

The Greening of the Bio-Resource Economy of the Northern Region



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Abstract. The article presents the results of a collaborative study aimed at finding opportunities and limitations for effective use of renewable bio-resources, which are an important part of the resource base of the economy of the Komi Republic. The novelty of the approach to achieving the goal lies in addressing the methodology of greening established as an official course of global sustainable development and gaining momentum in Russia. The logic of the research into modernization of the bio-resource economy of the Northern region corresponded to the traditional scheme, including the understanding of the content, measurement of parameters and areas of development of the process under study, and is reflected in the structure of the article. The research covers the stages of green development, its relations with sustainable development, and approaches to their measurement. Relying on the methodology of green sustainable development for the modernization of bio-resource industries has helped: specify it as environmental modernization aimed at preserving natural capital, improving the environmental quality of life, improving the resource efficiency of economic activity; assess the level of greening of the objects under study and identify the barriers to its increase; justify the areas of conservation and effective use of land, forest and water resources and “greening” the structure of the bio-resource economy of the region. The research results represent a contribution to the formation of the green economy of the Komi Republic and the launch of promising research into the resource efficiency of its renewable natural capital, and contribute to regional studies on the green growth of the Russian economy.

Key words: sustainable development, green growth, greening, bio-resource economy, environmental modernization.

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Introduction

Economic growth is currently associated with increased pollution and environmental degradation, depletion of natural resources, biosphere imbalance, and climate change, which leads to deterioration of human health and limits the opportunities for further development. The need to change the development paradigm at the global level was recognized at the turn of the third millennium as the goal of building the post-crisis economy, sustainable in the long term instead of resurrecting the unsustainable and polluting one. The starting point of sustainability is a strong green movement, with the main feature being a combination of economic growth with environmental sustainability and social equity.

Russia, facing the problems of dirty economic growth, is embedded in the green movement, denoting “the transition to a model of environmentally sustainable development, which will ensure the long-term effective use of the country’s natural capital while eliminating the impact of environmental threats on human health”. Following the meeting of the State Council “On environmental development of the Russian Federation in interests of future generations” (December, 2016), Russian President instructed to include this goal in the development of strategic planning documents and a comprehensive action plan of the Government of the Russian Federation for 2017–2025. The departments were asked to pay special attention to “the use of a system of indicators of sustainable development, the definition of mechanisms for achieving these goals, and a step-by-step solution of the objectives of environmentally sustainable development of regions’ territories for the period up to 2030 and for the future up to 2050; on establishing target indicators of energy efficiency of the economy as a whole and its main sectors; the impact of introducing mechanisms for environmentally sustainable

development on the activities of economic entities”.

For Komi Republic, as well as other Northern regions, is characterized by problems of land degradation, depletion of forest capital, atmospheric and water pollution in cities, low level of industrial waste processing from coal and oil production, random treatment of solid municipal waste, relatively low resource efficiency of the forest industry, lagging formation of organic agriculture, preservation of traditional life support.

Regional problems of biological resource management, rapid development of global green concepts, Russia’s persistent involvement in their implementation, motivated teams of laboratories for issues of territorial development and environmental economics at Komi ISE EPN Research Centre, Ural branch of RAS on the development of the project “Modernization of bio-resource economy of the Northern region”. The purpose for the work carried out under the author’s guidance in 2015–2017, was to identify the main provisions, limitations and opportunities for the development of green economy in the Northern region through effective use of renewable bio-resources. The main material objects of research (taking into account the objective segmentation and the composition of performers) were land, water and forest resources, the basic sectors of the bio-resource economy (agriculture, forestry, tourism), and traditional livelihoods.

The research relevance and novelty, being obvious at the start, remain at present. With the growing interest in the issues of greening among the scientific community and authorities, especially in the last two years, which is manifested in the volume of publications, number of meetings and conferences amid lack of strategies for regions’ green development. It seems that familiarity with the experience of entering the development of the “greening” areas of the regional economy can be useful for colleagues from other regions, and their

reaction – for the performers of the submitted material.

At all research stages information was prevailed by foreign experience. The review of sources was carried out by the author in connection with the methodological focus of the study [1] and by all the performers in the relevant sections of the topic. In this article, literary sources are supplemented by references in the course of material presentation and a brief reference on publications in Russian.

