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## Rational Use of Forest as a Renewable Natural Resource

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**Abstract:**

*This article is devoted to the formation of a mechanism for the rational use of forests as a renewable natural resource, including transfer of forest areas in rent taking into account market indicators, advantages and disadvantages in the process of timber sales.*

*The total income received in the form of fees for the use of forest fund and for the use of forests in 2016 in the Russian Federation is amounted to 24.4 billion rubles, which is 0.9 billion rubles (by 3.8%) more compared with the previous year.*

*According to the state report of the Ministry of Natural Resources and Ecology, in the reporting 2016 year this payment was received in the amount of 27.8 billion rubles, which is 3.4 billion rubles (almost 14%) more than in 2015.*

*Thus, due to the fact that Russia's natural forest resources constitute powerful strategic competitive advantage in the world economic system, the article, on the basis of the system approach, reveals correlation between the level of rent payments and profitability from the sale of round wood, taking into account harvested and considered assortments, which allows forming forest payments on the basis of domestic and export market prices and as a result increasing financial contribution from the use of forests to the national budget.*

**Keywords:** *Natural resources, rational use, forest, forest plot, rational use mechanism.*

**JEL Classification Codes:** *G 28, G32, G31, G38, H70.*

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## **1. Introduction**

In modern conditions of nature management, the economic value of forests as a renewable natural resource depends on its location, costs of harvesting and consumer properties. A measure of value is saving of labor in the harvesting, transportation and processing of forests. Savings are entirely determined by objective circumstances, and are called yields of natural resources or forest rents. Considering rent as an objective reality formed independently of the owner's or user's consciousness of forest resources and always distributed among them in one way or another, in our opinion, payment for forest resources is a derivative of profitability and the issue of its definition is one of the key issues of rational use of forests.

At this stage, legally, use of forests in Russia is carried out on a fee basis. The given process is realized with the means of payment for the use of the leased forest plot, in the form of rent and payment under the contract for the purchase and sale of forest plantations. Economic nature of these payments is the nature of absolute rent, which the state receives as the owner of the forests.

Despite this, inability to obtain objective data for assessing the effectiveness of the formation of these payments hinders the process of planning and further development and setting objectives for achieving strategic objectives in the field of rational forest management (Stepanova, 2017). In connection with the novelty of the problem of formation of lease payments, there is a need to build a mechanism for the rational use of forests as a renewable natural resource, which is based on a thorough analysis of forest payments based on domestic and export market prices (Zinovyeva, 2017).

Starting to explore the area of forest lease relations, let's touch on a little history of this issue. In Russia, the payment for standing timber in state forests was introduced at the end of the XVIII century; at the beginning of the XIX century, it was calculated on the basis of rates, so-called "taxes". The method proposed in 1883 by the Forestry Department of Russia "Manuals for preparing fees for forest materials from state forest dachas" was based on the collection of data on market prices; from these prices the cost of procurement of materials, their delivery to the market and the profit of the timber merchant were deducted. The remainder showed the value of forest materials on the root, in the forest. At the beginning of the Soviet period (1917-1937), Professor M.M. Orlov published a major work on forest management, in which he outlined the market theory of the root value of forests in a special section. In 1948 Prof. P. Vasiliev developed and introduced into practice "Soviet" forestry rates, which were applied before the period of Forest Code. In 2007, the Resolution of the Government of the Russian Federation No. 310 of May 22, 2007 (Edited on August 19, 2017) "On rates of payment for a unit of the volume of forest resources and rates of payment for a unit of a forest area under federal ownership" was adopted. To date, calculation of rent for the use of forest land is carried out

based on the rate of payment for a unit of forest area and is regulated by Art. 73 of the Forest Code of RF, without taking into account market factor. In this regard, the actual issue is the development of a mechanism for the rational use of forests, covering all the main market aspects associated with the sale of round wood in the formation of lease payments.

