ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Ecological Aspect of Investment Projects for the Development of Specially Protected Nature Territories (by the Example of the Sochi National Park).

Marina Ivanovna Ivleva[1]*, Irina Valeryevna Yablochkina[2], Irina Mikhailovna Kornilova[3], Sergey Davydovich Ludvig[4], Bogdan Sergeevich Vasyakin[5].

[1]Academic department of Philosophy, Plekhanov Russian University of Economics, Plekhanov Russian University of Economics, Stremyannyy pereulok, 36, Moscow,117997, Russia.
[2]The Center of Humanities, Plekhanov Russian University of Economics, Plekhanov Russian University of Economics, Stremyannyy pereulok, 36, Moscow,117997, Russia.
[3]Academic department of History, Plekhanov Russian University of Economics, Plekhanov Russian University of Economics, Stremyannyy pereulok, 36, Moscow,117997, Russia.
[4]Academic department of International and Constitutional Law, Plekhanov Russian University of Economics, Plekhanov Russian University of Economics, Stremyannyy pereulok, 36, Moscow,117997, Russia.
[5]Academic department of Psychology, Plekhanov Russian University of Economics Plekhanov Russian University of Economics, Stremyannyy pereulok, 36, Moscow,117997, Russia.

ABSTRACT

Ecological economics is one of the more widely used approaches in modern economic practice; it employs ecological and economic systematic analysis to solve the problem of sustainable social development in modern ecosystems. At the present time, allowing for the interdependence of the economic-, social- and environmental factors in economic development projects is an important condition of successful economic growth. This article investigates the possibilities of applying the approach of ecological economics to the analysis of investment projects in specially protected territories. As the object of analysis, authors chose the investment project of Olympic venues construction in the Sochi national park for the 2014 Winter Olympics. In this article, the authors use methods of environmental impact assessment, mathematical methods, and analysis methods. From the viewpoint of the ecological-and-economic analysis the article investigates the concepts of total economic value of natural resources and the ecological framework of a territory; different approaches to the assessment of a territory as real property. The article analyses environmental compliance and problems of environmental safety during Olympic construction in the Sochi national park. It evaluates measures on minimization of environmental impact taken in the process of the construction and territory development, including the development of the Rosa Khutor ski resort as the first Russian environmental resort, and researches compensating measures necessary for restoration of specific Sochi national park territories. From the viewpoint of the concepts of ecological economics, the article provides sound rationale for total economic value of nature calculations based on the types of consumption costs and assessed natural resources.

Keywords: specially protected nature territory, sustainable development, ecological economics, ecology, ecosystem, national park, investment project, environment, total economic value

Corresponding author

ISSN: 0975-8585

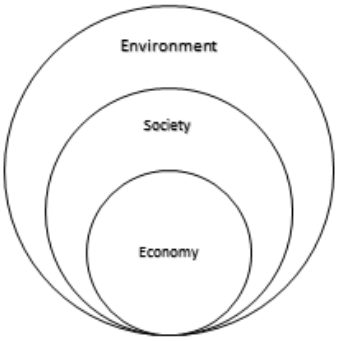
INTRODUCTION

Ecological economics today is one of the most promising scientific approaches for addressing economic challenges. Based on an interdisciplinary approach, this theory has integrated the concepts of economics, philosophy and ecology and other natural and social sciences by incorporating the features of traditional economics and traditional ecology that are most useful for research. Traditional economics focuses on the tools of an economic system while ecological economics is distinguished by a more comprehensive systematic approach. It represents a holistic approach to the study of ecosystems and believes that sustainable development is based on the value of life and nature itself (Costanza, 1996).

The development of key concepts in ecological economics was influenced by the works of K.E.Boulding (1978), H.T.Odum (1971) and also by the ideas of such scholars with expertise in the field of economics and ecology as K.W. Kapp (1950), J.K. Galbraith (1958), and others. The development of the theory itself is connected with the names of such scholars as R.B. Norgaard (1994), H.E. Daly (1999),R. Costanza (2001), W.E.Rees (2002), etc.

A distinctive feature of the ecological economics approach is a systematic analysis. After tracing the interconnection between the environment, human society and the economy, R. Levett (1998)suggested illustrating them with a "Russian doll model" in which the economic system has a supporting function while the social and ecological systems are leading(see Figure 1).

