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INSTITUTIONAL ASSESSMENT OF ENVIRONMENTALLY ORIENTED SUBSOIL USE

The article addresses two pressing issues related to the institutional assessment of environmentally oriented subsoil use: (1) the definition of environmental security and (2) the level of development of the institutional framework for environmentally oriented subsoil use that includes the institutional capacity of subsoil use regulation and institutional capacity of environmental security. This study includes an analysis of existing definitions of environmental security, the results of which are used to substantiate the views of authors on environmental security. Despite considerable domestic and foreign experience in assessing the institutional capacity of various processes, there are still some difficulties in defining and measuring the factors of institutional capacity. To some extent, these difficulties were offset by the use of factors and contents of the indicator describing the completeness of institutional capacity, that have been previously identified by the authors, analysis and consideration of qualitative characteristics in assessing the process regulated at the macroeconomic level, as well as by the application of common methodological tools to assess the completeness of institutional capacity for environmentally oriented subsoil use. The study is based on the hypothesis that the state needs to make the regulatory and restrained intervention in the process of subsoil use. In this study, the assessment indicator of state regulation in the area of environmentally oriented subsoil use means the level of completeness of its institutional capacity calculated by using fuzzy-set theory techniques. The work allowed to determine the levels of completeness of institutional capacity of environmentally oriented subsoil use both for the Arctic–Central Asia transport corridor and the countries included in it. The values describing the assessment of completeness of institutional capacity of environmentally oriented subsoil use can be used as a basis to identify the vector of its improvement.

Keywords: Institutions, assessment, institutional capacity, challenges, threats, environmental security, subsoil use, environmental management, state regulation, fuzzy-set theory, transport corridor

Introduction

The formal and informal rules defined by institutional theory provide the foundation for any process of human activities, including the environmental management.

Regardless of the type of resources, whether mineral, water, land, or biological, the institutional framework of environmentally oriented environmental management is made of such institutions as the environmental management and environmental security. Therefore, the institutional capacity of environmentally oriented subsoil use is also made of the institutional capacity of the subsoil use and institutional capacity of environmental security (Figure 1). The analysis of these institutions is the cornerstone of regulation not only in the area of subsoil use, but also for environmental management in general.

Given the worsening environmental crisis on the planet and active desire of various countries to move towards sustainable development, the issues of environmental security, the second important institution of environmentally oriented subsoil use, are increasingly brought to today's agenda. However, the methods used to assess the completeness of institutional capacity with regard to environmental security of subsoil use are not uniform. It should be noted that, in Russia and other countries, there is the experience accumulated in assessing the completeness of institutional capacity of various processes. The objects of studies range from assessing the completeness of institutional capacity of companies, universities, industries [1] (mainly, banking [2]) to state-level assessment. For example, Alan Lessik and Victoria Michener prepared a guide to assess the completeness of company's institutional capacity [3], regardless of company's goals, by using a system approach based on the following components:

(1) Administrative and support functions, including administrative and management procedures, financial management (budgeting, accounting, fundraising, and sustainability), human resource management (staff recruitment, placement, support, and staff development), management of other resources (information, equipment, infrastructure);

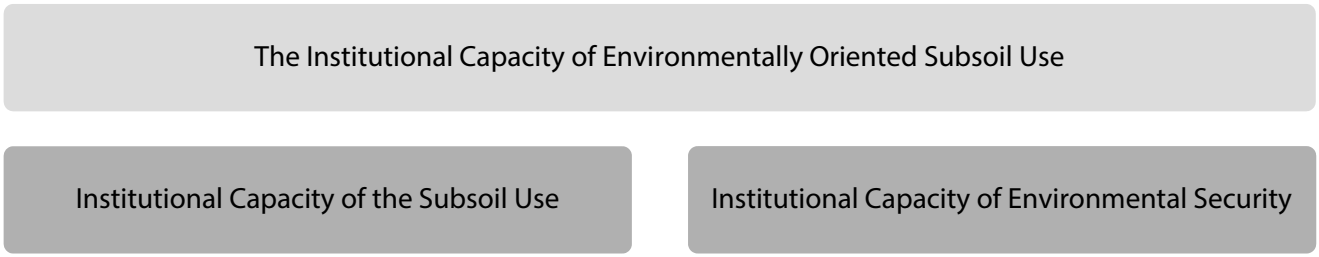

Fig. 1. *The essence of the institutional framework of environmentally oriented subsoil use*

