

## IMPROVEMENT OF THE ENVIRONMENT BASED ON THE ASSESSMENT OF KNOWLEDGE AND UNDERSTANDING OF THE ECOSYSTEM APPROACH BY CIVIL SERVANTS IN KAZAKHSTAN

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**Abstract.** The ecology of Kazakhstan requires improvement with the involvement of both the population and specialists from various organizations, including government officials. The purpose of this article was to assess knowledge, understanding of environmental problems in Kazakhstan by representatives of state authorities through a survey system.

For this purpose, we surveyed 256 employees of state institutions of Kazakhstan in 2019. The survey questions related to the current system of state management of natural resources and the current environmental situation in Kazakhstan. The assessment of the readiness of public administration institutions in Kazakhstan showed the absence of interdepartmental communication and an integrated approach to improve the ecology of Kazakhstan. Environmental legislation is considered more of narrow departmental interests, without taking into account an integrated approach to biodiversity conservation.

**Keywords:** management, ecosystem approach, efficiency, motivation, survey.

**JEL codes:** H76, Q57, Q58

**Аңдатпа.** Қазақстан экологиясы халықты да, түрлі ұйымдардың мамандарын, соның ішінде мемлекеттік қызметкерлерді тарта отырып, жақсартуды талап етеді. Бұл мақаланың мақсаты - мемлекеттік орган өкілдерінің сауалнама жүйесі арқылы Қазақстан экологиясының проблемаларын білуін, түсінуді бағалау.

Осы мақсатта 2019 жылы Қазақстанның мемлекеттік мекемелерінің 256 қызметкеріне сауалнама жүргізілді. Зерттеу сұрақтары табиғи ресурстарды мемлекеттік басқарудың қазіргі жүйесіне және Қазақстандағы қазіргі экологиялық жағдайға қатысты.

Қазақстандағы мемлекеттік басқару институттарының дайындығын бағалау ведомствоаралық байланыстың жоқтығын және Қазақстан экологиясын жақсартуға кешенді көзқарасты көрсетті. Қоршаған ортаны қорғау заңнамасы биологиялық әртүрлілікті сақтауға кешенді көзқарасты ескерместен, тар ведомстволық мүдделер болып саналады.

**Түйін сөздер:** менеджмент, экожүйелік тәсіл, тиімділік, мотивация, сауалнама.

**JEL кодтары:** H76, Q57, Q58

**Аннотация.** Экология Казахстана требует улучшения с вовлечением, как населения, так и специалистов различных организаций, включая государственных управленцев. Целью данной статьи являлась оценка знания, понимания проблем экологии Казахстана представителями государственной власти через систему опроса.

Для этой цели проводилось анкетирование 256 работников государственных учреждений Казахстана в 2019 году. Вопросы анкетирования относились к текущей системе государственного управления природными ресурсами и сложившейся экологической ситуации Казахстана.

Оценка готовности институтов государственного управления в Казахстане показала отсутствие межведомственной коммуникации и комплексного подхода в улучшении экологии Казахстана. Природоохранное законодательство рассматривается больше узковедомственными интересами, без учета интегрированного подхода по сохранению биоразнообразия.

**Ключевые слова:** управление, экосистемный подход, эффективность, мотивация, опрос.

**JEL коды:** H76, Q57, Q58

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### Introduction

The implementation by the state of one of the main tasks of ensuring sustainable economic growth and improving the quality of life of the population depends on the surrounding ecosystems (TEEB, 2010). That is why it is crucial to integrate ecosystem services into political decision-making processes related to the development and improvement of cities, the rational use of land, water, as well as flora and fauna. Among the complex of management problems, we examined the institutional diversity, both of the management methods themselves, and the heterogeneity of the subjects of natural resource management.

The growing popularity and actualization of the concept of ecosystem services (Schleyer et al., 2015; Braat and de Groot, 2012) can be traced in an increasing number of articles on this topic around the world. It is also since the emergence of the concept of ecosystem services has led to a shift in the paradigm of nature conservation from its intrinsic values towards a more anthropocentric side. The balance of the interests of nature in combination with the values of people, and their importance as a life support system on which people depend, are part of this paradigm (Loft et al., 2015; Folke 2007; Costanza et al., 1997). This transformation was accompanied by a change in our understanding of governance as a way of coordinating society (Kemp et al., 2005), in matters of environmental conservation. In studies of a similar nature, the methodology includes qualitative benchmarking, analysis of stated preferences, conditional valuation, economic experimentation, participatory social media analysis, simulation and role-playing games, and modelling of ecosystem services (Sattlera, 2018). The assessment of the priorities of local and regional managers by re-analyzing data from a nationwide stakeholder survey on environmental remediation, carried out by Hagger et al. (2017), was taken into account when forming the list of questions in the questionnaire.

Also, semi-structured interviews with managers for assessing climate risks are used in climatic conditions similar to Kazakhstan in Australia (Matzeka, 2019). Also, researchers note the lack of interaction

and cooperation of numerous participants involved in the management of ecosystem services as the main problem of the inefficiency of the management system (Lienhoopa, 2018). Some authors consider the management system for ecosystem services as the formation and institutionalization of mechanisms for mutual decision-making by involved entities (Rival and Muradian, 2013). According to Primmer and Furman (Primmer and Furman, 2012), ecosystem service management brings together knowledge from different disciplines and stakeholders who understand and manage ecosystem services and benefit from them.

