



The Role of the Resource Factor in the Socio-Economic Development of the Ecosystem

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Abstract: *The article considers nature as an economic good, its role as a resource factor in socio-economic development. First of all, it should be emphasized that the living and inanimate nature is the habitat, living space of a person. Without water and air, with excessive solar radiation due to the ozone layer or with excess cold due to greenhouse gases, human activity ceases much faster than in the absence of essential goods. Therefore, the value of natural conditions as a means of survival and development of the human community has an undisputed priority over other benefits and values. The life of any person is inextricably linked with nature, nature plays a role in shaping the quality of life and the spiritual wealth of society.*

Keywords: *nature, ecology, socio-economic development, ecosystem, biosocial nature, climate problems, green economy.*

I. INTRODUCTION

The beginning of the XXI century. marked an increase in the globalization process of the transition to a post-industrial knowledge economy. Nevertheless, research and practical experience of recent years convincingly prove that the formation of a new technological structure based on information, biological, nano- and other cutting-edge technologies [2] does not negate the importance of industrial production that remains the main framework of the economy, which in the present and in the foreseeable future will remain multi-structure or, figuratively speaking, multi-storey. No less convincingly, research and practical experience confirm: the cornerstone of this multi-storey building under construction is not money, but nature and man, or in terms of modern economic theory, natural and human (in a broad sense, including social) capital.

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According to various estimates, natural and human capital provides more than 4/5 of world and national (Russian) wealth; accordingly, the generated capital is less than 1/5. At the same time, Russia's feature remains a very high proportion of natural capital, which accounts for 39 to 43% of total assets and a significant portion of the world's natural wealth [12-14]. The natural environment of a person, its normal state and evolution are not only the most important prerequisite for successful economic growth, but also the condition for the survival and prosperity of humanity. However, the awareness of this fact and an adequate reflection of its importance in practical politics is slow.

II. METHODOLOGY

The founding fathers of classical political economy understood the fundamental role of natural and human capital; they put the earth in the first place — the main natural resource and object of labor of that era — and human labor. From the XX century. their equivalents - almost the entire set of environmental resources and modern, primarily intellectual, forms and results of labor, generating NTP and managerial innovations - a new factor of production, complementing the well-known classical triad. At the same time, man himself is a part of nature, which is the primary basis for the formation of the wealth of nations and nations. If it disappears, the person himself, the main creator and at the same time the consumer of material goods, will disappear, having devalued the meaning and the very purpose of the existence of money capital - the last of the classical triad of factors of production.

The classics, both traditional (with the exception of T. Malthus and his followers) and Marxist political economy, did not take into account the limitations of the natural resource potential of the territories, considering it to be infinite [15-17]. In principle, this was natural, taking into account, on the one hand, the low level of development of the productive forces of that era, which was characterized by a shortage of, first of all, manpower and a surplus of natural capital, on the other hand, a belief in the unlimited possibilities of their development, first of all, the progress of science and technology, which was to ensure the increasing replacement of a part of consumed natural resources by products of intellectual labor.

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Over time, the last postulate in a qualitatively different interpretation became one of the foundations of liberal neoclassical theories. Their authors, while not denying, in principle, the economists of the eighteenth and early nineteenth centuries, the fundamental finiteness of natural resources, believe that, thanks to a succession of scientific and technical revolutions that replace each other, generating productive technologies and new products, the needs of a growing population will always be met. and the need for production in primary raw materials is steadily decreasing. This paradigm comes from a number of critical assumptions.

First of all, nature and society are considered separately. The company is reduced to the market, which is a closed system that ensures the circulation of production and consumption of goods and services, and nature - to a warehouse or wholesale resource base located outside this market, the value of which is determined solely by the dynamics of supply and demand within the specified market system. Accordingly, any damage to nature caused by economic activity is qualified as external to the market costs, which are not taken into account in the prices of production. The sustainability of nature itself to the economic, and in general, anthropogenic impact is assumed to be infinite - there are no ecological limits.

