Quality Management of Forest Resources in Yakutia in Conditions of Globalization

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Abstract. The natural quality of forest resources of the Republic of Sakha (Yakutia) of the Russian Federation is not sufficiently realized in the resulting products. Forest quality management does not meet the emerging challenges of globalization and international market relations. According to the indicators of the State Program “Forestry Development of the Russian Federation for 2013-2020”, the volume of payments to the budget system of the Russian Federation from the used forests located on forest land per 1 ha of the forest fund of the Sakha Republic (Yakutia) is 3 rubles in 2016, and by 2020 this indicator should reach 5.7 rubles, i.e. it should increase by 90%. In Primorye, the same indicator should accordingly grow from 30 rubles in 2016 to 53.5 rubles by 2020, in the Amur region from 14 to 33.9 rubles, in Sakhalin from 17.6 to 33.1 rubles. The average indicators for the Russian Federation are 25.7 rubles, while the planned figures for 2020 are 48.7 rubles. The implementation of the task of full accounting of forest resources using modern methods of forest inventory, including space sensing of the earth, allows you to create a high-quality database that meets the requirements of the FSC (Forest Stewardship Council). FSC standards allow us to trace the origin of forest products, including forest biomass as a raw material for bioenergy. The most complete, up-to-date information will allow organizing effective scientific management of the quality of forest resources in the context of globalization.

1. Introduction

1.1. The forest industry of the Republic of Sakha (Yakutia)
The forests of Yakutia are among the most important natural renewable resources. The value of all types of forest products in the context of globalization will steadily grow.

The forest industry of the Republic of Sakha (Yakutia) has so far not sufficiently realized its potential. According to the indicators of the State Program “Forestry Development of the Russian Federation for 2013-2020”, the volume of payments to the budget system of the Russian Federation from the used forests located on forest land per 1 ha of the forest fund of the Sakha Republic (Yakutia) is 3 rubles in 2016, and by 2020 this indicator should reach 5.7 rubles, i.e. should increase by 90%. The average indicators for the Russian Federation are 25.7 rubles, while the planned figures for 2020 are 48.7 rubles [1].

Along with the well-known problems of the industry, characteristic of all forest and forest-rich regions, such as a certain depletion of transport-accessible forests, insufficient renewability of logging and forest carrying equipment, high cost of construction of the road network for transportation of...
timber, seasonality of operation of forest roads, lack of capacity for processing cargoes of the forest industry in river ports and railway stations, new challenges arise for the industry, directly due to globalization.

Globalization is manifested in the reflection of global trends in forest products trade. Requirements previously present in other areas of activity and consumption, such as consuming only an end product derived from natural or animal raw materials grown in certain humane, standardized, morally and ethically relevant requirements of modern humanistic democratic international society, began to spread to the cultivation, production, processing and consumption of forest products. The current world forest market requires raw forest raw materials to be harvested only in forests, where cultivation, exploitation, logging, qualification assessment and processing meet the quality standards of international organizations such as FSC (Forest Stewardship Council), and PEFC (Program for the Endorsement of Forest Certification, National Forest Certification System Approval Program).

2. Relevance of the question
In this paper, we examined the status of the issue at the international level, at the level of the Russian Federation and at the level of the region with forest reserves, on the example of the Republic of Sakha (Yakutia).

2.1. According to the quality standards of international organizations such as the FSC (Forest Stewardship Council), and the PEFC (Program for the Endorsement of Forest Certification, Approval Program for National Forest Certification Systems), up to 25% of the world's forests are certified. The share of various forest products on the world market meets their quality standards, including “supply chain requirements”. Both organizations are present in the Russian Federation. FSC is more represented in the Russian forest industry, and given the preferences of real external supply markets, cooperation with FSC may be more promising. According to the Russian FSC Bureau, “as of January 24, 2019, more than 204 million hectares of forests (1,585 forest management certificates) in 84 countries of the world were certified under the FSC scheme. According to the UN (UNECE), the FSC is the fastest growing forest certification system in the world. The market for products with the FSC logo is estimated at tens of billions of dollars. 36,270 supply chain certificates have been issued in 124 countries. Programs of public procurement of legal and certified timber operate in more than 30 countries, including Australia, England, Brazil, Germany, China, Finland, Sweden, Japan, etc. In Russia, 42.84 million hectares of forests are certified”[2].