In turn, the main problem in managing ecosystem services is the multiplicity of actors involved (Loft et al., 2015). As shown by various approaches to assessing the value of nature, nature is a multifaceted source of human well-being, and the degradation of ecosystems leads to huge costs of the national economy (Pascual et al., 2017; Costanza et al., 2014). However, the stakeholders in the management of ecosystem services are not only numerous but also diverse and treat the structure of ecosystem services in very different ways (Ruckelshaus et al., 2015). Their interests in ecosystem management differ depending on whether they consume or provide ecosystem services (Rode et al., 2016). Since beneficiaries and suppliers tend to be dispersed vertically at several levels of government and horizontally across sectors, there is often a lack of coordination between them (Plieninger et al. 2012; Wüstemann et al., 2017). Also, they hold multiple values, with individual value judgments often lacking transparency and a shared understanding of what is perceived as a service and what are the appropriate authorities that value the importance of the service (Vatn, 2005; Martín-López et al., 2014; Díaz et al., 2015; Maier and Feest, 2016). The perceived benefits of the ecosystem expressed in the words of the people themselves, contribute to a more accurate assessment of ecosystem services, the development of consumption policies, improved user experience and the encouragement of pro-ecological behaviour. (Asah, 2014). It is assumed that the success of efforts to change attitudes towards nature depends on the extent to which such efforts are aimed at

fulfilling the functions of these attitudes and behaviour (Smith et al., 1956, Katz, 1960). That is, if managers want to effectively compose and regulate specific behaviour, effectively manage ecosystem services, they must first understand what and how people gain or lose (direct and indirect benefits from ecosystems) by participating in such behaviour.

Thus, understanding how people perceive the benefits of ecosystems is essential for effective ecosystem management and for formulating effective policies that promote sustainable livelihoods and human well-being.

The purpose of the study is to develop recommendations for the comprehensive improvement of the environment in Kazakhstan based on the assessment of the knowledge, understanding of the ecosystem approach by government officials in the Republic of Kazakhstan.

### Materials and methods

#### State institutions and tools for natural resource management

The subject of this research is the system of state management of natural resources in the Republic of Kazakhstan. In

this regard, it is supposed to consider in detail the institutions of state management of natural resources available in the country and the instruments through which the state policy in this area is implemented.

The system of state power for the formation and implementation of environmental policy, coordination of management processes in the areas of environmental protection, protection, control and supervision of the rational use of natural resources, use and protection of water resources, land resources, water supply, wastewater disposal, forestry, protection, reproduction and use fauna, and specially protected natural areas are shown in Figure 1.

At the local level, state policy in the field of environmental protection and rational use of natural resources is carried out by local representative and executive state bodies, as well as local self-government bodies.

Thus, the sociological study covered persons holding leading positions in government agencies, subordinate enterprises and institutions responsible for the conservation and rational use of natural resources.

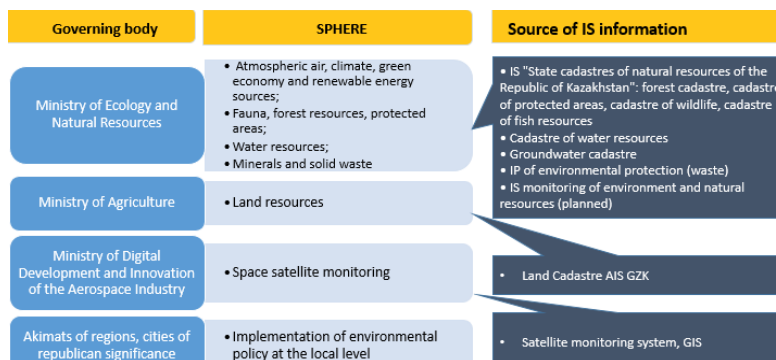


Figure 1 – Institutes of state environment management in Kazakhstan

The measurement of the level of involvement of decision-makers in the application and use of the ecosystem approach was carried out based on qualitative data analysis. The data were collected through a structured interview using a pre-prepared questionnaire containing 14 questions. Objects of research - persons holding leadership positions are the main drivers of the development of the ecosystem approach, being a key link in the practical application of scientific knowledge in the field of ecosystem services. (TEEB,

2010). The main criterion for the selection of respondents was their occupation of a leading position in a state organization of the central or regional level of government responsible for the conservation and rational use of natural resources (fauna and flora, specially protected natural areas (SPNA), water and land resources, ecology).

In total, 256 persons holding leading positions in various government bodies took part in the survey. The characteristics of the respondents' activities are classified into six main areas: geology and subsoil use;

protection and use of land and water resources; conservation and use of biological resources and protected areas; in the implementation of environmental policy. Information about respondents was also classified by levels of governance, both vertically and horizontally. Thus, the respondent in the course of the survey identified himself as a representative of the central or local executive body, as well as a representative of the upper or lower management level

Characteristics of respondents by levels of government, as follows: representatives of territorial subdivisions and subordinate organizations of central government bodies (TP CSB) -188 respondents (73.4%), 36 respondents (14%) are representatives of central government bodies and their departments (CGB), 17 respondents (6.6%) represent territorial subdivisions and subordinate organizations of local executive bodies in the field of natural resources and land relations (TS LEB), and 15 respondents (5.9%) are representatives of Akim's offices of a region, city, district or village (LEB).

A qualitative study was carried out to study the individual aspect of social practice - the real-life experience of leaders at different levels, through the prism of which a more comprehensive layer of problems related to public administration as a whole was considered (*Semenova, 1998*).

This analysis made it possible to correlate the managerial roles of leaders responsible for developing industry development policies with those responsible for organizing their implementation in the field.

The primary tool for conducting qualitative research is Microsoft POWER BI software, which allows a complex multi-level cross-analysis of the content of respondents' answers. It also made it possible to compare the level of awareness and motivation between different levels of government, both vertically and horizontally.

To effectively manage ecosystem services, managers must themselves understand the direct and indirect benefits of ecosystems (*Asah et al., 2014*). Thus, a good understanding of how people perceive the benefits of ecosystems is essential for effective ecosystem management and for developing effective policies that contribute to sustainable livelihoods and increased well-being (*Smith et al., 1956; Katz, 1960*).

