The emphasis of Russian regions forest potential realization: efficiency and sustainable development

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Abstract. In the modern world, Russia is the main "environmental donor", ensuring sustainability of the biosphere. Sustainable development of Russia and its regions is connected with the realization of forest potential. From ecological and economic position it is one of the fundamental components of the regional space, regardless of the forest area level of Russian region. Among the modern priorities of the Russian public administration is the efficiency of the timber industry complex (TIC) and the capacity of forestry. These aspects retain their long-term importance at the national level, with the strengthening of regional (subnational) emphasis: the impact of the forest sector on the regional situation and the socio-economic situation of most regions. The current economic practice shows the importance of combining the criterion of efficiency with the criterion of sustainable development for the realization of Russian regions forest potential. The author's interpretation of the forest potential as a set of two main functions of the forest, distributed over time - socio-economic and socio-natural, allows achieving this goal. The author's method of constructing an integral indicator of sustainable development of Russian regions forest potential is presented. The analysis of results of opportunities and threats combination is carried out; types of regions are identified. Problems of using the method of integral indices are indicated. The research uses methods of theoretical and empirical analysis, statistical, regional, strategic, content analysis, indicative, index methods, method of grouping, statistical clusters, verbal modeling, typology, logical and content analysis.

1. Introduction
Russia has the largest area of forests, the largest area of undisturbed economic activity of the territory, unique ecosystems and biodiversity [1].

The development of Russian territory, which main filling of the natural space is the forest, is a priority of the economic policy of the modern Russian state. This position should be combined with another urgent national economic task - to increase efficiency of the use of national forest potential [2]. Modern parameters of socio-economic development and spatial features of Russia make it necessary to take into account differences in the understanding and calculations of the effectiveness of the forest potential use.

Forest is a reproducible natural resource, a significant part of the national wealth as an intangible non-financial asset according to the system of national accounts, the basis for various types of economic activities and diversification of the regional economy. Forest retains its raw value as a source of timber-raw materials for various industrial activities, but its fuel [3], as well as recreational
value increases. Realization of regional forest potential is a factor of organization (transformation) of regional space [4]. The resulting effect not only meets the regional interests (sustainable process of regional reproduction), but also has national and supranational importance. On this basis, it is necessary to take into account not only different types of effects (social, economic, environmental), but also the effectiveness of the realization and development of regional forest potential at different spatial levels – regional, national, supranational [5].

In addition, the effectiveness is complex, it is important to note it as an indicator of the effectiveness of public administration mechanisms - sectoral (forest complex) and territorial (federal and regional levels). According to the author, the main result of the strategy of realization and development of forest potential of the region should be the sustainability of its development as part of regional economy – a subsystem of national level. In this regard, the author developed a method of constructing an integral index of sustainable development of Russian regions forest potential.

2. Models and Methods
The transition to sustainable development has become the most important global trend in modern conditions. Modern strategies of development integrate economic, social and environmental approaches, and the welfare is increasingly considered as the summation of consumption, human development and environmental sustainability, taking into account their quality and stability [6]. As a result, socio-natural-ecological-economic space is represented as a system of elements of biological, geographical, economic and social nature. The principle of balance that provides consideration of this space (environment of economic activity) as the whole is put in a basis. Therefore, sustainability assessments are inherently multi-component and require integration of environmental, social, economic and institutional aspects [7].

There are two most developed approaches to building sustainable development indicators. The first is based on the construction of a system of indicators, each of which reflects individual aspects of sustainable development. The following subsystems of indicators are highlighted: economic, environmental, social, and institutional. The strict division of indicators into groups is rather conditional. Some indicators may reflect different aspects of sustainability. In this regard, separate indicators are interpreted as mixed - environmental-economic, environmental-socio-economic, socio-environmental, etc.

The second approach involves construction of an integral (aggregated) indicator, on the basis of which it is possible to judge about the degree of sustainability. Aggregation is usually carried out on the main aspects of development – environmental, economic, social, and institutional. In particular, the economic aspect combines economic structure, production and consumption. Social aspect combines health, education, equality, housing, security, and population. Institutional dimension includes organizations and capacities of social institutions. The step-by-step integration of private indices allows to create heterogeneous blocks of indicators. However, multi-step integration makes it difficult to understand what the resulting index shows, causing the problem of interpreting the result.