2.2. In the Russian Federation, in the current version of the Forest Code, there is no norm for mandatory certification of standing timber, previously presented in Art. 71 of the Code of Russian Federation as amended in 1997. To effectively implement all types of Russian forest products in foreign markets, it is necessary to legally restore mandatory forest certification, study the accumulated experience of voluntary certification of forests and forest products in the Komi Republic and the Far East, in other Russian regions, and adapt the national certification system to the quality standards of international organizations.

In the strategy of development of the forest complex of the Russian Federation among the most important factors in the emergence of systemic problems in the field of forestry is the lack of accuracy in accounting for forest resources.

2.3. In the conditions of the Republic of Sakha (Yakutia), an activity of the Working Group on Forest Certification in RS (Y) is necessary, the main goal of which would be the development of regional criteria and standards for voluntary certification of forest management, adapted to the standards of the FSC system, and taking into account regional features of the forest quality of Yakutia.

To solve this very important scientific and technical problem, cooperation of the Government of the Republic of Sakha (Yakutia), Yakutsk branch of Roslesinforg, the NEFU, academic science, organizations of small indigenous people of the North, and all interested parties is necessary. It is generally accepted that voluntary forest certification is evidence of environmentally, socially and economically responsible forest management. The introduction of standardized forest certification is in the interest of the entire community related to forest management, residents of the entire republic. A
methodology has been developed and is being introduced for rationing the use of forests in places of traditional residence and economic activities of the indigenous people of Siberia and the Far East of the Russian Federation. It requires monitoring and proposals for the further development of this methodology in relation to the conditions of sustainable forest management in Yakutia, including the development of regional criteria and standards for voluntary certification of forest management.

3. Inventory of forests as an important condition for ensuring the quality of forest management of resources

In the Russian Federation, there are 8 forest vegetation zones, 34 forest areas with relatively homogeneous forest vegetation signifiers. The district borders divide forest areas into 167 parts. The ongoing work in the conditions of Yakutia is complemented and accompanied by the need to establish and clarify the boundaries of forest areas and forest sites. Additional inventory work is expected in connection with the “Far Eastern hectare” federal program and the interests of hunting users. For example, in the Krasnoyarsk region, 8 forest areas have been identified, determined by the geographical and climatic features of the predominantly meridional location of the territory, its unique landscape characteristics.

In this regard, the priority for the Republic of Sakha (Yakutia) is the completion of the ongoing state forest inventory. The “Procedure for the State Forest Inventory”, “Guidelines for the State Forest Inventory” are in force. Over the past 2018, according to the Yakut branch (YF) Roslesinforg, an inventory of 41 million hectares of forests in the forest areas of Amginsky, Vilyuyisky, Gorny, Megino-Kangalassky, Namsky, Neryungri, Ust-Aldansky, Ust-May, Khangalassky, Churapchinsky districts and the Yakutsk city was conducted. The task of 2019 is inventory of Aldan, Zhigansk, Mirny, Nyurba, Suntarsky, Verkhnevilyuyusky, Lensky, Olekminsky and Tattinsky forest areas with an area of 119.3 million hectares [3].

The work on forest inventory covers the whole range of forest characteristics. Duration of the cycles of these works reaches 10 years. Forest inventory as the basis of the complex of international forest certification is complemented by dendrochronological research. Dendrological studies of NEFU employees cover forests of all areas of growth, from the southern borders to the polar regions. They are conducted with the active participation of European scientists and have high international recognition [4,5,6].

4. Scientific provision of foreign resources accounting

Dendrological passports have now become the most important document, on the basis of which criminalization of the industry is reduced, obstacles to entry of illegal logging into the forest products markets are created, market preferences for legal forest products are being realized. Dendrochronological expertise has proven to be a reliable tool to reliably track the origin of felled wood. As an example, one can refer to the practice of forest certification and forest examination of forest products (mainly exported), based on the dendrological characteristics of the growing regions in Siberia and north-west Russia. Due to the relatively limited areas of the central regions and edges, the climatic unity of the logging areas, their dendrological passports have the same characteristics. In Yakutia, however, there are more than 20 such zones and subzones, characterized by individual stable dendrological characteristics, due to climatic diversity and landscape features. This work requires serious research, applied and legislative support, and should be carried out as a necessary part of forest inventory and certification of Yakutian forests quality. It is also necessary to take into account that in the framework of this work standardization of solid biofuels is carried out. The ability to trace the origin of biomasses is an essential component of the certification of biofuels and biomass as a promising forest product.

