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DEVELOPMENTAL FEATURES OF NON-URBAN AREAS USING LOCAL PEAT RESOURCES IN A SUSTAINABLE WAY

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Abstract

The purpose of the study: The purpose of the study is to assess the regional potential of the territory enriched with peat resources and to develop strategic directions and mechanisms aimed at its further sustainable and competitive development.

The methodology: Methodology is based on a systematic analysis of socio-economic processes, the use of monographic studies, the use of abstract-logical, economic-statistical, computational-constructive, and expert research methods. The object of the research is the production and social infrastructure of out-of-town territories. The subject of the research is to identify patterns, trends, and features of the formation and functioning of the industrial and social infrastructure of the out-of-town territory.

Main findings: The use of new technological processes and equipment for the processing of peat and mineral raw materials was substantiated scientifically to obtain new composite materials for multipurpose applications. The features of the use of local peat resources in ensuring the development of out-of-town territories were investigated based on a set of scientific approaches. The feasibility and effectiveness of the application of project management for the natural and technogenic complex to ensure multi-criteria optimization of the production and social infrastructure were established.

Applications of this study: The results of this study were tested and implemented within the territory of the Khanty-Mansiysk Autonomous Okrug-Yugra, which made it possible to develop a strategy for the development of a cluster-type okrug and increase the efficiency of using local peat resources of extra-urban areas.

The novelty (originality) of this study lies in the fact that the conducted research enabled to identify new features of the use of local peat resources in ensuring sustainable development of out-of-town territories, and to develop a strategy of socio-economic development adequate to new challenges of the external environment.

Keywords: *Region, Spatial Development, New Challenges, Strategic Planning, Non-Urban Area, Peat.*

INTRODUCTION

Currently, there is an outflow of qualified personnel and rural youth from the out-of-city territories of the Russian Federation to urban agglomerations due to the lack of comfortable housing and decent wages. In these territories, there are not enough jobs that meet the needs of young people, as well as there are no effective organizational and economic mechanisms aimed at the rational use of local renewable natural resources, including peat.

The purpose of the study is to assess the regional potential of a territory enriched with peat resources, to develop priority strategic directions and mechanisms aimed at its sustainable and competitive development, including increasing the attractiveness of a non-urban area for young professionals through the creation of cluster settlements.

The relevance of the study is determined by the lack of a holistic methodology for the rational use and reproduction of peat, agricultural, and bioenergy resources, the imperfection of the organizational and economic mechanism for the development of digital technologies in industries, and the regional agro-industrial complex, as well as mechanisms and tools for effectively solving problems and tasks associated with the optimization of production and social infrastructure.

The widespread distribution of peat fields and their territorial proximity to man-made formations make it possible to solve the problem of recycling of industrial and agricultural production wastes by their joint processing, as well as to provide the territories with cheap and effective types of fuel, fertilizers, construction materials, and other peat composite products. Peat is a natural resource that can be renewed under appropriate conditions. The annual growth of peat reserves in the peat bogs of Russia is estimated to be 250 million tons (at a moisture content of 40%). Energy reserves of peat representing 68.3 billion tons of reference fuel exceed oil and gas reserves and are second only to coal. Natural gas and oil reserves are limited, and today there is a trend of the instability of prices for these energy resources. An important aspect of the development of peat deposits should be effective, innovative peat extraction technologies for each specific deposit, which are determined by the balance and stability of natural ecosystems. Such technologies should be biosphere-compatible, environmentally friendly, and based solely on the principles of resource conservation. They provide the maximum economic benefit from the use of the material stock of a mineral substance while strictly limiting the negative impact on other components of the environment. The trend of the economy and economic science development includes the processes of digitalization of industrial sectors and economic operators, spatial, scientific, and technological development of Russia, strategic planning and project management, as demonstrated in papers (Kislitsky, 2018; Semin,

2019) and the project of the draft concept as well as in the strategy. The state's economic and social policy makes it possible to confront new "Big Grand Challenges", including human pressure on the natural environment, new demographic and epidemiological transitions, social stratification, migration, and regional conflicts, as well as other challenges. The "Big Grand Challenges" are complemented by national challenges to the spatial development of the Russian Federation. These include an unprecedented centripetal vector (gradient), the unfavorable geopolitical situation in the world, the insufficient infrastructure of the country, extraordinary unification of norms and rules of the country's spatial organization, and insufficient elaboration of the spatial package of the Federal legislation. There are major shifts in the spatial structure of the entire settlement system of Russia, which is characterized by increased polarization and spatial non-uniformity of the settlement.

