Tendencies of the development of forest management in modern Russia

E Kolesnichenko¹, S Morkovina², N Sirotkina³ and A Shevyakov¹

¹Department of Economics, Management and Service, Tambov state university named after G R Derzhavin, 207/6 Sovetskaya Street, Tambov 392000, Russia
²Faculty of Economics, Voronezh State University of Forestry and Technologies named after G F Morozov, 8 Timiryazeva Street, Voronezh 394030, Russia
³Faculty of Economics, Management and Information Technology, Voronezh State Technical University, 84 20th Anniversary of October Street, Voronezh 394026, Russia

E-mail: ekolesnichenko@live.ru

Abstract. Entrepreneurial activity in the sphere of forest management is characterized by a system of extensive relations and entrepreneurs seek to gain maximum profit from the use of economic, social and natural resources. In the article, the authors focus on the theoretical aspects of the study of forest management in modern Russia and analyze the key legal provisions regulating the activities of businessmen involved in the sphere of forest management. Based on the use of statistical analysis methods, the authors assess the state of forestry and reforestation process in Russia. According to the calculations, the authors conclude that the increase in forest cutting brings about a decrease in forest restoration (including artificial reforestation). Thus, entrepreneurs face certain problems related to the forest resources valuation. The authors conclude that an overestimation of the value of forest resources (rental rates) leads to a decrease in the entrepreneurial activity in the sphere of forest management. On the other hand, low cost of forest resources attracts unreliable investors, which has a negative effect. The researchers suggest that a concession is an effective mechanism for interaction between the authorities and business structures in forest management. They argue that this will make the use of forest resources more effective thanks to the process of reforestation.

1. Introduction

The issue the authors raise in the article is topical as, in the modern economic conditions, there is a catastrophic exhaustion of the global forest resources. Every year entrepreneurs involved in the sphere of forest management seek to gain maximum profit, despite a fairly slow process of forest restoration. Shadow economy in the sphere of forestry makes this problem even more serious, due to illegal logging which leads to a decline in reforestation. Moreover, valuable breeds of trees are cut down illegally [1]. Russian authorities need to find a solution to this problem, since Russia possesses a quarter of the world forest resources.

Rational forest management and efficient reforestation are top priority state problems [2]. However, the modern economy is characterized by interaction between the government and business entities [3]. This interaction has various forms and directions: creation of the infrastructure of the economic system; providing favorable conditions for effective functioning; formation and implementation of investment policy [4]. On the one hand, the state is the owner of forest resources (which are leased by entrepreneurs), and on the other hand, the state promotes reforestation thanks to national programs and investments.
Most enterprises engaged in the forestry sector harvest timber and sell it in the domestic and international markets. The state seeks to gain profit in the forestry sector [5], which has been growing in recent years. Analyzing the data presented in Table 1, we can see the size of forest use payments in different federal districts and levels of budgets [6].

**Table 1.** Forest use payments in different federal districts and levels of budgets (in 2017), mln. rub.

| Budget type | Generally across the Russian Federation | Generally across the Russian Federation |
|-------------|----------------------------------------|----------------------------------------|
|             | Central Federal District               | North-Western Federal District         |
|             | Southern Federal District              | North Caucasus Federal District        |
|             | Volga Federal District                 | Ural Federal District                  |
|             | Siberian Federal District              | Far Eastern Federal District           |
| Federal budget | 13925.7 | 1966.3 | 3636.8 | 213 | 48.6 | 1566.1 | 1976.5 | 2860.5 | 1657.9 |
| The budget of the subjects included in the Central Federal District | 5578.8 | 785.1 | 1754.8 | 30.4 | 6.4 | 1020.1 | 314.2 | 1347.6 | 320.2 |

It should be noted that in recent years there has been an increase in the forest income. However, there is an imbalance between the income and expenditure. The forest management expenditure is twice as high as the income. Reforestation in Russia (natural and artificial forest restoration) is crucial for interaction between the state and entrepreneurship in the forestry sector. Reforestation is carried out by entrepreneurial structures controlled by the state authorities in accordance with the Forest Code of the Russian Federation (as part of the national program) [7].

Modern forest management is aimed not only at increasing the size of the forests. It should also be aimed at improving the process of reforestation. Thus, it is crucial to take into account specific methods of forest restoration, the forest composition, forms of reproducible forest ecosystems as well as the ecological and social needs.