Figure 1: R.Levett's model



The economic approach to the concept of sustainable development is based on Hicks and Lindahl's theory of the maximum flow of aggregate income (Hicks, 1939; Lindahl 1939) which can be attained only by saving up the aggregate capital that helps to generate the income. This theory envisages sustainable management of scarce resources and implementation of green-, environmentally efficient-, energy-saving- and material-saving technologies, including raw material extraction and processing, development of sustainable products, the minimization, recycling and disposal of waste.

However, problems of correct interpretation and quantitative evaluation arise in trying to solve the problem of which particular capital should be conserved (for example, physical-, natural- or human capital) or the question of the extent to which the different types of capital are interchangeable, and during the process of monetary valuation of these assets, especially environmental resources.

The social aspect of sustainable development is human-oriented and is focused on preserving stability of social and cultural systems, including reducing the number of destructive conflicts among people. The theory of human development considers a person to be not the object but subject of development. Considering a person as a key value well-balanced ecological and economic development suggests participation of individuals in the processes that form their living environment, enabling them to contribute to the making and implementation of decisions, to control how such decisions are carried out.

From an ecological point of view, well-balanced ecological and economic development has to maintain the integrity of biological and physical natural systems. The resiliency of ecosystems, which are responsible for the global stability of the biosphere, is of particular importance. Moreover, the notion of

"natural" systems and habitats can be interpreted as the environment created by man. The primary focus is on the preservation of capacities for self-renewal and dynamic adaptation of such systems to changes but not on the preservation of their "ideal" static condition.

Degradation of natural resources, pollution of the environment and biodiversity loss reduce the capacity of ecological systems for self-renewal.

Fleishman (1982) thinks that the ecological subsystem is the most resilient one while the economic subsystem is the less resilient. There is a tendency towards resilience degradation when moving from physical and biological systems to social and technical systems and, contrary to the latter, more complex biological systems are more resilient. Sustainability of social and economic subsystems, in their turn, depends on the sustainability of the ecological subsystem as a core element of eco-economics. It means that when the ecological sustainability is disturbed, the sustainability of social and economic subsystems is disturbed as well.
A distinctive feature of ecological and economic development is that the ecological component is considered to be on an equal basis with the economic and the social one. Taking into account this factor, the principle of well-balanced, sustainable, constant economic development is, in the first place, the balance of the following values:

- Consumption rate of renewable resources cannot exceed the rate of their renewal;
- Consumption rate of non-renewable resources cannot exceed the rate of development of their renewable alternatives;
- Rate of emission of polluting substances cannot exceed the capacity of the environment to absorb them (Daly, 1996).

These are the core principles of well-balanced ecological and economic development as they reflect the main rules of sustainable use of natural resources in economic activities. Compliance with these rules is a prerequisite for the achievement of sustainable development; on the contrary, the opposite type of use of natural resources causes ecological problems and destruction of the environment and the development of any system is impossible without a natural basis and available natural resources.

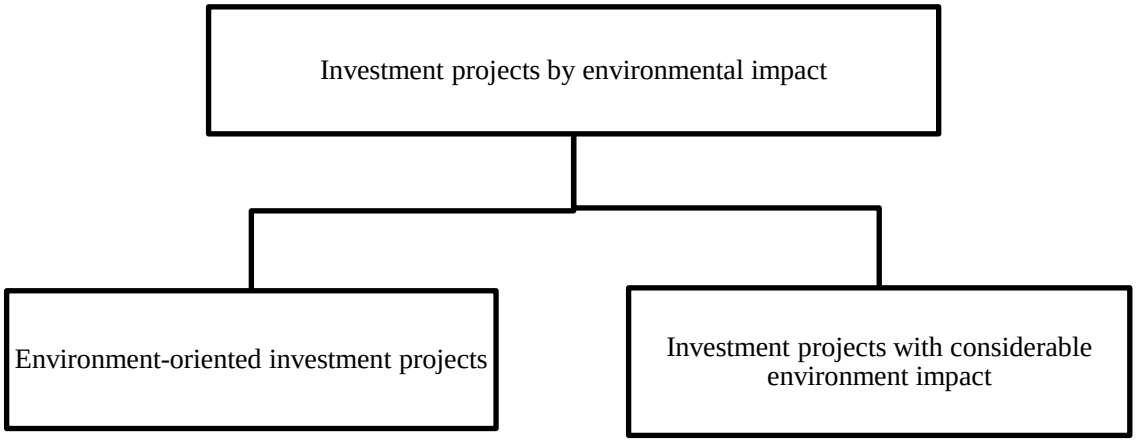
The postulates of ecological economics can be put into practice today in order to solve the problem of sustainable human existence in a modern ecosystem. The research in this area seeks to identify the role of both cultural and ecological factors in economic activities. For example, N.F. Reimers (1990) tried to formulate general principles of socio-ecological-economic project expertise methodology; his work is continued by O.E. Medvedeva (2004). V.E.Vikulov and S.D.Shirapova (2012) examine the history of abandoning development of the Oshurkovskoye apatite deposit in 2008 due to ecological and technological problems. G.Barry (2014) investigates the peculiarities of the interaction between economy and ecosystems. D.G. Korablev (2015) analyzes the value of nature in economics from philosophical point of view.