## **2. Methods**

Defining the methodology, it should be noted that the application of the system approach in analyzing the effectiveness of the formation of rental payments, allowed us to say that it consists of elements that are connected by a multitude of links both with each other and with external macro environment. At the same time, rational use based on the system approach implies an assessment of all existing aspects of the formation of lease payments under the impact of various market indicators (Morkovina, 2017).

It should be noted that domestic and foreign authors are concerned with the rational use of natural forest resources, but often their analysis is rarely identified with calculation of lease payments. As for foreign literature, existing mechanisms developed by foreign scientists, due to insufficient adaptation to Russian conditions, reflect an incomplete picture of ongoing processes (Petrov, 2004).

When choosing options for calculating lease payments, it is necessary to remember that the use of renewable natural forest resources in Russia in accordance with art.9, 79 of the Forest Code of the Russian Federation is possible on the following rights: lease (harvesting of wood with provision of forest plot, harvesting of gum, management of hunting with provision of forest site, agriculture, etc.); purchase and sale of forest plantations (logging without providing forest plot, geological study of subsurface resources, development of mineral deposits with provision of forest plot and felling of forest plantations); permanent (unlimited) use; gratuitous urgent use; limited use of forest site - servitude.

In the context of our study, lease options are discussed in details. Determination of the amount of rent under the forest lease agreement, in accordance with Article 74 of the Forestry Code of the Russian Federation, is based on the developed methodological guidelines No. 53 of 1 February 2016. The calculation of the rent is made by state authorities and local self-government bodies within their authority, determined in accordance with Articles 81-84 of the Forest Code of the Russian Federation. The amount of rent under the lease (A) is determined by formula 1:

$$A = A_{\min} * Re, \quad (1)$$

where:  $A_{\min}$  is the minimum amount of rent under lease, determined in accordance with parts 2 and 3 of Article 73 of the Forestry Code of the Russian Federation (rubles);

Re is the excess ratio.

The excess ratio (Re) is determined by formula 2:

$$Re = A_{auc} / A_{in} \quad (2)$$

where:  $A_{auc}$  is the amount of rent generated by the results of the auction for the sale of the right to enter into a completed lease agreement (rubles);

$A_{in}$  is the initial price of the subject of the corresponding auction (rubles).

In the mechanism of rational use of natural forest resources developed by the authors, the above-described methodology for calculating the rent is supplemented by mathematical methods of influencing market indicators for harvested and registered assortments.

### **3. Results**

Based on the foregoing, the presented mechanism for the transfer of forest areas for lease is a part of the concept of rational use of natural forest resources and excludes all negative factors that have an impact on efficient nature management in Russia.

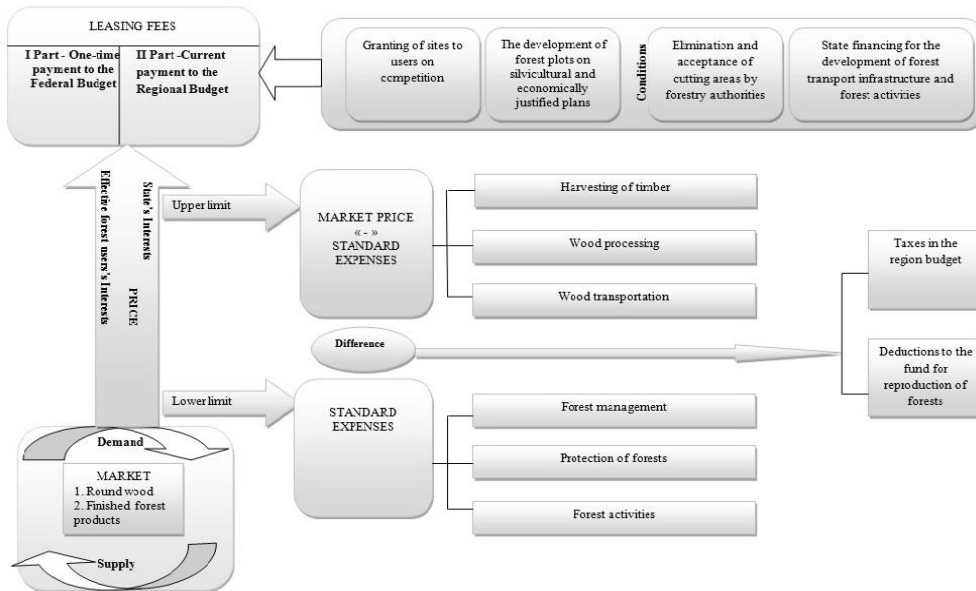
Now, with the implementation of 415-Federal law, in all the above-mentioned areas, an incomprehensible economic situation is created in the sphere of economic relations when using natural forest resources, when: in fact, harvested wood is taken into account and controlled by the state as a part of round wood assortments that determine their target final consumption (saw log - production of sawn timber, balances - cellulose production, plywood logs - plywood production); payment for harvested wood is carried out on the basis of data obtained as a result of forest inventory work and containing taxation (species, size of wood) and operational (distance of removal) characteristics of growing plantations sent to cutting. Here there is a difference in the volume of round timber accounted for in the assortment structure and in the amount of forest planted in the felling. At the same time, accounting for wood and transactions with it creates another information base for setting fees for standing timber, represented by indicators characterizing round wood market (assortment structure, geographic location, degree of monopolization, etc.).

