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ECOLOGICAL SUPERPROFIT MANAGEMENT IN SUBSOIL USE

Introduction

Development of the concept of waste generation and disposal in the Arctic and other areas of the Russian Federation on the basis of regulation of ecological rent is of the current concern and federal significance. The implementation of this concept has a particular importance in the coastal and Arctic zones with low population density and lack of the developed infrastructure. The fundamental scientific problem to be solved within this research is: development of conceptual provisions and methodology of estimation of ecological rent on the basis of waste flow optimization system with regard to high risk level. The analysis of information sources in this area shows that solutions to the waste management problems lie in the sphere of control over environmental safety, efficient use of natural resources, resource saving, technological development, risks and investment processes [1–9].

Although plenty, the publications devoted to the problems connected with environmental-focused development and waste management unsatisfactorily account for the current tendencies toward modernization and criminalization of the production and utilization waste handling in the regions and large cities of Russia, Ukraine and outer formerly Soviet countries. The factors of the control and monopolization relaxation, as well as prevalence of private companies in the waste management system in Russian cities are neglected. The regional ecological-economic and social features and the pollution consequences are taken into account incompletely. The modern economic literature fails to offer an accurate economic mechanism of the ecological rent, or its estimation methodology though questions of the ecological rent theory are being discussed [10–12] etc. There is no reason to spotlight the world leaders in the basic research in this area as the methodology of the ecological rent estimation yet remains to be developed.

The purpose of this study is shaping of the concept for waste recycling and disposal in the Arctic and other high-risk areas based on the ecological rent regulation.

For the first time, a geoeconomic concept is developed for generation, disposal and minimization of waste in the Arctic and other high-risk environmental management areas based on the ecological rent regulation, which is highly relevant and has regional, federal and international significance. On the basis of the recycling experience gained by industrial plants in the Onega, Ustyansky and other districts of the Arkhangelsk Region, recommendations are made for the marketable production using waste of the timber industry. The mining waste optimization model is considered within the framework of optimized reduction of overburden dumping. The model uses laser monitoring, slope optimization and reinforcement of pitwall rock mass in the Lomonosov diamond deposit, Severalmaz. The theoretical significance of the concept and its novelty are defined by the developed classification of ecological rent. The estimation methodology of ecological rent systematically combines standardization, analysis, comparison as well as economic and mathematical modeling. The practical significance is determined by the possibility of forming a regional strategy of waste and environmental impact minimization. The strategy is based on the noospheric scientific vision, rental approach, as well as on classification and estimation methodology of the ecological rent. Management of the rent, as well as socio-economic and environmental processes is proposed to implement using the experience of the Alaska Permanent Fund of the United States and the Government Pension Fund of Norway.

Keywords: strategic management, Arctic, ecological rent, assessment methodology, risk, low-waste technologies.

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Waste generation and ecological rent analysis

During the research based on the strategic analysis of the geo-economics system, the chain loops of the ecological rent and other kinds of super profit were determined. The super profit is made from the destruction and pollution of the natural environment and the customary way of life of people in the Russian Federation, and from the depopulation in the form of abnormal outbreaks of mortality from the future uncertainty, or oncological, cardiovascular and other diseases.

The mechanism of geopolitics of restraint and restrictions is the geoeconomic model of formation and unfair distribution of the natural rent. In this global rent model, waste and garbage are the final elements of formation, withholding and pocketing of the ecological rent as the superprofit. As a result, possessing the inexhaustible natural capital, Russian Federation only takes the 50th place by the human development index of the United Nations.

Ecological superprofits

The integrated oil-and-gas companies use natural resources of the subsoil while withholding the mining and

Table. Classification of ecological rent by the source criterion*

Type	Class	Kind	Sub-kind	Sort
Economic	Ecological	Industrial	Mining and concentrating	Dumping
			Mining and metallurgical	Tailing storage
		Agricultural	Oil-and-gas	Gas piping
			Coal	Oil loading
			Petrochemical	Gas by-products
				Dirt piles
				Mine water
				Chemical
		Communal	Animal production	Manure gasses
			Machines and tractors	Oil products
Building	Household Public catering Office	Paper		
		Glass		
		Aluminum		
Building	Civil engineering	Plastic		
		Large-sized		
		Light-bulb		
Building	Industrial construction	Sewage		
		Reconstruction		
		New building		
Building	Special construction	Demolitions		
		Limbs and fur needles		
		Bark and sawdust		
Timber industry	Lumber harvest			
	Wood processing			
Transport	Cargo	Petrochemical		
	Passenger	Trash		
Power generation	Coal-driven	Slag		
	Nuclear-driven	Radioactive		
	Oil fuel-driven	Gas and smoke		
Military	Army	Military technical		
	Aviation	Fuel		
	Naval	Water pollution		

*Developed by E. Yu. Savel'eva based on observations as expansion of the rent classification by Yu. V. Razovskiy

oil-and-gas rent. Extracted hydrocarbons are processed at the petrochemical plants producing packing tissue used by the transnational companies engaged in the packing production. Polyethylene packages and other kinds of packing are produced in large quantities at rather low cost. Their competitive consumer properties, advertising and a great demand allow them to be on sale together with the goods of high added value along the chain from a manufacturer of the goods up to a retail shop. As a result, the networks of wholesale and retail trade generate a considerable trading rent.

