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SUSTAINABILITY OF DEVELOPMENT AND GROWTH - CRISIS, DISTRIBUTION OF INCCOME AND INEQUALITY

Abstract

In the first part of the article, the reasons for transition of modern civilization to the concept of sustainable development are examined. The authors stressed the importance of shifting socio-economic development paradigms based on excessive exploitation of natural resources by the new paradigm based on the progressive system of knowledge and behaviour of man. In the second part of the article, the attention is paid to the factors of sustainable growth, including inequality in distribution of income. It is pointed out that stimulating economic growth is much smaller problem than its maintenance in the long run. By analysing factors that determine the sustainability of growth, it can be shown that the following factors correlate with long-term growth: equal distribution of income; improvement of political institutions; increasing the level of education, health care and physical infrastructure; international financial integration; competitiveness and export structure; trade liberalization and macroeconomic stability.

***Key words**: sustainable development, socio-ecological-economic system, ecological crisis, sustainable growth, distribution of income.*

***JEL classification:** O1, O4*

ОДРЖИВОСТ РАЗВОЈА И РАСТА – СЛОМ, РАСПОДЕЛА ДОХОТКА И НЕЈЕДНАКОСТ

Абстракт

У првом делу рада истражвани су разлози за прелаз савремене цивилизације на концепт одрживог развоја. Истиче се важност смене социо-економске парадигме развоја засноване на прекомерној експлоатацији природних ресурса новом парадигмом заснованом на прогресивном систему знања и понашања човека. У другом делу рада обраћа се пажња на факторе одрживог раста, укључујући и неједнакост у расподели дохотка. Истиче се да је стимулисање привредног раста много мањи проблем него његово одржавање у дугом року. Анализом фактора који одређују одрживост раста може се показати да су следећи фактори у корелацији са дугорочним растом: равномернија расподела дохотка, побољшање политичких институција, повећање

нивоа образовања, здравствене заштите и физичке инфраструктуре, међународна финансијска интеграција, конкурентност и структура извоза, либерализација трговине и макроекономска стабилност.

***Кључне речи**: одржив развој, социо-еколошко-економски систем, еколошка криза, одржив раст, расподела дохотка*

Introduction

In the human rights body, as the most important features of modern humanity, the right to a healthy environment is an institutionalized form of ecological values that belong to all people. But, nature has "its rights". The emergence of ecological values in our civilization is suppressed by an anthropocentric, liberal model of development based on "improving the country" and excessive exploitation of natural resources and absolute freedom of people in relation to ecosystems. "In no case the people's rights over other factors of life cannot be explained. The basic ecological principle is not the management of one another, but the mutual dependence of all coexisting parts within the whole "(Keler, 2006, 406). In accordance with this deep ecological principle and the universal value of life, we critically estimate that the neoliberal economic paradigm of uncontrolled economic growth is not a sustainable model of economic and overall social development. The only integral ecological-economic model of development, in the society of the risk in which we live, can provide a sound basis for the economy and the life of society and nature (Hafner, 2016, 26).

In this paper is considered the importance of factors determining the sustainability of growth, including inequalities in the distribution of income as an essential prerequisite for the sustainable development of the country and humanity.

The paper is structured in/consists of two parts. In the first part, the basic characteristics of the concept of sustainable development are given. The emergence of the concept of sustainable development was preceded by serious research on the environment, which established that human kind is living in conditions of devastating ecological crisis that turns into crisis of all humanity and which can lead humanity to destruction. It is said that modern civilization is helpless against senseless militarization and the colossal potential for self-destruction. All land-based systems are approaching their biophysical boundaries. The basic orientations and issues of humanity's exit from a systematic crisis are contained in the conception of sustainable development. At the end of this section, special attention is paid to the subject of the study of the concept of sustainable development - a socio-ecological and economic entity that represents a specific combination of the social, ecological and economic system that together function within defined institutional environment.

In the second part of the paper, the focus is on the sustainability of the growth period (the duration of economic growth) - defined as the time period beginning with the rise of growth and ending with the decline in growth, and the relationship between the duration of growth and the various policies and parameters (characteristics) of the country, including distribution of income. It is pointed out that many of poor countries have managed to achieve high economic growth in the medium term. However, it should be noted that developing countries rarely manage to sustain growth in the long run, and that is what distinguishes successful countries with rapid growth in the long run from

poor countries. In this respect, the question arises: what determines the duration of the period of growth and what role does the inequality in the distribution of income have?

1. The concept of the sustainable development and the new socio-economic paradigm

At the transition of the society from industrial to industrial-information, scientific conceptions, theories and models of human development are inevitable. One of the particularly important concepts of human development is the concept of the sustainable development. The emergence of the concept of sustainable development was preceded by serious researches on the environment in the world which found that humankind is living in conditions of growing ecological crisis, which turns into a crisis of the whole mankind and it which can lead us to destruction. The ecological crisis can be described as a disturbance of balance in ecological systems, and in the relationship between society and nature, which are consequences of the unresolved contradiction between the consumer's relation to the environment and the ability of the biosphere to maintain a system of natural bio-chemical processes.

Scientists stress that in the history of the Earth there were cases of civilizations tribulations. The typical example is the disappearance of Atlanta - advanced civilization. Interestingly, among the causes of the disappearance of Atlantis, the scientists say also technical and social factors, not only natural factors. Famous physicist Dž. Farrell represents the hypothesis of the technocratic catastrophe, which occurred 10-12 years ago. He argues that "the Egyptian pyramids were part of a gigantic military experiment in the creation of a particle arms of unprecedented power - an experiment which ended with global disaster (Farell, 2009). The main idea, which has intrigued the world with the myth of Atlantis, is that the natural disaster coincides with the social crisis that the Atlanteans produced and it led to the disappearance of civilization, without traces (Bakšutev, 2009).

Analysing the history of civilization, the attention is paid not only to the external causes of social disasters related to war and war conquests which by external barbarians have demolished developed civilizations, and instead have raised them backward. Namely, states and civilizations essentially demolish internal barbarians in the form of a ruling minority (exploiters, economic elites). External attacks only complete what was created as a result of the transformation of advanced civilization into barbarism which arises when the optimal relationship between production and consumption, collective and individuals, man and technique, society and nature, rich and poor people is disturbed. Speaking of the moral and social stratification of Atlanta's inhabitants, the scientist is referring to Plato's works "Timaeus" and "Critias" (Bakšutov, 2009).

Comparing the past and present, it can be seen the transformation of advanced civilization into barbarism - global technocratic crisis that affects the social, ecological and economic sphere of life. In the Declaration on Environment and Development adopted to the Second UN Conference on Environment and Development (Rio de Janeiro, 1992), the following observation is emphasized: "Humanity survives the crucial moment in its history. We are confronted with the problems of the disparities between states and within the states themselves, with the continual deterioration of the state of ecosystems on which our well-being depends." Scientists T.A. Akimova and J.U.N. Majsekin point out that two contradictory tendencies are developing in the economy:

global gross domestic product is rising, and global wealth decreases (living resources) (Akimova T.A., Moseikin Yu. N., 2009).

Modern civilization is helpless against senseless militarization and the colossal potential for self-destruction. Man has been underestimated the loss of natural resources. In line with the Global Environmental Perspective - the paper prepared within the UN program on the environment for the "Rio + 20", all systems are approaching their biophysical boundaries, with evidence that these borders are already close and that in some cases they have been crossed.

Air pollution is one of the main causes of premature mortality and health problems, especially in the child population. The risk of disappearing coral is much higher than the risk that threatens any group of living organisms. In recent decades, the wanton destruction of fish resources have been witnessed. Regardless of the series of improvements, water quality remains the main reason for human health problems worldwide. At the same time, climate change and further population growth can lead to an even greater water shortage in many areas. The quality of water is not compatible with the standards of the World Health Organization. As expected, more than 600 million people will not have access to drinking water in 2020, and more than 2.5 billion people will be deprived of basic sanitation.

Some progress has been made in ensuring access to food, although the struggle with desolation and drought has, in practice, yielded no positive results. Competition in terms of food, fuel and raw materials increases the pressure on the planet, affecting the development process of deforestation.

The basic orientations and issues of humanity's exit from the systematic crisis through the practical implication of the concept of sustainable development are contained in documents of the UN program dedicated to the environment and sustainable development. This conception has a declarative character. This means that the conception of sustainable development merely stresss the content of the opinion and observation on the environment of the UN, but it does not have a binding character. And so with whole its declarativity, the concept of sustainable development has succeeded in putting global analysis on the side of a complex of environmental and related social problems and has led to the formation of a new generally accepted model of civilization development that is called to replace an old civilization based on the anthropocentrism, enrichment and satisfaction material human needs.

The most valuable in the ideology of the sustainable development is the management of economic, environmental and social risks (Afanasiev, 2015). Sustainable development implies the management of civilization risks. Parallel with the shift of the generally accepted model of world development, the shift of the generally accepted scientific theory (paradigm) is studied. Thus, philosopher and mathematician Tomas Samuelson Kun argues that the shift of the generally accepted is arised when scientists discover anomalies that cannot be explained by the paradigm. In V.S. Stepin`s paper the diagram of the development of general-school paradigms from the beginning of the 17th century is gaven. Stepin describes the characteristics of the scientific revolution caused by the creation of: 1) classical mechanics (which studies free systems), 2) classical disciplinary organizational sciences, 3) neoclassical general system theory (cybernetics) associated with the construction of complex self-regulating systems, 4) post-classical science (synergetics) examined by complex self-regulating systems (Stepin, 2007).

The development of synergy enables the creation of a theoretical and methodological

basis for the realization of the concept of sustainable development directed at such large and complex self-developing systems, such as biosphere and society. Confirmation of the fundamental role of random fluctuations in the developing world lies in the basis of synergetic paradigm. The coincidence and indeterminacy appear as an inseparable feature of not only the micro world, but also the whole universe, including the man himself with his unpredictable emotions and the incredible diversity of variants of behaviour in identical situations (Haken, 1993).

Today, various social, economic and environmental phenomena are studied with the synergetic instruments within the social sciences. Scientists note the significant influence of synergetics has on contemporary economic theory on the complexity of the phenomena that are being studied. It should be noted that the savage paradigm of socio-economic development, based on a neoclassical theory based on the model of a rational (maximizing) man in a balanced (self-regulating) world and an emphasized consumer relationship with nature, undergoes a serious scientific critique.

The beginning of the economic crisis in 2008 showed the superficiality of the pre-crisis intellectual mainstream (the dominant scientific direction in the development of contemporary economic thought) in determining the contradiction of contemporary development and the fundamental problems of contemporary economic-centric civilization. On this occasion, it is pointed out to Karl Polanyi's statement, according to the industrial revolution of the 19th century created an unusual type of society, in which the economy is not included in the system of social connections, but social connections are embedded in the economic system. In this society, the production is secondary, it is viewed from the point of view of gaining profit, the social structure turns into a formless mass, and our humble dependence on the material, which human culture has always sought to alleviate, has been consciously strengthened and introduced in the master class.

Some of the countries that have built socialist society have adapted to industrial civilization. However, the fundamental problem remained, and the neo-liberal market system made the economy rise to the deity. The acceptable alternative to standard model of economic development is not found among modern Asian`s models of development. For example, the Chinese model of economic development puts the economic growth and mass production leading to the modern and inefficient ecological economy in the most populous country of the world.

Among the features of the crisis of the modern paradigm of economic development, its inability to solve new tasks on the path of development of human society in the field of biosphere is singled out. Criticizing the traditional neoclassical theory, Akim and Massachwrite: "Traditional economic science does not give answers to the most important practical questions. How to measure the quality of economic growth? Does the increase in goods and services influence the quality of life? How to compare the dynamics of the development of the economy and the possibilities of natural systems?". According to the scientists, in order to replace traditional economic science for the concept of sustainable development, it requires scientific knowledge about the behaviour of people and human societies in conditions of social and ecological constraints. The transition to the concept of sustainable development, according to Akimova and Masaykin, is related to the emergence of a new way of thinking, a new view of the world, which requires the realization three conditions: the change of the object of the management itself, the change of the set development goals and the reliance on social and ecological limitations. The authors believe that within the concept of the of

sustainable development, economy, ecology and society must be regarded as mutually interconnected, interdependent, mutually subordinated subsystems of a single entity.

2. Sustainability of economic growth

The recent financial crisis and the impact that it has on employment and poverty confirm the view that it is necessary, over and over again, to pay attention to growth factors, including the possible link between inequality of income, crisis and sustainable growth. Piketi and Saez noted the high increase in inequality in income distribution in the United States over the past two decades (Piketty&Saez, 2003).

A large number of economists have researched the following problem: to what extent does the inequality of income lead to a crisis? Ryan points to the existence of political and economic pressure that forced people wiht high income to accumulate money, and people with a low level of income to maintain the level of spending through borrowing (Rajan, 2010). Recent events in Tunisia and Egypt show how important of understanding the complex, reciprocal relationship between income distribution and economic growth. Too high levels of inequality can become an obstacle to growth. In addition to the risk that inequality increases the possibility of a financial crisis, it can also affect political destabilization, which, in turn, can reduce investment.

For the significant reduction in poverty, it is crucial to achieve rapid economic growth in the long run. For these purposes, it seems that long-term growth regressions of Robert Barro and similar analyses are the most relevant. These analyses assume that growth is more or less uniformly increasing real income (per capita), that changed by low shocks - fluctuations of the business cycle - with possible, an occasional increase in real income for as much as poor countries (developing countries) integrate into the global economy (Barro, 2000). Figure 1 shows an increase in the level of real per capita income in two developed countries (United Kingdom and the United States), according to a pattern that is in line with the above definition of growth. If this is the standard pattern, the most interesting question is: how to explain the fact that some countries develop faster than others in the long run.

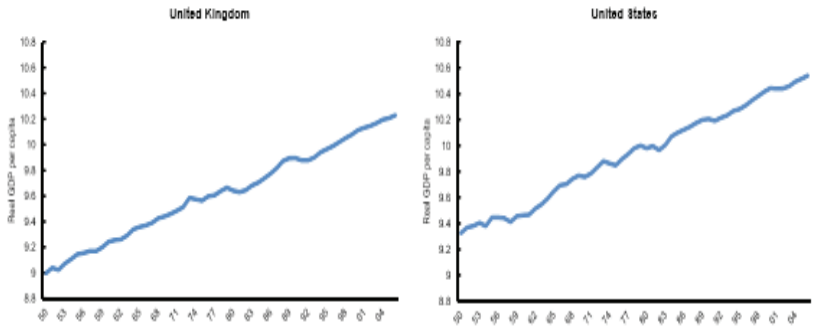

Figure 1. An uniform increase in growth (real GDP per capita)
Source: Berg, A., & Ostry, J. (2011) Inequality and Unsustainable Growth: Two Sides of the Same Coin? IMF Staff Discssion Note, 11(8): 1–14.

Figure 2 shows the level of real per capita income in the group of developing countries (Brazil, Cameroon, Chile and Jordan). Unlike the figure 1, the different experiences of developing countries is noticeable. Considering similar figures, Pritket and others have discovered that understanding growth must include the detailed consideration of the turning points (breakpoints), it should be not taken into account the ups and downs of growth within the business cycle, but the analysis of the question why some countries are able to sustain growth in the long term in time, while others explore the causes of decline every five years, followed by stagnation and deep recession (Pritchett, 2000). In order to get an answer to this question, the research focuses on the growth period, defined by the time interval that begins with the growth upbreaks and end with a downbreaks. The minimum length of the growth period is 8 years.

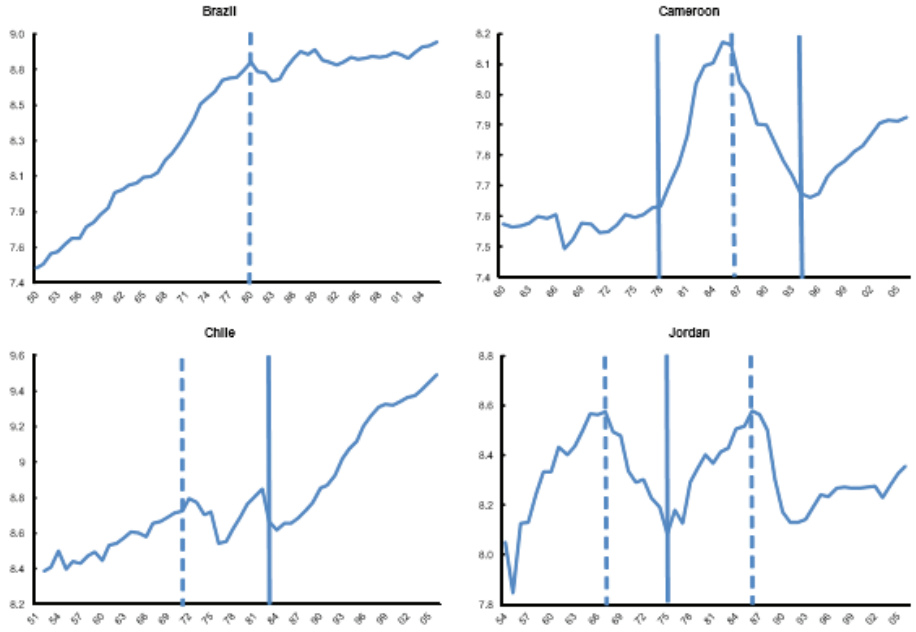

Figure 2. The upbreaks, downbreaks and period of stable growth (real GDP per capita)
Source: Berg, A., & Ostry, J. (2011) Inequality and Unsustainable Growth: Two Sides of the Same Coin? IMF Staff Discssion Note, 11(8): 1–14.