At the present time, ecological and economic analysis in general is extremely important in the preparation of investment projects aimed at territory development (G.A.Fomenko and M.A.Fomenko (2010), L.I.Starkova, (2011), V.V.Gaiduk (2013),E.S. Dilmanova (2014). The interdependence of the environment, society, and economy determines the need for projects for the economic development of various territories, cities or entities to take into account diverse factors, including ecological and socio-cultural factors, as the elements of ecosystems.

Economic activity includes the development and implementation of both environment-oriented (resource-saving) projects (for example, the setting-up of conservation areas or the introduction of a system for monitoring harmful emissions into the environment) and the implementation of project design decisions with considerable ecological consequences(see figure 2).

ISSN: 0975-8585

Figure 2: Different types of projects in terms of their environmental impact



The most complicated component of project-investment analysis is to predict the environmental externalities associated with activities envisaged in projects. At the same time, according to the nature of their environmental impact, these effects can be both mostly positive, resulting in the preservation of, or improvement in, the quality of the environment, natural capital and certain ecosystems or negative, accompanied by adverse ecological impact. The theory of total economic value of the environment serves to evaluate positive effects of investment projects by assessing different benefits connected with conservation or improvement of environmental quality including the benefits not expressed in monetary form.

A number of large-scale investment projects related to the use of natural capital and with considerable environmental impact are being implemented in Russia today. We are talking, first, about the development of special zones of the tourist-recreation type, most of which are located on specially protected nature territories. According to article 95 of the Land Code of the Russian Federation, specially protected nature territories comprise lands of state nature reserves, including biosphere reserves, state nature sanctuaries, natural landmarks, national parks, nature parks as well as health and recreation areas and resorts.

At the same time, the above-specified projects have an impact on the environment one way or another. In order to evaluate their economic and ecological consistency, it is necessary to provide an economic assessment of the existing natural values as well as of ecological services. The main values include the capacity of the environment to produce renewable resources, its absorptive capacity, fresh air and clean water, the capacity to provide the environment for fauna and flora, its recreational and esthetic features. International experience shows that in order for these services to find their place in the system of economic calculation, they have to receive proper monetary estimates.

Today, the theory of total economic value of natural resources is widely accepted everywhere. An important advantage of this approach, used by many scientists and international organizations (the Global Environment Fund, The World Bank), is that it seeks to apply a holistic approach to the assessment of the environment. It takes into consideration not only direct resource functions of nature, but also its ecological services, and the different functions of the environment determined by its esthetic, ethical, cultural and other aspects.

The amount of the total economic value (TEV) of the environment is the sum of two aggregated indices: use value and non-use value (Ehanourova, 2005):

$$TEV = UV + NV \quad (1)$$

where: TEV is total economic value, Rubles;
UV is use value, Rubles;
NV is non-use value, Rubles.

Use value is the sum of two components:

a) Value determined by a direct actual use of environmental assets (DV); it can be measured by income generated from the use of natural resources and environmental assets and

b) Value from indirect use (IV) which is usually measured by additional income generated from the utilization of environmental services (for example, income earned from the environment's health benefits). Therefore,

$$UV = DV + IV \quad (2)$$

where: *DV* is direct use value, Rubles; *IV* is indirect use value, Rubles.

The non-use value index reflects the social aspects of the nature's value to community. Non-use value, in its turn, includes:

a) Option value which is linked to an opportunity to benefit directly or indirectly from the use of environmental assets in the future (usually it is expressed as willingness to pay for preservation of the environment);

b) Inheritance value is determined by the willingness to pay for a clean environment, and

c) Existence value, as opposed to the option value, is determined not by possible future income connected with the use of environmental assets but by the fact of existence of a clean, diverse and productive environment (Wackernagel M.,*et al.,* 1999).