Research Gap and objective of the study

The inertial development of the settlement system is unacceptable because the consequences of the inertial forecast implementation may become critical for the sustainable socio-economic development of Russia, leading to the large-scale demographic "desertification" of the country. In this regard, the creation of modern cluster settlements in this type of territory - agro-cluster, agro-bio-energy cluster, ecovillages of the "Heliopolis" type is of great importance in this regard, and first of all, to retain qualified personnel and young specialists. Their creation and development increase the competitiveness and attractiveness of the territory, which is especially important in the context of the implementation of the strategy of the spatial development of Russia. So the author aimed to assess the regional potential of the territory enriched with peat resources and to develop strategic directions and mechanisms aimed at its further sustainable and competitive development.

LITERATURE REVIEW

The results of comprehensive studies (Alexandrov & Egoshina, 2016a, 2016b; Gamayunov et al., 1999; Kosov, 1991; Misnikov et al., 2015) have created the scientific basis for the integrated environmentally friendly use of peat and peat deposits. Nowadays, a large number of effective methods and technologies for processing peat and various wastes have been scientifically substantiated, developed, and passed practical testing, a scientific and technical groundwork, and practical prerequisites have been created to increase the volume of output and expand the range of peat composite products and the scope of their use, for example, peat sorbents for cleaning wastewater (Kosov, 1991), products based on granular peat, including for household purposes (Gamayunov et al., 1999), products of deep peat processing to obtain fire extinguishing powders and peat additives for hydrophobic modification of gypsum binders (Misnikov et al., 2015).

The system of production and consumption of multicomplex peat products is a composite and a complicated system, which is usually characterized using the methodology of systems analysis. Until recently, there is no unity in the definition of the Concept of "system". So, the founder of the theory of systems, von Bertalanffy (2017), defines a system as a complex of interacting elements or as a set of elements that are in certain relationships with each other and with the environment. Hall (1975) defines a system through the Concept of a set of objects, together with connections between objects and between their attributes. Mesarovich and Takaraha (1978) believe that the system is "a formal relationship between the observed features and properties". Ostreykovsky (1997), summarizing a large number of options for defining a system, offers the following as a “working” definition of the Concept of a system: a system is a set of elements that are in relationships and connections with each other, which form certain integrity, unity.

Having being analyzed a range of scientific sources devoted to the extraction and use of peat, one can state the presence of interdisciplinarity, which makes it possible to review the literature and the current state of research based on the method of complex scientific and methodological assessment (Kislitsky, 2018), which implies the allocation of various aspects in the object of research, each of which forms a scientific approach. Systems analysis is the foundation of the systems approach. System analysis also has several interpretations. In some sources, "systems analysis" is defined as "the application of system concepts to management functions related to planning." In others - as a synonym for the term "systems analysis" (Kveid, E.) or the term "systems research" (S. Young), in the third as a methodology for research of purposeful systems (Shier, 2008).

The Merriam-Webster Dictionary defines systems analysis as "the process of studying a procedure or business to define its goals and objectives and create systems that will effectively implement them." Another point of view, presented by the authors of the book "System Analysis and Design for the Global Enterprise" (Bentley & Whitten, 2006), considers systems analysis as a method of problem-solving that breaks the system into its parts to study how well these building blocks work and interact to achieve their goal. Thus, the action of system analysis is aimed at researching operations to improve work efficiency (Moiseev, 1981).

According to the criteria of the model of sustainable environmentally friendly industrial development - Ecologically Sustainable Industrial Development (ESID), it is necessary to optimize the use of natural resources (Kopanitsa et al., 2015). With the course of historical time, when obtaining useful products from natural systems, specific energy costs increase, the use of natural resources becomes less and less accessible and requires an increase in labor and energy costs for their extraction, transportation, and, if possible, for their reproduction (de Jong & Stremke, 2020). The application of the methods of system analysis provides for the interrelated solution to these problems.

It is interesting to use a systematic approach to modeling the production and consumption of peat products (Semin et al., 2017).