There is no need to prove that the above assumptions are scientifically untenable. Back in the middle of the XIX century. great physicists and mathematicians, including G. Helmholtz, J. Maxwell, L. Boltzmann, warned their fellow economists who created the marginal economic school: L. Walras, U. Jevons, I. Pareto, M. Edgeworth, who used their models market equilibrium equations of classical physics, associated with the law of conservation of energy, from the limitations or even the futility of the above approach [5].

Decades later, monetarists led by M. Friedman went much further than the classics and their neoclassical predecessors, pushing aside not only nature but also man, and giving priority to money capital. Monetarists tried to infuse a fresh stream into the theory of efficient markets and prove its universal and all-conquering power, while ignoring the numerous market failures that have manifested themselves in the relationship between the economy and nature. As it was definitely noticed: "Socialism collapsed due to the fact that it did not allow prices to reveal the economic truth. Capitalism may collapse due to the fact that it does not allow prices to reveal the ecological truth." This opinion is all the more valuable because it was expressed by the former vice-president of Esso Norway - a division of one of the giants of the global oil industry, known for its negative relationship with nature (just recall British Petroleum and the environmental disaster in the Gulf of Mexico in 2010) [6].

A logical question: if these economic theories, ignoring the value of nature, the environment, do not stand up to criticism, then why mention them at all? Moreover, alternative scientific schools of foreign and domestic economists have been existing and actively developing for a long time, which fundamentally differently consider the relationship of man to nature, their ever-growing interconnection in the process of modern globalization. This, in particular, is evidenced by the concept of sustainable development, adopted by the UN as a long-term strategy and laid in the basis of national action

programs in the field of environmental protection and economic development of many states. Formally, the concept of sustainable development is perceived in Russia.

The point, however, is that it is not this concept, but the aforementioned economic theories, that constitute the ideological foundation of a functioning modern world economy and politics. In particular, according to the consulting company Edelman Trust Barometer 2017, the majority of respondents from among the informed public (to which persons with university education who belong to the upper quartile in terms of income are included) are representatives of the business and political elite in a few dozen countries M. Friedman's dictum: "The social responsibility of business is to increase its profits." In Russia, the liberalism of the economy has largely surpassed Western models, half the respondents think so [4, 11]. This is particularly alarming, given the scale and severity of the social and environmental problems facing the country, the solution of which objectively requires the active participation of business.

This contradiction is even more aggravated if we consider the relationship of man and nature, not in a narrow economic framework, but from the standpoint of universal values and interdisciplinary scientific analysis. Such an approach seems to be the only correct one, since it is precisely it that corresponds to the biosocial nature and multidimensionality of being and the person's worldview, whose well-being, like the well-being of society, is far from identical to their material wealth. To an even greater degree, the criteria are determined by physical and psychological health, spiritual and moral condition, emotional mood of people, in the formation of which the role of nature is not only enormous, but simply irreplaceable [18-21].

First of all, it should be emphasized that the living and inanimate nature is a habitat, living space of a person. Without water and air, with excessive solar radiation due to the ozone layer or with excess cold due to greenhouse gases, human activity ceases much faster than in the absence of essential goods. Therefore, the value of natural conditions as a means of survival and development of the human community has an undisputed priority over other benefits and values. Before we consider this issue in more detail, it is necessary to dwell on the role of nature in shaping the quality of life and the spiritual wealth of society.

The life of any person is inextricably linked with nature. Even in economically highly developed countries, in which natural capital in national wealth accounts for only about 2%, employment of almost every seventh inhabitant is directly or indirectly associated with the use of natural resources: for example, in EU countries about 17% of the population [8]. In middle-income countries, in which the share of natural capital in national wealth accounts, according to the World Bank, on average more than 20%, and even more so in Russia, where this share is twice as large, employment in areas directly or indirectly associated with natural resources.

