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Specialized ecological consciousness: scientific justification of opportunities and the prospects of sustainable development in the territory of the Far-Eastern federal district

The article contains the review of practices of the Far-Eastern scientists in the field of rational organization of management of nature and nature protection activity of the end XX – the beginnings of the 21st century. Central idea of the authors: theoretical ecological consciousness has avoided far forward the practice of implementation of the solutions proposed by the scientific community. The authors emphasize that the Far-Eastern scientists always carried out and continue to carry out a high humanitarian mission, offering and developing the principles of forming of ecological education for the society. Special attention is paid on the methodological potential of categories "ecological framework of the territory", "ecological capacity", "ecological tension", "activity of the territory", "eco-geographical examination of the territory". Practical explications of the given concepts will allow arise management of nature and the nature protection activity to a qualitatively new level, to concretize in relation to the last the basic principles and provisions of the model of sustainable development.

Keywords: *the Far-Eastern branch of the Russian academy of sciences (further – the FEB RAS), management of nature, conservation, sustainable development, ecological framework of the territory, eco-geographical examination of the territory.*

Специализированное экологическое сознание: научное обоснование возможностей и перспектив устойчивого развития на территории Дальневосточного федерального округа

Статья содержит обзор наработок дальневосточных ученых в области рациональной организации природопользовательной и природоохранной деятельности конца XX – начала XXI века. Центральная идея авторов: теоретическое экологическое сознание ушло далеко вперед от практики реализации предлагаемых научной общественностью решений. Авторы подчеркивают, что дальневосточные ученые-естествоиспытатели всегда выполняли и продолжают выполнять высокую гуманитарную миссию,

предлагая и разрабатывая для общества принципы выстраивания экологического образования и воспитания. Особое внимание обращено на методологический потенциал категорий «экологический каркас территории», «экологическая емкость», «экологическая напряженность», «активность территории», «жизнеемкость производства», «эколого-географическая экспертиза территории». Практические экспликации приведенных понятий позволят поднять на качественно новый уровень природопользовательную и природоохранную деятельность, конкретизировать применительно к последней основные принципы и положения модели устойчивого развития.
Ключевые слова: *Дальневосточное отделение Российской академии наук (далее – ДВО РАН), природопользование, охрана природы, устойчивое развитие, экологический каркас территории, эколого-географическая экспертиза территории.*

Beginning a conversation on creation by the Far-Eastern scientists of the theoretical base of ecologically focused nature protection and management activity and ecological education in the country, we consider necessary to give the reference that in the scientific relation the Far East a long time (practically, the all Soviet period) was traditional "ancestral lands" of the scientists. The FED RAS (in the past – the FED AS of the USSR) has been presented generally by the scientists of the Research institute (further – SRI) developing the natural-science subject. Therefore the Far-Eastern scientists working on the environmental problems – the staff of the scientific research institute of forestry, the scientific research institute of mineral raw materials, the scientific research institute of water and environmental problems of Priamurye, etc. – at the same time undertook a problem of judgment of the problems of humanitarization of scientific knowledge, its valuable interpretation. In the article we haven't casually addressed the works of the Far-Eastern scientists of the end of the past beginning present centuries. We sought to show that the relevance of researches on an ecological perspective has no class and ideological involvement. Since the beginning of construction of BAM in the USSR and till present the line of researches of the management of nature activity in the region steadily is in the course of rationalization, humanitarization and aksiologization of the relations of the person and the nature. Development of ecological knowledge, owing to the specifics of an object of researches, is continuous, always relevant, directed to preservation of universal values.

So, we will address the works of the Far-Eastern researchers of the nature.

For identification of existential influence of economic activity of people on the different complexes of biosphere the Far-Eastern scientists traditionally pay much attention to studying of spatial structurization of natural and artificial landscapes. During this studying the category device of economic and physical geography, social ecology has gained development. According to us, this contribution of the Far-Eastern scientists to the development of modern science is still insufficiently evaluated. Therefore we will pay attention to development of a

system of concepts in which the ecological, economic and esthetic value of the territory is described.

First of all, the concept "ecological frame of the territory" attracts attention (further – EFT). EFT is understood "as the close system of maximum voltages geo- and bio-flows of the territory, their maximum gradients" [13, p. 195].

Considering hierarchy of EFT, the scientists divide them into several levels.

