

In the new context of human communities, highly engineered and anthroped, bioethics has become an integrated discipline that involves an ethical analysis of human behavior, ideally followed by a specific legislative decision.

Not the earliest, must be always remember that, the environmental damage affects the right to life, health, work and education of human. A pertinent solution is to create a framework of principles and procedures in accordance with the principles of bioethics and ecology (eco-bioethics) also with human rights, which can guide in the formulation of bio-legislation, policies or other instruments in the field of environmental protection and biodiversity. In fact, it can thus protect and promote the present and future interests of the people, which are part of the common heritage of humanity.

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## REFERENCES

- [1] Scripcaru Ghe., Scripcaru C., Isac L., *Relatia etologie-anomie din perspectiva bioetica și juridica*, 2008, [www.bioetica.ro](http://www.bioetica.ro);
  - [2] Bernard J., *Bioethics*, Instituto Piaget Publishing, Portugal, ISBN: 9789729295768;
  - [3] Bute S., *The advent of Bioethics*, The Romanian Bioethics Magazine, Vol 3, No 2 2005, <http://www.bioetica.ro/index.php/arhiva-bioetica/article/download/352/537>;
  - [4] <http://www.achpr.org/instruments/achpr/>;
  - [5] Duțu, M., *Tratat de dreptul mediului*, ediția a III-a, Editura C.H. Beck, București, 2008, pp. 327;
  - [6] Popescu, D. și Popescu, M., *Dreptul mediului. Documente și tratate internaționale*, vol. I, Artprint publishing, Bucharest, 2002, pp. 121;
  - [7] Bogdan A.T., Comșa D., *Eco-Bio-Diplomația*, Ed. Academiei oamenilor de știință din România, 2012;
  - [8] Marinescu C., *Securitatea ecologică și națională a statelor în condițiile globalizării*, Editura Porțile Orientului, Iași, 2005;
  - [9] Danciu V., *The sustainable company: new challenges and strategies for more sustainability*, Theoretical and Applied Economics Volume XX, No. 9 (586), pp. 7-26, 2013 (after Nidumolu, R., Pralahad, K.C., Rangaswami, Why Sustainability Is Now the Key Driver of Innovation, The Magazine, September, 2009);
  - [10] <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52010DC2020> (EUROPE 2020 A strategy for smart, sustainable and inclusive growth/\* COM/2010/2020 final \*/);
- [http://ec.europa.eu/environment/pubs/pdf/factsheets/biodiversity\\_2020/2020%20Biodiversity%20Factsheet\\_RO.pdf](http://ec.europa.eu/environment/pubs/pdf/factsheets/biodiversity_2020/2020%20Biodiversity%20Factsheet_RO.pdf).

## THE ROLE OF BIOSPHERE RESERVES IN ENVIRONMENTAL PROTECTION AT THE SOVIET UNION

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## ABSTRACT

In 1972 at United Nations Conference on the Human Environment in Stockholm was proposed the program of ecological monitoring, which examined the biosphere reserves as the essential part of conservation policy. After that conference, the Soviet Union took the official responsibilities of establishing biosphere reserves on its territory. In 1976 the Soviet academy of sciences established the project of fire biosphere reserves in different parts of Soviet Union to expand ecological monitoring from local to national level. That program had also a global scale when the Soviet Union and the USA in 1976 signed negotiation of choosing on both countries similar biosphere reserves. The Soviet Union had already more that 100 nature reserves, but they were used only for local conservation and cannot prevent territories from anthropogenic loan. The territories of rich biodiversity should be protected as national parks and it is could be visited by tourists for recreation purposes. Such renewable resources of National parks as ground and mineral waters, agriculture products and timber could be used by local industry, but the anthropogenic influence of that process should be very limited. From 1980<sup>th</sup> the biosphere reserves in the Soviet Union obtained much more research functions and gave scientists an opportunity to compare those protected territories and the places where the environmental load was very high. They should be focused on ecological monitoring, so it will be possible making research of pollutants migration from the surrounding territories.