Green economy as a scientific topic appeared in Russia ten years ago and at first was associated with the presentation of foreign reports and documents, the main contribution being made by bulletins and reviews of the Institute for Sustainable Development of the Public Chamber of the Russian Federation. The Institute does not operate now, but its leaders, S.N. Bobylev and V.M. Zakharov support this topic at the Center for Sustainable Development and Environmental Health at RAS Institute of Biology. The prerequisites for the formation and content of greening logically brought its conductors in Russia such as environmental specialist and researchers of sustainable development to the forefront. S.N. Bobylev and his colleagues promptly respond to the main positions and trends of the green course of sustainable development, introducing constructive approaches in the Russian theory and practice of nature management [2–5]. Their reference to the World Bank “adjusted net savings” indicator calculated as the economic index of Russian regions [3], prompted our studies to assess the depletion of regional forest capital.

N.V. Pakhomova and her colleagues are consistent in the development of greening, they practically reveal the effects of transition to green economy, the role of inclusive green growth in neo-industrialization, and the value of environmental modernization as the driver of formation of demand for innovation [6–8].

Analyzing the international indicators of inclusive green growth, the experts of Cadastr R&D and Design Institute, which has been successfully operating in the field of environmental and economic accounting in environmental management for a long time, suggest considering this system, which helps assess the risks of natural capital depletion, as a basic information platform for calculating green growth indicators in Russia not only at the national, but also at the regional and local level [9].

Reviews occupy an important place in literature sources. The most complete by sources, deep analysis of content, measuring, and strategizing of green economy and green growth development is the survey performed by E.M. Zomonova [10]. The work contains the methodology and calculation of ecological footprint on the example of the Republic of Buryatia, an indicator of perspective sustainable development, not typical for the national assessment.

New review materials touch upon the institutional aspects of greening in Russia. The chronology of ideology and methodology of green economy and green growth is presented in analysis of international events and documents, carried out by the researchers of the Russian Presidential Academy of National Economy and Public Administration [11,12].

An important topic of political and administrative barriers to green growth is covered by M.V. Teryoshina and M.V. Onishchenko. Along with lobbying the interests of major corporations not interested in the transition to “green” growth, inertial pressure of the existing raw material development model, the predominance of environmental optimism in modern Russian society, inconsistent strategic management decisions and regulatory “gaps” in legislation on “green” economy, the authors note scientific and methodological problems – undeveloped assessment mechanisms of natural capital, as

well as tools for assessing the total economic damage from negative environmental impacts [13].

It should be noted that recent domestic literature contain fewer works revealing the content of the concepts of green economy, with more works related to conditions and proposals for the introduction of “green technology” [14], the formation of “green industry”, “green energy”, “green tourism”, “green finance”, “green logistics”, etc.

The representatives of the scientific community move from general proposals for implementation of the principles of green economy in the regions in cluster form [15] to the designation of program objectives for the formation of the Russian national model of green economy, offering tools for their solution. Evgenii Schwartz, WWF Director of environmental policy in Russia, and his colleagues single out the following objectives: reducing the overall anthropogenic impact of the economy on the environment and building Russia’s reputation as the most environmentally responsible exporter of natural resources in global labor division; increasing natural resource and energy consumption efficiency of the economy while providing opportunities for technological modernization and formation of the economy of higher redistribution and formation of financial mechanisms and resources for such modernization; improving legal regulation to minimize environmental risks in the implementation of infrastructure megaprojects [16].

Methods and materials

The study of bio-resource economy modernization of the Northern region in the global greening trend included the stages of identification (understanding the content), parameterization (quantitative assessment) and strategizing (substantiation of directions) of development of the process under study, which correspond to the theoretical, methodological, and practical aspects of scientific research.

The present article is of a methodological nature. Its purpose is to get acquainted with the experience of studying the region from the standpoint of green economy formation – implement the objectives of presenting the structure (material is organized in accordance with these objectives), focusing the guidelines and fixing the main results of collective research, presented in the final provisions of the theoretical and methodological aspects and in the areas of greening the bio-resource economy (strategic aspect).

Theoretical aspect. In order to understand the content of bio-resource economy modernization, various trends of green economic development were analyzed.

The term “green economy” was first used in 1989 in the title of the report of a group of leading environmental economists to the UK government on harmonization of the economy and environmental policy and inclusion of sustainable development in the measurement of economic progress and evaluation of projects, but it was not disclosed in this work [17]. Later, one of its authors, David Pearce [18], outlined the following general properties for all forms of green economy: limiting human greed – it is necessary to change the economic behavior, responsibly weigh the costs and benefits; sustainability – the ability to reproduce the economy on a sustainable basis; decoupling – systematic reduction of the impact of the economic result on deterioration of natural assets used in its production. It is on these positions that the green economy is able to ensure sustainable use of natural resources without a decline in human well-being.

