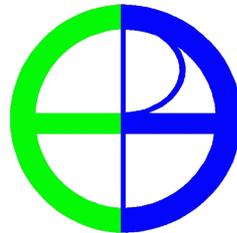


14<sup>th</sup> International Conference  
of the Russian Society for Ecological Economics

**RSEE-2017**



**Ecological and Economic Problems of  
Development of Regions and Countries  
(Sustainable Development, and  
Management of Natural Resources)**

Petrozavodsk,  
Republic of Karelia,  
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The 14<sup>th</sup> International Conference of the Russian Society for Ecological Economics RSEE-2017 will be devoted to the discussion of topical issues in the field of sustainable development of countries and regions, methodology and practices of establishing and developing the economic mechanisms of environmental management and protection. Topics include taxation of the use of natural resources and environmental impact, assessment and abatement of accumulated environmental damage, development of environmental target programs, management of ecological and economic systems, the problems of interaction between government, business and society, environmental security.

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## 1. PLENARY SESSION

### MAIN DIRECTIONS OF CAPITALIZATION OF THE BAIKAL NATURAL AREA

**Bardakhanova Taisiya B.**

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**Abstract.** *The paper considers the main directions of capitalization of the Baikal Natural Area. Namely: the development and implementation of a payment system for the use of ecosystem services, as well as the rationale for priorities and forms of support for environmentally oriented activities. The list of paid ecosystem services can be expanded by ranking various components of natural capital and various ecosystem services and conducting a detailed assessment of the most valuable components and services. Capitalization of the Baikal Natural Area affects a number of organizational, regulatory and economic aspects for the introduction of a payment system for ecosystem services and economic measures to promote environmentally oriented activities, including the creation of a special fund for charging and accumulating payments for ecosystem services, as well as improving the procedures for state support.*

**Keywords:** *ecosystem services; natural capital; environmentally oriented activities*

### TRANSACTION COSTS IN NATURAL RESOURCE GOVERNANCE: SURVEY OF INTERNATIONAL APPROACHES

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**Abstract.** *The article describes the main approaches to the problem of transaction costs in the governance of natural resources in modern ecological economics literature which are defined as the cost management of socio-ecological-economic systems. The most important is the question of how transaction costs, their magnitude, nature and distribution between actors can influence the achievement of sustainable development of countries and regions.*

**Keywords:** *transaction costs; ecological-economic policy; institutional solutions; path-dependence*

### ESTIMATION OF INFLUENCE ECONOMIC DEVELOPMENT ON THE ENVIRONMENT OF RUSSIAN REGIONS

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**Abstract.** *The impact of structural shifts and modernization of the economy on the environment is discussed in the report. The growth of the economy leads to an increase in pollution, but modernization of production, a change in the structure of the economy and environmental activities can reduce this impact. A new approach was proposed, special models were created and a methodology for identifying models and methods for predicting the ecological state of the regions were developed.*

**Keywords:** *economy of the region; environment; modernization*

### **ON THE DEVELOPMENT OF TARGETED AND PLANNED ENVIRONMENTAL INDICATORS, PROGRAMS AND PLANS OF ENVIRONMENTAL ACTIVITIES UNDER THE REGIONAL & SECTORAL SYSTEM OF NATURAL RESOURCES USE GOVERNANCE**

**Kasyanov Pavel**

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**Abstract.** *The subject of research is the practice of environmental protection governance at the regional level (by the example of the Yamal-Nenets Autonomous District) and the parties interested in taking part in a decision-making process regarding the natural resource use and environmental protection. The result of the study is proposals on the procedure for the development of targeted and planned environmental indicators, programs and environmental actions plans within the regional governance of the nature use and environmental protection, as well as preparation of a range of methodological documents on the functioning of the regional-sectoral environmental management system.*

**Keywords:** *Environmental Governance at the regional level; Environmental action plans; targets; stakeholders; participation in a decision-making process*

### **SPECIALLY PROTECTED NATURAL TERRITORIES AS AN IMPORTANT INSTRUMENT FOR CONSERVATION OF NATURE AND DEVELOPMENT OF THE ECONOMY OF THE REGION**

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**Abstract.** *The goal of environmental policy is to improve the environmental situation and improve the quality of the natural environment in the region. Particular attention is paid to the development of a network of specially protected natural areas (SPNAs) and conservation of biological diversity. Part of the Karelian SPNA has a high recreational potential and this*

*potential can be integrated into the development of the republic.*

**Keywords:** *the economy of the region; strategy; environmental Safety; tourism; specially protected natural territories.*

## **SHORTCOMINGS IN THE INTERACTION BETWEEN AUTHORITIES, BUSINESS AND SOCIETY IN ADDRESSING ENVIRONMENTAL-ECONOMIC PROBLEMS OF THE BAIKAL REGION**

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**Abstract.** *One of the greatest lakes on Earth, Baikal, lies in the heart of the Baikal region and is the dominant feature of its development. The current challenging environmental and economic situation in the region is considered, which was caused by legal collisions, funding shortages as well as by the objective contradictions between the levels and branches of society driven by the differing interests and priorities. Governance arrangements and economic mechanisms for dealing with the problems are suggested*

**Keywords:** *environmental-economic situation, contradictions, priorities, Baikal region*

## **ENVIRONMENTAL INNOVATION AS A DRIVER OF THE FOURTH INDUSTRIAL REVOLUTION: CHALLENGES FOR PUBLIC POLICY**

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**Abstract.** *Among the leading directions of the fourth industrial revolution, the authors analyze environmental innovations designed to find an answer to a number of global problems, including climate change and environmental pollution. Environmental innovations, while focused on achieving external, including global, effects, run into specific barriers, which require targeted efforts on the part of the state to eliminate them. In this context, the authors monitor the implementation of federal laws No. 219-FZ and No. 213-FZ in terms of stimulating environmental investments and the transition of basic industries to the principle of the best available technologies, which are among the improving technical and technological innovations. They identify the problems that arise and offer possible solutions.*

**Keywords:** *environmental innovation, the industrial revolution, modernization of environmental legislation, environmental charges, the best available technologies principle.*

## **INTEGRATION OF THE ENVIRONMENT INTO THE ECONOMY: ANALYSIS OF THE GERMAN EXPERIENCE**

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**Abstract.** The article analyzes the views of a renown German economist Horst Siebert (1938-2009). and development of environmental Economics in Germany. Analysis of trends in the development of German environmental policy is considered in the context of the "Strategy of environmental security of the Russian Federation for the period until 2025" (2017).

**Keywords:** environmental policy; environmental economics; German experience in environmental management; Horst Siebert

## **WATER POLLUTION AND FLOOD IMPACT SIMULATION USING 3S PLATFORM: APPLICATION TO CASE STUDIES IN CHINA**

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**Abstract.** Methodology combining GPS (Global Positioning System), GIS (Geographical Information System) and RS (Remote Sensing), was given the name 3S. It is widely used in the field of transportation, logistics and public security. In this study, a hybrid 3S Software package was built and it was applied to several case studies in China. One application was focused on simulation of how water pollution propagates in 3D space and time. As a result of the 2005 explosion of a workshop in Jilin City, 5000 tons of nitrobenzene were spilled into Songhua River. Simulation helps the decision makers to monitor where the contaminant is concentrated at a certain point in time after the accident. Another application aimed at analyzing the need of population relocation as a result of inundation caused either by a dam construction or a flood. Consequences of a recent hydraulic project of diverting water from Han River to Wei River were analyzed. Since houses and farms are submerged under certain elevation, our simulation of the location and the level of impact helped plan how many people were affected and how to settle them down.

**Keywords:** water pollution, floods, simulation, Digital Earth.

## **THE STATISTICAL ANALYSIS OF SUBJECT AND CHARACTER OF ECOLOGICAL-ECONOMIC STUDIES IN RUSSIA**

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**Abstract.** Results of the analysis, in a section an object-subject-character, 119 reports on ecologic-economic reports submitted at the RSEE-2013 conference are presented in the article. 16 signs of reports on which each report has received an assessment equal 0 or 1 are selected. The interrelation of these signs by detection of associative rules is investigated. The cluster analysis of reports for the purpose of definition of main direction of development of ecological economy is carried out.