(2) Technical/program functions, including service delivery system, program planning, program monitoring and evaluation, use and management of technical knowledge and skills;

(3) Structure and culture based on organizational identity and culture, vision and purpose of the company, leadership capacity and style, organizational values, governance approach, external relations;

(4) Company's resources (human, financial, and other). They used different methods of assessment, such as participatory, results-oriented self-evaluation); institutional development framework; organizational capacity assessment tool; dynamic participatory institutional diagnosis; organizational capacity indicator; Yes/No checklist or SCORECARD. The guide provides a fairly detailed description of all these methods. Based on such aspects as the type of organization, comparison with other organizations, temporary dynamic comparison, the collected data, their reliability, possibility of quantifying the factors, assessment of internal and external factors, and in order to assess the completeness of institutional capacity, the authors of the guide propose their recommendations on how to use various evaluation methods to measure the completeness of institutional capacity for the above components.

The American Council of Education defines the completeness of institutional capacity at the level of educational institutions in order to achieve their mission and improve the effectiveness of these organizations. In this case, the main focus is to build capacity for personnel and programs.

As a result, the assessment of the completeness of institutional capacity of the banking sector is determined by the availability of various banking services in the regions measured through customer satisfaction. To attract customers and increase their competitive advantage, the developers of this guide have created a practical tool for assessing the completeness of institutional capacity (Institutional Capacity Assessment Tool Kit and Guide Note (GNIT)). These methods represent different variations of sociological surveys and are used together. The assessment was made in the following areas:

— Legal and regulatory capacity; organizational capacity; support and monitoring;
— Content of banking services;
— Accounting, record-keeping and records management;
— Service delivery plan;
— Process of banking service provision;
— Overall assessment of the activities of banks and evaluation of the project used for assessing the completeness of the institutional capacity of the banking sector.

The methodological framework for assessing the completeness of institutional capacity at a country level [4] is presented in the context of future climate change. The methodology was based on a comprehensive approach and considered such levels as social norms, values and practices, state regulation, network of organizations, specific organizations, and individuals. It was proposed to make the level-based assessment in terms of climate policy by applying both quantitative and "non-quantitative" methods of assessment. The purpose of the assessment was to identify whether the studied levels are ready for adapting to the dynamic development of external environment related to the effects of climate change, as well as to identify the opportunities for improving the short-, medium-, and long-term sustainability of levels.

However, despite considerable experience and a variety of methodological tools developed for assessing the completeness of institutional capacity, there are certain difficulties in measuring the factors describing the areas of institutional capacity and making their assessment. First, the factors vary considerably depending on the goals and objects of assessment and, accordingly, the very essence of the indicator describing the completeness of institutional capacity also varies from study to study. Secondly, the scientists propose a number of disparate methods applied in aggregation, which raises the question of how reliable are the obtained assessments. Thirdly, for quantitative indicators of

the assessment of specific areas, the studies considered only the mere fact of their existence. For example, often when it comes to legal and regulatory capacity, the indicator of regulatory and legal acts at different levels of the territorial structure, which does not take into account their qualitative characteristics, is one of the most important indicators. Fourthly and finally, we have not been able to find a single paper that assesses the completeness of institutional capacity of any process at the country level. Most of the reviewed papers were related to the assessment of the institutional capacity of companies to improve their competitiveness and identify bottlenecks, i.e. they considered only the microeconomic level. In the study, the authors attempted to address the identified shortcomings and assess the completeness of the environmentally oriented subsoil use at the macroeconomic level, which implies the consideration of qualitative characteristics. The assessment was based on previous studies on the identification of factors and the essence of completeness of institutional capacity of both the subsoil use and environmental security at the country level. We used the apparatus of fuzzy-set theory as a methodological tool for assessing the completeness of institutional capacity of environmentally oriented subsoil use.

The study assessed the completeness of institutional capacity of environmentally oriented subsoil use within the boundaries of the studied Arctic–Central Asia transport corridor. The issue of creating and developing the transport corridors is brought to the agenda because such corridors can provide a "well-established and clearly regulated passage for the flows of natural resources, or a compensatory mechanism for obtaining the environmental services for not using these natural resources." The purpose of the Arctic–Central Asia transport corridor is determined by the need to maintain the sustainable development of the economies of the reviewed countries and improve the quality of life of their population in the context of globalization" [5, pp. 51–52].

