IRSTI 06.56.31
UDC 338.001.36
JEL Classification F30

https://doi.org/10.46914/1562-2959-2024-1-2-124-138

A.A. ADAMBEKOVA,*[1]
d.e.s., professor.
*e-mail: ainatas0408@gmail.com
ORCID ID: 0000-0003-2026-4321
M.M. MUKAN,[2]
PhD, associate professor.
moldir.mukan@narxoz.kz
ORCID ID: 0000-0001-8930-2176
B.U. TUREBEKOVA,[1]
c.e.s, associate professor.
bazhan.turebekova@kaznu.edu.kz
ORCID ID: 0000-0003-0946-9211
R.A. SALIMBAYEVA,[2]
c.e.s, associate professor.
salimbaeva.rasima@narxoz.kz
ORCID ID:0000-0003-0096-5657
[1]Kazakh National University named after al-Farabi,
Almaty, Kazakhstan
[2]Narxoz University,
Almaty, Kazakhstan

REGIONAL RESOURCE PROVISION MAP: METHODOLOGY AND KEY APPROACHES

Abstract

The achievement of sustainable development goals with the help of the implementation of a systematic approach to managing the resource potential of regions through sustainable development goals is one of the actual objectives in regional management. Mapping is known as an approach, which allows combining several data sources with different scaling. This study aims to develop regional resource provision map for creating sustainable development conditions. Multidisciplinary research is a valuable source of this research that allows to unit ESG criteria and their regional commitment through cartographic science tools. The methodology is presented in the form of a sequence of actions to draw up a resource supply map. Using the presented map of Western Kazakhstani region confirms the validity of the scientific and applied methodology. The research outcomes contain proven arguments for the further research based on the issues of constructing integrated resource provision maps for the Kazakhstani regions. Key cartography approaches make it possible to form recommendations for similar maps use in terms of decision-making based on interregional interaction, taking into account resource potential, consisting of natural, labor, financial, and infrastructural capabilities of the regions and environmental risk assessments. Developed recommendations were tested with the help of Microsoft Power BI and SuperMap (laboratory of "Geoinformation Cartography" of Kazakh National University named after al-Farabi Kazakh).

Key words: map, region, resource provision, sustainable development, cartography, regional management, methodology

Introduction

One of the main disadvantages of the research is a high asymmetry of Kazakhstani regions in terms of their development. This asymmetry is mostly caused by differences in natural, climatic and geographical conditions, different population densities, conditions for the development of industrial and agricultural production and the lack of funding sources. The study is based on the necessity of the methodology development to take into account the characteristics of natural and geographical conditions, production and labor potential for regional development. Generally, resource provision is a

concept, that weakly was covered both in domestic and foreign literature on the multidisciplinary level. One of the actively discussed issues was the problem of interregional population migration within individual states, when the ongoing processes mediate changes in the industrial structure of regional business, do not lend themselves to effective regulatory tools and create conditions for provoking risks of social, environmental and economic instability. Resource provision of the Kazakhstani region is the object of the research, while the subject are existing approaches of the resource potential assessment that allow systematize information on the region's focus on achieving sustainable development goals. The main aim of the research is a development of methodology and main approaches of the regional resource provision maps' construction. For the goal achievement, there were settled the following objectives: literature review, revealing the approaches and importance of resource provision for the development of regions in economic development, as well as modern trends in the study of maps and cartography. The implementation of this study will allow us to develop recommendations regarding the selection of key indicators for resource potential cartography of the region. In addition, to test these indicators, the task was set to collect data and test them to formulate key approaches of the methodology. Practical significance of the methodology allows participants of the regional process to consider it when carrying out strategic planning and building interregional interaction in the implementation of sustainable development goals. The importance of this study is determined by the fact that its results allow stakeholders to use this methodology not only on a regional, but also on an international level. It should also be noted that the methodology allows us to take into account community expectations for corporate and social responsibility through integrated sustainable management of the region's natural resources.

Materials and methods

In accordance with the methods of world scientific knowledge, there will be used the following research methods, as analysis and deduction, continuous observations, statistical research methods, as grouping, classification, and research results visualization through graphs and tables. Testing of the developed recommendations was carried out using Microsoft Power BI and SuperMap (laboratory of "Geoinformation Cartography" of Al-Farabi Kazakh National University).

For the methodology justification of the resource provision map, the following research plan and stages are defined:

- based on methods of analysis and synthesis, to study the main approaches to defining the concept of resource provision;
- this, in turn, will allow, through a literature review and content analysis, the identification of key criteria for resource provision and the determination of key approaches to mapping;
- to develop the main provisions of the cartography methodology and test it using materials from one of the regions of Kazakhstan;
- to identify the main obstacles that arise in the cartography process and, taking them into account, clarify aspects of the application of the resource provision map by regional authorities.

The information base for the research, which became the basis for empirical data, was the materials "On the natural resources of the West Kazakhstan region" (official website of the WKR Local government), "Population of Kazakhstan" (data from the Bureau of National Statistics of the Republic of Kazakhstan), "Budget of the West Kazakhstan Region" (Statistical Bulletin of the Ministry Finance of the Republic of Kazakhstan), "Atmospheric Pollution Index", "Water Quality" (Information bulletin on environmental pollution of the RSE Kazhydromet).

Main provisions

Reviewing and assessing the commitment of businesses and regional governments is arguably the most straightforward method to gauge the level of governmental dedication towards achieving sustainable development goals. Each region possesses its unique set of natural resources and distinct natural and climatic conditions, which significantly shape and dictate the socio-economic landscape for regional development. Matters concerning resource provision, regional resources, and their efficient utilization are relevant across various facets of both regional and corporate governance when evaluating sustainable development practices. The sustainable advancement of areas relies heavily on their inherent natural resources and requires taking into account economic, social, and