Therefore, in theory, the amount of total economic value is determined as the sum of five components:

$$TEV = DV + IV + OV + EV + InV \quad (3)$$

where:
EV is the amount of existence value, Rubles,
OV is option value (future/potential value), Rubles,
InV is inheritance value, Rubles.

At the present time, private land ownership in Russia is developing at an extremely rapid pace by means of transfer of titles to land plots to the owners of real property located on them and by encouraging transactions with almost all categories of land. A distinctive feature of this process is that the environmental aspect is not taken into account in documents that regulate the process due to discrepancies in bureaucratic interests of the authorities responsible for the governmental land and environmental protection policy. At the same time, representatives of environmental movements and scholars have been proactively developing the idea of transition to the model of sustainable development based on the creation of the ecological framework of territories. The ecological framework of a territory is taken to mean the aggregate of its ecosystems with individual natural resource management characteristics for each area that creates a spatially organized infrastructure, which maintains ecological stability of the territory, prevents loss of biodiversity and landscape degradation (Mirzekhanova Z.G., 2000).The essence of the ecological framework is the establishment of individual modes of natural resource management for certain territories and even certain land areas in order to maintain their ecological potential and preserve valuable nature-made objects.

In project investment analysis, different approaches to the assessment of a territory as a real property item serve as scientific substantiation of the need for investment projects. One of these approaches is the economic assessment of a territory in the process of compiling a general land registry and it is built upon the fact that a territory (land area) has two cost components:

a) Basic cost of a territory (land) – absolute cost of a territory, which does not depend on the mode of its utilization;

b) Cost of technological upgrades of a territory, which are aimed at generating income from utilization of the territory and its resources – it is determined by the real income that can be produced by this territory (Nosov S.I. 2003).

A whole set of methods is based on introduction of payments for the use of natural resources within a specific territory (Ryaschenko *et al.,* 2008). The major part of payments collected for the use of natural resources is regulated by applicable federal law and covers almost all types of natural resources that are directly used in business practices. Payments are set and collected in the form of rental payments, land tax, royalties, payments for restoration, payments for authorized extraction and other charges and duties.

The mechanics of use of biological resources and items on a paying basis can become an effective tool of creating a financial basis for preservation and restoration of biodiversity resources thanks to the expansion of the existing payment system. Such new areas of natural resource management on a paying basis can include:

- Increased rental rates for land plots that are located on valuable natural territories;
- Introduction of payments for legal entities that rent land plots within territories that are considered valuable in ecological and recreational sense, for protection and restoration of biological objects.

METHODS

Methods of environmental impact assessment are extremely important for managing the development of tourist-recreational territories with due consideration of a whole set of ecological and economic factors. Ecological and economic studies also describe a method of environmental impact assessment using restoration cost. It is aimed at comparing the cost of restoration of natural resources, which can be damaged due to implementation of a specific project, and the cost of measures to prevent the damage. The basic principle of this method is that costs connected with restoration (reproduction) of natural resources can be measured and expressed as the value of expected benefits from damage prevention. This type of analysis presupposes the following: the amount of adverse impact is measurable, restoration costs can be calculated and do not exceed the value of the destroyed production resources (for this reason restoration remains cost effective), there are no indirect benefits connected with these costs. Natural resources are considered here to be potential production resources which can bring benefit to people. The cost of their restoration is calculated from their productive value and then compared with the cost of preventive measures. If the restoration cost is higher, then a decision is taken to prevent the adverse impact. An alternative to the restoration cost method is the method of environmental impact assessment using transfer costs, which is also in project-investment analysis. The method is aimed at comparing the cost of transfer of a physical item due to changes in environmental quality caused by the implementation of a specific project, and the cost of measures preventing adverse changes in the environment.

RESULTS

The implementation of projects and programs for the construction of Olympic venues in Sochi for the 2014 Winter Olympics, including recreational, infrastructure venues, raised serious concerns about environmental compliance and environmental safety. The reason for that was the location of these venues on specially protected nature territories and the adoption in 2006 of the Federal Target Program titled “Development of Sochi as an Alpine Climate Resort” (2006-2014).As a result, a number of the region’s ecological problems had to be solved in a very short time. For example, the region was facing an acute problem of waste disposal (solid waste landfills in the Adlersky and Lazarevskoye districts were 246% overused), lack of sewage treatment facilities connected to the Black Sea, an increase in emissions into the atmosphere and the need to preserve specially protected nature territories. In order to solve these problems Russia made an ecological commitment in the Sochi-2014 Bid Book. Environmental activities during preparation for the Olympics were called upon to solve a whole range of ecological problems. For example, in order to protect the atmosphere, greenhouse gases emission inventory was performed, concepts and programs for the reduction of emissions and increase in the absorption capacity were developed. Purification facilities were built and renovated in Sochi in a very short timeframe in order to protect water bodies. Solid waste landfills between the Buu River and the Hobza River were planned to be built. However, the project was suspended because of public opposition as the selected location was fraught with ecological risks due to