The sectoral approach is implemented in the works of scientists, considering the technical and technological aspects of peat extraction and processing. Of interest are the issues of methodology for assessing peat reserves (Alexandrov & Egoshina, 2016a, 2016b), development of a technology for extrusion *briquetting* of peat and technogenic raw materials (Gorbunov, 2013), substantiation of energy technology methods for ensuring a given quality of peat composite materials (Grevtsev et al., 2010), peat extraction technology using agricultural machinery (Stolbikova et al., 2015), studies of wastewater treatment from heavy metal ions using modifications of peat sorbents (Kosov & Bazhenova, 2001), studies of the effectiveness of a new organometal fertilizer for increasing the fertility of degraded soils (Yashin et al., 2015), bioremediation of soils contaminated with oil products using carbonate sapropel and a biological product "Naftoks" (Ilyinsky et al., 2016), the prospects for using formed peat substrates in crop production (Grevtsev et al., 2017).

The theoretical provisions of the sectoral approach to the consideration of the peat industry are summarized in the works devoted to the scientific foundations of the technology of peat composite materials (Grevtsev, 1998), systemic principles of the development of resource-saving technologies in peat production (Kosov, 1991). Plakitkina and Apukhtin (2011) analyzed the development of the peat industry in Russia and the world in the period from 2000 to 2009, which made it possible not only to clarify and state the problems existing in the peat mining and processing industry but also to determine a range of long-term trends.

The study of the institutional framework for the extraction and use of peat, revealing the institutional approach, and describing the framework of regulation, was investigated in the aspect of Russian jurisdiction (Galinovskaya & Khludeneva, 2012). Their brief institutional analysis of the functioning of the peat industry in Russia revealed many formal and informal “failures”. An important component of the institutional approach is the theory and methodology of the systemic socio-economic development of single-industry territories based on institutional renewal (Pyankova, 2015). The results of scientific research related to the use of peat are introduced into practice through a system of recommendatory and mandatory requirements for production (*GOST R 54097-2010*, 2010). A separate aspect that stands out in the analyzed volume of research is the energy approach, which considers peat as a fuel - a source of energy resources.

Within the framework of the energy approach, it is interesting to consider the method of end-to-end energy-ecological analysis of energy-intensive technological objects (Lisienko et al., 1999), the development of algorithms and models for the energy-ecological analysis of technological processes, and the assessment of energy costs using the example of metallurgical technologies (Druzhinina, 1998), analysis of world energy resources (“Peat for fuel,” 2014), technological substantiation of energy-efficient production and use of peat fuel (Sorokin, 2015; Ermolaev et al., 2019).

The spatial approach is revealed through the analysis of the problems of using peat deposits located near large settlements (Savin, 2013; Nikitina, 2017), methods, and directions for solving the problem of using peat as a renewable local energy resource in the region (Karavajkov et al., 2012), the study of the integrated control system when carrying out measures for the rehabilitation of technologically contaminated lands (Ilyinsky et al., 2015).

A popular approach to addressing the development of peat deposits and the relationship of peat production to rural areas is the cluster approach. Within the framework of the cluster approach, the researchers considered aspects of the use of cluster and foresight technologies in the development of strategies for the sustainable development of rural areas of the region (Semin et al., 2020), socio-economic development of the region (Chernyavsky, 2010; Kulpina et al., 2020), territorial development of the region in terms of project management and cluster economy (Semin, 2019), the cluster form of the network organization of the Russian economy as an innovative direction of its development (Postaljuk, 2013), the formation of a system of clusters as a priority direction of innovative development region (Prokopyev, 2013).

Within the framework of the ecological approach, the issues related to the justification of the use of a fertilizer-reclamation mixture based on peat and sapropel to increase the fertility of degraded soils were considered (Kireicheva et al., 2016), the choice of environmentally compatible technologies for the development of peat deposits (Kashinskaya et al., 2011).

RESEARCH METHODS

The purpose of the study is revealed through the use of scientific methods and approaches that are typical for solving all the designated tasks.

These approaches include a systematic approach, which is used in the context of research to consider various aspects, mechanisms, and tools as a system of elements, ensuring the achievement of the research goal. An integrated approach satisfies the need for the formation of a single system as a complex of independent subsystems that require taking into account their influence and synchronizing their functioning. An epidemiological approach takes into account the conditions for the development and frequency of occurrence of pandemics. A sectoral approach considers the object of research within the industry, enabling to identify the features, unique properties of the subject and object of the research. And a synergistic approach helps determine the increase in the effect of cooperation. Solving the research problems

