A forest management system based on sustainable development

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Abstract. The article substantiates the necessity of changes in the forest management system on the basis of sustainable development. The implementation of an interdisciplinary approach in the study convincingly demonstrates the increasing importance of the forest in connection with its ecological, economic and social functions at the local, national and global levels. Based on the analysis of scientific sources and official international documents approaches to the definition of the essence of sustainable (sustainable, established) forest management, balanced development of forestry, namely as: 1) harmonious combination of ecological, economic and social functions of the forest ; 2) sustainable development of forest ecosystems and the landscape as a whole; 3) integrated application of measures for the use, reproduction, formation, conservation and protection of forests, taking into account the interests of all stakeholders; 4) rational use of forest resources (capacity). The concept of forest management as a modern model of development of the forest sector of the state economy on the initiative of entrepreneurial and public entities is concretized. Forest management is considered from the perspective of the ecosystem approach. Negative trends in forest management in Russia after the beginning of large-scale administrative reform in the country are analysed. The scheme of the main stages in the development of forest policy is proposed. The scheme of the main stages of forest policy development is proposed. The results of the study can be used by scientific organizations engaged in forecasting the development of sectoral economies, forest companies in the formation of economic relations in forestry. The research can be continued in the direction of assessing the ecosystem services of forests and their inclusion in the system of economic relations.

1 Introduction

The forest sector of the economy plays an important role in solving major economic, social and environmental problems of sustainable development and preservation of the natural environment.

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The duration of the forests' growth makes it necessary to make managerial decisions in the field of forest management and reproduction of forest resources ahead of time. A prerequisite for the successful solution of such a problem is the formation of an effective management system for sustainable development of the forest sector of the economy. Preservation of the current management system contains significant risks and threats associated with the onset of irreversible social, economic and environmental consequences for forestry, forest industry and other basic sectors" of the national economy, including the reduction of the industry's contribution to improving the quality of life of the population of the Russian Federation. This refers to the negative multiplier effect arising as a result of the interaction of unfavorable environmental factors, imperfect forest legislation, weakening of the economic base of state management of the forest sector of the economy, monopolization of the markets of forest and pulp and paper products, low competitiveness of domestic forest products.

As environmental problems increase, forests are no longer perceived by humankind only as a factor of production; they are becoming an important factor in the sustainability of socio-economic development of countries and territories [1,2]. Different policy documents of the constituent entities of Russia formulate integrated approaches to forest management. The trend is set by the international community, but has not yet been systematically implemented in the structure of environmental management in our country. Domestic scientists pay sufficient attention to the concept of multi-purpose forest management, they point to the need to preserve the productivity of the forest, its ecological and recreational value, based on the paradigm of the "post-industrial forest". However, in our view, insufficient attention is paid to the aspect of integrated forest management in the transition to a post- industrial economy, the development of tools to motivate economic entities to the integrated use of forest resources and the development of the functioning technology of this mechanism in the practice of forest management.

The mechanism of state forest management in Russia, formed as a result of the reforms, does not fully take into account the multi-purpose nature of forests. All of the above does not allow us to believe that the forest management system that has emerged as a result of the reforms of the last decade is capable of ensuring the social and environmental security of the country, the most important functions of the state in relation to forests and restrains the growth of the forest sector of the economy as a whole. In connection with the above, the topic of the presented research is relevant.

Globalization of the world economy and the free movement of goods and services have necessitated the integration and unification of requirements not only to the technical or qualitative parameters of forest products, but also to the social and environmental aspects of forest management. At the same time, environmental management systems deserve special attention.

Looking at forestry practices abroad, there are three main economic systems:

centrally planned;

market system of forestry organization with private forest ownership;

regulated market relations with various forms of forest ownership.