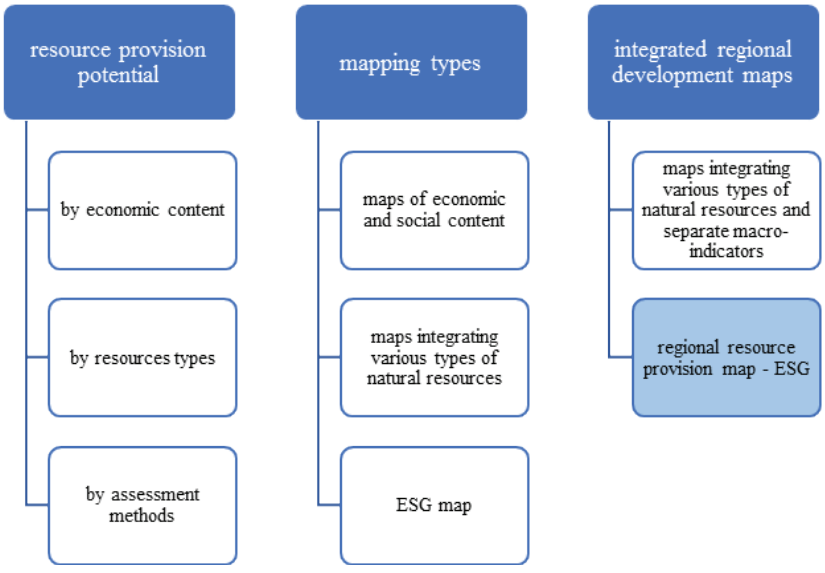
environmental aspects. However, the lack of a standardized evaluation method, along with diverse interpretations of the concept, hinders the efficient use of local resources, does not improve living standards, and makes environmental conservation and long-term business and production planning challenging when considering regional concerns. Currently, there is a noticeable disparity in the development of regions within Kazakhstan, which has persisted largely unchanged since the country gained independence. Emphasizing sustainable development, which involves identifying globally recognized key development indicators, can help regions address this imbalance and increase their attractiveness to investors. ESG principles promote a holistic approach to both corporate governance and public administration at both macro and micro levels. Nonetheless, ongoing research indicates a lack of consensus in global practice and academia regarding the selection of criteria for assessing commitment to the Sustainable Development Goals (SDGs) [1]. Furthermore, regional authorities and management have yet to adopt a systematic approach to managing their regions, incorporating their resource potential to achieve the SDGs and ESG principles. The primary obstacle in this regard is the absence of clear criteria for evaluating resource potential in the context of SDG attainment. The lack of standardized approaches to reporting on corporate sustainable development prevents regional management from focusing their efforts on aligning the environmental, social, and corporate interests of companies. Additionally, businesses themselves have not fully grasped the necessity and significance of ESG for their operations, often perceiving them merely as trendy obligations. Research indicates that regional initiatives can encourage and incentivize business commitment to ESG. Mapping resource potential enables the application of an integrated approach to regional management by visualizing resources that influence environmental, social, and corporate responsibility. Only through comprehensive consideration of all conditions and factors can allow resources been utilized wisely and to make the interests of businesses aligned with the environmental and social development of regions. The core positions of the research group emphasize that the mapping criteria should comprise indicators that are deemed acceptable by the stakeholders themselves and are minimally adequate for informing decision-making by regional authorities in pursuit of sustainable development goals. The methodology should elucidate the principal approaches to constructing databases and interlinking them, considering their influence on key indicators of regional development.

The study revealed that scientific literature on this topic can be classified into three distinct groups, as illustrated in Picture 1:

Works that delve into the essence of approaches concerning the concept and assessment of regional resources or the provision of resources within regions.

Research dedicated to the complexities of mapping regional resources.

Studies that offer insights into the characteristics and challenges associated with the creation of geographically referenced economic and social maps (integrated maps).



Picture 1 – Key research trajectories in the field of “maps of regional resource provision”

Note: Compiled by the authors on the base of [2–7].

From the point of view of interpreting the essence and content of resource potential, studies indicate that the resource potential of a region can be assessed as:

1 The region's resource potential, inherent in nature itself, represents the interconnectedness of individual potentials influenced by human activities [2, 3]. This perspective highlights the interconnection of various regional resources through human activity, providing a descriptive understanding of processes without evaluating the strength of this connection or establishing criteria for resource potential selection.

2 Resource potential serves as a comprehensive indicator reflecting dynamic changes in the natural environment of a region over its natural evolution and under the influence of external factors, including natural-climatic and anthropogenic elements [4]. This viewpoint aligns closely with the objectives of the current study and facilitates its utilization in constructing integrated maps with not only an economic focus but also broader considerations.

3 Resource potential is defined as the suitability of resources for production without adversely affecting the region's ecology due to their exploitation [5, 6]. This perspective highlights the importance of environmental responsibility in business and societal practices concerning the utilization and consumption of natural resources, making it particularly suitable for environmental considerations.

4 Resource potential as a natural complex characterized by intricate relationships and hierarchical subordination among all its components [7]. This viewpoint emphasizes the comprehensive study of all regional resources as interconnected elements of a unified ecosystem, making it particularly suitable for environmental purposes.

The provided classification suggests that studies on regional resource provision are conducted either from a natural-geographical or economic-social perspective, with the latter becoming increasingly prevalent. When considering studies based on typologies of different methodologies, which are utilized to evaluate natural resource potential, encompassing economic, social, industrial, physical-geographical, and comprehensive assessments [8]. The economic assessment methodology typically incorporates quantitative indicators of resource magnitude and utilization based on single criteria (e.g., Gross Regional Product (GRP) or population), as well as a systematic structural analysis assessing the status of natural resource protection and renewal. Upon reviewing research data, it is evident that a diverse array of approaches, terminology, interpretations, and calculation methods for indicators are utilized in this type of research. Furthermore, each approach necessitates adaptation to specific territories and conditions. In the context of this study, particular attention is directed towards the economic assessment type, predominantly achieved through the amalgamation of indicators, resulting primarily in a general analysis of natural resource potential.

All the outlined approaches, which are based on diverse assessments and types of natural resources, are inherently specific. Conversely, the composition and scale of natural resource utilization are historically variable and typically expand as the region's productive forces evolve, it is important to consider their development alongside those of neighboring regions. This expansion is attributed, firstly, to the increasing needs of people; secondly, to advancements in technological capabilities, such as the ability to extract and process resources; thirdly, to the economic feasibility of resource utilization; and fourthly, to the environmental consequences of human activity.

In the context of this study, the construction of a map depicting the resource potential of the region was mentioned in the findings of a literature review employing an economic approach. Here, we define the region's resource potential as the potential expressed through a set of indicators reflecting its economic, social, and environmental profiles, indicative of a commitment to sustainable development. The necessity to map the natural resource potential of the region arises from various economic, environmental, and social factors:

- Economic reasons stem from the significance of incorporating economic evaluations of the value of natural resources into regional development plans and strategies.
- Environmental reasons emerge from the influence of environmental factors on decision-making in management.
- Social reasons are shaped by plans for the socio-demographic development of the regions.

Literature review

The interdisciplinary nature of this study is evident not only in the examination of modern trends in interpreting regional resources and resource potential but also in the exploration of cartography types. The research revealed that integrated mapping of regional resources, which encompasses not only specific resources (such as forests, minerals, or labor resources), has its own characteristics. For instance, Paretti et al. proposed the "Resource Value Mapping" methodology, which aims to map and classify activities along with their associated energy/resource consumption. This method is founded on quantitative support to determine the marginal criticality (lean attitude) linked to production activities and to provide consistent guidance for decision-making in enhancing management strategies. To enhance the map's applicability, the authors recommend utilizing two performance indicators: the cost index and the Mouda index [9].

Pearson, Rzotzkevich and others highlight discrepancies between resource consumption and accessibility, attributing them to geographical features of the region that evolve over time. As a result, information on maps necessitates continuous updating. Understanding the social reaction to these changes is crucial for regional management to effectively respond. According to them, and pertinent to this study, updating integrated (or joint, as per the authors) maps with reliable information is essential for long-term planning in regions experiencing both climatic and social changes [10].