It is much higher among the poor, the vast majority of whom live in countries with developing and transitional economies (primarily in rural areas) and whose very existence depends on the state of natural resources. In addition, for all people, rest "soul and body" is unthinkable without communication with nature, allowing you to recuperate, improve your mood. Such rest favorably reflects on the spiritual and physical well-being, contributing to the improvement of the quality and longevity of a person's life, productivity and creativity of his work.

In this context, the role of nature goes far beyond pure economics, and its value is not limited to financial benefits. At the same time, the connection and the contribution of the natural factor to the economy are fairly obvious here, and it is quite possible to estimate a significant part of this contribution in monetary terms.

It is necessary to emphasize the beneficial effects of nature on the creativity of people, especially creative professions that create the intellectual capital of society. Human interaction with nature generates inspiration, but not economic assets that can replace each other and easily turn into money capital [22-26]. Favorite by neoclassical economists the concept of the marginal rate of transformation, which shows the possibilities of replacing one type of resource, for example, natural, with another, in particular with human capital (materialized in innovations), is defeated here.

For centuries, the natural heritage has served as a source of inspiration and an object of creativity for outstanding Russian writers, poets, artists, and scholars, whose list is huge. How to evaluate and how to measure the influence of nature? Obviously, in monetary terms, this is almost impossible and completely unnecessary, since the only true measure here is public recognition of the value of the contribution of cultural, art, and science figures, and not only them, to the national and world treasury of knowledge about the world, including economic, but not the other way around!

III. RESULTS

According to the proposed UN experts in the early 2000s. in the framework of the Millennium Ecosystem Assessment project, the concepts of ecosystem services, the relationship between man and nature can be described in terms of supply and demand - in this case, the services that nature provides to people that are vital to humans. At the same time, 24 types of such services are distinguished, which are grouped into four types, or classes (Fig. 1).

Particularly should be emphasized the importance of ecosystem services as a vital source of livelihood in the first place food and shelter for the poor, especially rural, and also as the main insurance against natural disasters and economic shocks. Improving the management of these systems and natural resources leads to the preservation and increase of natural capital, which in turn helps alleviate the problem of poverty. This is of particular importance for countries where the proportion of low-income people is significant, including Russia, not to mention poor countries. For example, in Africa, the life of 70% of the population directly depends on the productivity and biodiversity of ecosystems.

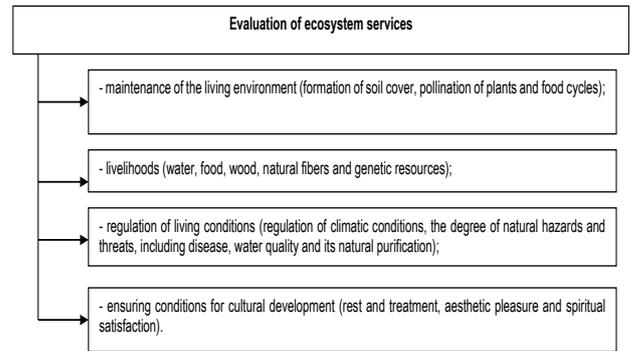


Fig. 1. Assessment of ecosystem services

Table 1 shows the role of ecosystem services for individual sectors of the economy, industry or product types. The environmental and economic calculations (in particular, the example of EU countries) imply that the usefulness of ecological non-market services of agricultural systems that provide for the production of food, feed and industrial crops, and bioenergy exceeds the cost of agricultural subsidies.

Table 1. The role of ecosystem services in some types of production and products

Types of production and products	World market capacity, billion dollars (estimates for 2017)	Comment
Pharmaceuticals	640	25–50% of products are produced using the natural gene pool of plants and animals
Biotechnology	70	Many types of products are obtained using the natural gene pool (enzymes, microorganisms)
Crop seeds	30	All products are derived from the use of the natural plant gene pool.
Personal items	12	Some products are obtained using the natural gene pool of plants and animals.
Herbal Supplements	22	-
Food and Drinks	31	-

Therefore, the institutionalization of these services (the inclusion in the prices of the production of the agricultural sector) significantly increases the value added received in this most important segment of the economy.