1. Regional. Here EFT of the territory make ridges with the pronounced barrier functions; places of the maximum manifestation of neo-tectonic processes; zones of the most contrasting over-falls of a relief where the maximum voltages of gravitational potential are concentrated (breakaways of the sea coasts, peaks of the ridges); zones of the main tectonic breaks; places of concentration of the main transit water flows; outputs of the breeds especially the subject to geochemical and physical aeration; ways of the main bio-migrations and the centers of speciation.

2. Pool-type level. Here the boundaries of pools, places of concentration of temporal water flows, large and convex natural slopes, brows and shoulders of the terraces are added to the listed above elements.

3. Local level. Boundaries of EFT are specified through accounting of such elements as the zones of contacts of unequal height and uneven-age levels of planation of a relief, elements of concentration of biological diversity of a landscape, a zone of relic elements of a hydraulic network (the small-sized rivers, streams) and erosive partitions.

4. Global level. Here the elements of ecological frame are polar caps of the planet, ozone layer, large zones of tectonic violations, sea passages.

Along with natural as the authors of the concept of EFT mark, there can be also artificial links of EFT: oases, trunk forest belts in the steppes and semi-deserts, large water reservoirs, etc. As B.A. Voronov emphasizes, EFT role is "in the maintenance of certain territorial lines is huge. Maintaining the natural specifics, biological diversity and in general stability of the regional ecosystems depends on its status … When corrupting the EFT processes steadily acquire essentially unpredictable, non-linear, bifurcation character … – tells all experience of the world environmental management about it" [1, p. 33; 2].

EFT – isn't the speculative removed concept, and a result of the long-term observations and the analysis of data of geology, geography, biology, geophysics. This concept so precisely reflects the real ecological basic functions of the elements included in its contents that its use is expedient during the planning the not only the management of nature, but also the nature protection activity. It is possible to give the article of S.D. Shlotgauer as an example where seven nature protection areas allocated in the Khabarovsk territory are described: Okhotsk and Ayansk, Hingano-Bureinsk, North Sikhote-Alin, Southern Amur, Sredneamursk, Nizhneamursk. The EFT affine elements are the basis for their allocation. On the same signs also the development of network of wildlife reserves in three directions – protection of the zones of BAM, protection of the marine ecosystems adjacent to the Amur Liman, protection of the highlands is planned. [14]

Allocation of EFT on the specific biological, geomorphological, geographical features especially is important that the biosphere within which

activity of the person is concentrated by the main part has no own space therefore careful accounting of the main structural features of the organization of hydro-, atmospheric processes in each concrete territory for minimization of the possible negative effect of actions is necessary.

The role of indicators of possible anthropogenic impact on the environment is played by those its properties which are reflected in the concepts "ecological tension", "ecological capacity", "ecological durability of the territory".

Ecological capacity is determined by the natural resource capacity of the territory which provides its stability in relation to the influence of natural and anthropogenic factors. For example, the region with extensive forest stocks can sustain the rather long period of logging works in its territory. But it is necessary to remember that all concepts described by us are complemented, only their sharing can give the complex, rather adequate evaluation to the ecological solvency of this or that kind of activity. So, in the Verkhnebureinsk district of the Khabarovsk territory having huge forests, cutting of the wood is conducted by the both domestic, and many foreign companies. The lack of timely evaluation of EFT of this area when determining the scales of cutting was expressed in the climate changes: deforestation of hillsides has led to a change of the direction and force of air streams on the territory that finally affects the human health. Winter temperatures up to -42 °C in windy weather are perceived by the organism as extreme that leads to an increase in a share of diseases of respiratory organs in an overall picture of pathologies.

The index of ecological capacity of the territory is tightly connected also to its ecological strength. Under the ecological strength of the territory the complex of indices of vulnerability of the regimes on geomorphological, climatic, soil and genetic factors means (in the Far East – also on the cryogenic factors). At the same time the analysis of factors is carried on two groups: the limiting factors (superimposing restrictions for the activities of the person, its intensity and character); the destroying factors (sharp oscillations of temperature, feature of a relief, wind force, etc.). In the discussions of the quoted authors the thought that "vulnerability of the territory reflects not the average, but the maximum indices of manifestation of these factors" permanently is carried out [4, p. 203].

