

# Problems of the Russian forest industry management and innovative development

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**Abstract.** The role in the economy and the structure of the forest industry are presented. The key problems of forest management and innovative development of the forest industry in Russia are highlighted. Namely, these are the following: 1) production and technological; 2) natural and ecological; 3) institutional and organizational; 4) problems of forest protection and reforestation. The ways of their solution are proposed for the forest industry of Russia. The innovative development of the forest industry of Russia is discussed. The implementation of the Forest innovation system is suggested for the sustainable forest industry management and based on the feedback of the experts in the forest industry.

## 1 Introduction

The forest industry is an important part of the Russian economy, especially in Baikal region and the adjoining Krasnoyarsk krai to the west, and the border-peripheral regions, including Buryat republic, Zabaykalsky krai, and the whole Far East Federal district to the east. Therefore, its condition and state have a great impact on the economy of the whole Russia. The development of the forest industry plays a special role due to its close ties with other branches of the national economy. Since forests provide us with both raw materials and components, for example, for construction, agro-industrial complex (AIC), furniture production and other industries. Industries such as agriculture and the pharmaceutical industry are associated with forage, food, and medicinal resources of the forest. The great importance of the forest industry for all segments of the population is due to the ecological, social, protective, recreational, cultural, and aesthetic benefits (services) of the forest.

The abundance of forest resources has played a crucial role for the formation of many branches of the national economy. The modern forest industry of Russia includes the following:

1. The Forestry (forestry enterprises) is intended for reproduction of the used resources and utilities (services) of the forest, protection from fires, protection from pests and diseases, and various kinds of negative natural and anthropogenic impacts, ensuring the needs of society in forest products, preserving and improving the natural environment, resource and ecological potential, biodiversity for the present and future generations.

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2. The lumber industry complex (LIC), consisting of: 1) the logging industry (LI), which primary tasks include the harvesting and transportation of different types of log wood; 2) the wood sawmill and processing industry (WSPI), directly involved in the production of lumber, fiberboard, LDF, MDF, chipboard, OSB, plywood and other products; 3) the Pulp and paper industry (PPI), the production primarily of such products and materials as cellulose, paper, newspaper paper, cardboard, paper bags, etc. PPI it is the key and strategically important industry; 4) Timber chemical industry based on chemical processing of wood. It includes dry distillation of wood, charcoal burning and various types of rosin-turpentine production.

The main user of wood is the Wood processing industry. Russian Federation exports the following types of timber products from the Siberia Federal district (SFD) and the Far Eastern Federal district (FEFD): roundwood, lumber, fuel wood, sleepers, chipboard and fiberboard, wooden, paper and cardboard containers, cellulose, paper, cardboard, wallpaper, paper hygiene products, paper and cardboard labeling, etc.

Today, unsystematic actions in forest management and illegal logging lead to the destruction of forests in SFD and FEFD. As a result of the excessive use of forest natural resources, there is a threat of destruction of existing ecosystems, deterioration of the climate, water balance, and from the economic point of view, the strategic potential of the country. The forest conservation is the necessary term that restrains the ecological crisis on Earth. The forest, as an exhaustible but renewable resource, is under the close attention of environmentalists and economists. In the era of globalization of commodity and raw materials markets, when most of the forests of the USA and Europe are undergoing conservation and preservation, the sustainable environmental management is relevant for Russia and especially for the Siberian and Far East regions most susceptible to illegal logging among the logging areas of the country subsections.

The concept of innovative development is studied by scientists for many decades. F. Nixon defined that innovation is a combination of various technical, production and commercial activities that result in the appearance of new or improved production processes and equipment in the market [1]. B. Twiss interprets innovation as the process in which an invention or new idea acquires economic meaning [2]. According to another researcher and economist, B. Santo, innovation is a socio-technical and economic process that leads to the creation of the best, in terms of their properties, goods and technologies, by means of the practical use of innovations and inventions, and if the innovation is focused on the profit or economic benefit, than its appearance in the market can result in additional income or excess profit [3]. Among modern researchers, D. V. Sokolov and others [4] interpret the concept of innovation as the result of creating and mastering a fundamentally new (modified) means that meets specific social needs and gives a number of effects. Another modern researcher, R. A. Fatkhutdinov considers innovation as a result of a novelty introduction in order to change the object managed and to acquire various types of effects [5].