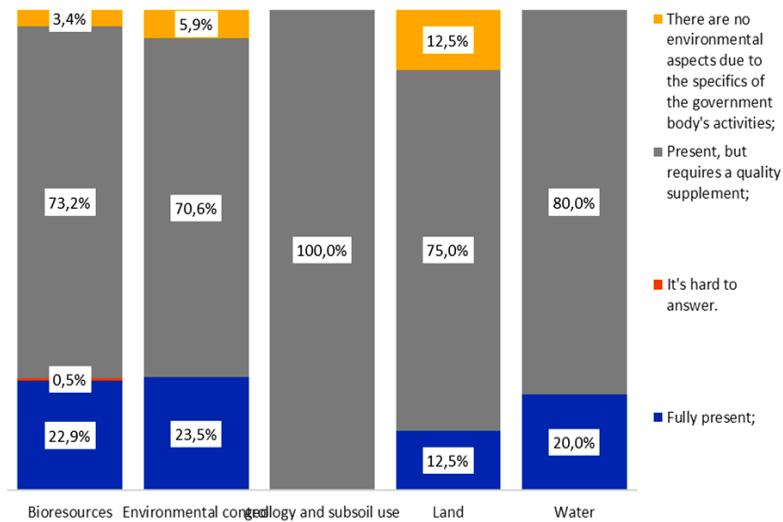
Additional sources of information were also quantitative statistical data on the dynamics of the state of individual ecosystems, considered on the analytical approach (*IPBES, 2018*).

Limitations of the study are related to the use of personal data of persons covered by the sociological study, i.e. only a generalized analysis of the sociological survey was presented.

### **Results**

For this block of questions, the respondents were assessed on the quality of the sectoral regulatory framework, program and strategic documents for the presence of the basic principles of the ecosystem approach.

In the overall picture on Figure 2, 73% of respondents believe that environmental issues are presented in sectoral plans and programs, but they require a qualitative addition.

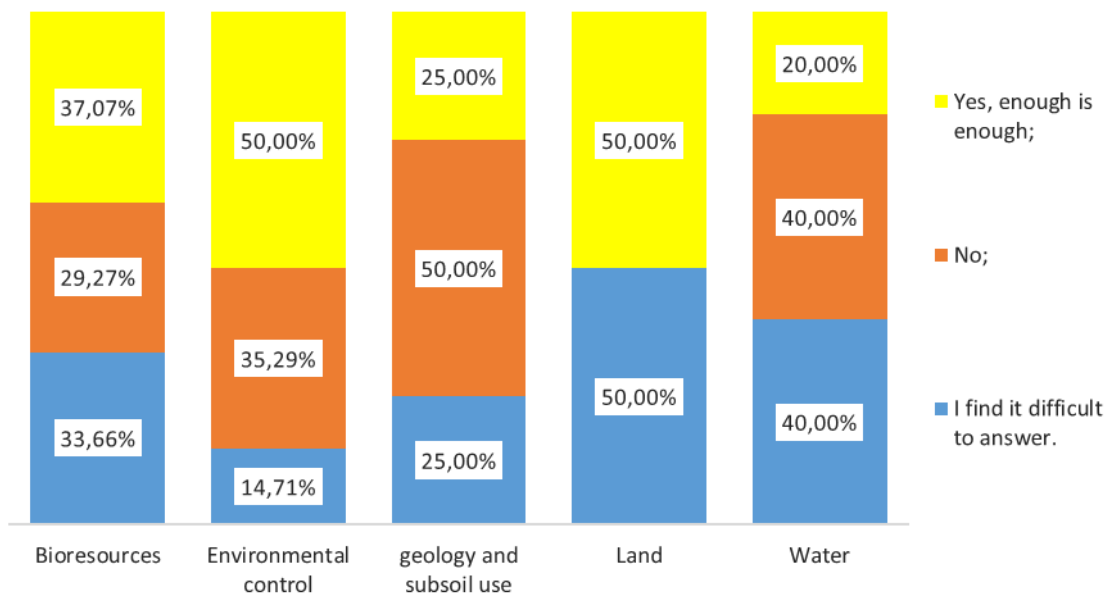


**Figure 2 – Evaluation of sectoral program and strategic documents for the presence of environmental conservation aspects**

At the same time, 22.3% believe that they are fully reflected, and almost 4%, every fifth of which are representatives in the field of land resources, said that the specifics of activities do not stipulate the presence of environmental aspects in sectoral

documents.

Further, the question concerned the existing procedure for conducting an Environmental Impact Assessment (EIA) in matters of ecosystem conservation.



**Figure 3 – Assessment of the existing EIA mechanism**

In the general picture, the number of those who answered affirmatively to this question was 38.7%, while 29.7% answered that the existing mechanisms for the conservation of ecosystems are not enough. The remaining 31.6% found it difficult to answer this question.

We noted that every second (50%) representative of the state body responsible

for conducting the EIA at the central and local levels is completely satisfied with the EIA mechanism, while 14.7% of them found it difficult to answer this question.

The most significant concern about the lack of development of the EIA mechanism for the preservation of ecosystems was expressed by representatives of state bodies in the field of conservation and use of water