All considered concepts reflect such property of the territory as its activity. Activity of the territory is, in our opinion, manifestation of the special status of natural objects, phenomena, processes in interaction of the society and the nature, in the structure of socio-natural relations. To read the nature only – to think of the object of influence at the level of the Stone Age, even below since the primitive person never read the nature the passive supplier of products. In the modern ecological conditions is very difficult accurately to differentiate a subject and an object in the socio-natural relations, especially in their equipment. In the last decades we watch a peculiar reversing of the subject and object relations in the considered sphere: the nature and the person mutually "remake", change each other, and the real threat of ecological crisis says that the big activity is shown now by the environment, but not the person whom it the status brings to recognition of the need of change of the established practices of environmental management. It is

shown especially noticeably that in production the mankind realizes the need of transition from the dominating transformative to the adaptive system of environmental management (E.S. Zarkhina's terminology). Transformative strategy economically stimulates building of "the cleared-away space" in the course of what the active stabilizing bio-sphere elements – the wood and swamps are destroyed. Actually the transformative strategy is programmed on degradation of natural surroundings. At the same time, it should be noted such positive elements of transformative strategy as technologization, change of scales of production, achievement of selection, etc. How to remove the negative directivity of strategy of environmental management, having saved its positive elements? The Far-Eastern scientists read that it is possible through the change of the person – the subject of environmental management. The user of nature shall have the real rights for the territory, a certain right of monitoring over the adjacent territories (where the natural processes, especially significant for it are created). It is necessary to rebuild the all education system and environmental management.

Wide-ranging studies in the field of minimization of the negative ecological results of economic activity of the person and in the field of conservation are conducted in the Far East since the beginning of the 70th years. It is necessary to recognize that specialized consciousness has progressed in this regard very considerably, especially in the perspective theoretical developments which major line is the basic possibility and a need of their realization. During the scientific research there is both a development new, and specification of the known concepts characterizing the ecologically significant objects, processes, phenomena.

The important place in the works of the Far-Eastern scientists is taken by the analysis of the reasons of disastrous ecological position of the region and Russia in general.

In the book "Environmental protection and rational environmental management" the following groups of reasons which are the cornerstone of any problem ecological situation are allocated: 1) specifics of the environment of the region and the knowledge of it; 2) imperfection of management, planning and low level of the territorial and functional organization of the economy; 3) insufficient readiness of ideas of the system of values and the general purposes, priorities and incentives of the social and economic development at a certain stage of development of the society. I.P. Druzhinin in the territory of Russia refers the lack of an obvious and immediate economic benefit of rational environmental management and conservation for the departments and enterprises to the reasons of crisis state of the nature and also "almost full ignoring of direct influence of the economic activity on the premature mortality of people, deterioration in their health, working conditions and rest that still doesn't find due understanding and account in the expected, planned and design, operational practice …, in the systems of consumer and medical care of the population and even in the plans of scientific research" [3, p. 44]. In this and other works the quoted author repeatedly addresses a problem of harmful influence on the society, the person, production of inattention to the ecological conditions of development of production. I.P. Druzhinin carries the indicator of life capacity of the territory, system, object,

process, technology to a number of one of the most important evaluations of interests of the person. In the simplest cases this indicator is determined by the premature mortality. Sometimes, the author emphasizes, this indicator it will be possible to consider the losses not only of people, but also the other living beings.

The life capacity indicators as I. Druzhinin considers, can be used very effectively. For example, the influence of thermal power plants burning coal is evaluated with a premature additional mortality of 100 - 226 people on each one billion kilowatt-hours of the developed electric power. Similarly it will be possible to establish the estimates of life capacity of chemical, metallurgical and other productions. In the practice of use of the indicators of life capacity estimation of cost of human life and the other living beings has essential value. There is no true estimation of cost or the price of human life still, and hardly sometime it will be precisely established. Nevertheless the conditional sizes can be picked more or less up. The quoted author, comparing these conditional sizes in the different countries, draws the following conclusion that the low evaluations of cost of life in our country inevitably do the economic life capacity of the objects, technologies, systems, etc. owing to what the deep judgment of dependence of the social and psychological health of the population on specifics of the environment surrounding it isn't demanded.

The nature of the Russian Far East differs in a peculiar spatial relief, and this relief is mobile owing to the incompleteness of many geomorphological processes in the territory of the region. The intensity of its industrial development has made obvious in time of a change of the environment even throughout the life of one generation. The description of the nature of the Far East, fixing of these changes in it became that factual material which is the cornerstone of numerous scientific developments on the environmental protection.