The scientific novelty of this research is in the study of the specific problems of the forest industry required to manage for its sustainable development within the framework of occurring and planned innovations including technological, product, institutional, and ecological innovations, the formation of the program of innovative and institutional transformations, and development of methods of the evaluation of institutional transformations and innovations. This research is of great interest not only for experts, scientists and students studying the development of the forest industry as one of the branches of the economy. This study may be of interest to a wide audience in general. The forest industry affects the activities of other sectors of the economy too. To a certain extent, this study relates to everyone. We all want to live in the safe and clean environment. The questions, such as how the forest industry will develop, how sustainable it will be, how forest resources will be restored, affect everyone.

## 2 Methods

The issue of the development of the innovation system in the forest industry based on institutional changes is presented with the case study of Irkutsk province. To analyze the concept and composition of the innovative system of the forest industry further and to be implemented in Baikal region, we have to study the advanced up-to-date methods and technologies, including foreign experience in the field of forest management in developed countries. Hence, the profound mutual with the forest industry experts research is required. Therefore, a profound sociological survey has been conducted and a special questionnaire was developed for experts who work in the management of the forest industry [6].

Over 60 experts in the forestry and forest industry businesses have participated in the questionnaires developed for them and provided a profound feedback via the answers to specific the forest industry of Russia related questions. The qualitative values provided by respondents helped to analyze and explain the effects of innovations on the sustainable development of the forest industry and once converted into quantitative numbers, allowed us to evaluate the effectiveness of all the innovations implemented in the forest business, as well as assess the role of institutional innovations and determine the importance of these innovations in the forest industry development.

The questionnaire survey was carried out with the formation of a stratified sample of respondents, taking into account the requirements of representativeness of the sample and further methods of mathematical and statistical processing of the results. The basis of the methodological approach to the study of economic and social behavior of enterprises was the following sequence of the work: collecting data on enterprises and the industry as a whole, assessing the expectations of enterprises and their impact on results, assessing the costs and benefits that they receive in the course of their activities. For this purpose, we used data from questionnaires and informal interviews with heads of enterprises and administrative structures, and other professionals and industry experts.

The interview scheme for forest service employees, scientists and other experts in the forest industry was aimed at identifying the role of institutional transformations and prospects for innovative development of the industry, including the most important property institutions, regulatory and legal framework, educational programs, i.e. all formal and informal institutions.

## 3 Results

The list of problems presented shows that inefficient use of forests is primarily due to inefficient institutional relations in the industry. First of all, this relates to the inefficient ownership rights for the forest resources.

In fact, there was no institution of ownership of forest resources in Russia until the ratification of the Forest Code. The first legal document that became the basis of the formal institution of ownership for the forest resources was the Forest Code of the Russian Federation, which was ratified in 1997. It was in the Forest Code, for the first time, when the right of ownership was assigned to the Russian Federation, i.e., the federal form of ownership of forests was actually established, and the right of management was transferred to the entities of the Russian Federation, the right of use was granted to forest enterprises and other commercial structures on lease. It was the Forest Code that became the instrument of specification of ownership rights to forest resources. The scheme of the specification of property rights was outlined and the subjects of law were identified. However, the powers were not transparently defined among the entities. The right to manage was divided between the Russian Federation and its entities. The interests of the parties involved clashed and get into conflicts. Many businessmen sought to gain access to forest resources, and they wanted

to make maximum profit after receiving forest tickets, without taking into account public interests and ecology.

The question of whether it was the right decision to decline the privatization of forests and solve all production issues exclusively on lease terms also remains open. Anyway, attempts to form a model of private forest ownership in Russian society turned out to be an inadequate sample of developed countries. The attempt to privatize forests has become an example of an unsuccessful economic experiment with negative social and environmental consequences. The readiness of the Russian society for private ownership of the forest had not been determined, as well as the terms and conditions of social responsibility of the forest business had not been determined too.