The sustain growth in the long run is interesting for two reasons:

- First, looking at the growth of developed and developing countries (Figures 1 and 2), stimulating growth is a much smaller problem than sustaining growth over long periods (Hausmann, Pritchett & Rodrik, 2005). Developing countries from time to time have managed to increase growth in the short or medium period. Nevertheless, the growth of developing countries is different from the growth rate of success for as long as developing countries are able to sustain growth over a long period of time.
- Second, in recent years, countries enjoy the stable economic growth in a much higher degree than in any other period of the last thirty years. A large number of the growth period of Africa, subscribed in sub-Saharan Africa, where many scientists studied the development of the country in the mid-1990s.

The first observation related to changes in growth (upbreaks and downbreaks) and growth periods is that growth and growth are quite frequent, which confirms the idea that growth is not uniform (the real added per capita does not increase evenly, as indicated by the long-term growth regression of Robert Barr and similar analyzes). On the other hand, the problem of underdeveloped countries (the countries of Latin America and Africa) is the inability to sustain growth over a long period of time. Almost all growth periods in developed and developing countries in Asia last at least 10 years or longer, as observed in only two thirds of Latin American countries (Table 1). It will be that the long-term increase in the real gross domestic product per capita is what distinguishes the developed countries from the underdeveloped ones.

Table 1.Characteristics of growth period

Region	Frecuencyand the duration of growth period					Awerage growthbefore, duringand after growth period				
	No. of countries	No.of periods	Mean duration (years)	% Periodslasting at least		Awerage growth			3 years	
				10 years	16 years	Before	During	After	Before	During
Complete growth period										
Developed countries	37	2	13.0	100.0	00.0	3.3	6.0	1.2	2.6	3.4
Developing countries in Asia	22	3	18.0	33.3	33.3	-0.7	9.1	1.4	1.4	1.9
Latin America	18	5	14.4	60.0	40.0	1.1	4.8	1.3	1.3	-1.3
Sub-Saharan Africa	43	3	8.3	00.0	00.0	-2.7	9.9	-4.0	-11	-6.5
Other countries in development	20	7	10.7	42.9	14.3	-1.6	5.0	-0.9	-1.4	-2.0
Total (including the full period of growth)										
Developed countries	37	11	24.4	100.0	63.6	0.7	5.7	N.a	-0.1	N.a
Developing countries in Asia	22	16	24.2	87.5	56.2	-0.3	5.8	N.a	0.4	N.a
Latin America	18	7	15.7	71.4	42.9	0.4	4.4	N.a	0.1	N.a
Sub-Saharan Africa	43	18	13.6	66.7	22.2	4.0	6.3	N.a	7.7	Na
Other countries in development	20	12	13.5	66.7	33.3	-2.1	5.0	N.a	2.8	N.a

Source: Berg, A., & Ostry, J. (2011) Inequality and Unsustainable Growth: Two Sides of the Same Coin? IMF Staff Discssion Note,11(8): 1–14.

In addition to the issue of growth duration, another significant feature of the growth period data refers to the growth rate within and out of the growth period. Table 1 shows that all regions have high growth rate within growth periods, with countries of Sub-Saharan African with the highest growth rates. There are, however, great differences after the end of the growth period. In developed Asian countries, the end of growth is

without serious negative consequences (without stagnation and deep recession), while in Africa, periods usually end in deep depression.

To what extent is the duration of growth associated with differences in countries' characteristics and policies, including income distribution?, the question arises. It has long been believed that the quality of economic and political institutions, external orientation, macroeconomic stability and the accumulation of human capital are important determinants of growth, the great deal on the understanding of mechanisms and political consequences caused by their mutual connections was done Berg and Ostri agree that the distribution of income can be classified as significant factor determining growth.

To justify this claim, Berg and Ostry show a linear (simple) correlation between the duration of the growth period and the average of income distribution during the growth period for selected countries. The measure of inequality is the Gini coefficient, ranging from 0 (all households have the same income) to 100 (all income is allocated to one household). As Berg and Ostri point out there is the pattern: more equal distribution of income (lower inequality) is in correlation with long-term growth in time. The question arises: what are the possible channels through which inequality affects the duration of growth? (Berg & Ostry, 2011).

- The lack of credit market. Poor people may not be able to fund their education. The more equal distribution of income could increase investment in human capital. In the research of Berg and Ostry there is a negative correlation between certain indicators of human capital (especially secondary education) and distribution of income (Berg & Ostry, 2011). This confirms Wilkinson and Pickett's argument that countries with unequal distribution of income have poor social indicators (Wilkinson & Pickett, 2009).
- Political power. Political power will be distributed in a more egalitarian way than economic power in countries with a marked increase in inequality in income distribution. Attempts to use political power to influence the redistribution of income, for example, through the tax system, can discourage investment and lead to a reduction in the duration of growth (Alesina & Rodrik, 1994). In addition, attempts by the economic elite to oppose redistribution, for example, buying votes and corruption measures, are inherently negative and harmful, and can cause significant damage to economic growth (Barro, 2000).
- Political instability. Inequality in the distribution of income can increase the risk of political instability, and the resulting uncertainties can reduce the incentive for investment and hence slow down economic growth. Rodrick agrees that inequality and political instability reduce the effectiveness of countries in opposing external shocks (Rodrik, 1999). Similarly, Berg and Sachs point out as a rule that societies with a high degree of inequality face very serious debt crises (Berg & Sachs, 1988). Ils points out the link between unemployment and social unrest (IILS, 2010).

Many factors can affect the duration of growth. Berg and Ostry investigate the mutual relationship between the duration of growth and other factors. The research strategy of Berg and Ostry therefore consists in assessing other factors determining the duration of growth, and then to draw some conclusions. Analysing the variables it can be shown that the following factors are in a positive correlation with long-term economic growth (Berg & Ostry, 2011):

- Improving political institutions. Political institutions controlling the executive contribute to the prolongation of growth. Berg and Ostry have discovered that several measures have been taken to improve political institutions in correlation with longer growth.

- Increasing the level of education, health care and physical infrastructure. Improving initial or primary education has strong impact on the length of economic growth.
- Liberalization of trade. Trade liberalization has significant impact on the growth period, which is in line with the idea that mechanisms such as: increasing the size of the market, encouraging competition, and the spread of know-how can link the openness of trade and growth and increase the duration of growth.
- International financial integration. Foreign direct investment (FDI) contributes to an increase in the duration of growth period, while increasing the external debt leads to a reduction in the duration of the growth period.
- Competitiveness and export structure. The high share of industrial goods in total exports and economic policy measures to improve the export structure are in a positive correlation with the duration of the growth period.
- Macroeconomic instability (volatility). The rising depreciation rate of currency and inflation lead to a reduction in the duration of growth period.
- External shocks. Reducing the volume of trade and raising interest rates in the US, in particular, leads to a reduction in the duration of the growth period.

In principle, the results of the Berg and Ostry's analysis are consistent with the interpretation of the East Asian "economic miracle": growth is the most sustainable (in the longest terms) in countries that remain faithful to external orientation, have high inflow of foreign direct investment and insignificant external debt, maintaining macroeconomic stability and that have relatively equal income distribution. In addition, it should be noted that the results of the analysis of Berg and Ostry, in general, remain unchanged even when the countries of Asia are excluded from the sample.

It is possible that many of the identified factors are interconnected. To take this opportunity into account, Berg and Osty investigate the cumulative effect of the identified factors. Many potential determinants of the duration of the growth period remain important in the multivariate analysis, although their significance (statistically and economically) vary depending on the particular sample, regardless whether or not other potentially significant variables are included or not, etc. Some variables are significant at least in several samples and specifications. The main results of the multivariate analysis of Berg and Osty are the following (Berg & Ostry, 2011):

- Better (improved) political institutions are in positive correlation with the duration of the economic growth period: decreasing the autocracies level from 1 to 0 corresponds increasing the duration of the growth period by 25%.
- Liberalised trade, measured by a variable that takes the value 1 when trade is liberalized (when there are no restrictions on trade) and 0 in the opposite case, is associated with an increase in the duration of growth.
- Decreasing the appreciation of the currency is associated with longer duration of the growth period. Reducing the appreciation by 10 percentage points of the real exchange rate - measured as deviation from purchasing power parity, after the adjustment of income per capita, is associated with an increase in the expected growth period of 8 percent.
- The impact of financial globalization on the duration of the growth period depends on the flow (movement) of capital. A larger inflow of foreign direct investment is associated with long-term economic growth. Increasing the share of foreign direct investment in GDP of 8 to 12 percents is associated with increasing the expected growth period of 15 percent.

- Lower external debt is associated with long-term economic growth. Reducing the share of external debt to GDP from 44 percent to 39 percent leads to an increase in growth of about 2 percent.

The key result of the joint (multivariate) analysis of Berg and Ostry is that the distribution of income is one of the most robust or important factors of the duration of the growth period. It should be said that inequality remains a statistical and economic factor in a common (multivariate) analysis, despite the inclusion of many variables. Inequality, unlike other factors, retains its statistical and economic significance within the various samples and definitions of the growth period. In this way, the inequality is a more important determinant of the duration of the growth period than many other factors that are considered as key determinants of the period of growth (Berg & Ostry, 2011).

Conclusion

Ecological values are fundamental ideal and collective norms of behaviour whose acceptance in the economy and everyday life enables an integrated and harmonious development of society, economy and nature. Ecological values, ecological awareness and ecological culture are important determinants of sustainable development. Taking into account the principles of sustainable development and ecological value, it is possible to reduce, control and manage a number of risks that give our civilization characteristics of a risky society. In order to achieve a sustainable development of the socio-ecological-economic system, it is crucial to achieve rapid economic growth in the long run. For these purposes, policies that would reduce inequality and revive economic growth should be favored.

It should be noted that inequality is partly the result of market forces, but this is not sufficient to justify noninterventionism. If growing inequality, in a certain way, is the inevitable consequence of the development of market economy, then it would expected a higher level of inequality in rich countries, but this is not the case. On the contrary, many differences in inequality in countries and in different periods can not be considered as the result of an efficient market. For example, some differences are obviously the result of the historical regularities of the country.

It should be bravely concluded that energetic (decisive) policies can reduce inequality. However, there is scope of policies to reduce inequality in income distribution, without undermining incentives that contribute to increase the duration of the growth period.

- Active labour market policies to encourage job creation can contribute to the recovery of economic growth, in particular when taking into account the fact that growing unemployment leads to an increase in inequality.
- Equality of opportunity or egalitarianism can lead to more equitable (fair) and more effective results. For example, effective investments in health and education - human capital - can adjust the cycle of long-term stimulating growth with equity, avoiding, in the short-term destimulating effects for economic growth. Investments in education and health can contribute that workers to adjust to new technologies. By doing so, these investments not only reduce inequality, but also stimulate sustainable growth.
- Some countries have managed to significantly reduce inequality through poverty-focused policies (Ravallion, 2009)
- Well-designed progressive taxation and adequate negotiating power of workers (strong unions) can also be important in ensuring equality. It is

necessary to avoid dual labour markets that encourage division between insiders and outsiders. In addition to the conclusions on economic policy at the country level, this research provides some recommendations for international institutions such as the IMF.

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SUSTAINABLE DEVELOPMENT AND PROJECT MANAGEMENT[3]

Abstract

The very concept of sustainable development is very complex, as evidenced by a number of definitions of the term. The International Institute for Sustainable Development has defined this concept as an idea where intragenerational and intergenerational equity affects the design or change of national economy and global development. Performance functioning of projects related to sustainable development as a system depends on how the defined goals are implemented and how the purposes are accomplished in a dynamic environment. The basic elements of the concept of project management are time, resources and costs on the one hand and the planning, monitoring and control of individual phases of projects on the other. The aim of this paper is to briefly describe the basic concepts related to the project management of its definition and characteristics, the concept of sustainable development management, the significance and indicators of sustainable development and the institutional and legislative framework for the implementation of sustainable development policy.

Key words: *Management, Sustainable Development, Project Management*

JEL klasifikacija:Q56,

ОДРЖИВИ РАЗВОЈ И УПРАВЉЕЊЕ ПРОЈЕКТИМА

Апстракт

Сам појам одрживог развоја је врло сложен, што потврђују бројне дефиниције овог појма. Међународни Институт за одрживи развој је дефинисао овај концепт као идеју где унутаргенерацијска и међугенерацијска једнакост утичу на обликовање или промене националне економије и глобалног развоја. Успешност функционисања пројеката везаних за одрживи развој као система зависи од тога како се реализују дефинисани циљеви и остварују сврхе у динамичком окружењу. Основни елементи концепта управљања пројектима представљају време, ресурси и трошкови са једне стране и планирање, праћење и контрола појединих фаза пројеката са друге стране. Циљ овог рада је да укратко опише основне концепте везане за управљање пројектом његове дефиниције и карактеристике, концепт

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управљања одрживим развојем, значај и индикаторе одрживог развоја и институционални и законодавни оквир за спровођење политике одрживог развоја.

Кључне речи: *Управљање, Одрживи развој, Управљање пројектима*

Introduction

The concept of sustainable development is very complex, as evidenced by a number of definitions of the term. International Institute for Sustainable Development has defined this concept as an idea where intra and intergenerational equity affect the design or changes in the national economy and global development.

According to the report of The World Commission on Environment and Development in 1987, sustainable development is development that meets the needs of nowdays without compromising the ability of future generations to meet their own needs.

Performance functioning of projects related to sustainable development as a system depends on how the defined goals are implemented and how the purposes are accomplished in a dynamic environment. However, it must be emphasized that the system of this type is acted by the external and internal disturbing factors. From those simplest disturbing factors, which effects can be predicted and which consequences of the system is known, so taking control measures to eliminate them is known, to such interference, which can not be predicted, and appropriate management measures for their removal are not known. If all what we cited added too low degree of determination of such systems, it is entirely clear that project management is essential.

Due to the dynamic environment, there is a need for greater elasticity and flexibility of companies to adequately respond due to the turbulent market developments.

Concept of project management

Performance functioning of projects related to sustainable development as a system depends on how the defined goals are implemented and how the purposes are accomplished in a dynamic environment. However, it must be emphasized that the system of this type is acted by the external and internal disturbing factors.

From those simplest disturbing factors, which effects can be predicted and which consequences of the system is known, so taking control measures to eliminate them is known, to such interference, which can not be predicted, and appropriate management measures for their removal are not known. If all what we cited added too low degree of determination of such systems, it is entirely clear that project management is essential.

The basic elements of the concept of project management are (Deželjin, Vujic, 1995):

- the time, resources and costs on the one hand and
- the planning, monitoring and control of individual phases of the projects on the other side.

The essence of project management is an attempt that through planning, monitoring and control of time, cost and resource project is implemented in minimal time, with

minimal use of resources, and with minimal costs necessary for the realization of the project (Deželjin, Vujic,1995)

Project Quality Management aims to ensure the quality of the project implementation in all its segments to the end. It is important that the terms of reference do not deviate from the prescribed quality standards. A measure of quality is the extent which we succeed to fulfill requirements, needs and expectations of the project task on which we engage the project team. Quality assurance is a management component, ie, the aspect of quality management. It includes management processes harmonization of the organization, concepts, objectives and resources in the project according to the standards provided for execution of the project and defined objectives. Quality needs to be looked at, in terms of importance, at the same level as the project scope, time and cost (Bobera, 2007).

Quality Management Project, globally speaking, involves two processes:

- Quality Assurance
- Project and quality control of the project.

Quality assurance represents essentially preventive activities, whose purpose is to create the preconditions for the parent organization, primarily through achieving quality of the process from which these products are formed (Rakovic, 2007). One of the most common forms in which quality is ensured is establishing, maintaining, improving and promoting the management system by quality within the organization and its certification to the ISO 9001: 2000 (Bobera, 2007). In every industry, in every business and every activity there are visible and hidden possibilities of fault, inaccurate or wrong doing the job. It is a fact that reflects a realistic and uncertain environment in which we live and work. However, there are, unfortunately, very real opportunities, especially in business processes, enterprises and systems that bugs are reproduced and multiplied, and that error or poorly done activity or work in one part of the project or system - related causes an error or bad performance of activities in other parts. In this way, the chain usually cause new mistakes and problems requiring tremendous time for finding, controling and correcting (Bobera, 2007).

That searching, checking and correcting or remaking requires a large number of people and considerable time, so in this way they cause enormous costs, expensive manufacturing and business process and make inappropriate and expensive products and projects (Rakovic, 2007).

Management of sustainable development

Sustainable development, as a complex concept, combines the three dimensions - environmental sustainability, economic efficiency and social responsibility. This concept of the above concept is known as the "three pillars model" (Đekić, Hafner, 2013). The environmental dimension is concerned, first of all, conversation of biodiversity, preservation and rational use of natural resources, reducing pollution of the environment, concerns about endangered species, their habitats, ecosystems, etc. (Đekić, Hafner, 2013). There are five areas based on which to monitor the environmental dimension of sustainable development (Miltojević, 2011):

Atmosphere, land, oceans, sea, water, biodiversity.

The social dimension refers to (Miltojević, 2011):

Social relations, human rights, the achievement of social welfare, transparency of social activities and, involvement of people in decision-making.

The social dimension is monitored through five areas (Miltojević, 2011):

Health, social justice, education, population, safety and housing.

The economic dimension of sustainable development is based on the principles of economic development compliance with the resources and the production capacity and it is observed through the two areas, namely (Miltojević, 2011):

- production and
- economic structure and consumption;

Serbian national economic development strategies also identified this the three pillars of sustainable development. All three dimensions of sustainable development links the existence of an adequate institutional framework, which is a necessary precondition for the implementation of objectives, policies and regional development policy. That is why institutional framework is highlighted as a fourth dimension of sustainable development in recent scientific analyzes and conclusions. Also, some authors believe that the culture is a specific dimension of sustainable development (Đekić, Hafner, 2013).