Given the above relevance, the purpose of this study is to identify the essence of environmental security and to assess the completeness of institutional capacity of environmentally oriented subsoil use in a way that takes into account the previous assessments made by the authors with regard to the completeness of institutional capacity in the area of subsoil use and environmental security. The study was conducted for the Arctic–Central Asia transport corridor (the most important areas include Russia and Kazakhstan), where the assessment of the completeness of institutional capacity is viewed as a prerequisite for implementing the geo-eco-socio-economic approach to the development of strategic natural and resource potential of these territories.

Theory

The theoretical and methodological basis of the study is provided by the theories of related branches of knowledge, mainly the institutional and evolutionary theory and the theory of state regulation.

The foundation of the institutional and evolutionary theory was laid, on the one hand, by the representatives of institutionalism, such as T. Veblen and his followers W. Hamilton, D. North, O. Williamson, F. Hayek, G.B. Kleiner, A. Nesterenko, V. Polterovich, E.V. Popov, O.S. Sukharev, and others, and, on the other hand, Ch. Darwin is an innovator in the evolutionary theory of organic matter, the principles of which have subsequently provided the foundation for the general systems theory. The basic provisions of the institutional and evolutionary theory were used in the development of the institutional system of subsoil use and environmental security and the assessment of its sustainability.

The methodology of state regulation combines "a wide range of views on the place, goals and possibilities of state intervention. The views of scientific communities have experienced substantial changes as they were caused to the level of economic development and characteristics of political situation in a particular historical period. In general, the processes, that went through the entire history" of studying the state regulation of the economy, "have prompted the scientists to study more closely the economic theory in terms of revealing the patterns and trends of state regulation. From a historical analysis of the role played by state regulation of the economy, we can conclude that the attitude towards the identification of this role changed and ranged from state control of economic relations (proponents of mercantilism), moderate intervention to implement the anti-crisis measures (J.M. Keynes) and regulatory regulation (institutionalists), to restrained intervention by indirect measures (neoclassicists) and near total non-intervention, except for the market of public goods (classicists)" [6, P. 591]. This study is based on the hypothesis that the state needs to make the regulatory and restrained intervention in the process of environmental management and subsoil use. Such hypothesis can be seen in the papers of the authors, such as the O.S. Sukharev, V.A. Kryukov,