Getting in household waste, packing continues to form superprofit as waste carriage-out and disposal is to be paid for. The use of land areas for waste storage generates the absolute spatial and differential land rent. The low cost of waste storage (without protection, treatment, sorting and processing) forms the ecological rent. The great demand for waste disposal and the significant ecological superprofit allows shaping an indivisible legal, shadow, corruption and criminal "garbage" economy. It pollutes the environment, destroys the landscapes and habitual life of people, and generates the ecological and criminal rent.

Additional formation of a superprofit can occur from extraction of sand, clay, break stone and other widespread

minerals of local and regional value, as well as from subsequent accommodation of waste in mined-out open pits. Later on, when surface mines are filled with waste, after earth backing, partial drainage of landfill gases and cosmetic pseudo remediation, it is possible to build and sell residential and industrial buildings on these sites and nearby.

Thus, various types of rents make a flow of incomes partly used for the convenience of the regional and municipal bodies (deduction in the related budgets), or control organs (fines). A part of the superprofit is taken by shadow structures (bribe) and organized criminal groupings (corruption) for generation of cash flows, their legalization and export of money abroad, in conformity with the geoeconomic model of the superprofit withholding from economy of the Russian Federation in favor of the transnational companies and western countries. The waste flow forms the concentrated sources of man-made accidents, as well as water, ground and air pollution sites. They create the basis for the depopulation down to a target level of the geopolitical doctrine implemented by the Western world.

Ecological rent and waste flow management

Based on the natural rent classification, the ecological rent is classified by the common criterion of source (see the **table**). The ecological rent is divided into basic kinds: industrial/ agricultural/ municipal and sorts: solid/ liquid and gaseous. The classification of the ecological rent allows revealing and differentiating the superprofit, and creates a scientific framework for the regulation of the rent relations.

The ecological rent is an additional differential income that arises as a result of cost saving by business management according to current regulations. The ecological rent is divided into solid, liquid and gaseous waste. The methodology of the ecological rent estimation is based on identifying the difference between the production cost, including recycling and disposal of waste given adherence to environmental standards, and the actual expenses of a company at the current level of compliance with environmental regulations and rules. The estimated cost difference between the actual superprofit of the company and the standard profit with regard to risk factors generates the ecological rent. The standard profit evaluation methodology based on the capitalization of the financial capital and risk factors is described in [10, 11, 13] etc. The ecological differential rent is defined as the superprofit balance after deduction of all other kinds of the rent.

The classification and estimation methodology of the ecological superprofit will help shape a framework for the principles of economic policy and ecological rent management strategy, reveal the influence of the environmental pollution due to industrial waste on economic efficiency of production, formulate principles of waste-free production and non-waste households, as well as suggest an optimized circuit for accumulation, flow and storage of municipal solid waste. The environmental policy is based on the stimulation system of low-waste and non-waste technologies for mineral mining, production of commodities, trade and household. The waste management strategy rests upon the concept of waste minimization and scientifically validated collection of a part of the ecological rent to a special regional fund by analogy with the Alaska Permanent

Fund, USA. Another part of the ecological rent can be used by a business company for the technological innovations in deep processing of waste.

The fundamental scientific vision and truth reflects the direct correlation dependence: minimization of waste by means of the ecological or other rent remaining at the disposal of a company results in the minimization of ecological, demographic, economic and social damage and risk. If there is no economic stimulus to make expendable inorganic packing, a wasteless packing would be produced. If there is no waste and no waste storage rent, hence, there will be no garbage dumps or waste storages. If there are no landfills and dumps, there will be no corruption, or environmental and demographic problems.

Mining waste management

At the Lomonosov diamond deposit in the Arkhangel'sk Region, since 2004, remote monitoring of the area of 100 km² is carried out using high-resolution satellite imagery. The total cost of sold products, works and services of Severalmaz PJSC in 2016 amounted to 5,5 billion rubles. The financial result (profit) amounted to 476,0 million rubles. The issues connected with environmental protection in 2016 required financing in the amount of 13,1 million rubles, which made only 0.2% of the annual expenditures of the company. This allows collecting the ecological rent. The payment for the environmental impact (fee for emissions, discharges and waste disposal) in 2016 amounted to 8,86 million rubles. The main component in the payment (83% of the total amount) was the dumping fee (waste of hazard class 5) [14].

To reduce the volume of overburden rocks, the design decisions should be adjusted by increasing the ultimate pitwall slope angle by 1–3 degrees. This will essentially reduce the overburden volume and the dumping site area, will increase efficiency of diamond production and will abate the environmental impact. The volume of mined rocks in 2016 totaled 14,884 Mm³. According to expert estimates, it can be cut down by 1,041 Mm³.

By expert estimates, at the standard environmental expenditures of 2%, the expenses should be 110 million rubles per year. Given the actual expenses of 13,1 million rubles, the ecological rent will be 96,9 million rubles.

Conclusion

For the first time, for the solution of the waste management problem, the interdisciplinary approach including the fundamental provisions of the theory of natural and ecological rent, its classification and estimation methodology has been applied.

The classification of the ecological rent and its estimation methodology allow shaping the scientific framework and concept for the economic policy and management strategy for flows of waste and income—the ecological rent.

The mining waste reduction model constructed for the open pit diamond mine can be improved by the decrease in the overburden dumping volume and by the optimization of the stripping ratio as a result of the higher angle of the ultimate pitwall slope, with reinforcement and laser monitoring of the pitwalls towards safe mining.

A part of the ecological rent calculated based on the proposed classification and estimation methodology should be transferred to a regional extra-budgetary fund on the model of the Alaska Permanent Fund, USA.

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