The centrally planned system with budgetary financing of forestry activities was used only in some socialist-oriented countries of Bulgaria, Cuba, and Mongolia. A centrally planned system, but with forestry financing from industrial activities, was used in the former GDR, Poland and Czechoslovakia before the conversion of these countries' economies to market relations. Under this system, the state, owning the forests, took a passive position, exercising only indirect control over the results of forestry activities of enterprises, financing forestry partly only in the creation of new forests. In economic relations, the category of rental charge was absent: instead of it, the cost of forest products included actual costs, established by analogy with entrepreneurial activity.

The application of the named variant of the centralized management system requires an even age structure of forests, which allows to carry out the use in a constant amount, and, therefore, to provide stable amounts of funds for forestry, as well as a high technological culture of production, which provides quality results of forest cultivation. For the development of forest resources with an uneven age structure, this variant of forestry organization has no prospects. The second system, which is widespread in the USA and a number of Scandinavian and other Western European countries, is the market system of forestry organization with private ownership. Forests in the aforementioned countries are predominantly privately owned. This economic system is based on the following principles: 1) possession, use, and regeneration are carried out by private owners; 2) the state regulates the volume of forest use through taxes, finances state programs of forestry development, and 3) forestry operations are financed mainly by forest owners (rents) under control of state forestry bodies and banks, in some cases providing budget subsidies and soft loans.

Forestry in countries with private ownership of forests shows high development results. Being managed by the state sector, Russia's forests have remained practically outside the sphere of interests of certain groups of subjects of forest relations, without the necessary financial support. The consequences that forestry in Russia is experiencing today are not present in other forms of ownership, as evidenced by the experience of countries with developed market economies. The countries that use the third economic system (mixed) include Canada, Germany, Poland, Norway, and Austria. As noted earlier, under this system, state regulation of forestry is carried out in conditions of market economy with a balance of interests of the state and companies (enterprises) using forest resources under different forms of ownership. In most countries with private ownership of forests, if forest owners fulfill their obligations for forest cultivation, they receive from the state partial or full compensation of their expenses (Finland, Austria, etc.), otherwise strict penalties are applied to forest owners.

The distinguishing principles of this forest management system are:

- the functions of forest ownership and control have been given to the state forestry authorities;
- the use and reproduction of forests is carried out by enterprises with different forms of ownership,mainly by private and joint-stock companies;
- forestry activities are financed on the basis of contracts between the enterprises and the forestry authorities from the funds earned by the latter (rents).

The conducted analysis of forest management shows the inefficiency of Russian state forest management in comparison with other countries. As a rule, the existing forest management model in modern Russia is characterized by the following features: distortion in the process of application of Western management models, which reflect the Western reality of system development; lack of improvement of Russian reality due to the general failure of theoretical foundations of forest management system in Russia.

We can note the system-wide methodological disorganization of forestry management in Russia. Imitation of the American management system has led to the problem of informational insularity of many Russian organizations of firms, as well as the elimination of best Russian practices, unnecessary detachment of the management system from the managed, increased crime and, in general, the destruction of the Russian traditions of partnership and mutual assistance existing for many centuries. Forest management organization activities are characterized only by power and influence, which leads to a complete disconnection between forestry and the forest industry. The main goal at present for many farms is to make a profit without taking into account important social and environmental factors. [3,4].

The forest ecological system has a number of features:

- has a long production process of reforestation;

* slow capital turnover in forestry due to a long production cycle lasting 80 years or more;
* placement of forestry is related to the geographical, natural placement of forests;
• main production factor of forestry is the natural factor;
* gap in both time and space between investments and the resulting effect of reforestation;
* variety of benefits received from the forest;
*forestry as a type of economic activity does not receive monetary equivalent for most of the suppliedutilities (ecological functions) and other features [5].

Currently, there is a problematic situation in the management of forestry as an ecological and economic system with a long production cycle. There is a degradation of forest ecosystems, an undesirable change of tree species. Irrational nature management is carried out that does not meet the requirements of sustainable forestry development. Studies of domestic forest economists of the planned economy and post-perestroika time were based on approaches according to which the economy of the forest sector of the country was characterized by free forest resources, its exclusion from civil circulation. According to the estimates of foreign researchers, forestry in conditions of private ownership of forests is associated with a positive economic result of economic activity, forest resources are fully included in civil turnover, and the forest or forest plot itself is the subject of purchase and sale. At the same time, the ecological functions of forests, as a rule, are not involved in turnover.