ongoing active slope erosion, mudslides and a close proximity of ground water. In 2010, the solid waste landfill in Adler was closed, reclaimed (reclamation costs amounted to 1 billion rubles) and became public property, in 2012 the solid waste landfill in Loo village was closed as well. 317.9 million rubles were spent for its reclamation and another 938.5 million rubles will be spent by 2017. Today the city is implementing so-called "zero-waste" scheme whereby Sochi will not have any functioning solid waste landfills. Waste from Sochi is taken to the landfills located in Belorechensk and Adygeysk. According to the press service of the Sochi resort administration, 2.75 million thousand cubic meters of waste were removed from Sochi in 2013. It is slightly less (by about 2%) than in 2012. Since 2007, the Persian Leopard Reintroduction Program has been implemented together with the Ministry of Natural Resources and other institutions and organizations, including WWF Russia. During the preparation for the Olympics, it was announced that the territory of the Sochi nature reserve would be transferred under the jurisdiction of the Caucasus Nature Reserve included on the UNESCO World Heritage List.

The total budget of the environmental protection activities carried out in the framework of the Federal Target Program was 138 million US Dollars. During the construction of 15 Olympic venues, including eight venues located directly within the Sochi national park (1% of the territory), all the project facilities were assessed in terms of environmental impact: geological environment impact, surface (including sea) and subterranean water impact, aerial environment impact, impact on soils, flora and fauna and also effects on specially protected natural areas, on specially protected natural sites, on specially protected natural territories, on landscape aesthetic appeal and also effects on historical and cultural heritage sites and on public life.

Both the probability of such negative effects and the spatial scale of the expected residual effects during strategic ecological assessment were evaluated; the conclusion was made that the impact on abiotic substances and wildlife in general was acceptable – the impact intensity varied from low to average and had a localized and short-term character.

It is worth noticing that the sports and leisure centers of the 2014 Winter Sochi Olympics, including the famous Rosa Khutor ski resort, were built in close proximity to the Caucasus biosphere reserve, a World Natural Heritage site known as Western Caucasus. The construction and exploitation of such venues and facilities can have a negative impact on the condition of specially protected natural territories. It is evident that every territory has its own environmental capacity and acceptable environmental load, which depends on the capacity of the environment to absorb harmful wastes and reproduce natural resources. For this reason, optimization of interaction between production and natural systems means the matching of the form and scale of economic activity with the natural capacities of a territory. When the capacity of an ecological-economic system is compared to the real environmental load, the territory's disbalance level can be determined in terms of economic and social development as well as environmental degradation.

Amid these conditions, the following measures on minimization of environmental impact in the construction of the above-specified venues were proposed (Potravny, Maltseva 2008):

- Minimization of impact on abiotic substances by using the best available construction and operational technologies, optimization of the timeframe of works and conducting comprehensive environmental monitoring;
- Minimization of impact on wildlife by implementing measures aimed at reduction of noise emission, ecological preparation of areas prior to construction work, optimization of the timeframe of work and environmental monitoring at all stages of implementing design solutions;
- Utilization of modern environmentally safe materials and energy efficient technologies;
- Development of a comprehensive environmental monitoring system that could control the development of environmental impact and allow taking timely and necessary measures to support sustainable development.

As initially planned, construction work at the Grushevoy range(the construction of a bobsleigh and luge track with relevant infrastructure) could have resulted in the destruction of forests on the construction site, degradation of the forest environment as a result of fragmentation of the established ecosystems due to infrastructure construction. It could have also resulted in the destruction of habitats of rare species of animals and plants listed in the Red Book of Endangered Species of the Russian Federation and the Krasnodar Krai.