In this regard, not only the traditional methods of reforestation should be employed. The government has to use an adaptive approach (forest ecosystem management) and a transformational approach (economic and technological forest management) to reforestation.

Thus, the interaction between the government and business structures is crucial within the periods of various social and economic changes. Therefore, to find a solution to the problem, it is necessary to take into account the peculiarities of the regions, legal and legislative barriers, as well as the imperfection of the existing interaction mechanisms which greatly hinders the interdependent cooperation between the government and business structures.

The purpose of this study is to analyze the mechanism of interaction between the government and business structures in the Russian forestry sector.

2. Methods and materials

Studying the effectiveness of investment in reforestation, the authors have analyzed the dynamics of forest restoration and indicators characterizing the volume of investment in fixed assets (for environmental protection and rational use of natural resources).

The study is based on the official documents containing the data on leased forest areas, the register of debtors using forest resources, information on forest restoration and on forestry management contracts, summary information on the use of forest areas, etc.

The analysis included two stages. At the first stage, the authors have determined the intensity of reforestation (including artificial forest restoration) within the period from 1992 to 2017 [8]. The authors have determined the chain and base increments ($\Delta b_\Delta c$), growth rates ($R_{Gb}, R_{Gc}$) and increments ($R_{Ib}, R_{Ic}$). Further, analyzing the indicators of changes in dynamics, the authors have calculated the outcome
indicators in the form of average values such as the average absolute increase ($\Delta_{aa}$), the average growth rate ($R_{Gaa}$) and the average increment rate ($R_{Iaa}$). These averages are used for extrapolation and forecasting in conditions of constant absolute increments and increment rates. Extrapolation means that the patterns of development related to the dynamics, will characterize the further processes. The basis of forecasting implies that the basic pattern of development related to the dynamics, will be maintained in the future. The accuracy of the forecast depends on the validity of the assumptions about the preservation of basic patterns of development in the future.

At the second stage, the authors have analyzed the impact of the volume of investments in fixed assets (related to environmental protection and rational use of natural resources) on reforestation (including artificial forest restoration) [9]. To carry out the analysis, the authors have studied the statistical data presented on the official website of the Federal State Statistics Service for the period from 2000 to 2017.

The authors used the methods of correlation and regression analysis, which allow us to see how the change in the factor indicator (the volume of investment ($x$)) affects the resultant indicator (the volume of reforestation ($y$)). The authors used a mathematical function in the form of a straight-line equation to show the relationships in the analytical form.

To assess the proposed regression model, the authors used the formula to determine the coefficient of variation and the averaged approximation error:

$$\overline{E} = \frac{1}{n} \cdot \sum \left[ \frac{y_i - \bar{y}}{y_i} \right] \cdot 100\%$$

(1)

The evaluation of the typicality of both the parameters of the regression equation and the parameters of the correlation coefficient was made on the basis of comparing the tabular value of the Student's criterion ($t$ is the distribution) with probability $\alpha = 0.01$. For the selected probability value when the number of $n-2$ is 16, the tabular value of the Student's criterion is 2.9. When the probability is $\alpha = 0.3$ and $n-2$ is 16, the tabular value of the Student's criterion is 1.07.

3. Results and discussion

According to the analysis of reforestation (Table 2), its average annual volume is 984.4 thousand hectares. Thus, within the period of twenty years, the volume of reforestation in Russia was 255594.1 thousand hectares, which was significantly less than the use of forest resources [10].

The analysis of annual absolute increments show that reforestation volumes tend to decrease annually (17.6 thousand hectares per year), which is 9.98% of the annual reduction of reforestation.

The analysis of the volumes of artificial reforestation (Table 3) has shown that its average annual volume is 245.6 thousand hectares. Within the period of 26 years, thanks to artificial forest restoration, 6386.0 thousand hectares were reforested. However, according to the figures, there is a dramatic decline in reforestation. So, the volume of artificial forest restoration tends to annually decrease by 10.8 thousand hectares or 3.65% [11].

In the face of declining reforestation (including artificial forest restoration) in the regions of Russia, it is extremely important to plant good quality trees. Thus, it is crucial to use good planting material in the process of reforestation. Forest restoration should be carried out in accordance with the scientifically based concept which takes into account the strategic objectives and the reforestation area (mentioned in the state programs); modern approaches, methods and aims of forest restoration; the experience of the advanced countries of the world; ecological features and forest potential of the reforested area; state, capacity and sufficiency of planting material and forest nursery.