Therefore, it is necessary to launch a mechanism for charging rent for the use of a forest plot that will characterize round wood market on the basis of supply and demand and provide a market approach where the payment for standing timber will be formed as the market price for round logs as shown in Figure 1.

First of all, the basis of the mechanism should include key provisions that ensure the balance of interests of the state, as the owner of natural forest resources and effective forest users, as entities that receive economic benefits as a result of their activities.

In the context of state ownership of natural forest resources, provisions are necessarily supported by legislative or regulatory acts.

**Figure 1. Mechanism of transferring forest land plots to the market**



In fact, the rent of forest plots should be based on the market price of standing timber, which is formed taking into account supply and demand for round timber in the context of assortments and final timber products. In its turn, market price of standing timber is set for the basic assortments of round wood in the border of two limits that meet the interests of owner of forest resources and efficient forest users (Larionov, 2017).

Market price of upper limit is determined by the efficiency in the sphere of wood consumption in the very direction that follows from the name of the assortment (production of saw-timbers with the use of saw logs, production of pulp and paper pulp - processing of balances, etc.). Market price of upper limit for each assortment is determined by the residual value (or income) per 1m<sup>3</sup> of timber formed by subtracting from the market price of the final products (e.g. sawn timber) of standard costs for processing wood and its harvesting, transportation costs for the delivery of raw materials from its procurement places to the point of consumption, regulatory profit in wood harvesting and processing productions.

Standard profit is set as a percentage of specific capital intensity of timber harvesting and processing based on standard payback period of investments in the forest sector. Standard profit guarantees resources reproduction for efficient forest users. The market price of the lower limit for standing timber is determined by the standard costs for forest management, protection of forests, and forest inventory activities

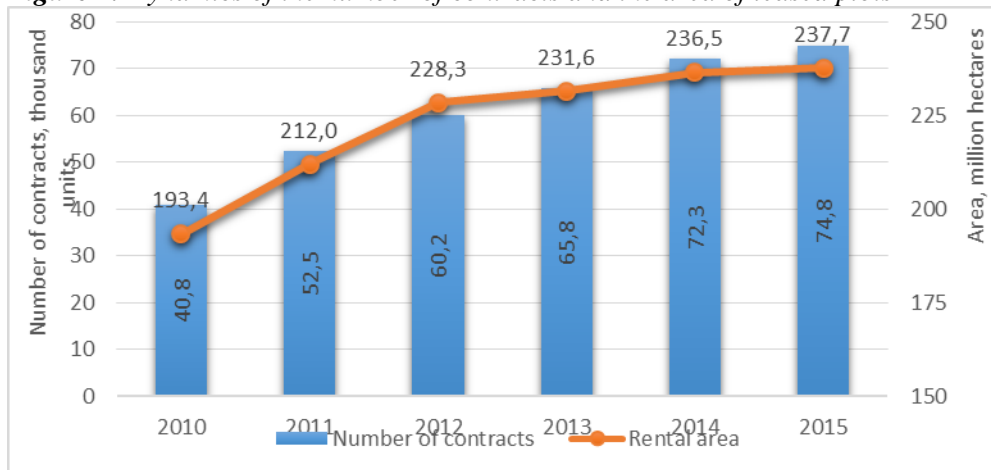
taking place at the federal level. In the case of development of forest plots without orientation for the target forms of forest management, market price of lower limit is taken to be the same for all assortments.

