Promising directions for the development of the forest sector in a sparsely wooded region

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Abstract. Most researchers of the problems and prospects of the forest sector focus their attention on issues related to the concept of sustainable development. Sparsely wooded regions of Russia face a lot of obstacles, which makes the search for promising directions for the development of the forest sector in these regions with an active role of state support urgent. The work investigates the forest sector of Kursk region: the main problems and trends observed in its forest sector are noted, the key features of its forest resources are discussed. The directions for the development of the forest sector in the region and the related tasks of state support are formulated. All proposals are based on an orientation towards stimulating the use of local wood raw materials in those types of regional industries that are least demanding on the quality of raw materials. The following is proposed: (a) development of elements of “forest-oriented” environmental legislation; (b) regulatory support of demand for local renewable energy sources through diversification of heat supply to social infrastructure facilities; (c) setting quotas for the share of local wood raw materials consumed by enterprises.

1. Introduction

The Russian forest sector is a unique complex of various multifunctional forest resources and areas of its use, which is of strategic importance for the development of the country. This makes it all the more paradoxical that the low efficiency of using the potential of the forest sector, both in the narrow economic and in a broader sense, is recognized at the level of official strategic documents.

Today, most researchers of the problems and prospects of the forest sector focus their attention on issues related to the concept of sustainable development. The same vision is conveyed by the Strategy for the Development of the Forest Complex of the Russian Federation until 2030. Sustainable development of the forest sector, to a first approximation, can be understood as achieving a balance between the extraction of forest resources (for its efficient processing in industry and use) and restoration and preservation of forests and its potential for the economy, and its ecological and social role as well [1]. It is noted [2] that the main type of forest use is still timber harvesting, carried out within the framework of lease agreements for forest areas, and reforestation lags behind outflow. The system of forest payments is ineffective, which hinders the increase of the attractiveness of the forest sector for business. Even less attractive are the regions of the sparsely wooded area, with a level of forest cover of the territory not exceeding 20%; that is, in particular, territorial subjects of the Russian Federation of the Central Chernozemic Economic Region. Forests here are protective, and the key areas of their development are the preservation of their environment, water protection, protective, sanitary-hygienic, and wellness functions, increasing the productivity, as well as forest reproduction.
and reforestation [3]. Low attractiveness for business of forests in a sparsely wooded area leads to the accumulation of ripe and overripe plantings, growth of areas affected by pests and diseases, and increase of the danger of forest fires. In these conditions, the business need, especially for small business, is evident for significant state participation and creation of a favorable regime for working in the forest sector. Active state support for the development of the forest sector in a sparsely wooded region, thus, can contribute to solving a whole range of environmental and economic problems.

In recent years, a number of works by Russian researchers have been devoted to the search for directions for the development of state support in the forest sector in a sparsely wooded region, the most interesting among which, in our opinion, are the following. The work [4] identifies key factors, based on the analysis of expert opinions, in the direction of which state support is needed. This part of the work, in our opinion, is the most valuable, since it provides important material for substantiating proposals for the development of the forest sector. Further, the authors define measures of regulatory, organizational, infrastructural support and support for forestry small and medium entrepreneurship (SME). Similar directions, substantiated by a number of identified shortcomings in the public administration system, are proposed in the work [2]. In this list of measures, in our opinion, some regulatory and legal measures are of interest. Other proposals, due to the weak elaboration of the source of resources issues and the mechanism for their implementation, could be interpreted as good wishes only. In the work [5] an organizational model of interaction between the state and SME is proposed. It’s obvious limitation is the focus exclusively on the stage of forest management and reforestation, without taking into account the timber industry, which indicates a weak elaboration of the resources issue. The proposed model can become a promising working version of the roadmap for the development of interaction between the state and SME in forestry, including establishing the supply of the forest industry in the region with the necessary wood raw materials within the framework of a more comprehensive approach. The work [3] is focused on the need to develop a set of measures to improve the mechanism of interaction between lessees and authorities in matters of leasing forest plots. There is also no connection between forest management and further stages of harvested timber processing.

Thus, in a number of the works reviewed, a key omission, in our opinion, is the consideration of the problems of forestry in a sparsely wooded region in isolation from the state, needs and prospects of the timber industry in the region, and where the proposed measures can be interpreted as extending to the industry, weak elaboration of the resources issues and the mechanism for the implementation of these measures is obvious.

This work aims to analyze the functioning of the forest sector of a typical sparsely wooded region of the Central Chernozemic Economic Region and to formulate the directions of its development and related tasks of state support. The relevance and importance of the work is largely due to the lack of research on the Russian forest sector, published in English and presented in the Scopus and Web of Science databases [6].