Using the methods of correlation and regression analysis, the authors made an attempt to assess the role of investment in reforestation. The researchers took into account the data presented in Table 3 (for the period from 2000 to 2017). The authors used a mathematical function in the form of a straight-line equation to show the relationships in the analytical form.
Table 2. Indicators characterizing reforestation in the Russian Federation [10].

| Year | Reforestation, total. thousand hectares | $\Delta b$, thousand hectares | $\Delta c$, thousand hectares | $R_{Gb}$, % | $R_{Gc}$, % | $R_{Ib}$, % | $R_{Ic}$, % |
|------|----------------------------------------|-----------------------------|-----------------------------|-----------|-----------|-----------|-----------|
| 1992 | 1402.3                                  | 59                          | 59                          | 104.2     | 104.2     | 4.2       | 4.2       |
| 1993 | 1461.3                                  | 59                          | 108.1                       | 111.3     | 111.3     | 11.3      | 6.8       |
| 1994 | 1561.8                                  | 100.5                       | 99.1                        | 76.3      | 76.3      | -20.9     | -23.6     |
| 1995 | 1453.7                                  | -108.1                      | 79.1                        | 93.1      | 93.1      | 3.6       | -6.9      |
| 1996 | 1109.7                                  | -344                        | 77.8                        | 98.4      | 98.4      | -22.1     | -1.6      |
| 1997 | 1091.7                                  | -18                         | 72.6                        | 93.3      | 93.3      | -27.3     | -6.7      |
| 1998 | 964.4                                   | -54.1                       | 68.7                        | 94.7      | 94.7      | -31.2     | -5.3      |
| 1999 | 972.9                                   | 8.5                         | 69.3                        | 100.9     | 100.9     | -30.6     | 0.8       |
| 2000 | 959.9                                   | -13                         | 68.4                        | 98.7      | 98.7      | -31.5     | -1.3      |
| 2001 | 886.8                                   | -73.1                       | 62.4                        | 92.4      | 92.4      | -36.7     | -7.6      |
| 2002 | 834.1                                   | -52.7                       | 59.4                        | 94.1      | 94.1      | -40.5     | -5.9      |
| 2003 | 796.7                                   | -37.4                       | 56.8                        | 95.5      | 95.5      | -43.1     | -4.4      |
| 2004 | 812.3                                   | 15.6                        | 57.9                        | 101.9     | 101.9     | -42.0     | 1.9       |
| 2005 | 877.3                                   | 65                          | 62.5                        | 108.0     | 108.0     | -37.4     | 8.0       |
| 2006 | 872.5                                   | -4.8                        | 62.2                        | 99.4      | 99.4      | -37.7     | -0.5      |
| 2007 | 828.4                                   | -44.1                       | 59.1                        | 94.9      | 94.9      | -40.9     | -5.0      |
| 2008 | 836.7                                   | 8.3                         | 59.6                        | 101.0     | 101.0     | -40.3     | 1.0       |
| 2009 | 811.5                                   | -25.2                       | 57.8                        | 96.9      | 96.9      | -42.1     | -3.0      |
| 2010 | 860                                     | 48.5                        | 61.3                        | 105.9     | 105.9     | -38.6     | 5.9       |
| 2011 | 841.7                                   | -18.3                       | 60.0                        | 97.8      | 97.8      | -39.9     | -2.1      |
| 2012 | 872.3                                   | 30.6                        | 62.2                        | 103.6     | 103.6     | -37.7     | 3.6       |
| 2013 | 863                                     | -9.3                        | 61.5                        | 98.9      | 98.9      | -38.4     | -1.0      |
| 2014 | 802.9                                   | -60.1                       | 57.2                        | 93.0      | 93.0      | -42.7     | -6.9      |
| 2015 | 839.9                                   | 37                          | 59.8                        | 104.6     | 104.6     | -40.1     | 4.6       |
| 2016 | 961.8                                   | 121.9                       | 68.5                        | 114.5     | 114.5     | -31.4     | 14.5      |
| 2017 | 840.5                                   | -10865.7                    | 1725.1                      | 2469.2    | 2469.2    | -774.8    | -30.7     |

According to the results of the calculations, the parameters of the equation are:

\[
a_0 = \frac{\Delta a_0}{\Delta} = \frac{\sum y \sum x^2 - \sum xy \sum x}{n \sum x^2 - \sum x \sum x} = 910.1
\]

(2)

\[
a_1 = \frac{\Delta a_1}{\Delta} = \frac{\sum xy - \sum x \sum y}{n \sum x^2 - \sum x \sum x} = -0.004
\]

(3)

Thus, using the following equation (2, 3), we can find out the influence that the investment volumes have on reforestation in Russia: \( y_{ij} = 910.1 - 0.004x \) (Table 4).