In the early 2000s, green concepts began to support and develop the leading global institutions: UN, OECD (The Organization for Economic Cooperation and Development), World Bank, Global Green Growth Institute, etc. Various green concepts are comparable in content and policy recommendations: they aim to reconcile economic and environmental

vectors of sustainable development, without neglecting social aspects. The common vision was developed in the Green Growth Knowledge Platform, which marks the unity of green concepts (green growth, green economy, new climate economy, low-carbon development, circular economy), recognizing that economic development (growth) is combined with environmental sustainability (green) and does not violate social equality (inclusive) [19].

Currently, the Platform¹ is an active poly-structural resource that includes “topics” (twenty different aspects of activities), “sectors” (12 activities), “countries” (green map of the world), “solutions” (experts, projects, best practices) that reflect and contribute to global promotion of green growth in many aspects.

The green course consisting of separate concepts and then platforms, began to form as a response to exhaustion of traditional resource-based economic development and is consistent with sustainable development as the ultimate goal. At the same time, Alan Atkisson, the main author of the report “Life beyond growth” (2012), noted the vague nature of the philosophy of sustainable development (“everything for everyone about everything”) and the weakness of economic decisions of national plans and strategies [20]. In 2015, the UN General Assembly adopted a resolution entitled “Transforming our world: the 2030 Agenda for Sustainable Development”, which identified and specified 17 goals. The activity of international organizations and countries linking these goals with the global trend of green development leads to a conclusion that it has become an official course of transformation of our world. At the same time, intensive development of indicators and tools for monitoring the achievement of goals and targets is encouraging in terms of strengthening the “economic philosophy” of sustainable development.

¹ Green Growth Knowledge Platform. Available at: <http://www.greengrowthknowledge.org/page/explore-green-growth>

The full wording of goals of sustainable development (GSD) (*Tab. 1*) includes words such as “poverty”, “hunger”, “health”, “education”, “gender”, “water”, “energy”, “work”, “infrastructure”, “inequality”, “cities”, “consumption”, “climate”, “oceans”, “environment”, “peace”, “institutions”, and “cooperation”.

According to the 2030 Agenda, many of the goals and objectives are simultaneously in line with economic, social and environmental development priorities. The SDG-8 is directly related to green growth; it is formulated as “promoting sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all”. According to objective 8.4, until the end of 2030 developed countries first and foremost need to improve the global resource use efficiency in consumption and production systems and ensure that economic growth is not accompanied by environmental degradation.

The stages of green course formation are summarized in *Table 2*. The first three stages are considered in detail in [1].

Thus, green growth, meaningfully combining different concepts with each other and with sustainable development, was reasonably chosen as a methodological reference point for studying the bio-resource economy modernization. Its features and trends, the content of modernization of the regional economy of Komi, which uses bio-resources, determined the greening aimed at preserving natural capital, improving the environmental quality of life and resource efficiency.

Methodological aspect. During the measurement of parameters, objectives of instrumentation for quantitative assessment of the start and progress of the bio-resource economy greening in the Komi Republic were performed: adaptation and development of green growth indicators for agriculture, forestry, tourism, assessment of the state of bio-resources and

Table 1. Goals of sustainable development 2030

No.	Goals of sustainable development
1	Extensive poverty eradication in all forms
2	Fighting hunger, ensuring food security, improving nutrition and promoting sustainable agriculture
3	Ensuring healthy lifestyles and promoting the well-being for everybody
4	Ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for everyone
5	Gender equality and women and girls empowerment
6	Ensuring the availability and sustainable use of water and sanitation for everyone
7	Ensuring universal access to affordable, reliable, sustainable and modern energy for everyone
8	Promoting progressive, inclusive and sustainable economic growth, full and productive employment and decent work for everyone
9	Building resilient infrastructure, promoting inclusive and sustainable industrialization, fostering innovation
10	Reducing inequalities within and among countries
11	Ensuring openness, security, resilience, and environmental sustainability of cities and human settlements
12	Ensuring sustainable consumption and production patterns
13	Taking urgent action to combat climate change and its consequences
14	Conservation and sustainable use of oceans, seas and marine resources for sustainable development
15	Protecting, restoring and promoting sustainable use of terrestrial ecosystems, sustainably forest management, combating desertification, halting and reversing land degradation processes and biodiversity loss
16	Promoting peaceful inclusive societies for sustainable development, providing access to justice for everyone and building effective, accountable and inclusive institutions at all levels
17	Strengthening the means to achieve sustainable development and revitalizing the mechanisms of the global space for sustainable development

Source: [3, p. 9].