requires the application of the following scientific approaches: the structural approach that is based on the analysis of the structural object of the research and its structural changes – shifts. A theoretical and methodological approach is necessary, in general, to provide a theoretical basis for the research and, in particular, to improve the theory of the functioning of the cluster and agro-cluster structures. A regulatory approach is applied to analyze the directions, mechanisms, and instruments of regulation. An adaptive approach assumes the allocation of directions, forms, mechanisms, and tools for responding to changes in the studied object of the research. A spatial approach considers the object and research results in relation to the territory; within the context of this study, the regional aspect is an important part of the implementation of this approach. A component-based approach assumes the allocation of the main components in the various processes and mechanisms under consideration, which is implemented in the allocation of the components of the regional cluster economy development. A risk-based approach involves considering the object and subject of the research through the risks or their system. A cooperative approach is revealed through the consideration of economic relations through the meaningful norms of the cooperation and integration functioning. A digital approach is implemented through an analysis of the application and possibilities of using digital technologies within the framework of the topic under consideration. In the presented study, the application of this approach is necessary to identify the digital products used, platforms for the functioning of the regional cluster economy, integrated structures, and cooperative organizations. An institutional approach involves the analysis of the rules for the functioning of formal and informal institutions (interaction practices); within the framework of our study, the application of this approach is required to develop new regulatory norms and improve the existing ones.

When conducting the research, the following were used as general scientific methods: monographic, economic-statistical and abstract-logical methods, and others. One of the key research methods was the method of comprehensive scientific and methodological assessment of socio-economic relations in the development of management decisions.

Through the adaptive approach, it was found that the power supply system of the region is inherently adaptive, the capacity of which at each current moment must correspond to the needs not only in the whole region but also in each settlement or enterprise ... The resource approach was applied to assess the territory's capabilities to reduce the consumption of non-renewable fuel and energy resources and switch to the use of peat, the extraction of which is characterized by a relatively low labor and energy intensity. An ecological approach was necessary when studying the reduction of the environmental load from the activities of the fuel and energy complex since peat is characterized by a low content of sulfur and ash, which ensures a low level of harmful emissions during its combustion. The marketing approach was used to study the export opportunities of the studied territory and its natural resources, in particular peat deposits. The assessment of the financial resources of the leading companies in the region was carried out, the management of which is ready to invest in the development of agricultural infrastructure and landscape architecture free funds from the export of oil and gas. The energy approach was used in the study of effective schemes that make it possible to significantly expand the areas of use of peat fuel.

RESEARCH FINDINGS

Responses to challenges and threats are developed and introduced based on strategic planning documents. In the considered Khanty-Mansiysk Autonomous Okrug – Yugra, as a geographical and administrative-territorial object, the Concept of cluster development is used in strategic planning according to papers (Zharkova, 2011; Prokopyev, 2013; Pyankova, 2015; Semin, 2019).

Many researchers, including the famous American economist Michael Porter who is the founder of the cluster theory which, by the way, began comparatively not long ago, namely in 1990, believe that clusters are very effective and can implement various innovative projects and scientific and technological achievements in a shorter time. We also share their positions.

A cluster (according to Porter) is a group of geographically localized companies, suppliers of equipment, components, specialized services, infrastructure, research institutes, universities, and other organizations that complement each other and enhance the competitive advantages of individual companies and the cluster as a whole, as is proven in Porter's monograph (2005).

Cluster generation can be divided into five models, according to paper (Postaljuk, 2013): Italian with a large number of small enterprises united in various associations to improve their competitiveness; Japanese with a leading firm with a large scale production; Finnish with a high level of innovation, supported by strong research and development sector and a well-developed educational system; North American with strong competition between enterprises; and Indian-Chinese with a key role played by the State.

In the Russian Federation clusters incorporate the features of many models, but mainly Russian clusters are closer to the Japanese and Finnish models, i.e. there is a development around a large company (an anchor company) and participation in a cluster of technological parks and scientific and educational centers.

The strategic focus of the Khanty-Mansiysk Autonomous Okrug (KhMAO) – Yugra on the development of cluster economy made it possible to create a series of territorial sector-based clusters, according to papers (Zharkova, 2011; Zyablitskaya, 2012). At the moment the timber and gas processing clusters are operating successfully. As part of the

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strategy, the agro-industrial and mining clusters will be further developed. Medical and scientific-innovative clusters are being formed.

The priorities of the timber and gas processing clusters are aimed at modernizing and expanding the production with the use of innovative technologies. An industrial park is being formed in the gas processing cluster.

The technological structure of the agro-industrial cluster of Berezovsky district developed in the region is aimed at the development of agriculture, fishing industry, and fish farming, wild crops collecting, and hunting (Figure 1). The creation of small meat and dairy farms and experimental farms for breeding valuable fish species in the village of Saranpaul is of great promise. The agro-industrial cluster is aimed at the development of receiving and processing points for wild crops, the creation of small enterprises for the production of meat and dairy products, fish processing, creation of small enterprises for processing of fur, and the sewing of fur products. Consumers and distribution channels have been specified.

