Public-private partnership as an instrument of economically sustainable usage of forest resources of sparsely forested areas

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Abstract. This article discusses the implementation of public-private partnerships mechanisms, taking into account the specifics of forestry - the presence of significant risks and significant environmental orientation of the results. The main purpose of this article is formation of scientifically based method of evaluation of the collaboration between government and forest businesses based on multidimensional appraisal and matrix of cooperation. This method can be applied using a complex of both well-known (i.e. effectiveness and efficiency) and created by the authors criterions (i.e. riskiness and environmental sustainability) which are evaluated by experts by giving points to every criterion according to the scale of standard value. The method proposed by the authors is focused both on the assessment of quantitative parameters of the interaction and qualitative characteristics of public-private partnerships. As a result, it allows identifying problems in forestry. This method is unified and can be used in Central Chernozem Region as well as in the other regions of the Russian Federation. This technique also makes it possible to apply the complex of necessary measures to identify effective ways of interaction between government and business structures.

1. Introduction

Expediency and efficiency of public-private partnership are traditionally viewed through the prism of ‘Value for money’ (VfM) philosophy, i.e. the best correlation between price of the project and quality of its implementation which means that goals of the project should be achieved with minimal expenses and maximal (optimal) return on invested resources. Essentially, it is a complex evaluation of quality, expenses, usage of resources and attaining intended parameters. This approach should provide deviation from traditional appraisal of the efficiency of expenses, i.e. correlation between results and expenses, which is employed for assessment of commercial projects. The approach should be used more widely and evaluate diverse kinds of efficiency, such as social, scientific, technological, innovative development and economic growth. VfM is usually described as a simultaneous achievement of the following requirements: efficiency, profitability and effectiveness. The principle of "economy" provides the lowest possible cost of resources with sufficient quality of the result, "effectiveness" characterizes the achievement of the desired results, and "efficiency" - obtaining the highest possible result, based on the available resources [1].

A large amount of research is devoted to the problems of studying and implementation of the mechanism of public-private partnership. Azanov claims that mechanisms of public-private partnership development are the main priority in Russian forestry [2]. A V Bralnin and A V Plastinin
emphasize the necessity of detailed studying of the issue of government’s degree of participation in implementation of public-private partnership mechanism in forest roads construction [3]. There is a well-developed mechanism of investments attraction for realization of the strategy of forestry development for public-private partnership [4].

Meanwhile, it is noted that there is no uniform methodology for assessing the implementation of Public Private Partnership, according to the results of studying the opinions of entrepreneurs conducted by the Center for PPP Development with the participation of the Chamber of Commerce and Industry of the Russian Federation [5].

At the same time, the existing approaches do not fully take into account the specifics of the implementation of public-private partnership mechanism in the industry-specific context [6]. Therefore, in our case, it is necessary to form a system of indicators for assessing the interaction of government and business structures in public-private partnership system taking into account the specifics of forestry - the presence of significant risks and significant environmental orientation of the results.

2. Theoretical, informational, empirical, and methodological grounds of the research
Mechanism of public-private partnership is used for implementation of investment projects, creation of forest infrastructure, forest roads construction and later for forest regulation. However, the rationale behind application of public-private partnership in silvicultural practice in building of Forest Seed Centers requires establishment of a system of evaluative indicators.

Table 1 displays types of public-private partnership which meet the requirements of both forestry legislation and interests of government and business to the fullest extent.

### Table 1. Forms of public-private partnerships those are appropriate for use in the area of increasing and using forest resources.

| Public-private partnership form | Subject of a contract                              | Example of implementation in the forestry                  |
|--------------------------------|----------------------------------------------------|-----------------------------------------------------------|
| State contract with investment commitments of private sector | Co-financing, construction, exploitation | Priority investment projects: 113 investment projects in forest development |
| Rent of forest plots          | Forest usage with subsequent reforestation        | 163,1 million ha of rented forest plots, 52 300 rental contracts |
| Participation in the capital | Co-financing of the capital                       | Regional unitary organizations of the forestry system     |
| Concession                    | Co-financing, projection, construction            | As an alternative to rental of forest plots, building of forest infrastructure and roads |
| Production sharing agreement  | Construction, exploitation                        | Forest management                                         |

Nowadays, the most wide-spread institutional-legal forms of public organizations which participate in partnerships with private institutions are public institutions, state unitary companies, state corporations, financial and industrial groups, non-commercial partnerships and autonomous non-commercial organizations and funds.

