Comprehensive analysis of formation and extraction of the forest resource rent of the region

A K Tulokhonov¹, S D Puntsukova¹ and M P Eniseev¹
¹ Baikal Institute of Nature Management SB RAS, Ulan-Ude, 670047, Russia
E-mail: eniseev_mikhail@mail.ru

Abstract. The article shows the role and place of forest resource potential of the region in the structure of forest rent and the fiscal system. The results of the analysis showed that the region’s forest resource potential is quite high, and the forest income, calculated on the basis of rent, in contrast to the actual income at the established fee rates, ensures the financial needs of the republic’s forestry. It has been established that the gap between the incomes of forest revenues to the budgets of different levels has increased in recent years: to the federal budget - growing, to the republican budget - decreasing. The study of the mechanism for the extraction and distribution of forest rent in the region allows us to conclude that it is necessary to intensify regional powers in the field of taxation of the regional part of the payment for standing timber, which are legally within the competence of the region, to replenish their own income. It was concluded that the rent taxation of forest resources would make it possible to increase the efficiency of the existing budget system, since, due to its absence, the budget does not receive enough of the significant financial resources.

1. Introduction
The uneven development of the regions is associated with the heterogeneity of area, which is determined by the competitive advantages of some territories compared to others. Among these advantages in the “new economic geography”, there are factors of the “first nature” that do not depend on people (natural, human resources endowment, favorable geographical position, including the border position), and factors of the “second nature” associated with the activities of the state and societies (agglomeration effect, quality of human capital, institutional environment) [1]. In this context, the region can be considered as the territory of production of total economic rent as a result of the realization of its competitive advantages. In this regard, it is important to investigate the main factors that form the economic rent, the methodological basis of its quantitative determination in order to substantiate the structure and components of the rent in the region. Comprehensive analysis of the formation and assessment of regional rent involves the study of mechanisms for the extraction of the rent and its use within the country's fiscal system.

1.1. Formation of the economic rent of the region
Rent is regarded as additional income derived from the use of a limited resource in social production. Initially, from the times of physiocrats, classics of political economy (Petty W, Quay F, Smith A, Ricardo D and others) rent was associated with land. At the same time, land was considered as a resource (i.e. as a potential) and as a production factor. In the works of Ricardo D, the focus was on the factor associated with the difference in natural fertility, and in Tyunen’s I works - with the availability of the
resource and its location relative to markets. By analogy with land, a territory that we understand as a land area with defined boundaries, which is subject to the jurisdiction of a state or an administrative unit in its composition, can be considered both as a resource and as a factor of production. Its limitations are determined by the composition and quality of natural and labor resources, favorable location, accessibility to markets, capital, etc.

1.2. The mechanism of extraction of economic rent in the region
Regional rent is manifested in the framework of interbudgetary relations between the region and the federal center, since the country's fiscal system is the main instrument for extracting the region's economic rent. In Russia, there are no rental payments in the classic sense of the term. Therefore, the tax system does not provide for the allocation of economic rent as an object of taxation. The role of rent payments is performed by taxes, various fees and payments for the use of resources. As a result, the tax system performs mainly an administrative function than a stimulating one, that is, it is aimed at fiscal withdrawal of income to replenish the Russian budget.

Structuring the elements of the regional economic rent, its analysis and assessment in conjunction with the fiscal system will reveal the potential growth of the country and its regions, the direction of improving inter-budgetary relations between regions and the center in order to optimize it.

2. Methods and materials

2.1. Methods and materials for the analysis of the formation of forest rent in the region
The methodology for estimating income derived from the use of the forest resource potential of the region is based on the rental approach, which defines income as the difference between the market price of production and the cost of its production taking into account the normal return on capital; and an extended interpretation of the concept of national wealth [2-4], according to which national wealth includes not only the totality of material benefits created by human labor, on a certain date, but also a healthy ecosystem and a healthy ecology.

Thus, rent arises not only when a resource is consumed, but also when it is polluted. The presence of the carrying capacity of the environment (the ability to absorb pollution without changing its properties and self-recover within certain limits) saves on environmental costs and at the same time prevents losses (damage) caused to the natural environment by negative impact. Cost savings and prevented damage, i.e. external cost of production, are the basis of the economic assessment of the carrying capacity of the environment [5-7]. However, the assessment of the carrying capacity in the form of fees for pollution, the rates of which should be determined based on the magnitude of the marginal damage to the environment, has many problems. The main one is the difficulty of estimating the external costs of production, which makes it difficult to put into practice rent estimates and payments.