2. Methodology

The work analyzes the official statistics of the forest sector of a specific sparsely wooded region of the Central Chernozemic Economic Region – the Kursk region. To analyze the state and dynamics of development of the timber industry of the region the data of Kursk State Statistic Service (Kurskstat) on the production indices in 2015-2019 and on the volume of goods, works and services for 2019 are involved. To analyze the state and development trends of forestry, we used the current Forest plan of the Kursk region, data of the state forest register for 2017-2019, statistics of the forestry committee of the Kursk region for 2018-2020 by the number and area of forest plots leased out and income from forest use, annual report of the forestry committee of the Kursk region of development and assessment of the effectiveness of the state program “Development of forestry in the Kursk region” for 2013-2019. Based on the results of the analysis, conclusions were drawn, on the basis of which the directions of development of the forest sector and the tasks of the state support were formulated.
3. Results
The total forest area of the Kursk region as of January 1, 2020 amounted to 269,600 ha, of which under the jurisdiction of the forestry committee of the Kursk region – 236,900 ha (87.87%), of which areas covered with forest vegetation – 219,600 ha. All forests of the Kursk region belong to protective forests. The forests are dominated by the hardwood group of species, which occupies 62.48% of the land covered with forest vegetation, coniferous plantations account for 12.66%, and soft-wooded plantations – 24.04%.

An important indicator of the characteristics of the forest fund is its age structure. Young 1st class plantings account for 10.24% of the main forest-forming species, average aged plantings – 47.25%, ripening plantings – 15.24%, ripe and overripe plantings – 27.27% of the area covered with forest vegetation. The general growth stock in the forests of the region, as of January 1, 2020, is 40.64 million cubic meters (or mmcm). Stocks of ripe and overripe timber, as of January 1, 2020, accounted for 12.98 mmcm, or 31.94% of the total stock.

On the lands of the forest fund in 2018-2020, the key type of income bringing forest use remains timber harvesting (clear and selective cuttings), carried out both within the framework of lease agreements for forest plots and sale and purchase of forest plantations (including those concluded with SME). In 2020, it brought 46.70% of payments to the federal budget, and 77.16% of payments to the regional budget. However, during 2018-2020, there was a decrease in wood production by 9-10 thousand cubic meters (5-6%) annually (figure 1). In 2019, this decline was accompanied by an increase (largely inflationary) of 8.68% in cash receipts compared to 2018 (which indicates a slight increase of unit value of harvested wood). In 2020, continued decline in harvested volume led to a sharp decrease in cash receipts (by 34.12% compared to 2019), including payments to the regional budget – by 53.40%, which indicates a sharp reduction of unit value of harvested wood towards the minimum wages. Obviously, the epidemiological situation in the country and the economic crisis provoked by it cause the decrease in cost.

![Figure 1. Dynamics of payments to the federal and regional budgets by type of activity “Timber harvesting” and the volume of timber harvesting in 2018-2020.](image-url)

Analyzing the total payments to the federal and regional budgets, it can be noted that in 2018-2019 forest lease agreements and contracts of sale and purchase of forest plots concluded with SME are two main types of contracts that are comparable to each other in volume. In 2020, in contrast, payments
under lease agreements for forest plots accounted for 76.17%, while contracts for the sale and purchase of forest plots concluded with SME provided 7.65% only. This is due to a 57.92% drop in wood harvesting by the SME sector. There is a severe crisis of the entire socio-economic sphere caused by the epidemiological situation and the resulting consequences for the timber industry, the solvency of the population, and especially for the SME sector.

In general, speaking about a decrease in the volume of timber harvesting in the forests of the Kursk region, it should be noted that, with the rated wood cutting within 230-245 thousand cubic meters, until 2016 the actual volume of timber outflow had been within 75-80%, and by 2019 had decreased to 57.80%. There are about a hundred enterprises in the Kursk region, which can be attributed to timber industry. According to data for 2019, the volume of goods shipped, works and services performed by type of economic activity “wood processing and production of wood products and cork”, “manufacture of paper and paper products”, “furniture production” totaled 10 086.3 million rubles (5.11% of manufacturing and 2.71% of the total production of the region). Dominant type of activity is pulp and paper production (88.48% of the total timber industry).

The leaders of the timber industry of the Kursk region are several medium and large enterprises that occupy prominent places in the industry on a national scale. These are, firstly, the Group of Enterprises “Fabrika poligrafti i upakovki” (advertising representative printing, corrugated cardboard, cardboard packaging); secondly, the Group of Companies “Gotek” (packaging and packaging materials for various industries); thirdly, joint-stock company “Izoplit” (fibreboards). The dynamics of performance indicators of the timber industry in the region is of research interest. The dynamics of production indices is shown in figure 2.