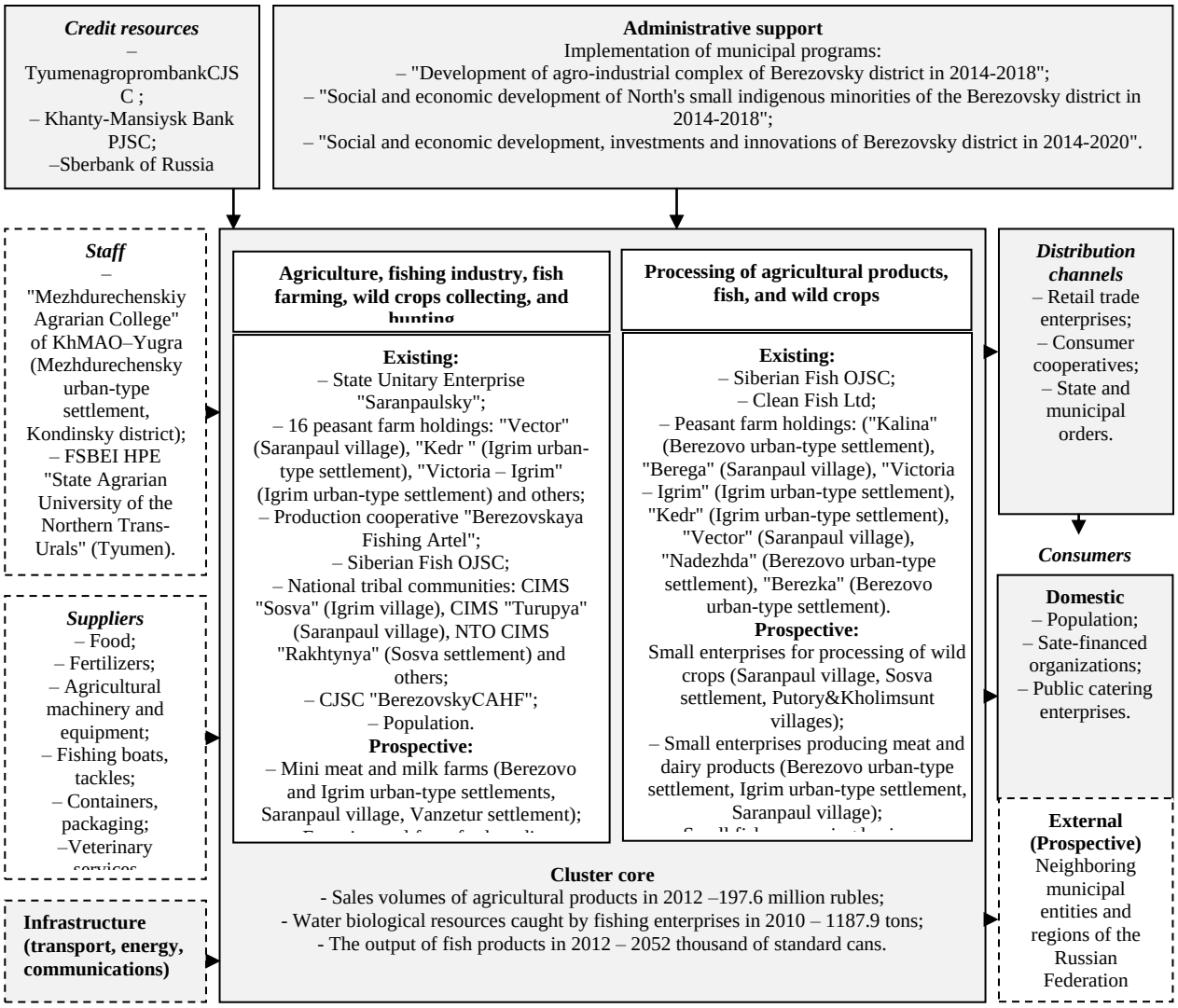

Figure 1: Technological structure of agro-industrial cluster of Berezovsky district of KhMAO–Yugra, according to strategy

Source: Zyablitskaya, 2012

The expediency of local fuel resources development in the Berezovsky district and the necessity of energy infrastructure development on the principles of small-scale municipal power engineering are confirmed by the results of work of local executive authorities and the Development Fund of the Khanty-Mansiysk Autonomous Okrug – Yugra, as well as by research conducted by scientists of the Ural State Mining University.