Forests by its nature are long-term enterprises, and the expected results of the forest owner, such as the state of the forests for many years to come, require action today and over time to ensure that these results are achieved. Forest resource management planning does not always include management objectives that directly include timber, but most forest management objectives do include active forest management and timber, at least indirectly. For example, wood must be processed to achieve wildlife habitat goals, create recreational opportunities, or create exceptional prospects [6].

Without proper planning, forest owners may find that future forest conditions do not meet its management goals. Planning ensures sustainable management of forest and land resources. Planning can ensure profitability, if this is the goal, due to the fact that the timing of logging and final harvesting of wood will be optimal from a financial point of view. This can ensure the development of wildlife habitat to encourage individual species and ensure that the forest has the desired recreational potential Proper forest resource management planning can even minimize income taxes paid on timber harvesting, or ensure multi-generational forestry [7,8,9].

Forest management is a market form of management of forestry and forest resources, management of reproduction of its ecological and economic potential to achieve the goal of sustainable economic development in modern economic conditions. The strategic goal of forestry development in the forest management system is the formation of highly productive and sustainable forests, a multi-purpose and integrated management system. Conceptual support of environmental management is a key research problem of domestic and foreign scientists.

The key aspects of the development of society from the point of view of ecological balance dominate the theories of sustainable development and environmental determinism. At the same time, in the modern format of the central provision of environmental management, the mechanism of its implementation at the enterprises of the timber industry is insufficiently justified [10,11,12].

The purpose of the study is the scientific substantiation of the methodological and methodological approach to the formation of the forest management system.

2 Materials and methods

The general methodology of the study is based on a comprehensive approach to the problems determined by the purpose of the article. In the process of research methods of historical analysis, the method of comparison, modern concepts of sustainable management, foreign and domestic experience of economic relations in forestry were used.

The methodological basis of the study is the methodology of the system approach to the study of natural and economic structures and spatial organization, the principles of historical, logical and system analysis and synthesis. System approach in nature management focuses on the disclosure of the integrity of the object - the sphere of socio-productive activity aimed at meeting human needs with the help of natural resources; revealing in it diverse types of relationships, including analysis of anthropogenic impacts on nature, their consequences for humans, bringing them into a single theoretical concept. In our case, the representation of the object under study as a system allows us to study it more comprehensively, comprehensively. To reveal all elements, which influence on functioning of object, all interrelations between elements, external factors, which influence on functioning of object.

3 Results and Discussion

Forest management in Russia has a number of shortcomings:

- lack of reliable and complete information on the quantitative and qualitative state of forests;
- failure to balance the interests of the main subjects of forest relations: the state, the populationand forest business structures;
- suboptimal balance of powers in the forest sphere between the Russian Federation and its subjects, etc.

Negative features of Russia's forest economy are:

- mismatch of budgetary interests of the Russian Federation and its constituent entities in the establishment and distribution of payments for forest use;
- low level of payment rates for the right to use forest areas (on average 60 rubles/cubic meters);
- revenues from the use of forests are half the cost of the state forest management for a long periodof time, etc.[1]

The concept of sustainable development, as one of the problematic and very important concepts, is closely related to the concept of environmental management.

Among the most important factors of sustainable development of forestry is the use of effective mechanisms of nature and forest management, environmental protection, including programs of sustainable development, which provide a balanced solution of socio-economic problems, problems of conservation of a favorable environment and natural-resource potential.