**Keywords:** environment, ecological economics; environmental management; statistical analysis;

scientific studies; Russia

## DEVELOPMENT OF CIRCULAR ECONOMY IN LATVIA

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**Abstract.** Nowadays, to develop a sustainable, low carbon, resource-efficient and competitive economy, transition to a more circular economy is essential. Circular economy is very complex issue. The aim of the research is to investigate nature of circular economy, its status and current trends in Latvia and to develop some recommendations to improve the situation. The results of the research show that circular economy implementation milestones are: legal framework, administrative conditions, economic instruments and public education and awareness.

**Keywords:** circular economy, sustainable development, life cycle, Latvia

## ECOLOGICAL CONFLICTS IN RUSSIA: CAUSES AND CONSEQUENCES

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**Abstract.** The report analyzes the causes of environmental conflicts in modern Russia. The economic nature of environmental conflicts is shown. It is based on the distribution of environmental external costs. An analysis of the mechanisms of environmental regulation in our country made it possible to identify weaknesses in terms of preventing environmental conflicts. The leading role of local communities in the process of formation of sustainable development of territories is shown.

**Keywords:** environmental conflict, environmental externalities, internalization of externalities, environmental regulation, environmental impact assessment.

## ASPECTS OF ASSESSMENT AND REMEDIATION OF ENVIRONMENTAL DAMAGE IN THE ARCTIC REGION

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**Annotation:** The article deals with the environment and environmental security in the Arctic, a new position in the formation and development of the state environmental policy, strategic planning documents, defining the main directions and methods to improve the state regulation in the field of ecology, environmental safety

**Keywords:** environment; natural resources; ecological safety, negative impacts, the Arctic, the Northern Sea Route, the accumulated environmental damage.

## **2. SECTION 1. ENVIRONMENTAL POLICY AND ENHANCEMENT OF THE ECONOMIC MECHANISMS FOR NATURAL RESOURCE MANAGEMENT**

### **THE STRATEGY OF GREENING OF THE AGRICULTURAL AND FOOD SECTOR: EXPERIENCE OF THE EUROPEAN UNION**

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**Abstract.** *The paper contains proposals for the transition of the strategic management of greening the agro-food complex to a new level based on the experience of renewed common agricultural policy of the European Union. The author has provided perspectives and indicators for use biotechnology and measures for the protection of water resources in agriculture. He also proposed in a framework of the scientific and industrial infrastructure of the agribusiness to integrate the state information resources created for the processing of the results of the monitoring of agricultural lands, and the database of the information and analytical infrastructure of biotechnology.*

**Keywords:** *soil; water resources; greening; ecological safety; indicators*

### **PUBLIC-PRIVATE PARTNERSHIP AS A MECHANISM OF SUSTAINABLE DEVELOPMENT OF COASTAL TERRITORIES OF THE RUSSIAN FEDERATION**

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**Abstract.** *Public-private partnership is a mechanism for ensuring sustainable development of coastal areas, solving problems of economic and environmental development. The essence, features, spheres of application and prospects for the development of PPP mechanisms in the coastal territories of the Krasnodar Territory, the Kaliningrad Region and the Republic of Crimea are considered in the article. A number of recommendations were proposed to stimulate the use of public-private partnership projects in the sustainable development of coastal areas.*

**Keywords:** *Coastal areas; public private partnership; sustainable development*

### **ECOLOGICAL COMPONENT OF REGIONAL SOCIO-ECONOMIC DEVELOPMENT STRATEGIES**

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**Abstract.** *The necessity of more fully taking into account the ecological component in regional socio-economic development strategies is substantiated, the foreign and domestic experience in this field is analyzed.*

**Keywords:** ecological and economic development; socio-economic development strategies; environmental assessment of strategies; "green" economy

## **ENVIRONMENTAL PROTECTION INCENTIVE INSTRUMENTS FOR SUSTAINABLE DEVELOPMENT OF REGIONS.**

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**Abstract.** The article describes methods of stimulating industrial activities for sustainable development of the territories and environment. The main methods of economic incentives include: preferential taxation of profits, innovative insurance risk transactions under the state guarantees, information support and free advertising, the provision of showrooms, the possibility of obtaining preferential expert, consulting and design services. The article also justified such incentive mechanisms of enterprises in the field of environmental management, as preferential loans and finance leases. Currently, there are no Russian leasing companies, which would be exclusively environmental focused, which greatly complicates the work of environmentally oriented enterprises under leasing schemes. Another effective tool to stimulate the activities of enterprises is a concession that represents a long-term form of investment. International cooperation in this area will allow to access new technologies and information resources. It is also noted that the perspective stimulating nature protection direction is the development of market mechanisms to sell the rights to pollute. In conclusion, the use of these incentive mechanisms will effectively manage the processes of environmental protection for sustainable ecological and economic development of territories, and that will increase the territory's investment attractiveness and the population's quality of life.

**Keywords:** Sustainable development, promotion of ecological projects, economical stimulation of environmental security work.

## **INFLUENCE OF GLOBAL SUSTAINABLE INITIATIVES ON THE ARCTIC LOCAL COMMUNITIES AND ENVIRONMENT**

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**Abstract.** The paper presents the results of a study aimed at identifying elements of global sustainable development initiatives adopted by mining companies in the Murmansk region and assessing their impact on local communities. The results show that the local community is a weak link in the "business-region-local community" system in the Arctic. They are not ready (not trained) to solve the problems of transition to sustainable development and to act accordingly. Local interests had not formulated in the perspective of sustainable development as same as the vision of a sustainable future.

**Keywords:** Sustainable development; Global initiatives; Corporate social responsibility; Local community; Arctic

## FORECAST OF GREENHOUSE GAS EMISSIONS IN THE IRKUTSK REGION AND ASSESSMENT OF ITS ABATEMENT METHODS

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**Abstract.** *The paper presents historical data and projections of greenhouse gas emissions from fuel combustion in thermal power plants and boiler houses of the Irkutsk region till 2030 Presented several scenarios for electricity and heat generation. Give a cost to greenhouse gas emissions.*

**Keywords:** *greenhouse gases; Thermal power stations; Boiler rooms; Price of CO2 reduction*

## PRIORITY PROBLEMS OF USE AND PROTECTION OF SURFACE WATER, AND ECONOMIC MECHANISMS OF THEIR SOLUTION FOR THE ECOSYSTEM OF THE MASRIK BASIN

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**Abstract.** *The present state and priority problems of the effective use and protection of surface water resources in the basin of the Masrik River were discussed, analyzed and clarified, the changes in the time and vulnerability of the river runoff were clarified and analyzed some issues of their regulation and effective management were discussed.*

**Keywords:** *surface water resources, river runoff, monitoring, use and protection of water, priority problems, dynamic change, Masrik River basin, the Republic of Armenia.*

## DEVELOPMENT OF THE NATIONAL PUBLIC STANDARD "ENVIRONMENTAL SECURITY IN THE ARCTIC"

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**Abstract.** *The paper presents the stages of development the public standard for ensuring environmental safety in the Arctic zone for all types of activities and the basic principles of its construction. The analysis of relevance of the developed standard to international documents on sustainable development and best existing practices of corporate social responsibility of business is given. The standard is analyzed for the acceptability of its use by various organizations. Approaches to introduce the standard into practice are offered.*

**Keywords:** Arctic; Environmental standards; Sustainable development; Environmental policy; Interaction

## ECOLOGICAL AND TECHNOLOGICAL ASPECTS OF MODERNIZATION OF MINING ENTERPRISES OF RUSSIA

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**Abstract.** *The article is devoted to a comprehensive solution of ecological and technological problems of modernization of economy of our country through the transition to best available technologies (BAT). As the object of study are the enterprise, the main economic activity of which is mining. The importance of BAT implementation at these plants is proved by the fact that the share of mineral production in Russia in terms of emissions of polluting substances in the atmosphere accounts for 27.5% of the total volume of emissions from stationary sources, and in terms of waste production and consumption – 92 % of the total volume. There are a number of difficulties for BAT implementation in the field of mining. First, before mining is not an easy task related to the scope of the government requests information for the development of information technology of the BREFs, as requested from the enterprises, data is often confidential information. Secondly, the introduction of BAT given in the manuals, in full is impossible, because every mining company has a unique, peculiar to him alone characteristics due to both natural (geological) and mining conditions. Third, the diversity of activities that have a negative impact mining operations have on the environment, requires the study and application of various sectoral and cross-sectoral information and technical references on BAT and the availability of appropriate specialists. Finally, possible problems due to the lack of a legal framework for the design of mining enterprises and processes on the principles of BAT. In the end, it is concluded that with the aim of greening the economy, the transition of mining companies that have a significant environmental impact, BAT is required. However, the implementation of this process should be preceded by very hard work on creation of normative-legal base, corresponding to Russian realities and taking into account the peculiarities of the mining industry.*