Bailey, Drake, and others stress the importance of integrated mapping for understanding the connections between human activities and the environment in a given area. They highlight the need to combine various data sources across different scales, despite the challenges associated with collecting and adapting data. Their proposed method involves merging household data with detailed maps to identify key areas of resource usage, creating a spatial «footprint» of human activity. This map, termed as «a map of community use of the landscape,» can then be combined with remote sensing data to evaluate environmental impacts. They tested this approach in three regions, which will also inform the main project implementation [11].

Similarly, Song, Dai, and colleagues propose an aggregated downscaling model that integrates large-scale spatial datasets such as population density, GDP, and urban development to map scrap inventories in China. This model predicts scrap concentration in major cities, taking into account various indicators. Its significance lies in its potential to guide policymaking and business decisions regarding resource efficiency, waste management, and environmental sustainability at a regional or city level. The main methods employed in this study will inform the selection of cartographic criteria for our project [12].

One of the primary objectives of mapping the interaction between nature and society is to uncover various aspects of environmental management, including ecosystems, socio-economic factors, and environmental impacts, through integrated maps. This allows for understanding how global environmental changes influence human activities and land and resource utilization. Furthermore, as stated in the research conducted by Coetzer-Hanak and colleagues, integrated maps assist in recognizing the interconnections between environmental mechanisms and human behaviors [13]. To achieve this goal, there is a need to establish complex and comprehensive indicators and criteria in the creation of maps, enabling the assessment and reflection of the efficiency of natural resource utilization, the scale of environmental impacts resulting from economic activities, and the characteristics of socio-economic development in specific regions. However, as noted by Dubovik, these data often operate on different spatial and temporal scales compared to human activities within the region, posing numerous challenges in integrating remote sensing data (such as ensuring accuracy levels compared to other datasets and developing generalized methods for various types of land cover) and data on human activities [14].

Meili and Stooki suggest incorporating regional financial resources, including household incomes and government purchases, into regional governance strategies due to the well-researched impact of bank investments on promoting the circular economy. Their analysis, drawing from more than a thousand observations, highlights the separate and significant influences of corporate and regional financial resources, underscoring their combined effect on promoting circular economy principles in regional governance [15].

In research conducted by M. Ahmad, Z. Ahmad, and their colleagues, a one-way causal relationship is identified between financial development, eco-innovation, income from natural resources, and geopolitical risks. They demonstrate through econometric analysis that the first two factors positively contribute to sustainable development, while the latter hinder the Environmental, Social, and Governance (ESG) potential of regions. The authors recommend enhancing international collaboration in regional governance and risk-sharing initiatives based on these findings [16]. Asteriou and Spanos stress the pivotal role of financial development in fostering sustainable development, as it provides crucial mechanisms for mobilizing resources, managing risks, and promoting inclusive growth, thereby aiding in the establishment of sustainable and economically prosperous regions [17]. Jalilian and Kirkpatrick's research underscores how financial resources within a region can stimulate economic growth and alleviate poverty, essential for sustainable regional development. They argue that an efficient financial system can efficiently pool and utilize savings, leading to increased levels of economic growth and investment [16,17,18]. Drawing insights from these studies, we concentrate on selecting public and corporate finance indicators to construct a resource provision map and criteria for effective corporate governance.

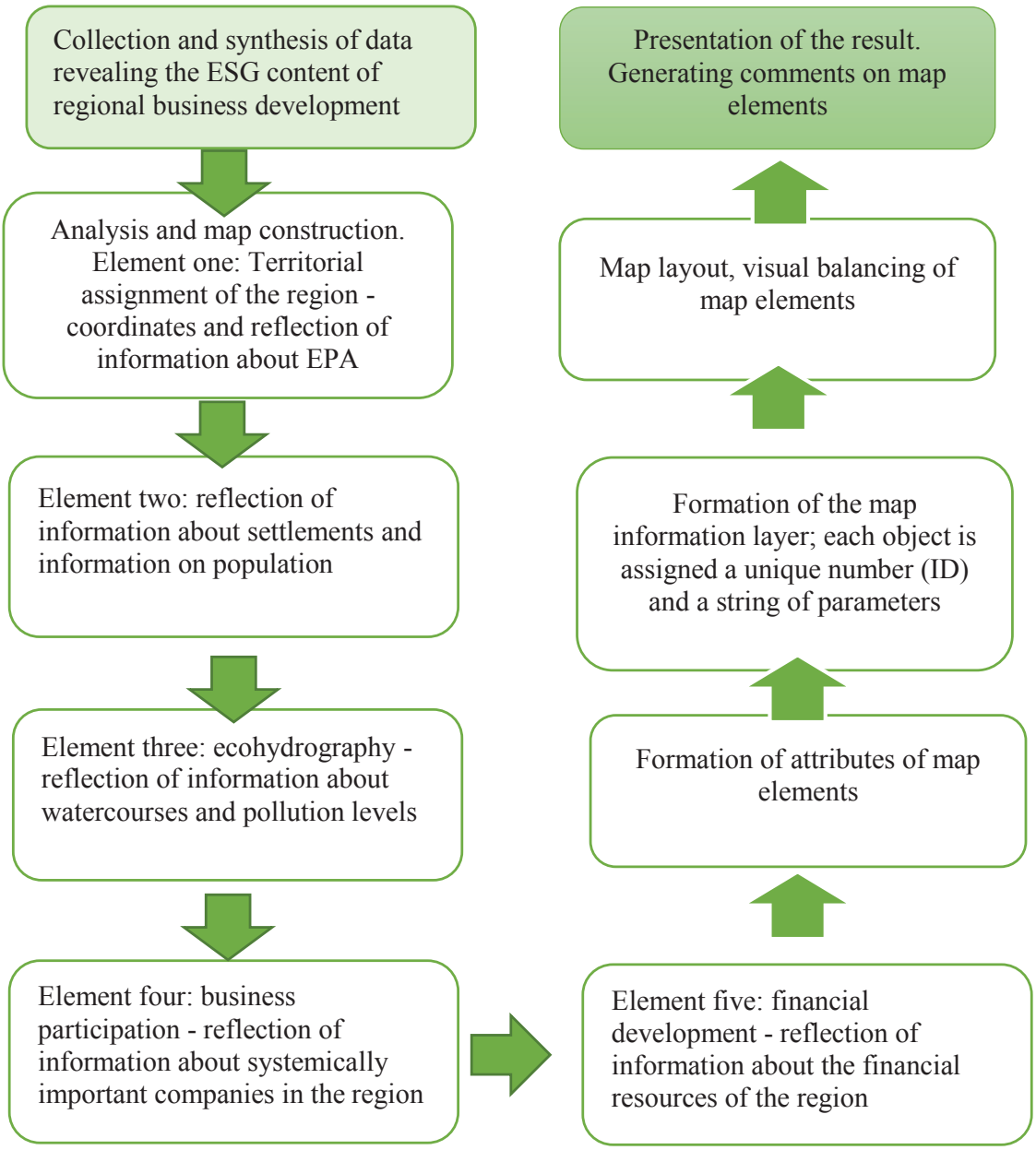
Results

The justification for employing the regional resource map methodology to reflect the balance of interests between businesses and regions towards achieving sustainable development goals has yielded several significant outcomes. The cartographic method offers numerous advantages over other means of presenting results that depict regional imbalances in natural resource potential and socio-economic development within countries and regions. This methodology can serve as a pivotal tool for comprehensive analysis of the results derived from mathematical modeling of phenomena and processes occurring globally and within regions. Without replacing statistical tables, cartographic representations provide a dynamic and static view of processes. They illustrate the geographical picture at a given moment (statics) and depict the dynamics of specific processes (dynamics) by highlighting changes over time on a single map or through a series of maps representing different periods.

