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ENVIRONMENTAL DETERMINANTS OF ECONOMICS AND REDESIGN OF ECOLOGICAL-ECONOMIC INSTRUMENTARIUM FOR ENVIRONMENTAL PROTECTION

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Abstract: In the evolution of "environmental awareness" of humanity, which occurred in mid-twentieth century, the transition from industrial civilization into the information society, the most important role was played by ecology and economy, which are interconnected, and this relationship is manifested primarily in the fact that disruption of the ecological balance is due to the tendency to maximize economic outcomes, with many not only economic but also social harmful consequences. Legal solutions and ecological-economic instruments didn't ease the deal between "conflicting" sides in order to achieve a greater level of internalization of environmental costs. Current selection of ecological-economic instruments for environmental protection is suboptimal and must necessarily be improved by redesigning the existing instruments and tools.

Keywords: *environmental economics, externalities, ecological-economic instruments*

INTRODUCTION

Modern ecological rationality strongly shook the foundations of classical and traditional economic theory and practice, science, technology and human knowledge. Problems of current economic development model, population expansion, insufficient and non-renewable natural resources, health and quality of life have outgrown the current understanding of the ecology as a narrow topic and mainly as a biological discipline. The necessity of

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interconnection of economic and socio-cultural development of the environmental state, essential natural balance, processes and global living conditions has now become part of the economic-political, normative-institutional and cultural realities of modern humanity⁴.

Economy represents the skill and science about the alternative, most productive use of rare and, in relation to the needs, insufficient and limited resources, which are always transferable and which can be evaluated and converted into cash. The basic premise of economic theory and skills of the market economy system is developed system of economic and technological communication. However, in modern circumstances were recorded areas of social and economic life in which economic theory and traditional market practice type do not have the answers. For all the more is evident the different interests of individuals, as well as economic entities, in relation to the common good, which concerns the community as a whole. It is not always enough to actually indulge the interests of free competition and economic entities and thus ensure optimum economic and socio-cultural situation of the community. The state, as a classical political organization and structure of government in modern circumstances, has become a strong economic power and a determinant of economic activity. It takes care of the organization and reproduction of security, development, welfare and other social functions, or their essential segments. One important area of common interest, the environment, remained uncovered. Until recently, it seems that natural resources such as water, air, free space, sunlight, and many earth and marine resources are priceless.

1. ENVIRONMENTAL PROBLEMS IN ECONOMIC THEORY, INTERNAL AND EXTERNAL ECONOMICS

Based on the theoretical principles of the so-called *labor value* of Adam Smith, David Ricardo and Karl Marx, it seemed that natural resources such as water, air, free space, sunlight, and many of the earth and marine resources are priceless. That is the case because during the "classic economic period" there were no major environmental problems as obvious economic issues.

During neoclassic period, there were no novelties in theory, when it comes to the economics of the environment. The utility was still dominant principle which couldn't be subordinated to the interests of preserving the fragile natural balance. Clean environment did not have a market valuation, nor could they adequately explain the theoretical mechanisms for settling the costs of environmental pollution, consumption of non-renewable resources, endangering and destroying natural rarities.

The problem, however, in economic theory has been observed already in the nineteenth century. At first Malthus made catastrophic cautionary vision of extensive extraction of sources such as water, air, and especially arable land, compared to the expansion of population and reproductive needs of the people.

⁴ Adžemović, M., Pantović, M. (2014): Ecological economy in terms of paradigm of sustainable development, Internacional Conference Ecological truth Eco-ist 14, University of Belgrade Technical faculty Bor, 10-13 june 2014, Proceedings, pp. 518_523.

David Ricardo and John Stuart Mill noted problems of valorization of natural resources, particularly concerned about public parks as a national treasure of the former British Empire. Karl Marx, in his version, described "predatory economy" as rule of capital, which is ruthless and refers to the country and its wealth, which stems from the capitalist system of production.