Within the territory of the Sochi national park, there are 107 species endemic to this territory historically known as Colchis, 116rare and endangered species, 23 of which are extinct everywhere else. They are the Common Yew, the Box Tree of Colchis, the Pitsunda Pine, and the Sweet Chestnut. Forty-six species of plants are endemic and forty-seven are on the Red Book of Endangered Species of the Russian Federation. Thus, implementation of the construction project could have also led to the destruction of part of these endemic and protected endangered species. For this reason and under public pressure, the Russian Prime Minister made a decision in July 2008 to relocate the construction of some competition venues away from Grushevaya Polyana, which is situated near the Caucasus reserve.

In 2007, the Russian branch of the World Wildlife Fund (WWF) and the Rosa Khutor Development Company entered into an agreement for the construction of the first Russian environmental resort in Krasnaya Polyana. According to the agreement, the fund assumed the functions of the company's environmental advisor and undertook responsibilities for the development, implementation of measures that promote modern environmental standards of production and consumption. In turn, the construction company undertook to observe the accepted environmental standards and regulations, utilize environmentally safe construction materials and perform environmental activities for the restoration of the natural environment within the territory of the national park. Besides that, the developer implemented alternative energy sources in addition to traditional ones, installed energy- and water-saving equipment and was observing green standards providing for conservation of resources and minimization of environmental impact, including energy- and water saving, and the use of ecologically friendly materials in the design of buildings and infrastructural constructions. This system of voluntary environmental certification (the system of "green standards") was registered by the Federal Agency for Technical Regulation and Metrology in 2010.

Rosa Khutor's Olympic tracks are mostly located above the level of the forest which makes it possible to minimize deforestation. In the riding zone, there are only tracks, lifts and basic infrastructural facilities necessary for operation which are situated on natural slopes which required the minimum volume of earthwork and, consequently, minimum changes in the natural landscape. The felling of trees was brought to a minimum, strictly as was necessary for the construction of required buildings and facilities.

As a result of implementation of a number of projects for the construction of Olympic facilities in the Sochi national park, the water system of the Mzymta River was exposed to considerable negative impact. First and foremost, the impact was due to the extraction of sand and gravel from the river bed for construction purposes, due to the use of heavy equipment within areas with a special regime of natural resource management, etc.

At the same time, the Mzymta River plays an important role in the development of recreational activity in the region, in particular, in terms of development of water tourism, catamaran rafting, etc. which brings significant income. The Mzymta River natural capital was valued at 6 million Euros per year (the basic level of services extracted from the ecosystem prior to negative impact) (Perelet, 2005).This evaluation is based on the information about the population willingness to pay for recreational services (payment for river rafting), as transpired from public polls, on the basis on the number of tourists and travel firms engaged in water tourism on the Mzymta River, prices for such services, the duration of the rafting season. This while not taking into account other benefits which the ecosystem could provide in value terms (reproduction of fish resources, reproduction of drinking water, conservation of biodiversity, etc.).

The estimates assumed that the area of the river where water activities took place was 60 ha. The value of the unit of services provided by the ecosystem per person was 350 rubles. As a result of sand and gravel extraction, river diversion and other types of construction activities, the landscape and esthetic appeal of this type of recreation suffered and, consequently, the total value of services offered by the ecosystem dropped to 5 million Euro a year. The period, during which a project for the restoration of the negatively impacted ecosystem was carried out, was 4 years (2007-10).

In this case, the following equation can be made using the above formula.

$$[6000 \text{ mil Euro} \times (1.0-0.8)/ 1)] \times 60 \text{ ha} = [5000 \text{ mil Euro} \times (0.9-0.7)/1] \times P.$$

Here, the P value is the area which has to be reclaimed so as not to reduce income from the development of water tourism on the Mzymta River, i.e. so it could remain at the level seen before the negative impact.

Based on calculations according to the system of environmental swaps ("resource for resource") it was empirically proven that at least 72 ha have to be restored in order to keep the same level of money flow from the use of the Mzymta river natural capital. This approach can be used to justify the actual compensatory payments as compensation of damage in resorts and specially protected nature territories. In this case the area of 72 ha that has to be restored is bigger than the original area in the Mzymta basin where water tourism facilities were located. It can be explained by the fact that the landscape was changed and the ecosystem can produce fewer services per area unit or the number of tourists decreased due to the likely change in the quality of the environment, landscape, attractiveness of the area.

It is worth noting that such an approach using the resource equivalence principle is very relevant for the Sochi national park.