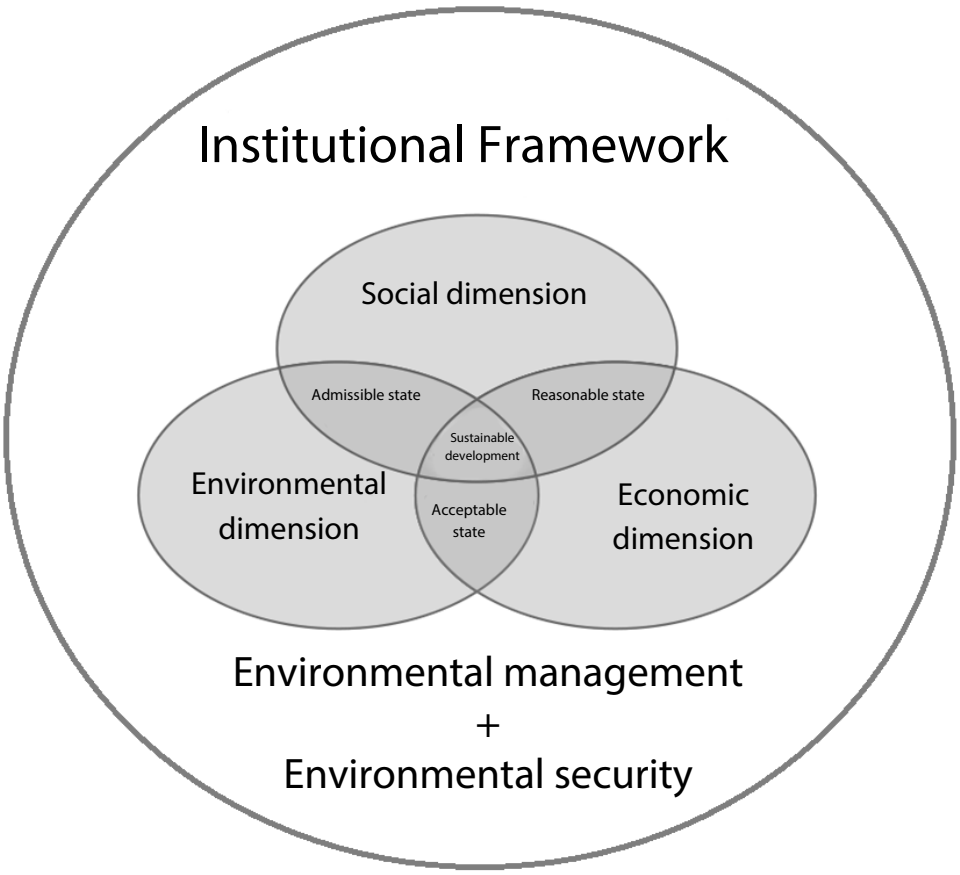

Fig. 2. *The dimensions of environmentally oriented environmental management*

D.V. Vasilevskaya, V.N. Lazhentsev, S.F. Larichkin, N.G. Zhavoronkova, N.N. Lukyanchikov, I.M. Potravny and others, whose studies confirm the need to consider the institutional aspects in the implementation of environmental management/subsoil use. Therefore, a three-dimensional measurement of environmental management is inconceivable without an institutional framework that includes the institutional capacity of the environmental management and environmental security (Figure 2). As a result, in this study, the assessment indicator of the state regulation in the area of environmentally oriented subsoil use means the completeness of its institutional capacity.

The methodological tools of the study include general scientific research methods that help to identify the areas for development of the institutional foundation of environmentally oriented subsoil use, as well as the levels for the management of this process. To assess the completeness of the level of development of institutional foundations of environmentally oriented subsoil use, the authors used the methods of mathematical statistics, expert evaluation, and method of empirical testing.

The conceptual apparatus used in the study includes such concepts as the "institutions", "institutional environment", "institutional foundations", "institutional security", "subsoil use", which have already been described in another paper [7, P. 148]. The authors also used such terms as the "environmental management", "environmentally oriented environmental management", and "environmental security", which need to be clarified:

1. Environmental management means the relationship of the people with the natural environment in the process of their economic and socio-cultural activities.

2. Environmentally oriented subsoil use means a set of relationships to provide the sections of subsoil for the use in order to conduct the geological studies, prospect and assess, explore and mine the fields of mineral deposits, build and operate of non-mining underground structures, use the mining waste and associated processing facilities by market agents on agreed terms by taking into account the requirements of environmental protection and environmental security.

3. Environmental security means the state of protection of nature, individual and society against the challenges and threats caused by natural phenomena, as well as environmental changes resulting from economic and other activities (Figure 3). In one or another interpretation, this definition can be found in the literature [8] and it represents the most comprehensive version for taking into account

all the substantive aspects of the institution of environmental security. The need to expand the term "environmental security" is caused by the uncertainty and vagueness of this concept existing up to this date both in scientific papers and legislative acts.

For example, M.M. Brinchuk [9], S.A. Bogolyubov [10, P. 46] and others consider the environmental security as the protection of the natural environment in order to "preserve the favorable state of the environment". Ensuring the environmental security means the activities to protect the environment and rationally use the natural resources, which are in the interest of maintaining the favorable state of the environment, as well as to protect the environmental rights and legitimate interests of individuals and legal entities" [9, P. 106].

T.V. Petrova [11, P. 79] recognizes the environmental security as a particular sphere of social relations. Not every activity can be the subject of these relations; these can be only the activities that pose a high risk of causing significant environmental damage. N.G. Zhavoronkova proposes to consider the environmental security "as an opportunity for a comprehensive approach to environmental protection, human living environment, economic and environmental interests, with the possibility and the need to harmonize sectoral, territorial/regional, socio-economic and other interests in the long-term planning and operation of production facilities" [12, P. 94].

A.K. Golichenkov defines the environmental security of individual and other objects (society, state) as the "protection of social, economic, environmental and legitimate interests of people, material, cultural and other valuables of the society and the state; economic and other interests of enterprises, organizations, institutions and entrepreneurs against the harmful effects of environmental hazards caused by anthropogenic impacts on the environment, as well as against the effects of environmental accidents and disasters" [13, P. 426].

S.N. Rusin understands the environmental security as the "protection of individual, society and the state against environmental threats, and views ensuring the environmental security as the activities to prevent the environmental threats" [14, P. 13].