Today, it can be noted that the State's influence on the development of the forest industry is, in general, insufficiently effective. The innovative development should be based on technological, product, institutional, and ecological innovations [7]. The State can and should interfere in the distribution of income via the taxation system, the regulation of prices and wages. The problems of the forest industry are related not only to the work of market mechanisms, but to the State regulation measures too, which ensure the balance between economic development and environmental protection.

The first official environmental document concerning forests appeared on April 4, 1888, when the tsarist government, influenced by the public opinion, issued the Forest Protection Law, which regulated forestry in forests that plaid environmental functions mostly and restricted some rights of the forest owners.

The modern Federal Law "About Specially Protected Natural Territories", signed by the President of the Russian Federation [8], distinguishes the following categories of specially protected natural territories: State nature reserves; national parks; natural parks; State nature preserves; natural monuments; arboretum parks and botanical gardens; health-improving areas and resorts. Besides that, the Government of the Russian Federation, executive authorities of constituent entities of the Russian Federation, and local self-government bodies may establish other categories of specially protected natural territories (for example, green zones, urban forests, city parks, coastlines under protection, protected landscapes, biological stations, micro-reserves, and others).

Today, forest management, as well as forest legislation itself, still remains complex and confusing in Russia. Specialists involved in the Forest face this problem themselves when deciding on the application of certain forestry standards. It is often, when some provisions of forest laws and regulations come into conflict with land, water, and environmental legislation. The drafts of the new Forest Code of the Russian Federation have not escaped these shortcomings, according to the industry employees themselves. The transition from a centrally planned to the market economy without a reasonable program has aggravated the existing nature of the structure and location of the forest industry, forestry, causing the unprecedented collapse of production in the industry for the history of Russia in the late 1990s - early 2000s.

## **4 Discussion**

The problem of nature degradation is associated with anthropogenic impact on forests. First of all, it is direct impact (deforestation, forest fires, harmful insects, construction of facilities, tourism, atmospheric emissions). Secondly, it is indirect, when living conditions change as a result of air and water pollution, the use of mineral fertilizers and pesticides, which entails a change in plant composition). In addition, radioactive pollution is becoming a new factor in the degradation of forests and vegetation.

Today, the difficulties of forest management and reforestation are caused by specific factors. First of all, this is the long period of forest cultivation. The age of large-sized valuable

trees is at least 70 years. It is necessary to follow the proportionality of forest use to the scale and timing of its reproduction. The compliance with the principle of "continuous, sustainable forest management" (CSFM) is enshrined in the Forest Code and is the main postulate of the sustainable forest management provision [9].

The organization of the forestry based on the principles of sustainable and multi-purpose forest management can be effective in the form of multi-level forest management. At the same time, forest resources and products are divided into two groups: market resources with market value, and public goods that are indivisible between individual consumers.

We will highlight the main problems specific for the forest industry in general and in Russian forest rich Siberian and Far East areas in particular. They can be divided into the following: 1) production and technological; 2) natural and ecological; 3) institutional and organizational; 4) problems of forest protection and reforestation [10].

#### **4.1 Production and Technological Problems**

The production and technological problems in the forest industry of Russia include the following:

- Imperfection of logging and reforestation technologies, low efficiency of the forest reproduction system, due to the significant excess of logging areas over reforestation. In some areas, forests lose their climate and water-regulating significance. There is a decrease in the share of coniferous forests and an increase in the share of soft-leaved plantations due to improper exploitation of forests. Poor reforestation is explained by the termination of self-seeding, destruction of undergrowth, soils degradation during logging and transportation of wood.
- Outdated processing technologies and inefficient use of wood. Rational use of wood while harvesting implies the full utilization of the resource. However, in practice, losses are at least 30% of the total wood output. They occur due to incomplete logging, under-logging, and abandoned trees. The applied cutting technologies lead to the destruction of undergrowth. In addition, bark (10% of the volume of wood), twigs (12%), stumps (8%) are lost when harvesting wood. The use of outdated wood processing technologies leads to the loss of wood and, as a result, to the high cost of forest production.
- The unavailability of huge forest areas for intensive development of the forest industry due to the lack or absence of roads, the construction of which for the maintenance and operation of forests in existing conditions is highly costly for existing and potential forest users.
- The lack of capacity for deep processing of wood. In order to ensure more rational use of natural resources and generate greater export revenues, it is necessary to develop capacities for deeper processing of raw materials. For many decades, Russia has been exporting mainly roundwood (more than 15 million m<sup>3</sup> annually), which accounts for about 20% of the business timber harvest. In the second place is cellulose. Lumber, paper, cardboard and plywood and other wood processed products are sold in smaller volumes.
- Low technical level of production and non-compliance with international standards. The most urgent task of forest management is to create a national system of forest certification necessary for effective supply and management of forests. The border for non-certified forest is almost closed today. Russian lumber producers have limited access to world markets.
- High degree of depreciation of the main industrial and production assets. The depreciation of main technological equipment in the forest industry in some regions, such as, for example, in Irkutsk province reaches 80%. Thus, in the most capital-intensive Pulp and paper industry, most of the equipment was physically and morally outdated. Productivity at the best enterprises is 30-40% of the Scandinavian level, and at others about

10%. The problem is further complicated by the lack of competitive domestic equipment, insufficient attraction of private investments, including foreign investment too.

## **4.2 Nature and Ecological Problems**

The nature related and ecological problems include the following:

- The diseases and harmful insects impact on forests for which it is assumed to use physical, mechanical, chemical and biological methods of control, and forestry measures.
- Forest fires are one of the most serious problems of Russian forests [11]. The main reason for their occurrence is the careless handling of fire by individuals.
- Ecological aspects of forest management by large lumber companies in Russia. Today, we have environmental requirements for forest exploitation and priority measures for forestry established, and forests requiring restoration have been identified, including at the expense of state subsidies. Forest users are obliged to preserve the flora and fauna. The contradiction between the interests of economic development at the expense of forest raw materials and ecology based on forest conservation is one of the main problems of environmental protection. The administrative-legal influence, restrictions, administrative and criminal penalties are the tools for solving this problem for many years. The main lever of administrative and legal influence and economic mechanism here are the institutions that have been operating for a long time and are being newly created in the forest industry [11].
- Depletion of wood reserves in areas where existing forest enterprises are located.

## **4.3 Institutional and Organizational Problems**

You Institutional and organizational problems are those that affect the effectiveness of the use of resources. The existing institutional structure of the forest industry did not allow the forest business to function effectively for many years and contribute to the sustainable socio-economic development of territories. Over the years of reforms, the forest management system has undergone significant transformations. This has happened due to issues of ownership, organizational restructuring, and changes in forest legislation. The institutional structure and institutional changes in the forest sector are closely linked to forest policies that regulate the economic, social and environmental consequences of forest management, including ownership and management issues., There is a need for the system of national and regional forest policy measures to encourage effective entrepreneurship in the forest sector, which requires a thorough institutional analysis.

The defining institutions in the use of forest resources are: the ownership institution; investment institutions (banks, insurance companies, funds, etc.); the legal framework for forest management (laws, regulations, decrees, projects, standards and regulations); the taxation system, including rules and regulations that determine how the State collects the part of the forest income; the organizational structure of the industry as a whole and the organizational structure of individual enterprises; information support for the industry and organizations; institutions that ensure the development and implementation of regulatory documents; institutions that provide professional training and education of personnel; informal institutions that support manufacturing enterprises.

The main institutional problems of the Russian forest sector are related to both the legitimacy of forest resource consumption and non-compliance with environmental standards, delays in their adoption and implementation. There are significant contradictions in the forest legislation and there are conflicts with other laws of the Russian Federation. This leaves open the question of allocation of rights to forest management. A number of sources also note the complexity of tax policies that do not promote economic activity or new

investment; the problem of forest payments return back to the forest sector; the presence of corruption schemes that become a serious obstacle to the development of business activity in the forest sector; the closeness or lack of financial information and statistics [11].

However, the imperfect Federal legislation is the obstacle to effective use of forests. The entities of the Russian Federation had received powers in the field of forest management, as the new forest legislation was introduced. In particular, they are entrusted with forestry planning, providing forest lots within the borders of the forest fund lands, organizing the protection, forests conservation and reproduction of, and implementation of the State forest control and supervision.