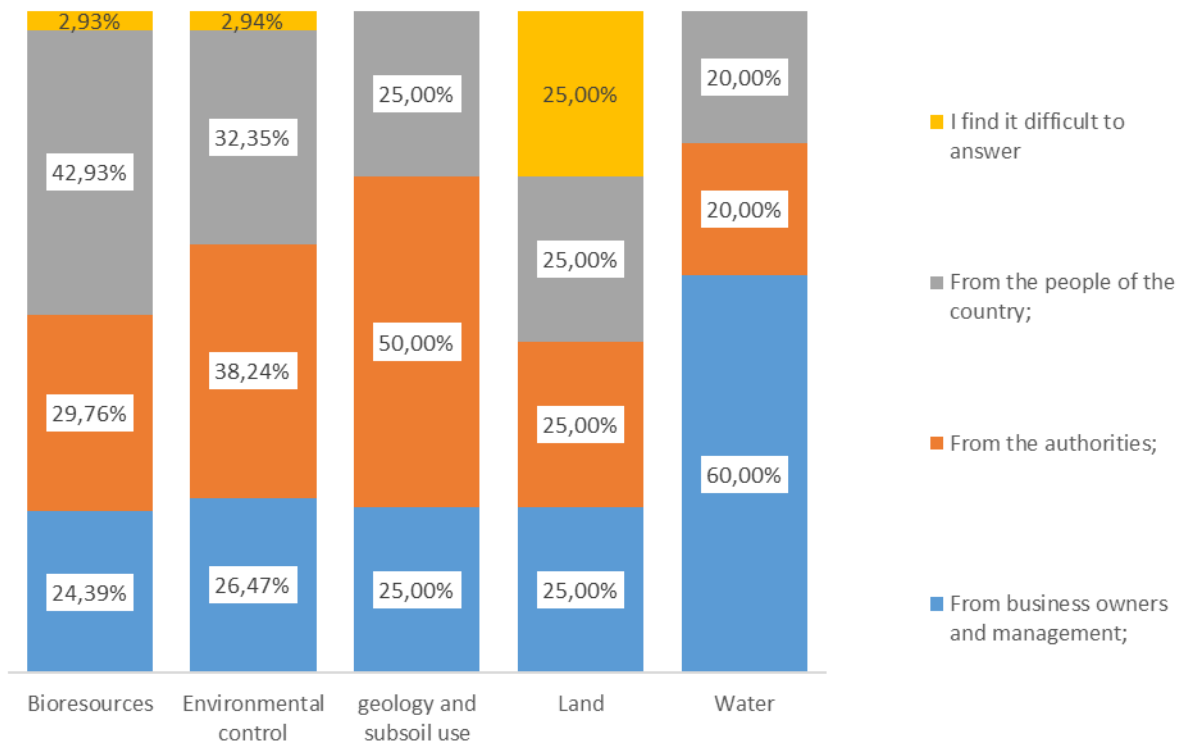
resources and geology and subsoil use, 40% and 50%, respectively.

Assessment of the level of perception and motivation

The criteria for this assessment was the analysis of the survey results in terms of the level of respondents' perception of the ecosystem approach principles through the prism of values, inner beliefs and life experience. The first question concerned the determination of the respondent's level of perception regarding responsibility for the

state of the environment in the country.

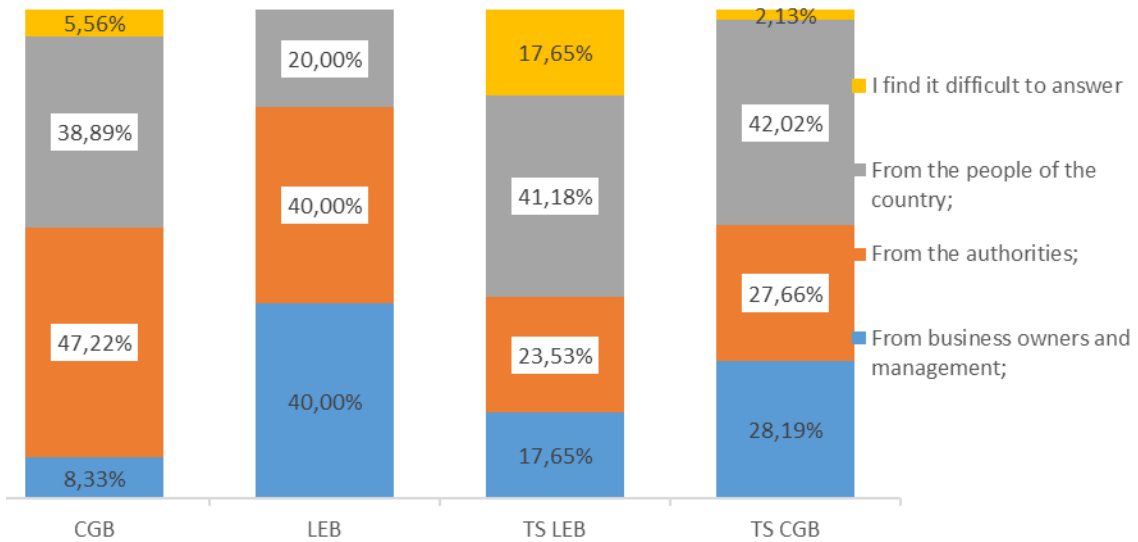
In the overall picture, 40.2% of the respondents believe that the ecological state of the environment depends on the country's citizens, every third (30.9%) believes that the state of the environment depends on the authorities, one in four says that the owners and management of enterprises play the central role in the improvement/deterioration of the environment and 3.5% of respondents found it difficult to answer.



**Figure 4 – Cross-section of responses by factors ecological state of the environment**

Meanwhile, a cross-analysis of the data obtained showed that representatives of the local executive bodies assign responsibility for the state of the environment

equally to the owners of enterprises and the authorities (40% each), and only one in five of them believes that the attitude of the citizens is important.



**Figure 5 – Cross-section of responses by factors ecological state of the environment by central and local executive bodies**

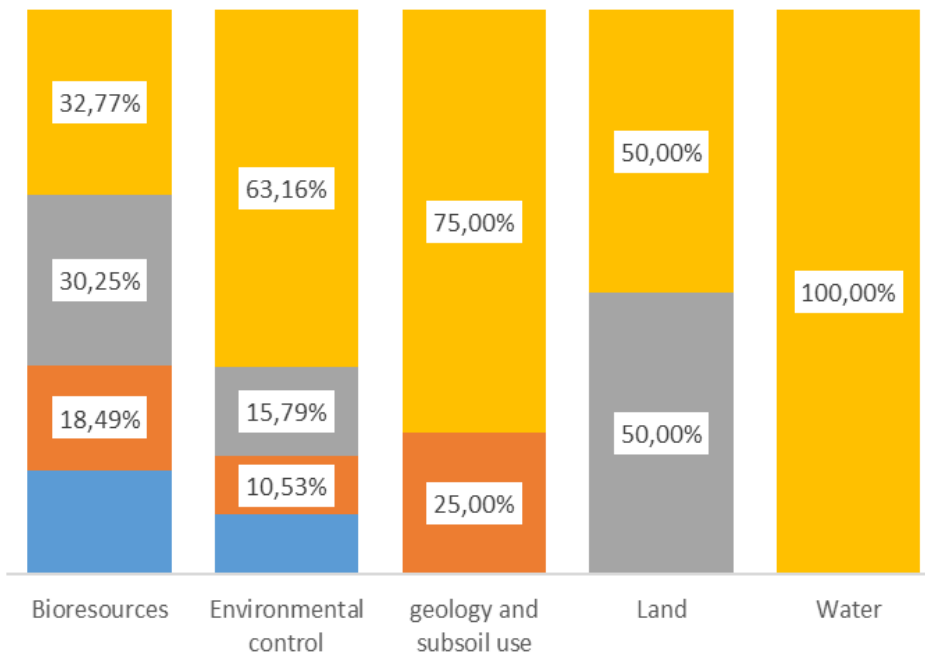
Representatives of the CGB believe that the environmental situation to a greater extent, 47.2% depends on the authorities, and 38.9% believe that it depends on the citizens. At the same time, environmentalists note 61.5% of cases, while every third blame the country's residents (30.8%) and 7.7% believe that the prominent role in the state of the environment belongs to the owners of enterprises.

