

Review paper

SUSTAINABLE DEVELOPMENT AND NATURAL RESOURCES EXPLOITATION - BRIEF REVIEW

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Abstract: Natural resources are limited and uncontrolled exploitation can have negative effects on the environment. It is necessary to find approach of their sustainable use. Sustainable development is the framework for defining strategies of continuous state and social progress, without harm to the environment and natural resources essential for human activities in the future. Model that regulates sustainable use considers strategies and legal regulations for exploitation of natural resources and energy. Goal is to ensure the sustainable use of natural resources at national and global level. Sustainable use of natural resources is directly related to environmental protection. Also, the preservation of the working and living environment is related to the degree of economic development and the level of education of the population about the importance of a healthy environment and the way of its preservation. Accelerated technological development leads to an improvement in the quality of life in all spheres of human activity, but in parallel, it creates the possibility of greater environmental degradation. Therefore, it is necessary, within the goals of the development policy of the society, to include the correct criteria that will contribute to sustainable development. Thus, we contribute to preserving the environment and balance of natural ecosystems.

Keywords: natural resources, sustainable development, environmental protection

1 INTRODUCTION

The sustainable development concept was created with the aim of preserving the environment so that all partial measures and separate politics have united and thus give a better result. How complex is sustainable development concept and what are its based pillars is shown graphically in the figure 1 (Mihajlovic et al., 2018; <https://mrbgeography.com>; Mensah, 2019).

In 1980, the International Association for the Environment and Natural Resources Protection developed an environmental strategy with primary aim of achieving sustainable development through natural resources protection. Later, The World

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Commission on Environment and Development, known as Brundtland Commission, (Strbac et al., 2012), has taken over this concept. In 1987, the Brundtland Commission prepared a report called Our Common Future. Emphasis was placed on politically more acceptable idea of sustainable development than those ideas promoted in the 1972 in "Limits to Growth", (Milenovic, 1996). However, "Limits to Growth" idea which was based on resource wasting and possible limits to growth, drew attention to a wide range of global, scientific and political public. The concept sustainability strategies define the problem of goods and natural resources exploitation by species, spatial distribution, diversity, scope and quality. Besides, the balance categories are determined and condition changes, valuation method and conditions of sustainable use are predicted, (Pesic, 2002; Ilic, Mihajlovic and Omanovic, 2016). Definitions of natural resource sustainability and sustainable development can be classified into six groups, (Boskovic, 2015; Perman et al., 1999): 1. The natural resources sustainability is a condition in which the usefulness (or consumption) of resources does not decrease over time; 2. The natural resources sustainability implies resource management in such a way that their production capabilities are not diminished over time; 3. The natural resources sustainability means that there is no resource reserves decrease over time; 4. The natural resources sustainability means managing them in such a way to maintain a sustainable yield, ie. the effect of their use; 5. Sustainability implies providing a minimum of ecosystem stability conditions over time and 6. Sustainable use of resources and sustainable development are the capacity for achieving wide consensus.

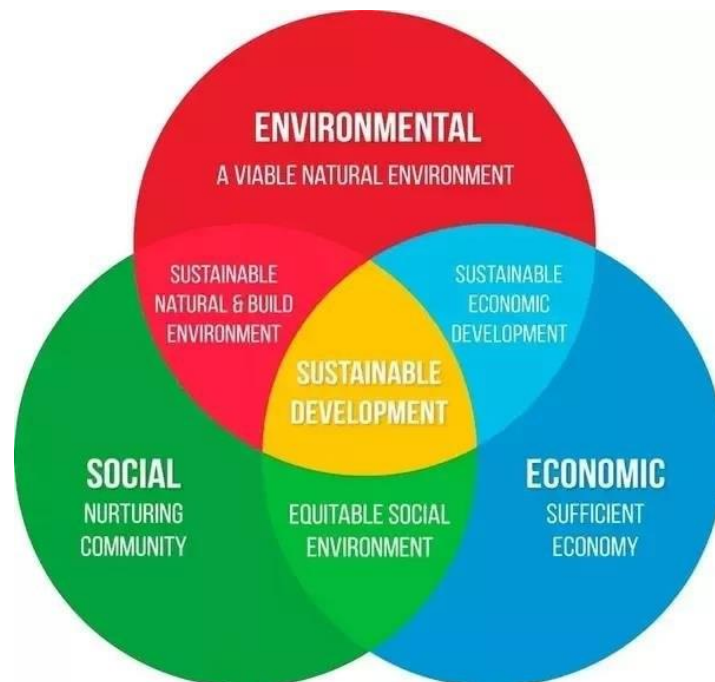


Figure 1 Pillars of sustainable development

In order to natural resources, as key elements of the environment, have sustainable use, it is necessary to fulfill certain conditions, (Boskovic, 2015; Goodstein, 2003; Milenkovic, 2006): 1. Development and preservation of all environmental elements and a complete turn in changing trends in their exploitation; 2. Greater efficiency of economic and ecological processing of environmental elements and always considers them as the basic wealth of humanity; 3. Quick but careful acceptance of technical and technological developments in the collection and quality environmental information processing and 4. Eliminate inappropriate activities of people in the environment as soon as possible, which could reduce the socio-economic efficiency of that environment in the future.

Environmental protection and sustainability of natural resources are common and priority goals of modern society at the global level. This is complex problem, and it is necessary to engage experts from all scientific fields to reach acceptable solutions. The Paris Agreement, which was adopted by the consensus of 196 countries on December 12, 2015, (signed in 2016.), also made a great contribution to the solution. Congress participants signed an agreement within the United Nations on climate change, climate change mitigation, adaptation and finance. The signatories to the agreement have pledged to report regularly on their contribution to mitigating global warming (United Nations, 2015).

