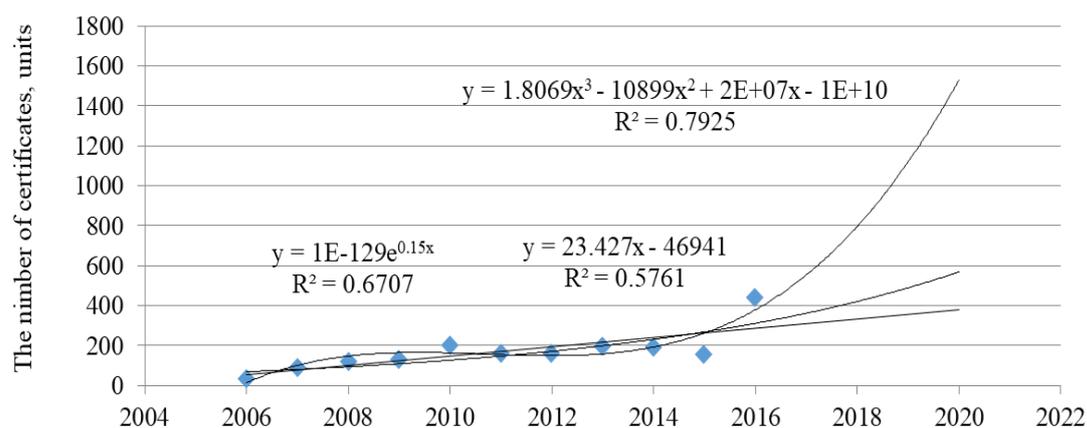


Fig. 4. Forecast of the increase in ISO 14001 certificates in Ukraine by 2020

Taking into consideration the above-mentioned regularities and the growth of demand for certified products on world markets, it is expedient to suggest the tools,

aimed to stimulate growth of the number of certificates in Ukraine connected with the general economic growth. At the present, certain conditions for the development of ecologically certified production have already been created at the governmental level: economic and organizational measures are being actively implemented.

Thus, in early 2017, the Ministry of Agrarian Policy and Food of Ukraine initiated the process of stimulating the production of certified products according to international standards by selling lease rights on the land plots of state ownership on land auctions at preferential rental rates. As of 08.08.2017, 42 land plots with a total area of 841 ha were included to the list of state-owned land plots, the rights to which are exhibited for land bids (auctions) with the destination “for ecologically certified production”. Nevertheless, further development requires targeted and mutually agreed actions, in particular, the authors suggest: preferential crediting and “tax holidays” for enterprises that obtain ISO 14001 certificates and carry out the establishment of ecologically certified production; specialized units of disciplines, development of non-formal education and its introduction into the educational process in school; activation of the state innovation and investment policy directed at modernization of enterprises that carry out production in accordance with ecological standards ISO 14001; formation of ecological consciousness of society through the social and administrative methods of management.

#### **4. Conclusions**

1. In the modern world, the highest number of ISO 14001 certificates from the standpoint of sectoral composition are in the construction industry, metal production, electrical engineering and optics.

2. The share of environmental management certificates according to the regions showed that the highest number is in the East Asian and Pacific region, the second place is occupied by Europe region. The largest numbers of valid certificates are in Italy, The United Kingdom, Spain, Romania and Germany. The number of certificates in Ukraine in 2016 was 422 and it is one of the lowest in the Europe.

3. The economic and social impact of the growth in the number of ISO 14001 certificates have been proved based on the hypothesis of Kuznets and correlation analysis. It was proved by the correlation coefficient between GDP in actual prices and the number of ISO 14001 certificates, which is 0.831 and it indicates the close connection. Coefficient of correlation between available income per person and number of certificates per capita is 0.797, which reflects a similar close relationship.

4. The key tools for the development of environmental management certification systems in Ukraine such as preferential crediting, “tax holidays”, development of non-formal education can be used.