Table 2. Green course development

Concept	Content	Providers
Green Economy	Maintaining human well-being and sustainable use of natural resources [18]	J. Pierce , 1989, 1992
	Low-carbon resource-efficient economy, including social aspects [21, 22, 23]	UNEP*, 2008, 2011 Rio+20 Conference, 2012
Green Growth	Stimulation of economic growth and development with preservation of natural assets and uninterrupted provision of resources and ecosystem services which our well-being depends on [24].	Green growth strategy. OECD, 2011
	Investment and innovation forming the framework for sustainable growth and leading to new economic opportunities [25].	From growth – to green growth. World Bank, 2012
Inclusive Green Growth	Economic development (growth) – environmental sustainability (green) – social equality (inclusive) [19]	Global Green Growth Institute (GGGI), UNEP, OECD, World Bank, 2016
Green Growth & SDGs**	Green growth means the economic development which preserves the environment and which is the basis of our well-being http://www.greengrowthknowledge.org/page/explore-green-growth	UN, World Bank, Green Growth Knowledge Platform (GGKP)

* UNEP – United Nations Environment Program.
** SDGs – Sustainable Development Goals.
Sources: compiled from: [18;19; 21–25].

environmental quality; development of the source base, methods and algorithms of measurement; carrying out initial calculations of the level of greening.

At the same time, foreign experience in the development of the assessment base was widely used, reflecting the main stages of greening:

green economy – green growth – green growth of sustainable development. The most significant contribution to the green growth measurement base is related to the OECD. In 2017, the organization presented new improved indicators of green growth compared to the set of those of 2014, which was the starting

point for the present study [26]. The progress towards green growth is measured by 25–30 indicators characterizing the environmental and resource efficiency of the economy, natural assets, environmental aspects of the quality of life, economic opportunities and political instruments and reflecting the socio-economic context and characteristics of growth. This list is the basis for monitoring the green growth of OECD database (including Russia²), as well as of individual countries that assess their progress in dynamics and comparison with OECD countries³. The OECD electronic database provides an opportunity to compare the countries by air pollution, carbon emissions, the impact of development on land resource reduction, green investment and taxes related to the environment.

In addition to OECD, green indicators were proposed by the Global Green Growth Institute, UNEP and World Bank, which annually publishes a Little Green Data Book describing 200 countries (separately and in groups) on 50 indicators [27]. An important step in consolidating approaches and adjusting different sets to measure inclusive green growth was the work of a special Committee of the Platform [19].

The extensive measurement of green growth progress is formed in connection with the new stage of long-term (since 1995) work with indicators and monitoring of SDG 2030 achievement. They are developed by the UN Commission to help countries [28, 29] complementing the monitoring of statistical and cartographic applications⁴.

Rich useful resources for researchers and practitioners to monitor indicators and assess trends in their implementation appeared on

² OECD. Stat. Green Growth Indicators. Available at: http://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH

³ Statistics Netherlands visualizes green growth. Available at: <https://www.cbs.nl/en-gb/visualisaties/green-growth#/>

⁴ Welcome to the Sustainable Development Goal indicators website. Available at: <https://unstats.un.org/sdgs/>

the websites of global structures⁵. World Bank presented the Atlas of sustainable development goals, compiled on the basis of world development indicators in 2017 based on economic and quality of life statistics of 200 countries. For each of the 17 goals relevant indicators are identified and visualized by maps and charts. The Atlas aims to reflect the breadth of SDG and present national and regional trends and “snapshots” of progress towards their implementation, highlighting and emphasizing the most important issues, according to World Bank experts. In particular, the implementation of green growth indicators is meaningfully commented on: 8.4.1 – material footprint, material footprint per capital, and material footprint GDP and 8.4.2 – domestic material consumption, domestic material consumption, and domestic material consumption per GDP. The analysis of resource costs requires the assessment of dependence of environmental degradation on economic growth. They include resource consumption due to CO₂ emission from fossil fuel, losses from changes in agriculture, forestry and land use, wood overcutting and mortality caused by exposure to environmental hazards – air and water pollution, unsanitary living conditions and poor working conditions. Based on estimation of dependence of average annual GDP growth and average annual losses on environmental degradation for 178 countries for the period 1990–2015 illustrated graphically, it is obvious that most countries demonstrate weak decoupling or strengthening of direct correlation between growth and degradation [30, p. 48].