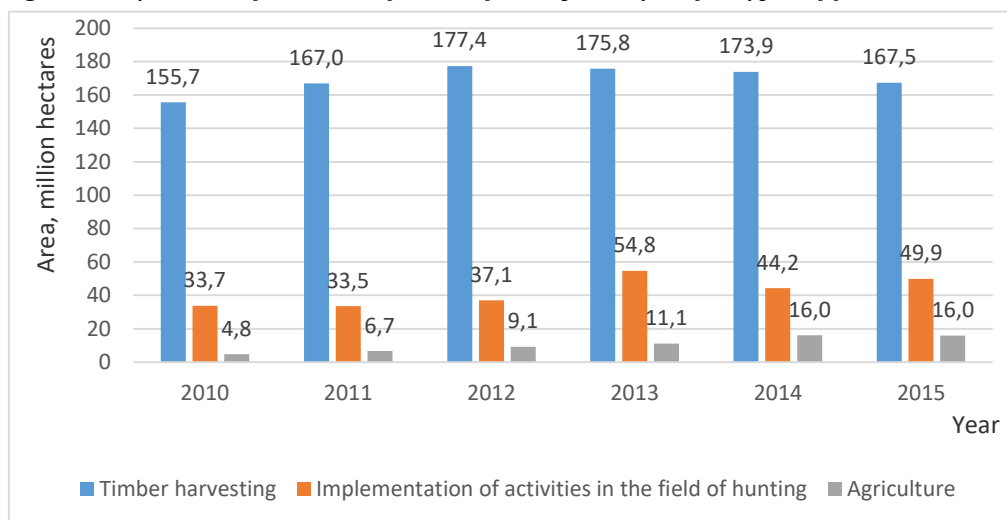
It is recommended that the rent of the lower level for the standing timber (A<sub>lower</sub>) must be allocated as a tax to the federal budget at a rate set in rubles for 1m<sup>3</sup> of timber, without using differentiation by assortments and species. The rent of the upper level of the price limit (A<sub>up</sub>) is established on the basis of market price of the upper limit for the assortment. The difference between the rent in the amount of upper price level and rent in the amount of the lower price level, as an option, can be transferred to the regional budget of the constituent entities of the Russian Federation for the needs related to the specifics of the industry. In the alternative, this value can be directed, for example, to the established fund for the reproduction of forests of a subject of the Russian Federation. The rental rates for the use of forest land within the upper and lower levels with annual indexation and differentiation by entities are established and approved by the Government of the Russian Federation.

#### 4. Discussion

Having considered the economic essence and legislative base of rent payments, we analyze the data obtained for the period of 2010-2015 in the Russian Federation. As it has been already noted above, according to Art. 25 of the Forestry Code of the Russian Federation there are 16 types of forest use. As of 01.01.2016, the country had about 74.8 thousand lease contracts; the data are in Figure 2. Note that the total area of leased forest areas is 237.7 million hectares, the share of leased land in the total area of forest fund lands (excluding reserve forests) is 20.7%. The largest area of forest plots is leased for the purpose of harvesting wood, for use of forests to carry out activities in the field of hunting and farming; the data are in Figure 3.