To ensure sustainable development, it is of great practical importance to take into account regional and local characteristics of the forest fund, forest growing conditions, development of the forest sector of the economy, and demand for forest products. It is necessary to develop a regional strategy for multi- resource forest management, taking into account the organization of environmental-oriented (ecological) forest management. Environmental management in the field of forestry can be characterized as environmental and economic management, aimed at studying and solving the problems of forest resources use in human economic activity, as well as the processes of reforestation. The main purpose of forest management is to coordinate the economic and environmental interests of society in matters

of forest use and reforestation. Ecological management implies the management of forestry enterprise activities, taking into account the priorities of environmental protection and optimization of the relationship between man and nature. At the heart of its development are the needs of society in the stable provision of both material resources and intangible natural benefits, creating acceptable conditions of life.

The objectives of environmental management are the following (fig.1).

A very significant feature of environmental management in forestry is that the effect of a particular measure is difficult to assess, since the result of its implementation is clearly visible only after several years, and sometimes several decades. In addition, it is highly dependent on other management measures that have taken place before, the results of which will be obtained in the future.

The transition of forestry enterprises to environmentally oriented production requires the implementation of international norms in the field of environmental protection, in particular, the introduction of environmental management standards. In order to meet international standards of production management, including environmental ones, forestry enterprises must strive to improve their performance. For this purpose, a forest policy is developed, taking into account environmental requirements, which allows the enterprise to evaluate the nature protection measures it has implemented to the fullest extent possible.

Environmental management in forestry can include the following main aspects:

Multifunctional management of forest resources consumed within the framework of long-term development;

ecologically-oriented management of forest use and reforestation;

Environmental auditing as an important means and tool for ensuring compliance with environmental standards and environmental safety;

Introduction of ecological forest certification of products;

system of environmental responsibility in making management decisions.

The main goal of management as a field of practical activity is to ensure the harmonious development of the managed object (Fig.2).

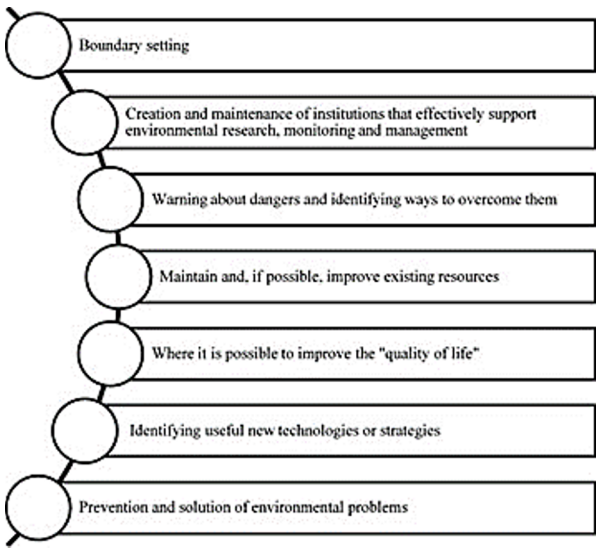

Fig. 1. Environmental management objectives

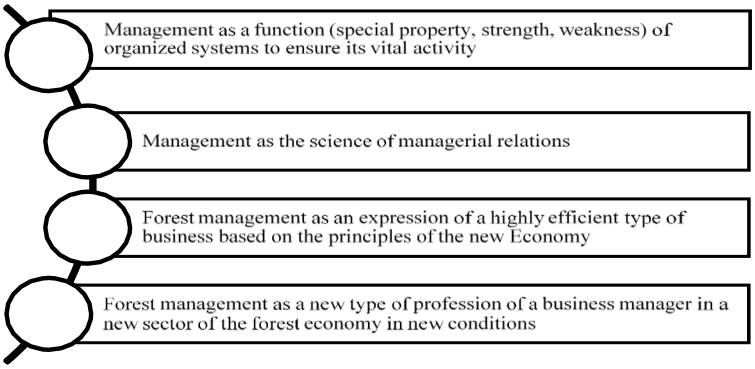

Fig. 2. Forest management as a management area.

It means that all elements of the forest sector of the economy as an object of management must function in a coordinated and efficient manner. When building a new strategy for the development of forestry in Russia, the principle of the leading role of the interests of the country (interests of the population) should be taken into account, that is, forest policy measures in the forest management system should be adequate to the socio-economic processes taking place within the country with a strong emphasis on local conditions (interests) and regional peculiarities of national culture [13,14,15].