A.A. Kuklin, I.S. Belik, and N.L. Nikulina define the environmental security as the "protection of natural environment, economic entities of the territory, and population against real or potential threats of natural and man-made character" [15, P. 17].

The analysis revealed that, currently, a number of experts consider that the concept of "ensuring the environmental security" is primarily used in the sense of "environmental protection".

The heterogeneity of the concepts of "environmental security" that leads to confusion between the concepts of "environmental security" and "environmental protection" can be also traced in the environmental laws of the Russian Federation (Figure 4).

Therefore, the above concept can be explained by the need to protect, on the one hand, the natural environment and vital interests of individual, the status of which is defined in the concept of "environmental security" in Federal Law On Environmental Protection No. 7 and, on the other hand, the individual, society and the state against internal and external threats. The guarantees for the protection of both the natural environment and the vital interests of individual, society and the state will allow to ensure the decent quality and standard of living of the citizens, defense and security of the country. For its part, the concept of "environmental security" is included in the concept of "national security" in the National Security Strategy.

Our definition is based on the opinion of N.N. Lukyanchikov, I.M. Potravny, I.I. Drodomiretky, and E.L. Kanter, which we also share. These scientists view the environmental security as the "protection of natural environment and the vital interests of the individual against the potential negative impact of economic and other activities, emergencies of natural and man-made character and their effects" [16, P. 588; 17, P. 385].

Data and methods

The methodological tools for assessing the level of development of institutional foundations of environmentally oriented subsoil use of the country (I) are based on an assessment of the completeness of institutional capacity of the subsoil use and assessment of the completeness of institutional capacity of environmental security.

Their calculation required to identify the areas reflecting the substance of the very process of regulation of the environmentally oriented subsoil use, and their significance, as well as to determine the final values of the development of institutional foundations for both the subsoil use and

Environmental security is the state of protection of nature, individual, and society against the challenges and threats caused by natural phenomena, as well as environmental changes resulting from economic and other activities.
Main substance of activities to ensure the environmental security is the preservation and restoration of the natural environment, rational use and reproduction of natural resources, prevention of the negative impact of economic and other activities on the environment and elimination of their effects, prevention of the negative impact of the natural environment on the vital interests of individual and society

EXTERNAL CHALLENGES

INTERNAL CHALLENGES

Threats to environmental security are environmental factors and anthropogenic factors that have a negative impact on nature, individual and society. The sources of threats will be natural hazards, as well as economic and other human activities

EXTERNAL THREATS

INTERNAL THREATS

EFFECTS OF EXTERNAL AND INTERNAL THREATS ARE EXPRESSED AS FOLLOWS:

1. For nature and its valuables:

- Risk of changes in the natural environment up to its partial or total destruction;
- Emergence of diseases among various species of flora and fauna and progression in the mutation of individuals;
- Reduction or extinction of biodiversity.

2. For individual/society, their vital interests and values [14]:

- Risk of changes in the natural environment to the extent when the existence of individual/society as a biological species will be possible;
- Emergence of diseases caused by the effects of environmental factors;
- Reduction of the resource potential of natural environment, which is a source of meeting the material, spiritual, cultural, and other needs of individual/society

Fig. 3. *The substantive characteristics of environmental security*

Federal Law *On Environmental Protection* No. 7-FZ of January 10, 2002	The Environmental Doctrine of the Russian Federation (the Directive of the Government of the Russian Federation No. 1225-p of August 31, 2002)	The Strategy of National Security of the Russian Federation until 2020 (the Decree of the President of the Russian Federation No. 537 of May 12, 2009)	Federal Law *On Security* No. 390-FZ of December 28, 2010	The Foundations of the State Policy in the Areas of Environmental Development of the Russian Federation until 2030 (Decree of the President of the Russian Federation of April 30, 2012)	The Law of the Russian Federation *On the Subsoil* No. 2395-1 of February 21, 1992	Draft Strategy of Environmental Security of the Russian Federation until 2025 (2015)
Environmental security is the protection of natural environment and vital interests of the individual against potential negative impact of economic and other activities, natural and man-made emergencies, and their effects. The document deals with the *environmental protection*, while the *environmental security* is considered only in terms of conceptual apparatus. The main content of environmental protection is the preservation and restoration of natural environment, rational use and reproduction of natural resources, prevention of the negative impact of economic and other activities on the environment and elimination of its effects	The concepts of "*nature protection" and "ensuring the environmental security"* are presented as separate concepts (the substance of these concepts is not revealed). The document identifies the priority areas for *ensuring the environmental security* and defines the measures for nature protection	*Environmental security* is an integral part of the national security. *National security* is the protection of individual, society and the state against internal and external threats that allows to ensure a decent quality and standard of living for citizens, defense and security of the country. The document does not expand on the concepts of "security", *"ensuring the environmental security"*	Environmental security is a type of security. The document does not expand on the concept of "Security"	The concept of *"environmental safety"* is referred to along with the concept of *"environmental protection"* (the substance of these concepts is not revealed). The document defines the priorities for developing the regulation of environmental protection	The document does not expand on the conceptual apparatus. The concepts of "environmental protection" and "environmental safety" are not identical, but have similar goals and objectives. The absence of definition leads to arbitrary interpretation of the concept of "ensuring the environmental security in the subsoil use"	*Environmental security* is viewed as the protection of individual, society, and state against the threats caused by changes in the environment as a result of economic and other activities, and by natural phenomena. *Ensuring the environmental security* means the activities to prevent environmental threats (external and internal). The documents defines the priorities and objectives in ensuring the environmental security, and the ways to achieve them effectively