The aggregate global value, or the cost of all these types of services, according to some estimates, reaches significant numbers. In 2007, the value of the services of 17 ecosystems ranged from \$ 15 trillion to \$ 64 trillion, or an average of \$ 36 trillion annually, while the value of world GDP at that time was \$ 38 trillion.

Studies conducted primarily in the framework of the global project "The Economics of Ecosystems and Biodiversity" suggest that these figures should be increased and may increase over time. According to estimates for 2016, only the value of wetland ecosystem services is \$ 15 trillion, including services to provide water for drinking, irrigation and industrial purposes; food products (primarily fish); flood and storm protection; climate change mitigation; recreation and cultural and aesthetic needs.

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Current estimates of the economic usefulness of only pollination of crops by insects (primarily bees) all over the world vary from 153 billion to 190 billion dollars a year, which is equivalent to 9.5 to 11.8% of the value of global agricultural production in 2016 or approximately eight times the current revenue of Walmart, the largest retail chain in the world.

It should be especially emphasized that not all ecosystem services have artificial analogs or alternatives, that is, they can be replaced by humans, for example, producing and maintaining the oxygen level necessary for people's life support [48-56]. From this it follows directly that the above monetary estimates of the cost of ecosystem services reflect only a small part of their true value, which is understandable, given the nature of these services as a public goods or resources for sharing or sharing that are not well distinguished by the existing market price system. At best, it covers only part of the cost of these services related to the provision of its livelihoods, and that is not completely; other types of ecosystem services, with rare exceptions (for example, tourism), are practically ignored by the market. This is clearly visible even in relation to such a higher value for a person, like health and its protection. So, despite the fact that about 25% of the drugs were made on the basis of the natural gene pool of plants and animals (Table 1), from which scientists have studied just less than 1%, the world community tolerates an annual loss of about 50 thousand species and varieties of this gene pool.

With such "market failures", the enormous environmental damage suffered by the world community over the past half century seems logical. According to experts, the already mentioned global UN project "Ecosystem assessment for a millennium", compared with the middle of the last century at the beginning of the XXI century. the world has lost a quarter of the top (most fertile) soil layer of the earth and a third of the forests; Two-thirds of the world's ecosystems providing the types of services in question have been destroyed or were used unacceptably intensively in favor of the growth of world production, the volume of which grew fivefold over the same period. The so-called ecological footprint of economic activity, reflecting the need for ecosystem services with the existing methods and technologies of environmental management (as an indicator of the multiplicity of available volumes of natural resources and capacity of ecosystems), by the end of the 80s. of the last century exceeded the dangerous threshold equal to 1. By 2017 this indicator reached 1.5, which meant a 50% excess of the above threshold.

According to the calculations of the British research company Trucost, whose estimates are actively used by UN organizations, the environmental damage caused by human activities each year amounts to \$ 6.6 trillion, or 11% of the global gross domestic product - GDP (including only 3 thousand. the largest corporations - \$ 2.2 trillion, or 3% of world GDP).

Without qualitative changes in the economy, this can lead to even greater destruction of the resource base of its development and the very ecological basis of the human community, especially with the catalytic effects of global climate change, if we imagine that in the future all countries of the world will rush to the pursuit of the living billion.