Interesting work has been started by International Institute for Sustainable Development in Canada (IISD) within the framework of the project SDG Knowledge Hub

⁵ WDI 2017: Sustainable Development Goals. Available at: <http://datatopics.worldbank.org/sdgs/>

where world news, activities and publications to achieve SDG are accumulated. The indicators portal provides information (16 countries so far) to determine the popularity of goals, the number of indicators used to measure them, as well as their similarity with those proposed by the UN. The same data would be tracked in dynamics for 38 indicators of SDG at the local level – in 13 Canadian cities⁶.

In Russia, methodological work to achieve SDG has begun with a new series of annual reports on human development in the Russian Federation, edited by S.N. Bobyleva and L.G. Grigor'eva. The report "UN Sustainable Development Goals and Russia" provides an overview of the progress in achieving 17 goals at the global level based on a number of indicators with relevant data available for 2016 [31]. The report "Environmental priorities for Russia" among the main problems of the formation of the national system of sustainable development indicators for global indicators noted the gaps in data and methodology, as well as in disaggregation of indicators. Full information is available for only 142 indicators on the global list; no internationally agreed methodologies on 88 indicators have yet been developed [32].

According to SDG methodology and informational framework, an opinion survey of CIS countries statistical services was conducted⁷. Rosstat has started the development of a special resource, a database⁸ and a corresponding section of indicators on a departmental website. In this work, Rosstat relies on detailed OECD metadata⁹.

⁶ IISD's Own Work on the Sustainable Development Goals. Available at: <https://sustainable-development-goals.iisd.org/#results>

⁷ List of indicators for SDG achievement for CIS regions. Available at: <http://www.cisstat.com/sdgs/CIS-SDG%2001%20indicators%20list%2025-11-2016%20rus.pdf>

⁸ Data for indicators of SDG achievement in Russia. Available at: http://www.gks.ru/free_doc/new_site/m-sotrudn/CUR/cur_main.htm

⁹ Detailed metadata. Available at: <http://www.oecd.org/std/measuring-distance-to-the-sdgs-targets.htm>

An important methodological aspect of monitoring progress towards SDG is the OECD annual assessment aimed at measuring the "distance" of countries from the values of 2030 indicators [33]. The assessment helps compare own positions with the level of other countries and the average for OECD and identify the strengths and weaknesses of the development plan; it also improves statistics by country, harmonizes and improves the overall statistics of the instrumental set of assessment.

In the 2017 study, 13 countries were evaluated, 131 indicators covering 98 objectives were used; the sets of indicators, the degree of objectives coverage and the starting positions of countries differ significantly. The results of the study revealed a significant distance to the positions of 2030. The closest indicators were "health", "water" and "energy", the farthest – "gender equality". The assessment profile of countries briefly describes their situation in terms of: 1) achieving certain SDG objectives; 2) the extent to which the available indicators cover the relevant targets in relation to the UN Statistical Commission's common set of 232 indicators to measure 169 objectives; 3) the country's impact on other countries' ability to achieve their goals.

In order to illustrate the assessment profile for SDG achievement it is interesting to compare countries from different sides – Norway and Latvia (*Fig. 1*). The situation in Norway was assessed by 130 indicators, which measured 98 objectives, 33 of which were completed at the level of 2030. Latvia implemented 11 out of 66 estimated objectives; 90 indicators were used for measuring. Norway's success is not accidental: it has a clear agenda for 2030 [34].

It is obvious that the monitoring SDG achievement will develop in Russia as a relevant statistical base is formed, such a format of territorial comparison, in our opinion, is appropriate in the future for the Russian regions.

The development of indicators and methods for measuring different aspects of the bio-resource economy greening in the Komi Republic was carried out with the testing of these and the wide involvement of other information resources, taking into account the specific features of assessment objects, strong limitations of regional and almost complete absence of municipal statistics of resource use.