However, the issues of solving the problems of lack of raw materials, reduced investment, technical backwardness, shortage of highly qualified personnel, poor use of technologies for deep processing of wood and others are still present. The effective development of the industry is possible only on the innovative basis, which requires, first of all, the restructuring of institutional relations.

The list of problems presented shows that inefficient use of forests is primarily due to ineffective institutional relations in the industry. First of all, this relates to inefficient ownership rights to forest resources.

According to the theory of ownership rights, effective can be called such property rights, in which the owner makes the best use of his property of all possible ways of use [12]. The most effective use of property rights is provided, on the one hand, by the properties of the property rights themselves, on the other by external incentives.

The properties of effective property rights are the following: 1) clarity and unambiguity, i.e. clarity (transparency) of the property rights, it is when it is clear which object belongs to whom (this also includes the specification of property rights, i.e. an accurate description of property rights in relation to the properties of the object of property rights); 2) enforceability or realizability, which is provided by the State system of property rights protection and enforcement, customs, criminal methods, contracts; 3) exchangeability, i.e. the ability of the owner to sell, gift, i.e. there should be a market for property rights.

External incentives for effective use of property rights are provided by the following: 1) the specification of property rights, which is provided by the owner's protection from violation of property rights, including violations by the State; 2) reliable protection of property rights of the owner's assets. Among certain property rights, the most important are the following:

- the ownership right, i.e. physical control over property and assignment of rents;
- the right of disposal and management, i.e. the right to make decisions about who can use the resource and how;
- the right to use, i.e. the right to personal use of a resource.

The question of whether it was the right decision to refuse the forests privatization and solve all production issues exclusively on terms on the rent remains open too. In any case, attempts to form a model of private forest ownership in Russian society proved to be inadequate to the models in developed countries. The attempt to privatize Russian forests became an example of a failed economic experiment in Russia with negative social and environmental consequences. The readiness of the Russian society for private ownership of forests has not been defined, nor have the terms and conditions for social responsibility of forest businesses been defined.

The analysis of the transformation processes happening in the country confirms that with maintaining of the State ownership for forest resources, there may be a conflict related to the "right to manage" forest resources, which is caused by the redistribution of this right in favor of the Russian Federation or regions as entities of the Russian Federation. Relations among entities were formed empirically during 2005-2013, when there was a significant tendency to centralize Federal power in the forest sector. Regions have lost the ability to participate independently in joint management in relation to the management of the forest fund as the

State property. This initiative provoked a strong negative reaction locally. The powers that belonged to the entities of the Russian Federation in accordance with the Forest code were returned and expanded by Federal law no. 199 dated December 31, 2005. It included almost all the functions of State and economic management of the forest fund. Subsequently, the authorities in the region tried to consolidate and expand their rights, sought to tighten the conditions for forest use, and proposed to cancel auctions and replace them with competitions. The forest business itself opposed such changes, considering them as an infringement on the freedom of economic relations [13].

Today, we can note that the State's influence on the development of the forest sector of the economy is generally not effective enough. The State can and should intervene in the distribution of income through the taxation system, regulation of prices and wages, and can influence the balance of supply and demand through the distribution of income, creating conditions for the reproduction and renewal of forest goods necessary for society. The problems of the forest industry are related not only to the operation of market mechanisms, but also to measures of the State regulation that ensure the balance between economic development and protection of the environment.

#### **4.4 The Forest Protection and Reproduction**

There is a number of shortcomings in this area which should be noted. The first official nature protection document concerning forests appeared on April 4, 1888, when the tsarist government, influenced by public opinion, issued the Forest Protection law that regulated forest management in forests that perform primarily nature protection functions, and restricted certain rights of forest owners.

The modern Federal law "About specially protected natural territories", signed by the President of the Russian Federation [8], distinguishes the following categories of specially protected natural territories: State nature reserves; national parks; natural parks; State nature reserves; natural monuments; dendrological parks, and botanical gardens; health-improving areas and resorts. In addition, the government of the Russian Federation, executive authorities of constituent entities of the Russian Federation, and local governments may establish other categories of specially protected natural territories (for example, green zones, urban forests, urban parks, protected coastlines, protected landscapes, biological stations, micro-reserves, and others).