The mission of forestry in the forest management system is sustainable reproduction of forest resources, meeting the diverse needs of present and future generations, forming the image of Russia as a country of high ecological and national culture, providing socio-economic infrastructure for rural development, increasing the social responsibility of forestry for the green architecture of the Russia. The strategic goal of forestry development in the forest management system is the formation of highly productive and sustainable forests, a multi-purpose and integrated management system based on the growth of the general and professional culture of forestry workers, increasing its economic independence and profitability in the context of the transition of the national economy to the values of post-industrial society and advanced innovative development of the service sector [16,17].

The priority directions in the forest management model are: structure, finance for the reproduction and protection of forest resources, accounting of forest resources, business plan for the reproduction of forest resources, economics (forest income), logistics (organization). The main stages of forest management policy development are shown in Figure 3.

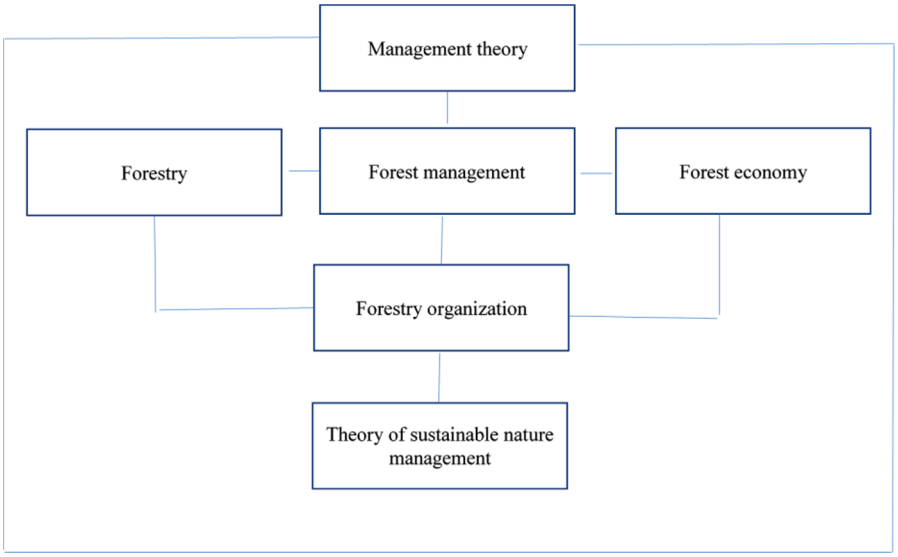

Fig. 3. Methodical formation scheme of the main stages of forest management policy development.

The criterion of success in the management of forest resources in Russia is a reasonable approach to the creation of forest management as an organizational and managerial mechanism that will significantly increase the efficiency of the use of forest resources for multifunctional purposes.

The forest management system in the complex variety of its elements can be simplified by the functional and organizational structure of the links involved in all stages, from forest cultivation to the extraction of all forest opportunities and services. Each stage of forest management corresponds to a particular branch of the economy, which has its own goals and tasks. The main factor determining the functional structure of forest management is the directed activity of the economic entity: reproduction of the resource or use of the resource. Each type of directed activity, in turn, has a complex differentiation. Forestry is engaged in the reproduction of forest resources, while forest industry is engaged in the use of forest resources. In Russia before the revolution, these types of activities were one segment of economic life. The practice of foreign countries demonstrates just such a model: forestry includes not only forest cultivation, but also logging. In the context of related issues of forest management, it is reasonable to consider this economic system as an integral system of the forest complex.

The main methodological provisions for assessing the economic efficiency of forestry management are considered at three levels of forest management and include: determining the economic efficiency of the functioning of forestry as an independent branch of the national economy (macro level); determining the economic efficiency of forestry-by-forestry enterprises (meso level); determining the economic efficiency of forestry measures (micro level).