In contrast to ecologists, representatives of water and land resources,

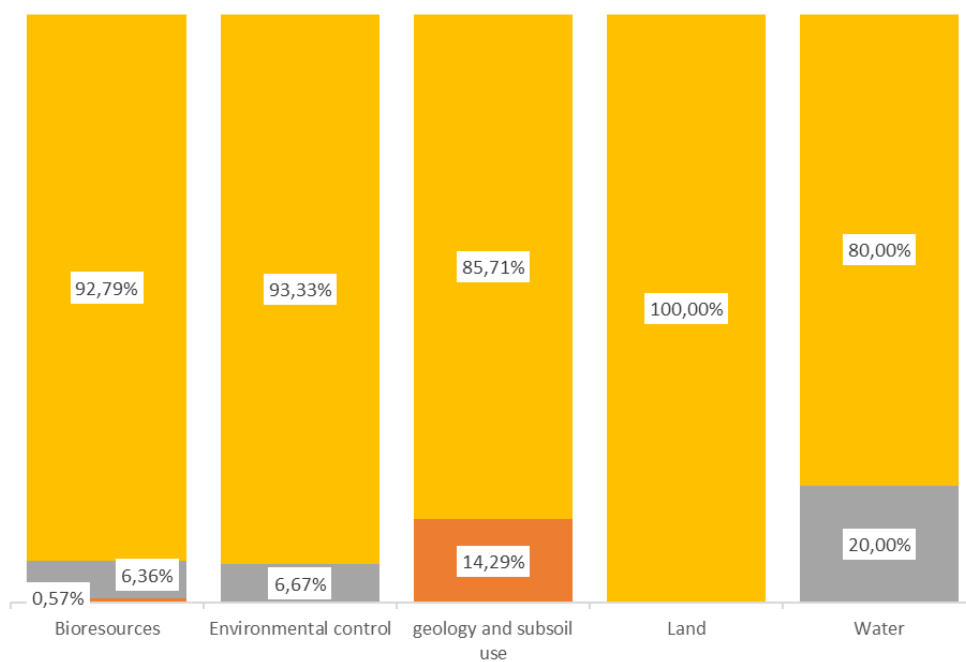
on the contrary, believe that responsibility for the state of the environment lies mainly on the owners and management of enterprises (60%, 66.7%).

To determine the level of awareness and motivation of decision-makers, we proposed to prioritize the value of a healthy ecosystem for the state and a person according to 4 indicators (social, economic, scientific and environmental)

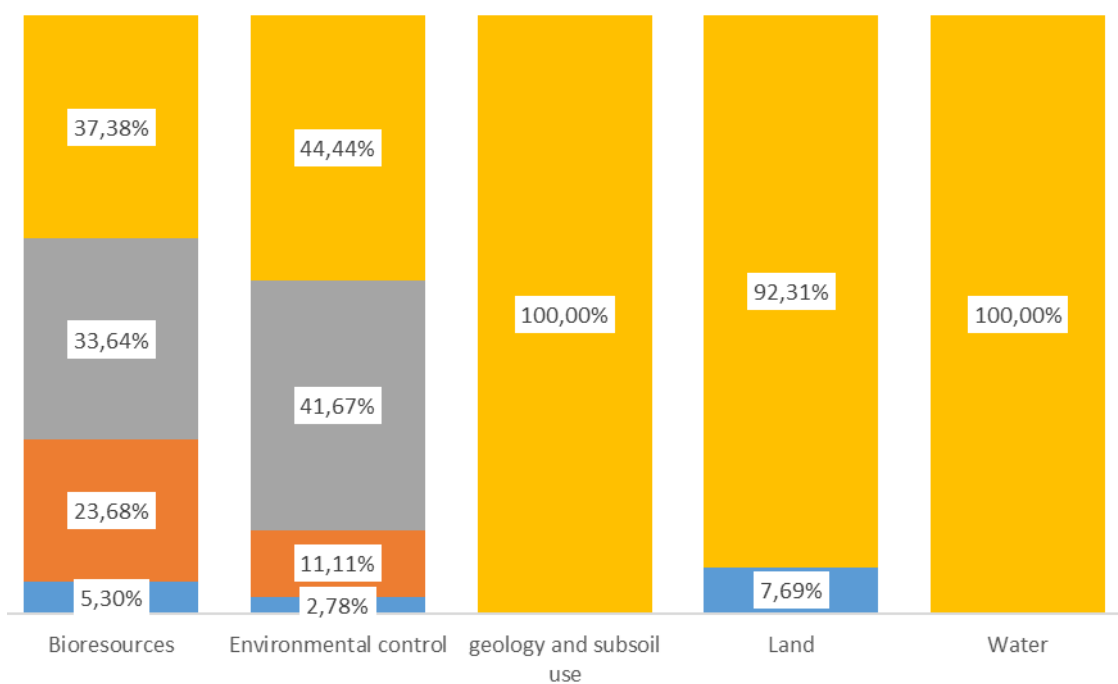
Among the total number of respondents, the picture is as follows:



**a) economic;**

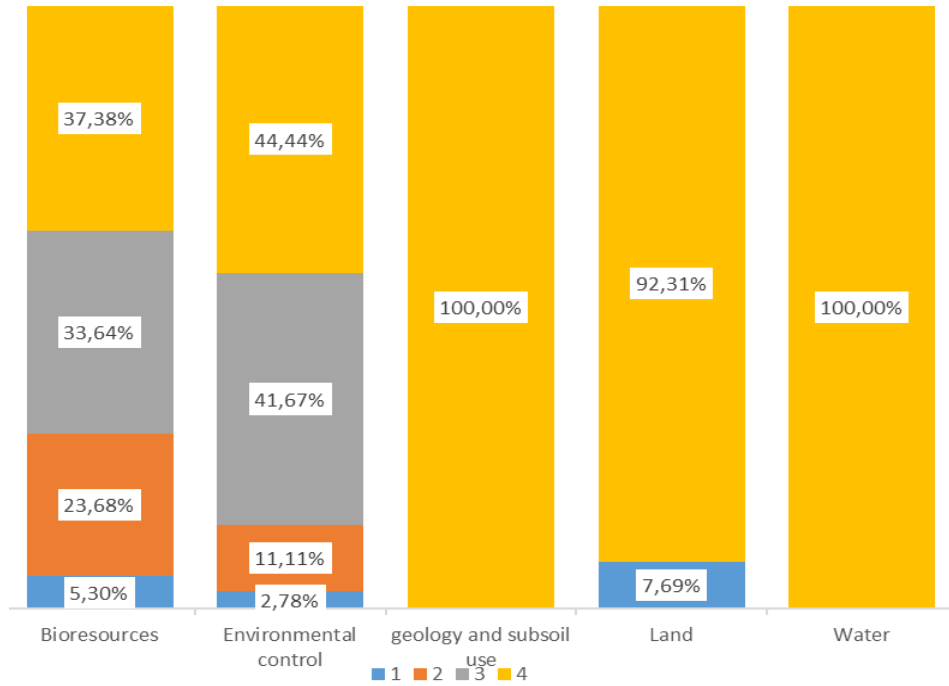


**b) ecological;**



**c) social;**





d) scientific

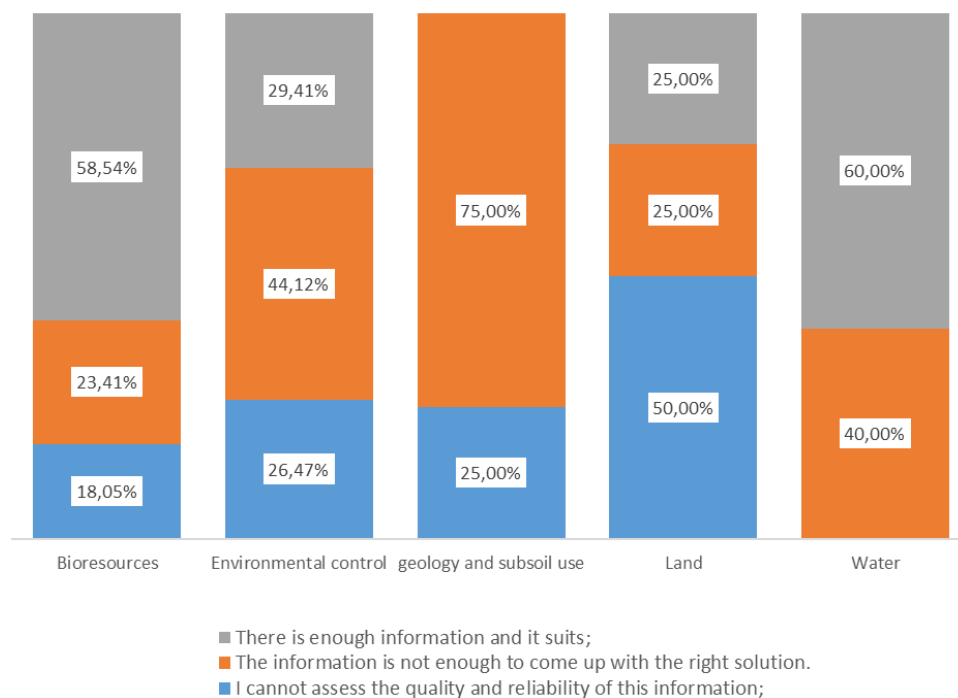
Figure 6 – The value of a healthy ecosystem for the state and people

Besides, some respondents gave such additional categories of the value of a healthy ecosystem as biological, political, technological, cultural, educational and public.

Assessment of the level of communication

This cross-section of questions in

Figure 9 helps determine the level of accessibility of information to decision-makers. This criterion is one of the main in the process of implementing the ecosystem approach. Here one can observe a mixed opinion both for the industry representatives as well as among the levels of government.