Scientists of the Ural Mining University with the participation of professionals from Yugra have developed the "Concept of using local fuels such as brown coal and peat of the Berezovsky District of the Khanty-Mansiysk Autonomous Okrug – Yugra to provide heat and power generation".

The Concept of lean manufacturing, project management, application of information, and communication technologies will become the mechanisms ensuring the introduction of innovative approaches into the economy of the Berezovsky

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district. The strategy of the region includes the establishment of a Priority Social and Economic Development Area (PSEDA) in the Berezovsky district.

During the development of the Concept, three independent projects were considered: 1) a project for the construction of a small multiple-unit thermal power plant (TPP), operating with the use of modern combustion technologies for local fuels; 2) a project for the development of fuel reserves based on the brown coalfield of the Borisov area of the Lyulinsky field with the placement of the small TPP on the open-pit site or in the village of Saranpaul; 3) a project for the development of fuel reserves based on the peat fields of the Berezovsky district with the extraction of milled or sod peat with the placement of the small TPP in the village of Saranpaul.

The necessary calculations for comparative analysis have been carried out (Table 1).

Table 1: Basic technical and economic indicators of peat fuel (milled and sod peat) and brown coal extraction options, according to the previous research

Parameters	Peat Fuel		Brown Coal	
	Milled peat	Sod peat	To the open-pit side	To the settlement
Extraction volume, thousand tones	56.4	43.3	30.0	30.0
Breakeven production volume, thousand tones	37.7	26.9	11.0	10.7
Breakeven production volume, RUB, in thousands	28,386.0	33,339.5	40,071.4	41,336.4
Funding volume, RUB, in thousands: –Investment costs	392,891.5 76,891.5	400,462.0 84,462.0	588,060.0 92,060.0	538,060.0 92,060.0
Planning horizon, years	10	10	20	20
Reaching the project capacity, years	2	2	3	3
Credit payment period, years	4	4	7	6
Discounting rate, %	7.7	7.7	7.7	7.7
Total net present value, RUB, in thousands	517,035.41	169,931.77	155,961.35	167,924.83
Discounted payback period, years	3.06	3.16	6.74	5.02
The net present value of returns	1.65	1.5	1.36	1.34
Internal rate of return, %	28.89	24.73	12.85	12.76
Output profitability, %	110.4	70.38	29.11	23.86
The profitability of sales, %	46.0	37.10	21.49	18.18
Return on average assets, %	150.7	106.68	117.28	94.35
Asset turnover	3.26	2.85	5.3	5.02
Overall liquidity	4.86	4.08	3.47	3.13
Instant liquidity	3.18	2.5	1.94	1.63
VAT accrued over the period payable to the budget, RUB, in thousands	157,323.8	145,739.8	235,771.3	206,652.6
Social security contributions accrued over the period, RUB, in thousands.	46,094.95	53,572.7	116,744.7	116,744.7
Property tax accrued over the period, RUB, in thousands	7,393.83	8,638.8	10,820.3	10,820.3
Corporate income tax accrued over the period RUB, in thousands	97,264.86	78,397.0	73,858.6	62,728.8
Budgetary income at all levels over the period, RUB, in thousands	308,077.42	286,348.3	437,194.8	396,946.4
Budgetary discounted income at all levels over the period, RUB, in thousands	226,403.2	210,510.0	221,718.4	202,684.5

Source: Grevtsev et al., 2017

The results of the calculations presented in the table demonstrate that the variant of the organization of milled peat fuel extraction is distinguished by the lowest investment costs and the payback period of 3.06 years. The net present value of returns in case of realizing this variant is found to be 1.65, and the internal norm of return is found to be 28.89 %, and these are the maximal parameters among the considered variants. Also, it should be noted that the variant of extraction of

the milled peat fuel generates the maximum budgetary income in the considered period, and taking into account discounting this income will be equal to 226,403.2 thousand rubles.

Summarizing the results of the research, it can be concluded that the sustainable use of local peat resources is the potential to ensure the sustainable development of non-urban areas and increase the economic development of the country. Features of the use of local peat resources in ensuring the development of non-urban areas are presented in Table 2.