**Keywords:** biosphere reserves, nature protection, conservation, ecology.

## INTRODUCTION

By the early 1960<sup>th</sup> due to the development of industrial production, the environment of Soviet Union faced with the threat of the massive income of pollutants and reduction of many endemic species. In those conditions, the nature reserves were a very important instrument of ecological protection. In 1965 the head of Institute of geography Soviet academy of sciences Innokentiy Gerasimov had spoken about the needs of environmental protection at a meeting of Soviet Academy of Sciences, where he discussed the anthropogenic influence of paper industries to the ecosystem of Lake Baikal. In his report, there was an alarming warning about the increase of industrial and domestic wastewaters from 11 to 60 km<sup>3</sup> per year during 20 years. Taking into account the need for dilution and subsequent self-cleaning of 5–10 times the amount of clean



water meant a threat of an acute water crisis in especially important industrial regions of the country [8].

In 1969 Innokentiy Gerasimov became the head of special commission about the problems of the biosphere under the Council of Ministers of the USSR, where he was responsible for Soviet Union participation at the international ecological research. In the same year, he published the general plan for the transformation of nature, where special attention was paid to the special role of nature reserves as wildlife keepers. According to Gerasimov's plan, the nature reserves should become the basic type of natural ecosystems, which will be strictly protected from human activity and transformation into anthropogenic ecosystems. The comparison of natural and anthropogenic ecosystems should give an answer to the question how perfect those human-made ecosystems are [6]. That idea was very close to the approaches of the Soviet ecologist Stanislaw Schwarts. He thought that numerous industrial and agricultural activities, which are absolutely necessary for needs of society and human population, makes impossible to preserve pure ecosystem. This gave Innokentiy Gerasimov believe that it was necessary to create a new type of nature reserves on the territory of Soviet Union, which would be the effective instrument of environmental monitoring [11].

## METHODS

The process of the biosphere reserves creation in the Soviet Union is the object of that research. Many of our methodological issues are used in the environmental history. We used scientific literature and reports of scientist, who were responsible for biosphere reserves creation, gave as very essential information about Soviet biosphere reserves and scientists. Those scientific reports were founded in the depositary of academian Innokentiy Gerasimov, who was the director of Geographical institute of Soviet academy of sciences from 1951 till 1985. That depositary is stored now in the scientific archive of Russian academy of sciences. The book «Shades of Green: Environmental Activism Around the Globe», which examines the impact of political, economic and scientific institutions on environmental activism around the world, was also very useful to improve the methodology of that research [12].

## RESULTS

In 1972 at United Nations Conference on the Human Environment in Stockholm was proposed the program of ecological monitoring, which examined the biosphere reserves as the essential part of conservation policy. After that conference, the Soviet Union took the official responsibilities of establishing biosphere reserves on its territory. In September 1972 Supreme Soviet of the USSR issued the resolution on the measures for the protection of nature and the rational use of natural resources. In December it was adopted as the resolution of the Central Committee of the Communist Party of the Soviet Union and the Council of Ministers of the USSR on strengthening environmental protection. In response to these resolutions in 1975, Innokentiy Gerasimov initiated the creation of the State Committee for Environmental Protection under Council of Ministers of the USSR. In his note to Alexander Vinogradov, the vice-president of the Academy of Sciences of the USSR he proposed among the tasks of the committee to distinguish: the control of the services of accounting for natural resources and

observations of the environment; assistance in the introduction of new effective methods for cleaning industrial and household wastes [3, 7].

The greater significance was the signing on July 7 of 1974, a joint Soviet-American agreement about protecting the environment and the implementation of UNESCO's "The Man and the Biosphere" program. According to the agreement, both countries agreed to allocate their territories for the creation of biosphere reserves, which should serve for taking more effective measures to protect the "global" environment. The 1st Soviet-American Symposium on Biosphere Reserves, held in the Soviet Union in May 1976, was devoted to the discussion of arrangements for the organization of biosphere reserves. According to the results of the symposium, the chairman of the Scientific Council on the Problems of the Biosphere of Academy of sciences Alexander Vinogradov instructed Innokentiy Gerasimov, Vladimir Sokolov and Yuri Israel prepare proposals on the organization of the network of biosphere reserves at the territory of Soviet Union [3].