Some key recommendations for improving the institutional dimensions of sustainable development at the global level are also highlighted at the summit. The recommendations are:(Đekić, Hafner, 2013):

- changes to international contracts in the field of environmental protection,
- the introduction of new regulations in the international management by concept of the sustainability
- conflict management when concluding multilateral agreements,
- strengthening public-legal partnerships and networks and
- to strengthen the national system of sustainable development management.

Importance of sustainable development

Natural resources are at the base of the industrial development of each country. Natural resources are natural sources of raw materials and energy on which development of all industries is based.

With the exception of land and water, as renewable sources, we conclude that the higher part of industrial development are non-renewable mineral resources. (Đekić, Hafner, 2013):

- the ore,
- nonmetals and
- energy resources - coal, oil and gas.

We see absurd in the correlation between the achieved level of industrial development of mineral resources and available mineral resources. Specifically, industrial production recorded a constant growth rate and its development base, shaped in natural mineral resources, has a constant rate of reduction in available reserves.

Therefore, there is the question whether a given rapid growth of industrial development lead to the complete exhaustion of its raw material base, and thus to its collapse (Đekić, Hafner, 2013).

The world economy is, therefore, faced with the issues where is the border of economic growth. Dramatic warnings on such a future in the past decades are less and less denied. The protagonists of the drama challenging situation, as one of the main arguments, emphasize the fact that the Earth is still little explored and that the

possibility of finding new mineral reserves are still high, especially sources renewable energy sources (solar, wind, geothermal, biomass).

This is true, or rather partly true, but not enough to relax and neglect the following facts (Đekić, Hafner, 2013):

- accessible part of the earth's crust, where are the deposited prospecting mineral raw materials is limited;
- Most rich deposits of mineral raw material is largely exhausted, and amongst the newly discovered and explored deposits, there are more poor than rich, with tendency of a constant decline of quality;
- soil, water and air are exposed to an increasing degradation and contamination due to intensive exploitation of natural resources
- population of the Earth is growing rapidly, and thus the need for food, water and industrial products.

Thus, in conditions of limited natural resources, compensating exhausted newly found reserves don't remove collapse, but it only postponed for a while.

Mankind is aware of these facts, the first global conference on the environment in Rio de Janeiro in 1992. passed a resolution on the promotion of the sustainable development strategy, which has the same targets as new philosophical direction in the further development of human civilization (Đekić, Hafner, 2013).

The essence of the sustainable development strategy comes to the requirement that each generation works and develops satisfying their needs, but not denying editing capability for further development of future generations. Basically, this means development through rational use and saving natural resources and environmental protection, which is just the most vulnerable of their exploitation and processing.

Therefore, management of natural resources, as narrow scientific area, aims to promote and explore the economic specifics of the industry that deals with the exploitation and processing of natural resources, and overall economics of basic industries and study in the context of sustainable development strategies.

This goal gives it a much wider significance than its name and puts it in a multidisciplinary field, with fundamental significance for future industrial and socio-economic development in the world (Đekić, Hafner, 2013).

Resource management as a basis for sustainable development

Some natural raw materials and fuels are non-renewable. Their quantities in the earth's crust are limited. Once extracted and spent reserves of ore, coal, oil and gas, nature is no longer compensated.

Therefore, their rational exploitation, in accordance with the principles of sustainable development, is the strategic question of the survival of human civilization. The strategic importance of the rational exploitation of non-renewable resources stems from the fact that their exploitation, and the use are followed by a lot of environmental pollution (Đekić, Hafner, 2013).

Renewable natural resources, such as land and water, in the era of rapid industrial development become conditionally renewable, since that they are exposed to environmental degradation and pollution.

Sustainable development is a harmonious relationship between the economy and ecology, in order to preserve natural wealth and healthy environment for future generations. In other words, sustainable development means the development harmonized with the limits of nature and the economic and environmental interests, both locally and globally (Đekić, Hafner, 2013).

Correspondingly, sustainable development is defined as development which meets the needs of the present without compromising the ability of future generations to meet their own needs (Miltojević, 2011).

It also includes the need of compromise between excessive consumption of natural resources in the rich countries and the need of poorly developed countries for faster development, and achieving social approaching the poor people to the rich.

In addition, in the foreground stand out requirements for the protection of nature and the long-term conservation of natural resources. This can be achieved only through rational global reduction in use of non-renewable resources, in order

to achieve development that connects the needs of present and future generations. National Sustainable Development Strategies are defined as the process of planning and action that allows the integration of economic, social and environmental objectives towards achieving sustainable development. An integral part of such a strategy is a strategy for environmental management, which includes design, manufacturing, sale and use of the product with minimizing environmental impact during the entire "life cycle" of a product (Miltojević, 2011).

The conference in Rio de Janeiro is a watershed moment for the global acceptance of the concept of sustainable development. Several important documents for the establishment of procedures were signed which should change condition for the better (Đekić, Hafner, 2013):

- Declaration on Environment and Development
- The Convention on Climate Change
- The Convention on Biological Diversity

Indicators of sustainable management

Sustainable development indicators are easily understandable, useful and complex information to investors and shareholders to make decisions on development planning. Indicators must be suitable for the analysis, communication, clarifying and assessing the performance of alternative solutions, through easily comparable value, in order to facilitate a proper decision.

There is no single approach to the definition of sustainable development indicators, but each state creates its own model of sustainable development, in accordance with natural resources, historical, political, cultural and environmental

conditions, with the possibility of redefining the goals. Indicators should provide the information necessary to make decisions that allow you to move the country towards sustainable development. They must be easily identified through the entire "life cycle" of the development system.

When we defining the indicators we should bear in mind that sustainable development, in addition to demands for environmental protection and long-term conservation of natural resources, involves a compromise between excessive consumption of natural resources in the rich countries and the need of the poor to accelerate the development and approaching to the rich.

Sustainable development indicators should specifically define the mechanism of providing funds for achieving the goals of sustainable development. Overall, indicators of sustainable development can be classified into the following groups (sets) (Miltojević, 2011):

Indicators of use of resources, indicators of management, indicators of product, regional indicators, local indicators and sectoral indicators.

Each set of indicators should include indicators of (Miltojević, 2011):

Prosperity, benefits for people, structure of the population, production, recycling, waste storage, climate and climate impact, the quality of soil, water and air, biodiversity, use of non-renewable and renewable energy sources, the impact of production on human health and others.

For effective monitoring of realization of the National Strategy for Sustainable Development it is necessary to establish a system of measuring the degree of realization of the objectives defined by the Strategy in given time by indicators. Indicators should enable forecasting acceptability of business, providing information on current conditions and assumptions about changes over time. In order to be effective over time it is necessary that indicators are constantly upgraded in accordance with technological innovations and changes in social values. A good indicator indicates a problem and helps identify ways to solve it (Đekić, Hafner, 2013).

The institutional and legislative framework for the implementation of sustainable development polices in Serbia

Although the role of the state is often challenged in the past, however, when it comes to achieving the goals of sustainable development, as a complex concept that combines several dimensions, the active role of the state is more than desirable (Miltojević, 2011).

One way of directing the development in the direction that ensures intergenerational equity is to create a sustainable strategy. With this move, the Government of the Republic of Serbia showed interest in the issues of sustainable development and a willingness to develop adequate policies and take appropriate action in this area (Đekić, Hafner, 2013).

The strategy was written in accordance with international strategies in this area and also it is complied with numerous other development strategies which the government of the Republic of Serbia adopted. The report on the analysis of the National Strategy for Sustainable Development of the Republic of Serbia, which is made by the Research Institute for Sustainable development in Vienna, the development process and institutional solution that strategy propose are positively assessed (Đekić, Hafner, 2013).

The key institution that should take the lead role in delivering and implementing sustainable development policies defined in the Strategy, is the Office for Sustainable Development. It prepares decisions and coordinate the work of the Council for

Sustainable Development and it is accountable to the Government. Office for Sustainable Development should perform professional, administrative and operational tasks in connection with coordinating the work of all ministries that their actions are involved in the process achieving sustainable development (Đekić, Hafner, 2013).

Office for Sustainable Development is responsible, on behalf of the Government, implementing the Strategy, implementing projects and activities from the Action Plan for the implementation of the Strategy, as well as to monitor the achievement of sustainable development goals, coordinate inter-ministerial group and cooperation of the state administration in promoting and monitoring the implementation of sustainable development , inform the public and promote activities in achieving sustainable development (Đekić, Hafner, 2013).

In addition to the Office for Sustainable Development, it is necessary to establish a Council for Sustainable Development, which would be an inter-ministerial body, which composition they would make the ministers responsible for environmental protection, economy and regional development, finance, labor and social policy, telecommunications and the information society and Science, as well as other ministers of the relevant ministries of the Republic of Serbia. In addition to these institutions, the issue of sustainable development should be also dealt with (Đekić, Hafner, 2013):

The agency for environmental protection, Energy efficiency agency, Institute of public health of Serbia, Republic hydrometeorological service, Republic institute for statistics , Republic institute for development, Institute for nature conservation of Serbia, Center for cleaner production, and National center for climate change.

Sometimes a large and disorganized institutional apparatus may negative affect the achievement of the objectives of the Strategy, and should therefore be taken into account which ministries, agencies and offices will be involved in activities related to the concept of sustainable development. It is important that among these institutions there is a high level of cooperation and connection, since that sustainable development consolidate several dimensions (Miltojević, 2011).

Until now the most effective approach is the Norwegian approach, where the main responsibility of the Prime Minister's office with the support of a special Council chaired by the Ministry of Finance. As an institutional solution to the level of transferred liability particularly outstanding example of Sweden, which in 2005

established the Ministry for Sustainable Development. The Ministry was formed by merging three previous individual departments (Đekić, Hafner, 2013)

- energy,
- environmental protection,
- planning and housing.

Sweden is one of the countries of the European Union is a leader in key areas of sustainable development (Miltojević, 2011).

Conclusion

Modern business conditions, numerous global crisis, the growth of world population and limited natural resources have popularized the issue of sustainable development.

Each market-oriented country, which takes account of the issues of ecology, environmental protection, social welfare of its citizens and their standards, pays great attention to the issue of sustainable development. This concept incorporates three dimensions: economic, social and environmental, and recently it was joined the fourth, institutional dimension. It should coordinate the activities of the past three dimensions and to provide them with support in achieving their policy. Looking at the global, institutional aspects of sustainable development has so far shown a number of failings that need to be eliminated in the coming period. Primarily it refers to the changes in international contracts in the field of environmental protection, the introduction of new regulations in the international management of the concept of sustainability, avoiding conflict when concluding multilateral agreements, strengthening of public-legal partnerships and networks and national authorities who will deal with these issues, and certainly raise awareness of all citizens when it comes to the issue of sustainable development. The Republic of Serbia by adoption of the National Strategy for Sustainable Development showed serious intention to address this issue, since it is a prerequisite to join the European

Union. The strategy, in addition to economic, social and environmental dimensions, and provided the institutional framework.

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ENVIRONMENTAL SUSTAINABILITY: IMPLICATIONS AND LIMITATIONS IN WESTERN BALKAN COUNTRIES

Abstract

Environmental sustainability is one of the most important factors of sustainable development in recent years. Consequently, the improvement of environmental quality is a significant task of every national economy that strives to long-term social and economic development. The purpose of this paper is to analyse the environmental performances of six Western Balkan countries and to identify the critical factors for its improving in the future. The research is made using the data of Environmental Performance Index (2018) published by Yale University and Columbia University, in collaboration with the World Economic Forum. The research methodology is based on comparative analysis and benchmarking. The research findings of this study indicates many possibilities for improvement of environmental performances in Western Balkan countries, especially in Bosnia and Herzegovina. The conclusions of this paper provide recommendations to environmental policy-makers in Western Balkan countries.

Key words: *environmental performances, sustainability, Western Balkan countries*

JEL classification: Q56, O57

ЕКОЛОШКА ОДРЖИВОСТ: ИМПЛИКАЦИЈЕ И ОГРАНИЧЕЊА У ЗЕМЉАМА ЗАПАДНОГ БАЛКАНА

Апстракт

Еколошка одрживост представља један од најважнијих фактора одрживог развоја последњих година. Сходно томе, унапређење квалитета екологије представља значајан задатак сваке националне економије која тежи дугорочном друштвеном и економском развоју. Циљ овог рада је да анализира еколошке перформансе шест земаља Западног Балкана и идентификује кључне факторе за њихово побољшање у будућности. Истраживање се врши

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коришћењем података Индекса еколошких перформанси (2018), објављених од стране Јејл универзитета и Колумбија универзитета у сарадњи са Светским економским форумом. Методологија истраживања заснована је на компаративној анализи и бенчмаркингу. Резултати истраживања ове студије указују на велике могућности за побољшање еколошких перформанси у земљама Западног Балкана, посебно у Босни и Херцеговини. Закључци овог рада дају препоруке доносиоцима одлука у области еколошке политике у земљама Западног Балкана.

Кључне речи: *еколошке перформансе, одрживост, земље Западног Балкана*

Introduction

The concept of sustainable development had become an important object of scientific observation in the theoretical and empirical studies world wide. A large body of the modern literature in this field is based on three key dimensions of sustainable development: economic development, social development, and environmental protection. Each of these dimensions is examined in the literature from numerous aspects. Consequently, there are a number of different conclusions about every mentioned dimension of sustainable development that provide recommendations for policy implementation.

Every national economy in a globalized world conducts a series of policies that are focused on one or more dimensions of sustainable development. Environmental policy is one of them. It is a policy that focuses on problems arising from human impact on the environment, which retroacts onto human society by having (negative) impact on human values such as good health or a green environment (Rajput, Raghuwanshi, Thakur, 2015). It is obvious that the efficiency of the environmental policy has great impact on the life quality of the people. Thus, it is very important to continuously evaluate the results of each world country in the process of establishing environmental goals.

The ambition of this paper is to analyse the environmental performances of six Western Balkan countries and to benchmark them with the environmental performances of top six European countries. The purpose is to determine the global position of each country in the Western Balkan group and identify key factors for the improvement of their environmental performances in the future. The research findings of the study should give guidance to policy-makers of Western Balkan countries in the process of improving environmental performances.

The first section of the paper provides a theoretical background and literature review in the field of environmental sustainability. Research methodology and data basis are elaborated in the second part of the paper. The research results are shown and considered in the third section. The last part of the paper provides the conclusions and recommendations for improving the environmental sustainability in Western Balkan countries.

Theoretical background and literature review

Rapid and extensive industrialization and urbanization around the world in recent years have created a number of serious environmental problems in almost all countries across the globe. It made the need on the national economy level to create different strategies and plans of environmental development as an important prerequisite for the sustainability of human activities. It is important to note that „the term 'sustainability' should be viewed as humanity's target goal of human-ecosystem equilibrium (homeostasis), while 'sustainable development' refers to the holistic approach and temporal processes that lead us to the end point of sustainability" (Shaker, 2015, p. 305). The same understanding of those terms is applicable in the case of „environmental sustainability" and „environmental development".

Goodland (1995) considers that „we must save the remnants of the only environment we have and allow time for and invest in the regeneration of what we have already damaged" (p. 5). This author also concludes that „the goal of environmental sustainability must be reached as soon as humanly possible" (Goodland, 1995, p. 21). It refers to the importance of environmental sustainability in every national economy that strives to long-term survival. Unfortunately, the concept of environmental sustainability has special significance in the developed countries, but it has not adequate treatment in some of the developing countries (Aquilani et al., 2018). However, it must be acknowledged that almost every country in the modern world applies the concept of environmental sustainability, some in the larger and some to a lesser extent.

There is vast of literature on the different aspects of environmental performances and environmental sustainability. A huge part of that literature is related to corporate environmental performances in various industries (Jung, Kim & Rhee, 2001; Labuschagne, Brent & Van Erck, 2005) and countries (Latan et al., 2018). Latan et al. (2018) prove that the implementation of environmental strategies has been considered key competitive advantages for many companies and emphasize the importance of achieving better corporate environmental management. However, dominant part of the studies refers to the environmental sustainability on the country level. Some of them examine the relationship between economic growth and environmental sustainability (Almeida et al., 2017). The others are related to overall environmental policy (Botta, E., Kozluk, T., 2014). Furthermore, the great attention of the researchers in this field attracts evaluation of environmental performances of countries (Gallego-álvarez et al., 2014), which is also ambition of this paper.

There are numerous empirical studies that use or propose different indicators for evaluation of environmental performances and environmental sustainability (Azapagic & Perdan, 2000; Dewulf & Van Langenhove, 2005; Evans et al., 2009; Janković-Milić, Jovanović & Krstić, 2012; Singh et al., 2012; Yigitcanlar & Teriman, 2014; Dizdaroglu & Yigitcanlar, 2016; Hallstedt, 2017; Fraccascia et al., 2017). In addition, environmental experts at the Yale University and Columbia University have developed the methodology of measuring environmental performances of countries by Environmental Performance Index. It allows the comparation of the results of national economies according to indicators that correspond to environmental health and ecosystems. This paper uses the data of Environmental Performance Index to meet its goal.

Research methodology and data basis

The ambition of this paper is to analyse environmental performances of Western Balkan countries and to identify key factors for their further development in this field. The research is made by applying the comparative analysis and benchmarking method. The study refers to the following six Western Balkan countries: Albania, Bosnia and Herzegovina, Croatia, Macedonia, Montenegro, and Serbia. Since the analysis includes six Western Balkan countries, the following group of top six European countries according to EPI global rank are defined as a benchmarking group: Denmark, France, Malta, Sweden, Switzerland, and United Kingdom.