Tacit stance on incompatibility has dominated for a long time, or even a conflict of principles of economics and the phenomenon of threats and concerns for the environment. It was not until the twenties of the twentieth century when American economist Pigou in "welfare economics" emphasizes the economic importance of the consequences of pollution⁵, defining it as the difference between the gross product of the private and social net product. Specifically, if an entrepreneur achieves its economic activity price of the product or service on its overall value in the market, it does not mean that it produced just as much a social net worth. The social net product, as a pure effect of this economic activity is less than the private (commercial production) gross domestic product for the damage incurred as a result of pollution generated in the production. Although there was no answer to the question who should bear the consequences, there is a significant difference between the treatment of the environmental consequences of the producers and consumers of polluting goods, services and processes, on the one hand, and society, on the other hand.

The issue of evaluation and conservation of endangered natural resources and the environment has largely come to light during sixth decade of the twentieth century, thanks to the left stream⁶ of the French philosophers, humanists and non-conventional economists in England and America. They first started to treat and consider environmental problems as a planetary issue. They have contributed that economic-ecological complex is now treated on an equal stagewith the problems and the environmental consequences in the context of biology, technology, medicine, the social and cultural development, philosophy, laws and politics.

Economic science today largely accepted a theoretical standpoint where environmental problems and natural heritage evaluation belong to the phenomenology of externalities⁷. Category of external economies was an attempt to reconcile the views of private interests, preferences and economic incentives as greater profits and to reduce business costs or internal economy, for the interests of the community in terms of environmental protection and nature in general⁸.

Internal Economy is a category that includes the organization of production and the effects of the manufacturing process, involving the companies or individuals as producers or consumers of a certain goods or services. These effects can be positive and in this case are internal (private)

⁵ Pollution originating Latin word (pollution) means fouling, tempering.

⁶ The left stream of the French humanist philosophers, among which stand out Andre Gorz and Jacques Attali.

⁷ Tietenberg, T., Lewis, L. (2012): Environmental & Natural Resource Economics, Ninth Edition, Pearson Education, Inc., New Jersey, pp. 16-45.

⁸ Drašković, B. (1998): Ekonomija prirodnog kapitala, Institut ekonomskih nauka, Beograd, pp.185.

savings or benefits (benefits). On the other hand, the internal (private) costs (costs) for the company are its various expenses, which is to be cut down if possible in relation to the beneficial effects of this difference and the realized profits. Motif of internal economy is still shrinking by avoiding internal costs and other expenses (including the protection and preservation of nature), and by the maximization of profit, either by increasing revenue, or by reducing costs.

External Economy includes all positive and negative effects of some economic activities that are not directly related to producers or consumers, but to other subjects, of immediate vicinity, in the so-called neighboring activities, or relating to the consequences for society as a whole. **Positive externalities** are the consequences of one's economic activity, which also means economic savings or if it's used for any other entity or community. The most famous example is of the beekeepers and apple plantation in its vicinity, with each of them having a positive impact on increasing the production and productivity. There are a lot of examples, especially in agriculture, tourism, infrastructure investments, specifically when it comes to public goods, intended to provide social benefits. The **negative external** effects (external diseconomies) represent damage of some economic activities related to the environment, and in economic terms means special expenses and damages to other subjects or to a society as a whole, which sometimes cannot express monetarily. Such effects on the environment are numerous and significant, and externalities in the form of special compensation costs and use of natural resources and other environmental consequences, today is the elementary principle of theoretical analysis (sustainable) of economic development.