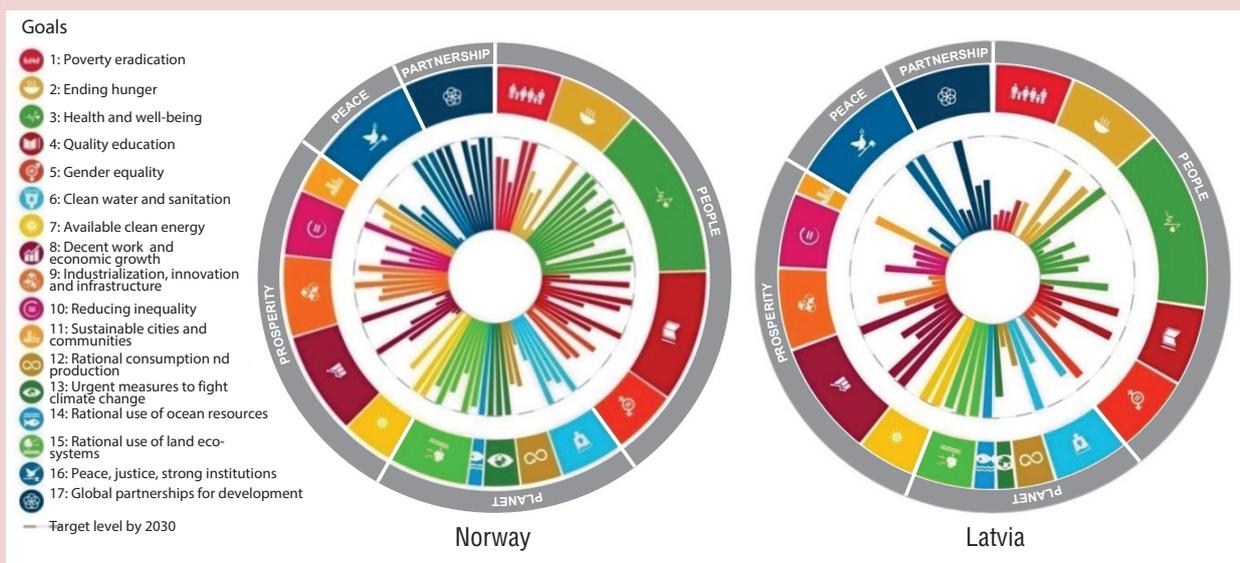
Sectoral sets of indicators were developed to assess the state of land, water, and forest resources, green tourism, environmental assessments of the economy and quality of life (pollution, waste). Positions of measuring the formation of organic agriculture and green impact on economy and environment of IT services were defined. In assessing the starting state of the resources and sectors, approaches and measurement algorithms were tested and adapted. Methodological work was continued at the final stage in connection with including the developments on indicators for achieving global sustainable development goals up to 2030 in the research database. In this case, the use of appropriate indicators adjusted

weak capacities of indicators of the quality of land and forest resources proposed for SDG measurement, which, due to a large contrast of world countries, are too general and do not help identify and objectively assess the territorial differentiation of land degradation and depletion of forest capital.

The main methodological result of the study is the formation of a regional comprehensive set of indicators for bio-resource economy greening, as well as a set of methods used, which include the international model for assessing the state of environment “Driving Forces – Pressure – State – Impact – Response” (DF-P-S-I-R); the decoupling built into this model and assessing the nature of relations between the economic activity and the main indicators of environmental load; the scheme of P. Victor’s types of economic growth using the principle of decoupling.

The methods of assessing forest capital depletion and forest resources condition in the medium- and long-term perspective taking into account the improvement of forest cultivation organization and technology have been

Figure 1. Current “distance” of achieving SDG indicators



Source: [33, p. 50 and 44].

developed. Based on the UNWTO (UN World Tourism Organization) and the European Commission methodology, with the existing information limitations, an approach to assessing the level of green tourism is proposed.

The strategic aspect involves the development of areas of greening the bio-resource economy. The strategic vectors of eco-modernization of the Komi Republic are as follows:

- improvement of environmental quality (air, water) and resource conservation (prevention of land degradation, restoration of forest capital);
- identification and activation of growth factors in the efficiency of industries and activities that use resources – forestry, traditional livelihoods;
- green transformation of the structure of the regional economy through the development of organic agriculture; green tourism; production and sales of eco-goods, products, and services; formation of information and communication sector stimulating sustainable development and resource efficiency.

Promotion by strategic vectors is realized through directions by types of activity, justified taking into account the assessment of the situation and regional problems. In the present paper, the author as a research supervisor their summary is presented.