The cartography methodology comprises three stages: data collection and synthesis, analysis and map construction, and layout and presentation of results [19]. The first two stages have seen minimal changes since the widespread adoption of Geographic Information Systems (GIS) systems. However, with the advancement of web technologies, there has been a shift in how information is conveyed to users, leading to an increased demand for web maps and the evolution of cartography as a tool for interdisciplinary research. In essence, cartographic images serve dual purposes. On one hand, they visually represent the textual content of studies, providing a spatial model of the written works. On the other hand, completed maps can serve as analytical tools, forming the basis for further scientific exploration and management decision-making. They aid in identifying regional characteristics of the natural resource base, assessing regional imbalances, and facilitating the analysis of situations or phenomena over time.

The study of cartography methodology materials has led to the formulation of the following approach to constructing a map of regional resource provision with a focus on the Sustainable Development Goals (SDGs), as presented in picture 2. Within this methodology, each group of indicators is designated as elements of the map. The ESA (Elementary Soil Area) element, for instance, provides information about natural reserves, soil combinations, and road transport routes, which are essential for planning cultivated areas [20]. Following digitization and object description, object attributes are established. A separate database is created for each layer, containing attribute information about the object, with data entered individually for each object. Object attribute fields indicating the type of localization are created during object description in each electronic layer.

The electronic version of the map is developed using graphic editors such as CorelDraw, MapINFO, GoogleEarth, NVDI, ArcGIS, McsPowerBI, etc., across various operating systems. Subsequently, each element on the electronic map is assigned a unique number (ID) to ensure unambiguous identification.



Picture 2 – Methodology of the regional resource provision map

Note: Compiled by the authors on the base of [21–24].

The literature review facilitated the identification of the following group of indicators for the resource supply map of regions. It is noteworthy that all indicators can be divided into two groups based on the criterion of dynamism: static and dynamic indicators:

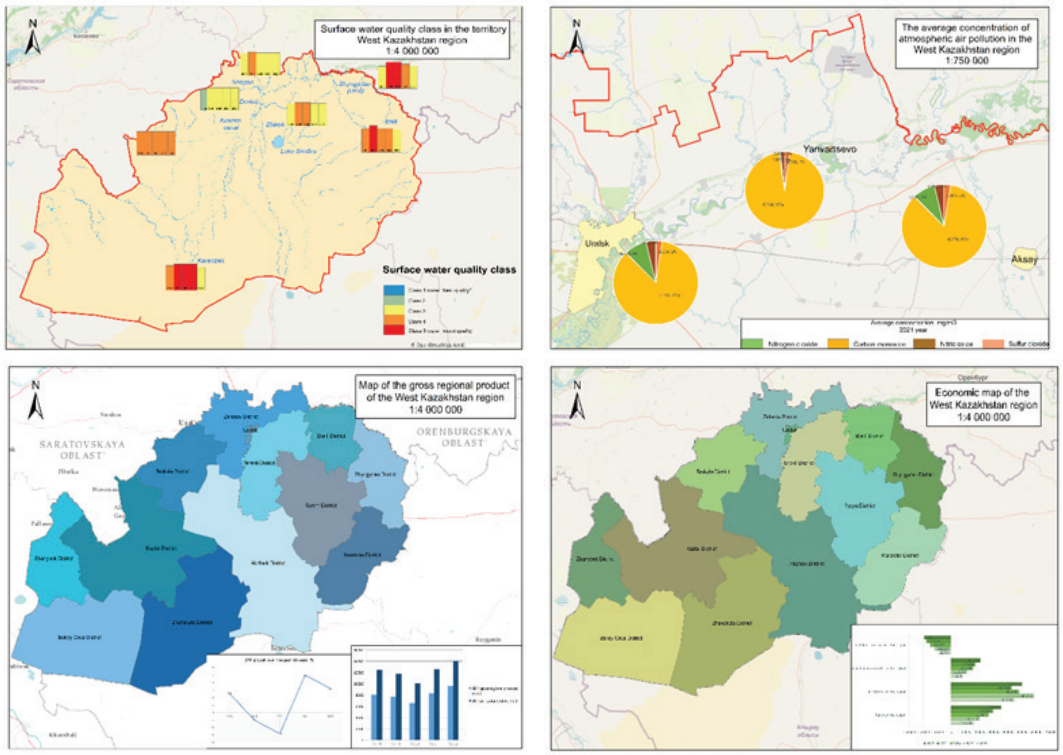
- Natural geographical element (static);
- Social element (dynamic);
- Economic element (dynamic).

The developed methodology was tested using data from the West Kazakhstan region as an example. This region was chosen because it has comprehensive information on all Environmental, Social, and Governance (ESG) components, and there are business entities that produce reports on sustainable development. The results of the data collection are presented in table 1 (p. 131).

As part of this publication, we present the results of the first and last stages in the process of testing the methodology presented in the picture 2. To build the map, two tools were used: Microsoft Power BI and SuperMap. The SuperMap results are presented in the picture 3 (p. 132).