Thus, a set of different types of rent from the use of the forest potential of the territory can be defined as the forest rent of the region (FRR). Table 1 shows the structure and main types of forest potentials that form the forest rent of the region, as well as the mechanisms for its extraction through taxation and fiscal policy.

The source of information for assessing the forest resource potential of the Republics of Buryatia (RB) is the records of the forest fund and forest management regulations of forestry [8, 9]. The total area of land occupied by forests in the Republic of Buryatia as at January 1, 2017 is 29,762.7 thousand hectares (84.7% of its territory), the total timber stock is 2,241.38 million m³.

By purpose, the forests are divided into protection forests, which occupy an area of 11,487.1 thousand hectares (38.8% of the total forest area of the Republic of Buryatia), exploitable – 9,822.1 thousand hectares (33.1%) and reserve – 8,264.8 thousand hectares (27.9%). Estimated cutting area in accordance with the approved forestry regulations of forestry is 10.6 million m³.
Table 1. Types, sources and mechanisms for forest rent extraction in the region.

| Types of FRR            | Sources of FRR                                                                 | FRR extraction mechanism                        |
|-------------------------|-------------------------------------------------------------------------------|-------------------------------------------------|
| Forest resource rent    | Overall capacity of forest resources (wood, non-timber forest materials, minor forest production, etc.) | Payment for use of forest resources              |
| Ecological rent         | Ecological services (water regulation, soil protection, sanitary and hygienic, cultural, etc.) | Payments for environmental services (PES)*       |
| Assimilation rent       | Carrying capacity of the forest environment (reforestation capacity of forests after logging, fires and other negative impacts; the ability of forests to absorb carbon dioxide from the atmosphere) | Payments for negative impact on the forest environment* |

* the proposed mechanisms for the extraction of relevant rents.

In recent years, the annual volume of timber harvesting in all types of logging in the republic is at the level of 3 million m³. Possible annual volume of use of secondary resources: berries - 201 tons, mushrooms - 88 tons, medicinal raw materials - 27 tons, pine nuts – 6,397 tons. For rental assessment of wood resources, calculated values of rental rates for standing timber per forest areas of the Republic of Buryatia were used [10].

2.2. Methods and materials for the analysis of the extraction and distribution of forest rent in the region

The analysis of the taxation system as a tool for rent extraction is based on a comparative analysis of existing models of the division of rights and powers in the field of formation and expenditure of budgetary funds of the Russian fiscal system [11]. The first model is the division of jurisdictions in tax collection and its assignment to a certain level of power (federal, regional, local). At the same time, the powers of regional and local authorities in setting their taxes are very limited, since all the basic elements of taxation are determined by federal tax legislation. The second model is the regulatory division of income from specific types of taxes levied at uniform rates throughout the country, between budgets of different levels according to the Budget Code of the Russian Federation. The third model is the sharing of the tax base, which concerns the corporate income tax. Although “one tax – one level” model is considered to be the best practice.

The source of information is the statistical reporting of the Federal Tax Service of the Russian Federation, the Federal Treasury and the Ministry of Finance of the Republic of Buryatia. The revenue part of the consolidated budget of the Republic of Buryatia has not almost changed over the past five years. In 2017, tax and non-tax revenues in the structure of revenues amounted to 49.4% and 2.7%, respectively, non-repayable receipts from the federal budget - 47.9%. The main sources of incomes of the budget of the Republic of Buryatia that are formed on its territory are taxes on labor and capital, not related to the use of natural resources and the natural environment. Their share in the revenues of the consolidated budget of the Republic of Buryatia in 2017 amounted to 43.8% and 34.5%, respectively. The share of natural resource payments (tax and non-tax) is only 5.4%, of which land tax is 2.4%, payments for mineral resources are 2.4%, and payments for forests use, 0.3%. Payments for environmental pollution make no more than 0.2% of the contribution to the consolidated budget of the republic. Thus, natural resource payments do not play a significant role in the formation of the republican budget.

3. Results of calculations and its discussion

The results of the calculation of the rent estimate of the raw forest resource potential of the Republic of Buryatia are shown in Table 2. The total rental income from the use of the forest resource potential in 2017 amounted to 1,661.8 million rubles. According to our calculations, the main part of the forest rent of the republic is wood, its cost is estimated at 1,028.4 million rubles (62%), minor forest production (berries, mushrooms, medicinal raw materials) - 633.4 million rubles (38%).
Table 2. Rental income from the use of the resource potential of forests of the Republic of Buryatia (2017).

| Types of forest products | FRR value, million RUB |
|--------------------------|------------------------|
| **1. Wood resources**    |                        |
| Timber                   | 954.7                  |
| Firewood                 | 73.7                   |
| **2. Minor forest production** | 633.4             |
| Pine nut                 | 575.6                  |
| Berries                  | 32.5                   |
| Mushrooms                | 18.2                   |
| Medicinal raw materials  | 7.1                    |
| **Total**                | 1,661.8                |