**Figure 7 – Level of availability of qualitative information for decision making**

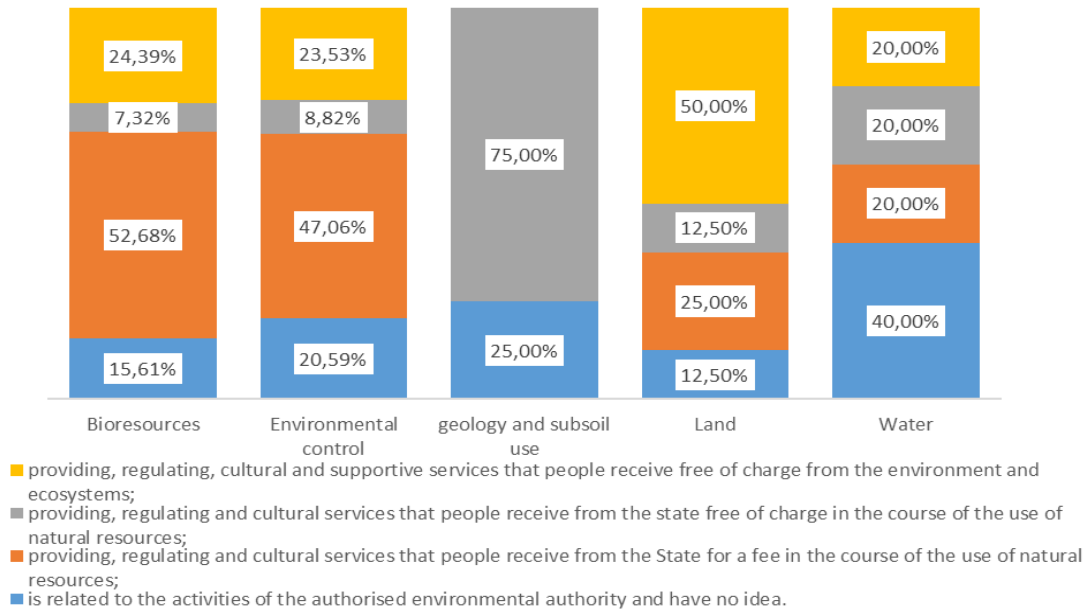
Assessment of the level of basic knowledge

Assessment of the level of basic knowledge of managers on the ecosystem approach is based on data processing on four questions shown in Figure 10.

While measuring the level of understanding the term “ecosystem services”, in the general picture, only every

fourth (24.6%) has an idea of ecosystem services and more than half of the total number of respondents confuse this concept with the term “public service” (58%).

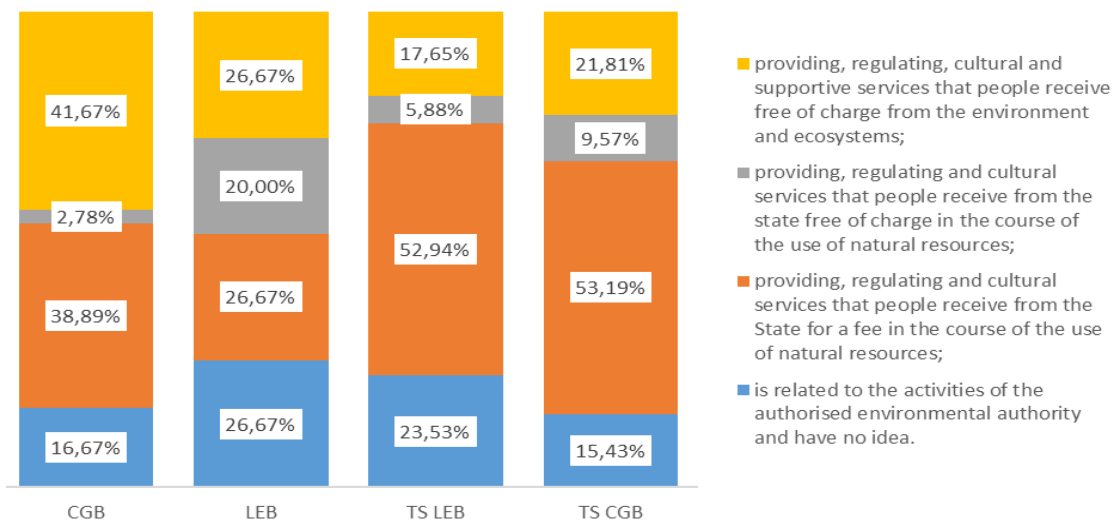
Also, 16.8% of the respondents believe that the term "ecosystem service" is associated exclusively with the activities of state bodies responsible for the implementation of environmental policy.



**Figure 8 – Results of the survey on the term "ecosystem service" by industry cut (correct answer in green)**

The survey showed that respondents have little understanding of the relationship between ecosystem services and the ecosystem approach. Only 34% of those who

correctly disclosed the concept of "ecosystem services" correctly defined the "ecosystem approach".



**Figure 9 – Results of the survey on the term "ecosystem service" by the level of management**

The next one concerned the definition of the “Ecosystem Approach”. (We asked to choose one of the most complete of four answer options)

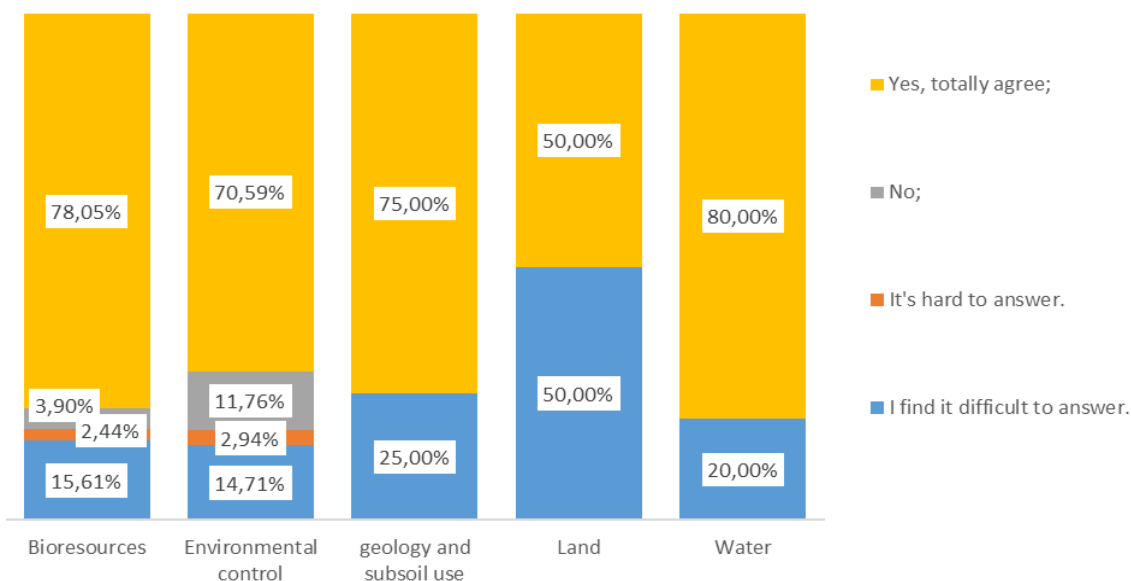
It should be noted that a critical socio-economic aspect, considering the ecosystem approach as an essential tool for enhancing sustainable development and fighting poverty, was indicated by only about 1% of all respondents.