![Figure 2. Dynamics of production indices by types of activity related to the timber processing industry and all manufacturing industries in 2015-2019.](image)

The production of paper and paper products demonstrates multidirectional trends during the period under review. In 2015-2017, there was a decrease in the volume of production, while in 2018-2019, on the contrary, production showed growth. However, taking the whole period of 2015-2019 into account shows that the growth of 2018-2019 is just a comeback to positions lost during previous years; for the period of 2015-2019, there is a decrease in production volumes by 6.89 % for this type of activity.

At the same time, manufacturing industries showed growth, in general. For the whole period of 2015-2019, production volumes for all types of manufacturing in total increased by 28%. Thus, it
should be noted that the main part of the timber industry production shows a negative dynamic for the period under review, which indicates developmental problems. Even furniture manufacture, which showed aggregate growth in these years, looks worse than the aggregate level of manufacturing.

In general, in the Kursk region, a low level of business activity in the use of forest resources is obvious, which causes to underutilization of rated wood cutting. A decrease in the volume of sanitary clear cuttings has a negative impact on the forests, including significant increase of risk of fires and square of areas affected by pests. The decrease in harvesting reduces the investment opportunities for creating and reconstruction of the business infrastructure in the forest sector. Underdeveloped infrastructure, primarily the road network, leads to low development of forest resources. Low harvesting hinders the creating of processing capacities, and its absence deprives financial opportunities to invest in the development of the road network. It is a vicious circle leading to degradation of the industry. The support to SME economic entities in forestry is low, which, in case of another economically difficult periods, provokes instability in the entire socio-economic life of the region due to the reduction in regional production, decrease in employment and payment capacity of the population. The most developed part in the timber industry – pulp and paper – shows a decline in the last five years, which may cause, if this dynamics persists, negative economic consequences for the entire forest sector of the Kursk region.

Planning its activities in the forest sector, business entities in sparsely wooded regions are influenced by a specific environment, the main controversial features of which are [3]: high development of territories; shortage of forest resources and utilities per capita; high population density; predominance of forests performing environment, water protection, protective, sanitary-hygienic, and wellness functions; predominance of small entrepreneurship in the forest sector; significant level of high-cost artificial reforestation.

In these conditions, business entities, especially small ones, are apparently in need for significant participation of the state and creation of a favorable regime for work in the forest sector.

4. Discussion

In the forests of sparsely wooded regions, harvesting is carried out not in exploitable forests (where the highest quality, high growth class wood, which is supplied to high-maintenance, in relation to the quality of raw materials, manufacture spheres, is highly desired), but in protective forests, where not only ripe and overripe plantings, but also plantings damaged by fires, diseases and pests, leftovers of handling of young 1st class are being harvested. Such raw materials were, to a large extent, previously considered as not only unusable wood waste, but also requiring the withdrawal from harvesting place and disposal. Analysis of modern world practice shows that now about 1 Million tons (Mt) of wood waste is annually recycled in the construction, pulp and paper, furniture and energy industries, which is a leading environmental approach to sustainable forest management [7].

As follows from the analysis, the most developed structural element of the timber industry of the Kursk region is pulp and paper production. Our first proposal is based on the consideration of the pulp and paper industry as a driver of the region's forestry economy. Modern negative dynamics in this area also indicates the need to preserve and enhance existing developments, therefore, in our opinion, it requires support measures from the state.

The key advantage of pulp and paper production located in sparsely wooded zone is that this production is relatively undemanding to raw materials. Wood harvested in protective forests can be used in the production of cardboard, paper for the production of corrugated packaging and other packaging products, which forms the basis of the region's pulp and paper products. Thus, the forests of the Kursk region have raw materials suitable for pulp and paper production.

Our proposal is as follows. To support the pulp and paper industries, the authorities of the subject of the Russian Federation are invited to stimulate the demand for packaging products. The development of elements of regional “forest-oriented” environmental legislation is considered as an incentive tool.
At the federal level, some prerequisites have already appeared. On December 28, 2020, the government of the Russian Federation adopted the Concept of improving the extended responsibility of manufacturers and importers of goods and packaging. It offers to change the focus from fines and fees towards ensuring the interest of manufacturers and importers of goods in the creation of systems of waste separation, recycling, and waste disposal facilities. The Concept also notes that, according to expert estimates, about 50 per cent of municipal solid waste is packaging waste. At the same time, the volume of packaging will keep increasing, including in connection with the active global development of e-commerce and delivery services, and as a result, packaging becomes a link between all parts of the world [8]. So, since the main task of the extended liability mechanism is return of packaging waste to the economic circulation, paper or cardboard packaging corresponds to the solution of this problem to the greatest extent.