According to some estimates, in this case, the consumption of natural resources in the world would increase from the current approximately 53 billion tons (estimates vary from 47 billion to 59 billion tons) to 140 billion tons, including the use of minerals, ores, fossil fuels and biomass, in 2050, that is, almost tripled. The cost of world GDP would increase by a factor of 15, respectively (compared with the level of 1950, 75 times), and by 2100 - 40 times (or 200 times compared with the level of 1950). At the same time, judging by all forecasts, against the background of a steady decline in the resource intensity of world production (in the 20th century, resource consumption increased eight times, GDP - 23 times), and the overall use of natural resources will continue to grow (the forecast for the 21st century - 8 -9 times, that is, approximately as in the XX century.), The trend towards increasing the share of non-renewable natural resources in the total volume of their consumption, which is unfavorable for the environment, will intensify: in 2010, the ratio of biomass and mineral consumption was estimated at 1: 2 (vs. 3: 1 in 1900), and by 2050 it can reach 1: 4. As a result, if the current situation does not undergo significant changes, by 2050 the environmental damage from economic activity may reach \$ 28.6 trillion, or 18% of world GDP, and the environmental footprint will be dramatic 2.3.

A critical resource for human life is water, in the reproduction of which the biosphere plays a huge role. Therefore, the degradation of the quality of their services to provide drinking and technical water to the needs of the population and household facilities is directly related to the degradation and reduction of ecosystem resilience. In 2015, about 2.5 billion people, or 41% of the world's population, experienced the so-called severe water stress (water shortage in terms of quantitative and qualitative parameters). In the BRICS countries - a group of five rapidly developing countries - Brazil, Russia, India, China, South Africa (first of all, this concerns China and India), the last figure is even higher - about half of the population. According to the forecasts of OECD experts, the organization of economic cooperation and development, in 2030, 45% of the world population (4 billion people) may already experience severe water stress, in the BRICS countries 70% of the population.

The damage from the loss of ecosystem services, caused by the loss of biodiversity, primarily plant crops, which are directly related to the sustainability of farming, crop yields and, ultimately, food security of all segments of the population, can be very tangible. Not by chance, given the unprecedented scale and rate of losses, as well as the number of endangered (due to the impact of economic activities) plant species, including forests, and animals and ecosystems in general throughout the world, the UN declared 2010 the International Year of Biodiversity, 2011 - the International Year of Forests, and the period 2011-2020. - International Decade for Biodiversity, thereby leaving no doubt about the environmental priority of international politics at the beginning of the XXI century.

Comparison of previously reported data on the extent of environmental damage, on the one hand, and the importance of ecosystem services, on the other, leads to an unequivocal conclusion that these services are seriously underestimated as a factor in socio-economic development, not to mention their importance for the preservation and development of the human community. This is clearly manifested in the huge gap between the value of ecosystem services, the needs for the costs of nature conservation measures and the real costs for these purposes.

It is estimated that such costs for the conservation of biodiversity in the world each year range from 10 to 20 billion dollars, mainly in the form of implementation of more than 300 special state programs that provide payments for ecosystem services [9]. This averages one third of the need for such expenses and is estimated at about \$ 45 billion, or less than 0.04% of the minimum estimate of the cost of ecosystem services. For comparison: according to Wall Street bankers, the real costs of mitigating financial sector losses from the economic crisis in 2008 were estimated at \$ 1.0–1.5 trillion, which is two orders of magnitude greater than the cost of protecting non-renewable biodiversity resources. Thus, humanity finds itself in unpaid (moral) and unpaid (economic) debt to nature and to itself, bearing in mind future generations. At the same time, maintaining sustainability and maintaining the quality of natural systems, not to mention ensuring the very basis of life, may not only be a necessary (although not sufficient) condition for economic growth, but also a basis for modernizing existing and developing new types of modern business. With regard to traditional industries and industries, the most convincing examples include ecological tourism, agricultural production based on organic fertilizers, environmentally sustainable forestry, the demand for services of which is growing rapidly in the world.

According to forecasts, covering a wider range of industries (including forestry and water management, agriculture and food production, energy and metallurgy), non-destructive and rapidly accelerated resource depletion of their use by 2020 can provide a market of about \$ 1 trillion. [7, 10]. This means an incentive and new perspectives for entrepreneurship, both private and joint (public-private partnership).

