

# INSTITUTIONAL ASPECTS OF FORECASTING SOCIO-ECONOMIC SYSTEMS IN THE ORGANIZATION OF FOREST MANAGEMENT IN THE RUSSIAN FEDERATION

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## ABSTRACT

*The main trends of socio-economic development expressed in absolute measures indicate that the contribution of the forest sector in GDP of the forest regions of the Russian Federation decreased, while its proportion in the economy of the region has declined over 10 years from 1.2 to 0.8%. According to the preliminary studies, the labor power employed in the forest sector and future green jobs in the regions have also declined, in particular due to the increase in the performance efficiency. The recession that began in 2008 also led to increased unemployment and economic ills in forest-dependent communities and areas.*

*As for the regions of the temperate and boreal zones, according to the analysis, the value added indicators have not changed in the period of 2010-2015 (although exports increased by 10%), proportion of sector in total labor power (contribution to employment) declined by 0.2 percentage points (from 0.7 to 0.5%), while the percentage of forest sector in GDP decreased by 0.3 percentage points (from 1.1 to 0.8%).*

*Three developed regions (North-Western, Siberian, and Far East regions) are still major producers and consumers of forest products. At that, they account for 23% of total employment, half of value added in the global forestry sector, and 60% of forest products exports that is mainly due to a high level of value added in the wood processing sector in these regions.*

*However, the share of these three regions in the global value added indicators, employment, and trade in the last decade has steadily decreased due to various factors, including the recent economic downturn and financial crisis, increased competition in international markets and competition from other sectors.*

*Developing regions and Eastern Europe began to play an increasingly important role in global forest products manufacturing and trade. In the period of 2010-2015 their share in total employment in the global forestry sector has increased from 58 to 68%, while the proportion in global value added indicator in the sector has grown from 28 to 47%. This is mainly due to the development of the wood processing industry.*

**Keywords:** biodiversity, ecosystem, forest policy, forest services, green economy, medical ecology, monitoring, payments for ecosystem services, protective functions of forests, recreation.

## INTRODUCTION

Overall value added in the forestry sector did not grow at a rapid pace, with the exception of some regions, where the development of this sector was a particular priority of the national development policy [1, 12]. Just a few regions have paid attention to the development of this sector, since the preference was given to other industries. Thus, the forestry sector has almost always been assigned a secondary role, especially in regions with rapidly developing economy. In addition, this suggests that this sector is not one of the main drivers of economic growth and development, with the exception of cases characterized by the special circumstances [2, 9, 16].

As the efficiency of the sector increases, the number of employees in this sector decreases; more than this - it loses its significance in the economy.

These trends should be considered in the broader context of the current changes, including the transition of forestry, based on logging to the multi-purpose forest management, changes in the system of forests ownership, as well as mechanization and the implementation of information technology that is being observed for more than two decades. These trends are not the same everywhere; for example, the level of mechanization varies, because it depends on geography /topography, as well as political and legal aspects of the economy [3, 7, 13].

## METHODOLOGY

Many studies are dealing with the effects of mechanization. However, just few of them discuss the implications of various technologies for forest management planning, which sometimes depends on geography and topography of the area. In many parts of the Russian Federation the forests in the mountainous areas and forest holding sizes mean that mechanization is possible only to a limited extent, and therefore, despite the growing popularity of mechanical processors, working methods, involving the use of hand motor tools, continue dominating.

Based on seven thematic studies for representational mountain ranges of the Russian Federation, it was concluded that in harsh terrain areas inappropriate technology is often used, and that selection of forest extraction methods is not based on accounting of the hillside slope angle. Nonmechanized and outdated logging systems are one of the reasons for the low operations efficiency and have the greatest impact on the environment, while fully mechanized systems are reported to be most effective, and their use guarantees the least number of accidents and the least damage to forest stands.