The function is adequate if the variation coefficient does not exceed 33%. According to the calculations, it is 5.58%, which means that the linear regression model is adequate.

According to the calculations, the approximation error is 4.45%, which also proves that the chosen model is adequate.
Table 3. Indicators characterizing artificial reforestation in the Russian Federation [10].

| Year | artificial reforestation (forest planting), thousand hectares | Δb, thousand hectares | Δc, thousand hectares | R_{GB}, % | R_{GC}, % | R_{IB}, % | R_{IC}, % |
|------|---------------------------------------------------------------|-----------------------|-----------------------|----------|----------|----------|----------|
| 1992 | 447.20                                                        | -19.30                | -19.30                | 95.68    | 95.68    | -4.32    | -4.32    |
| 1993 | 427.90                                                        | -56.20                | -36.90                | 87.43    | 91.38    | -12.57   | -6.16    |
| 1994 | 366.90                                                        | -80.30                | -24.10                | 82.04    | 93.84    | -17.96   | -16.84   |
| 1995 | 335.10                                                        | -142.10               | -61.80                | 68.22    | 83.16    | -31.78   | -24.10   |
| 1996 | 267.10                                                        | -180.10               | -38.00                | 59.73    | 87.55    | -40.27   | -12.45   |
| 1997 | 259.80                                                        | -187.40               | -9.30                 | 58.09    | 97.27    | -41.91   | -2.73    |
| 1998 | 254.60                                                        | -192.60               | -1.60                 | 56.93    | 93.84    | -40.76   | -6.16    |
| 1999 | 254.30                                                        | -192.90               | 25.70                 | 58.86    | 96.00    | -43.14   | -4.00    |
| 2000 | 233.10                                                        | -214.10               | -21.20                | 52.12    | 91.66    | -47.88   | -8.34    |
| 2001 | 187.10                                                        | -244.80               | -7.90                 | 45.26    | 94.57    | -59.53   | -5.43    |
| 2002 | 194.50                                                        | -252.70               | -7.40                 | 45.49    | 103.96   | -56.51   | 3.96     |
| 2003 | 202.40                                                        | -255.80               | -11.00                | 42.80    | 104.06   | -57.20   | -5.43    |
| 2004 | 200.80                                                        | -260.70               | -11.00                | 40.74    | 104.57   | -59.53   | -5.43    |
| 2005 | 187.40                                                        | -266.20               | -11.00                | 39.96    | 98.08    | -60.04   | -1.92    |
| 2006 | 181.70                                                        | -270.60               | -11.00                | 39.49    | 98.82    | -60.51   | -1.18    |
| 2007 | 178.70                                                        | -276.40               | -11.00                | 38.19    | 94.36    | -61.81   | -5.64    |
| 2008 | 176.60                                                        | -280.30               | -11.00                | 37.96    | 92.73    | -63.26   | -8.74    |
| 2009 | 174.50                                                        | -285.80               | -11.00                | 37.64    | 92.73    | -64.71   | -9.27    |
| 2010 | 172.70                                                        | -291.30               | -11.00                | 37.32    | 92.73    | -66.16   | -9.80    |
| 2011 | 171.00                                                        | -297.30               | -11.00                | 37.00    | 92.73    | -67.62   | -10.34   |
| 2012 | 169.30                                                        | -303.30               | -11.00                | 36.68    | 92.73    | -69.18   | -10.88   |
| 2013 | 167.60                                                        | -309.30               | -11.00                | 36.36    | 92.73    | -70.74   | -11.43   |
| 2014 | 166.00                                                        | -315.30               | -11.00                | 36.04    | 92.73    | -72.30   | -11.98   |
| 2015 | 164.40                                                        | -321.30               | -11.00                | 35.72    | 92.73    | -73.86   | -12.53   |
| 2016 | 162.80                                                        | -327.30               | -11.00                | 35.40    | 92.73    | -75.42   | -13.08   |
| 2017 | 161.20                                                        | -333.30               | -11.00                | 35.08    | 92.73    | -76.98   | -13.63   |
| Sum  | 6386.00                                                       | -5241.20              | -270.60               | 1328.00  | 2414.73  | -1172.00 | -85.27   |

Let us use the Student's criterion to analyze the parameters of the regression equation from the standpoint of typicality. Actual values of t – criterion are:

\[ t_a = \frac{\sqrt{n-2}}{\sigma_E} = 524.2511 \]  
\[ t_a = \frac{\sqrt{n-2} \cdot \sigma_s}{\sigma_E} = 11.57947 \]

If the probability is \( \alpha = 0.001 \cdot t_m = 2.9 \) the inequality \( |t_a| \geq t_m \leq |t_s| \) holds, which means that the parameters of the equation are typical.