The data basis of the research includes the data of *Environmental Performance Index* (2018) published in the annual report by *Yale Center for Environmental Law and Policy of Yale University, Center for International Earth Science Information Network of Columbia University*, in collaboration with the *World Economic Forum*. As it is noted in the report, this index provides a measure on a national scale of how close countries are to established environmental policy goals. Thus, it proposes a global rank list of the national economies that highlights leaders and laggards in environmental performance, gives insight on best practices, and provides guidance for countries that aspire to be leaders in sustainability (Nardo et al., 2008; Hsu, Johnson & Lloyd, 2013).

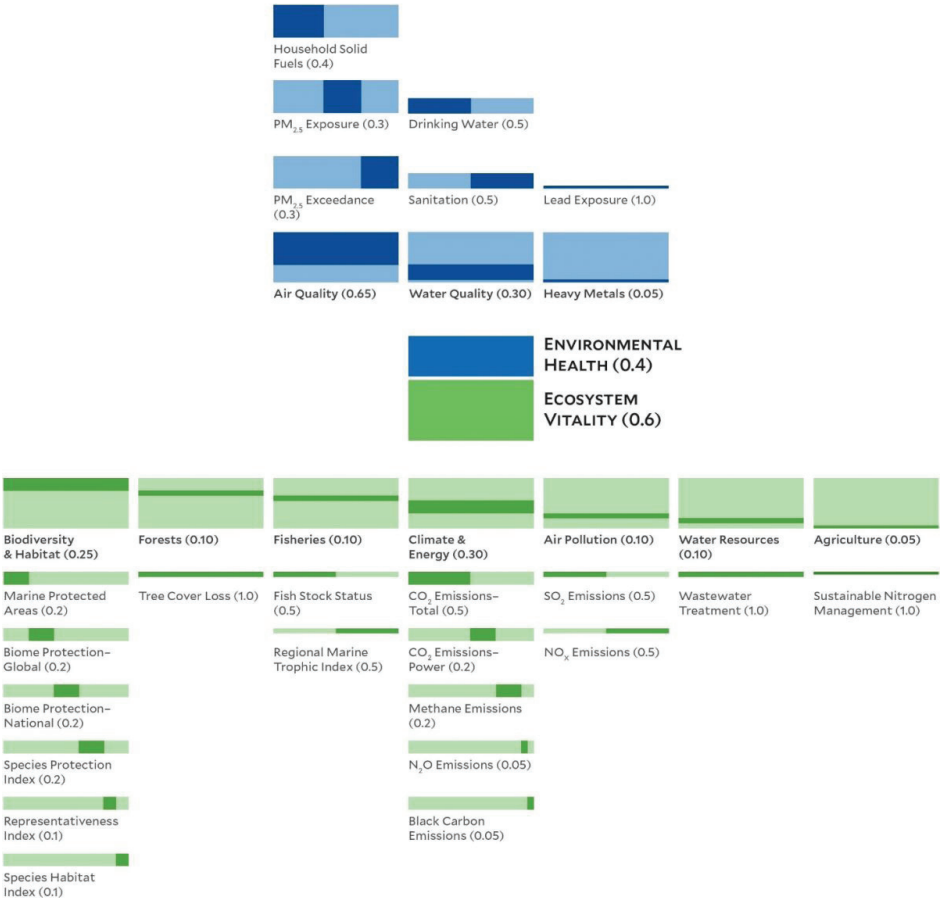
Environmental Performance Index (EPI) is a composite index that includes two fundamental dimensions of sustainable development, i.e. *policy objectives* as it is named in the EPI report:

(1) *Environmental health*, which rises with economic growth and prosperity and measures threats to human health, and

(2) *Ecosystem vitality*, which comes under strain from industrialization and urbanization and measures natural resources and ecosystem services.

These two policy objectives of the EPI are consist of 10 *indicators* (that named *issue categories* in the EPI report) which are consist of 24 *sub-indicators* (that named *performance indicators* in the EPI report). The conceptual framework for measuring EPI is presented in Figure 1.

Figure 1: The conceptual framework for measuring EPI



Source: 2018 Environmental Performance Index Report

As it is presented in Figure 1, sub-indicator scores are aggregated into indicator scores, indicator scores into policy objective scores, and policy objective scores into final EPI scores. The score of all mentioned measures (sub-indicators, indicators, policy objectives, and EPI) ranges in the interval from 0 to 100. Each sub-indicator, indicator, and policy objective has own weight in the EPI calculation (see Figure 1).

The *2018 Environmental Performance Index Report*, as a data basis for the research, ranks 180 countries across the world. The authors of this paper analyse environmental performances of Western Balkan countries until the level of indicators. There are 10 following EPI indicators (see Figure 1):

(1) Air quality,
(2) Water and sanitation,
(3) Heavy metals,
(4) Biodiversity and habitat,

(5) Forests,
(6) Fisheries,
(7) Climate and energy,
(8) Air pollution,
(9) Water resources, and
(10) Agriculture.

Research results and discussion

The analysis of environmental performances of Western Balkan countries is based on data about rank and score of the EPI. Table 1 presents the position of each Western Balkan country according to the EPI score and EPI global and group rank in 2018, as well as the score and global rank of these countries in two EPI policy objectives: Environmental health and Ecosystem vitality.

Table 1: The score and rank of EPI for the Western Balkan countries (2018)

Country	EPI score (0-100)	EPI global rank (out of 180)	Rank on the list of isolated group of WBC	Environmental health		Ecosystem vitality	
				Score	Global rank	Score	Global rank
Albania	65.46	40	1	65.67	82	65.32	30
Croatia	65.45	41	2	67.04	77	64.39	34
Montenegro	61.33	65	3	72.61	55	53.81	87
Macedonia	61.06	68	4	67.43	74	56.82	64
Serbia	57.49	84	5	61.18	100	55.03	77
Bosnia and Herzegovina	41.84	158	6	63.87	89	27.15	179

Source: 2018 Environmental Performance Index Report

Table 1 shows that all Western Balkan countries except Bosnia and Herzegovina are positioned in the first half of the global list according to EPI (2018). Albania records the highest score in the Western Balkan group (65.46), followed by second-ranked Croatia (65.45), third-ranked Montenegro (61.33), fourth-ranked Macedonia (61.06), fifth-ranked Serbia (57.49), and sixth-ranked Bosnia and Herzegovina (41.84).

Albania, as a best-ranked Western Balkan country, is positioned at the 40th position in the world according to EPI (Table 1). It achieves better global rank in ecosystem vitality (30th place) than in the environmental health (82nd place). Bosnia and Herzegovina is the worst-ranked Western Balkan country. It is positioned at the 158th place in the EPI global list. According to EPI policy objectives, Bosnia and Herzegovina reaches better performances in environmental health (89th place) than in the ecosystem vitality (179th place out of 180). Haiti (180th place) is the only poor-ranked country in terms of global ecosystem vitality in relation to Bosnia and Herzegovina. Other Western Balkan countries (Croatia, Montenegro, Macedonia, and Serbia) are positioned from 41st to 84th global place according to EPI.

With the aim to compare the environmental performances of Western Balkan countries with the most developed economies, it is necessary to show the competitive position of the top six European countries with the best results in environmental performances. The top six European countries serve as a benchmarking group that will be compared with the six Western Balkan countries. Table 2 expresses the scores of top six European countries according to EPI indicators (2018).

Table 2: Top six European countries according to the score and global rank of the EPI (2018)

Indicator	Switzerland	France	Denmark	Malta	Sweden	United Kingdom	Average score of the top 6 European
I_1 Air quality	91.06	95.97	99.16	94.40	92.84	94.43	94.64
I_2 Water and sanitation	99.99	97.22	97.78	100.00	96.88	100.00	98.65
I_3 Heavy metals	87.77	83.29	88.30	48.74	100.00	93.09	83.53
I_4 Biodiversity and habitat	84.20	96.25	94.48	87.77	81.00	96.69	90.07
I_5 Forests	47.40	25.08	12.74	-	5.53	6.90	19.53
I_6 Fisheries	-	57.71	50.75	56.49	53.76	42.16	52.17
I_7 Climate and energy	90.55	70.46	67.56	67.04	86.80	63.06	74.25
I_8 Air pollution	98.70	96.82	71.00	57.32	64.17	82.87	78.48
I_9 Water resources	99.67	95.56	98.45	100.00	98.49	99.82	98.67
I_{10} Agriculture	43.87	67.77	67.02	32.62	55.12	57.34	53.96
EPI score	***87.42***	***83.95***	***81.60***	***80.90***	***80.51***	***79.89***	***82.38***
EPI rank	***1***	***2***	***3***	***4***	***5***	***6***	***-***

Source: 2018 Environmental Performance Index Report

With the seventeen countries in the world's top twenty, Europe is the absolute leader in the world according to EPI (2018). Moreover, all world's top sixteen countries are European countries. The best-ranked country in the world according to EPI (2018) is Switzerland, with the EPI score of 87.42 (Table 2). Switzerland is followed by the second-ranked France (83.95), third-ranked Denmark (81.60), fourth-ranked Malta (80.90), fifth-ranked Sweden (80.51), and sixth-ranked United Kingdom (79.89).

The data presented in Table 2 show that Denmark reaches the best score in Air quality indicator. Also, Malta and United Kingdom are the best in Water and sanitation indicator; Sweden in Heavy metals indicator; United Kingdom in Biodiversity and habitat; Switzerland in Forests, Climate and energy, and Air pollution indicators; France in Fisheries and Agriculture indicators; and Malta in Water resources indicator.

Table 3 shows the scores of Western Balkan countries in all ten EPI indicators. Beside that, Table 3 presents the highest score of Western Balkan countries (column 8),

the average score of Western Balkan countries (column 9), the highest score of top six European countries (column 10), and the average score of top six European countries (column 11) for each of ten EPI indicators. The ambition of this analysis section is benchmarking the results of Western Balkan countries with the top six European countries according to environmental performances in 2018.

Table 3: The scores of indicators within the EPI for Western Balkan countries (2018)

Indicator	Albania	Croatia	Montenegro	Macedonia	Serbia	Bosnia and Herzegovina	The highest score of WBC	Average score of WBC	The highest score of top 6 European countries	Average score of top 6 European countries
1	2	3	4	5	6	7	8	9	10	11
I_1	65.47	64.07	69.28*	66.43*	69.73*	60.37	69.73 Serbia	65.89	99.16 Denmark	94.64
I_2	66.56	70.01*	78.61*	69.16*	56.67	71.54*	78.61 Montenegro	68.76	100.00 Malta/UK	98.65
I_3	62.89	87.84#	79.89*	70.11	68.53	63.39	87.84 Croatia	72.11	100.00 Sweden	83.53
I_4	75.37*	95.25#	73.77*	64.85*	49.84	26.93	95.25 Croatia	64.34	96.69 UK	90.07
I_5	23.36#	34.36#	30.77#	30.62#	38.66#	49.31⁰	49.31 B&H	34.51	47.40 Switzerland	19.53
I_6	58.25⁰	54.55#	36.18	-	-	-	58.25 Albania	49.66	57.71 France	52.17
I_7	68.36#	54.41#	46.85	63.85#	61.77#	26.80	68.36 Albania	53.67	90.55 Switzerland	74.25
I_8	86.07#	43.23	59.22*	56.99*	59.76*	30.79	86.07 Albania	56.01	98.70 Switzerland	78.48
I_9	80.73*	86.58*	81.67*	52.07	60.49*	0	86.58 Croatia	60.26	100.00 Malta	98.67
I_{10}	22.61	47.68*	10.57	35.99*	52.95*	33.09	52.95 Serbia	33.82	67.77 France	53.96
EPI score	*65.46*	*65.45*	*61.33*	*61.06*	*57.49*	*41.84*	-	-	-	-
EPI rank	*40*	*41*	*65*	*68*	*84*	*158*	-	-	-	-

Source: 2018 Environmental Performance Index Report

Legend:

Indicates that the score is below the average score of the group of Western Balkan countries.

* Indicates that the score is above the average score of the group of Western Balkan countries.

\# Indicates that the score is above the average score of top 6 European countries.

0 Indicates that the score is above the score of the best country in the group of top 6 European countries.

Table 3 shows that the average scores of Western Balkan countries in all indicators of EPI except Forests (I_5) are much below the average scores of top six European countries (see column 9 and 11). The biggest backlog of average scores of Western Balkan countries is achieved in the following indicators: Water resources (I_9), Water and sanitation (I_2), and Air quality (I_1). However, there is one EPI indicator in which Western Balkan countries have advantage over the top six European countries. It is Forests indicator (I_5). Western Balkan countries reach the average score of 34.51 in Forests indicator, which is much better than top six European countries (19.53). Nevertheless, this impressive score of Western Balkan countries remained in the shadow of the rest (poor) scores of environmental performances.

Using the results of the previous analysis, the authors present the list of critical indicators for further development of Western Balkan countries in terms of environmental performances. It is presented in Table 4.

Table 4: Indicators within the EPI which require priority of development policy by Western Balkan countries (2018)

Country	The critical indicators which show the negative deviations from the average score of the group of WBC	Number of critical indicators
Albania	I_1, I_2, I_3, I_{10}	4
Croatia	I_1, I_8	2
Montenegro	I_6, I_7, I_{10}	3
Macedonia	I_3, I_9	2
Serbia	I_2, I_3, I_4	3
Bosnia and Herzegovina	I_1, I_3, I_4, I_7, I_8, I_9, I_{10}	7

Source: Author's presentation

Table 4 shows that Bosnia and Herzegovina is the worst positioned Western Balkan country according to the total number of the negative deviations of EPI indicators from the average score of the group (7 critical indicators). It is interesting that Albania as a best-ranked Western Balkan country has even 4 critical indicators. Next to the Albania, Montenegro and Serbia have poorer performances in 3 indicators, and Croatia and Macedonia in 2 indicators.

Beside previous analysis, Table 4 allows identification of indicators in which most Western Balkan countries record a negative deviation. Heavy metals (I_3) indicator requires intervention and improvement by the majority of Western Balkan countries (4 out of 6 countries). Air quality (I_1) and Agriculture (I_{10}) need urgent actions in 3 Western Balkan countries. Water and sanitation (I_2), Biodiversity and habitat (I_4), Climate and energy (I_7), Air pollution (I_8), and Water resources (I_9) must be improved in two Western Balkan countries, while Fisheries (I_6) need urgent actions in one Western Balkan country.

Above interpretation of research findings points to the critical indicators of Western Balkan countries in the first priority level (benchmark is the average score of Western Balkan group). Beside that, it is also relevant to identify critical indicators of

Western Balkan countries in the second priority level (benchmark is the average score of top six European countries) and in the third priority level (benchmark is the best score among top six European countries). Specification of indicators within the EPI according to priority and urgency of their necessary improvement by the Western Balkan countries is presented in Table 5.

Table 5: Specification of indicators within the EPI according to priority and urgency of their necessary improvement by the Western Balkan countries

Country	The first priority level – the benchmark is the average of WBC	The second priority level – the benchmark is the average of top 6 European countries	The third priority level – the benchmark is the best country among top 6 European countries
1	2	3	4
Albania	I_1, I_2, I_3, I_{10}	I_4, I_9	I_5, I_7, I_8
Croatia	I_1, I_8	I_2, I_9, I_{10}	I_3, I_4, I_5, I_6, I_7
Montenegro	I_6, I_7, I_{10}	I_1, I_3, I_4, I_8, I_9	I_5
Macedonia	I_3, I_9	I_1, I_2, I_4, I_8, I_{10}	I_5, I_7
Serbia	I_2, I_3, I_4	I_1, I_8, I_9, I_{10}	I_5, I_7
Bosnia and Herzegovina	I_1, I_3, I_4, I_7, I_8, I_9, I_{10}	I_2	-

Source: Author's presentation

The purpose of this analysis is to determine the priorities (based on the urgency) in environmental development policy of each country from the Western Balkan group (see Table 5). Firstly, every Western Balkan country need to improve its environmental performaces in the indicators that belong to the first priority level (see column 2). Benchmark standard for this priority level is the average score of Western Balkan group. When country reaches that result, the goal should be the average score of the top six European countries (see column 3). After achieving that goal, Western Balkan countries should strive to achieve a higher goal, i.e. to reach the score of the best country in the group of top six European countries (see column 4).

Table 5 show that all Western Balkan countris except Bosnia and Herzegovina have at list one indicator in each priority level. Unlike other countries, Bosnia and Herzegovina has seven indicators in the first priority level, one indicator in the second priority level, and no one indicator in the third priority level. That is another in a series of evidence that confirms very poor performances of Bosnia and Herzegovina in terms of environmental sustainability.

Conclusion

The analysis of data about the score and global rank of six observed countries of Western Balkan (Albania, Bosnia and Herzegovina, Croatia, Macedonia, Montenegro, and Serbia) published in 2018 Environmental Performance Index Report point to the

global competitiveness of these countries in terms of environmental performances. The research findings of this study indicates many possibilities for environmental sustainability improvement in Western Balkan countries.

Analysis showed that all Western Balkan countries except Bosnia and Herzegovina are positioned in the first half of the EPI global list. The best-ranked country in the Western Balkan group is Albania with the highest EPI score of 65.46. It is followed by second-ranked Croatia (EPI score 65.45), third-ranked Montenegro (EPI score 61.33), fourth-ranked Macedonia (EPI score 61.06), fifth-ranked Serbia (EPI score 57.49), and sixth-ranked Bosnia and Herzegovina (EPI score 41.84).

Beside previous conclusion, it is very important finding of the study that the average scores of Western Balkan countries in all indicators of EPI except Forests indicator are much below the average scores of the top six European countries. The biggest backlog of average scores of Western Balkan countries is achieved in the following indicators: Water resources, Water and sanitation, and Air quality. Only indicator in which Western Balkan countries have advantage over the top six European countries is the Forests indicator.

The worst results of environmental performances among Western Balkan group are recorded in the case of Bosnia and Herzegovina. It is concluded that this country has seven indicators in the first priority level, one indicator in the second priority level, and no one indicator in the third priority level. In other words, it lags behind the Western Balkan group in even seven indicators, while exceeds the results of other countries in this group in only one indicator.