The next block of questions is devoted

to the role of accounting and investment of natural capital in favour of the country's economic development.

The survey on categories of natural capital assets showed significant awareness (85.6%) of the respondents.

The majority of those surveyed (64.4% + 27%) generally agree with the statement that the transition to a green economy relies on natural capital with investment in it for economic development.



**Figure 10 – The level of understanding of the role of natural capital in the development of a green economy**

The results of the responses of the CGB respondents in the field of environmental policy look ambiguous, 14% of whom do not agree with the effectiveness of investment measures in natural capital.

**Discussion**

1) Industry analysis

Researcher Lienhoopa believes that the main problem in the management of ecosystem services is the interaction of the multiple actors involved in the management of ecosystem services (Lienhoopa et al., 2018). This task is challenging because 1) the interests of the stakeholders differ depending on whether they consume or provide ecosystem services, and 2) there are many and often conflicting views on ecosystem services.

So, considering the results of the

questionnaire through the prism of consumption or provision of ecosystem services, the following tendency is observed: it is assumed that the central government bodies (CGBs, departments) that determine the state policy for the conservation of natural resources are on guard against the deterioration of quality and quantity of nature, and representatives of the local executive body are their consumers.

In this context, the most significant concern is about the lack of involvement of state land administration authorities in environmental conservation issues.

In our opinion, the main reason that one in two representative of the land sector civil servant is sure that there is no need to include environmental aspects in sectoral programs and development plans is the agrarian orientation of state policy.

2) Perceptions by levels of government  
Considering the level of perception and motivation of decision-makers (DM) by levels of government, a qualitative analysis of the key factors influencing the choice of answers of respondents during the questionnaire was carried out.

It should be noted that 80% of the top-level executives at the regional level, who are confident in the dominant role of the authorities in the state of the environment, consider the lack of quality and reliability of available information to be the cause of ineffective management. This factor leads to a decrease in the effectiveness of managerial decision-making at the regional level. It should be noted here that local government bodies do not have access to data from information systems for monitoring the state of natural resources.

Considering the difference in approaches to preserving the environment between the levels of government horizontally (CGB and LEB), it should be

noted that the representatives of the CGB are more inclined (40%) rather than the representatives of the LEB (20%) to take into account the role of the population.

Next, we tried to find out how the level of state power (level of civil servants) effects on the assessment of the value of ecosystems (it's economical, ecological or another part).

The sectoral cut showed that the geological authorities give the lowest appraisal of the ecological value of ecosystem services, while the greatest importance is given to its economic value.

The country's state policy orientation on the extraction of the raw materials in order to obtain instant and short-term benefits brings to such results.

Based on the processing of the research results, the following assessment of the influence of indirect factors on land use, forestry, the expansion of protected areas, the extraction of natural resources, and pollution was carried out.

**Table 1 – Assessment of the impact of indirect factors on environmental protection.**

	Factors	Land use	Water use	Subsoil use	Pollution	Extraction of natural resources
1	Institutional	x	v	v	x	~
2	Communicative	x	~	x	x	~
3	Motivational	~	~	~	x	~
4	Basic knowledge	v	x	x	~	v

x negative    ~ neutral    v positive

### Conclusion

Speaking of the results, our assessment showed the importance of the survey data obtained in the context of the current state of affairs in the system of public administration of natural resources.

The assessment of wildlife law, for example, classifies wildlife items in terms of usefulness, supporting harvesting processes.

In turn, considering the value of natural benefits through the prism of an ecosystem approach using the structure of ecosystem services will update the understanding of aesthetic, spiritual, health and cultural values.

Managing natural resources, with the right communications, will lead to more socially acceptable management options

that reduce conflict, increase public support for managerial decisions, and ultimately enhance ecosystem protection.

The obstacles to the implementation of the ecosystem approach are caused, in our opinion, by the following factors:

1) lack of strategic environmental vision in public policy;

2) indicators of state sectoral programs are not coordinated and often contradict the goals of sustainable development;

3) the lack of a mechanism for interaction between government bodies of natural resources

4) the absence of an accessible Unified Information System, where all parameters of the state of natural resources are formalized;

5) lack of continuity between levels of government;

6) low use of the potential of local knowledge in the process of state planning and decision-making;

7) the absence of external stakeholders who will be both a source and a recipient of environmental information;

It is necessary to institutionalize mechanisms for mutual decision-making on natural resource management with the involvement of all stakeholders.

It is necessary to positively evaluate the contribution to the development of the ecosystem approach by decentralizing the powers of state bodies of natural resource management and continue this trend by involving non-governmental organizations and the public in the decision-making process.

The successful implementation of the ecosystem approach lies in taking into account the interests of all stakeholders.

The development of integrated

approaches in sectors of the economy will provide an opportunity for a more systematic assessment of biodiversity and ecosystem services for the benefit of people by public and private individuals.

It includes additional options for measuring national wealth beyond current economic indicators, taking into account the diverse values of nature.

Strategic environmental planning will provide a comprehensive set of incentives to support the transition to sustainable development.

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#### ҚАЗАҚСТАН ЭКОЛОГИЯСЫН КЕШЕНДІ ЖАҚСARTY ҮШІН ЭКОЖҮЙЕЛІК ҚЫЗМЕТТЕР ТУРАЛЫ ТҮСІНІКТІ БАҒАЛАУ

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#### ОЦЕНКА ПОНИМАНИЯ ЭКОСИСТЕМНЫХ УСЛУГ К КОМПЛЕКСНОМУ УЛУЧШЕНИЮ ЭКОЛОГИИ КАЗАХСТАНА

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