Fig. 4. *The comparative analysis of the concepts of "environmental security", "ensuring the environmental capacity", and "environmental protection" in the environmental legislation of the Russian Federation*

environmental security by using the fuzzy-set theory techniques. [18] When assessing the levels of development of institutional foundations of subsoil use and environmental security, we separated such areas of institutional capacity as the legislative and regulatory capacity, integration and project capacity, organizational capacity, and financial and economic capacity, distributed by four levels of regulation, including international, federal, inter-state and regional levels. The algorithm for assessing the level of development of institutional foundations of environmentally oriented subsoil use is based on the research [7]; [19] and summarized in Fig. 5. In this case, with regard to the Arctic–Central Asia transport corridor, which includes 2 objects/countries (Russia and Kazakhstan), the completeness of institutional capacity or the assessment of the level of development of the institutional foundations of environmentally oriented subsoil use of the corridor ($I_{SU_{corridor}}$) is determined by calculating the simple average of indicators of the assessment of the level of development of the institutional foundations of environmentally oriented subsoil use in the countries included in the study of the corridor. The calculation based on simple average method was selected on condition of sufficient degree of comparability of the level of completeness of institutional capacity of the countries in organizing the environmentally oriented subsoil use. When considering the legal and regulatory level of capacity, we should note that it is highly interlinked with the resolution of disputes over international trade contracts in the area of subsoil use. Such disputes are generally settled in international commercial arbitration courts, where the parties may choose (by means of an arbitration agreement) a system of law, which they trust for the settlement of their disputes. Therefore, the level of completeness of the institutional capacity of legal system to be used for dispute resolution will be determined by the level of completeness of the institutional capacity of a specific country and, possibly, by the level of completeness of the institutional capacity of a third party, as the subsoil users from Russia and Kazakhstan may choose, for example, the Anglo-Saxon system or other system of law.