Based on the above analysis, the authors specify the indicators within the EPI according to priority and urgency of their necessary improvement by each Western Balkan country. It allows to the environmental policy makers of these countries to formulate its politics and actions in order to improve the results in this field in the future. The general conclusion of this paper is that all Western Balkan countries and especially Bosnia and Herzegovina need to make a lot of efforts in a future development of its environmental performances.

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NATURAL RESOURCE PROTECTION AND CONSERVATION MEASURES IN SERBIAN NATIONAL PARKS

Abstract

The topic of protection and conservation of natural resources is growing critical in today's society. The fact that national parks fall within the first category of protected natural assets (assets of national importance) in Serbia and that natural resources in national parks are becoming increasingly endangered served as the background of this paper, which uses the available data, legislative acts, and the research conducted by the authors themselves to highlight the most significant measures of protection and conservation of natural resources in Serbian national parks. The issue of sustainable use and conservation of natural resources is a priority, as it concerns the entire community with a fundamental and clear goal – present-day generations need to act responsibly and to rationally use all available resources in order to preserve them for the future generations.

Key words: *protection measures, conservation, natural resources, national parks*

JEL classification:Q56, Q57, Q58

МЕРЕ ЗАШТИТЕ И ОЧУВАЊА ПРИРОДНИХ РЕСУРСА НАЦИОНАЛНИХ ПАРКОВА СРБИЈЕ

Апстракт

Проблематика заштите и очувања природних ресурса је све актуалнија тема савременог друштва. Чињеница да национални паркови спадају у прву категорију заштићених природних добра од националног значаја и да јее све више израженије угрожавање природних ресурса националних паркова определила нас је да у оквиру овог рада на основу доступних података, законских аката и сопствених истраживања укажемо на најзначајније мера за заштиту и очување природних ресурса националних паркова Србије. Питање одрживог коришћења природних ресурса и њиховог очувања представља приоритет, који се тиче целокупне друштвене заједнице са основним и јасним циљем да садашње генерације морају да буду одговорне и да на рационалан начин користе све расположиве ресурсе како би их сачували за будуће генерације.

Кључне речи: *мере заштите, очување, природни ресурси, национални паркови*

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Introduction

The topic of environmental protection and natural asset/resource protection can be viewed internationally and nationally. Since Serbia is currently in the process of EU accession, Serbian legislation is being harmonized with that of the EU, so this paper will only include Serbian legislation.

Natural resource conservation measures are classified into measures for conserving renewable and non-renewable natural resources. Exploitation of non-renewable natural resources in national parks is prohibited by law, and even if such exploitation is present, it is minimal since national parks are protected primarily because of their natural wealth (flora, fauna, vegetation, etc.). Therefore, this paper highlights the measures for natural resource protection and conservation.

Renewable natural resource protection and conservation measures are classified into:

- legal measures (prevention of free access and uncontrolled use of resources),
- quantitative restrictions,
- restrictions to the amount of exploited resources, and
- economic measures (fiscal measures (taxes and subsidies) and the system of individual transferrable quotas) [10, 7].

The analysis of numerous legal and sub-legal acts, strategies, and management plans, which deal with the issue of national parks and the exploitation of natural resources, revealed that all natural resource protection and conservation measures are classified into:

- administrative (legal, economic),
- technical,
- technical and technological, and
- strategic.

A number of measures, methods, technical and technological solutions, and other activities are implemented in Serbian national parks in order to maintain the favourable condition of both natural resources and specific areas of importance in protected territories.

Legislative Measures of Natural Resource Protection in Serbian National Parks

Legislative measures of protection stem from legal, planning, and strategic documents that are based on legal regulations enacted to protect and conserve national resources in Serbian national parks.

In the process of creating the *Study of National Park Protection*, the evaluation of natural resources and the degree of their vulnerability is followed by the determination of protection regimes and levels in order to conserve and improve the state of the environment and natural resources in national parks [1]. Certain protection regimes defined for a given protected area need to be adhered to when creating plans and strategic documents. The most important planning document that regulates and defines the use of space within national parks is the *Spatial Plan of Special Purpose Areas*.

Protection regimes for national parks regulate:

- the prohibition of activities and actions within the protected area;
- the prohibition of activities and actions in a protected area for which a specific protection level has been defined;

- allowed activities and actions within the protected area for which a specific protection level has been defined.

The *Rules on Interior Order* defines which activities and actions are prohibited or restricted for every national park. Prohibitions and restrictions vary between different national parks. The following activities and actions are prohibited and restricted in all national parks:

- activities that can diminish the ecological status of wildlife, their habitats, and the habitats of species that are important for preserving biodiversity;
- deforestation and removal of shrubbery and other vegetation that threatens forest borders, puts soil at risk of erosion, etc.;
- introduction of non-native plant species (except for preventing erosions or landslides);
- introduction of non-native animal species;
- game hunting (except for culling for sanitary and breeding purposes) and commercial fishing;
- construction of industrial and metalworking facilities, as well as facilities for oil and gas;
- construction of facilities that pollute the air, soil, and water and affect their quantity;
- construction of nuclear facilities and waste disposal and recycling facilities;
- disposal of construction waste, earth, debris, sawdust, or refuse;
- opening of open-pit and underground mines;
- exploitation of peat and other materials from rivers and river beds;
- motorway construction;
- use of forest roads for public transport;
- damage to notification and other signs;
- ploughing of meadows and pastures.

In addition to general prohibitions of conducting activities and actions across the entire national park areas, the areas of national parks for which the **protection regime of the first degree** has been established also include prohibitions of the following activities and actions:

- use of natural resources;
- exploitation of national resources (deforestation, grazing, extraction of minerals and other raw materials, as well as peat, spring catchment, water drainage, damming of water courses, and the like);
- destruction of and damage to plant cover (chopping, breaking, and excavating trees and shrubs, etc.);
- use of plant parts and products (collection and removal of humus, branches, and felled trees, picking and collection of fruits, flowers, and seeds);
- capturing, killing, and dispersing animal species;
- construction of buildings and other construction activities;
- uncontrolled visits and tours of the reservations;
- introduction of new plant species in the reservation flora [1, 21].

In addition to the abovementioned general prohibitions of conducting activities and actions across the entire national park areas, as well as prohibitions of activities and actions in the areas of national parks for which the protection regime of the first degree has been established, the areas of national parks under the **protection regime of the second degree** also include prohibitions of the following activities and actions:

- unplanned construction and altering of the use of a space;
- earthworks and altering of terrain morphology;
- construction of industrial facilities, warehouses, cold storages, etc.;
- disposal of municipal, industrial, or other waste;
- construction of additional infrastructure and transport systems and facilities, and construction of major roads;
- industrial exploitation of mineral and non-mineral raw materials;
- opening of borrow pits of earth and rock and construction of quarries;
- hydro-geological and hydro-technical works;
- wastewater discharge into water courses;
- spring catchment;
- collection of any plant and animal species listed in the Regulation on Imposing Control of the Use and Trade in Wild Flora and Fauna and the Rules on the Proclamation and Protection of Strictly Protected and Protected Wild Species of Plants, Animals and Fungi;
- game hunting and non-planned logging;
- introduction of foreign plant and animal species;
- use of chemical agents and lighting of fires [1, 21].

In addition to the abovementioned general prohibitions of conducting activities and actions across the entire national park areas, as well as prohibitions of activities and actions in the areas of national parks for which the protection regimes of the first and the second degree have been established, the areas of national parks under the **protection regime of the third degree** also include prohibitions of the following activities and actions:

- construction of buildings that threaten the integrity of cultural monuments or their protected areas;
- construction of hydro power stations and energy distribution infrastructure;
- expansion of existing residential areas in the direction of areas with protection regimes of the first and second degree [1, 21].

For the purpose of adequate national park protection, in addition to the abovementioned prohibited or restricted activities and actions, it is also necessary to establish activities and actions that are allowed, depending on the degree of protection regime.

Accordingly, the following activities and actions are allowed in national parks under the **protection regime of the first degree**:

- scientific research and monitoring of natural processes (climate observations, numbering of trees, or sampling of soil, water, plants, insects, and other animal species);
- renting of areas in which measurements can be performed or equipment installed;
- experimental interventions on vegetation and soil (planting, sowing, spacing, removal of moss, increase or decrease of soil moisture, etc.);
- regulation and provision of access to the reservation;
- enclosure of specific sections for direct physical protection;
- use of technical and biological protective measures against diseases or pests;
- use of technical fire safety measures and placement of fire lookout towers;
- implementation of protection, mitigation, and other measures in case of fires, natural disasters, accidents, diseases, and over-reproduction of plant and animal species;
- reconstruction and maintenance of existing facilities of special significance (high-voltage power lines) [1, 21].

The following activities and actions are allowed in national parks under the **protection regime of the second degree**:

- regulation and damming of water courses;
- creation of accumulations up to a total of 10 million m3;
- construction of mini hydro power stations up to 5 kW on smaller water courses;
- reclamation and other hydro-technical works on areas up to do 5 ha;
- construction of biogas-fired power stations up to 1 MW and solar power stations up to 50 kW;
- construction of roads and facilities for energy, public utility, and other infrastructure, which do not negatively impact the status of plant and animal species and their habitats, natural wealth, and the landscape aesthetics of national parks;
- construction of smaller buildings for tourist accommodation, hospitality services, nautical tourism, and for showcasing the traditional-style values or buildings in the designated areas;
- construction of residential and commercial buildings for agricultural and forest farms that will not negatively impact the status of plant and animal species in the national park;
- restricted exploitation of national resources (rock, clay, and other materials on a terrain area of 150 m2);
- construction of facilities for commercial breeding of domestic animals and small game with the capacity of 100 places for broilers, 500 for other poultry, and 10 for cattle;
- fishing for recreational and scientific-research purposes;
- sanitary game hunting;
- collection of fungi and wild plan and animal species only from private lots;
- forest and forested and management in accordance with the National Park Management Plan;
- maintenance of existing monocultures [1, 21].

The following activities and actions are allowed in national parks under the **protection regime of the third degree**:

- construction of energy facilities and mini hydro power stations up to 30 MW;
- construction of biogas-fired power stations up to 5 MW and solar power stations up to 100 kW;
- construction of wind turbines in border areas of third degree protection;
- construction of smaller industrial facilities for prevalently local needs;
- construction of infrastructure facilities, public ski slopes, etc. in keeping with sustainable use of natural resources and space capacities;
- construction of warehouses for industrial goods and construction material in the border zones of the protected area;
- construction of holiday cottages on the edges of the protected area next to existing residential areas, as well as construction within and around the existing residential areas;
- exploitation of mineral raw materials and geothermal resources, as well as processing of mineral raw materials, at a distance bigger than 2-3 km from the areas with first and second degree protection regimes;
- construction of smaller facilities for collection, storage, and treatment of inorganic waste;

- fishing for recreational, sanitary, and scientific-research purposes, as well as sanitary game hunting;
- maintenance of existing monocultures [1, 21].

The allowed activities and actions in areas with first, second, and third degree protection regimes

- are temporally and spatially restricted
- and are conducted within the scope and manner compliant with sustainable use of natural resources and space capacities

so as to prevent any threat to the fundamental values of the national park [1, 21].

The existing built energy and mining facilities and the already initiated work in areas under second and third degree protection regimes will be used according to the law.

Nature Protection Measures in National Parks

In order to conserve and improve the natural wealth of national parks, it is not enough to establish specific protection regimes that specify the manner and degree of protection, use, regulation, and improvement of protected natural assets, but also to implement nature protection measures.

Nature protection measures in national parks include:

- determination and assessment of states, phenomena, and processes in nature and the area;
- establishment and determination of protected natural resources;
- implementation measures of protection of nature, natural resources, and areas in plans and documents;
- sustainable use of natural resources and protected natural assets;
- creation of reports on the state of nature;
- mitigation of harmful effects due to activities in nature, use of national resources, or natural disasters;
- coordination and harmonization of the national system of national park protection with the international system of national park protection;
- scientific and professional work pertaining to nature protection;
- informing the public;
- incentives and promotions for national park protection;
- involvement of local communities in the national park protection system [1, 30].

Active nature protection measures are those that include protection of populations of species in their natural habitat, conservation of natural ecosystems, conservation, and recovery of populations in their natural habitat, as well as preservation of geodiversity at the place of origin or discovery of rocks, ores, minerals, crystals, and fossils [30].

Strategic Assessment of National Parks' Environmental Impact

Strategic assessment of national parks' environmental impact is conducted for plans, programs, and purposes pertaining to the protection of natural and cultural assets and wildlife and their habitats in national parks.

The procedure of strategic assessment of national parks' environmental impact comprises the following stages: preparatory stage, report on the strategic assessment, and the decision making [1, 29].

The *preparatory stage* involves decision making on the creation of the strategic assessment, selection of the person in charge of the creation of the report, and involvement of interested parties.

The *report on the strategic assessment* describes, evaluates, and assesses the potential significant environmental impact due to implementation of the plan and program, and defines measures for reducing the negative environmental impact. The report comprises:

- Starting points (plan and program, review of the existing state, environmental quality of the analyzed area, solution options, etc.);
- Aims and objectives (harmonization with other plans and programs established on the national and international level);
- Potential impact assessment (presentation of assessed solution options, improvement of those options, data on protected natural assets, etc.);
- Guidelines (creation of strategic assessments and environmental impact assessments);
- State of the environment monitoring program (plan and program, monitoring indicators, indicators for response in the event of unforeseen negative impact, etc.) [1, 29].

Decision making involves the participation of interested bodies, organizations, and members of the public, report evaluations, agreement on the report, availability of information, etc.

Assessment of National Parks' Environmental Impact

Since national park protection regimes are of the first, second, or third degree, to which prohibitions and restrictions of activities and actions that could diminish basic and other features of national parks apply, it is necessary to perform a mandatory assessment of their environmental impact [1, 28].

The Law on Environmental Impact Assessment specifies that impact assessment is performed for:

- projects related to industry, mining, energy industry, transport, tourism, agriculture, forestry, water management, waste management, and public utilities;
- projects planned for national parks and their protected areas [1, 28].

The Regulation on Determining the List of Projects for Which Impact Assessment Is Obligatory and the List of Projects for Which Environmental Impact Assessment May Be Required defines two lists:

- List 1 – projects for which environmental impact assessment is obligatory and
- List 2 – projects for which environmental impact assessment may be required.

Projects for which environmental impact assessment is obligatory (List 1) include:

- Plants (e.g. for oil processing, gasification, smelting, hazardous waste treatment, wastewater treatment, etc.);
- Facilities (hydro-technical, dams, gas and oil pipelines, poultry breeding, oil storage, etc.);
- Activities (construction of railroads and associated facilities, groundwater exploitation, oil and natural gas extraction, burned overhead power lines, etc.) [1, 28].

Projects for which environmental impact assessment may be required (List 2), are divided into 15 subgroups (agriculture and forestry, extractive industries, energy production, pipelines, storage of flammable liquids and gases, metalworking and metal production, mineral processing industry, chemical industry, food industry, textile industry, leather industry, pulp and paper industry, rubber manufacturing industry, infrastructure projects, tourism and recreation, and other projects). All projects included in Lists 1 and 2 that are carried out in national parks and protected national park environments are subject to obligatory environmental impact assessment [1, 28].

Therefore, leaders of projects that are planned for national park areas have to submit a request for an impact assessment study.

Project impact assessment study for projects to be carried out in national parks contains the following:

- Information about the applicant;
- Description of the project and the project location;
- Presentation of the state of the environment at the location (micro- and macro-location);
- Description of possible environmental impacts of the project;
- Environmental impact assessment in the event of accidents;
- Description of measures for preventing, reducing, and removing any significant detrimental environmental impact;
- Environmental impact monitoring program;
- Data on technical deficiencies or the lack of adequate professional knowledge and skills or the inability to acquire appropriate data [1, 28].

After the completed procedure, the authorized body either:

- consents to the impact assessment study for projects in national parks or
- denies the request for the impact assessment study [1, 27].

Establishment and Determination of Protected Natural Resources in National Parks

In order to preserve biodiversity and the gene pool, i.e. species that hold special significance for Serbia in terms of ecology, ecosystems, biogeography, science, health, economy, and other aspects, wild species of plants, animals, and fungi are categorized as

- strictly protected wild species and
- protected wild species.

Accordingly, protection of *strictly protected wild species* and *protected wild species* is carried out in national parks (Table 1.).

Table 1. Protection of strictly protected wild species and protected wild species in national parks

Protection measures for strictly protected wild species	Protection measures for protected wild species
Prohibited use and destruction Prohibited activities that threaten wild species and their habitats Population management (habitat protection, monitoring of the state, biotechnical measures, recovery and revitalization of damaged habitats, scientific research, educational activities, popularization of species conservation and protection, etc.)	Restricted use Prohibited destruction Prohibited activities that threaten wild species Population management

International Union for Conservation of Nature (IUCN) established degrees of vulnerability of plant and animal species through its Red List categories of taxa (Table 2) [4, 1].

Table 2. IUCN Red List categories of taxa [1, 4]

Red List category	Criterion
EX – Extinct	The last known individual is dead.
EW – Extinct in the wild	The taxon is no longer present at a specific time (time of day, season, or year) in a specific territory.
CR – Critically endangered (danger of immediate extinction)	Extremely high probability of taxon extinction in the near future
EN – Endangered (high risk of extinction in the wild)	High probability of taxon extinction in the wild in the near future
VU – Vulnerable	High probability of taxon endangerment in the wild in the near future
LR – Lower risk	Low probability of taxon endangerment (CD – Conservation dependent; NT – Near threatened; LC – Least concern)
DD – Data deficient	Insufficient data to assess the probability of taxon extinction
NE – Not evaluated	The taxon has not been evaluated against the criteria.