Compared to the integrated indicators of sustainability, the approach based on construction of indicator systems is more widespread in the world. However, it should be noted that among many foreign integrated assessments there are practically no measurements corresponding to national definition of "social and economic development", since this concept for western practice sounds very abstract in contrast to the traditional one in our country. Along with the construction of indicator systems, the development of integrated (aggregated) indicators is quite active. The presence of integrated indicators is especially valuable for decision makers. One such indicator could be used to judge about the level of stability of the country (region), the balance of the development trajectory. In that form, this indicator can be an analogue, for example, of GDP, which is now often measured by the level of economic development and wellbeing. The principal issue in the aggregation of information into indicators is the determination of weights of initial indicators to preserve their importance and to eliminate subjectivity as much as possible. The higher the level of information aggregation, the more
difficult it is to weigh heterogeneous quantities. The author takes into account formulated [8] basic requirements for indicators:

- be significant for management decisions (policy relevance);
- be easy to understand for a wide audience (simplicity);
- adequately reflect the actual situation (validity);
- based on the available data and not require large costs for data collection (data availability);
- be representative, possibly complex (representativeness);
- adequately reflect changes (sensitivity).

The current ecological and economic situation in the country is to a significant extent the result of extensive development and accumulated structural deformations in the economy of Russia (the dominance of nature-intensive sectors and industries, raw material export orientation, etc.). It should be noted that in Russia the term "sustainable development" is still an alien one. "Green economy" occupies a narrow niche and is associated with unreasonably high costs [9]. The report "National assessment in the transition of the Russian Federation to sustainable development" contains a large number of sustainability indicators. It is emphasized that Russia is characterized by significant regional differentiation. Existing regional differences were the result of historical imbalances in the development of production, focus on the industry of primary processing of natural resources, backwardness and imperfection of the technologies used. This fact determines the need for differentiated regional policy on the basis of a single regulatory framework. Due to the above reasons and the considerable spatial extent of the country, it is reasonable for Russia to assess the progress in sustainable development goals in the regional context, which significantly distinguishes us from the world experience. Foreign systems of indicators are characterized by a small number of regional indices, although it is obvious that many methodological problems of sustainable development aspects are similar for countries and regions.

In countries with economies in transition, there is a clear conflict between economic development and environmental security. For Russia, the issue of developing a sustainable development strategy is relevant, since today's economic growth of extensive type is accompanied by aggravation of environmental situation. It is obvious that economic growth is possible only in conditions of stable level of environmental safety, so as the country's development experience of diversified assessments of sustainable development is becoming more and more popular [10].

Methodology for measuring the sustainability of regional development is only emerging. This is due to a rethinking of basic principles for measuring development, and to statistical constraints. Especially great are the difficulties of constructing integral indices; none of the existing indices can be called "trouble-free".

Building a system of indicators of sustainable development of Russian forest potential is associated with solution of a number of specific tasks. It is known that in Russian forest sector the main problems of the current period are not related to reserves, but to their use. In this regard, the transfer of sectoral indicators, which are typical for most countries with limited forest resources, is inadequate, and it is necessary to substantiate the basic indicators that reflect problems of Russian forest sector.

Based on the indicators recommended by the world community, in terms of sustainable forest management principles, Rosleskhoz prepared "Criteria and indicators of sustainable forest management and forestry of Russia." The criteria and indicators for sustainable forest management for Europe's forests (the pan-European process) and for the world's temperate and boreal forests (the Montreal process) were the basis for their development.

The author's interpretation of the forest potential as a set of two main functions of the forest, distributed over time: socio-economic and socio-natural, in addition to the construction of indicators related to sustainable development of forestry implies also construction of indicators related to the TIC, as well as the impact of socio-economic situation in the region on the level of sustainability.

Within the framework of this study, various approaches to the construction of indicator system were considered. Indicators were constructed in such a way as to give a quantitative description of the identified problems, basing on the database of state Russian statistics. The approach used contains a
fairly "compressed" system of key/basic indicators. A number of priority basic indicators and their modifications based on the structure of "problem – indicators" are proposed. Key / basic indicators are selected to reflect the specifics of Russian forest sector, including features of modern period of development. In this regard, it should be noted that the list of indicators cannot be a frozen system and should be adjusted when trends and problems change.

According to the author, the method of constructing integrated index of forest potential sustainability in Russian regions is based on the interrelated assessment of two main sustainability components, which can be represented in coordinates: potential (opportunity) - risk (threat).

In accordance with the above - mentioned logic, a set of private indicators-indices was formed:

- characterizing the prerequisites for sustainable development of forest potential;
- defining the limitations of realizations of forest potential sustainable development.