## RESULTS

Effects of market factors have led to downsizing and restructuring of forest industry of the Russian Federation. The outcomes of the research, devoted to the impact of the forest sector on the economy, have shown that in 2015 almost all of the indicators in terms of value were lower than in 2001 (adjusted for inflation at the rate US dollar in 2015), as well as number of employees, value added, and value of production; besides, there have been shifts in the industry. All economic multipliers have increased that implies a scaling-up integration of forestry and production of forest products in the economy of the Russian Federation in the period of 2001-2015 [3, 11].

The sawmilling sector may be exposed to employment and unemployment cycles, the transition to more capitalized approaches and restructuring. The results of conducted studies show that workers with years of experience face problems such as long period of unemployment security, cyclical unemployment, and adverse physical and psychological labor conditions. Analysis of the manual workers' status in the six enterprises of the forest industry in the Northwest region, where restructuring had been taking place during the long-term period (2001-2015), showed that negative attitude towards changes increases the risk of being subjected to stress, and leads to lesser satisfaction with work.

In connection with the emergence of advanced concepts of integrated management of forest ecosystems and economic development of rural areas, the traditional theory of forest management today is undergoing significant changes. For example, the traditional models of permanent use of the forest are converted into sustainability concepts based on ecosystems, while emphasis is focused now not on economic growth in the forest products sector, but on the broader sustainable socio-economic development of the society. At that, the society realizes the fact that the resolution of its socio-political disagreements concerning forest management is an aspect of providing sustainability equally important as the consideration of the fact of the limited biological potential of forests [4, 10].

Therefore, today the state policy in the forest management:

1. Relies more on the ecosystems and is implemented at the landscape level;
2. Takes into account different social values or functions;
3. Is in the relationship with many socio-economic and political systems, ranged from local to regional and national, and even supranational level (for example, CIS);

In the case of forestry, presented indicators, certainly, do not allow judging about the total number of people working in the sector; at that, a huge amount of forest operations is carried out by state and private forest owners and members of their families, as well as members of local communities, none of which appears in the official employment statistics. Thus, the economy sector provides income and work for a much larger number of people than is evident from statistics.

The state of the local informal sector is one of the factors that indirectly influence the work-force size. Informal sector, where workers do not have basic social and legal rights, is prevalent in countries with emerging economies.

The improvement of labor conditions in the forestry sector in general occurs according to the classical scheme, resulting in an increase in wages, as well as reduction of working time and physical hard work, though this also entails rising unemployment, segmentation of labor market, its flexibilization, and environmental degradation. Full-cost accounting method, uneven-aged forest management, creating added value, giving communities the right of ownership, and ECO certification could become the basis for the adoption of alternative measures to improve labor conditions and performance efficiency [5, 14]. Sociological studies of the workforce show that formerly hereditary adherence to labor in the forest sector has been a tradition, while today many often go to work in the forestry sector from other economy sectors, or quit their jobs in the forestry sector and seek employment in other economy sectors. The main reason for this is a higher degree of flexibility of the labor power, dissatisfaction with labor conditions and life standards, as well as the loss of jobs due to mechanization.

In the Russian Federation, as elsewhere in the world, chain saws are currently used for harvesting of wood. The special mobile harvesting machines, which are operated by workers from the cab and which carry out tree felling, cleaning off branches, crosscutting, and stacking of round wood get rapid widespread. Logging mechanisms are widely used for lateral hauling of trees or logs, while transportation of short-length sticks to upper depots is carried out by forwarders. However, manual labor is still widely used in forest nurseries, as well as in the operations of planting, protecting, and pruning the trees. Therefore, the forestry workers perform both highly specific operations requiring special skills, and routine work [6].

Just some forest workers have jobs, regularly receive wages, and use social security, which is provided by forest owners or forestry companies. In order to save costs and achieve flexibility, many workers are fired from the staff and re-hired as contractors. This often leads to a deterioration of labor conditions, such as periods of excessive work to maintain expensive equipment, which are interspersed with periods of calm, when there is no work. For another thing, the extent of insurance against accidents, diseases, and disabilities is, as noted, insufficient.