Under the conditions of possible climate change, dendrological studies improve the quality of the assessment of anthropogenic impact on the environment. Their role in monitoring and forecasting climate change and the impact of these changes on the state of permafrost soils is important.
North-Eastern Federal University has a long experience of cooperation with the forest industry. The Department of Woodworking and Wooden Structures has been working for 25 years. Bachelors of woodworking are being trained, 20 funded places are allocated annually in this area. The scientists of the department obtained significant scientific and practical results in many aspects of this area of research [7,8,9].

5. Practical results
1. A serious array of scientific and applied results on wood science, on the study of the physicom mechanical properties of wood of various northern species has been accumulated, there is experience in certifying the quality of local pine. Along with this, further substantiation of the physicom mechanical, ecological, radiological characteristics of Yakut wood of various growing areas is required. Not only dendrological certification and zoning is necessary, but also zoning in terms of wood strength. The high strength of Yakut wood is due to the harsh climatic conditions. A thin annual layer and a high content of more durable late wood form an increased strength and durability compared with the indicators given in the Code of Rules and Regulations for the Design of Building Structures.

2. It should be noted that in the Russian Federation, as in most countries, the national forest inventory network is based on the use of a rectangular cell of the national network, with indicators of stocks and other characteristics per 1 hectare. Ground work should be accompanied by the operation of a satellite network of remote sensing of the earth (Earth remote sensing). This requirement is valid within the framework of the State Program "Forestry Development of the Russian Federation for 2013-2020". Trial plots are determined, inventory measures are carried out, and by comparing with remote sensing data, the indicators for the interpretation of satellite information are corrected. NEFU scientists and specialists can take a productive part in the fulfillment of this important state task. It is necessary to ensure the integration of the geographically distributed information system of remote sensing with the information system of monitoring, demarcation of forest areas and forest sites. Extensive work is expected in the vast territory of Yakutia (3.1 million sq. Km), with 51% forest land, in which the area share of valuable forest plantations in the forest fund lands is 84.4% [1]. An additional difficulty lies in the increasing imperfections of the existing cartographic material of forest areas, topographic maps of settlements, and linear objects. It is often extremely difficult to find compromises when using different cartographic sources, when making comparisons and aligning them with remote sensing data. NEFU has a considerable experience in the practical scientific work in the use of geographic information systems (GIS systems) [10]. This experience is very useful in solving the complex of scientific and practical problems.

Establishing and clarifying the boundaries of forestry and forest sites, directly related to the above-mentioned problems of adapting the previously existing ground-based cartographic data with the results of the remote sensing data should be carried out simultaneously with the forest inventory. Borders of forestry and forest fund are entered in the state register of real estate, covered by cadastral registration. According to the NF Roslesinforg, in 2018 40 million hectares were documented in 9 forest districts, in 2019 - 45 million hectares in 7 forest districts.

6. Conclusion
During the work on this article, we came to the conclusion that the Republic of Sakha (Yakutia) should establish cooperation with the FSC bureau in Moscow and Krasnoyarsk, together with the federal forest authorities. The NEFU should raise the quality of forest inventory to a higher level by organizing cooperation in space sounding of the earth, developing dendrological passports and passports of the origin of biomass as a raw material for bioenergy.

FSC has developed a map of Russian forests indicating the certified forest areas [11, 12]. On the territory of Yakutia, only limited areas of inaccessible forest areas are designated. More complete information should be expected when processing the results of the state forest inventory of Yakutia and cooperation with FSC. The strategic goal of increasing the contribution of the forest complex to
the socio-economic development of Yakutia as a federal unit of the Russian Federation, as well as ensuring environmental safety and a stable satisfaction of public needs for forest resources and services will be realized.

The most complete, up-to-date information will allow organizing effective scientific management of the quality of forest resources in the context of globalization.

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