DISCUSSION

Big construction projects implemented within this territory usually presuppose compensating measures including creation and expansion of specially protected nature territories. Such measures were planned during preparation for the Olympics as well. However, the envisaged compensation measures, for example, measures to expand the Sochi national park, do not take into account the qualitative composition of the territories withdrawn for construction purposes, for example, such territories in the Imeretinskaya Valley, specific areas of the Krasnaya Polyana Forest District with high level of biodiversity while the territories provided as compensation (such as, an area in the vicinity of the Loo village, Lazarevsky District of Sochi) lack in such quality and are not even geographically related to the national park and the Caucasus Biosphere Resort. Thus, at the present time, on the agenda is the question of transfer to the Sochi national park of a 20 ha area from the Loo forestry district which constitutes 10% of the currently existing area of the park. Moreover, the development of the Teberdinsky biosphere landfill is currently considered in the framework of creation of an ecological corridor as one of the elements of such corridor.

In our opinion, the economic value of nature and the functions of the nature capital are not taken into account today in the implementation of the above-specified construction activities. Such an approach is connected with a number of conflicts that involve local citizens, scholars and executive authorities as compensatory measures are often inappropriate.

The total economic value can be determined based on the types of consumption costs, natural resources that are to be valued, for example, in resorts and within specially protected nature territories:

1) Value of the nature capital that is used directly for the satisfaction of needs – such as mountain landscape for the construction of ski pistes and hiking, water as a source of drinking water or as a means of transportation, forests as a place for picking up mushrooms and berries, etc.
2) Productive value represents the production of goods including food, different raw materials, materials for specific economic sectors;
3) Ecosystem value represents maintenance of biosphere processes;
4) Genetic value means the storage of information on the structure and functioning of biologic systems that has been accumulated in the process of evolution;
5) Recreational value meaning the spiritual and esthetic components, recreation and health improvement.
According to the proposed approach to the comprehensive economic assessment of natural resources, the potential total economic value of resorts and specially protected nature territories in Russia can be expressed in the following formula:

$$TEV = NC + P + R + Ec + G \quad (4)$$

where: $NC$is value of the used nature capital, Rubles, P is productive value, Rubles, R is recreational value, RUB, Ec is ecosystem value, RUB,G is Genetic value, Rubles.

The formula to find the capitalized potential total economic value of natural resources at resorts and in specially protected nature territories can be presented slightly differently:

$$TEV = \sum(p_t + r_t + e_t + g_t) \div (1 + d)^t \quad (5)$$

where: p_t, r_t, e_t , $g_t$are annual net incomes (or real or fictitious money flows viewed as equal to them) in t year, respectively, from the used natural capital, from the productive capital, from the recreational capital, from the ecosystem- and genetic "origin" capitals;
d is discount rate(to calculate the present value of money flow and future flows).
The recreational value of a natural object in general is determined according to the following formula:

$$R = \sum R_\omega \quad (6)$$

where: $R_\omega$is the component of the aggregate recreational value determined by the relevant cluster of consumers of recreational services.

CONCLUSION

The environmental impact of large-scale investment projects connected with the development of Specially Protected Nature Territories is very significant, so we suggest making economic evaluation of nature and ecosystem services as a part of investment project analysis according to the concept of total economic value of the environment. This is important for adequate estimation of possible positive and negative changes in ecological and economic systems as a result of the investment project realization. Intensive development of Specially Protected Nature Territories should include analysis of the ecological factor as a part of economic analysis to support sustainable economic growth of a territory as well as social and economic wellbeing of the local population.