In the past, especially in the Russian Federation, the trade unions played an important role in improving the status of forest workers. Today, due to reducing the number of employees, their role is weakened and at present very few forestry workers are the members of trade unions. The International Labor Organization (ILO) and the Building and Wood Workers International (BWI) federation were able to include social criteria in the forestry certification system. In particular, this was done thanks to the Declaration on Fundamental Principles and Rights at Work adopted by ILO. Due to this, the labor conditions of some workers, as declared by the Russian Federation, have improved [7, 12]

According to demographic indicators published in the "World Population Prospects" (edition of 2015), the Russian Federation is a region, where the working-age population (15-64) in the period of 2015-2030, as projected, will decrease in general (by 9.2%), while the population group aged 45-64 years will increase by 0.7%. Thus, on the one hand, the working-age population is reduced, while on the other hand, it is somewhat aging. The ageing of the labor power employed in the forest sector is a particular symptom of a more general trend of aging of the whole labor power; however, this research is focused on the more important aspect, namely the consequences of this aging. Possibly, workers of older age are subjected to greater risks in terms of health and safety, though, on the other hand, they are more experienced and qualified, especially given the increasing level of mechanization [8, 15].

Gender and ethnic diversities in the labor power are fragmentary. The number of regions that provide information about the gender composition of labor force employed in forestry increased from 10 (in 1990) to 30 (in 2015), at that, the number of regions that provide information about the gender composition of workers in the timber and paper industries has increased as well. The proportion of women employed in forestry increased slightly from 14% in 1990 to 15% in 2015, while in some regions they have a fairly large share in the labor power.

Women work mainly in forest nurseries and are engaged in planting and caring for trees, though some women perform typical men's work, such as the logging operations and fire suppression. However, women's wages are lower than men's salaries, even in the case of work requiring experience and skills, where women are reaching greater results than their male counterparts [9, 16]. However, the research outcomes indicate that the data received from the regions do not allow getting an idea about the types of work performed by women, as well as

concerning their opportunities for professional growth. In this study major attention is paid on the racial and gender aspects. At the same time, it is noted that the adoption of the legislation on relevant civil rights and litigation forced the Federal Forest Agency of Russia to start the diversification process, which resulted in the fact that the number of women in the Agency increased significantly, though this concerns mainly administrative jobs, rather than jobs that offer the opportunity for further advancement.

The structure of the organization affects the diversity of research workers. A recent study (2015) shows that the proportion of women among scientific workers of research institutes and forestry faculties of universities (multilayer organizations) is higher than that at the university faculty, though women do not occupy high positions at any institution. Demographic statistics suggests that the representation of women holding positions of senior scientific staff increases. It also seems likely that the inclusion of sociologists in interdisciplinary teams does not limit the opportunities for diversifying functions and gender composition. Given gender structure of traditional forestry, we can make the assumption that women are more likely to be engaged in less traditional activities than men. This issue was studied, and it was concluded that traditional forestry activity is the major task for both male and female owners of family agro-forestry; however, women work in the service sector more often than men.

A survey of men, who have the professional occupation associated with an increased risk, has shown that in many regions more than 90% of fatality at work are occurring with men. This is due to three reasons: men tend to be engaged in heavier physical labor associated with increased risk, they are less likely to pay attention to pain and health condition and rarely seek care in a social support network. By virtue of these qualities, men are more likely to take risks and will be easy in treating injuries and less likely to report difficulties or health problems [9, 11]. Research statistics does not contain information on the ethnic composition of the labor power. However, this issue has gained more attention similarly to the case of other professions that are in demand in rural areas. Forest management often hires migrants to work in forestry because they are attracted by higher wages. Some of them eventually settle in the host region, while others come only for seasonal works. They can largely contribute to the family budgets in their native countries. However, the money earned is not easy. Local workers receive much higher reward for comparable work.