Forest management is understood as the systematic, purposeful influence of society on the system of forest use as a whole or on its links, based on the application of objective regularities and trends in the interests of the optimal development of this system. Forest management must be aimed at achieving a balance in the scale and methods of the use and reproduction of forest resources and their protection. At the same time, one of the most important tasks of forest management is to optimize the location and structure of forest resources in full accordance with the physical and economic-geographical characteristics of

the territory on the basis of selection of zonal-geographical systems of forest resource use and reproduction, types, forms and structures of forestry.

The strategic purpose of forestry development in the forest management system is the formation of highly productive and sustainable forests, a multi-purpose and integrated management system based on the growth of the general and professional culture of forestry workers, increasing its economic independence and profitability in the context of the transition of the national economy to the values of post-industrial society and advanced innovative development of the service sector. The modern idea of the economic efficiency of social production, which, in addition to labor efficiency, takes into account its social utility, indicates the need to use a system of evaluation indicators when measuring it, expressing both the degree of achievement of the tasks set and the different level of management [17].

The main factors that have a strong influence on the modification of the assessment of the effectiveness of forest management are shown in Figure 4.

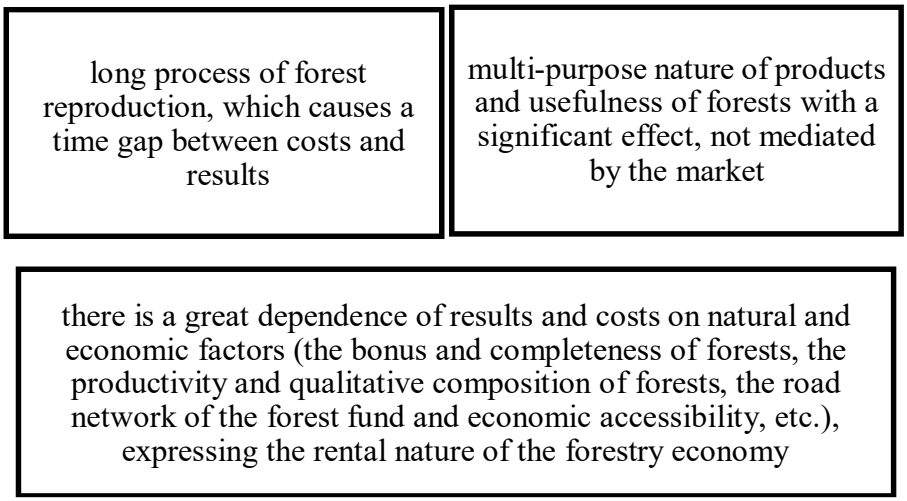

Fig. 4. Factors influencing the modification of the assessment of the effectiveness of forestry.

The generalization of theoretical approaches to understanding the essence of forest management gives grounds to assert that the concept under study is an instrument of environmental policy in the field of forestry and forest management, which uses a state environmental platform with a stable legislative, regulatory and legal framework and a coordinated hierarchical structure of administration in the context of coordination of management decisions, as well as market models of doing business with voluntary involvement entrepreneurial initiatives, public formations, for balanced management of forest resources, its reproduction and enrichment in order to create a socio-cultural environmentally oriented society.

Thus, the main goal of forest management in the field of practical activity is to ensure the harmonious development of the managed object in the hierarchy of management. This means that all elements of the forest sector of the economy as objects of management, including the forest manager, must function consistently and effectively as part of the contour of the organizational structure.

The most important component of success in the management of national forest resources is the creation of a set of technical regulations as legislative provisions of the legal basis of forest relations in the forest management system.

The formation of forest management is carried out by forest policy instruments at the national level, through the improvement of the legislative framework of eco-management, the development of strategies and plans for the development of forest expansion of international partnership and cooperation in the development of eco-business projects, attracting investment.