At the same time, for forestry, a public-private partnership is the only mechanism for resolving the issue of the balance of interests between forest use and reforestation [7].

Mechanism of public-private partnership in forestry is based on economical and forestry systems. Then it is possible to present the entire set of indicators in two groups - indicators reflecting the economic aspects of public-private partnership in silvicultural production, and indicators reflecting the forest-holding aspects of silvicultural production (Tables 2 and 3).
Table 2. Economic indicators of evaluation of implementation of public-private partnership in silvicultural operation of forestry.

| Name of indicator                                      | Indicator determination                                      | Quantitative                                                                 | Qualitative                                                                 |
|--------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| Cost of reforestation work per 1 ha of forest area     | Amount of budget expenditure on reforestation                | Share of budget expenditure in the total expenditure on reforestation       |                                                                                |
| Production cost of forest plantations                  | Amount of expenditure on creation of forest species of main forest forming species | Production cost of growing of a seedling of main forest forming species      |                                                                                |
| Cost of building of Forest Seed Centre                 | Investments to construction of Forest Seed Centre            | Investments to construction of Forest Seed Centre per 1 000 seedlings        |                                                                                |
| Comparative effect of seedlings growth with closed root system | Expenditure on growth of seedlings with closed root system in the conditions of Forest Seed Centre per 1 ha | Production cost of a grown seedling with closed root system                  |                                                                                |
| Comparative effect of seedlings growth with open root system | Expenditure on growth of seedlings with open root system in the conditions of Forest Seed Centre per 1 ha | Production cost of a grown seedling with open root system                    |                                                                                |

Created system of indicators needs approbation. Consequently, adding aforementioned indicators with criterions of evaluation which characterize riskiness and ecological component of collaboration is considered advisable.

Table 3. Forestry indicators of evaluation of public-private partnership implementation in silvicultural activities of forestry system.

| Name of indicator                                      | Indicator determination                                      | Quantitative                                                                 | Qualitative                                                                 |
|--------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| Amount of reforestation                                | Amount of forest areas                                      | Share of reforestation forest areas in the areas which are allotted for logging |                                                                                |
| Amount of created forest plantations                   | Amount of created silvicultured areas of main forest-forming species | Survival and establishment of forest plantations                             |                                                                                |
| Production of seedlings with improved hereditary qualities | Amount of seedlings and saplings of the main forest-forming species created with improved hereditary qualities | Share of seedlings, saplings with improved hereditary qualities in total amount of produced planting material |                                                                                |
| Amount of seedlings produced for internal demand       | Amount of seedlings and saplings of the main forest-forming species created for realization on a regional market and fulfillment of reforestation plan | Share of seedlings produced in the region in total amount of seedlings which have been purchased for silvicultural work |                                                                                |

Accordingly, we suggest method of evaluation of collaboration between government and forest business based on multidimensional expert assessment and matrix of cooperation which is conducted using well-known criterions of effectiveness and efficiency as well as criterions of riskiness and environmental sustainability, created by us. These criterions are ranked by experts by giving points to
each of them according to the scale of standard value where 0.9 has high significance value and 0.1
has low significance value.

In accordance with the established methodological requirements, the developed approach contains
a dialectical complex of parameters differentiated in two blocks: analytical and evaluation.

Public-private partnership implies harmonization of entrepreneurs’ and government’s interests. Federal
Agency of Forestry Affairs and forest business are interested parties in forestry. Expert analysis
should be used for identification of problems and finding their solutions.

Essence of expert methods is creation of rational procedure of intuitive and logical mind-set in
conjunction with methods of processing and analysis of achieved results. Generalized experts’ opinion
is considered as a possible solution of the problem. Board of experts may include representatives of
the government, forest management and representatives of business (small and medium-sized
businesses).

To determine possible areas of interaction between the forest business and the authorities, we
consider it expedient to use the commissions’ method as an open discussion on the problem to develop
unanimous opinion of experts. Collective opinion is determined as a result of open or secret voting.
The members of the expert committee: study the materials submitted for examination, prepare a draft
expert opinion. If the experts need further information they visit particular forest plots.

The experts have suggested the following reasons of government motivation in public-private
partnership participation:

- Desire to attract private capital for achieving large-scale and socially important goals, thereby
  increasing financing of these projects;
- Endeavor to increase efficiency of government expenses and management of these facilities at
  the expense of private business.