Reduction in occupational health and safety to the current level of morbidity and injury requires the following measures to ensure improvement in hygiene and safety of workers in the forestry sector:

1. Raising the level of political will to improve occupational health, safety and security protection through the analysis of current situation with the labor power;
2. Drastically improving control over the occupational health, safety, and security protection of forestry workers;
3. Promoting the application of the Forest Code of the Russian Federation in forestry contractors practice, and carrying out the relevant monitoring;
4. Ensuring compliance with relevant legislation and developing, if necessary, regulations to account for changes in technology and working conditions;
5. Funding outreach efforts to ensure employers and workers to be adequately aware of the safety standards and occupational health;
6. Conducting proper campaigns aimed at forming a culture of preventive security and occupational health.

Data collected for a nationwide indicator of sustainable forest management "Safety and Security Protection" suggest that "work in forestry still remains a very dangerous and fraught with accidents," though occupational health, safety, and security protection is one of the main policy priorities in many regions of the Russian Federation, although the improvements in this area are very little or not at all.

In regions, where a high level of forest harvesting mechanization was achieved over the last decades, the number of accidents is much less than in regions, where chain saws are still widely used. Given the large number of accidents in the regional forestry sector, it is necessary to undertake continuous efforts at all levels to improve the situation in occupational health, safety and security protection of those, who earn a living by working in forestry [4, 11].

It is important to note that there is a serious problem with regard to this indicator, which is "the lack of data comparability", i.e. there is no consensus at the global level on how to report the data on the losses in time, caused by accidents and injuries. At that attitudes concerning the transparency issue significantly differ as well.

Many publications note that the working in forestry still remains one of the most dangerous or significantly more dangerous than working in other industries. One of the problems is that according to the prevailing opinion, the security issue can be solved through the mechanization of operations through employment of technologies, proven in terms of both ensuring labor safety and cost-effectiveness that however has negative consequences for employment and local economy.

Statistical data on fatal accidents are generally the most accurate among all the statistical data on accidents, because they are presented not by the injured persons, but published in the official reports. The number of fatal accidents is an important indicator showing the activity effectiveness in the field of risk prevention, and demonstrating the effectiveness and consistency of measures taken by individual countries in order to ensure occupational safety.

In the Siberian Federal District, where number of fatal accidents is fairly high, detailed analysis of the information contained in the accident reports showed that the presented data are not sufficiently detailed to develop preventive measures. Only through further study of the injuries and analysis of accidents, as well as the implementation of new equipment, it became possible to manage the development of preventive measures that determine the order of actions in case of accidents and provide for the eradication of their causes.

A study conducted in the Far Eastern Federal District showed that measures to ensure the safety of workers in agriculture, forestry, and fisheries are limited in scope. Besides, standards and safety rules are generally less stringent than in other industries, while actions taken for their implementation, sadly, are unsuitable.

The vulnerability of agriculture, forestry and fishery workers is enhanced when they have immigration status. Agricultural workers especially suffer from the fact that they have long been "excluded" in accordance with the law, since many provisions regarding protection simply do not apply to this category of the labor power.

Official statistics indicate that between 1990 and 2015 the number of people employed in all sectors of the forest industry of the Russian Federation has considerably decreased: in forestry, a reduction amounted to 845 thousand people (63%), in the woodworking sector – 457 thousand people (39%), while in the pulp and paper industry – 135 thousand people (32%). The total number of people employed in the forest sector of the Russian Federation between 1990 and 2015 was reduced by more than 1.4 million people (49%).

The number of employees in the furniture industry also decreased significantly. Thus between 1990 and 2015 the reduction amounted to 416 thousand people (45%). However, it is interesting to note that the number of people employed in this industry in North-West and Central Federal districts has increased by 63 thousand people (82%).

After political reforms of 1990-1992 in the Russian Federation, the largest capacities of the wood industry, as well as the production of wood panels and furniture were transferred from the Western and Central parts to the East, while major research centers and higher educational institutions of the Russian Federation in these decades have been reintegrated and reformed to ensure their survival in the context of the occurring economic and political changes [1, 12].