In order to reduce land degradation and ensure resource conservation it is proposed to form an adaptive landscape system of agriculture with the use of soil protection elements, which can be tested in the framework of pilot projects to improve soil fertility in agricultural organizations with financial support from the national budget.

When restoring and preserving forest resources, the use of extensive and intensive methods of forest formation, depending on their productivity should be combined with a compensatory strategy of timber processing

using best technology for processing wood of declining quality.

The environmental modernization of water management is based on the introduction of the DF-P-S-I-R model into the system of regional environmental management using the decoupling method, as well as production modernization on the principles of the best available technology in creating the appropriate infrastructure.

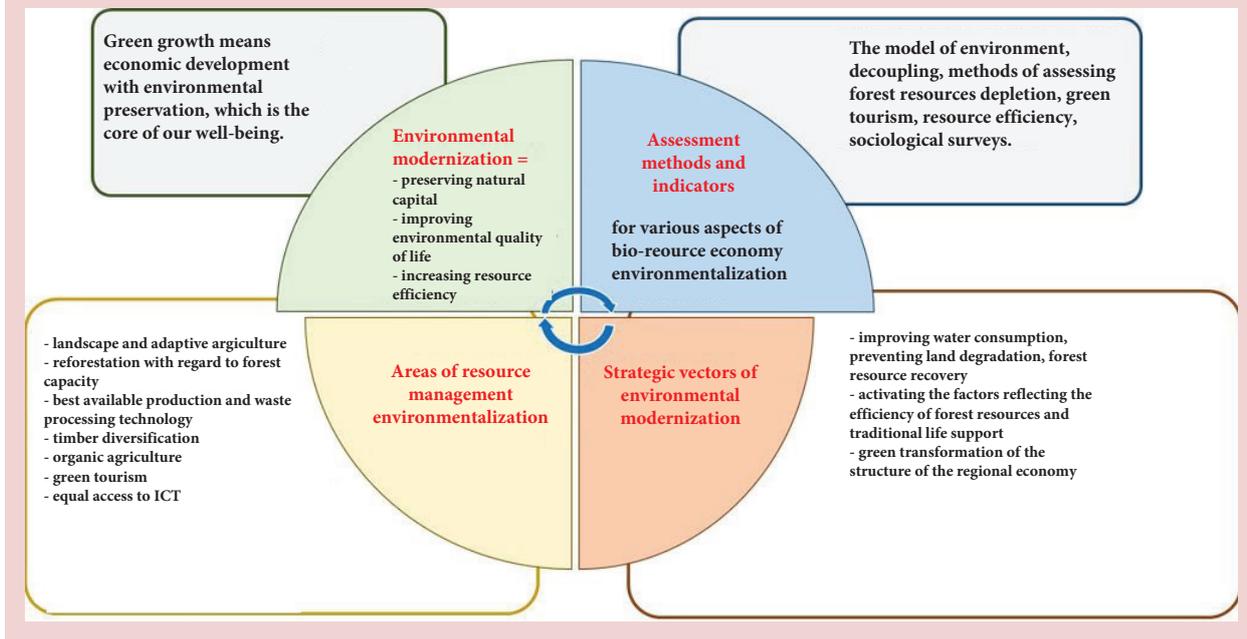
In order to successfully perform the functions of ensuring employment, income, food security of rural households, semantic content of the villagers' life, traditional life support should be rebuilt taking into account the best practices of institutional reforms in the foreign North, based on the implementation of the right of indigenous people to land, resources and territorial self-government.

The reduction of Russia's growing double lag in the resource efficiency of the forest industry from European countries will contribute to the full implementation of investment plans to deepen the processing of wood in new and existing enterprises, the technological modernization and updating of equipment, complete processing of wood waste, as well as the expansion of the commodity structure through new products: oriented strand boards, wood biodiesel, "smart paper", viscose, etc.

The relevant objective of organic agriculture development in the region has favorable natural resource and consumer prerequisites, but needs a scientifically based assessment of potential organic land use, the formation of the regulatory framework of production, and development of the regional market of organic products.

The restrictions in green tourism development can be removed by forming green tourism products on the basis of eco-tours; creating tourist infrastructure to meet the requirements of green certification; complying the products of historical and cultural tourism with the requirements of green tourism

Figure 2. Modernization of bio-resource economy of the Komi Republic in the context of green growth



products; developing a regional system of green tourism management taking into account the relevant criteria and promotion of green tourism products.