Table 1 – Used data for cartography using the example of West Kazakhstan region

Indicators	Units	2018	2019	2020	2021	2022	2023
Static indicators							
Surface waters of the region	Name	Rivers Ural, Ilek, Utva, Barbastau, Solyanka, Embulatovka, Bykovka, Chagan, Derkulom, Chizha-1, Chizha-2, Dura, Ulenta, Buldurta, Kaldygayta, Bolshoi and Maly Uzen Lakes: Kamysh-Samarskie, Ashche-Uzek, Shalkar and Alzhan					
Minerals of the region		gas and gas condensate, oil, borate ores, oil shale, potassium-magnesium salts, cement raw materials, expanded clay, construction and alluvial sand.					
Forests	Thousand hectares	216.8 thousand hectares, incl. area covered with forest 87.8 th. h.					
pastures,		6187,5 th. h.					
region area,	Thousand sq. km	151.3 thousand sq. km, which is 5.6% of the territory of Kazakhstan					
Dynamic indicators (changing annually)							
population	thousand people	646, 9	652,3	656,8	661,3	683,3	693,7
Self-employed population,		118 ,2	117,5	88,6	88,8	88,3	88,8
Employed population,		321,0	321,6	321,0	322,3	330,9	333,3
Unemployed population		16,4	16,4	16,8	16,8	17,4	17,0
GRP	Million $	8095.7	7697,9	6625,4	8292,9	9631,5	10804,3
GRP per capita,	$	12514,6	11801,2	10087,4	12540,2	14095,6	6956,6
GRP growth over the past 10 years,	%	12.9	-5	-14	25	16	12
Regional budget,	Mln tenge	161898	202124	263961	295655	355921	453047
Investments in the region ,		450382	586 265	481485	428742	501155	546211
subventions + regional subsidies,		74809	111139	154688	171484	207774	262902
net deficit or surplus of the region (without subsidies),		-83377	-120228	-151697	-178635	-193115	-246303
Maximum single con -centration of carbon monoxide, Uralsk	mg\m3	9,7	11,52	11,49	21,471	13,04	12,56
Maximum single con -centration of carbon monoxide, Aksay		3,4033	4,99	5,92	3,589	7,03	19,46
Level of surface water pollution, Zhaiyk: Nitrite nitro-gen, total iron, Phenols	Max 5, more than 5 – higher pollution	3	4	4	>3	3	2
Karaozen River: chlorides, magnesium		4	>5	>5	>5	3	3
Note: Compiled by the authors on the base of [25–28].							



Picture 3 – Maps by level of environmental sustainability,
GRP and financial development of the region

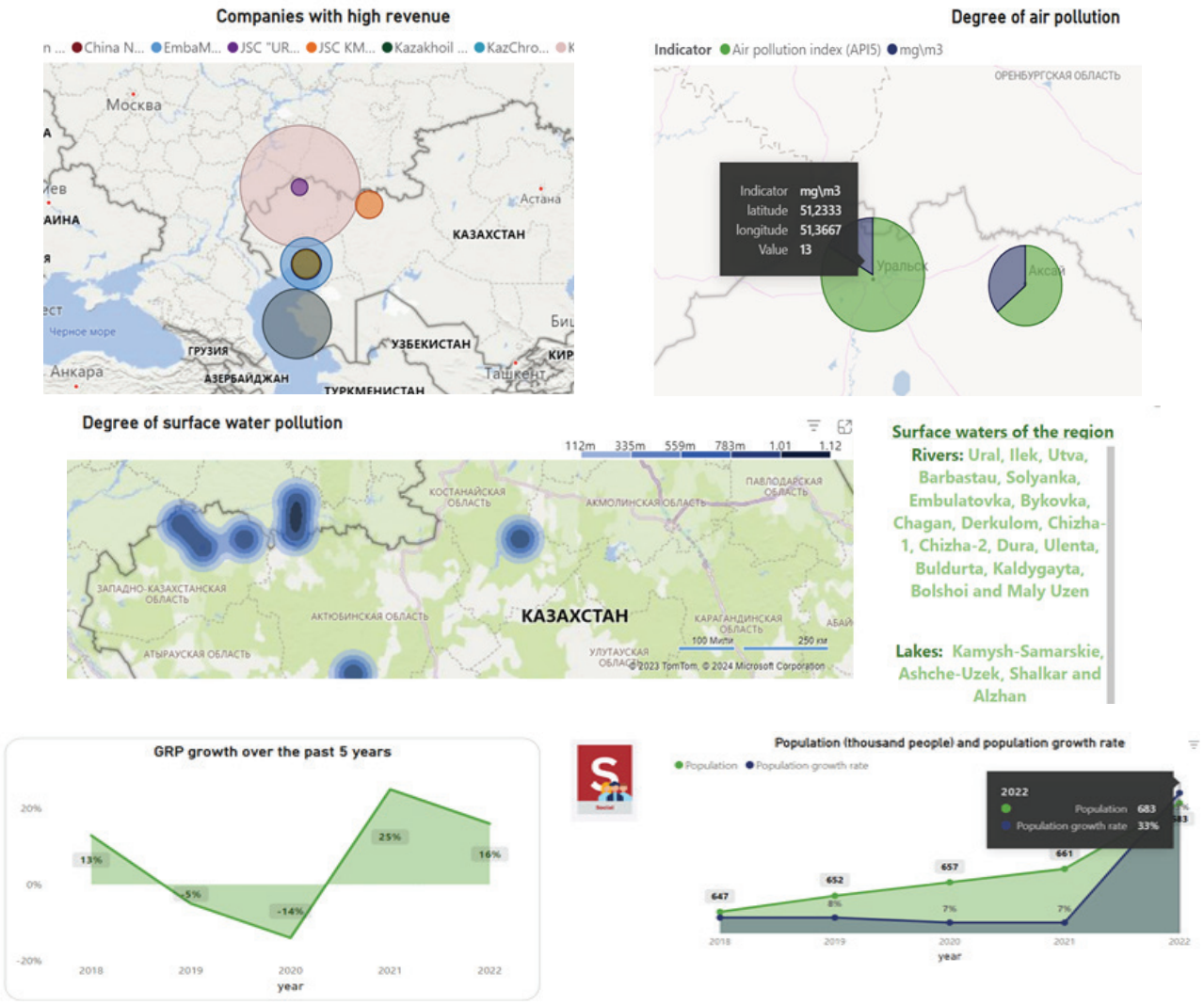
Note: Compiled using SuperMap Lab.

Presenting research results at the testing stage through Microsoft Power BI provides a more interactive version of the web map, as depicted in the picture 4 (p.133).

Discussion

The development of a modern map primarily involves two options: creating a map in image format or utilizing existing geoportals and mapping services while preserving spatial reference and enabling spatial analysis. In this study (project AP19678012), we adopt the first approach, as it aligns with the philosophy of using the map to assess the regional balance of interests between businesses and the region. A map in this format is static and essentially functions as a digital equivalent of a paper map, without the capability for additions. While placing it on map services enables data supplementation, analysis, and synthesis, this approach entails significantly higher costs for collecting and systematizing data, as well as ensuring its constant updating. Additionally, it requires significant storage capability and measures for data security, suggesting that it should be implemented as a distinct, independent project.

The study revealed that the practicality of integrated maps, including the Regional Resource provision Map presented, is difficult by the capabilities of participants and researchers. Differences in levels of ESG perception among businesses, cartographic knowledge, and experience in interpreting interdisciplinary connections pose challenges. Furthermore, incorporating external data can be a challenging endeavor. It was specifically determined that for integrated data, the cartography approach is the most appropriate. This is because integrated data without scaling or georeferencing has limited usefulness beyond the entity that produced it and is less likely to be incorporated by governments, researchers, or policymakers into forthcoming studies or regional management strategies. Therefore, the methodology outlined here aims to emphasize and validate the importance of the cartography approach in presenting multi-dimensional data aimed at a shared objective.