**Keywords:** *modernization, best available technologies, information and technical references, mining enterprises.*

## ECONOMIC INSTRUMENTS OF URBAN ENVIRONMENTAL SECURITY AND ENVIRONMENTAL PROTECTION

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**Abstract.** *The article presents a schematic application of economic tools and techniques of strategic management to ensure ecological safety and environmental protection of the city.*

**Keywords:** *economic instruments, instruments of strategic management, the methodology of the balanced scorecard, the strategic map of goals, ecological risks, ecological culture, ecological safety of the city*

## THE DEVELOPMENT OF A MODEL OF ECOLOGICAL COMPETENCE OF EMPLOYEES AS A WAY OF FORMING SOCIAL RESPONSIBILITY OF BUSINESS

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**Abstract.** The article substantiates the necessity of taking into account the socio-psychological basis of environmental activities and behavior of the population in environmental management. In this context, reveals the problem of interaction between environment and organization. Develop methodological approaches to the formation of a model of ecological competence of employees, including the study and implementation of projects of liquidation of accumulated environmental damage. Examines the issues of formation of model of interaction of enterprises of employees, the public, state administration bodies in the process of solving environmental and economic problems.

**Keywords:** environmental competence; the elimination of accumulated environmental damage; social responsibility; environmental management; green economy

### **ANTIFRAGILE STRATEGY OF ADAPTIVE DEVELOPMENT OF FOREST COMPLEX**

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**Abstract.** On the basis of a comparison of the concepts should be primed, «antifragile», «invulnerability», «sustainability» shows a modification of the adaptive strategies of development of the forestry complex. Formed adaptive strategies for sustainable development of the forestry complex and their content is considered as varieties of coevolutionary strategy.

**Keywords:** adaptive development; adaptive-resistant; adaptive-antifragilestrategy

### **NATURE CONSERVATIVE PROBLEMS OF RUSSIA'S OLD INDUSTRIAL REGIONS**

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**Abstract.** It has been shown in the article that the key condition of the achievement of economic, social and ecological purposes of Russia's old industrial regions development is the maintenance of the balanced development. It takes into account developed industrial infrastructure and territorial labor division, requirements of economy and society, regional resource potential, environmental capacity and other significant factors. It has been proved that the absence of coordination between industrial corporations and state bodies of power can hamper nature-conservative problems settlement in old industrial regions.

**Keywords:** old industrial regions; nature-conservative activity; "nature-conservative production"; public benefit

## THE PROBLEM OF TERRITORIAL CORRECTNESS OF THE EKOLOGICAL AND ECONOMIC INFORMATION

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**Abstract.** A binding of the ecological and economic information to units of administrative-territorial division is not best way of territorial interpretation. In regions and areas there are distinctions between the most occupied both economically mastered centres and rural (wood) periphery. The account of a landscape basis and the systems of wildlife management is necessary. Examples of calculation of specific characteristics of atmospheric emissions, assignments of sewage and formation of a waste on types and wildlife management subtypes, and also social and economic parameters on a landscape basis are presented.

**Keywords:** wildlife management; geographical types of wildlife management; the ecological and economic information; the North of the European Russia

## INTEGRATION IN CHANGING GEOPOLITICAL CONDITIONS: OCE-STANDARD AND CONTEXT OF NATIONAL SECURITY

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**Abstract.** The context of the new regionalization, the growing information war for the new world order, is increasingly evident in the desire to format any global structures, including the OCE process, in the context of certain national interests. In this communication, it is proposed to talk about the OCE process towards Russia systematically. It is necessary to take into account the trends in the transformation of the economic space of Russia and Eurasia, the interconnection between the mechanisms for transforming the economic space and changes in the structure of the economy of its various parts.

**Keywords:** Sustainable development; regionalization; environmental standards; national security

## BIOENERGY POLICIES: A TOOL FOR REGIONAL DEVELOPMENT AND SOURCE OF LOCAL CONFLICTS

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**Maxim Trishkin**  
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**Abstract.** Current bioenergy development, particularly in the EU, is strongly driven by a framework of supportive legislation and political programmes on transnational, national and local level. The EU renewable energy directive (RED) and the resulting national and regional translations and implementations of the same are a prime example of these processes. Aside the

aims of decarbonisation, security of supply and an European energy union based on sustainable energy production, regional development through local green growth is a core aspect of most bioenergy policies and programmes. Still, hailed as a saviour of local countryside and their economic possibilities from one side, bioenergy development has become a contested process and multiple conflicts have materialized spanning from issues related to local implementation towards global debates, such as food vs. energy. The study connects these two interlinked processes of regional development and bioenergy conflicts by drawing on an conflict from German Bioenergy Region development and by presenting data from DEBEG bioenergy conflict database. First, it provides an overview on global conflicts, their causes and typologies and; second, displays a conflict that results from a bioenergy instrument that aims to facilitate regional development. Thus, the study presents the conflict potential of bioenergy development in general and highlights restrictions of bioenergy policies as a tool for regional development.

## **USTAINABLE DEVELOPMENT WITHIN THE FRAMEWORK OF THE CONCEPT OF HUMAN DEVELOPMENT OF UNDP**

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**Abstract.** *The concept of sustainable development is a modern model of the development of civilization, designed to ensure the survival of mankind and a decent level of quality of life for the present and, in particular, future generations, in the face of the global environmental and social problems that we face as a result of population growth, consumption, negative consequences of scientific and technological progress, poverty, inequality, poor quality of life, etc. The same problems are taken into account in the UNDP concept of human development. The authors of UNDP human development reports declare the need to incorporate the principles of sustainable development into the country development strategy, call for international cooperation to solve global problems, propose to introduce a single dashboard of sustainability indicators based on existing indicators, making adjustments to modern valuation methods. The report compares the concepts of sustainable and human development.*

**Keywords:** *human development, sustainable development, quality of life.*

## **BASIC CONCEPTS AND TOOLS OF GREEN MARKETING**

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**Abstract.** *The article describes the modern understanding of Green Marketing that considers the environmental aspects of production and consumption of the product throughout its life circle. To achieve the goals of Green Marketing, classical tools of traditional marketing (product-price-place-promotion) are proposed to be supplemented with specific, «green» (environmental policy tools, environmental certification, assessment of the ecological life cycle of products, extended producer responsibility, etc.).*

**Keywords:** *green marketing; ecological life cycle of products; environmental policy; extended producer responsibility.*

## **RIO DE JANEIRO'S CHARGE SYSTEM FOR BULK WATER USE AND THE HUMAN RIGHT TO WATER**

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**Abstract.** *This article focuses on the water charge experience in the Brazilian state of Rio de Janeiro. It discusses the environmental principles and the economical interests that underpin the charge for bulk water use, describing the legal nature, the purposes of this charge mechanism and its ability, as control and planning instrument incorporated in the Brazilian National Water Resources Policy, to guarantee the human right to water.*

**Keywords:** *water management; water resources, Human Right to water*

### 3. SECTION 2. SIMULATION OF PROCESSES IN ECOLOGICAL ECONOMIC SYSTEMS

#### LAND PRICING IN URBAN AREAS: THE INTEGRATION OF ENVIRONMENTAL FACTORS

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**Abstract.** *The work is devoted to assessing the role of the environmental factor in pricing in the land market of urbanized territories. The research of the ecological component of land value in Nizhny Novgorod was carried out on proposals for the sale in the urban area. Regression analysis was used to construct the model. The price of 100 square meters was chosen as a dependent variable. The availability of sewerage, the distance from the city center, the availability of schools and the level of air pollution were selected after an analysis of their correlation. The weight of the environmental factor in the model was 26.12%.*