According to the calculations, if the probability is \( \alpha = 0.001 \cdot t_m = 2.9 \) (4, 5), the inequality \( |t_a| \geq t_m \leq |t_s| \) holds, which means that the parameters of the equation are typical.

If the probability is \( \alpha = 0.003 \cdot t_m = 1.07 \), the inequality \( |t_a| \geq t_m \leq |t_s| \) also holds, which makes us conclude that the parameters of the equation are typical.

The calculations of the correlation coefficient show that there is feedback (according to the Chaddock scale).

The linear correlation coefficient should correspond to the Student's t-test (6):
\[ t_s = r_{xy} \cdot \sqrt{\frac{n}{1-r^2} \cdot (n-2)} \]  

Equation 6

\[ t_s = 1.667487912, \text{ then } t_m = 1.07 \ t_r > t_m. \]

Table 4. Indicators characterizing forestry in the Russian Federation [10].

| Year | Reforestation Volume of investment in fixed assets (for environmental protection and rational use of natural resources) (mln. rub.) |
|------|-------------------------------------------------------------------------------------------------------------------|
|      | Thousand hectares | Thousand hectares |                                                                 |
| 2000 | 972.9 | 263.3 | 22339 |
| 2001 | 959.9 | 264.9 | 27710 |
| 2002 | 886.8 | 254.3 | 25270 |
| 2003 | 834.1 | 233.1 | 35407 |
| 2004 | 796.7 | 230.4 | 41168 |
| 2005 | 812.3 | 187.1 | 58738 |
| 2006 | 877.3 | 194.5 | 68188 |
| 2007 | 872.5 | 202.4 | 76884 |
| 2008 | 828.4 | 191.4 | 102388 |
| 2009 | 836.7 | 181.0 | 81914 |
| 2010 | 811.5 | 170.8 | 89094 |
| 2011 | 860.0 | 196.5 | 95662 |
| 2012 | 841.7 | 184.9 | 116543 |
| 2013 | 872.3 | 186.9 | 123807 |
| 2014 | 863.0 | 187.4 | 158636 |
| 2015 | 802.9 | 182.2 | 151788 |
| 2016 | 839.9 | 178.7 | 139677 |
| 2017 | 961.8 | 176.6 | 154042 |

The calculated value is \( t_r \geq t_m \) (according to Table 4), which rejects the hypothesis. Thus, we test the significance of the linear correlation coefficient and the statistical significance of the relationship between \( x \) and \( y \).

There is an inverse relationship between the volume of investment and reforestation. There are a number of reasons for that. Currently, the executive authorities and business structures have rental relations. A tenant can be a representative of both a large business and small and medium-sized entities (SME). As a rule, large businesses have more chances than small and medium-sized entities to conclude short-term contracts to get the right to use the forest area (especially the sparsely wooded area). This contradicts the overall tendency of the executive authorities to interact with business structures in forestry and to encourage entrepreneurship. Moreover, over the past two years, arrears of rent have increased. Lease agreements are not terminated with forest tenants who do not pay a rent, which leads to a further increase in arrears. Thus, there are certain problems related to the business activities and the valuation of forest resources. Therefore, an overvaluation of forest resources leads to a decline in the activity of forest enterprises. On the other hand, low cost of forest resources attracts unreliable investors, which has a negative impact on the quality of forestry works (inefficient use of investment resources). Improving the efficiency of forest use should be primarily aimed at the development of logging activities.

Further development of the regional forest sector requires substantial modernization of the main activities and the use of scientific and technological innovations. At the same time, the forest management should be aimed at preservation of forest ecosystems and improvement of forest density and species composition. Forest managers should also take care of forest ecosystems, taking into account the biological features of protective forests. Every year there is an intensive reduction in the use of wood
resources. Thus, certain measures should be taken to improve the mechanism of interaction between forest users and the government.