Innokentiy Gerasimov, Vladimir Sokolov and Yuri Israel proposed create five biosphere reserves at Arctic (Franz Josef Land), at Central forest-steppe (near the Kursk field station of the Institute of Geography of the USSR Academy of Sciences and the Central Chernozem Reserve), at Central Asian desert (sands of Karakum, Repetek), at South Siberian taiga (Baikal reserves) and at East Siberian taiga (Yakutia). However, Berezinskiy biosphere reserve, Caucasus biosphere reserve, Sary-Chelek biosphere reserve, Sikhote-Alin' biosphere reserve, Repetek biosphere reserve, Prioksko-Terrasny biosphere reserve and Tsentralno-Chernozemniy biosphere reserve were finally established in the Soviet Union. The creation of biosphere reserves was approved by the Bureau of the International Coordinating Council of UNESCO's Man and the Biosphere Program (April 17-22, 1978), and then the soviet biosphere reserves were included in the international network. Tsentralno-Chernozemniy and Prioksko-Terrasny biosphere reserves were considered as the best and most important reserves for ecological research in the Soviet Union [3, 4].

The Central Black Earth Biosphere Reserve is located in the Kursk Region. It's main activity was carried out on the territory of the Experimental and Demonstration Farm of V.I. Lenin All-Union Scientific Research Institute of Agriculture and Soil Protection from Erosion of the Soviet Academy of Agricultural Sciences. In addition, observations and studies were conducted on the territory of the Kursk region with the most typical types of industrial and urban impact within the basin of Seim river. The main reason for creation the Central Black Earth Biosphere Reserve was in the fact that in that the natural landscape of the forest-steppe and many endemic species were preserved in that economically important and densely populated region [1].

The territory of Central Black Earth Biosphere Reserve was divided on the core area, the buffer zone and the transition zone. V.V. Alekhin nature reserve was the core of new biosphere reserve, its territory was divided into five fragments, three of which were near such big cities as Kursk and Staryi Oskol. The main advantage of the usage of that nature reserve was in the long duration of its existence and making the long-term series of observations as recorded in the annals of nature (recording of climate data, biological processes and human influence). The first was the absolutely protected areas of forest and steppe which were connected with territories strictly controlled haymaking or grazing. Here, the existing semi-natural ecosystems kept saved and the small arrays of



oak forests with black soils were the most valuable territories. It was also very important to save such endemics as *Schivereckia podolic*, *Dendranthema zawadskii*, *Bupleurum multinerve*, *Daphne julia* K.-Pol. Researches also paid very much attention to find out the origin of very specific geomorphologic objects created with thermokarst [10].

The buffer zone is a conservation zone of the reserve, a strip a kilometer wide, where economic activities are allowed only under the supervision of the reserve staff. The transition zone (the zone of typical usage) was consisted with the demonstration Farm of the All-Union Scientific Research Institute of Agriculture and Soil Protection from Erosion of V.I. Lenin Academy of Agricultural Sciences. The mine dumps and territory of nuclear power stations near Kursk were included to the transition zone. That territory was officially controlled by the ecologists, so that the structure of the biosphere reserve enabled ecological monitoring on the regional level [1].

The Prioksko-Terrasny biosphere reserve is located on the left bank of the Oka river in the Serpukhov district of Moskovskaia oblast. Its core zone was based on Moscow Nature Reserve, which established in 1945 to protect plant, bird and mammal species. Many of them were later mentioned in the "Red List of the USSR". More than 50 species of plants characteristic of the steppe zone grow: *Festuca valesiaca*, *Stipa pennata*, *Phleum phleoides*, *Prunus fruticosa*, *Scorzonera purpurea* L., *Phlomis*, *Artemisia austriaca*, *Tulipa biebersteiniiana* and others. Not far from the steppe plots in the depressions among the pine forests, there were bogs of the upper type, where they grew sphagnum moss with cranberry (*Oxycoccus*), sundew (*Drósera*) and ledum (*Lédum palustre*). The floristic relics of the glacial period were also protected on the territory of the reserve: *Carex obtusata*, *Dentaria trifida* Poir. and others. In total, over 800 species of higher plants were registered on the territory of the reserve, of which over 60 are rare for the region and therefore subject to special protection [6].

The protected zone of the Prioksko-Terrasny Biosphere Reserve was presented by the typical and unique ecosystems of the center of the Russian Plain. This territory was located on the forested terraces of the valley of the Oka river. The lowest terraces of that valley in the southern part was covered with sandy hills and valleys, which form huge barchans, faced toward the prevailing winds. In some places, the sandy walls protected depressions from flooding of waters of the Oka River. Karst dips and funnels of various shapes also gave the landscapes their uniqueness. In the soil cover of the territory, podzolic and sod-podzolic soils of sandy and sandy loamy predominate. Rich in humus, the aluvial meadow soils were formed in the valleys flooded with hollow waters, and wherever there are limestones close to the surface, there are powerful soddy-carbonate soils reminiscent of their coloration and the structure of black soil (*chernozem*).