Based on the available data, any researcher can apply the following additional criteria:

- Criterion A: Population reduction over a specified period of time;
- Criterion B: Habitat area and the area of occupied space;
- Criterion C: Small size and reduction of population;
- Criterion D: Extremely small and limited population;
- Criterion E: Assessment of extinction probability over a specified period of time [4, 1].

Imposed Control of the Use and Trade of Specific Wild Flora and Fauna from National Parks

The control of collection, use, and trade of specific flora and fauna in national parks is imposed in order to ensure that the species are collected from their natural habitats for later use in the *amounts* and in the *manner* that will not endanger their future, structure, and stability of their communities.

The *Regulation on Imposing Control over the Use and Trade in Wild Flora and Fauna* defines 78 plant species, three lichen species, 15 fungi species, and nine wild fauna species whose collection, use, and trade has been placed under control [1, 23].

Protected species can be collected in amounts that are determined each year for national parks, with adherence to the following principles:

- Prohibited collection of protected species outside predetermined periods;
- Prohibited use of technical equipment for wild species collection;
- Protected species collectors have to be professionally trained for collection;
- Protected species collection has to adhere to specific rules and techniques;
- Prohibited damaging of subsurface plant organs, breaking of trunks, stems, and branches of trees and shrubs, etc. [1].

The following additional protection measures must also be adhered to:

- Prohibited hunting over a specified period (close season), which protects specific species of mammals and birds;
- Permanently or temporarily prohibited fishing;
- Prohibited collection of specific protected wild flora and fauna species in specified territories [1].

Technical and Technological Measures of Natural Resource Protection in National Parks

For the purpose of protecting and conserving a favourable state of national park natural assets, it is possible to use certain technical and technological solutions that will eliminate or mitigate the negative impact on natural assets.

Special technical and technological solutions are usually used in practice, as they allow the creation of *wildlife crossings*, which enable unobstructed and safe passage of wild animals between areas. Wildlife crossings include ecological bridges, underpasses, overpasses, tunnels, culverts, ditches, safety and directional objects, fish ladders, lifts, and other structures [32]. The type of crossing to be used depends on the analysis of ecological vulnerability of the area, the composition of natural vegetation, and movements of wild animals, especially during the mating season. Depending on their purpose, wildlife crossings can be divided into amphibian-reptile tunnels, crossings for small and large wild mammals, and landscape bridges [15].

Amphibian-reptile tunnels are tunnels with movement guidance with openings at both ends, either orthogonal or elliptical. *Crossings for small mammals* (e.g. foxes, otters, hedgehogs, badgers, rabbits, etc.) are underpasses, either round or orthogonal, whose size is usually adapted to the species for which it is intended. *Crossings for large mammals* (e.g. wild boars or does) include *overpasses* (with safety fencing) and *underpasses* [15].

Additional measures of protecting natural assets in national parks include:

- Safety fences that protect animals from falling on or reaching roads, eliminate or reduce the negative effects of noise and light beams from roads, etc.;
- Technical measures of pest control;
- Placement of fire lookout towers;
- Technical fire safety measures;
- Enclosure of specific sections for direct physical protection;
- Construction of waste management facilities;
- Restriction or change of transport regimes to prevent potential threats or damage to natural assets in national parks;

- Placement of feeders, waterers, and canopies;
- Prohibition of access to specified locations;
- Construction of entrance posts with proper facilities and equipment;
- Placement of traffic and technical signalization;
- Construction of educational and visitor centres, etc. [1].

Monitoring of Natural Resources in National Parks

Monitoring of natural resources is the basis for the management and successful monitoring of the implementation of protection regimes and natural asset conservation in national parks. Environmental monitoring is regulated by primary and secondary legislation. According to the *Law on Environmental Protection*, environmental monitoring in national parks involves:

- Monitoring;
- The information system;
- A report on the state of the environment [1, 33].

Monitoring in national parks is performed by systematic monitoring of indicator values, state of water, air, and soil quality, flora and fauna, and monitoring of negative impacts on the environment and the state of the environment. It also involves measures and activities that help reduce the negative impacts and improve environmental quality [1, 33].

The information system of the state of the environment in national parks involves the formation, classification, maintenance, presentation, and distribution of numerical, descriptive, and spatial databases regarding the quality of the mediums, environmental monitoring and protection, legislative, administrative, organizational, and strategic prevention measures, etc., as well as the keeping of the *registry of environmental pollution sources* in national parks [1, 22].

The report on the state of the environment in national parks is created based on collected data and information obtained through the monitoring of specific indicators [1, 33].

The *Law on Strategic Assessment of Environmental Impact* regulates the content of environmental monitoring in national parks, and the content comprises

- description of plan and program goals;
- environemntal monitoring indicators;
- rights and obligations of authorized bodies;
- response in the event of unforeseen negative impacts;
- other elements depending on plan and program type and scope [1, 29].

The key monitoring areas in national parks are natural assets (biodiversity, geoheritage, landscapes, and forests), air, water, soil, noise, and emissions [1, 9].

The national park monitoring system is based on

- the data on the environment that are present in the creation and development of various projects and programs in national parks (water supply, sanitation, transport and energy infrastructure, soil recultivation after exploitation, project of protection, recovery, and improvement of biodiversity, geoheritage, landscapes, forests, etc.;
- the data derived from the regulations and various established programs of regular environmental monitoring on a national and local level [1].

Monitoring of the state of most environmental factors in national parks is performed by local self-government bodies, i.e. municipalities in whose territories the national parks are located.

Monitoring system for water quality control. The main document for water quality monitoring in national parks is the *Program for Systematic Water Quality Testing* for the current year. The Program, implemented by the Republic Hydrometeorological Service of Serbia, includes

- monthly, weekly, or daily measurements and observations of water courses, accumulations, and springs of special importance;
- annual tests of sediment quality;
- annual groundwater testing [1, 30, 11].

Monitoring of water bodies used to supply people with drinking water is performed by the authorized healthcare institutions, while the type and scope of monitoring is adapted according to the dynamics of the realization of planned solutions for meeting the water supply demand, primarily with regard to tourism-related construction [1].

Monitoring system for air quality control. Standards and methods of air monitoring in national parks are regulated by the *Regulation on Air Quality Requirements and Monitoring Conditions* and the *Rules on limit values, immission measurement methods, criteria for establishing the measurement points and data recording* [1, 24, 11].

Systematic measurement of air quality in national parks measures the following substances:

- Specific inorganic substances (sulphur dioxide, soot, suspended particulate matter, nitrogen dioxide, ground-level ozone, carbon monoxide, hydrogen chloride, hydrogen fluoride, ammonia, and hydrogen sulphide);
- Particulate matter from the air;
- Heavy metals in suspended particulate matter (cadmium, manganese, lead, mercury, and copper);
- Organic substances (carbon disulphide, acrolein, etc.);
- Carcinogenic emissions (arsenic, copper, nickel, vinyl chloride) [1, 24, 11].

The measurements are performed by the Republic Hydrometeorological Service of Serbia based on the Serbian Government's or the municipalities' programs of environmental monitoring.

The state of air quality in national parks depends on the emission of gases from industry, transport, households, and uncontrolled burning (fires and burning of different materials). The air pollution level, i.e. the presence of pollutants in the air (CO_2, NO_2, and smoke), is primarily the result of obsolete manufacturing technology, old vehicles, fire-afflicted areas, etc. To monitor air quality, the Republic Hydrometeorological Service places measurement stations inside national parks [1].

Air quality evaluation is performed according to annual pollutant concentrations, which are obtained through measurement at automatic meteorological stations for air quality measurement (AMSKV).

Monitoring system for soil quality control. Monitoring of the soil intended for agricultural production in national parks is regulated by the *Law on Agricultural Land* and it pertains to the examination of the amounts of hazardous and harmful materials in the soil and irrigation water, according to the Program enacted by the minister of agriculture. Fertility control of arable agricultural soil and of introduced mineral fertilizers and pesticides is conducted when necessary, but no less than once every five years. The report on the basic examination is always accompanied by a recommendation on the type of fertilizer to be used and the best ways to improve chemical and biological

properties of the soil. The examinations are conducted by professionally and technically trained and authorized legal persons (companies, enterprises, and the like) [1, 27].

Monitoring of emissions. The *Law on Integral Prevention and Control of Environmental Pollution* mandates the monitoring of emissions/effects at the source as the necessary part of obtaining an integrated license for facilities and activities that could affect the national park environment and human health [1, 25].

Monitoring of noise. The *Law on Environmental Noise Protection* mandates that noise monitoring should be performed through systematic measurement, evaluation, or calculation of specific noise indicators. Noise level assessment, monitoring, and control are conducted on the national level, local level, or by national park managers. Noise monitoring data are always included in the unified environmental information system [1, 31].

Monitoring of natural assets. The primary goal of natural asset monitoring is the establishment of a monitoring system for the *state of biodiversity, wild flora and fauna populations* (predominantly the vulnerable habitats and rare endangered species), and the *state and change of geodiversity areas and objects* [1, 8, 31]. The said monitoring is under direct jurisdiction of the Institute for Nature Conservation of Serbia, and according to the medium-term and annual programs of natural asset conservation. Forest monitoring is performed by authorized forestry and forest management scientific institutions according to specific programs and projects, especially those related to negative impacts and changes (forest desiccation, fires, forest calamities and diseases, windthrow, and snow-induced damage), which are enacted for a five-year period (specific rules) and a ten-year period (general rules). These documents contain exact evaluations of the results of forest management and the changes that occurred during a given period [1].

The minimum requirement for general monitoring is once a year, while individual monitoring activities are organized if needed in the event of unforeseen changes that can cause significant negative effects. Monitoring of flora and fauna numbers and health status falls under the jurisdiction of national park management [1, 32].

Conclusion

The information presented in the paper leads to a conclusion that there is a set of legal, economic, and biological measures as well as technical solutions prescribed by primary and secondary legislation and other acts for the purpose of natural resource conservation in Serbian national parks.

The goal of all listed measures for natural resource protection and conservation is the same – to prevent destruction and uncontrolled use of natural resources over the entire protected territory of national parks and in protection zones.

However, all public companies that manage national parks in Serbia are prevalently "supported" from the exploitation of natural assets, primarily forests and forest resources. Therefore, it is necessary to change the current funding system for public national park management companies.

Finally, the conclusion is that it is necessary to permanently monitor all key indicators and introduce monitoring across entire protected areas of national parks in order to precisely define natural resource protection and conservation measures for each national park. Research has shown that certain secondary legislation acts are not harmonized with the new primary legislation acts in Serbian national parks. Thus, it is necessary to enact new and harmonized regulations as soon as possible because only

Djerdap National Park possesses the most important secondary legislation act – the *Rules on Internal Order*.

Natural resource protection and conservation measures have to be defined for each national park because the national parks are morphologically completely different. Only the combination of different prescribed measures and their continuous implementation can yield an efficient system of natural resource protection and conservation in national parks. Therefore, such measures need to be integrated and implemented in all key strategic documents, which are essential for successful and proper management of Serbian national parks.

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ENVIRONMENT AND SUSTAINABLE AGRICULTURAL DEVELOPMENT[2]

Abstract

The concept of sustainable development came out from the need to preserve the environment in order to maintain its quality at the appropriate level for future generations. Direct dependence on natural resources and the necessity of their use in the production process make agriculture to be a sector which has to intensively increase environmental awareness. Therefore, sustainable agriculture focuses on three main goals: a healthy environment, economic profitability, and social and economic fairness. In addition to multiple and unquestionable impact on the resource base and environmental quality, there are some methods in agriculture that already contribute to the achievement of mentioned goals. Nevertheless, there is a need for their further improvement, development of new methods and strengthening the environmental aspects of agriculture.

Keywords*: agriculture, environment, sustainability, environmental awareness.*

JEL klasifikacija: *Q50, Q51*

ЖИВОТНА СРЕДИНА И ОДРЖИВИ РАЗВОЈ ПОЉОПРИВРЕДЕ

Апстракт

Концепт одрживог развоја се изнедрио из потребе очувања животне средине како би се њен квалитет одржао на одговарајућем нивоу и за будуће генерације. Директна зависност од природних ресурса и неопходност њихове употребе у процесу производње, чине пољопривреду сектором у коме се мора интензивно развијати еколошка свест. Одржива пољопривреда се у том настојању фокусира на три основна циља: здраву животну средину, економску профитабилност и друштвену и економску правичност. Поред вишеструког и неспорног утицаја на ресурсну базу и квалитет животне средине, у пољопривреди се већ могу се издвојити методе које доприносе остварењу напред поменутих циљева. Ипак, неопходно је даље радити на њиховом усавршавању, развијању нових метода и јачању еколошког аспекта пољопривреде.

Кључне речи: *пољопривреда, животна средина, одрживост, еколошка свест*

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Introduction

Environmental issues come to the forefront along with accelerated economic development, provoking interest as issues that need to be paid more attention, such as air and water pollution, the survival of plant and animal species, the excessive use of chemicals that damage human health and the environment, etc.

For these reasons, consensus on the need to preserve a healthy environment has been growing over the past years within the framework of world politics. States are increasingly confronted with the ecological limitations of rapid economic growth leading to the evolution of the environmental awareness. There is a general agreement that environmental policy and eco-innovation can improve economic growth, maintain and increase employment in all sectors, including the agricultural sector (Stojanović, Radukić, 2006, pp. 471-485).

Agriculture has an inevitable place in ecological policy given its direct connection with the environment. The concept of agricultural sustainability is gaining an importance. Nevertheless, in spite of the fact that it is recently gaining momentum, this concept had its roots in the past decades. That is confirmed by numerous examples as evidence for taking into account it in the past (OECD_b, 1999).

Agriculture has gone through different stages throughout its evolutionary path, where the ecological consciousness gradually matures. However, appropriate measures and activities are needed in order to raise this awareness among farmers to a higher level, but not only of themselves than also the awareness of relevant institutions and policy makers (economic, environmental protection, etc.).

Agricultural sustainability does not mean completely to abandon the existing mode of production and all technologies, especially having in mind that the most are harmful to the environment. On the contrary, technology that contributes to greater productivity and does not jeopardize the environment can be considered as "sustainable" and used in agriculture. In addition to providing healthy and safe food with the application of adequate technology, the agricultural sustainability is also reflected in the conservation of public goods (clean water, conservation of animal habitats, flood protection, etc.) (European Commission, 2014).

1. Environmental impact on the agricultural development

There are numerous approaches to define sustainable development. However, generally is accepted that it represents "satisfying the needs of development and environmental protection of the current and future generations at the same time" (World Bank, 2001). The concept of sustainable development clearly requires a comprehensive, systematic and integrated approach for achieving long-term development, while balancing different dimensions of economic growth, social stability and environmental sustainability (National Research Council, 2010).

Being one of the millennium development goals set by the World Bank proves the importance of sustainability (World Bank, 2011, p. 52). However, setting goals in the context of sustainability is much easier than achieving them. Implementation requires a close cooperation of various institutions, the adoption of appropriate policies and the choice between quite different approaches for economic development and improving competitiveness.

There is a close link between economic and agricultural development and environment, which can be presented through the following:

- quality of growth,
- quality of regional and global goods,
- quality of life.

The *quality of growth* is not easy to be achieved. Proper use of natural resources is a key issue while considering the ecological aspect. Economic theory and practice emphasize that the use of resources will be effective if the agricultural markets are functioning well. However, this is not always the case. Environmental problems are most often caused by market disruptions, inadequate policies, or both. The markets for organic products and services are underdeveloped or not developed at all. Therefore, the prices of these products often do not reflect their real value. On the other hand, there are often no prices at all, making these products totally free for users. This ultimately leads to their uncontrolled use, or on the other hand to their insufficient supply.

Global goods are often exposed to the influence of people in all parts of the world. The ecosystem does not recognize the administrative barriers since the pollutants cross over long distances and effect on neighbouring countries and regions. Individual attempts of countries to contribute to sustainable development will largely depend on the protection of global goods. Therefore, the key questions of the environmental protection in the context of global goods and their protection can be divided into two categories:

1. Global goods that are directly related to the maintenance of the basic components of the earth system:
   - climate changes,
   - damage the ozone layer,
   - accumulation of organic pollutants,
   - endangering biodiversity.

2. Degradation of natural resources at a global level:
   - degradation of international water and marine ecosystems,
   - degradation of noise,
   - degradation of soil.

Although some issues have a national character, their successful resolution requires coordinated activity at the international level.

The influence of environmental factors on the *quality of life* can be grouped into three categories:

1. *Threats to life*. Nearly a billion of rural households relies on natural resources (forests, water, land, etc.). The survival of these households would be directly compromised by limiting their availability or deteriorating their quality. The main causes are the following:

   - excessive use, poor management and pollution of freshwater resources - nearly one third of the human population faces drinking water problems, especially in Africa and Latin America.
   - degradation of soil - caused by erosion, salinization, compression.
   - rapid destruction of forests, ponds, biodiversity as a result of poor economic policies and incentives and weak regulatory decisions.

2.*Health threats*. Environmental degradation is one of the factors that contribute to various human diseases, disrupting their health and quality of life. Millions of children and adults die each year from causes that could be removed by raising the quality of the environment to a higher level. The most common causes of the disease are:

   - diseases caused by water,

- exposure to polluted air in a closed or open space,
- exposure to agricultural or industrial chemicals.

3. *Sensitivity to changes*. Poorer population is particularly vulnerable to natural disasters and environmental changes. This fact stems from the need for using natural resources located in highly risky areas, in relation to their exposure to various natural disasters. On the other hand, the poorer population is more exposed to the negative consequences in the event of a disaster due to financial difficulties and inability to take loans.