The second stage of forest management implementation is regional, which is implemented by local authorities and self-government according to the scenario of development and implementation of measures developed for each region. At this level, it is important to coordinate the spheres of influence of environmental units, municipal and municipal institutions, as well as financing restoration activities and projects. The formation of a regional forest management policy determines the direction in which the forest industry of the region will move. It is the task of the regions to develop an ecological and economic strategy with the involvement of state institutions, public organizations and influential business structures in order to create a comfortable investment environment. The third level of forest management coordination is local (local), carried out by local communities, public environmental organizations and state forest enterprises (forestry enterprises) in district centers, as well as small and medium-sized businesses in the field of forest exploitation, woodworking and timber processing industries, hunting organizations. It is this format of socio-economic relations that determines the level of development of forest management, requires state support and public initiative in the formation of forestry and reforestation measures, the formation of infrastructure.

Forest management in the conditions of a socially oriented digital market economy and digital information systems for transmitting and applying up-to-date information about internal and external parameters of the management system is necessary as an economic tool for the successful conduct of modern forest businesses. One of the most important problems of forest management formation is the formation of systems of new knowledge about quantitative and qualitative taxation standards of target technologically available forest products of consumer choice contained in operational and protective forests of forest management facilities. It is necessary for making known technologically available wood resources for assessing the quantity and quality of target forest products contained in operational stands, information about which is not available for use in the forest management system for current and long- term planning of forest management using modern methods of cognition. It should be noted that the differences between the fundamentals of the theory of general and forest management from a pragmatic point of view need to be reinforced by the methodology of managerial decision-making using modern methods of cognition, which will be the subject of subsequent discussions of the problems of forest management formation and in the conditions of the development of a market digital economy.

4 Conclusions

Thus, the current system of forest sector management does not provide an economic and legal basis for sustainable development. Its preservation dooms the forest complex to lagging development.

Improving the efficiency of management of the subjects of the forest complex is possible only on the basis of purposefully modernized and coordinated use of tools of an integral multipurpose system of regulation of environmental and economic processes of the forest sphere at the macroeconomic (including regional), local (local), intrafirm (corporate) and intercompany levels.

At the same time, it is fundamentally important to ensure a rational ratio and balanced sustainable development of the links of forestry, logging and woodworking industries, as

well as timber processing industries, taking into account the determining influence of the forestry potential on the state and strategic prospects of forest management. Forest management in a socially oriented digital market economy and digital information systems of transmission and application of relevant information on internal and external parameters of the management system is necessary as an economic tool for the successful management of modern forestry.

One of the most important problems of formation of forest management is the formation of a system of new knowledge about quantitative and qualitative taxation standards of target technologically available forest products of consumer choice contained in operational and protective forests of forest management enterprises. It is necessary for familiarization with technologically available wood resources for estimation of quantity and quality of target forest products contained in operational forest plantations, information about which is not available for use in forest management system, for current and perspective planning of forest use using modern methods of cognition.

The issues of providing favorable macroeconomic conditions in the chain "forest reproduction

forest use" on the basis of improving the tools of state regulation of both environmental protection activities and the forest industry require in-depth scientific and analytical study. The socio- economic prospects of the whole country largely depend on the vector of development of the various parts of the forest complex. It should be noted that the differences between the basics of the theory of general and forest management from a pragmatic point of view need to be supported by the methodology of management decision-making using modern methods of knowledge, which will be the subject of subsequent discussions of the problems of formation of forest management and in the development of a market digital economy.

A further stage of the study can be the definition of principles of a balanced multipurpose management of the forest complex and ways to improve the performance of its subjects, taking into account the rational organization of their internal and external economic relations, as well as the systematization of tasks of multilevel regulation of their activities, based on which the methodological recommendations for the development of strategic management in the forest sector, including methods of analysis, forest certification, environmental expertise, management of investment processes and economic risks.

Theoretical and methodological analysis and reasoning about the need for urgent transformation of the management structure of the values of forest national wealth and forest management methods using forest management methods in a green digital market economy will restore the worthy contribution of the forest sector. to the efficiency of regional and national economies as a whole.

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