2. EXTERNALITIES

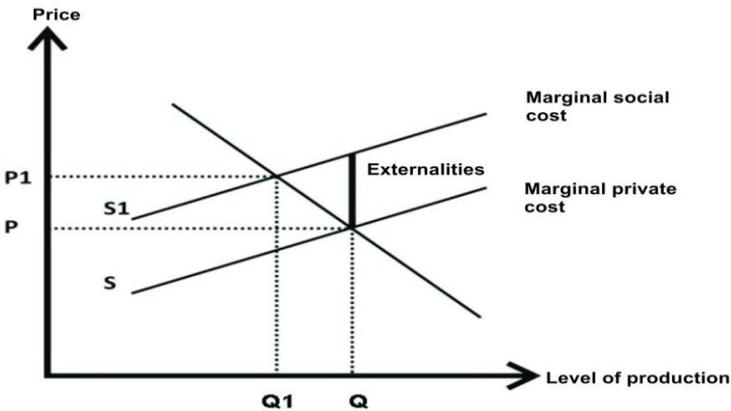


Figure 1: The gap between private and social cost

The central issue of external economies boils down to the question: how to evaluate the natural heritage and how to pay for the external costs of protection, preservation or the restoration of pure and natural environment? The marginalist theory attempted to enter more deeply into the problem of marginal analysis, internal, external and total costs of production, as well as the marginal benefit. Given the fact that the internal costs of their coverage

must be included in the product market price, and the external environmental costs-not, there is a contradiction between the private interests, which tends towards the greater production and lower costs and social interests for which lower production and lower external costs applies.

One of the ways of the internalization of externalities is the introduction of tax per unit of production, which would be equivalent to the cost of pollution. In a theory, if we start from the assumption that the market is perfectly competitive product for enterprise-pollutants and the absence of any government intervention, market demands reflects the marginal social utility⁹. However, in a real life, the gap between private and social costs is evident¹⁰, and the market offer without government regulation reflects only marginal private cost (Figure 1).

According to Pigou this welfare economics, is the only way to achieve optimum by imposing a tax or polluter fees in the amount equal to the difference between social and private costs. *The internalization of externalities, as non-market phenomenon, is done by paying a certain price for the damages incurred*¹¹.

Therefore, the price of manufactured goods is equal to the marginal social cost of the good, which is equal to the sum of the marginal private cost and taxes. This solution is known as a *tax on emissions (Pigouov tax)*. Extremely simplified theoretical approach to environmental taxation is shown on the chart 2

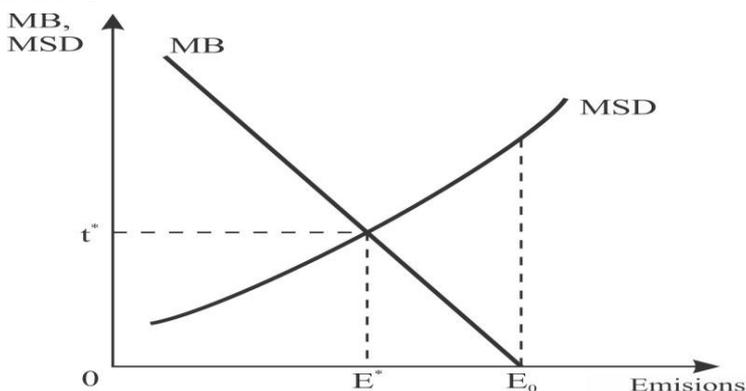


Figure 2: Recreational ecological taxation

Increasing function of the *marginal social cost (MSD)*, measures the cost of environmental pollutant emissions resulting from various causes and disruption of the ecological balance. The increase of emissions growth of marginal social damage, by assuming damage growth increases the level of emissions. Decreasing function of *marginal social benefit (MB)*, measured by

⁹Eban S. Goodstein (2011): Economics and the environment, Wiley, pp. 34_48

¹⁰Facheux, S., Noel, F. (1995): Economie des ressources naturelles et de benvironnement, Armand Colin, Sorbonne, Paris, pp. 83.

¹¹Trivić, N. (2007):Model internalizacije eksternih ekoloških troškova, Anali Ekonomskog fakulteta u Subotici, Ekonomski fakultet, br.18, Subotica, pp. 39_46.

the "value" of environmental benefits without taking out controls or other activities to reduce environmental damage. Total emissions, in terms of the absence of regulation, marked with point E_0 . We can see that the cost of control is very high when the permitted emissions equal to zero (0), while with increasing level of emissions is marginal cost of supervision.