Scientists-biologists, hydro-biologists actively promote a settlement of pollution and protection of waters of the Amur River at the interstate level especially as L.M. Kondratyev marks out, the sanitary and hygienic and toxicological norms established for the separate components of biosphere taking into account a danger to the person don't correspond to the modern ecological approaches. By their drawing up most often were guided by the slogan "The person is protected — the ecosystems are protected". However the person is not the most sensitive organism capable to react quickly to the long insignificant influences. Therefore it is hardly worth waiting for that moment in the state of ecosystem when its changes begin to affect health of the person. It is time when the all nature protection services need to represent accurately what to control, as where to normalize how and when to limit and why [6, p. 80-84].

The employee of the Institute of water and environmental problems of the Russian Academy of Sciences (further – IWEP RAS) Z.G. Mirzekhanova, considering the territory as an independent object of a research and as the active element, specifies that in the conditions of orientation of activity of the person to sustainable development as the ideal of interaction of the society and the nature is

more expedient to carry out not ecological[1], but eco-geographical examination of the territory (further – EGET).

We have seen the following differences between a traditional concept of environmental evaluation (further – EE) and the offered EGET. If the environmental evaluation is carried out concerning the objects, projects, technologies, then eco-geographical examination has the object the complete territory. At the EGET degree of compliance of the economic activity of person to the natural and resource potential while the problems of EE – to establish a degree of compliance of innovations to the standard requirements of environmental protection is determined. Considerably the subject of analysis extends in case of EGET – all territory in the borders of the developed levels of management, unlike the territory in the borders of placement of the objects and zones of their influence at EE becomes it. If a selection of data at EE is carried out by the principle of branch approach, then the EGET information block is formed proceeding from the independent and absolute evaluation of properties and features of the territory. Criteria of EE – the existing average standards; EGET assumes a preliminary study of the criteria reflecting features of the territory, its identity. And, at last, EE purpose is ensuring such planning and management which would be followed by a reduction of influence of the concrete types of economic activity of the person by the environment. EGET purpose is justification of planning and the management directed to the maintaining ecological balance and sustainable development of the territory.

At the same time three main levels at which EGET is carried out are assumed: 1) eco-functional (analysis of ecological and natural capacity of the territory[2]); 2) eco-resource (studying of the resource opportunities of the territory, the developed structure of land use and ecological consequences, extents of use of the resource potential[3]); 3) expected and optimizing – here occurs association of the conclusions and results received during two previous stages for the purpose of elaboration of the strategy of ecological development of the territory (vulnerable landscape complexes come to light, the model of ecological framework of the territory is built, zones of priority use of different types of the resources are allocated.

Z.G. Mirzekhanova, representing EGET as a basis of ecologically sustainable development, outlines those principles and features which allow her to perform these functions. Such principles are: systemacity, complexity, independence (results of EGET have to perform the functions of objective information for the all users, "regional devotion", objective courtesy of wrong decisions (EGET has to precede decision-making process and to be its component);

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[1]Environmental assessment – assessment of impact on the life environment, natural resources and health of the population of economic innovations: implementation of various projects, technologies, constructions and reconstruction of objects, etc.

[2]Ecological capacity of the territory – ability of the territory to maintain anthropogenic loading, keeping self-control functions.

[3] At this level also assessment of an ecological situation as the generalized indicator reflecting impact of the person and his economic activity on the environment is carried out; the analysis of the reasons of current situation is carried out.

objective information security; interrelation with the other information programs, presentation and publicity (EGET has to be provided cartographical) [7–10].

The concept of EGET which is put forward as a specification of provisions on realization of the model of sustainable development is directed to the studying and creation of conditions of rational environmental management at the regional level. Now it continues to be studied by the Far-Eastern ecologists in details. But, apparently from the provisions given to disclosure of its contents, they are localized in the field of obligation which isn't issued by still any precepts of the law and economic indicators that is have, as well as a model of sustainable development, ideal character.

The Far-Eastern ecologists carried out a number of scientific research according to the Programs of basic researches of the Presidium and Separations of RAS, in particular, within the programs "Geographical bases of sustainable development of the Russian Federation and its regions", "Wildlife: the current state and problems of development", "A space role in upgrade of Russia: natural and social and economic potential", etc., having the theoretical value and high potential of practical explications.

Summing up the results, we will mark that in the researches of the Far-Eastern scientists the categorical device of both natural-science, and social and humanitarian knowledge received the incorrect staticized study. The analysis of categories is carried out taking into account realities of the sustainable development and the opportunities of expected, project and application-oriented activities. The authors of the article are sure that the highest theoretical potential of practices of the Far-Eastern scientists which is now the real base of lining of the ecologically oriented activities at all levels: political, economic, educational, spiritual – will save the heuristic and methodological potential and in the long term.

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