The very important to scientists was the fact that Prioksko-Terrasny biosphere reserve is situated on the border of the subzone of European taiga with the admixture of broad-leaved species and the subzone of broad-leaved forests. The functions of reserve were in preservation of typical ecosystems and unique observation of the natural dynamics of ecosystems and their components (biota, soil, water, climate), the study of the influence of anthropogenic factors on the change in the natural state of the natural environment at the territory of the biosphere reserve and training researchers in conservation and environmental monitoring [6].

The Repetek reserve was organized in 1928 and became the first desert reserve in the Soviet Union. That reserve was located in the Turan biogeographical province, which is the territory of the plains of Central Asia and Southern Kazakhstan. In Repetek reserve all types of sand desert ecosystems were represented in a small area. Many endemics species as *Aristida karelinii*, *Ammodendron*, *Eremosparton aphyllum*, *Calligonum* were protected on that territory. These endemics species were very important for studying the plant adaptation to the extreme conditions of its existence. In total, the number of endemic species in the flora was about 37%. At the territory of reserve the rare species included in the "International Red List" as desert monitors (*Varanus griseus*) and goitered gazelles (*Gazella subgutturosa*) were also protected. From 1965 to 1974 Repetek reserve took part in the work on the International Biological Program, finally received the status of a biosphere reserve in 1978 [9].

The Caucasian biosphere reserve was established in 1924 and reserved its status of a biosphere reserve in 1978. The territory of Caucasian biosphere reserve was located in a high-mountainous region of the north-western Caucasus with hard-to-reach rocky ridges and peaks. The Acragwarta Mountain is the highest point of that reserve (above 3360 meters under the sea level). The average height of the reserve's territory is 1500 meters. The mountainous relief created the altitudinal zonation of climate and distribution of vegetation. The composition of subalpine tall grass includes relict species: *Aconitum orientale*, *Campanula lactiflora*, *Delphinium pyramidatum*, *Inula magnifica*, etc. The flora of biosphere reserve was very rich; because about 20% of endemic species of Soviet Union were grow there. The great importance of flora was occupied by relics. Among that relics were trees (*Taxus*, *Picea orientalis*, *Abies nordmanniana*, *Buxus colchica*, etc), evergreen shrubs (*Rhododendron caucasicum*, *Ilex*, *Prunus laurocerasus*, *Ruscus aculeatus*, etc), deciduous shrubs (*Vaccinium arctostaphylos*, *Rhododendron luteum*), lianas (*Hedera colchica*, *Smilax*). Especially valuable were the rare endemics growing in the biosphere reserve as *Tulipa lipskyi*, *Crócus speciosus*, *Lonicera caucasica*, *Dryas incise*. Unfortunately, by the 1980s the territory of Caucasian biosphere reserve could not ensure the safety of the population of such valuable animals as caucasian wisent (*Bison bonasus caucasicus*) and brown bear (*Ursus arctos*). In this regard, the biosphere reserve cannot be considered as the secure place of keeping their gene pool. A significant part of wild animals remained in the winter with a limited food base and was forced to migrate to the lower belt of mountains to populated territories, which led to a reduction in the number of these animals due to hunting [2].

Sikhote-Alin biosphere reserve is located in a watershed on the eastern slopes of Central Sikhote-Alin in the Terneysky and Krasnoarmeysky districts. The Sikhote-Alin reserve was created in 1935 to protect the population of such rare animals as Siberian tiger (*Panthera tigris tigris*), Amur goral (*Naemorhedus caudatus*), scaly-sided merganser (*Mergus squamatus*) и mandarin duck (*Aix galericulata*). It should be noted that only about ten Siberian tigers were lived on the territory of the reserve, which could be explained by the big hunting territory of one tiger, which is reached 30-40 thousand hectares. It was necessary to increase the area of the reserve by 2-3 times to ensure the existence of at least 20-30 tigers. The territory of the reserve was remote from the sources of local anthropogenic pollution. However, the core territory of reservation had only been partially affected by humans' influence in the form of cutting cedar forests in the river basins. The ecological monitoring in the reserve was developed by from the Pacific Institute of Geography of the Far Eastern Branch of the Academy of Sciences of



the Soviet Union and the Far Eastern Scientific Research Institute of Hydrology and Meteorology, which launched works to control environmental changes in the protected and bordering those areas [5].