4. Recommendations

The above-mentioned problems are regulated by the Federal Law No 471 (dated December 29, 2017) "On Amendments to the Forest Code of the Russian Federation with regard to the improvement of the procedure for the use of forests with and without the provision of forest plots". The amendments to the Forest Code have introduced a new way to conclude a forest lease agreement for timber harvesting (on the competitive basis). The amendments have also improved the procedure for organizing auctions for the right to conclude lease agreements for forest plots as well as agreements on purchase and sale of forest plantations.

To sum up, we should note that the aim of the competitions is to conclude contracts with reliable leaseholders (who are engaged in reforestation and take care of forests) or with the entrepreneurs who are willing to meet the requirements provided for by the Federal Law No 471.

However, rental agreements are often concluded only if the forest areas are attractive for investors, productive and located close to settlements. Therefore, it is crucial to change the mechanism of interaction between the executive authorities and business structures.

Taking into consideration the above-mentioned facts, the authors of the article suggest that a concession is the best way of interaction between the executive authorities and business structures in forestry. A concession (a concession agreement) is a contract between the state and business structures, regulating the use of state property by entrepreneurs [12]. Thus, in accordance with such agreements, private companies perform specific functions and are authorized to use the forest areas they lease. Rental payments are made by the lessee in accordance with concession agreements as long as the leased areas are used. The new mechanism of interaction is likely to attract more financial and material resources to the socially significant forestry sector and to involve interested persons and business structures in forest management.

Thus, a new mechanism implies that both parties (the executive authorities and investors) are interested in the interaction. The government cannot take on the functions of entrepreneurs; it implements strategic plans for the development of the industry and promotes use of forests. Businessmen invest financial resources and get profit.

From the economic point of view, the mechanism of cooperation between the executive authorities and business structures is quite simple: entrepreneurs seek to gain profit, avoiding unstable markets and political interference. Whereas the government needs partners to manage financial issues, so that it can avoid interference with the budget, social development, redistribution of financial flows and ecological environment.

It goes without saying that each land concession contract requires consideration. The factors that matter most include the location of the site, the distance from the bodies of water, from the places of public entertainment, from federal highways, etc. Business success depends on the entrepreneur’s personality, strategies and the business development plan.

It is important to note that the concession fee can be paid in the form of the share of products the concessionaire gets performing the functions stipulated by the concession agreement. Apart from the concession fee, the concessionaire pays taxes and performs government contract work. The concessor is entitled to provide the concessionaire with state support in the form of subsidies, benefits or tax credits.

Concessors are guided by the concession agreement to control the project implementation and the concessionaire’s activities. In accordance with the concession agreement, concessionaires are obliged to meet deadlines, to make investments in the project, to follow technical and economic standards and to ensure that the targets of the project are met [13].

As a rule, rental contracts are concluded with reliable tenants who avoid a number of administrative barriers and are aimed at multipurpose or targeted use of the forest area. Concessionaires rent plots only for targeted use, so that sparsely forested areas can improve, which contributes to the environment and
Positive interaction will lead to an increase in the number of small and medium-sized businesses involved in forestry [14].

5. Conclusion

The use of concessionary mechanisms in sparsely forested areas will not only reduce budget expenditures and attract new investors, but will also create additional sources of budget revenues such as tax revenues and concession payments.

In addition, thanks to concessionaires who conclude concession agreements to rent plots in the sparsely forested areas, the quality of forest management improves. The government is likely to spend the minimum amount of money to keep state-owned forests clean, which will contribute to the development of public services and production.

To sum up, according to the research carried out by the authors, concession agreements are of vital importance for the development of sparsely forested areas. Taking into account unattractiveness of such areas, the authors have come to a conclusion that a special mechanism is required. The concept of the mechanism developed by the authors will contribute to the effective cooperation between entrepreneurs and executive authorities in the organizational, legislative and economic spheres. Innovations related to lease contracts will allow reliable entrepreneurs to avoid some administrative barriers, and thanks to the new mechanism of interaction, the executive authorities are likely to be more loyal to entrepreneurs.

Thus, the authors of the article conclude that a concession is an appropriate mechanism for interaction between the executive authorities and business structures in forestry. The scientific study has a theoretical significance as its results can be used both in teaching a number of disciplines and in further research. As for the practical significance of the study, the authors give a number of suggestions and recommend developing and improving the mechanism of interaction with business structures to promote sustainable forest management.

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