Picture 4 – Maps by level of environmental sustainability,
business concentration and financial development of the region

Note: Compiled using Microsoft Power BI.

Conclusion

In this study, we introduce a novel approach to mapping regional resources by combining business survey methodology and economic development analysis with environmental surveys. This approach highlights the region's potential for achieving sustainable development goals. We developed this methodology to address challenges associated with linking data at the regional level to inform management decisions and identify strategies and tools for implementing sustainable development goals. This methodology considers regional variations in resource utilization and aims to map the region's primary resources while assessing their environmental impact. Our main objectives were to (1) identify key approaches to assessing resource provision and the primary indicators underlying them for creating a map, and (2) outline a methodology that enables us to understand the essence, significance, and applicability of the Resource provision Map for guiding management decisions, particularly at the regional level of authorities and management.

The study of this issue has highlighted that the challenge of mapping the resource provision of a region is not only labor-intensive due to the need to gather extensive data across various dimensions,

including environmental sustainability, social development aspects, and financial indicators for assessing corporate and regional management. Creating a map according to this methodology across an entire country also requires significant funding, time, and attention to issues of data storage and security. Moreover, a critical concern that further compounds these expenses is the imperative of keeping data up to date, necessitating constant data supplementation. This underscores the rationale for initiating and implementing a separate project dedicated to developing a map of regional resource provision. In this study, the aim was to develop the methodology for the Resource Provision Map and validate it using a specific region in Kazakhstan as an example.

Funding information. This research is funded by the Committee of Science of the Ministry of Science and Higher Education of the Republic of Kazakhstan (Grant AP19678012) «The Triune Concept of Sustainable Development (ESG): business interests in the context of balanced regional development».

REFERENCES

1 Reta B.A., Soromessa T. Integrated assessment and mapping of provisioning services for sustainable management of natural resources, the case of Lake Hawassa Basin, Ethiopia // Heliyon. 2024. Volume 10. Issue 3. P. 15

2 Oberle B., Bringesou S., Hatfield-Dodds S., Hellweg S., Schandl H., Clement J. World Resource Outlook. UN, 2019.

3 Красильников П.А., Кустов И.В. Представление результатов геоинформационно-картографического моделирования природно-ресурсного потенциала в интернет-среде // Современные проблемы науки и образования. – 2013. – № 5.

4 Сальников А.Л., Пищухина Е.Ю., Шабанов Д.И., Сальникова Н.А. Методология оценки природно-ресурсного потенциала муниципальных образований // Известия вузов. Северо-кавказский регион. Естественные науки. – 2010. – № 3. – С. 94–99.

5 Гудкова Т.В., Синицын С.А. Цифровизация как фактор устойчивого развития компании // Государственное управление. – 2022. – № 93. – С. 121–133.

6 Саркытова А.А., Ряховская А.Н., Конырбеков М.Ж. Аймақтық экономиканың бәсекеге қабілеттілік мәселелері // Вестник университета Туран. – 2022. – № 4(96). – С. 226–238.

7 Касымова С. Егембердиева С. Мустафаев К. Совершенствование индикаторов оценки «зеленой экономики» для устойчивого развития Кызылординского региона // Вестник ЕНУ им. Л. Гумилева. Серия Экономическая. – 2023. – № 3. – С. 9–26.

8 Орлов П.Ю., Журкин И.Г., Камынина Н.Р., и др. Анализ опыта оценки природно-ресурсного потенциала и устойчивого развития // Известия вузов. Геодезия и аэрофотосъемка. – 2023. – 67.04. – С. 45–64.

9 Papetti A., Menghi R., Di Domizio G., Germani M., Marconi M. Resources value mapping: A method to assess the resource efficiency of manufacturing systems // Applied Energy. 2019. Volume 249. P. 326–342.

10 Pearson L.A., Rzotkiewicz A., Mwita E., Lopez C., Richardson R. Participatory mapping of environmental resources: A comparison of a Tanzanian pastoral community over time // Land Use Policy. 2017. Volume 69. P. 259–265.

11 Bailey M.K., Drake D.M., Salerno J., Cassidy L., Gaughan E.A., Stevens R.F., Pricope G.N., Woodward D.K., Luwaya H., Hartter J. Mapping natural resource collection areas from household survey data in Southern Africa // Applied Geography. 2020. Volume 125. C. 102326.

12 Song L., Dai S., Cao Z., Liu Y., Chen W. High spatial resolution mapping of steel resources accumulated above ground in mainland China: Past trends and future prospects // Journal of Cleaner Production. 2021. Volume 297. No. 15. P. 126482.

13 Coetzer-Hanack K.L., Witkowski E.T.F., Erasmus B.F.N. Thresholds of change in a multi-use conservation landscape of South Africa: historical land-cover, future transformation and consequences for environmental decision-making // Environmental Conservation. 2016, no. 43(3), pp. 253–262.

14 Dubovyk O. The role of Remote Sensing in land degradation assessments: opportunities 617 and challenges // European Journal of Remote Sensing. 2017, no. 50(1), pp. 601–613.

15 Meili R. Stucki TMoney matters: The role of money as a regional and corporate financial resource for circular economy transition at firm-level // Research Policy. 2023. Volume 52. Issue 10. P. 104884.

16 Ahmad M., Ahmed Z., Alvarado R., Hussain N., Khan S. Financial development, resource richness, eco-innovation, and sustainable development: Does geopolitical risk matter? // Journal of Environmental Management. 2024. Volume 351. P. 119824.

17 Asteriou D., Spanos K. The relationship between financial development and economic growth during the recent crisis: evidence from the EU // Finance Res. Lett. 2019, no. 28, pp. 238–245.

18 Jalilian H., Kirkpatrick C. Does financial development contribute to poverty reduction? // Development Study. 2005, no. 41, pp. 636–656.

19 Cruciani C., Santagiustina C. The present and future of sustainability disclosure in equity investment funds' pre-contractual documents: Mapping ESG discourse through STM // Finance Research Letters. 2023, no. 58, pp. 104033.

20 Wang Y., Sun Y., Cheng X. A review of regional and Global scale Land Use/Land Cover (LULC) mapping products generated from satellite remote sensing // Journal of Photogrammetry and Remote Sensing. 2023. Volume 206. P. 311–334.

21 Kalinauskas M., Shuhani Y., Paulo P. Mapping ecosystem services in protected areas. A systematic review / /Science of The Total Environment. 2024. Volume 912. P. 169248.

22 Huang F., Jiang S., Chen J. Mapping local climate zones for cities: A large review // Remote Sensing of Environment. 2023. Volume 292. P. 113573.

23 Suleymanov A., Arrouays D., Savin I. Digital soil mapping in the Russian Federation: a review // Geoderma Regional. 2024. Volume 36. P. e00763.

24 Pedruzzi R., Silva A.R., Moreira D.M. Review of mapping analysis and complementarity between solar and wind energy sources // Energy. 2023. Volume 283. P. 129045.