Financial flows generated in the field of environmental management and environmental protection are of the most pronounced rental nature. In 2017, out of the total amount of natural resource payments formed on the territory of the republic 1,586 million rubles (58.3%) had been received to the republican budget and 1,133.3 million rubles (41.7%) to the federal budget. The main contribution to the budget system is made by the mineral extraction tax (43.8%) and the land tax (26.7%). The share of fees for the use of water resources together with water tax amounted to 15.7%, for forest use - 11.7%, for a negative impact on the environment - 1.6% of the total amount of natural payments (Table 3).

Table 3. Revenues from the use of the natural potential of the Republic of Buryatia, received by the budgets of different levels in 2016-2017 (million rubles)*.

| Received in the budget | Total |
|------------------------|-------|
|                        | 2016  | 2017  | 2016  | 2017  |
| Water tax              | 26.8  | 27.9  | -     | -     |
| Land tax               | -     | -     | 769.6 | 726.2 |
| Mineral Extraction Tax | 495.7 | 468.6 | 751.2 | 721.6 |
| Fees for the use of wildlife objects | -     | -     | 5.4   | 6.2   |
| Payment for use of water resources | 324.7 | 398.9 | -     | -     |
| Subsoil use fee        | 3.7   | 2.6   | 5.5   | 3.9   |
| Forest use fee         | 197.4 | 235.3 | 68.9  | 83.9  |
| Fee for negative environmental impact | -     | -     | 65.0  | 44.2  |
| **Total**              | 1,048.3 | 1,133.3 | 1,665.6 | 1,586.0 | 2,713.9 | 2,719.3 |

*Source: Compiled according to the statistical reporting of the Federal Tax Service Russian Federation – https://www.nalog.ru/rn03/related_activities/statistics_and_analytics/, Ministry of Finance of the Republic of Buryatia – http://egov-buryatia.ru/minfin/activities/otchet, Federal Treasury of the Republic of Buryatia – http://buryatia.roskazna.ru/ispolnenie-byudzhetov.

The largest share in the structure of income from the use of forests of the Republic of Buryatia, directed to budgets of different levels, is paid for the use of forests for timber harvesting, on average it is 67%. Income from logging is growing every year (Figure 1). This is due to the increase in timber harvesting from 1,835 thousand m³ in 2012 to 3,144 thousand m³ in 2017 and the indexing of rates for standing timber using multiplying coefficient to minimum wage rates, which are set by law at the federal level, in particular, in 2017 it was 1.51 to the 2007 rates.

According to budget legislation, the federal budget receives payment for the use of forests in terms of the minimum amount of payment under a forest stands purchase and sale agreement,
in terms of the minimum amount of rent, as well as income from monetary penalties (fines) for violations of forest legislation. The republican budget receives a fee for the use of forests in the part that exceeds the minimum amount of payment under a forest stands purchase agreement, in part that exceeds the minimum amount of rent, the payment under a forest stands sale agreement for their own needs. In 2016, the total amount of revenues to the federal budget of the Russian Federation was dominated by fees under forest lease contracts (52%) and payments under forest purchase agreements (27%). In the total amount of revenues to the consolidated budget of the Republic of Buryatia, a large share of revenues accounted for the lease agreements (63.2%) and the purchase and sale agreements for forest stands for own needs - 19.0%.

If in the early 2000s, the gap between revenues to the budgets of various levels was insignificant, in recent years it has increased. There is a tendency to increase the receipt of payments to the federal budgets and decrease in the republican ones. The decrease is especially noticeable in 2015: from the total amount of forest income in the amount of 113.8 million rubles the federal budget received 90.2 million rubles, the republican - 45 million rubles. This situation is explained by the fact that the republican government, having legislative authority to establish the size of the regional part of the payment for wood that remains in the republican budget, is reluctant to fulfill its obligations and thus does not seek to replenish its budget.