Such prospects are of particular importance for Russia for two reasons. One of them is institutional in nature and is due in large part to the risks that the technologically lagging domestic economy brings with it the international practice of using environmental standards that tighten requirements not only for the quality of the final product, but also for its production technologies, including the use and conservation of natural resources [27-35].

One example is the International Finance Corporation (IFC) No. 6 Efficiency Standard for Measures on Biodiversity Conservation and Sustainable Use of Natural Resources. This standard is not only a direct guide to investment decisions of the IFC itself. It also has a significant impact on the willingness to invest about 60 of the largest transnational banks following the well-known Equator Principles, which require adherence to IFC performance standards when financing projects worth over \$ 10 million in emerging markets, including Russia.

The other reason, ecological and economic, is connected, on the contrary, with the prospect of obtaining certain benefits. Most of the country's territory (almost 2/3) remains poorly involved in economic activities, therefore the quality of the environment there is high, the degree of disturbance of ecosystem stability is negligible [36-47]. These wilderness areas in Russia, constituting about a quarter of such territories in the world, perform vital functions to maintain global ecological balance, including the conditions for the existence of the human race itself, the preservation of biodiversity, and climate regulation. Because of this, as well as Russia's role in efforts to preserve the global climate, its contribution to maintaining the ecological balance, saving the world's biodiversity is without exaggeration of eternal importance. Since the development of international and national institutions in the field of environmental policy stimulates the increasing use (and growing role) of market mechanisms in solving these problems, Russia faces favorable prerequisites for receiving not only political and moral, but also economic benefits from "environmental donation".

IV. DISCUSSION

For Russia, it is necessary to ensure that the provision on such donation is recorded in international agreements governing the solution of global environmental and climate problems [57-61]. Therefore, a fundamental and correct step by Russia, in the context of implementing decisions taken by the Cancun Conference on a mechanism to compensate developing countries for their costs of saving tropical forests, is to link their own intentions to reduce greenhouse gas emissions by 15–25% by 2020 with the obligations of the international community the contribution of Russian forests to the reduction of technogenic emissions of these gases, as well as with the obligations of the countries - the main sources of emissions for their comparable reduction.

According to the latest results of modeling the effects of climate change [62-69], obtained by scientists of the Institute of Atmospheric Physics them. A.M. Obukhov RAS, although the ensemble of models in the XXI century. an increase in the net production of terrestrial vegetation (especially outside the tropics), carbon accumulation in it, as well as a change in the carbon stock in the soil is consistently manifested in most regions, a steady absorption of CO₂ from the atmosphere is characteristic only of the terrestrial ecosystems of Eurasian extratropical latitudes, primarily Siberian taiga [one]. According to Roshydromet, in 1990–2017. The net balance of deposition and emissions of anthropogenic carbon by boreal (northern coniferous) forests of Russia amounted to 72 million tons on average per year. This corresponds to at least \$ 6 billion in indirect subsidies that Russia provides to the world economy and which it could receive as annual compensation.

V. CONCLUSION

Receiving other potential benefits is associated with significant quotas of reductions in greenhouse gas emissions that Russia has accumulated over the past 20 years due to a decrease in emissions of these gases (as well as other pollutants) required by the Kyoto Protocol. These benefits can be realized within the framework of the mechanism of joint investment projects provided for by this protocol, first of all, projects with companies from developed industrial countries, thanks to which direct investments and technologies can be obtained to help the Russian economy make the transition to an innovative development path. Unfortunately, much of the time and the benefits that could have amounted to at least \$ 2 billion annually have already been lost, however, the possibilities for obtaining multimillion-dollar income still exist and should be used. In addition, it may be even more important for Russia's perspectives to draw lessons and take into account the experience of recent decades. In particular, use the concept of ecosystem services to organize the system of environmental-economic accounting as an organic part of the national accounts system, and these services themselves and using their production potential to form a dynamic sector of the green economy as one of the important factors for its modernization [6].

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