The former are presented as opportunities for sustainability, the latter, on the contrary, as threats that provoke an increase in instability, characterized by assessment "the more, the worse".

Most often particular indicators are complex, performing interrelated socio-natural (environmental) or socio-economic (economic and social) functions. Often, a particular indicator of threat of this development corresponds to a particular indicator characterizing possibilities of sustainable development.

In general, normalization of private indicators-indices is made by finding a deviation from the average allRussian indicators (standardization of indicators is made by referring the value of each particular indicator for this region to the average value of this indicator for the Russian Federation as a whole). The overall rate of opportunities (or threats) is calculated as arithmetic value of the sum of partial indicators of opportunities/ threats. The composite index summarizes values of particular indicators (indices) in such a way as to take into account the contribution of each from position of stability [11]. Formally, all indicators receive equal weight in the calculation of the final index, since there are no universally recognized priorities in ranking economic, social and environmental problems. At the same time, in order to avoid the subjective approach to the maximum extent, each component is not weighed due to the lack of a representative number of expert assessments. Therefore, the values of all particular indices are taken into account with the same weight, based on equal importance of all the selected factors.

General indicator of opportunities united 6 particular indicators characterizing potential of sustainable development: health (resilience) of the population, production of gross regional product (GRP), forest supply of territory, sufficiency of protected areas (specially protected natural areas - SPNA), intensity of forest use, development of forest industry.

General indicator of threats grouped 6 particular indicators that form risks of forest potential sustainable development: demographic load on forest lands, pollution, forest capacity of TIC production, wood consumption by the population, fire danger, saturation of roads for development/reproduction of forest potential.

As a result, each Russian region is characterized by a quantitative assessment: how great is its potential as an object of sustainable development and how great are threats to sustainable development of forest potential of the region compared to the average Russian. The resulting process is presented as an outcome of positive and negative processes interaction.

3. Results and Discussion
The results of calculations of stability level for all regions of the Russian Federation on the basis of official data are presented graphically in the form of distribution of points-regions on coordinate plane, where the horizontal axis characterizes possibilities (arithmetic mean of particular "positive" indicators - indices) of sustainable development, and the vertical – threats (arithmetical mean of particular "negative" indicators - indices) (figure 1). The final stage is the construction of a matrix of regions based on the average values of opportunities and threats of sustainable development of forest potential (table 1). This greatly facilitates the interpretation and practical application of the technique.
Figure 1. Sustainability of Russian forest potential in context of regions.


Table 1. Integrated index of sustainable development of Russian regions forest potential in the coordinate system "Opportunities" (O) – "Threats" (T). Regions are represented within each category as the threat indicator increases.