The forest management education in the Russian Federation faces the following challenges: reducing the number of students, possible discrepancy of the training format with contemporary requirements, the lack of funding, tough competition from other specialized institutions of higher education, the irrelevance of the acquired skills due to demands put forward in connection with the need to ensure sustainable development, acquiring knowledge by young people that do not meet the expectations of the business community, the low attractiveness of forest management education and the incompatibility of current curricula in forestry education with the phenomenon such as globalization.

The key change that occurred in the forest sector of the regions, for example, in North-Western, Volga and Central Federal districts, having the most developed forestry infrastructure, consisted in reduction of the number of workers employed during the transition period. In 1990, 311.9 thousand people worked in this sector, of which 192.9 people or 61.8% were employed in the woodworking and furniture industries.

During the transition period the number of employed rapidly decreased every year that was due to two main reasons:

1. Reform of state forest enterprises that significantly reduced the number of employees engaged in logging activities;
2. Bankruptcy of many state companies in woodworking as well as pulp and paper industries.

## DISCUSSION

As a consequence, total employment in the forest sector in 2015 amounted to about 141 thousand, i.e. just 45% of that in 1990. The most significant change in terms of employment occurred in the woodwork and timber industry (including furniture industry), where numerous small companies with the number of employees equal to 5-50 people, which went completely bankrupt during the transition period, were replaced by large companies.

The number of employees also decreased significantly in the cellulose and paper industry. In some regions, for example, in the Siberian Federal District, cellulose production was completely stopped, while in other regions (in the Southern and Far Eastern Federal districts) it was reduced to a minimum, and currently the industry is on the verge of starvation.

In the forest sectors of these regions, i.e. within the same geographical boundaries and at almost the same potential, the number of employees exceeded almost by 170 thousand people as compared to 2015. This suggests the fact that in this sector there are opportunities to create enough jobs in the next 10 years, provided the availability of conditions for more efficient use of these workers. To this end, some regions have already taken steps towards expanding the use of their own labor power through the implementation of action plans in the field of forest industry to create new jobs.

The forest sector, mainly forest husbandry and timber industry, plays a quite important role in providing employment in rural areas. A study conducted in North-Western, Volga, and Central Federal districts in the framework of the project "Production of wood-based energy for sustainable rural development", shows that about 4 thousand people in these regions are involved in the production of wood fuel. Among them more than 70% are engaged in harvesting wood fuel and burning out charcoal. Adding this figure to the number of support staff, it turns out that approximately 6.7 thousand people are involved in the wood fuel production. Employment in woodwork and timber industry is the only source of income for the rural population.

The level of self-employment in the timber industry is one of the most essential, especially in sectors such as wood procurement, and the collection and processing of non-timber forest products. A study conducted in the North-West, Volga, Central and Southern Federal districts shows that the number of self-employed people just in one forestry sector amounts to 12.3 thousand, who are engaged in harvesting of wood fuel in private forests of rural areas. The number of these workers is not officially reported due to the deficiencies existing in the official statistics system.

Changes that affect employees, occupied in the regional forestry sectors, are caused by several factors among which the most important are:

1. Structural changes in the forest sector;
2. Development of new technologies and implementation of technical innovations;
3. Demands to continuously improve the performance efficiency;
4. Market trends, especially the demand of foreign buyers for high quality wood products;
5. Rural development and environmental protection policy.

## CONCLUSION

In recent years, a new development concept was adopted in the framework of structural changes in the regional forestry sector. This concept is based on the action plan for the forest sector in the conditions of "green" economy development. The incorporation of this new concept into the strategy for forestry development and its improvement are currently continuing. In this regard, the labor force is facing new requirements.

Until recently, in the framework of the organization of forestry, the major attention was focused on the labor power required to meet the needs of harvesting operations. This approach is still predominant, since state forestry enterprises and even the national parks services in their activity largely depend on the wood harvesting and sales.

However, a new development concept of the forest sector advances new demands to the labor power. This is necessary to use other functions of forests in addition to timber production, and certainly will affect the labor training system in the near future. Though, there are essential differences between individual subregions that must be overcome to create and advance opportunities to remove barriers in the forest product market development from the viewpoint of public and private sector.

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