Experts assume that public-private partnership enables the government to:

- Rent forest plots to the private sector, providing strict control of entrepreneurs’ activity and
  holding forest plots in state ownership;
- Transfer functions of building, exploitation and maintenance of facilities of forest infrastructure
  to private sector;
- Provide technical development of forest equipment and innovation;
- Create conditions and prerequisites for efficient work of industrial facilities, forest seed centers
  and their rational management;
- Terminate the contract in case of violation of its terms and conditions by the entrepreneur, to
  return the object to the government or transfer it to another economic entity;
- Realize principals of social justice to the fullest extent, optimizing government intervention in
  the economy;
- Attain additional payments to budgets of all levels.

Business interest in participating in public-private partnership projects projects is manifested in the
fact that:

- A private company attains the right of long-term ownership and usage of state assets (which are
  not owned by it) on concessionary terms;
- Investing, the entrepreneur has sufficient guarantees of their return, since the state as its partner
carries certain risks to ensure a minimum level of profitability.

In our study, the Central Chernozem Region has been used as a test region. The possibilities of the
proposed methodology have been evaluated using the example of Forest Selection and Seed
Production Center (FSSPC) of the Voronezh Region.

3. Results and discussion
Undoubtedly, there are areas where entrepreneurship can function without government’s involvement.
The most significant role of efficient and result-oriented entrepreneurship for providing successful
social and economic development of the whole country and its regions is indisputable [8]. However,
forestry from a purely market position is low attractive. In case of definite orientation to the forest business, after a few years forest fires (in 2010), desertification of territories, soil erosion, environmental anomalies and catastrophes can flood us. It is important to note that there is one more reason - a monopoly on forest areas, according to the Forest Code of the Russian Federation, the state cannot transfer them into ownership. Then the essence of the principle is to harmonize and take into account mutual interests, in the system of concessions and preferences, which makes it possible to achieve individual and often contradictory aims of these subjects.

From legal point of view, it can be considered a memorandum which does not have any concrete forms.

W. Widman stresses the importance of government partnerships with forest owners and industrial enterprises in Sweden in order to motivate them to participate in forest conservation and to conclude Nature Conservation Agreements [9].

The research results of Kenya Forestry Research Institute in 10 countries in Eastern Africa also show that private business players (both in the primary forest production and secondary production) need support from the public sector to enhance their professional skills [10]. In addition, many researchers consider it possible to implement public-private partnership mechanisms in the forest industry [11]. However, some authors point out that government is not able to create the conditions necessary for successful institutionalization; the state needs a large amount of funds to consider using the partnership approach [12].

What is this interaction of business structures and state directed to in the forest sector? First of all, it is increasing efficiency of usage of advanced resources, growth of investment attractiveness of the sector and rise of efficiency of implementation of government authority in the forest management [13].

Next, it is needed to initiate a solution to the problem, which involves choosing between all possible forms of accomplishing the task - private business, public-private partnership, or production of necessary public goods by the state. According to the federal experts, the choice of a particular area for the implementation of public-private partnership projects depends on internal factors - the needs of the regional infrastructure, the interest of investors, the activity and profile of their activities [14].

According to the most regional experts, there is an urgent need to centralize the process of developing the fundamentals and practices of public-private partnership. Currently, there is a lack of coordination and regulation of relations between the state and business in the sphere of infrastructure, the process is rather spontaneous in various industries and territories. At this stage, a proposal in the form of a public-private partnership project is formed. It is important to emphasize that public-private partnership projects should be linked to the macroeconomic and mesoeconomic needs of forestry in general, and take into account regional specificities of their implementation.

The main instruments of public-private partnership are concessional agreements, contracts of lifecycle, service contracts, long-term investment projects, federal target and federal address investment programs.

Basic stage of created method of evaluation of government and business structures collaboration in forestry system is an objective expert assessment of economical and silvicultural indicators. Analytical stage of the suggested method of evaluation of government and business structures collaboration in the system of public-private partnership of forestry implies calculation of criterions of expediency of realization of a public-private partnership project both for the government and forest business.