The optimal level of emissions is indicated by point E^* , where *marginal social benefits (MB)* are equal to *marginal social costs (MSD)*, which is achieved by corrective taxation, i.e. applying the tax t^* . From the graph it is evident that the height of the *marginal social cost (MSD)* unattended (shown in dashed line, $EO - MSD$), significantly exceeds the amount of the costs of supervision, $0 - t^*$, and by which achieves the optimal level of emissions (shown in dashed line, E^* - where the cutting tool MB, MSD). Thus, the level of emissions is higher than E^* , and would have caused more damage than you are saving on the *cost of supervision*, while the level of emissions lower than E^* avoid damage if value was less than the *marginal costs (costs) of monitoring*.

This traditional approach of *managing sustainable development* requires state regulation with the optimal level of emissions, since there is no common market interaction of supply and demands between those who provide emission reductions and those that require a (claimed) clean environment. If the state can intervene and determine the "price correction" for the program, market interactions should lead to an optimal level of emissions. This is, of course, extremely simplified explanation, which in practice is a very complex. Polluter pay principle must apply to all of this, whereby the *environmental tax is invoice for environmental damage*¹².

3. ENVIRONMENTAL COSTS AND THE PRICE OF ENVIRONMENTAL RESOURCES

Economic theory identifies the environment as an atypical problem, with the contemporary issues of ecology and sustainable economic and technological development beyond the competence of individual scientific disciplines and professions. The consequences of today's system of production, technology and market left for the future, are almost immeasurable, not only by economic instruments, but also by any other parameters.

Ecological destruction leaves direct economic consequences in the following areas:

- Pollution of the environment and nature;
- Congestion space, roads, communications and difficulties in production and life;
- Mentally ecocide due to the risk of health effects of work and noise;
- The consequences of "limits of growth" of economic reproduction current mode and economic development.

Pollution is an old phenomenon of human development, which in the past had specific consequences due to human and medical ignorance, so it was

¹²Adžemović, M. (2011): Ekološko-ekonomski instrumenti u zaštiti životne sredine, Fakultet za primenjenu ekologiju Futura, Beograd, pp. 48_52.

often cause of epidemics and mass human catastrophes. Today it is a far greater problem of industrial, technological, producer and consumer pollution of air, water and land, which are transferred to the food, human environment and other basic assumptions of life, thereby increasing its costs and lowers the quality. The cost of pollution represents the overall material costs of economic agents or society as a whole for the rehabilitation of the consequences or prevention of pollution. The cost of pollution and reduction must be addressed in the overall social or ecological cost of production. However, even if that price is provided, various tax and other instruments¹³, remains facing the real volume of emissions of pollutants, which depends on uncovered differences and accumulation of unpaid pollution.

Congestion¹⁴ in the environmental economics represents the problem of congestion, an overcrowded space with people, buildings, cars, other transportation and communication means and facilities, which is why the crowds, lines, slowing of movement, problems occur with traffic and reduced economic efficiency. This implies significant expenditure for the construction and maintenance of parking lots, expansion of roads, as well as the costs of unproductive time, accidents and all manner of confusion, especially in big cities.

Congestion cannot be solved solely by market mechanisms, but it cannot be solved without economic instruments. Life in the cities, although relatively expensive and unhealthy, and sometimes traumatic, has advantages that today's civilization is difficult to waive. The cost of congestion is in large part a burden of community that taxes and government fees trying to solve these problems or remediate bottlenecks, traffic congestion, public garages and parking lots, the green areas and other public goods are usual way to cope with the needs of the environment and acceptable way of life in large cities, where it is necessary to find acceptable measures of movement and communication. Public goods must be equally available to all citizens.