**Keywords:** *land market; Ecological factor; Pricing*

#### PROBLEMS OF FORMATION AND DEVELOPMENT OF "GREEN" ECONOMY IN THE RECREATIONAL REGIONS OF THE RUSSIAN FEDERATION

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**Abstract.** *The author tested the key problems of ecological-economic development of recreational regions of Russia, identifies the main problem areas of environmental-economic development of the subregion resort - Caucasian Mineral Waters and proposes the author's vision of the ecologically sustainable development of these territories.*

**Keywords:** *sustainable development, green economy, recreational areas, the determinants of ecologically sustainable development.*

#### QUANTITATIVE ASSESSMENT OF CRITERIA FOR SELECTION OF ENVIRONMENTALLY ORIENTED INVESTMENT PROJECTS

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**Abstract.** *The report presents the results of applying multi-criteria analysis methods for the selection of environmentally oriented investment projects. The methods of pairwise comparisons, weighted sums, and analysis of hierarchies are considered. The most adequate method for*

*solving this problem is the hierarchy analysis method.*

**Keywords:** *Environmentally oriented investment projects; multicriterial analysis; hierarchy analysis method*

## **COMPLEX ASSESSMENT OF SUSTAINABLE DEVELOPMENT OF THE REGIONAL SOCIAL, ECOLOGICAL AND ECONOMIC SYSTEMS**

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**Abstract.** *Despite the fact that there are few studies dedicated to sustainable development of the ecological and economic systems for the Russian regions, all of them virtually don't concern the social sphere that is one of the competent parts of the famous triad of the theory of sustainable development. The paper is aimed to hold the complex assessment of the level of sustainable development of Russian regions using the widespread instruments such as the Genuine Progress Indicator (GPI), Ecologically Adjusted GRP, Genuine Savings etc. The GPI indicator will be used for the first time in Russian studies. Study has been financially supported by the Department of Humanities and Social Sciences of the Russian Foundation for Basic Research and Krasnoyarsk State Foundation to Support of Scientific and Technical Activities (projects no. 16-12-24015, 16-02-00127).*

**Keywords:** *regional economics, ecological economics, sustainable development, social, ecological and economic system, genuine savings, genuine progress indicator, ecologically adjusted gross regional product*

## **COMPLEX INFORMATION SYSTEM FOR THE ASSESSMENT OF REGIONAL DEMOGRAPHIC PROCESSES**

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**Abstract.** *Functional possibilities of an integrated information system for estimation of regional demographic trends in conjunction with social and economic processes are presented. The*

modules of rating ("quality of life in the region") and modeling of interrelations of the main indicators, including one by means of panel analysis, for output and data visualization are the basic program blocks of the system. The program is developed in the R language and is a flexible tool for the analysis of socio-economic and ecological status of the territory.

**Keywords:** demography, region, information system, modeling, quality of life.

## **METHODOLOGICAL APPROACH TO THE EVALUATION OF THE CAPACITY OF SUSTAINABLE DEVELOPMENT OF RURAL AREAS (ON THE KEMEROVO REGION EXAMPLE)**

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**Abstract.** The article proposes a methodological approach for the evaluation of the capacity of sustainable development of rural territories, based on models of resource optimization of production. On the Kemerovo region example there is considered an optimization model for target indicators for sustainable rural development to ensure food security in the region.

**Keywords:** the potential of agricultural production, resources, optimization model

## **SUSTAINABLE DEVELOPMENT MODELS OF TERRITORIES IN MINING TOWNS OF URAL**

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**Abstract.** Mining industrial complex has a negative impact on ecological status of the environment and development of territories. Open method of mining mineral deposits has more influence on environment and lands quality. Underground method of mineral deposits development poses a risk for subsequent land use. For sustainable development of territories in mining towns is necessary to plan the land usage considering the zones of influence of mining industrial complex facilities and develop regulations ensuring safety of life activities in this zones.

**Keywords:** sustainable development, mining industrial complex, planning, urban planning

## **MODERNIZATION OF RECLAMATION SYSTEMS AS A FACTOR OF SUSTAINABLE DEVELOPMENT OF AGRICULTURE OF RUSSIA**

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**Abstract.** The article proves the role of land reclamation systems modernization in farming stable development. Some recommendations on methodological approach in investment in the systems modernization were developed; these investments are essential for complex ecological, social and economic problems solution in farming.

**Keywords:** land reclamation system, modernization, agricultural landscape, "green" economic, external conditions, efficiency

## **ECOLOGICAL ASPECTS OF RUSSIAN REGIONS DEMOGRAPHICAL INDICATORS DYNAMICS**

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**Abstract.** The purpose of the work is to assess the dependence between demographic and environmental indicators in Russian regions. The research includes collection of the data on a number of demographic, socio-economic and environmental indicators for 76 regions of Russia for 2015; building and estimation of the regression model and spatial effects. According to the results, the deterioration of demographic indicators on average is caused by low quality of drinking and domestic use water and excess of pollutants MPC in the atmospheric air.

**Keywords:** demographic indicators; environmental indicators; Moran index

## **MATHEMATICAL TOOLS OF ESTIMATION OF ENVIRONMENTAL EFFICIENCY OF ENERGY-SAVING PROJECTS**

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**Abstract.** In work the tools of an assessment of impact of energy saving projects on the environment based on adaptation of model of interindustry balance for fuel and energy complex are offered. The specific carbon dioxide emissions coefficient with respect to the energy content reflects influence of branches of production on the environment and is the indicator of efficiency of introduction of ecological projects is entered. Computing of 22 aggregated branches of production are carried out for the actual economic data. It was demonstrated that the fuel-and-power sector have greatest action on the environmental load.

**Keywords:** Mathematical tools, environmental efficiency, the environment, emissions of carbon dioxide, input-output mode

## **SIMULATION OF INDICATORS FOR THE DIAGNOSTICS OF THE SUSTAINABILITY OF REGIONAL SOCIO-ECOLOGICAL AND ECONOMIC DEVELOPMENT**

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**Abstract.** Based on the analysis of existing methodological approaches to assessing the sustainability of regional development, it seems appropriate to develop a balanced system of a limited number of performance indicators for the characteristics of the economic, social and environmental component of the development of the region. As the assessment of the sustainability of the development of a regional system is usually carried out with the help of a sufficiently large set of indicators, the question of choosing and modeling these indicators remains relevant.

**Keywords:** simulation; sustainable development; indicator; region

## **ECOLOGY-ECONOMIC SYSTEMS WITH ASYMMETRIC AGENTS**

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**Abstract.** Discrete-time game-theoretic models related to a bioresource management problem (fishery) with asymmetric players are investigated. Players use different discount factors and have different (fixed or random) planning horizons. The main goal here is to construct the value function for the cooperative solution and to distribute the joint payoff among the players in the asymmetric cases. We propose to use the Nash bargaining solution to obtain cooperative profits and strategies.