Table 4 displays system of these criterions.
Table 4. Criteria for assessing the interaction of government and business structures in the system of public-private partnership in forestry.

| Name of criterion | Algorithm of calculation | Economical essence |
|-------------------|--------------------------|--------------------|
| Effectiveness     | $Eff = \frac{\text{Economic effect}}{\text{Expenses}}$ | Economic effect per 1 ruble of expenses on its realization; Government revenue in the form of obligatory payments and taxes |
| Environmental sustainability | $E_{\text{ny}} = \frac{\text{Effect of reforestation}}{\text{Investments}}$ | Effect of reforestation as a ratio of the amount of survived forest species, created by seedlings with improved hereditary qualities per 1 ruble of investments into building and exploitation of the Forest Seed Centre |
| Efficiency        | $\text{Effic} = \frac{\text{Effect of decreasing of expenses}}{\text{Investments}}$ | All expenses on seedlings growing with improved hereditary qualities per 1 ruble of investments into building and exploitation of the Forest Seed Centre |
| Riskiness         | $R = \frac{\text{Effect of decreasing of losses}}{\text{Income}}$ | Share of losses on replenishment and additional reforestation in obtained income from production of seedlings with improved hereditary qualities |

It should be pointed out that value of each indicator is different for participants of public-private partnership mechanism. Thereby, indicators of riskiness and effectiveness are the most important ones for entrepreneurs, while efficiency and environmental sustainability are more important for the government. Needless to say that maximization of criterions of effectiveness and environmental sustainability and minimization of efficiency and riskiness are necessary in order to provide balance of interests.

Final stage of methodology, i.e. evaluation of implementation of mechanism of public-private partnership, is a solution to this problem. We propose a matrix of matching the interests of the participants in public-private partnership mechanism (Table 5).

Table 5. The significance of indicators of public-private partnership mechanism feasibility in the forestry system

| Entreprenuer State | Effectiveness Value 0.4 | Riskiness Value 0.3 | Efficiency Value 0.2 | Environmental sustainability Value 0.1 |
|--------------------|-------------------------|---------------------|----------------------|--------------------------------------|
| Environmental sustainability Value 0.4 | 0.16 | 0.12 | 0.08 | 0.04 |
| Efficiency Value 0.3 | 0.12 | 0.09 | 0.06 | 0.03 |
| Effectiveness Value 0.2 | 0.08 | 0.06 | 0.04 | 0.02 |
| Riskiness Value 0.1 | 0.04 | 0.03 | 0.02 | 0.01 |

The matrix shows value of each indicator for entrepreneur–investor in horizontal way and
government-fund holder - in vertical way. Thus, the interaction within the framework of public-private partnership mechanism is determined by the realization of interests, and the sustainability of relations in the implementation of the project in the creation of Forest Seed Center is determined by the achievement of the maximum indicators of environmental friendliness and efficiency.

4. Conclusions and recommendations

Currently, forest businesses do not want to participate in public-private partnership projects. The main reasons for that are deficiencies of legislative system and distrust towards the government. Relationship between business and state in conditions of public-private partnership should be directed to efficient collaboration and mutual providing with the necessary resources. In this process, both the awareness of future partners and the speed of decision-making by government agencies are important. After all, it depends on how quickly the approvals and permits processes pass, how successfully the relations between the parties to the partnership will be built. Partnership of business and government is not one-way communication, but mutually beneficial cooperation aimed at achieving mutually beneficial results.

Business takes on the burden of solving financial and management issues becoming a partner of the state, and the state, using its administrative resources, should provide the business with favorable conditions for development. In the forestry system, two main subjects of public-private partnership - the state represented by Federal Forestry Agency and private partner (investor) are just beginning to master public-private partnership tools, therefore the application of the developed methodology makes it possible to avoid analytical errors in the early stages of interaction.

Generally, the method can be represented as a combination of four following stages:

Stage 1. Determination of ways of usage of public-private partnership. Setting targets and needs of the government based on the method of commissions;
Stage 2. Comparative analysis of solutions to socially significant tasks and meeting the state needs;
Stage 3. Creation of a system of key tasks of public-private partnership, i.e. economic and forestry tasks, taking into account strategic economic and forestry indicators;
Stage 4. Analysis of the indicators of the project feasibility - coordination of the interests of forest business and state based on the implementation of the matrix approach to the assessment of interaction.

Suggested method is oriented not only on evaluation of quantitative parameters of collaboration but on qualitative characteristics of public-private partnership, as well. The method enables to identify the problems in forestry. It is unified and can be used in Central Chernozem region and other regions of the Russian Federation. The method allows taking necessary measures for identification of ways of efficient collaboration between the government and business structures.

The aim of the implementation of the proposed approach is to obtain objective and relevant information on the effectiveness of the interaction of business and government in the system of forestry and reforestation in order to clarify the integrated programs for the development of forestry in general and forestry business in particular.

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