Mentally ecocide is the ecological consequence of noise or any other disturbing psychological effects of modern life. The existence of people can be psychologically unbalanced or even compromised by exposure to elevated noise conditions, or such unnatural-looking living environment that affects the health and quality of life. It is understood that the silence must have a price, and production and transportation costs to prevent additional noise. For example exhaust pipes on the engines indicates usability practices by which legal rule requires an adequate investment and increasing prices of goods Kaja are equipped with Eco standards. All the elements of mental ecocide cannot cover the whole economic and legal means, but a large part of them are required.

¹³ Adžemović, M. (2012): Dizajniranje ekološko-ekonomskih instrumenata zaštite životne sredine, Ekološki spektar 2012., I međunarodni kongres ekologa, Univerzitet za poslovne studije Banja Luka, 20. i 21. april. Zbornik radova, UDK 502.1:338.246.2, pp.927_942.

¹⁴ Congestion, from the Latin *congestie*, is primarily a medical term that denotes excessive inflow and repletion of an organ with blood. For ecological and economic complex it entails an unacceptable situation congestion, slowing down, lack of space and the various costs and losses on that basis.

*The cost of "limits to growth"*¹⁵ was created as a result of previous methods of economic development, based on cheap energy and raw materials, i.e. the ruthless exploitation of natural resources. What is not paid in the past will be charged today or in the future.

Natural resources (natural heritage in general) have a beneficial effect on economic activity, growth and development, but only in a situation where they are not endangering perspective of this development. If the energy consumption per unit of product or per capita stagnated or even increased in the second case, there is no doubt that it must pay for the restructuring of production and lifestyle changes that will require a transition from classical to alternative energy sources. Similarly, to raw materials, arable land and other economic natural resources that have been consumed for free for a long time. Times have changed: the time has come to pay their revaluation, which has a national political, legal and economic dimension, on the one hand, and the global character on the other. The price of the natural heritage is increasingly gaining its importance, relevance and amount, in accordance with rareness and limitations of its potential, that is, with the current pace of depletion of nature.¹⁶ Although they have not been established yet, the economic mechanisms of global payments for environmental costs and natural rents will not solve the problem at the national level or international environmental declarations, which have a moral, legal and political character.¹⁷

Natural balance as a base of the life is the premise for the survival of wildlife present on the planet, which is inextricably linked chain of natural and biological balance and interdependence. The natural environment has a very specific dimension for each country, family and individual. The economic practice, especially today, confirms the truth that major changes in the configuration and the importance of the factors of production are under the influence of technological, socio-cultural and civilization development. Today, already somewhat archaic and outdated, is classic; division of production factors to land, labor and capital. It is widely known the economic importance of the technological state of the nation, or anything that signifies the concept of "human capital". Some authors emphasize information as the most important economic factor, their acquisition, processing and use, especially of those who will inherit the benefits of the information society¹⁸. Others insist today on human knowledge (knowledge capital) as a key factor of production and

¹⁵ The term is taken from the paradigmatic studies married couple **Meadows** and other non-governmental experts multinational organizations **Roman Club**, which in 1972. published its first report under the name **Limits of Growth**. It pointed out the contradiction planetary expansion of population in relation to the limits and the consequences on the planet due to overuse and pollution of natural resources and vulnerability of basic principles acceptable way in the country.

¹⁶ Ehrenfeld John, R. (2009): To reach sustainability- there are no simple solutions (Dostizanje održivosti-jednostavna rješenja ne postoje), qLife, No. 2, Cotrugli Bs, Quantum 21. net, Rijeka, pp. 21_36.