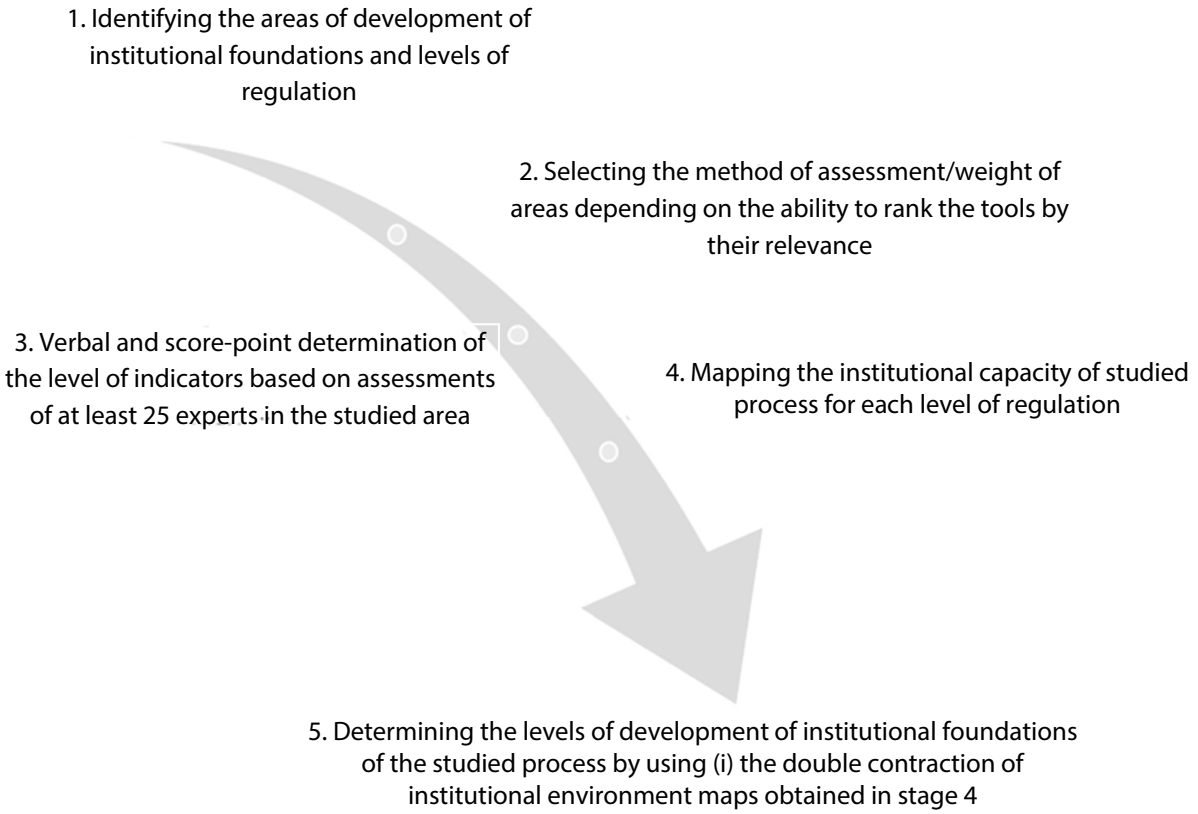

Fig. 5. *The algorithm for assessing the level of development of institutional foundations/institutional capacity of the studied process*

At the heart of the methodological toolkit lies the use of specific algorithm to assess $I_{SU_{in\text{-}object}}$ that includes the institutional capacity of subsoil use regulation ($I_{SU_{in}}$) and the institutional capacity of environmental security regulation ($I_{ES_{in}}$) based on the weight coefficients (see (1), (2)).

$$I_{SU_{corridor}} = (\sum I_{in\text{-}object})/n, \quad (1)$$

where $I_{SUcorridor}$ is the completeness of institutional capacity of environmentally oriented subsoil use of the Arctic–Central Asia corridor; $I_{SUin\text{-}object}$ is the institutional capacity of environmentally oriented subsoil use of the *n*-th object (country); *i* is the number of objects (countries) ($i = 1, \ldots, n$); *n* are the objects (countries) included in the Arctic–Central Asia corridor.

$$I_{SUin\text{-}object} = \alpha \times I_{SUin} + \beta \times I_{ESin}, \quad (2)$$

where α, β are the weight coefficients; I_{SUin} is the institutional capacity of subsoil use; I_{ESin} is the institutional capacity of environmental security regulation.

To determine the level of institutional capacity of environmentally oriented subsoil use that takes into account both the institutional capacity of subsoil use regulation and the institutional capacity of environmental security regulation, we conducted the survey of 35 experts from the following organizations: Ural Mining and Metallurgical Company (UMMC), Ural State Mining University (USMU), Federal State Institution Territorial Geological Information Fund for the Ural Federal District, Institute of Economics of UB of RAS, Institute of Plants and Animals of UB of RAS, Institute of Mining of UB of RAS, Department of Subsoil Use of Khanty-Mansi Autonomous Area—Yugra, Tyumen Industrial University, OJSC Lukoil-Perm, OJSC Surgutneftegaz, OJSC Giproruda Institute, Mining Institute of Perm Scientific Center of UB of RAS.

After analyzing the results of the expert survey, we prepared a report that defined the different weight coefficients for the underground and open-pit production of subsoil resources. The resulting coefficients were subsequently reduced to the following values: 0.45. for the institutional provision of subsoil use regulation and 0.55 for the institutional provision of environmental security regulation. Therefore, the formula for assessing the completeness of institutional capacity of environmentally oriented subsoil use of the country ($I_{SUin\text{-}object}$) included in the Arctic—Central Asia corridor will be as follows:

$$I_{SUin\text{-}object} = 0.45 \times I_{SUin} + 0.55 \times I_{ESin}, \quad (3)$$

where 0.45; 0.55 are weight coefficients; I_{SUin} is the institutional capacity of subsoil use regulation; I_{ESin} is the institutional capacity of environmental security regulation.