To better protect nature and its resources and to implement the provisions of the Paris Agreement as efficiently as possible, the Green Agenda: Sustainability Planning in 2021 (European Commission, 2020) was adopted. It was pointed out that a key decade for the future of our planet will begin in 2021. It is necessary to apply multidisciplinary approach and a collective effort to bring climate change under control are needed.

Sustainability of natural resources and development are directly related to human activities and their aspiration to use natural resources. Term-ecological footprint is used as an indicator of sustainable development as a measure of that utilization.

Ecological footprint is an ecological deficit that determines the level of resource consumption and waste generation by an economy or population that exceeds sustainable natural production and the power of assimilation in the spatial sense (Veljković, 2021). This term describes the difference between the ecological footprint of a given economy and population of certain geographical area. Calculating the ecological footprint, it was found that humanity in 21.st century does not live within the carrying capacity of the planet Earth. The ecological footprint showed that, for example, in 2008, 2.7 global hectares per person (gha/pers) were needed, which is 30% more than the natural biological capacity of 2.1 gha/pers. This environmental deficit at the global level is met from unsustainable extra sources, and they are obtained by: 1. inclusion in the services of world trade in raw materials and finished products; 2. taking from the past (e.g. fossil fuels), or 3. borrowing from the future on principles contrary to the concept of

sustainable development (e.g. over-exploitation of forests and fish stocks) (Veljković, 2021; McManus and Haughton, 2006).

2 NATURAL RESOURCES

Natural resources encompass everything that comes from nature and have general wealth and use value. Mineral resources, water, forests, land, solar and wind energy have a direct use value, but climate and relief have indirect use value, as they represent conditions for the development of some other economic activities, (Milanovic, 2009; Kattumuri, 2018). A broader term for natural wealth is natural potential that encompasses all natural resources and conditions. They signify all material goods used by man: ores, coal, forests, biodiversity, climate and relief. When one begins to use these goods, they become a resource (Fr. ressource-source) that has its economic value, (<http://vssp.edu.rs>). Natural resources are divided according to the duration in (Milanovic et al., 2008): 1. Non-renewable resources (raw material or mineral resources); 2. Renewable resources (land, water, air, flora and fauna) and 3. Sustainable resources (solar energy, wind, tides, running water).

2.1 Management of non-renewable natural resources

The management of non-renewable natural resources, including mineral resources, is very complex, because their available stocks continuously decreasing during exploitation. Mineral resource management must be strategic in order to achieve a high level of efficiency and effectiveness during the exploitation process. The basis of applied strategy is rationality in their use, which is based on the rule of maximizing the use of natural resources, (Ilic, Mihajlovic and Omanovic, 2016). Strategic management of mineral resources starts with economic evaluation at local, national and regional level. Management objectives at the local level are based on resource availability, quality and structure, capital investment amount, environmental aspects and interests of the population. National strategic management objectives are based on exploration and determination of available stocks, resource depletion, availability of resources for mineral exploitation (means of labor), human resources security, state of investment funding, implementation of measures and activities envisaged by strategic planning. The basic regional objectives of mineral resources strategic management are the reconciliation of primary production and processing (Ilic, Mihajlovic and Omanovic, 2016; Milenkovic, 2000). The precondition for the sustainable development is a balance between the exploitation of natural resources and preservation of biodiversity is (Mihajlovic et al., 2018; Maksimovic, Urosevic and Ivkovic, 2015; Magdalinovic and Magdalinovic Kalinovic, 2012; Mihajlovic and Blagojev, 2019). During the mineral exploitation process, both underground and surface excavation, the negative impact on the environment can be divided into three groups: 1. Depletion of reserves, 2. Destruction of the environment, and 3. Pollution of the environment. In areas with underground mines the environmental degradation is less than in the areas of surface mining.

Generally, all forms of exploitation and mining can have a negative impact on the environment. In this sense, the obligation to have a strong link between mining and environmental protection is also promoted by legislation (Ivkovic, Dramlic and Dragosavljevic, 2015).

2.2 Management of renewable natural resources

Renewable natural resources are characterized by the processes of constant renewal and regeneration, at the same time with the process of their consumption. The management of these resources is based on the harmonized relationship between consumption and renewal, i.e. regeneration. In order to conserve natural resources, some measures are taken by the state; legal measures, quantitative restrictions and economic measures, (Pesic, 2002; Lindkvist, Ekeberg and Norberg, 2017). Legal measures regulate property rights over resources and prevent free access and uncontrolled use. Quantitative restrictions refer to the resource utilization quantities (extent of exploitation, extent of collection of flora and fauna, etc.) Some analysis of activities contributing to the management of renewable natural resources indicates that the best results are achieved by application of economic measures. The introduction of the system of taxes and subsidies, as well as fiscal measures contributed to the protection and conservation of renewable resources. The most important part of renewable resources is flora and fauna. Special attention was paid to the use and trade of wild flora and fauna. This issue is regulated by a special decree of the Government of the Republic of Serbia (Regulation "Official Gazette of the RS, No. 31/05), which clearly specifies under what conditions and to what level protected species from natural habitats can be collected, used and placed in traffic, (Ilic, Mihajlovic and Omanovic, 2016).

3 CONCLUSION

A prerequisite for sustainable development is a balance between the exploitation of natural resources and the biodiversity conservation. The Sustainable development mission succeeds only if there is balance between economics and ecology. The main link in all activities on this topic is man and his awareness of the importance of preserving the environment and its existence within the natural laws. By raising the population awareness from the local level to the global level, we are getting closer to the concept of sustainability. Namely, it is a condition where man uses natural resources, but controlled with constant care and striving for their restoration. On the other hand, non-renewable resources require the formation of strategy of their rational use and exploitation.

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