**Figure 2.** Dynamics of the number of contracts and the area of leased plots



**Figure 3.** Dynamics of the area of leased forest plots by major types of forest use

In the five-year period, the growth in the number of lease contracts is 44.3% or it has increased 1.23 times. In 2015, a complex of activities on forest care, protection, protection and reproduction of forests, seed production and growing of planting stock, forest management, taxation and allocation of cutting areas for a total of 12.9 billion rubles has been carried out on leased forest sites. The average value is 54 rubles / ha. At the end of 2015, 2.4 thousand forest plots with a total area of 14.1 million hectares of them were granted for permanent (unlimited) use:

- for the implementation of recreational activities - 77% - (10.86 million hectares);
- for wood harvesting -18% - (2.54 million hectares);
- for implementation of research and educational activities - 4% - (0.57 million hectares);
- other activities account for 1% (1 million ha).

The largest percentage of the number of contracts is concluded for the purpose of recreational activities, in comparison with the timber harvesting agreements, the data vary in 5 times.

Forest development projects are developed for 1.7 thousand (70%) of forest areas. Also on forest plots transferred to permanent use, 2.2 million cubic meters of merchantable wood has been harvested, as well as a set of activities to protect and reproduce forests, allocation of cutting areas for the amount of 7.6 billion rubles was made. The average value is 537 rubles per hectare. By the end of 2015, 2,562 agreements on the free use of forest areas were concluded on a total area of 378.9 thousand hectares, almost 95% of which are for agriculture. In 2015, 503 thousand contracts for sale and purchase of plantings for own needs with a total area of felling areas of 356.7 thousand hectares and a volume of cut wood of 24.8 million cubic meters

were made. The sale price has amounted to 0.79 billion rubles. The average value is 31.85 rubles per cubic meter.

Under the contracts for the purchase and sale of plantations for the harvesting of timber and contracts for the performance of activities to protect and reproduce forests, 38.3 million cubic meters of timber have been harvested with a total forest area of 670.3 thousand hectares. The average volume of logging per hectare is 57 cubic meters.

For today in Russia the most widespread kind of use of wood is preparation timber harvesting (more than 90% of the used area of forests). As of 01.01.2016, the annual allowable cutting rate on the lands of the forest fund was 699.77 million cubic meters. At the end of 2015, 205.21 million cubic meters of timber were harvested (Table 1). About 80% of harvested wood comes to the share of tenants of forest plots. The data indicate that the estimated annual allowable cutting rate is only used by 29.3%.

**Table 1.** Types and volumes of use of forest lands in 2014-2015

Type of forest use	Volume of use		Ratio 2015 to 2014,%
	2014	2015	
Harvesting of timber - total, million cubic meters	202.76	205.21	101.2
Of the total volume of logging by tenants, million cubic meters	145.04	164.,73	113.6
Including on farms:			
Of the total volume of timber harvesting under contracts for the purchase and sale of forest plantations, million cubic meters	41.07	38.3	93.2
Preparation of gum, thousand tons	0.15	0.08	53.3
Harvesting and collection of non-timber forest resources, thousand hectares	437.26	449.17	102.7
Harvesting of food forest resources and collection of medicinal plants, thousand hectares	1 896.97	1 966.47	103.7
Implementation of activities in the field of hunting, thousand hectares	44 182.60	49 853.79	112.8
Agriculture, thousand hectares	16 392,45	16 309.46	99.5
Realization of scientific-research activity, educational activity, thousand hectares	774.06	840.85	108.6
Implementation of recreational activities, thousand hectares of them on leased forest plots	4 698.6 34.99	10 642.59 33.86	226.5 97.0



Despite the existing difficulties, for the last 5 years the share of harvested timber at leased plots has increased by almost 11% or 30 million cubic meters; the data is in Table 2.