**Keywords:** bioresource management problem; asymmetric players; Nash bargaining solution

## **ADOPTION OF OPERATIONAL DECISIONS IN THE TRANSITION TO THE PRINCIPLES OF THE CIRCULAR ECONOMY IN RUSSIAN INDUSTRY**

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**Abstract.** *The article analyzes the process of formation of circular economy and the corresponding to closed loop supply chains in the transition to a modern version of sustainable development and presents 1) the key elements of closed-loop product life cycle for the industrial sectors; 2) the principles of circular production and business models of companies focused on the transition from linear forms of business organization to the circular; 3) decision-making specifications for recovery operations, disposal of end-of-life products in order to reduce costs, improve resource and energy efficiency, and reduce waste.*

**Keywords:** *circular economy; reuse; remanufacturing; recycling*

## **MODELING OF THE INTEGRATED INDICATOR OF ESTIMATION OF SUSTAINABLE DEVELOPMENT OF THE REGION AND PRACTICE OF ITS APPLICATION**

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**Abstract.** *The article considers one of the ways to assess the sustainable development of the region, namely the algorithm for constructing and calculating its integral indicator. It is shown that the integral indicator is modeled by constructing socio-ecological and economic models in which the integral indicator is taken as an effective indicator, and the indicators of the state of the social, ecological and economic subsystems are considered as factor signs. The results of the assessment of the level of sustainable development are given on the example of the Republic of Karelia.*

**Keywords:** *sustainable development; assessment of sustainable development; ecological and economic modeling; integral indicator of sustainable development of the territory*

#### 4. SECTION 3. ECOLOGICAL ECONOMIC DEVELOPMENT PROBLEMS OF REGIONS AND SECTORS OF THE NATIONAL ECONOMY

##### PROSPECTS OF DEVELOPMENT OF ECOLOGICAL TOURISM IN ARKHANGELSK REGION

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**Abstract.** *In this article, the author examines issues related to the current state of ecotourism and the prospects for its development in the Arkhangelsk region. The region is located in three climatic zones (arctic, subarctic, temperate) and four natural zones (arctic deserts, tundra, forest-tundra and taiga), which determines the diversity of tourist resources. The region has a great potential for ecotourism development, but there are a number of restrictions and problems that hinder the more active development of ecotourism in the Arkhangelsk region. The objectives of this article were to identify the main problems and prospects for the development of ecotourism at the regional level.*

**Keywords:** *eco-tourism; regional economy; the green economy; protected areas; Arkhangelsk Region*

##### "GREEN" DEVELOPMENT OF RUSSIAN COASTAL TERRITORIES IN THE CONTEXT OF THE DEVELOPMENT OF THE ARCTIC

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**Abstract.** *Modern global environmental problems, such as climate change, soil degradation, natural disasters caused by these phenomena, lead to a negative transformation of the landscape, especially coastal areas. In recent years, the Russian Federation has adopted a number of fundamental documents regulating the functioning and development of coastal ecological and economic systems. Adoption of the Strategy for the development of the Arctic zone of the Russian Federation and ensuring national security for the period until 2020 has actualized the preservation of the potential of the northern coastal areas and natural resources of our country. In the world, more and more attention is paid to issues not only of sustainable development, but also of the green economy. Russia inevitably follows the world trends. Currently, the Arctic territories are actively developing due to industrial development, the creation of modern infrastructure, the introduction of innovations. However, there are a number of areas whose potential remains undisclosed. This is Arctic tourism, the introduction of renewable energy sources in local communities, the Northern Sea Route.*

**Key words:** *Arctic, coastal areas, "green" economy, sustainable development*

##### LANDSCAPE-BASED ZONING OF BOREAL REGIONS RELYING ON ECOLOGICAL AND BIOLOGICAL RESOURCE PARAMETERS AND PRIORITIZED USES OF NATURAL RESOURCES

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**Abstract.** The possibilities offered by the landscape-based system in zoning of boreal regions by ecological, bioresource and economic parameters are demonstrated. The effort was based on the results of nearly 40 years of basic research into the structure, spontaneous and anthropogenic dynamics of boreal ecosystems, as well as on the analysis of a vast pool of archival materials, official statistics, published sources, remote sensing data for the boreal zone of European Russia. Karelia was taken as the model area to demonstrate over 20 zoning approaches (based on timber stock, recreational value, prioritized forest uses, etc.). It has been discussed whether it is advisable and sufficient to use the catchment-based approach (as compared to landscape-based). The general principles of the system of ecological-landscape planning of multi-purpose forest use were formulated, and the historical land use scenarios (agrarian, forest industry, suburban, etc.) were taken into account. There are case studies to show how elements of this system can be integrated in nature management and conservation practices. The economic implications of forest use limitations have been analyzed. Speaking generally, such studies are pioneering, at least for the European part of the boreal zone.

**Keywords:** landscape, ecosystem services, biological resources, zoning, environmental management planning

## **METHODICAL BASES OF FORMATION OF THE TERRITORIAL BOUNDARIES OF THE COMPETITIVENESS OF PRODUCTS FROM MINING WASTE**

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**Annotation.** The expediency of differentiation when forming the territorial limits configuration competitiveness consumer costs generated from mining waste in accordance with the directions of their possible use. Research revealed the feasibility consideration of four types of territorial market, which may compete various types of products, which are created by mining waste: "direct", that is, the location of the waste; "adjacent"-bordering wastes; "regional"-within which are waste and "Federal". Correlation of competitiveness for 20 types of consumer costs established on the basis of mining wastes with configurations territorial markets.

**Keywords:** mining waste, use value, effectiveness evaluation, economic turnover, the border markets, typing territorial markets

## **GEOLOGICAL-ECOLOGICAL-SOCIAL AND ECONOMIC APPROACH TO THE DEVELOPMENT OF THE NATURAL RESOURCES POTENTIAL OF THE NORTHERN TERRITORIES**

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**Abstract.** The article substantiates the expediency of using the geological-ecological-social and economic approach formed when the social-economic and geological-ecological approaches are

converging, while developing the natural resources of the territory. We disclose the features of the proposed approach, its relationship with the theory of biotic regulation; the requirement to preserve intact natural ecosystems on a global scale; the need to ensure the harmonization of anthropogenic load with the ecological capacity of the biosphere; changing attitudes to ecosystem services. The paper forms a list of problems which require the priority solutions in order to strengthen the greening of project decisions related to the development of the natural potential of the northern territories.

**Keywords:** development, coherency, biotic regulation, preservation, prevention

## **ENVIRONMENTAL AND ECONOMIC PROBLEMS OF ACCIDENTS ON PIPELINES IN THE KHANTY-MANSIYSK AUTONOMOUS OKRUG – YUGRA**

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**Abstract.** In the Khanty-Mansi Autonomous Okrug subsoil was carried out on 519 sites of subsurface resources with a long-term licenses for geological survey, exploration and production of hydrocarbons. Accidents involving pipelines was 81 the subsoil, the environment has got a 2836 tons of oil products and formation water, disturbed 195 hectares of land.

**Keywords:** accidents involving pipelines; pollution; oil companies; the region's economy; Russia

## **ANALYSIS OF THE EFFICIENCY OF ENVIRONMENT PROTECTED MECHANISMS IN THE REGIONS OF CROSS-BORDER COOPERATION WITH CHINA**

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**Abstract.** Authors consider efficiency of present natural protected mechanisms in the regions of cross-border cooperation with China. We found that the volumes of the environmental pressure depend weakly on the factors considered and the most effective direction to the expenditure of finance is current expenditures on environmental protection. It is shown that the really environmental expenditures in fact lower than it seems because some of them are transaction costs arising from maintenance of fixed assets for environmental purpose.

**Keywords:** Environmental protection mechanism; transaction costs; the region; the environmental pressure

## **WORLD EXPERIENCE IN IMPROVING THE ENVIRONMENTAL SUSTAINABILITY OF THE COAL INDUSTRY**

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**Abstract.** *On the basis of studying the international experience of the closure of coal mines the main threats to the environment in the implementation of this process are given. The main technical directions of the greening of the coal industry abroad are described. The results of the study can be used to develop the system of measures for solving the problems of accumulated environmental damage in the territory of the Arctic zone of Russia as one of the largest countries-producers of mineral fuel in the world.*

**Keywords:** *the ecologization of the coal industry, the elimination of coal mine; world experience*

### **IMPROVEMENT OF THE METHODOLOGY OF SUSTAINABLE LAND USE ON INTENSIVE TERRITORIES**

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**Abstract .** *The paper analyzes the state of the problem of sustainable land use. The conceptual, ideological, political and economic levels of management of sustainable land use are proposed. Scientific and technological principles of sustainable land use on intensively developed territories are formulated, a scientifically substantiated variant of accounting for individual interests and public preferences in the sphere of land use is proposed.*

**Keywords:** *Sustainable land management and most efficient use; land resources; principles of sustainable land management and most efficient use*

### **ANALYSIS OF THE IMPACT OF PRODUCTION PROCESSES ON THE ENVIRONMENT DURING MINING OF ALLUVIAL DIAMONDS**

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**Abstract.** *The article deals with evaluation of the impact on the environment during the development of mineral resources in the Republic of Sakha (Yakutia). The impact of production processes on the environment is analyzed in conjunction with an assessment of the impact of the project on the ethno-social conditions of life and activities of the indigenous peoples of the North in project implementation on the territory of traditional nature use. The results of the joint evaluation of project impact on the environment and on ecological environment are considered in the system of measures for the calculation of compensation to the population in the area of conducting mining works.*