Today, in the field of packaging materials, plastic materials compete with paper and cardboard products at a high level. Since it is necessary to provide stimulation of demand for paper and cardboard packaging materials, the region, in line with the aforementioned Concept, should establish by law such a system of environmental fees, which would make it economically more profitable for enterprises to choose packaging materials based on paper and cardboard. As an addition, encouraging eco-design of packaging is relevant [9].

Another area that is just as undemanding to the original wood raw material is production of solid biofuels. This refers to fuel pellets – biofuel obtained, in particular, from wood waste [10]. Prospects for this area are caused by the current shift in the world energy towards green growth solutions and closed loop economy [11]. In some European countries, where the market of alternative energy sources is the most developed, already a decade ago up to two-thirds of apartments were heated with pellets. Average annual growth in global consumption of wood pellets in 2013-2018 amounted to 9.1% [12]. The main market growth factor is stimulation of consumption of ecological fuel by the governments [12].

Our second proposal, in connection with the above, is to stimulate demand for pellets as another direction for the development of the forest sector in the region, which gives prospects of active industrial consumption of wood harvested in the forests of the region. We propose to start by organizing a sustainable segment of demand through diversifying the ways to meet the fuel needs of state organizations. In practice, the possibility of heating with wood biofuel should be provided during the construction and reconstruction of infrastructure facilities. Simultaneously, authorities of the subject of the Russian Federation are recommended to use the mechanism of public-private partnerships to engage the private sector in order to launch a pilot project for the production of pellets in the region.

To make the forest sector of the Kursk region work as a well-coordinated mechanism, every stage of its operation from timber harvesting to final product must be consistent and coherent. For this, it seems necessary to quote a share of local raw materials in the amount of raw materials consumed by the pulp and paper industry and biofuel production. Without this measure, the private sector may be looking for more profitable conditions for the supply of raw materials to reorient to the multi-forest regions.

The quotas will be a temporary or permanent (at the discretion of the expert community) protectionist measure aimed at ensuring sustainable marketing of forest products harvested in the forests of the Kursk region. The size of quotas should, of course, be linked to the dynamics of demand for pulp and paper products and biofuels. With an excessive level of quotas, there is a danger that the benefits of government support will be offset by the costs associated with the procurement of raw materials and the private sector simply will not be interested to invest in Kursk region considering such restrictions. Development and regulation of quotas should be carried out by a forestry committee according to statistical harvesting data, forest plan, and targets ensuring the necessary care of the forests.

In the short term, this should lead to an increase in the profitability of the lease of forest plots and the purchase and sale of forest plantings, which should interest private sector enterprises, interaction with which the authorities can establish through the development of a roadmap based, for example, on
the model proposed in the work [5]. In addition, business entities that will engage in pulp and paper and wood pellets production can develop their own harvesting capacities and act as permanent lessees of forest plots or buyers of forest plantations. It will allow not only to develop the forest economy of the region, but also to provide finances for the budget of the subject of the Russian Federation. An indispensable condition should be the establishment of a direct correspondence between regional budget revenues from forestry and funding of the forestry committee. Now, there is no correspondence, which reduces the motivation of the committee workers and makes them too dependent (not only administratively – along subordination, but also financially) in the matter of planning the forestry works on the will of regional leaders.

5. Conclusion
Based on the study of the development problems of the forest sector in the sparsely wooded region of Russia and formulated conclusions, several directions of improving the government support (highly interconnected and assuming complex implementation) are proposed:

- stimulating the development of the pulp and paper industry as a driver of the forest sector in the region based on the development of a regional “forest-oriented” environmental legislation;
- stimulating of creation and development of production of solid wood biofuel by organizing a stable demand by diversifying the ways to meet the fuel needs of public sector organizations;
- quotas for local raw materials in the volume of raw materials consumed by pulp and paper production and production of solid wood biofuel.

Comprehensive implementation of the proposals made will allow, in our opinion, to give dynamism and prospects for the development of the forest sector in such a sparsely wooded region as the Kursk region.

It is important to note that during the development of practical aspects at the level of authorities of the subject of the Russian Federation, it is necessary to conduct a study of the impact of the implementation of the decisions made to all value chains in the forest sector, similar to research conducted in Northern Europe on large-scale biofuels deployment scenarios [13].

In the long term, the acceptance of the above proposals could create prerequisites for the active study and accumulation of experience in environmentally oriented development of the forest sector in a sparsely wooded area. The spread of these practices to neighboring regions with similar problems of the forest sector allows us to talk about the formation a vast region within the Central Chernozemic Economic Region, which can be designed as a model forest. Russia has an extensive experience in territorial initiatives applying international concept of model forest, and, despite the known obstacles [14], the design of model forest in the Central Chernozemic Economic Region can create favorable conditions for partnership of all interested parties in the matter of sustainable development.

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