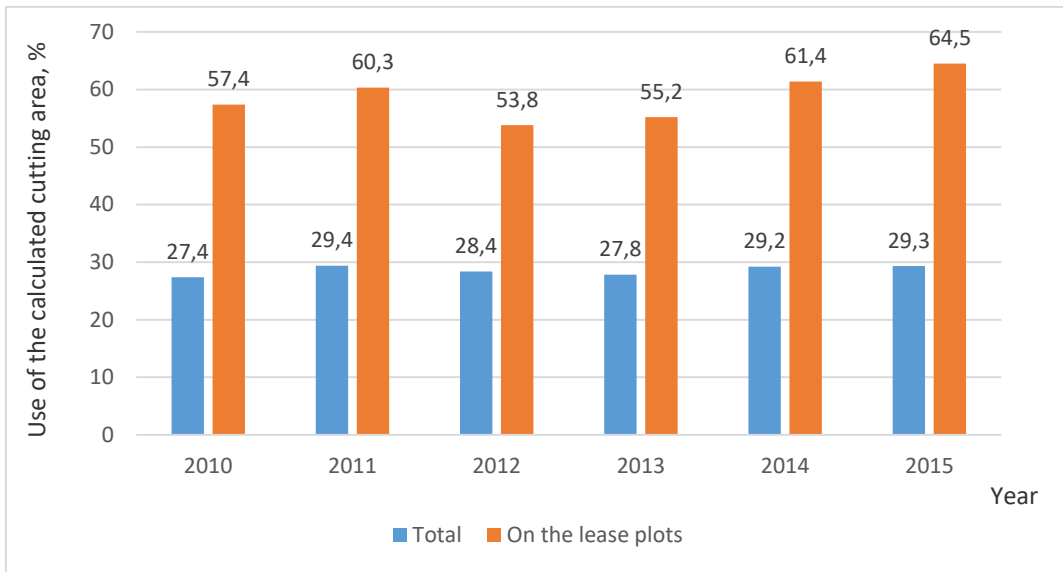
**Table 2.** *Distribution of harvested timber by forms of forest use*

Form of forest use	Type of forest use	Distribution of harvested timber by the forms of use, %				
		2011	2012	2013	2014	2015
Rent of forest plots	Harvested, total	69.72	73.16	75.50	78.09	80.24
	Including:					
	- under contracts for harvesting	66.56	69.82	71.76	73.26	75.03
	- under contracts for purposes not related to harvesting	3.16	3.34	3.75	4.83	5.22
	of them on the plots leased without auctions	3.08	3.26	3.62	4.76	5.05
Fixed-term use without consideration	-	-	0.02	0.20	0.04	0.01
Permanent use	-	0.92	0.93	1.07	1.13	1.11
Contract of sale	Harvested, total	29.36	25.89	23.23	20.75	18.63
	of them under contracts of sale and purchase concluded on the basis of results of auctions	29.36	25.89	23.23	20.75	18.63
Wood, harvested for business purposes, under contracts concluded at auctions		95.99	95.77	95.02	94.04	93.82
Wood, harvested for business purposes, under contracts concluded without auctions		4.01	4.23	4.98	5.96	6.18
<b>Total</b>		<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