Today, forest management, as well as Forest legislation itself, is still complex and confusing in Russia. This problem is faced by forestry workers themselves too when deciding on the application of certain forest regulations. Furthermore, certain provisions of forest legislation and regulations conflict with land, water and environmental legislation often too. According to the industry employees themselves, the draft of the new Forest code of the Russian Federation did not avoid these shortcomings. The transition from a centrally planned to the market economy without a well-founded program worsened the existing nature of the structure and location of the forest industry and forestry, causing in the late 1990s and early 2000s unprecedented for the history of Russia collapse of production in the forest industry.

Thus, innovative changes in the forest industry that can increase the efficiency and productivity of the industry are not possible and must begin with institutional changes in ownership and in other institutional relationships. The primary condition for the forest industry transformation on the innovative basis is the formation of the innovative system for the industry. Now we will study the advanced experience in the field of forest management and development of the forest industry in Russia to analyse the concept and composition of the innovative system of the forest industry.

## 5 Conclusions

Innovative transformations that can ensure an increase in the efficiency and productivity of the forest industry, taking into account the requirements of environmental conservation, should begin with institutional transformations. The primary condition for the development of the forest industry on the innovative basis is the formation of the innovative system of the forest industry. It is necessary, first of all, to study the best foreign experience in the field of forest management and development in order to analyze the concept and composition of the innovative system of the forest industry. This system includes the following: carriers of resources (of knowledge, personnel, capital, etc.), administrations, interested parties, clients, the research and development sector, the consulting sector, markets, innovative entrepreneurship.

There is a need to ensure the sustainable development of the forest industry in Baikal region, which should be implemented via improving the efficiency of the forest resources use by increasing the share of wood used for processing. Experts suggest the formation of regional lumber industry clusters, which will allow the following [14]:

- to develop deep chemical and mechanical processing of the wood in order to involve small-scale, low-quality and soft-leaved wood in processing and produce highly cost-effective products; promote the development of biofuel production;
- to restructure exports structurally in the direction of increasing products with a higher degree of processing;
- to encourage an increase in the number of high-performance jobs and increase the level of wages at the lumber industry enterprises;
- to create conditions favorable for attracting investment in the Baikal region's LIC for the modernization and construction of processing facilities to produce new types of import-substituting products (modern wood board materials, pulp and paper products, sanitary products, furniture).

Experts believe that one of the ways to improve the effectiveness of control and supervision activities is to increase the number of employees who carry out State forest supervision until the patrolling of the area controlled is ensured in accordance with the forest patrol standards approved by the order of the Ministry of natural resources and ecology of the Russian Federation.

There is a need for a unified national forest management policy. Especially important is State regulation aimed at the implementation of highly effective innovative projects via guarantees on borrowed loans, tax and customs preferences, financing of priority scientific innovation projects and small innovative enterprises.

The effective institutional form is a public-private partnership (PPP), in which enterprises are supported by subsidies from the federal budget, investment funds, the Development bank and regional budgets through various financial schemes.

It is necessary to ensure the protection of the forest fund from illegal actions, as well as to interest entrepreneurs to legalize logging and the forest certification. Along with foreign recognized certification systems, such as responsible forest management of the Forest Stewardship Council (FSC) and Pan-European (PEFC), currently inactive in Russia, the certification schemes of the Russian National Council for Forest Certification should be developed to comply with the accreditation in international programs similar to PEFC.

The innovative development to increase the efficiency and productivity of the forest industry requires institutional changes again. The primary condition for the forest industry transformation on the innovative basis today is the formation of the forest industry innovative system at the national level. This system has to be based on institutional innovations [15], as well as targeted efforts of the State, regional, municipal administrations, increased influence of the research institutions, and of entrepreneurs in the forest industry, to accelerate the

implementation of modern technologies and science achievements, which will consequently improve the quality of life and provide sustainable economic development in the forest rich regions of Russia.

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