**Keywords:** *environmental economics; deposits of alluvial diamonds; the assessment of the impact on the environment; the ethnological project appraisal; indigenous peoples of the North;*

## PROBLEMS AND PROSPECTS OF ENVIRONMENTAL IMPROVEMENT OF THE SARATOV REGION'S APK SYSTEM

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**Abstract.** *The ecological problems of the Saratov region in various directions of the negative impact of the agro-industrial complex are considered. Priority areas are identified that require an early solution, in particular, restoration of soil fertility and littering of soils with agricultural waste. Particular attention is paid to the agrochemical characteristics of soils that affect the yield level, as well as proposals for restoration of soil fertility, taking into account a combination of both technological and economic approaches.*

**Keywords:** *Ecology, agro-industrial complex, fertility, waste, efficiency*

## MANAGE CONFLICTING INTERESTS OF STAKEHOLDERS IN THE DEVELOPMENT OF THE RECREATIONAL ZONES OF THE AZOV-BLACK SEA COAST

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**Abstract.** *Discusses the management and coordination of conflicting interests of stakeholders in the development of recreation areas on water bodies of the Azov-black sea Krasnodar region. Developing methods for marine environmental management in the system "land-sea". As regulatory tools in the resolution of conflict situations are encouraged to use economic assessment of the recreational potential of the coast through the application of geographic information systems, improvement of the procedure of holding auctions for the right of use of objects of the marine and natural resources.*

**Keywords:** *environmental management; conflicting interests; recreational areas; water bodies of the Azov-black sea coast*

## THE PROJECT APPROACH IN THE IMPLEMENTATION OF THE OBJECTIVES OF ELIMINATION OF ACCUMULATED ENVIRONMENTAL DAMAGE IN THE ARCTIC

## ZONE

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**Abstract.** Discusses the use of project approach in the implementation of tasks on elimination of accumulated environmental damage. Implementation of projects on elimination of damage associated with past economic and other activities in the Arctic zone of the Russian Federation is linked to the objectives of industrial development of territories of traditional nature use, including resource estimation and compensation of the caused harm to indigenous peoples of the North. The experience of the Republic of Sakha (Yakutia) for the implementation of the project approach in the environmental management for sustainable development of the Arctic.

**Keywords:** the elimination of accumulated environmental damage; the project approach; environmental management; Arctic

## COMPETITIVENESS OF THE TIMBER INDUSTRY OF RUSSIAN REGIONS

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**Abstract.** The paper is aimed at an analysis of current state of Russian timber industry sector at regional scale, clustering problem of Russian regions by the level of competitiveness and finding of new solutions for policy-makers under current macroeconomic conditions. The theory of revealed comparative advantages has been applied at regional scale for different product groups. The clusterization of Russian regions by their levels of competitiveness.

Study has been financially supported by the Department of Humanities and Social Sciences of the Russian Foundation for Basic Research and Krasnoyarsk State Foundation to Support of Scientific and Technical Activities (project no. 16-12-24001).

**Keywords:** regional economy; electric power; the green economy; power consumption; Russia

## PROBLEMS OF DEVELOPMENT AND MANAGEMENT OF THE ARCTIC ZONE OF THE RUSSIAN FEDERATION

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**Abstract.** The report discusses three problems - economic development, management, scientific support of socio-economic processes in the Arctic zone of the Russian Federation. The report convinces the fundamental nature of the problems of development and management of the Arctic and the relevance of the formation of new scientific ideas. Much of the report is devoted to discussing new requirements for scientific support of Arctic governance.

**Keywords:** Arctic zone of the Russian Federation; economic development; actual tasks; management

## **NORTH-WEST REGION OF RUSSIA: CRITERIA AND INDICATORS OF SUSTAINABLE DEVELOPMENT**

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**Abstract.** *The importance of using indicators of sustainable development for the regions is demonstrated. Based on Russian and global experience, indices of sustainable development are offered for the North-West region of Russia.*

**Keywords:** *indices of sustainable development; regional economy; economy of the region; adjusted net savings; UN Goals of sustainable development*

## **INTERSECTORAL INTERACTION IN IMPLEMENTATION OF EDUCATIONAL PROGRAMS FOR SUSTAINABLE REGIONAL DEVELOPMENT**

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**Abstract.** *The necessity of the changes in professional educational space, connected with changes in practice of business in transition to sustainable development and "green" economy, is proved. Experience of intersectoral interaction in creation of the network master program "Policy of Social Responsibility of Business and Sustainable Development of the Region" for the "Public and Municipal Administration" speciality in the Kuban State University is considered.*

**Keywords:** *intersectoral interaction, sustainable development, education*

## **EFFICIENCY FOREST GROWING COUNTRY**

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**Abstract.** *The article assesses the efficiency forestry in Russia. There is a steady picture, that in some forest regions, forest industry has a quite low budget efficiency. There is a large timber harvesting, but they have not deep processing enterprises on their territories. In fact, the forest industry in these regions is subsidized from the consolidated budget of Russia. Forest complex of Russia is in need of deep modernization, both in terms of technology and governance.*

**Keywords:** *forest exploitation; financial viability; forest resources*

## **BOUNDARY VILLAGES OF ARMENIA: KHOZNAWAR (NATURAL- GEOGRAPHICAL AND SOCIO-ECONOMIC FEATURES, PROBLEMS)**

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**Abstract.** *In this article are discussed one of the boundary villages of Armenia Khoznawar social-economical, natural-geographical. In this article are discussed the social-economical and natural-geographical features of one the boundary villages of Armenia Khoznawar emphasizing the most important problems.*

**Keywords:** *village, ecological tourism*

## 5. SECTION 4. «GREEN» ECONOMY AND ASPECTS OF ECOLOGICAL-ECONOMIC ASSESSMENT

### METHODICAL APPROACH TO THE ASSESSMENT OF DRINKING WATER AVAILABILITY AT THE REGION LEVEL

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**Abstract.** A set of indicators which was based on geographical, qualitative, organizational and technological, economic availability criteria is offered for an assessment of drinking water availability level. Approbation of the offered methodical approach has proved need to change of the "universal" mechanism to "responsible" water management complex model in territorial features.

**Keywords:** drinking water availability; assessment of drinking water availability level; methodical approach

### TOOLS FOR EVALUATION OF LOW-CARBON ECONOMY DEVELOPMENT: REGIONAL ASPECT

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**Abstract.** Although the notion "Low-carbon economy" is not used in official documents in Russia, the targets set by the country for the nearest 10-20 years are very similar to the ones of transition to low-carbon economy. It is reflected in the policy of resources usage and also in the available legal instruments. The article discusses a proprietary methodology of diagnostics of low-carbon emissions economy development in the region and reflects the evaluation of its results by the example of Sverdlovsk region.

**Keywords:** low-carbon economy; green economy; environment protection

### THE RELATIONSHIP OF CONSTRUCTION ACTIVITIES AND GREENHOUSE GAS EMISSIONS BASED ON THE MODEL OF THE FULL RESOURCE AND ENERGY CYCLE

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**Abstract.** The article analyzes the impact of construction activities on climate change. Factors

such interference with the climate system is the amount of construction, raw material consumption, material consumption, the volume of waste and greenhouse gas emissions. Analysis of the application in the construction of technology "through the resource cycle" allows you to define the biosphere extracted from raw mineral and energy resources and to evaluate the potential of energy and resource efficiency of production. It proposed to use the model of the "total resource cycle" for these purposes.

**Keywords:** greenhouse gases; construction activity; model of resource and energy cycle; environmental management; climate change

## **DETECTION OF ANTHROPOGENIC EFFECTS THROUGH THE LEVEL OF THE MATERIAL INTENSITY OF THE POWER INDUSTRY OF THE RUSSIAN ECONOMY**

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**Annotation.** The effect of the level of specific material intensity of the electric power industry on the environment is considered. To evaluate it, the criterion of the total MI (Material Input) is used, the analysis of the negative impact on the environment is carried out through the estimation of the specific emission of greenhouse gases. Data are obtained on the material intensity of the electric power industry in the regions of Russia. The analysis made it possible to identify the reasons for the high material intensity of the electric power industry in certain regions, to establish new patterns related to its impact on the environment.