Results and discussion

The information on the level institutional capacity of subsoil use regulation and environmental security regulation of the countries of the Arctic–Central Asia transport corridor is provided in Tables 1 and 2 based on previous research by the authors [7, 19].

Table 1

The levels of completeness of institutional capacity of the subsoil use regulation and environmental security regulation in Russia

Level of regulation (i)	Level of completeness of institutional capacity of the subsoil use regulation, %	Level of completeness of institutional capacity of the environmental security regulation, %	Level of completeness of institutional capacity of the environmentally oriented subsoil use, %
Inter-state (i)	64	75	70
Federal (ii)	64	70	67
Interregional (iii)	68	70	69
Regional (iv)	60	60	60
Average level for the country, %	64	69	67

Based on the formulas (1)–(3) and results of the expert survey with regard to the weight of institutional capacity of subsoil use regulation (0.45) and the institutional capacity of environmental security regulation (0.55), the completeness of institutional capacity of environmentally oriented subsoil use in the Arctic–Central Asia corridor will be 67 % (Table 3) on a scale from 0 % to 100 %, where 0 % is the minimum and 100 % is the maximum.

The obtained values of the institutional assessment of environmentally oriented subsoil use can serve as a basis for identifying the vector for improving such assessment, what will contribute, in the future, to the economically and legally ensured, stable and clearly regulated flow of subsoil resources and goods produced at different stages of their processing in both countries.

Translation

Table 2

The levels of completeness of institutional capacity of the subsoil use regulation and environmental security regulation in Kazakhstan

Level of regulation (i)	Level of completeness of institutional capacity of the subsoil use regulation, %	Level of completeness of institutional capacity of the environmental security regulation, %	Level of completeness of institutional capacity of the environmentally oriented subsoil use, %
Inter-state (i)	64	90	78
Federal (ii)	64	75	70
Interregional (iii)	68	70	69
Regional (iv)	56	50	53
Average level for the country, %	63	71	68

Table 3

The level of completeness of the institutional capacity of environmentally oriented subsoil use in Russia and Kazakhstan within the Arctic-Central Asia transport corridor

Level of regulation (i)	Level of completeness of institutional capacity of the environmentally oriented subsoil use in Russia, %	Level of completeness of institutional capacity of the environmentally oriented subsoil use in Kazakhstan, %	Level of completeness of institutional capacity of the environmentally oriented subsoil use within the Arctic–Central Asia corridor
Inter-state (i)	70	78	74
Federal (ii)	67	70	69
Interregional (iii)	69	69	69
Regional (iv)	60	53	56
Average level, %	67	68	67

Conclusion

The results of the completed study are as follows:

1. The analysis of existing interpretations of the term "environmental security" revealed various approaches to its substance. In this study, the authors support the view of those scientists who define the environmental security as the protection of nature, individual and society against the challenges and threats caused by natural phenomena, as well as environmental changes resulting from economic and other activities. "The main substance of activities to ensure the environmental security is the preservation and restoration of the natural environment, rational use and reproduction of natural resources, prevention of the negative impact of economic and other activities on the environment and elimination of their effects, prevention of the negative impact of the natural environment on the vital interests of individual and society." [14, P. 15]. In this interpretation, the environmental security considers the individual and nature together, since both these subjects need protection from natural calamities and effects of the anthropogenic impact.

2. We assessed the existing formal and informal rules in the area of environmentally oriented subsoil use that apply to the Arctic–Central Asia corridor, which has determined the level of development of institutional foundations of environmentally oriented subsoil use within the Arctic–Central Asia corridor equal to 67 %. For Russia, it was 67 %, for Kazakhstan 68 per cent, which demonstrates a sufficient degree of comparability and continuity in the joint development of institutional capacity of these countries in the area of environmentally oriented subsoil use.

These results do not reject possible prospects for further study of the issues of environmental security, assessing the level of development of the institutional foundation of subsoil use regulation and environmental security regulation with regard to clarifying and improving the proposed methodological recommendations, as well as the phased coordinated implementation of measures to develop the institutional foundations of environmentally oriented subsoil use at all levels of regulation in the countries of the corridor.

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