25 Бюро национальной статистики АСПРРК Краткие итоги социально-экономического развития регионов. Западно-Казахстанская область. URL: https://stat.gov.kz/ru/region/zko

26 Ежемесячный информационный бюллетень о состоянии окружающей среды. Казгидромет. Западно-Казахстанская область URL: https://www.kazhydromet.kz/ru/ecology/ezhemesyachnyy-informacionnyy-byulleten-o-sostoyanii-okruzhayuschey-sredy

27 Статистический бюллетень МФ РК на 01.07.2023. Исполнение местных бюджетов. Западно-Казахстанская область. URL: https://www.gov.kz/memleket/ entities/minfin/documents/details/503077?lang=ru

28 Информационный сервис для организаций публичного интереса и субъектов рынка ценных бумаг. Депозитарий финансовой отчетности Министерства финансов. URL: https://cabinet-online-reports.dfo.kz/ru/dcr-information

REFERENCES

1 Reta B.A., Soromessa T. (2024) Integrated assessment and mapping of provisioning services for sustainable management of natural resources, the case of Lake Hawassa Basin, Ethiopia // Heliyon. Volume 10. Issue 3. P. 15. (In English).

2 Oberle B., Bringesou S., Hatfield-Dodds S., Hellweg S., Schandl H., Clement J. (2019) World Resource Outlook. UN. (In English).

3 Krasil'nikov P.A., Kustov I.V. (2013) Predstavlenie rezul'tatov geoinformacionno-kartograficheskogo modelirovanija prirodno-resursnogo potenciala v internet-srede // Sovremennye problemy nauki i obrazovanija. No. 5. (In Russian).

4 Sal'nikov A.L., Pishhuhina E.Ju., Shabanov D.I., Sal'nikova N.A. (2010) Metodologija ocenki prirodno-resursnogo potenciala municipal'nyh obrazovanij // Izvestija vuzov. Severo-kavkazskij region. Estestvennye nauki. No. 3. P. 94–99. (In Russian).

5 Gudkova T.V., Sinicyn S.A. (2022) Cifrovizacija kak faktor ustoĭchivogo razvitija kompanii // Gosudarstvennoe upravlenie. No. 93. P. 121–133. (In Russian).

6 Sarkytova A.A., Rähovskaia A.N., Konyrbekov M.J. (2022) Aimaqtyq ekonomikanyñ bäsekege qabılettılık mäseleleri // Vestnik universiteta Turan. No. 4(96). P. 226–238. (In Kazakh).

7 Kasymova S. Egemberdieva S. Mustafaev K. (2023) Sovershenstvovanie indikatorov ocenki «zelenoj jekonomiki» dlja ustojchivogo razvitija Kyzylordinskogo regiona // Vestnik ENU im. L. Gumileva. Serija Jekonomicheskaja. No. 3. P. 9–26. (In Russian).

8 Orlov P.Ju., Zhurkin I.G., Kamynina N.R., i dr. (2023) Analiz opyta ocenki prirodno-resursnogo potenciala i ustojchivogo razvitija // Izvestija vuzov. Geodezija i ajerofotos#emka. 67.04. P. 45–64. (In Russian).

9 Papetti A., Menghi R., Di Domizio G., Germani M., Marconi M. (2019) Resources value mapping: A method to assess the resource efficiency of manufacturing systems // Applied Energy. Volume 249. P. 326–342. (In English).

10 Pearson L.A., Rzotkiewicz A., Mwita E., Lopez C., Richardson R. (2017) Participatory mapping of environmental resources: A comparison of a Tanzanian pastoral community over time // Land Use Policy. Volume 69. P. 259–265. (In English).

11 Bailey M.K., Drake D.M., Salerno J., Cassidy L., Gaughan E.A., Stevens R.F., Pricope G.N., Woodward D.K., Luwaya H., Hartter J. (2020) Mapping natural resource collection areas from household survey data in Southern Africa // Applied Geography. Volume 125. P. 102326. (In English).

12 Song L., Dai S., Cao Z., Liu Y., Chen W. (2021) High spatial resolution mapping of steel resources accumulated above ground in mainland China: Past trends and future prospects // Journal of Cleaner Production. Volume 297. No. 15. P. 126482. (In English).

13 Coetzer-Hanack K.L., Witkowski E.T.F., Erasmus B.F.N. (2016) Thresholds of change in a multi-use conservation landscape of South Africa: historical land-cover, future transformation and consequences for environmental decision-making // Environmental Conservation, no. 43(3), pp. 253–262. (In English).

14 Dubovyk O. (2017) The role of Remote Sensing in land degradation assessments: opportunities 617 and challenges // European Journal of Remote Sensing, no. 50(1), pp. 601–613. (In English).

15 Meili R. (2023) Stucki TMoney matters: The role of money as a regional and corporate financial resource for circular economy transition at firm-level // Research Policy. Volume 52. Issue 10. P. 104884. (In English).

16 Ahmad M., Ahmed Z., Alvarado R., Hussain N., Khan S. (2024) Financial development, resource richness, eco-innovation, and sustainable development: Does geopolitical risk matter? // Journal of Environmental Management. Volume 351. P. 119824. (In English).

17 Asteriou D., Spanos K. (2019) The relationship between financial development and economic growth during the recent crisis: evidence from the EU // Finance Res. Lett, no. 28, pp. 238–245. (In English).

18 Jalilian H., Kirkpatrick C. (2005) Does financial development contribute to poverty reduction? // Development Study, no. 41, pp. 636–656. (In English).

19 Cruciani C., Santagiustina C. (2023) The present and future of sustainability disclosure in equity investment funds' pre-contractual documents: Mapping ESG discourse through STM // Finance Research Letters, no. 58, pp. 104033. (In English).

20 Wang Y., Sun Y., Cheng X. (2023) A review of regional and Global scale Land Use/Land Cover (LULC) mapping products generated from satellite remote sensing // Journal of Photogrammetry and Remote Sensing. Volume 206. P. 311–334. (In English).

21 Kalinauskas M., Shuhani Y., Paulo P. (2024) Mapping ecosystem services in protected areas. A systematic review / /Science of The Total Environment. Volume 912. P. 169248. (In English).

22 Huang F., Jiang S., Chen J. (2023) Mapping local climate zones for cities: A large review // Remote Sensing of Environment. Volume 292. P. 113573. (In English).

23 Suleymanov A., Arrouays D., Savin I. (2024) Digital soil mapping in the Russian Federation: a review // Geoderma Regional. Volume 36. P. e00763. (In English).

24 Pedruzzi R., Silva A.R., Moreira D.M. (2023) Review of mapping analysis and complementarity between solar and wind energy sources // Energy. . Volume 283. P. 129045. (In English).

25 Bjuro nacional'noj statistiki ASPRRK Kratkie itogi social'no-jekonomicheskogo razvitija regionov. Zapadno-Kazahstanskaja oblast'. URL: https://stat.gov.kz/ru/region/zko. (In Russian).