¹⁷ The most important is the Rio Declaration from 1992, which is so far the most publicized, but above all a moral and political force. Its contents are represented mainly as an appeal, which was not the reason for the diminishing its importance

¹⁸ The John Naizbit book Megatrends, in early eighties actualized such a position. In our translation was published in the edition of Globus 1985, p. 127-186.

development, putting into the background things like technology and capital¹⁹. The modern world in the economic development aspect is no longer what it was a few centuries or even a few decades ago. Furthermore due to ecological rationality it should become an integral part of economic theory and business practice. Today many environmental standards have the force of "imperative provisions". Standards of acceptable environment became extremely transparent thanks to relatively developed environmental legislation. A variety of non-governmental and humanitarian organizations exert influence, but also raise funds for protection and preservation of rare natural resources and a healthy environment. Expert changeproduction factors thought patterns of economic wealth, especially for the valuation of natural resources and environmental factors. There are more advocates of this stand that in calculation of domestic product we should reduce the total amount of the unpaid external costs and endangered ecological resources. It is debatable whether the production of military-industrial complexes today can be considered productive, since, from a humanitarian and ecological point of view, it means making assumptions, not for economic and social development, but for the destruction and degradation of people, material-economic and natural potentials.

The evaluation of the environmental and ecological resources and environmental changes is **still dominated by the economic approach** which is based on an estimate of preferences of people related to the change of state and the environment in which they live. Ecological resources to produce goods and services when in most cases, there is no market, is functioning very imperfectly. Examples are numerous, ranging from air quality, which affects human health, crop yields, damage to buildings, deforestation due to acid rain, and the drinking water. Whether there is no market, whether it works imperfectly, the result is that the price of environmental resources do not exist, and hence no awareness of people about the immediate monetary value of the environment. In order to introduce economic valuation of the environment, it must proceed from the same principles as it is for the evaluation of the products or human labor, these are the principles of willingness to pay (WTP) and the principle of willingness to accept compensation (WTA) for environmental damage or degradation of the environment. When these parameters can be measured, then the economic evaluation ensures that the environmental damage and financial benefits can be expressed, for example the value of different scenarios of pollution control. Then there is the opportunity to evaluate the environmental benefits and the net loss to society as a whole. Lack of markets and prices for environmental goods and services creates a double challenge: first challenge is to identify ways in which environmental damage is affecting the well-being and the other challenge is to estimate the cash value of these changes, through the use of a range of direct and indirect techniques.

The first step in determining the components of total economic value is to define and measure the impact on the environment, which often involves a high degree of scientific uncertainty. Therefore the *accuracy of economic valuation* depends primarily on the accuracy of the scientific identification and

¹⁹ Peter Drucker Postapocalyptic Society, Economic Review, Belgrade 1995, p. 12-35.

quantification of how environmental changes and human preference are for environmental goods and services. Cost-benefit analysis and precise methodology for economic valuation of key environmental media²⁰, has not been questionable and is the cornerstone of evaluating natural resources, and the costs of risk of environmental damage from possible accidents in the environment are precisely calculated with negligible deviations²¹.

4. TOWARDS A NEW PARADIGM OF DEVELOPMENT

Modern economic development exceeds the theory of modernization, especially in the fact that environmental problems are solved. The need for a new conceptualization is essentially a consequence of the changed circumstances and the termination of 'solid' association, for example of agricultural sector and the development of the rural economy. ***The new paradigm²² of development*** is a new challenge and a new necessity time, which should be essentially focused on the ground of the investments, evaluation and exploitation of unused resources. Globalization and the processes that are carried with it, although often with negative effects and consequences in many sectors of social reality in rural areas e.g., have the potentials that should not be ignored (improving communication, reduce transport costs), which means not only for financial policies of redistribution and agriculture. For example, the general correspondence objectives and harmonization of conditions of life in rural and urban areas are no longer sufficient, because simply it is not enough. Farms must be competitive, and competitiveness is necessary for rural areas and for the natural environment as well in which households are able to demonstrate their readiness for change, diversity in the orientation of the "new" economic flexibility and to introduce new knowledge, application of good practices and others.

Views on the socio-economic development, particularly from the end of the last century and the beginning of this century are changed. The prevailing integralistic approach, which itself inherited all the good achievements of the past, but which evokes overcoming disparities of all kinds, particularly regional and differences between urban and rural developments.