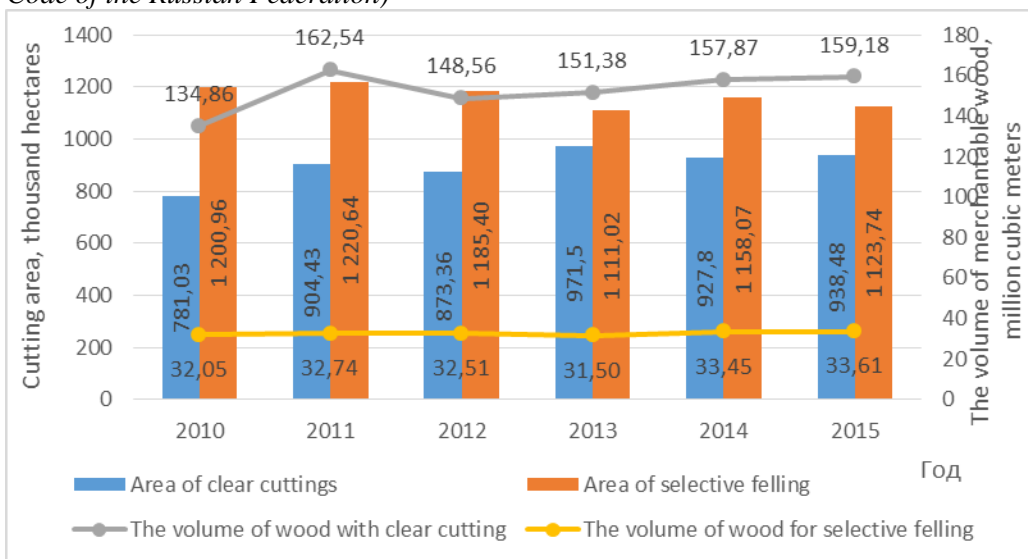
Once again, we note that the estimated felling area for all types of felling in general on the lands of the forest fund was used by 29.3%. In the leased forest areas, the intensity of development of the estimated cutting area was 64.5%, Figure 4.

Ripe and over-mature stands account for about 74% of the total volume of merchantable wood. Predominant method of cutting is continuous cutting: they account for 83% of harvested wood and 44.5% of the area, Figure 5.

**Figure 4.** Dynamics of use of the estimated annual allowable cutting rate as a whole for all types of forest use and on leased plots



**Figure 5.** Dynamics of area and volume of timber, harvested in continuous and selective cutting (excluding cuttings provided in Articles 13, 14 and 21 of the Forest Code of the Russian Federation)



## 5. Conclusion

As a result, changes in the volumes of various uses of natural forest resources that have taken place in recent years have an oscillatory character and are largely

determined by the demand for certain types of services provided by forestry authorities of the subjects of the Russian Federation. Taking the legal terms of leasing for forest plots in Russia (from 10 to 49 years) as a basis, it can be positioned as a long-term one, the effectiveness of which is determined by the economic mechanism laid down in its basis.

A number of Russian authors see it as an alternative to renting-buying-selling plantations at open auctions, but one can unequivocally state that this area of application has objective limitation: these are areas of densely populated regions and forest areas with developed forest and public transport infrastructure. Thus, thorough analysis has showed that there is only one way out, and it consists in a rational mechanism for transferring forest land plots on a lease subject to their provision to users through a tender; development of forest areas for silvicultural and economically justified plans; removal and acceptance of cutting areas by forestry authorities; state financing of the development of forest transport infrastructure and forestry operations in accordance with the development plan for the forest plot (Morkovina, 2017).

As a result, all analytical work on collecting and processing the necessary information to justify rental rates, preparation of proposals for their value should be carried out by specially established commissions on the territory of the constituent entities of the Russian Federation, which competence includes pricing and determination of payment for forest resources (Zinovyeva, 2016). In conclusion, we note that presented mechanism for the rational use of natural forest resources in rent makes it possible to implement the approach to determining the rent, based on the amount of payment for the volume of actually harvested registered round wood assortments. At the same time, the components of the rent should be divided into:

1. One-time payment for obtaining the right to lease a forest plot is expected to be paid to the federal budget in an amount equal to the product of the forest plot area as an object of the lease agreement for the tax rate approved by the Government of the Russian Federation.
2. Current annual payment for the volume of actually harvested and recorded assortments is supposed to be paid to the regional budget according to the scheme described above, in the amount equal to the product of the upper and lower level rental rates by the actual volume of harvested and considered assortments.

In order for the mechanism to operate, it is necessary to plan and consistently implement a set of measures, starting with the development and approval of methodological provisions for determining the rent taking into account market factor for pricing the value of standing timber and ending with creation of well-founded regulatory framework for estimating costs throughout the production process from the phase "standing timber" up to the phase " final forest products".

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