**Keywords:** material intensity; greenhouse gases; electric power industry; environment; natural resources

## **ACCOUNTING PROBLEMS OF ECOSYSTEM SERVICES IN THE INDUSTRIAL REGION**

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**Abstract.** ecosystem services are considered as a vital element of the green economy. Describe the characteristics of ecosystem services. Analyzing factors, which are affecting on ecosystems in industrial regions.

**Keywords:** ecosystem services, ecology, environmental impact, industrial region

## **ENERGY AND CARBON INTENSITY AS STRATEGIC INDICATORS OF RUSSIAN REGIONS DEVELOPMENT**

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**Abstract.** In the article author analyzes modern challenges of energy and carbon intensity of Russian economy as a part of Paris agreement on climate change. The author underlines the importance of these objectives at regional level, identifies problems of variation in regional development in the sphere of energy intensity of economy and information lack about greenhouse

*gases emissions. The author defines the role of large cities in climate impact decrease and recommends measures for a strategy of low-carbon development.*

**Keywords:** *energy intensity, carbon intensity, strategy of low-carbon development*

## **PROSPECTS OF SOLAR ENERGY USING BY HOUSEHOLDS**

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**Abstract.** *The article considers the prospects for the use of alternative energy by households (in Zabaykalsky Krai). In the region an increasing of electricity production leads to the total and specific environmental pressure. The survey showed that the desire to use solar panels to households was expressed by 77% of respondents. The majority of those who are willing to buy them ready to do it at a price 10 times below market value. Also we analyzed the payback of PV systems depending from the members of households and state support.*

**Keywords:** *solar energy; the payback period; households; regional economy*

## **METHODICAL FRAMEWORK FOR ENVIRONMENTAL DAMAGE ASSESSMENT IN THE ARCTIC ZONE – CITY OF VORKUTA**

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**Annotation.** *The article is devoted to the assessment of environmental damage from industrial activities in Vorkuta. Authors identify shortcomings of the prevailing approach to the assessment of environmental damage, and propose a cumulative approach as a method for the comprehensive calculation of environmental, social damage and assessment of the health status of the population.*

**Keywords:** *Methodology of damage calculation, accumulated environmental damage, cumulative environmental impact, cumulative assessment method*

## **METHODOLOGICAL APPROACH TO ASSESS THE EFFECTIVENESS OF MEASURES FOR REDUCING GREENHOUSE GAS EMISSIONS IN RUSSIAN ELECTRIC POWER INDUSTRY**

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**Abstract.** Following article considers the principles of market implementation of trading GHG emissions allowances on the example of the European Union. The implementation of the national system for trading allowances is suggested on the example of electric power industry. Developed methodical approach allows predicting the price of CO<sub>2</sub> emissions in Russian electric power industry. The proposed technique is illustrated on a hypothetical example. Conclusions state the need of implementing national system for trading CO<sub>2</sub> emissions allowances in Russia, and the allowances cost estimation method is proposed.

**Keywords:** trade quotas on CO<sub>2</sub> emissions, the price of CO<sub>2</sub> quotas in the Russian power industry

## **ECONOMIC VALUATION OF WATER RESOURCES – ACTUAL DIRECTIONS OF IMPLEMENTING SINCE 2019**

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**Abstract.**

The paper addresses the actuality of monetary evaluation of water resources methodology development for statistical account, as it is established by law. The passage includes the results of research. The resource potential of water bodies is classified and methodological approaches of direct and indirect use of water resources are considered.

**Keywords:** economic value; monetary evaluation; the potential of water bodies; ecosystem services

## **IMPROVEMENT OF THE SLUDGE TREATMENT PROCESS**

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**Abstract.** Quality processing of industrial waste impacts on environmental safety. Sludge treatment is formed in each township. Dehydration and aeration are important for environmental and economic processes. In the scientific work an analysis of the impact was conducted by aeration and study of the flocculants influence on the sludge dewatering. The most effective aeration time is 60 min, optimal dose of flocculent is 3,3 kg/dry per ton.

**Keywords:** Sludge, compaction; dehydration; aeration; Russia

## ON THE PROBLEM OF GEOINFORMATION SUPPORT FOR ASSESSING THE FERTILITY OF AGRICULTURAL LAND IN THE SYSTEM OF ADAPTIVE LANDSCAPE AGRICULTURE

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**Abstract.** *Rational use of land is the main goal of land policy. Information support for such use is associated with land management and land monitoring, cadastre management, registration of legal rights. The most important characteristic of agricultural lands is fertility, which accumulates soil qualities, the influence of climate and technology. In this connection, the modern biomedical paradigm is discussed, which requires more valid tools for its monitoring, and in essence - special geoinformation support for the design, creation and monitoring of agro-landscape farming systems.*

**Keywords:** *soil, agricultural lands, biofarming, rational land use, geoinformational support.*

## METODOLOGY OF ECONOMIC VALUATION OF WATER RESOURCES FOR WATER MANAGEMENT PURPOSES

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**Abstract.** *The article deals with the problem of economic valuation of water resources for water management. To expand the range of management tasks performed with the application of valuation measures, a method of determining the total economic value of the resource potential of water bodies is proposed. The article describes an approach that takes into account characteristics of a water body. The article also gives the results of the valuation for the basins of the rivers Pechora, Don, Ob.*

**Keywords:** *water resources, valuation of water, economic valuation*

## REGIONAL ECOLOGICAL NETWORK AS A FACTOR OF NATURE PROTECTION'S

## EFFICIENCY

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**Abstract.** The structure of regional ecological framework demonstrates the degree of transformation of the territory by human activity, and can be considered as one of the indicators of nature protection's efficiency at the regional level. The article discusses the dependence of ecological framework's structure of the territory from the level of the human activity pressure, as well as the possibility to reduce the costs of restoring ecosystems and damage from anthropogenic impacts by optimizing the structure of the regional ecological framework.

**Keywords:** ecological framework; environmental costs; environmental damage; environmental management efficiency

## THE QUESTION OF THE MAINTENANCE OF THE STATE REGISTER OF OBJECTS OF ACCUMULATED ENVIRONMENTAL DAMAGE IN THE ENVIRONMENTAL MANAGEMENT

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**Abstract.** Discusses the methodological and practical issues of formation and maintaining the state Registers of objects of accumulated environmental damage in environmental management. A critical analysis of currently existing approaches for maintaining rosters, proposed by the Ministry of natural resources and ecology of the Russian Federation. To ensure that the information base of liquidation of accumulated environmental damage, the necessity of reference also Registry cleaned, ecologically rehabilitated areas and the register of enterprises, organizations performing works and services in the field of elimination of accumulated environmental damage.

**Keywords:** accumulated environmental damage, environmental management, Register of objects of accumulated environmental damage elimination, priority object

## THE EVALUATION OF ENERGY EFFICIENCY OF ECONOMY (AT THE MUNICIPALITIES OF THE KEMEROVO REGION EXAMPLE)

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**Abstract.** The article is devoted to the actual problem of energy efficiency of the Russian economy – a priority for sustainable development. Energy saving and energy efficiency of the economy has become the main direction for innovative development, integration into the international economic cooperation, reduce the negative impact on the environment and human health. Particular attention is paid to the problems arising in the implementation of energy efficiency programs at the municipal level.