Natural resource payments, by definition, are intended to restore, save and protect natural resources, but most natural resource payments are taxable, therefore depersonalized, and perform only a fiscal function. On the contrary, non-tax payments are of a targeted nature and, accordingly, can be directed further to environmental management, compensation for damage to the environment. Fees for forest use are related to non-tax payments and therefore, in principle, should cover the costs of forest management. In reality, the situation is different: the regulatory costs of forestry management in the Republic of Buryatia are 5-6 times higher than the forest income from timber harvesting to the state budget. The main reason for this is the weak linkage between the rates of payments and the “rent” for wood. The average rate of payment per unit volume of forest resources for timber harvesting in 2017 in the Republic of Buryatia was 53.3 rubles/m³, the average minimum rate was 34.9 rubles/m³. Calculations carried out on the basis of calculated average rental rates of payment per cubic meter of wood at 450 rubles [10] showed that the rental income from logging should be 1,028.4 million rubles (Table 2). This amount would cover the financial needs for forest management of the republic.
Thus, the low amount of forest payments does not create true income, which is formed on the territory of the republic, and therefore occupies a very modest place in the budget of the republic in comparison with traditional taxes. For its compensation, Russia has a mechanism for the indirect extraction of rental income, when it is not the natural resources themselves that are taxed, but the value added to them, i.e. the natural rent is redistributed in favor of the processing industry. The negative impact of the low cost of natural resources, obviously, leads to their wasteful use and depletion. The most reasonable decision in these conditions is to increase the rates of payment for forest resources, their collection and to effectively use the raised funds.

4. Conclusion
The conducted study made it possible to structure the forest potential of the region, to reveal the role and place of resource potentials in the structure of forest rent in the region and the fiscal system. The results of the analysis showed that the region’s forest resource potential is quite high and the income from forest use calculated on the basis of rent, in contrast to the actual budget revenues at the established fees, makes it possible to fully meet the financial needs of the republic’s forestry.

The largest share in the revenue structure is regulatory taxes, which are federal taxes and are regulated by federal law. In this regard, there is a direct dependence of allocations for taxes and fees to the consolidated budgets of the subjects of the Russian Federation from the federal budget on the size of the limits. Consequently, the current system of intergovernmental relations in Russia does not provide the optimal balance of interests of all budgets of the Russian Federation, as it is characterized by excessive centralization of resources and powers. The results of the analysis showed that the gap between the incomes of the forest revenues to the budgets of various equals has increased in recent years. There is a tendency to increase the receipt of payments to the federal budgets and decrease in the republican budgets. The study of the mechanism for the extraction and distribution of forest rent in the region allows us to conclude that it is necessary to intensify regional powers in the field of taxation of the regional part of the standing timber fees, which are legally assigned to the regions and are within their competence, to replenish their own incomes in the regional budget. The study of the mechanism for the extraction and distribution of forest rent in the region allows us to conclude that it is necessary to intensify regional powers in the field of taxation of the regional part of the standing timber fees, which are legally assigned to the regions and are within their competence, to replenish their own incomes in the regional budget. It was concluded that strengthening the rent component of taxation of forest resources would improve the efficiency of the existing budget system, since due to its absence, budgets of different levels do not receive significant financial resources annually, which could be sufficient to offset the costs of reforestation, conservation and protection of forests from forest fires and other negative processes.

The study of the formation and evaluation of the region's forest rent, the mechanisms for its extraction and distribution among the budgets of different levels is of great practical importance for identifying existing problems in this area and making decisions for their improvement.

References
[1] Krugman P R 1991 Geography and Trade (Cambridge: Mass) p 156
[2] Dixon J, Bakkes J, Hamilton K, Kunte A, Lutz E, Pagiola S and Xie J 1997 Expanding the Measure of Wealth. Indicators of Environmentally Sustainable Development (Washington, D.C: The World Bank) p 136
[3] The World Bank publication 2006 Where is the Wealth of Nations? Measuring Capital for the 21st Century. (Washington, DC: World Bank) ed K Hamilton, G Ruta et al. p 188
[4] Silvestrov S N and Porfiryev B N 2008 National Wealth: Assessment and Management of Economic Development (Moscow: Econ. Science) p 100
[5] Pearce D and Turner K 1990 Economics of Natural Resources and the Environment (London: Harvester Wheatsheaf) p 378
[6] Golub A A and Strukova E B 1998 *Economics of Natural Resources* (Moscow: Aspect-Press) p 319

[7] Akimova T A, Haskin V V, Sidorenko S N and Zykov V N 2005 *Macroecology and fundamentals of eco-development* (Moscow: RUDN) p 367

[8] Resolution of the Government of Buryatia from 28.12.2018 № 763 "On approval of the Forest Plan of the Republic of Buryatia", access date 12.02.2019
https://egov-buryatia.ru/ralh/activities/documents/lesnoy-plan/

[9] Forestry regulations of forest areas of the Republic of Buryatia, access date 12.09.2018
https://egov-buryatia.ru/ralh/activities/documents/lesokhozaystvennye-reglamenty/

[10] Puntsukova S D and Andreev A B 2015 *Society: politics, economics, law* 6 38-45

[11] Sokolova A A 2009 *Finance and credit* 6 14–22