REFERENCES

[1] Barry G. (2014) Terrestrial ecosystem loss and biosphere collapse. Management of Environmental Quality: An International Journal. 25(5), 542-563. DOI: 10.1108/MEQ-06-2013-0069
[2] Boulding K.E. (1978) Ecodynamics: a new theory of societal evolution. Sage Publications, Beverly Hills.
[3] Costanza R. (1996) Ecological Economics: Reintegrating the Study of Humans and Nature. Ecological Applications,6(4), DOI:978-990. DOI. 10.2307/2269581
[4] Costanza R. (2001) Visions, values, valuation, and the need for an ecological economics. Bioscience. 6 (51), 459-468.
[5] Daly H.E. (1996) Beyond growth: the economics of sustainable development. Beacon Press, Boston.
[6] Daly, H.E. (1999) Ecological Economics and the Ecology of Economics: Essays in Criticism. Edward Elgar Pubishing. Inc., Cheltenham, UK.
[7] Dilmanova E.S. (2014) Ecologo-economicheskaya effectivnost investizionnyh proektov. Vestnik Saratovskogo gosudarstvennogo tekhnicheskogo universiteta,1(74),177-183.
[8] Ehanourova E.A. (2005) Otchenka ecologicheskih vigod na territoriyah s osobim rezimom prirodopolzovania. Ekonomika prirodopolzovania, 3, 28-54.
[9] Fleishman B.S. (1982) Osnovy sistemologii. Radio i svyaz, Moscow.
[10] Fomenko G.A., Fomenko M.A. (2010) Ecologo-economicheskaya otchenka ressursov Kaliningradskoi oblasti. Gorni zurnal, 3, 14-21
[11] Gaiduk V.V. Investizii v economiku respubliki Bashkortostan skvoz prizmu ecologicheskogo soznaniya. Vestnik BIST (Bashkirskogo instituta socialnyh tehnologyi), 1 (17), 32-38.
[12] Galbraith J.K. (1958) The affluent society. Houghton Mifflin, Boston.
[13] Hicks J.R. (1939), Value and Capital: An Inquiry into Some Fundamental Principles of Economic Theory. Clarendon Press, Oxford.
[14] Kapp K.W. (1950) The social costs of private enterprise. Harvard University Press, Cambridge, MA.
[15] Korablev D.G. (2015) Tzennost prirody kak filosofsko-economicheskaya kategoriya. Vestnik Rossiiskogo economicheskogo universiteta imeni G.V.Plekhanova. Vstuplenie. Put' v nauku, 3-4 (12), 24-31
[16] Levett R. (1998) Sustainability indicators – integrating quality of life and environmental protection. Journal of the Royal Statistical Society A, 161, part 3, 291-302.

[17] Lindahl E. (1939), Studies in the Theory of Money and Capital. G. Allen & Unwin, London.
[18] Medvedeva O.E. (2004). Metodicheskiye rekomendatsii po osushchestvleniyu ekologoekonomicheskoy otzenki effectivnosti proektov namechaemoy khozyaistvennoy deyatelnosti. ANO "Soiuzekspertiza", Moscow.
[19] Mirzekhanova Z.G. (2000) Ecologichesky karkas terrotorii: naznachenie, soderzhanie, puti realizatzii. Problemy regionalnoi ecologii, 4, 42-55.
[20] Nosov S.I. (2003) Economicheskie metody upravleniya v zemlepolzovanii. Svazotzenka, Moscow.
[21] Norgaard R.B. (1994) Development betrayed: the end of progress and a coevolutionary revisioning of the future. Routledge, London.
[22] Odum H.T. (1971) Environment, power and society. Wiley, New York.
[23] Perelet R.A. (2005) Globalnye ecologicheskie (ecosistemnye) uslugi – mezhdunarodnye obmeny I torgovlya. Uralecologiya. Prirodnye resursy-2005. Ufa-Moscow, 73-74.
[24] Potravny I., Maltseva N. (2008) O sport! Ty-vyzov. Delovoi ecologicheski zhurnal, 1 (20), 48-50.
[25] Rees W.E. (2002) An ecological economics perspective on sustainability and prospects for ending poverty.Population & Environment, 1 (24), 15-46.
[26] Reimers N.F. (1990) Metodologiya nauchnoi (ecologo-sozialno-economicheskoi) ekspertizy proektov i khozjaistvennyh nachinanii. Moscow.
[27] Ryaschenko S.V., Bogdanov V.N., Romanova O.I. (2008) Regionalny analiz rekreatzionnoi deyatelnosti. Izd. Instituta geografii, Irkutsk.
[28] Starkova L.I. (2011) Investizionnaya privlekatelnost territorii natzionalnogo parka v kontekste ecologicheskoi ekonomiki. Ekonomika prirodopolzovania, 6, 50-66
[29] Vikulov V.E., Shirapova S.D. (2012) Ecollogo-economicheskie ekspertizy tekhnicheskih proektov osvoeniya Oshurkovskogo mestorozhdeniya. Vestnik Buryatskogo gosudarstvennogo universiteta, 4, 36-40.
[30] Wackernagel M., Onisto L. Patricia Bello, Alejandro Callejas Linares, Ina Susana Lopez Falfan, Jesus Mendez Garcıa, Ana Isabel Suarez Guerrero, Ma. Guadalupe Suarez Guerrero (1999) National natural capital accounting with the ecological footprint concept. Ecological Economics, 29, 375-390.