## CONCLUSION

The creation of biosphere reserves was the important instrument of environmental policy in the Soviet Union. In 1976 when the Soviet Academy of Sciences established the project of fire biosphere reserves in different parts of Soviet Union it had the aim to expand ecological monitoring from local to national level. That program had also global scale when the Soviet Union and the USA in 1976 signed negotiation of choosing on both countries similar biosphere reserves. From 1980th biosphere reserves had much more research functions and gave scientists an opportunity to compare those protected territories and the places where the environmental load was very high. However, only Central Black Earth, Prioksko-Terrasny and Sikhote-Alin biosphere reserves were able to participate in ecological monitoring, because they were supported by the academic institutions and scientific bases of Soviet Academy of sciences. The rest of biosphere reserves were not able to make such measurements as defining the level of solar radiation, changes in the gas composition of the atmosphere and the state of the ozone screen. Repetek biosphere reserve and Caucasus biosphere reserve were very successful in the ecological observations, which were carried out on the individual species of vegetation cover and wildlife. In the other biosphere reserves ecologists systematically carried out phenological recordings (the chronicles of nature), but that observations were typical for all natural reserves in the Soviet Union which not even had a UNESCO certificate. The biosphere reserves were also a very important instrument for the environmental cooperation with socialistic countries. For instance, The Central Black Earth Biosphere Reserve from 1978 participated in the Council for Mutual Economic Assistance program on economic and non-economic assessment of human impact on the environment.

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## REFERENCES

- [1] A.M. Grin and V.D. Utehin The monitoring of geosystem in the biosphere reserve // *Nature (Priroda)*, 1981, № 9, pp. 30-34. (in Russian)
- [2] A.M. Khokhlov and A.S. Solodko Caucasus biosphere reserve and the problems of nature conservation in the North-West of the Caucasus // *Nature (Priroda)*, 1979, № 2, pp. 58-69. (in Russian)

[3] Alexey V. Sobisevich and Valerian A. Snytko Some aspects of nature protection in the scientific heritage of academician Innokentiy Gerasimov // *Acta Geographica Silesiana*, № 1 (29) 2018, P. 55–60.

[4] D. Armand, I. Gerasimov and V. Preobrazhensky Prognostication and geographical science. Geographical prognostication: problems and prospects. Moscow, 1986. pp. 23–30.

[5] E.N. Smirnov, M.B. Podushko and N.G. Vasiliev Sikhote-Alin' biosphere reserve // *Nature (Priroda)*, 1981, № 3, pp. 32-35. (in Russian)

[6] V.A. Kovda, A.S. Kerzhensev, A.S. Blistanov and L.V. Zablostkaia Prioksko-Terrasny biosphere reserve // *Nature (Priroda)*, 1981, № 1. pp. 74-83. (in Russian)

[7] V.A. Snytko and A.V. Sobisevich Contribution of academician I.P. Gerasimov to the problem of environmental monitoring // *Problems of Ecological Monitoring and Ecosystem Modelling (Problemy ehkologicheskogo monitoringa i modelirovaniya ehkosistem)* 2017, № 28 (1), pp. 9-17. (in Russian)

[8] V.A. Snytko, A.V. Sobisevich, O.S. Romanova and V.M. Savenkova The ecological approach in geography: from the scientific heritage of academician I.P. Gerasimov // S.I. Vavilov Institute for the History of Science and Technology. The annual scientific conference dedicated to the 85th anniversary of the IET RAS. vol. 23. Moscow, 2017. pp. 39–44. (in Russian)

[9] V.E. Sokolov and P.D. Gunin Repetek reserve – the first desert biosphere reserve in the USSR // *Nature (Priroda)*, 1979, № 1, pp. 32-41. (in Russian)

[10] O.S. Ignatenko and A.M. Krasnitkij The nature reserve of V.V. Alekhine – the core of the biosphere reserve // *Nature (Priroda)*, 1981, № 9, pp. 35-39. (in Russian)

[11] S.S. Schwartz Theoretical foundation of global ecological forecasting // Second Joint US / USSR Symposium on Comprehensive analysis of the environment. October 21–26. Honolulu, Hawaii, US. Washington, 1975. pp. 92–97.

[12] *Shades of Green: Environmental Activism Around the Globe* / Edited by Christof Mauch, Nathen Stoltzfus and Douglas R. Weiner. New York, 2006. 228 p.