Interconnection between economic and agricultural development, and the environment on the other hand, indicates that a large number of industries and sectors can be identified as potential environmental polluters. Economic motives as drivers of rapid economic growth and development are now losing significance since the priority is given to the environmental goals.

Agriculture certainly has a major impact on the environment with regard to its direct connection and environmental dependence. Indirectly or directly it affects the quality of growth, quality of global goods and quality of life. The use of natural resources in production (forest, water, land, etc.) affects their quality and insufficient accountability can leave far-reaching consequences. Therefore, a special attention in agriculture is given to the concept of sustainable development and the need for environmental protection.

2. Increasing environmental awareness in agriculture

Agriculture has undergone many changes throughout its development, which were more or less fundamental and revolutionary. Adapting to newly discovered tools and inventions that lead to the changed way of production, agriculture went through its transitional phases, growing its ecological awareness (OECD_a, 2001, p. 10).

The term "green revolution" began to use in the mid-1960s in order to emphasise the increase of agricultural production by using new varieties, primarily cereals and rice, adequate irrigation systems and better agricultural techniques. The previously used production system (excessive use of pesticides, fertilizers and other chemicals) is becoming unsustainable, pointing to the antagonism of agriculture and ecology, respectively environment.

Providing food security to the population, a raw material base for industrial production, a source of human resources for non-agricultural activities, etc., agriculture is increasingly oriented towards preserving and improving the quality of the environment in its multifunctionality (Djekic, 2010, p. 23). The role of farmers is not only to produce food, but primarily to serve as environmental managers in order to internalize externalities wherever possible and to ensure proper management and use of natural resources for the purpose of their long-term sustainability (World Bank, 2005).

There are different approaches to define the concept of agricultural sustainability. Starting with the need to ensure the diversity and dimension of the agricultural production system, three criteria can be distinguished (Davidson, 2002).

The first criterion refers to the establishment of internal sustainability, where is expected to maintain an adequate resource base, prevent pollution, salinisation and other forms of soil and water degradation, and develop the ability to respond to plant and animal diseases, periodic climate change, and changes in market conditions. Internally sustainable agriculture contributes greatly to local communities by maintaining the infrastructure and ensuring the stay of the rest of people who could represent the future

generation of farmers. *The second criterion* emphasizes external sustainability where agriculture should not impose externalities to non-agricultural activities, nor to affect the environment beyond the limits of tolerance.

The third criterion indicates that agriculture should be responsibly sustainable in the context of flexibility and dynamism to respond to different (unsustainability) crises in other sectors. Participation of agriculture in solving the problems of global warming is reflected in, for instance, afforestation of different plots, greater use of biodiesel, etc. No system of production should be isolated, but in agreement with other systems should jointly contribute to sustainable development.

Also, generally is accepted to define the sustainability as the possibility to satisfy the needs of the present generation without jeopardizing the possibility of future generations to satisfy their own needs (Horrigan, Lawrence, Walker, 2002, p. 452).

In spite of the fact that the concept of sustainable development is gaining attention in recent times, there are also examples of environmental accounting in agriculture in the distant past. At least three examples can be counted in order to confirm that fact (Ruttan, 1994, pp. 6-7).

The first example of the sustainable agriculture is reflected in the existence of a system of afforestation of untreated areas in most parts of the world in the pre-modern era. This system has provided excellent results in poorly populated areas.

The second example can be found in the agricultural history of East Asian countries as "wet rice cultivation". The traditional way of cultivating rice was like agriculture in the aquarium. Most of the production was recycled into suitable fertilizers. Nutritious organic and mineral substances have been used in accordance with the irrigation system. The yields, although slowly, grew during the period.

The third example is the system of integrated farming and livestock, characteristic of the late Middle Ages in Western Europe. First of all, the system emphasized the possibility of using various plant and animal fertilizers for the purpose of increasing soil fertility.

3. Interaction between agriculture and environment

Agriculture should provide adequate agricultural products at affordable prices in response to the existing demand for food and bio-energy in line with the ever-growing global population. At the same time, increased production costs, limited natural resources and climate change should be taken into consideration. Increasing awareness of the (unintentional) impact of agricultural production leads to great social expectations regarding the improved environment, as well as the welfare of the community, workers and the animals in agriculture (OECD_b, 1999).

Agriculture affects the environment in a variety of different ways, influencing water, land, but also the use of fertilizers and phytosanitary measures (Sustainable Development Solutions Network, 2013). From the aspect of its relation to the environment, certain specific characteristics of agriculture make it different in comparison to other sectors in the economy. First of all, the relationship between agricultural activities and the environment is complex and non-linear. They are determined by different agro-ecological systems and physical characteristics of the land, prevailing conditions and production technology, as well as the practice of managing agricultural farms from the aspect of natural conditions (Ashraf, Öztürk, 2012, p. 25).

The following table provides basic agricultural activities and their interaction with environmental problems.

Table 1. The environmental issues caused by the impact of agriculture

Agricultural activities	Environmental issues caused by agricultural activities
Use of pesticides, artificial fertilizers, etc.	Impact on human health through residues in food, soil and water
Throwing fertilizers and animal waste into underground and aboveground waters	Water pollution
Converting harmful gases in steam due to excessive use of fertilizers, straw firing and similar	Air pollution
Inadequate land and waste management	Filling, erosion and soil contamination
Destroying natural habitats as a result of the abandonment of traditional agricultural production; replacing old local varieties with new ones	Loss of biodiversity and genetic erosion
Increasingly large holdings within the farm that impose the use of intensive machinery with monocultures	Landscape change
Excessive irrigation with low efficiency	Groundwater exhaustion
Livestock on farms and waste that it produces	Unpleasant smells

Source: Lasa, B., Aparicio-Tejo, P.M.; Lamsfus, C., Irigoien, I. (2010): *Interaction between agriculture and the environment*. Agricultural Sciences: Topics in Modern Agriculture, Texas, USA: Global Media

Although there are few agricultural methods that can be considered as purely sustainable, there are still some of the other methods that contribute to the achievement of this goal (Horrigan, Lawrence, Walker, 2002, p. 452). Those methods are the following:

- *Crop rotation*. Farmers interrupt the reproductive pest flow and reduce the need for their control by rotating two or more crops in the fields; rotation sometimes reduces the need for fertilizer use since one type of crop produces nutrients for the next crop.
- *Covered crops*. They contribute to the maintenance of soil quality, prevention of erosion and minimization of weedy appearance.
- *Agriculture with or without minimal land cultivation*. This system is based on the fact that minimizing soil treatment increases the retention of water, nutrients and maintenance of the surface layer of the soil.
- *Land management*. A good farmer should adequately manage everything in his possession, in particular physical, biological and chemical means. In this way, the products obtained by cultivating the soil become safe for human health.
- *Variety*. The cultivation of different types of crops appears as a solution to both economic and environmental problems. Monocultures are not suitable either for pests or they are more sensitive to market price fluctuations.
- *Integrated pest management*. This system uses biological methods against pests; the use of pesticides is practiced only as the ultimate solution if the previous ones did not end up with adequate results.

Agricultural activities have a wide range of positive and negative impacts on the quality of the environment. They can lead to disturbing the quality of soil, water and air, but also to endangering natural habitats and biodiversity. However, agricultural activities can be useful in reducing the greenhouse effect, preserving and improving biodiversity, but also in the prevention of floods and landslides. Therefore, in most countries, the

agricultural sector is under strong state intervention and policies to control the impact on the environment. This has a significant impact on agricultural production, its location, agricultural practice, but also the used management system (OECD_b, 1999).

Conclusion

At the global level, economic progress has brought numerous, both positive and negative changes. They have been reflected in almost all economic sectors, emphasizing the need to take into account their long-term sustainability in addition to short-term economic goals.

The future agricultural development will focus on the ecological aspect which will bring out new strategies and policies paying more attention to the environmental protection. Permanent reforms of agricultural policy should keep pace with the requirements for environmental protection. Proposing further directions of development also implies taking into account possible implications for the environment. It is obvious that market liberalization and subsidy reduction contribute to achieving this goal by reducing incentives for intensive production (Nielsen, Pedersen, Christen, 2009, p. 383).

Agricultural production modifies the natural environment much more than other human activities. It represent at the same time an opportunity and threat for the preservation of biodiversity.

The aim of sustainable agriculture is to have benefits throughout the society, not only in food production, but also in maintaining ecosystems in terms of water, forest and soil quality. Thus, farmers should be rewarded not only for food production, but also for the provision of various ecological services. By rewarding sustainable production, the productivity would increase and its profitability would be encouraged in the short, medium and, first of all, the long-term (Clay, 2003, pp. 2-3).

The future farms will be significantly different from the present ones. They will employ managers who are creative and innovative, and who will base their business on economic, ecological and social sustainability, thereby contributing more to the welfare of the community. However, the transition to a "sustainable world" will primarily depend on the ability to integrate technological, economic, environmental and social principles into the service of a healthy environment and economic development.

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HUMAN CAPITAL AND SUSTAINABILITY OF THE EUROPEAN UNION RURAL AREAS

Abstract

Sustainable rural development is one of the priorities of the European Union, given that rural areas make up 91% of the total territory, providing food products for the urban and rural population. Human capital of rural areas is an important factor of long-term rural development. Problems such as rural depopulation, aging of the rural population, position of women and youth as labor force, inadequate qualification structure of the rural population, represent constraints on the future development of these areas. The aim of the paper is to analyze the age, gender and educational structure of the rural population and to notice the obstacles to sustainable rural development in the countries of the European Union, since human capital is an important determinant of the sustainability of rural areas.

Key words: *human capital, sustainable development, European Union, rural areas*

JEL klasifikacija: *J21, J43, I25, O18*

ХУМАНИ КАПИТАЛ И ОДРЖИВОСТ РУРАЛНИХ ПОДРУЧЈА ЕВРОПСКЕ УНИЈЕ

Апстракт

Одрживи рурални развој је један од приоритета Европске Уније, с обзиром да рурална подручја чине 91% укупне територије, при чему обезбеђују прехрамбене производе за урбано и рурално становништво. Хумани капитал руралних средина, важан је фактор дугорочног руралног развоја. Проблеми као што су рурална депопулација, старење руралног становништва, положај жена и младих као радне снаге, неадекватна квалификациона структура сеоског становништва, представљају ограничења будућег равоја ових подручја. Циљ рада је анализа старосне, полне и образовне структуре руралног становништва и сагледавање препрека одрживог руралног развоја на нивоу Европске Уније, с обзиром да хумани капитал представља важну детерминанту одрживости руралних средина.

Кључне речи: *хумани капитал, одрживи развој, Европска Унија, рурална подручја*

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Introduction

The rural areas of EU-28 are making up for 91% of the entire territory and 56% of the entire population. Such areas generate more than 15% of gross value added and employ 13% of the working-age population. The primary goal of such environments is the food product production for rural and urban population, as well as the production of industrial raw materials. Thus, rural development is of crucial importance for the EU and one of the key priorities as well (Tomasz, Edward & Mariana, 2016).

Rural development policy in the EU has set a sustainable framework for the future of the rural areas of Europe as its goal and it is closely connected with the improvement of conditions in the countryside, which includes the aspects of housing, living environment, infrastructure, communication, employment possibility and land management. Such actions are specifically important for many countries of Central and Eastern Europe, with rural depopulation in mind (Pašakarnis, Morley & Maliene, p. 703, 2013). The final goal of such actions is the improvement of the human capital in rural areas, having in mind that human capital is a very important determinant of sustainable rural development. Human capital enables innovation generating and the integration of new methods into economy of the rural areas (Marinas, 2015).

Human capital is an important factor of rural development, whereby, qualification, age and gender structure of the labor force of such areas make up the entire key determinant of a long-term sustainable growth. The employment problem of women, elderly and youth, the rural depopulation problem, as well as the educational services inadequacy in rural areas are also some of the problems of the rural areas in the European Union and an obstacle for sustainable growth. The main goal of this paper is the analysis of gender, age and qualification structure of rural population through observation of the limitation of future development of rural areas at the European Union level.

Basic determinants of rural area sustainability

Three dimensions are crucial when it comes to rural area sustainability: economic, ecologic and social. Criteria, indicators and goals that are in close connection with the aforementioned dimensions are interdependent and they overlap. For example, economic decisions farmers make are affecting ecologic and social components, while living environment preservation is a precondition for long-term economic potential of rural areas (Siudek & Vashchyk, 2014).

The Common Agricultural Policy of the European Union for the period 2014-2020, in the rural development area, anticipates three key goals: the improvement of agricultural competitiveness; sustainable management of natural resources and climate actions; balanced territorial development of rural areas, including incenting and maintaining employment rate (European Commission, 2013). Rural development priorities of the EU listed here are accentuating the importance of all three dimensions of rural area sustainability.

An important determinant of rural area economic growth is the economic dimension of rural development sustainability which includes both the characteristics of agricultural and non-agricultural sectors in rural areas, as well as the labor market. Yet, both ecologic

and social factors may have a drastic effect on the economic growth of such areas, and they might represent important constraints. Economic component of sustainable rural growth refers to the necessity of living environment management in rural areas, in order to preserve the elements of a natural environment. Namely, through their economic activity in the countryside, people influence the worsening of the living environment quality, wherefore the availability of contemporary methods and environmental protection technologies in rural areas play an important role in the slowdown and elimination of such negative processes (Sobczyk, p. 122, 2014). The social dimension refers to people and countryside living conditions and it plays an important role in the accomplishment of sustainable rural growth. Key indicators which are connected with this component are: employment rate, educational level, internet access (Hull, 2008).

The problem of rural growth sustainability of the European Union includes three components – economic, ecologic and social. Less favorable economic parameters are characteristic for the rural environment of Eastern and Central European countries when it comes to the members of the European Union, while the most advantageous economic indicators occur in Western and Southern European countries. Besides that, the worst ecologic parameters are possessed by some of the older members of the EU, while the question of rural area social growth in the EU is a bigger problem for some of the newest members.

According to a certain research (Siudek & Vashchyk, p. 106, 2014), taking into account the economic component of the rural areas of the EU, the most developed countries in the period 2000-2012 had been: Luxemburg, the Netherlands, Slovenia, France and Malta, while the least developed were Lithuania, Romania, Slovakia, Poland and the Czech Republic. From the ecologic aspect, the countries with the best parameters were: Latvia, Finland, Austria, Sweden and Estonia, while the rural areas of the Great Britain, Spain, France, Poland and Malta had the worst indicators. Also, the highest level of social growth in the rural area framework of the EU was recorded in Luxemburg, Denmark, Belgium, Sweden and the Netherlands, while the lowest was recorded in Romania, Croatia, Poland, Lithuania and Greece.

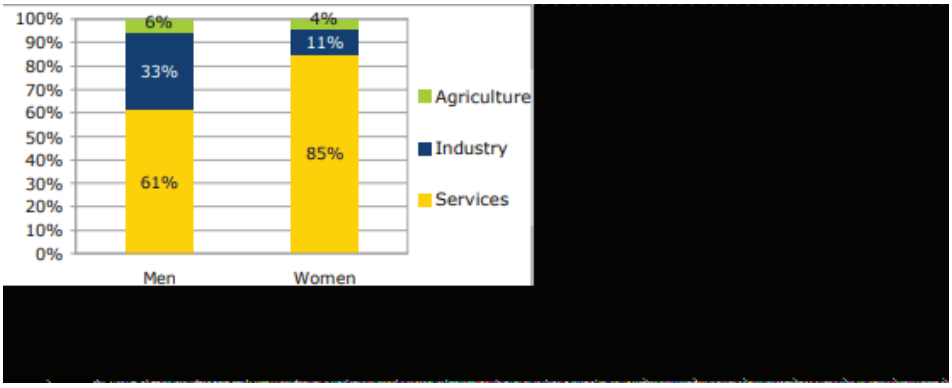
The position of women labor force in the rural areas of the EU

Women are characterized with the lower rate of economic activity, especially in the rural areas. Even when they are working, they receive lower salaries for their work and they have lower representation in the decision-making positions. The average difference in men and women salaries in EU-28 is 16.4%. For example, in rural areas of Spain, the percentage of women which earn between 400 and 1000 euros is higher (56.8%) than the percentage of men, while men are more dominant when it comes to average salary between 1000 and 1800 euros (Alonso & Trillo, p. 153, 2014). In agriculture, which plays an important role from the employment aspect in the rural areas, especially for newer members of the EU, women are rarely seen on managerial positions and they manage smaller agricultural holdings.

The employment rate is generally higher for men than it is for women. On the EU-27 level, 76% of men and 62% of women were employed in the year 2009, while in the year 2012, the percentage of women was 62.4% and was 76.4% for men. Such gaps

are approximately the same for each separate regional type (predominantly rural, mixed and predominantly urban) as it is for EU-15 and EU-12 (Graph 1). In predominantly rural areas of the EU-27, only 61% of women aged between 20 and 64 was employed in the year 2009. The situation is even more unfavorable in EU-12 (58%) than it is in EU-15 (63%). The lowest employment rates of women in predominantly rural areas were recorded in Italia (48.6%), Greece (50.9%), Spain (51.6%) and Hungary (52.2%). Contrary to that, Austria (70.4%), Germany (71.5%), Denmark (73.6%) and Sweden (74.6%) have the highest employment rates of women in predominantly rural areas. The employment rates of men in predominantly rural regions are notably higher than when it comes to women. Hungary (65.1%), Lithuania (66%), Latvia (67%) and Estonia (70.2%) have the lowest rates, while Denmark (80.4%), Germany (81.8%), Austria (82.1%) and the Netherlands (86.9%) record the highest employment rates of men in rural areas, everything above the national targets (European Commission, 2011).