Our social reality, burdened with numerous problems in implementation of declaratively adopted policies could be more receptive when it comes to the practical application of the concept of multi-functional combination of economy and integrated approach to improving the socio-economic status of system components and environmental quality. The concept of multifunctionality in our conditions often ends up with the fact that

²⁰ Adžemović, M., Jelić, I. (2014): Methodology of cost-benefit analysis of impact assessment on the environment, 9th Symposium "Recycling Technologies and Sustainable Development" with International Participation, University of Belgrade Technical faculty Bor, Zaječar, 10-12 September 2014, Proceedings, pp. 430_434. (ISBN 978-86-6305-025-9 COBISS.SR-ID 209520396)

²¹ Harris, J. M. (2002): Environmental and Natural Resource Economics, Houghton - Mifflin Co., Boston-New York, p.105.

²² Paradigm is a form of reputation model by which something is built or created. In scientific theory, the most general model by which to build certain principles and laws.

agriculture is the example and it remains the largest user of rural resources and decisive factors that affects the appearance of the rural area. Public Psychological barriers, created decades and centuries ago, that link and see all negative and bad compared to everything that carries the label of the village, are unsustainable. Copernican revolution in the minds of people is necessary and desirable because without proper glorification of rural life, rural traditions and affirmation of cultural and ethnic uniqueness and value, there will be no fundamental change in attitude towards everything that is rural.

CONCLUSION

The modern world of the economic development aspect is no longer what it was a few centuries or even decades ago. Furthermore due to ecological rationality it should become an integral part of economic theory and business practice. Expert thought patterns of economic wealth and production factors are changing, especially in the valuation of natural resources and environmental factors. There are more advocates of this stand then in calculating domestic product should be reduced to the total amount of the unpaid external costs and endangered ecological resources. Natural Heritage must be established as global dimension. This, in turn, is still far off, and then the evaluation of natural resources and environmental resources is largely a matter of individual national strategies for economic and technological development. In the evaluation of the environmental, ecological resources and environmental changes it is still dominated by the economic approach which is based on an estimate of preferences of people related to the change of state of the environment in which they live.

The research results confirms the initial hypothesis that legal solutions and ecological-economic instruments are easier to deal with "conflicting" sides in order to achieve a greater level of internalization of environmental costs. That is the current choice of ecological and economic instruments for environmental suboptimal protection and needs to be improved by redesign of existing instruments and tools that have positive effects for ecological and economic instruments for environmental protection and it can be achieved through decentralization of decision-making on the implementation of some of the instruments, as well as to redefine and enhance the Fund for Environmental Protection work.

EKOLOŠKE DETERMINANTE EKONOMIJE I REDIZAJN EKOLOŠKO-EKONOMSKOG INSTRUMENTARIJUMA ZAŠTITE ŽIVOTNE SREDINE

Mr sc Mesud Adžemović, mr sc Miloš Nikolić, mr sc Dimitrije Aleksić

Apstrakt: U evolucija „ekološkog osveščivanja“ čovečanstva, do kojeg je došlo sredinom XX veka, na prelasku iz industrijske civilizacije u informatičko društvo, najznačajniju ulogu su odigrale ekologija i ekonomija, koje su međusobno povezane, a ta povezanost se ispoljava, pre svega, u tome što narušavanje ekološke ravnoteže dolazi zbog težnje za maksimiziranjem ekonomskih rezultata, sa mnogim ne samo ekonomskim već i socijalnim štetnim posledicama. Zakonska rešenja i ekološko-ekonomski instrumenti nisu olakšali dogovor „sukobljenih“ strana radi postizanja što većeg stepena internalizacije ekoloških troškova. Trenutni izbor ekološko-ekonomskih instrumenata zaštite životne sredine je suboptimalan i nužno mora da se unapredi redizajnom postojećeg instrumentarijuma.

Ključne reči: *ekološka ekonomija, eksternalije, ekološko-ekonomski instrumenti*

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