Table 2: Characteristics of the use of local peat resources in the development of non-urban areas based on a combination of scientific approaches

Approaches	Characteristics
Adaptive	The regional energy supply system is an adaptive one, the capacity of which at each current moment should meet the needs not only of the region as a whole but also of each separate settlement or enterprise.
Administrative and territorial	Construction of large unit capacity power facilities will not be able to solve the problems of energy supply and heat supply in the Far North regions because the construction of expensive long electrical power transmission lines will be required to deliver energy to consumers.
Logistic	The simplicity of transport schemes and short distances for peat removal.
Legal	In June 2016, amendments were made to the Federal Law "On Energy" concerning the implementation of measures to support the production of electricity using peat as fuel, which is important for the development of small-scale power generation in non-urban areas.
Resource	Reduced consumption of non-renewable fuel and energy resources; relatively low labor and energy intensity of fuel peat extraction.
Economic	Prices of peat as an energy raw material are sufficiently stable, as opposed to constantly changing prices of oil and gas fuels.
Environmental	Reducing the environmental impact of the fuel and energy complex activities because peat is characterized by low content of sulfur and ash, which provides a low level of harmful emissions during its burning.
Export	Marketing research shows that the export potential of soil-forming fertilizers based on deep processing is quite high. The main threat to agriculture in the countries of the Middle East and North Africa is the increasing desertification of fertile lands every year. Besides, soil erosion caused by overexploitation of the land as a result of intensive agriculture is actively developing in many countries of this region. In this regard, away back in the 80s of the last century, the UN, at last, approved a special program to combat this phenomenon. An important factor is the availability in most countries of these regions of quite a large amount of disposable monetary resources from oil and gas exports, which the leadership of these countries is ready to invest in the development of agricultural infrastructure and landscape architecture.
Energetic	The milled peat is local energy fuel. Peat briquettes and sod peat are traditionally used as public utility fuel by households and utility companies. For today the Russian scientists have developed effective schemes which allow for the essential expansion of perspectives on the use of peat fuel. There is a long-term industrial Russian and foreign experience in the generation of heat and electric energy from peat and industrial raw materials.

The data in Table 2 demonstrate the key directions for the development of competitive advantages of the local peat resources use and areas for implementation of the Concept of sustainable use of natural resources wealth of the municipal economy.

DISCUSSION

Currently, there are discussions related to the use of peat, fuel oil, coal, or gas as fuel in the northern territories, including the Russian Federation. The discussion is conducted in several areas: in theoretical, methodological, methodological, and practical aspects. Several researchers support the point of view that when making managerial decisions related to planning the development of a regional fuel and energy complex (including peat deposits), it is necessary to apply the methods of systematic analysis of the efficiency of functioning of geographically distributed industrial facilities from technical, economic and socio-organizational points of view. In their opinion, this is an effective tool for supporting the choice of the optimal management decision (Karavajkov et al., 2012).

A group of national researchers as (Grevtsev et al., 2017) believe that areas with peat deposits can make a significant contribution to the development of the food security system and its central link - agriculture. Industrial cultivation of

crops requires mass production of high-quality soil mixtures and composts. Since the problem of food security in the country is directly related to the problem of restoring the fertility of soils of agricultural enterprises, and fertile soils of natural origin are practically exhausted, the process of searching for replacing the soil with soilless substrates based on all kinds of natural and synthetic materials is underway. The most widespread and used in agriculture are soils and various substrates based on peat. Peat is a decay product of peat-forming plants, has high agrophysical properties, and retains biologically active substances in its chemical composition, which make it possible to successfully use it in crop production, veterinary medicine, pharmacology, balneology, as well as in various modern environmental biotechnologies. According to the research of this group of scientists, the basis of high-quality substrates is high-quality peat of a low degree of decomposition.

It was found the presence of a close relationship between the prices for thermal coal and fuel peat. If the price of steam coal changes by USD 1, the price of fuel peat will change by USD 0.58. By the way, the analysis of profitability and financial stability (Savin, 2013) led to the conclusion that the peat industry is currently in a state of crisis.

The problems of the development of peat deposits in the vicinity of cities and large settlements also remain many discussions. Frequent fires force the administrations of individual cities to engage in not extinguishing, but the development of deposits and the extraction of peat. In contrast to other researchers, this work examines the problems of the development of northern territories, which develop much more slowly in comparison with urban agglomerations. At the same time, these territories, despite the significant abundance of natural resources, are exposed to various factors of an extreme nature, including “big challenges”, which include such components as anthropogenic pressure on the natural environment, depopulation processes, social stratification of the population, technological lag, migration processes, and other challenges. Many leaders of the constituent entities of the Russian Federation are faced with a dilemma - to follow the path of preserving small settlements and use a normative approach, fulfilling the minimum social standard, or bypassing the certification of rural (non-urban) territories for creating a cluster economy, when an engineering, communal, social, scientific, educational and other infrastructures.