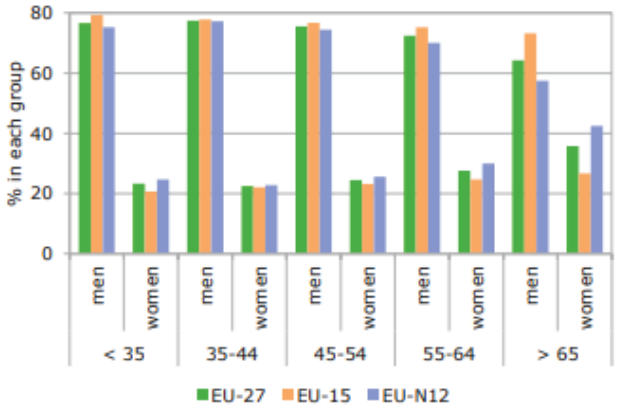
Graph 1 - Employment rate for men and women by type of region (2009)



Source: European Commission (2011). Agriculture and Rural Development. Rural areas and the Europe 2020 strategy employment, p. 3

In agricultural holdings of the EU, the majority of managers, i.e. the ones who are responsible for financial questions and production are men (Graph 2). Only in the oldest age group (65 years and more) women make up for more than 30% of farm managers, especially in the newer members of the EU. This is connected with longer life expectancy of women and it is especially noted in the Baltic countries and some Eastern European countries.

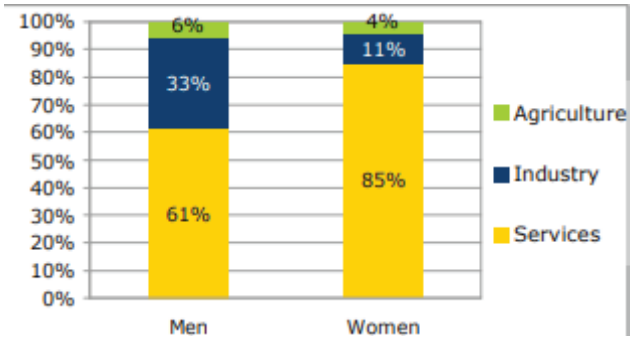
Graph 2 - Farm managers by sex and age groups in 2010 (in% in each group)



Source: European Commission (2013). Agriculture and Rural Development. Structure and dynamics of EU farms: changes, trends and policy relevance, p. 9

In 2011, agriculture provided for 4% of the employment of women in EU-27 (Graph 3), while for men this sector played a slightly more important role. In the utmost extent, women are employed in the service sector (85%). However, when it comes to the employment of women in agriculture, it varies from 34.5% in Romania up to less than 1% in Belgium, Denmark, Malta, Sweden and the Great Britain (European Commission, 2012). Also, rural areas of newer EU members are still dependent from agriculture to a certain extent, where Romania significantly stands out. In Romania, agriculture contributes to 30% of the total employment rate, which is 6 times higher than average in EU-28. Rural environments of Romania are characterized by economic deprivation and educational backwardness, which demands considerable investments into improvement of human capital quality of such regions, in order to eliminate the obstacles for sustainable rural growth (Tigu, Marinas & Valimareanu Mircioi, 2015, p. 357).

Graph 3 - Employment of women and men by sectors of the EU, 2011



Source: European Commission (2012). EU Agricultural Economic Briefs. Women in EU Agriculture and Rural Areas: hard work, low profile, p. 3

In 2008, the European Parliament brought the Resolution of Women and their Position in the Countryside, in which, among other, countries are urged to:

- In cooperation with the regional and local management, open new possibilities for education and training of women and to orient their policy towards the improvement of basic living conditions for women in the rural areas (health protection, legal protection, right to work, cultural and social activities, decision making);
- Encourage female entrepreneurship;
- Support female unions, models of mentoring and associations of entrepreneurs;
- Support projects which help and counsel during the establishment of innovative companies for primary agricultural production, which will open new working positions, especially for women;
- Develop the legal form of mutual property which will wholesomely respect women's rights and ensure their social protection and recognition of work;
- Give ideological and financial support for unpaid and voluntary work and to warn about the importance of social work of female organizations (Cesar & Broz, 2014);

Greater involvement of women in economic activities of rural areas would ensure more efficient usage of human capital of such areas, decrease in inequality and the improvement of the position of women in the countryside, all of which contributes to bigger possibilities of rural growth sustainability.

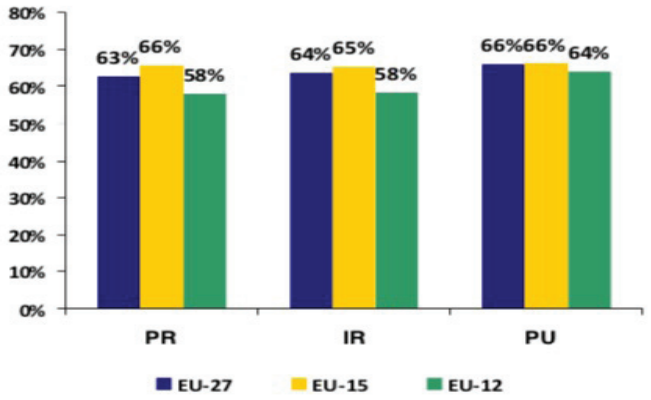
Age structure of human capital in rural areas of the EU and the problem of sustainability

About 30% of farm managers belongs to the age group of more than 65 years of age, which did not change in the period 2005-2010 (European Commission, 2013). However, data shows that older farmers manage smaller farms and that they are not ready for innovation and investment, while the largest farms are being led by middle-age farmers. Many farmers continue to work on their smaller holdings even after the normal retirement age, before giving the land to the younger generation or simply sell it. Young farmers are facing the problem of scarcity of land because the largest parts of the land the retired farmers give to their next generations, usually middle-aged farmers with already developed operations and significant resources, all of which younger farmers lack. The contribution of younger farmers is gradually increasing, especially because of the very restricted access to land.

Some of the reasons why younger people are involved in the agricultural sector are: insecurity and risks which are characteristic for the agricultural sector; rural lifestyle is less appealing to younger people; the price of land and renting are very high in comparison with income; high initial costs; experience and certain skills when it comes to farm management is mandatory (Koszegi, p. 90, 2017). For example, in 2008, in Spain only 38% of people aged from 30 to 49 lived in the same environment in the rural area where they were born, while in 2001 that percentage equaled 44.5% (Alonso and Trillo, p. 151, 2014).

In EU-27, the employment rate of young people for the year 2009 was 64.3% which is under the average rate of 68% (Graph 4).

Graph 4 - Employment rate among young people, 2009 (between 20 and 30 years of age)

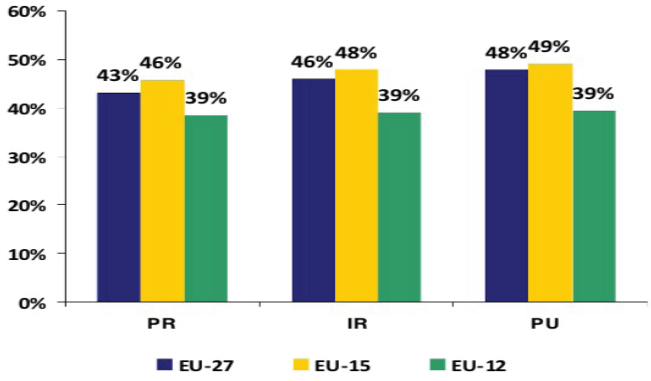


Source: European Commission (2013). Agriculture and Rural Development. Structure and dynamics of EU farms: changes, trends and policy relevance, p. 9

Predominantly rural areas have the lowest employment rates of young people, 62.6% in EU-27, 65.8% in EU-15 and 58.1% in EU-12. Mixed and predominantly urban regions have higher rates, although under the Europe 2020 target of 75%. The employment rate of young people is lower in EU-12 than it is in EU-15 for all regional types. In predominantly rural regions, the lowest employment rate for people between 20 and 30 years of age is recorded in Italy (51.5%), Romania (52.8%) and Hungary (53%). The Netherlands (89.2%), Austria (80.1%) and Denmark (76.9%) had the highest employment rates of young people in the year 2009 (European Commission, 2011).

Also, elderly people from 55 to 64 years of age were hit by very low employment rates. Such rates in the year 2009 was only 46%, whereby 43.2% in predominantly rural regions, 45.9 in mixed and 48 in predominantly urban regions (European Commission, 2011).

Graph 5 - Employment rate for people aged 55-64 (2009)



Source: European Commission (2011). Agriculture and Rural Development. Rural areas and the Europe 2020 strategy employment, p. 7

The lowest employment rate of elderly people was recorded in predominantly rural regions on the EU-12 level (38.6%). On the EU-15 level (45.7%) of the elderly people were employed in the predominantly rural regions in the year 2009, while mixed and predominantly urban areas had slightly higher rates (47.9% and 49.1%, respectively). On the country level, the lowest employment rates of elderly people were recorded in Hungary (29.8%), Poland (32.3%), Slovenia (32.7%) and Italy (35%). Contrary to that, Sweden and Estonia record the highest rates (68.5% and 59.6%, respectively) although they still have lower rates than for other age groups.

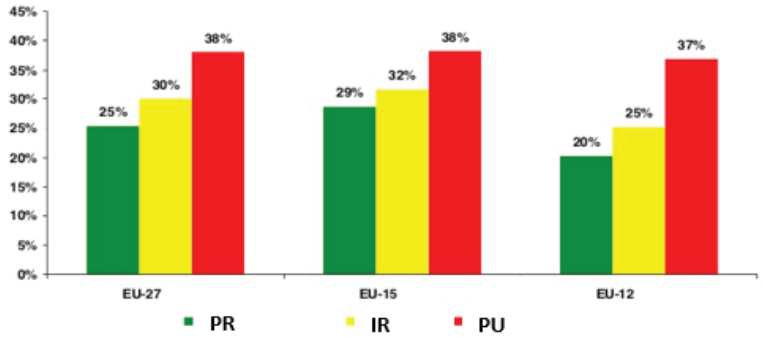
Education as a factor of sustainability of the rural areas in the EU

Human capital of rural areas is consisted of available skills, competitiveness and educated labor force and it represents a key driving force of growth, due to the fact that it contributes to the regional knowledge base and it supports innovative processes, entrepreneurship and productivity. The availability of educated and qualified labor force in the rural areas could generate the increase in income and economic growth of such area (Marinas, p. 493, 2015).

Rural areas of the European Union are faced with a challenge – creating sustainable jobs for highly-qualified labor force. In this respect, the gap between urban and rural areas continues to expand. Although rural areas make up to a considerable amount of the total EU territory, the per capita income in such areas is barely higher than the half of the income in urban areas. This makes attraction and retention of qualified individuals very hard (Neacşu & Bâldan, 2009). Such problems are especially accentuated within the newer members of the European Union.

The highest number of people aged between 30 and 34 years of age with high education is present in predominantly urban areas (around 5.4 million), which represents 38% for this age group (Graph 6). In mixed regions, that number is 3.5 million, or 30% of the population, in the year 2009. Around 25% of the population aged between 30 and 34 years, in predominantly rural areas, are people with high education, i.e. around 2.1 million people. The lowest percentage of people with high education aged between 30 and 34 in predominantly rural areas can be found in Romania (11.7%), Czech Republic (15.1%) and Hungary (17.1%) in EU-12, and for EU-15 Portugal (16%), Italy (17.7%) and Austria (18%), while the highest rates were recorded in Ireland (44.7%) and Finland (42.4%). On the EU-12 level, the highest rates were recorded in Lithuania (36.9%) and Estonia (32.5%) (European Commission, 2011).

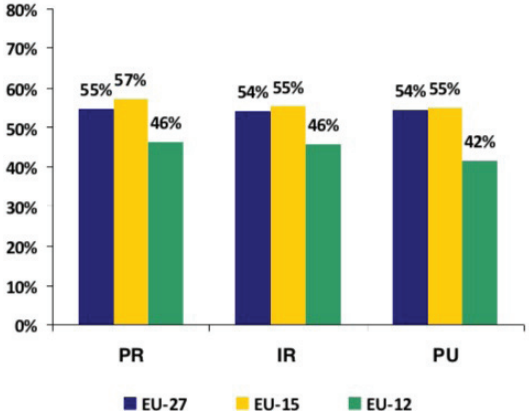
Graph 6 - Population with higher education by region, 2009 (30 to 34 years)



Source: European Commission (2011). Agriculture and Rural Development. Rural areas and the Europe 2020 strategy: education, p. 6

The data shows that people with lower secondary education also have lower rates than average (Graph 7). On the EU level, this rate is 54% in the framework of three different regional types for the year 2009. The employment rate of low-qualified people is higher on the EU-15 level than it is on the EU-12 level (55.6 and 45.5%, respectively). Predominantly rural, mixed and predominantly urban regions on the EU-15 level and EU-12 level had average rates in the year 2009. Slovakia, Hungary and Lithuania recorded lowest employment rates in that period when it comes to low-qualified people in predominantly rural areas (28.1%, 35.4% and 36.1%, respectively), while the highest rates in this area were recorded in Portugal, the Netherlands and Denmark (72.5%, 66.2% and 65%, respectively). The employment rates for such workers in Czech Republic, Slovakia, Hungary, Lithuania and the majority of Poland were under 45%. Sweden, Denmark and the Netherlands, as well as some parts of the Great Britain and Germany have the employment rates of low-qualified people above 60% (European Commission, 2011).

Graph 7 - Employment rate for low-skilled people, 2009 (20-64 years of age)



Source: European Commission (2011). Agriculture and Rural Development. Rural areas and the Europe 2020 strategy employment, p. 8

According to a certain research (Zaharia & Oprea, p. 102, 2013) which involves the period 2000-2011 and all regional types on the EU level, the positive relationship between education (i.e. primary, secondary and high education) and the employment rates. It can be concluded that the employment rates of people with primary education is the lowest in the EU, while the employment rates of people with high education is the highest, in the observed period. Also, the employment rates for workers with high education is recorded with the largest increase in Bulgaria from 75.2% in 2001 to 86.1% in 2008 and in Spain, from 75.3% in 2000 to 82.5% in 2007. Germany has made a significant increase of such rate, which had been 82.8% in the year 2005 and 87.6 in the year 2011 which was the highest employment rate of a certain population in the entire European Union. It was also noted that employment rates of a certain population with secondary education has slightly lower values when compared with workers with high education. The largest rates were recorded in Spain (62.1%), Bulgaria (64.8%), Germany (76.3%) and Sweden (80.4%), while the employment rates with primary education were lower from both secondary and high education workers. As such, the highest rates in the analyzed period were recorded in Sweden and they do not surpass 70%, while the lowest were recorded in Hungary which had been under 40% during the entire analyzed period.

EU strategy in the area of education and training for the period 2010-2020 emphasizes the goal of at least 40% people of high education aged between 30 and 34 years. In the focus of the strategy is the ensuring of equality and social cohesion throughout offering of equal possibilities and fighting against any kind of discrimination (Gavrila, Tulbure & Marghitan, p. 46, 2016). In this respect, as a key goal stands out the creation of an attractive system of scholarships which would allow equal access to high education for all young people, especially for those from rural areas.

Education and training are the key factors of positive influence on the quality of life when it comes to people in the rural areas. Research data shows that rural areas lack educated labor force, while some of the Eastern countries are still combating the illiteracy of the rural population. As a result, the supply of the labor force is insufficient, the employment rates are low, the possibilities of employment are bad and the investment rates are small. The employment rates in some of the rural areas of Western Europe and all rural areas of Eastern Europe, still, to a certain extent, depends from agriculture. Low income and seasonal economy of work bear a potential risk of poverty and social exclusion (Strano, 2012).

Investments in the development of human capital should increase the quality of human capital of rural areas especially among the newer members of the EU, which would support both competitiveness and productivity, which are very important preconditions of economic growth and the decrease of disparity between rural and urban areas and fulfillment of key goals of the EU rural growth policy.

Conclusion

Human capital of rural areas can be a limiting factor of rural growth sustainability, given the problems of the rural depopulation, aging of the rural population, insufficient involvement of women and youth in the rural economy, inadequate qualifications of the rural population, with which even the rural areas of the EU are having problems with, with significant differences between the member countries.

Statistical data points out to lower employment rates of women in the rural areas, lower representation on the decision-making position, as well as the fact that they are paid less than men are. However, Strategy Europe 2020 does not anticipate strengthening of the gender equality as its goal. Even though the goal when it comes to employment rates is 75% for both men and women, a different starting point was not anticipated, having in mind that in year 2012, the employment rates of men were 74.6% and for women only 62.4%. The lowest employment rates of women were recorded in Hungary, Lithuania, Latvia and Estonia, while the highest employment rates were recorded in the Great Britain and Germany.

The problem of predominantly rural areas is the employment of youth as well. The employment rates of youth aged between 20 and 30 years is around 60%, whereby this rate is especially low in Italy, Romania and Hungary and higher than average in the Netherlands, Austria and Denmark. On the other hand, even the elderly people aged between 55 and 64 years are facing the same kind of problem, having in mind that the employment rate was lower than 50% in all regions of the European Union, whereby this rate is especially unfavorable in predominantly rural areas, which indicates to the position of both young and elderly people in such areas and the necessity of a solution for this problem by creating certain projects and actions in the framework of the common agricultural policy of the EU.

Besides that, the data shows that the lowest percent of population with high education is present specifically in the rural regions, in comparison with mixed and predominantly urban regions, whereby this problem was specifically pointed out in Romania, Czech Republic and Hungary, while some more positive examples on the level of the European Union can be found in Ireland and Finland.

The improvement of quality of the rural area human capital of the EU, through ensuring better conditions for the education of the rural population, could bring to the improvement of the growth potential in such areas. Besides that, improvement of usage of human capital of rural areas, through larger involvement of women and young people in rural economy, could enable larger capacities for growth and development of rural areas in the EU.

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