26 Ezhemesjachnyj informacionnyj bjulleten' o sostojanii okruzhajushhej sredy. Kazgidromet. Zapadno-Kazahstanskaja oblast' URL: https://www.kazhydromet.kz/ru/ecology/ezhemesyachnyy-informacionnyy-byulleten-o-sostoyanii-okruzhayuschey-sredy. (In Russian).

27 Statisticheskij bjulleten' MF RK na 01.07.2023. Ispolnenie mestnyh bjudzhetov. Zapadno-Kazahstanskaja oblast'. URL: https://www.gov.kz/memleket/ entities/minfin/documents/details/503077?lang=ru/ (In Russian).

28 Informacionnyj servis dlja organizacij publichnogo interesa i sub#ektov rynka cennyh bumag. Depozitarij finansovoj otchetnosti Ministerstva finansov. URL: https://cabinet-online-reports.dfo.kz/ru/dcr-information. (In Russian).

А.А. АДАМБЕКОВА,*[1]
э.ғ.д., профессор.
*e-mail: ainatas0408@gmail.com
ORCID ID: 0000-0003-2026-4321
М.М. МҰҚАН,[2]
PhD, қауымдастырылған профессор.
e-mail: moldir.mukan@narxoz.kz
ORCID ID: 0000-0001-8930-2176
Б.У. ТУРЕБЕКОВА,[1]
э.ғ.к., қауымдастырылған профессор.
e-mail: bazhan.turebekova@kaznu.edu.kz
ORCID ID: 0000-0003-0946-9211
Р.А. САЛИМБАЕВА,[2]
э.ғ.к., қауымдастырылған профессор.
e-mail: salimbaeva.rasima@narxoz.kz
ORCID ID:0000-0003-0096-5657
[1]әл-Фараби атындағы Қазақ ұлттық университеті,
Алматы қ., Қазақстан
[2]Нархоз университеті,
Алматы қ., Қазақстан

АЙМАҚТАРДЫ РЕСУРСТЫҚ ҚАМТАМАСЫЗ ЕТУ КАРТАСЫ: ӘДІСТЕМЕ ЖӘНЕ НЕГІЗГІ ТӘСІЛДЕР

Аңдатпа

Аймақтардың ресурстық әлеуетін басқарудың жүйелі тәсілін жүзеге асыру арқылы тұрақты даму мақсаттарына қол жеткізу аймақтық менеджменттің кезек күттірмейтін міндеттерінің бірі. Карталау әдісі әртүрлі өлшем масштабтарын қамтитын бірнеше дерек көздерін біріктіруге мүмкіндік беретін тәсіл ретінде белгілі. Зерттеудің мақсаты аймақтардың тұрақты дамуына жағдай жасау үшін оларды ресурстармен қамту картасын әзірлеуге бағытталған. Зерттеудің құндылығы оның пәнаралық көзқарасымен анықталады, бұл картография ғылымының құралдары арқылы аймақтардың ESG міндеттеме критерийлерін біріктіруге мүмкіндік берді. Әдістеме ресурстық қамтылған картасын жасау бойынша әрекеттер тізбегі түрінде ұсынылған. Әзірленген әдістеменің ғылыми және қолданбалы негізділігі оның Батыс Қазақстан облысының картасын дайындау мысалында сынақтан өтуімен расталады. Ғылыми жұмыстың нәтижелері Қазақстан аймақтарын ресурстық қамтамасыз етудің кешенді карталарын құру мәселелерін одан әрі зерттеу перспективаларына дәлелденген аргументтерді қамтиды. Картографияның негізгі тәсілдері аймақтардың табиғи, еңбек, қаржылық, инфрақұрылымдық мүмкіндіктерін және экологиялық тәуекелдерді бағалауды көрсететін ресурстық әлеуетті ескере отырып, аймақтық өзара әрекеттесу негізінде басқару шешімдерін қабылдауда ұқсас карталарды пайдалану бойынша ұсыныстарды тұжырымдауға мүмкіндік береді. Әзірленген ұсыныстарды тестілеу Microsoft Power BI және SuperMap (әл-Фараби атындағы ҚазҰУ «Геоақпараттық картография» зертханасы) арқылы жүргізілді.

Тірек сөздер: карта, аймақ, ресурстармен қамтамасыз ету (қамту), тұрақты даму, картография, аймақтық басқару, әдістеме.

А.А. АДАМБЕКОВА,*[1]
д.э.н, профессор.
*e-mail: ainatas0408@gmail.com
ORCID ID: 0000-0003-2026-4321
М.М. МҰҚАН,[2]
PhD, ассоциированный профессор.
moldir.mukan@narxoz.kz
ORCID ID: 0000-0001-8930-2176
Б.У. ТУРЕБЕКОВА,[1]
к.э.н, ассоциированный профессор.
bazhan.turebekova@kaznu.edu.kz
ORCID ID: 0000-0003-0946-9211
Р.А. САЛИМБАЕВА,[2]
к.э.н., ассоциированный профессор.
salimbaeva.rasima@narxoz.kz
ORCID ID: 0000-0003-0096-5657
[1]Казахский национальный
университет им. аль-Фараби,
г. Алматы, Казахстан
[2]Университет Нархоз,
г. Алматы, Казахстан

КАРТА РЕСУРСНОГО ОБЕСПЕЧЕНИЯ РЕГИОНОВ: МЕТОДОЛОГИЯ И КЛЮЧЕВЫЕ ПОДХОДЫ

Аннотация

Достижение целей устойчивого развития через реализацию системного подхода к управлению ресурсным потенциалом регионов является одной из актуальных задач в региональном управлении. Метод картографии известен как подход, позволяющий интегрировать несколько источников данных, охватывающих разные масштабы измерений. Данное исследование имеет своей целью разработать карту ресурсного обеспечения регионов для создания условий их устойчивого развития. Ценность проведенного исследования определена его междисциплинарным подходом, позволившим объединить критерии ESG приверженности регионов посредством инструментов картографической науки. Методология представлена в виде последовательности действий по составлению карты ресурсного обеспечения. Научная и прикладная состоятельность разработанной методологии подтверждена ее апробацией на примере представленной карты Западно-Казахстанской области. Результаты научной работы содержат доказанные аргументы перспективности дальнейших исследований по проблемам построения интегрированных карт ресурсного обеспечения регионов Казахстана. Ключевые подходы по картографии позволяют сформировать рекомендации по пользованию аналогичными картами при принятии управленческих решений на основе межрегионального взаимодействия с учетом ресурсного потенциала, отражающего природные, трудовые, финансовые, инфраструктурные возможности регионов и оценки экологических рисков. Апробирование выработанных рекомендаций проводилось с помощью Microsoft Power BI и SuperMap (лаборатории геоинформационной картографии КазНУ им. аль-Фараби).

Ключевые слова: карта, регион, ресурсное обеспечение, устойчивое развитие, картография, региональное управление, методология.