During the research, it became possible to clarify the essential content of the cluster economy by studying various types and models of clusters (Italian, Japanese, Finnish, Indian, Chinese, North American clusters). The generalization of foreign experience made it possible to identify certain common features in the emerging Russian clusters. We concluded that there is not a pure of the cluster model, its name "Finnish" or "Japanese" model is rather arbitrary. Most likely, the cluster models are of a mixed nature and try to absorb the best that is observed in economic practice in various countries of the world that use this kind of formation - a cluster. In Russian clusters, one can trace the amalgamation of various enterprises around a large (anchor) company, with the entry into the cluster of technoparks, various scientific and research and educational centers, social facilities, and other economic entities. For many territories, the question of the feasibility and economic efficiency of coal or peat mining remains unresolved. We faced this problem in the Khanty-Mansiysk Autonomous Okrug - Yugra (in the Northern Urals of the Russian Federation). In the course of the study, a systematic analysis was carried out of not only financial and economic, organizational and managerial, environmental, but also geological exploration. It was found that for the development of settlements and other settlements in this territory, it will be necessary to develop a concept, strategy, and specific projects aimed at increasing the efficiency of using local fuels (brown coal and peat) to ensure the generation of heat and electricity. The Concept of lean production, project management, the use of information, and communication technologies made it possible to ensure the introduction of innovative approaches to the economy of several regions of this Autonomous Okrug.

The options for the extraction of peat fuel (milling and lump) and brown coal considered in the article indicate that the extraction of peat in this particular deposit is less costly in comparison with the extraction of brown coal. The profitability of products and sales is 3 times higher than those for brown coal. The creation of a specific mining enterprise and its entry into the cluster structure can become a growth point for the Berezovsky district, and in the future serve as a basis for the development of the entire emerging territory of advanced growth.

The problem areas in this field of research remain highly actual: the lack of a holistic methodology for the spatial development of out-of-town territories of advanced growth; the imperfection of methodological materials for the creation of cluster structures and cluster settlements; lack of elaboration of the mechanism of state support for small businesses that are part of cluster formations.

In general, summarizing the results of the study, we can conclude that the rational use of local peat resources is a large and still little realizable potential for ensuring sustainable development of out-of-town territories and increasing the level of economic development of the state's territories.

CONCLUSION

Technical and economic studies on the forecast of peat product development demonstrate significant efficiency of products obtained as a result of deep peat processing. Thus, the ratio of prices for new types of products to the price of peat for composting (per-yield-unit) for molasses is 1:35; 1:200 for fodder yeast; 1:300 for biostimulants, 1:350 for activated carbons, and 1:350 for wax.

Forecast analyses indicate that by 2030 there will be a 3.8-fold increase in mineral extraction and a 5.9-fold increase in processing industries.

The shipping volume for production and distribution of electricity, gas, and water will increase by 3.5 times by 2030. The turnover of small enterprises and medium businesses will increase by 2.7 times. Fixed capital expenditure will increase by 3.9 times. The average monthly money income per inhabitant will increase by 2.5 times.

Application of strategic planning, project management, and development of the cluster economy in the territory of the Khanty-Mansiysk Autonomous Okrug – Yugra are effective tools and mechanisms for further sustainable development of this unique region of the Russian Federation.

Implementation of the Concept of using local fuels such as brown coal and peat developed by scientists of Ural State Mining University and the implementable projects presented in the Concept will contribute to strengthening the competitive positions of both separate territories of the Okrug (Berezovsky district) as well as its other territories.

The development of small-scale municipal power generation will increase the economic strength of the country's northern territories. At the same time, this will provide the additional accelerated growth of GDP, the creation of new workplaces in remote areas, the growth of incomes and revival of the local economy, additional local taxes, as well as the improvement of the environmental situation in regions.

LIMITATIONS AND STUDY FORWARD

Until now, a clear and holistic methodology for the formation of the cluster economy of the northern territories, which have explored peat deposits, has not been developed. There is also no single approach to the creation of out-of-town territory settlements that meet the modern requirements of the socio-economic development of out-of-town territory (rural) territories. Scientifically grounded standard organizational and management models of cluster formations have not been developed. A comprehensive strategy for the restoration of the peat industry in the Russian Federation has not been created. Scientists have yet to work on these priority areas soon.

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