**Keywords:** *energy efficiency of the economy; energy saving; the economy of municipalities*

## **COMPLEX ASSESSMENT OF LOCAL COMMUNITIES CAPACITY IN DEVELOPMENT OF "GREEN" ECONOMY: THEORY AND METHODOLOGY**

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**Abstract.** *Relevance of a research is defined by rather contradictory tendencies of the "green" economy development in local communities. The concept of "ecolocus" and "ecological identity of local communities" are determined, the classifications of ecolocus types based on a stage of their development and resource potential are developed. The main possible effects of ecological identity influence on economic behavior of individuals in local communities are diagnosed. Main "barriers" of "green" economy development on local level are highlighted, the possibilities of using method GAP-analysis in the analysis of the development potential of the green economy are shown..*

**Keywords:** *green economy; local communities, ecolocus, environmental identity*

## **RESOURCE AND ENERGY SAVING AS THE CONDITION FOR FORMING SUSTAINABLE PRODUCTION AND CONSUMPTION**

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**Abstract.** *The main approaches to the practical implementation of the provisions of the concept of sustainable development are considered; The interrelations of resource, energy saving and sustainable production and consumption are justified; Recommendations are formulated to reduce the resource and energy intensity of the economy as a condition for the formation of sustainable production and consumption.*

**Keywords:** *resource-saving; energy saving; sustainable production and consumption*

## **«GREEN» ECONOMY AS THE BASIS OF THE TRANSITION THE RUSSIAN AGRICULTURAL SECTOR TO A MODEL OF SUSTAINABLE DEVELOPMENT**

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**Abstract:** *Discusses the need for transition of the agricultural sector to the model of sustainable development based on the principles of "green economy". As a basic guideline it is proposed to use the Strategic framework of a green economy in the Pan-European region. The article deals with the problems of production and consumption of food, resulting in a decline in the quality of the population life and the deterioration of the environment. With the aim of achieving sustainable development the proposed conceptual framework of transition the agricultural*

*sector to a green economy.*

**Keywords:** *«green» economy; agricultural sector; sustainable development; food security; malnutrition*

## **6. SECTION 5. THE ENVIRONMENT, NATURE MANAGEMENT AND NEW ECONOMY OF KARELIA**

### **SUSTAINABLE TOURISM IN THE REGION: ECONOMIC, ECOLOGICAL AND SOCIAL ASPECTS**

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**Abstract.** *The concept of sustainable development in the projection on tourism at the regional level is discussed in the paper. Main economic, environmental and social aspects are formulated in the study.*

**Keywords:** *sustainable tourism; concept of sustainable development; tourism economics*

### **CONCEPT OF SUSTAINABLE DEVELOPMENT AND CONTEMPORARY PROBLEMS OF FOREST MANAGEMENT**

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**Abstract.** *The article reveals the issues related to the extension of the concept of sustainable development in modern economic systems. Approaches to the definition of this concept are considered. The processes of formation of institutes of sustainable development at the world and Russian level are described.*

**Keywords:** *the concept of sustainable development, sustainable forest management, ecologically sensitive markets, forest certification*

### **FORESTRY CERTIFICATION AS THE INSTITUTE FOR INTERACTION OF POWER, BUSINESS AND SOCIETY IN THE SOLUTION OF ECONOMIC PROBLEMS OF FORESTRY TERRITORIES**

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**Abstract.** *In the article the questions of ecologization of modern forest industry in the context of the formats of sustainable development and sustainable forest management are considered. The problems and perspectives of the development of the Forest Certification Institute in relation to the forest raw material region of the Russian Federation are analyzed. The necessity of creating a regional standard of forest certification for the Republic of Karelia is substantiated. The article was carried out within the framework of the state task of the Russian Academy of Sciences "The role of human capital: new economic theories - modern challenges" (0224-2015-0003).*

**Keywords:** *forestry, greening of forest industry, sustainable forest management, forest companies, regional forest certification standard*

## **DEMOGRAPHIC AND HEALTH CHARACTERISTICS OF THE DEVELOPMENT OF THE NORTHERN TERRITORIES (ON THE EXAMPLE OF THE REPUBLIC OF KARELIA AND FINLAND)**

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**Abstract.** *The Republic of Karelia and Finland are the Northern border areas, which are very similar to each other according to economic and geographical potential, however, socio-economic and demographic characteristics, and the quality of life of the population, there are significant differences. The purpose of this article is to evaluate the possibility of social innovation in the field of public health in neighboring Finland, including in the field of mental health (program to reduce suicide mortality, and "Schizophrenia") for the solution of medico-demographic problems in the Republic of Karelia.*

**Keywords:** *demography; region; health; modeling; quality of life*

## **ASSESSMENT OF EXPLOITATION OF NATURAL RESOURCES IN BORDER REGIONS (ON THE EXAMPLE OF RUSSIA AND FINLAND)**

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**Abstract.** *The main attention within this research is paid to the analysis of border territories of Russia and Finland. The research consists in carrying out the analysis and an assessment of a number of indicators on possible use of land of regions of various states, with different economic policy. Thus, the comparative analysis of border Russia of the territory and Finland will allow to reveal both specific, and similar features of economic and social development.*

**Keywords:** *region economy; border region; Russia; Finland; natural resources*

## **CONSEQUENCES OF GLOBAL CLIMATE CHANGE IMPACT ON SEASONAL TRANSPORT INFRASTRUCTURE IN THE REPUBLIC OF KARELIA: ISSUE DETERMINATION**

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**Abstract.** The use of seasonal transport infrastructure in the Republic of Karelia is typical for logging enterprises due to the natural features of the region and their specific features. The increase in the number of warm winters in the last 10 years reduced the maintenance time for snow-ice and ice roads, exacerbating the problem of transport accessibility of forest resources. The attempt to broaden the scope of assessing the impact on the Russian economy by including in it the problems of operations of seasonal snow-ice roads is made in this paper.

**Keywords:** Snowroads; logging; climatechange; The Republic of Karelia

## SYSTEMATIZATION OF ENVIRONMENTAL RISK FACTORS IN THE REPUBLIC OF KARELIA

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**Abstract.** The research in the field of systematization of environmental risk factors in the Republic of Karelia has been continued. The known published by different authors and new data, characterizing risk factors of natural and anthropogenic origin, are given.

**Keywords:** environmentalrisk;lithosphere;classification

## MODERN TECHNOLOGIES OF ENVIRONMENTAL MONITORING

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**Abstract.** The newest technologies of ecological monitoring are considered. The use of unmanned aerial vehicles (UAVs), remote sensing devices and public control with the use of crowdsourcing along with wireless communication and data centers (DPCs) allows the creation of a system of continuous monitoring of the regional environment, the cost of which is significantly lower than traditional methods.

**Keywords:** Ecological monitoring; unmanned aerial vehicles;remote sensing; crowdsourcing;human capital

## A RESEARCH ON THE EFFECT OF THE FISHERIES CLUSTER ON THE ECOLOGICAL SECURITY OF THE REGION

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**Abstract.** Commercial fishing activity leads to negative and often irreversible transformation of aquatic ecosystems. Accordingly, the ecological security of the region is disrupted, economic risks of fish farms increase. The creation and development of the fisheries cluster is seen as a solution to the above problems. The authors analyze the main negative factors and propose a set of actions to eliminate them with assessment of economic efficiency and possibilities of practical implementation.

**Keywords:** fish farming; eutrophication; waste management; economic efficiency; the Republic of Karelia

### **FEATURES OF DEPRESSIVE DISORDERS AND THE BIPOLAR SPECTRUM IN THE NORTHERN REGION (THE ROLE OF A SEASONALITY)**

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**Abstract.** The article evaluated clinical and psychological characteristics of mood disorders depressive and bipolar spectrum. A sample of patients of the Republican psychiatric hospital (50 patients aged from 18 to 60 years) was considered as the material of the study. We implemented the following methods of analysis: the research map, questionnaire hypomania (HCL-32), rating anxiety scale of the Hamilton, Beck depression scale (BDI), the collected database. The study was able to identify the role of seasonality and important characteristics of the seasonal pattern in patients with disorders of the affective sphere.

**Keywords:** clinical and psychological features; seasonality; trigger; bipolar spectrum disorder; depression

### **ENVIRONMENTAL FINANCING IN ECONOMIC CRISIS CONDITIONS (THE CASE OF THE REPUBLIC OF KARELIA)**

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**Abstract.** The article is devoted to the problems of impact of economic development on the environment and environmental financing. Trends in the relationship of basic economic and environmental performance and financing of environmental protection in the Republic of Karelia are analyzed. The key challenges of impact of economic crisis on the environment are highlighted. Particular emphasis is placed on the targeted use of fees for the negative impact on the environment.

**Keywords:** environmental pollution; payment for environmental pollution; investment in environmental protection; Republic of Karelia