## References

- Anielski, M., Wilson, J. (2010). Environmental Footprinting for Agriculture in Alberta: Literature Review and Analysis. *Environmental Stewardship Division of Alberta Agriculture and Rural Development*. Edmonton: 157 p. – [http://www1.agric.gov.ab.ca/\\$Department/deptdocs.nsf/all/sag13450/\\$FILE/lit\\_review.pdf](http://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/all/sag13450/$FILE/lit_review.pdf) [16 06 2018].
- Bamber, C., Elezi, E., Sharp, J. (2014). Critical Review of ISO Management Systems Certification in the UK Agricultural Sector // *9th Mibes International Conference*. Vol. 30, No. 5–1: 351–367. – <http://mibes.teilar.gr/proceedings/2014/Bamber-Elezi-Bamber-Sharp.pdf> [16 06 2018].
- Blackman, A., Rivera, J. (2011) Producer-Level Benefits of Sustainability Certification // *Conservation Biology*. Vol. 25 No. 6: 1176–1185. – <https://doi.org/10.1111/j.1523-1739.2011.01774.x>.
- Chaikin, O. (2014). Kuznets Curve: Ecologically Certified Production Position View // *Economist. Scientific Journal*. No. 6 (332): 53–55.
- DeFries, R., Fanzo, J., Mondal, P., Remans, R., Wood, S. (2017). Is Voluntary Certification of Tropical Agricultural Commodities Achieving Sustainability Goals for Small-Scale Producers? // *Environmental Research Letters*. Vol. 12. No. 3: 1–11. – <https://doi.org/10.1088/1748-9326/aa625e>.
- Grossman, G., Krueger, A. (1991). Environmental Impact a North American Free Trade Agreement. *National Bureau of Economic Research working paper No. 3914*. – Cambridge. Retrieved from <http://www.nber.org/papers/w3914.pdf>. – <https://doi.org/10.3386/w3914>.
- Hesham, A., Elkhalek, A., Remon, Aziz, F., Ahmed, F., Omar, B. (2015). Implmenttion Of Environmental Management Systems In Construction Industry // *International Journal of Education and Research* Vol. 3. No. 7:407-432.
- May, A., Massoud, R., Rabih, K., Mutasem, F. (2010). Environmental Management System (ISO 14001) Certification in Developing Countries: Challenges and Implementation Strategies // *Environmental Science & Technology*. Vol. 44, No. 6: 1884–1887. – <https://doi.org/10.1021/es902714u>.
- Melykh, K., Melykh, O. (2016). Implication of Environmental Certification and CSR for Companies' Sustainable Performance in Developing Countries // *Journal of Sustainable Development*. Vol. 9. No. 3: 160–169. – <https://doi.org/10.5539/jsd.v9n3p160>.
- Nikitenko, P. (2011). Sajmon Smit Kuznec – Odin iz Vydayushchihsya Ekonomicheskikh Kreativnyh Myslitelej-Ekonomistov-Predtechej Innovacionnyh Modelej Social'no Orientirovannogo Ekonomicheskogo Rosta i Noosfernoj Ekonomiki // *Problemy upravleniya*. No. 2 (39): 42–52.
- The site of the International Federation of Organic Agricultural Movements. (2018). – <https://ifoam.bio/>[16 06 2018].
- The site of the International Organization for Standardization. (2018). – <https://www.iso.org/home.html> [06 06 2018].
- Vlontzos, G., Niavis, S., Pardalos, P. (2017). Testing for Environmental Kuznets Curve in the EU Agricultural Sector through an Eco-(in) Efficiency Index // *Energies*. Vol. 10(12): 1–15. – <https://doi.org/10.3390/en10121992>.
- Zambrano-Monserrate, M., Troccoly-Quiroz, A., José Pacheco-Borja, M. (2016). Testing the Environmental Kuznets Curve Hypothesis In Iceland: 1960–2010 // *Revista de Economía del Rosario*. Vol. 19. No. 1: 5–28. – <https://doi.org/10.12804/revistas.urosario.edu.co/economia/a.5239>.

**APLINKOSAUGOS VALDYMO SERTIFIKAVIMAS:  
SOCIALINĖ IR EKONOMINĖ STEBĖSENA**

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**Summary**

Šiuolaikinės aplinkosaugos problemos reikalauja, kad būtų diegiami nauji verslo procesų požiūriai, o tai lemia aplinkos valdymo plėtros svarbą. Tyrimo tikslas – socialinė-ekonominė stebėseną ir rekomendacijų dėl aplinkosaugos vadybos sistemų įgyvendinimo Ukrainoje kūrimas. Tyrimo metodika: mokslinės literatūros (1991–2018 m.) analizė, statistiniai duomenys apie ISO 14001 sertifikatų skaičių, BVP dinamikos tyrimas Ukrainoje, Gruzijoje ir ES šalyse 2006–2016 m. ir pagal jį – koreliacinė duomenų analizė. Pagrindiniai rezultatai: naudojant Kuznetso kreivės interpretaciją, nustatytas ekonominio ir socialinio BVP vienam gyventojui augimo poveikis aplinkosaugos sertifikatų skaičiui. Siekiant skatinti aplinkosaugos vadybos sertifikavimo sistemą Ukrainoje, siūloma naudoti: lengvatines paskolas, neformalųjį ekologinio švietimo plėtotę, inovacijų ir investicijų politikos tobulinimą.

*Raktiniai žodžiai: aplinkosaugos sertifikavimas, valdymas, socialinis stebėjimas.*

*JEL kodai: M11, Q48; Q56.*