| Point № | Region                               | Point № | Region                               |
|---------|--------------------------------------|---------|--------------------------------------|
| great O - minimal T (2A)               | minimal O - significant T (4B)      |
| 24     | Leningradregion                      | 52      | Samararegion                         |
|         | significant O - minimal T (3A)       | 56      | Sverdlovskregion                     |
| 28     | RepublicofAdygea                     | 65      | AltaiKrai                            |
| 6      | Kalugaregion                         | 71      | Omskregion                           |
| 49     | NizhnyNovgorodregion                 | 25      | Murmanskregion                       |
| 30     | RepublicofIngushetia                 | 13      | Smolenskregion                       |
| 3      | Vladimirregion                       | 69      | Kemerovoregion                       |
| 42     | RepublicofMariEl                     | 11      | Oryolregion                          |
| 23     | Kaliningradregion                    | 1       | Belgorodregion                       |
| 47     | PermKrai                             | 14      | Tambovregion                         |
| 79     | Sakhalinregion                       | 64      | RepublicofKhakassia                  |
| 15     | Tverregion                           | 8       | Kurskregion                          |
| minimal O - minimal T (4A)             | 4       | Voronezhregion                       |
| 10     | Moscowlregion                         | 60      | Chelyabinskregion                    |
| 34     | RepublicofNorthOssetia               |         | maximum O - great T (1C)             |
| 46     | ChuvashRepublic                      | 20      | Arkhangelskregion                    |
| 31     | Kabardino-BalkarRepublic             | 18      | RepublicofKarelia                    |
| 41     | RepublicofBashkortostan              |         | great O - great T (2C)               |
| 33     | Karachay-CherkessRepublic            | 19      | KomiRepublic                         |
| 2      | Bryanskregion                        | 59      | Yamalo-NenetsAutonomousArea          |
| 36     | KrasnodarKrai                        | 68      | Irkutskregion                        |
| 51     | Penzaregion                          | 67      | KrasnoyarskKrai                      |
| 43     | RepublicofMordovia                   | 73      | Sakha (Yakutia) Republic             |
| 44     | RepublicofTatarstan                  |         | significant O - great T (3C)         |
| 54     | Ulyanovskregion                      | 78      | Magadanregion                        |
| 17     | Yaroslavlregion                      | 74      | KamchatkaKrai                        |
| 12     | Ryazanregion                         | 75      | PrimorskyKrai                        |
| 70     | Novosibirskregion                    | 22      | Vologdaregion                        |
| 35     | ChechenRepublic                      | 76      | KhabarovskKrai                       |
| 5      | Ivanovoregion                        |         | minimal O - great T (4C)             |
| 27     | Pskovregion                          | 80      | JewishAutonomousRegion               |
| 29     | RepublicofDagestan                   | 39      | Volgogradregion                      |
| 45     | UdmurtRepublic                       | 9       | Lipetskregion                        |
| 16     | Tularegion                           | 38      | Astrakhanregion                      |
|         | great O - significant T (2B)         | 50      | Orenburgregion                       |
| 61     | AltaiRepublic                        | 53      | Saratovregion                        |
| 58     | Khanty-MansiAutonomousOkrug          | 55      | Kurganregion                         |
|         | significant O - significant T (3B)   | 40      | Rostovregion                         |
| 62     | RepublicofBuryatia                   |         | great O - maximum T (2D)             |
| 57     | Tyumenregion                         | 21      | NenetsAutonomousOkrug                |
| 26     | Novgorodregion                       |         | significant O - maximum T (3D)       |
| 7      | Kostromaregion                       | 81      | ChukotkaAutonomousOkrug              |
| 48     | Kirovregion                          | 77      | Amurregion                           |
| 63     | RepublicofTyva                       |         | minimal O - maximum T (4D)           |
| 72     | Tomskregion                          | 37      | StavropolKrai                        |
| 6      | ZabaykalskyKrai                      | 32      | RepublicofKalmykia                   |

In general, the proposed indicators and their aggregation were informative and applicable for integrated assessment of sustainability, although certain problems (reliability, technical capabilities of calculation, timely receipt of data) still remain.
4. Conclusion
The results allowed us to draw a number of conclusions.

- Calculation of integral index (matrix construction) is quite simple in comparison with other integrated sustainability indices, it includes balanced economic, social and environmental indicators, that allows to use it not only for development of the forest sector decisions, but also for assessment of socio-environmental and economic sustainability. This index is based on a stable statistical database and can be updated regularly.

- Results, based on a one-time observation demonstrate the significance of composite index (matrix). At the same time, they show that regular use of existing statistical base allows to trace the dynamics and predict further development.

- Further improvement of composite index (matrix) is advisable through specification of the list of economic, social and environmental indicators included in it, as well as introduction of weights for particular indicators, depending on the changes in their importance in the conditions of the state policy.

- An important goal is reflecting those aspects of economy that lie outside the monetary circulation. The rule of the market economy - "the good (service) that does not have a price/valuation does not exist in economic reality" distorts indicators on which the decision-making process is based. Therefore, the widespread use of natural indicators with further standardization (the assignment of the value of each particular indicator for the subject of the Federation to the average value of this indicator for the Russian Federation as a whole) in construction of indicators allows to display all aspects.

- One of the typical problems for Russia, which often remains out of sight, is the imbalance in development of individual components. Diagnosis of particular indicators of sustainable development allows to identify the "weak link" and to focus resources to address priorities, not just equalizing.

The problem of applicability of integrated indices, capable of measuring development sustainability is rooted, first of all, in the inconsistency, on the one hand of economic and, on the other, social and environmental development trends, that makes many integrated assessments difficult to interpret. Taking into account the mentioned problems, it is necessary to improve the methodological apparatus of sustainable development monitoring and integrated assessments. In general, we should note that a significant way needs to be done to turn the system of sustainable development indicators into a powerful tool of management, decision-making adjustments, optimization of resources (natural, financial) impact and understanding of the factors, determining dynamics of sustainability processes. The natural capital of our country plays an important role in the world economy, so the formation of environmentally sustainable development in Russia has not only national, but also supranational meaning.

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