In order to address the information and communication challenges of achieving SDG through green growth it is necessary to ensure wider implementation of ICT for remote diagnostics and preventive medicine services, for quality continuous education; as well as access to information and communication services, eliminating gender and spatial inequality. An important role is given to the equipment of ICT organizations, market liberalization, modernization of networks, and communication development in small remote settlements.

Conclusion

In addition to the presentation of the main results of research into the modernization of the bio-resource economy of the Northern region, presented in the classic triad “theory-technique-practice” and generalized in the scheme (Fig. 2), it should be noted that it has become possible:

- to launch an important topic at the level of regional studies to which Russia is turning, namely, the green growth of sustainable development;

- to start assessing the development in the unity of economic growth, environmental sustainability, and social equality (the latter in this case – through quality of the environment and availability of resources and services);

- to expand the range of research tools through the development of foreign approaches, as well as international (OECD, Green Growth Knowledge Platform, Eurostat) and regional (Geoportal of the Komi Republic) databases;

- to outline the prospect of research into resource efficiency (the pressing area of environmental issues [35]) of using renewable natural capital of the Northern region with access to comprehensive decoupling of GRP and resource costs (financial losses from deterioration of natural and human resources).

The results of bio-resource economy greening of the Komi Republic will be presented in a collective monograph, which is being prepared for publication.

References

1. Dmitrieva T.E. Green growth – methodological landmarks of regional bio-resource economy modernization. *Aktual'nye problemy, napravleniya i mekhanizmy razvitiya proizvoditel'nykh sil Severa – 2016: materialy V Vserossiiskogo nauchnogo seminaru* [Relevant issues, areas and tools for the development of production powers of the North]. Syktyvkar, September, 22–23 2016. In 2 parts. Syktyvkar: Komi respublikanskaya tipografiya, 2016. Chapter I, pp. 16–26.
2. Bobylev S.N. Sustainable development for future generations: economic priorities. *Mir novoi ekonomiki=The world of new economy*, 2017, no. 3, pp. 90–96. (In Russian).
3. Bobylev S.N., Solov'eva S.V. Tseli ustoichivogo razvitiya: sistemnyi vzglyad v budushchee [Sustainable development goals: system approach to the future]. *Doklad o chelovecheskom razviti v Rossiiskoi Federatsii za 2016 god.* [Report on human development in Russia for 2016]. Moscow: Analiticheskii tsentr pri Pravitel'stve Rossiiskoi Federatsii, 2016, pp. 7–25.
4. Bobylev S.N., Minakov V.S., Solov'eva S.V., Tret'yakov V.V. Ekologo-ekonomicheskii indeks regionov RF. Metodika i pokazateli dlya rascheta – WWF Rossii [Eco-economic index of Russian regions. Calculations methods and indicators – WWF Russia]. *RIA Novosti* [RIA News], 2012. 150 p.
5. Bobylev S.N., Goryacheva A.A., Nemova V.I. Project management in green economy. *Gosudarstvennoe upravlenie: elektronnyi Vestnik=Public administration e-journal*, 2017, issue 64, pp. 34–44. Available at: <https://cyberleninka.ru/journal/n/gosudarstvennoe-upravlenie-elektronnyy-vestnik#/987357>. (In Russian).
6. Pakhomova N.V., Rikhter K.K., Malyshko G.B. Structural transformations in the context of “green” economy formation: challenged for the Russian state and business. *Problemy sovremennoi ekonomiki=Problems of modern economics*, 2012, no. 3 (43), pp. 7–15. (In Russian).
7. Pakhomova N.V., Richter K.K., Malyshko G.B. Inclusive sustainable development: priorities, indices, international experience, potential of coordination with reindustrialization model. *Problemy sovremennoi ekonomiki=Problems of modern economics*, 2014, no. 3 (51), pp. 15–24. (In Russian).
8. Pakhomova N.V., Richter K.K., Malyshko G.B., Bondarenko Yu.P. – Formation of demand for ecological innovations: is the institutional support sufficient? *Problemy sovremennoi ekonomiki=Problems of modern economics*, 2015, no. 2 (54), pp. 15–27. (In Russian).
9. Fomenko G.A., Fomenko M.A., Terent'eva A.A., Arabova E.A. Measuring inclusive green growth: specific features and challenges. *Problemy regional'noi ekologii=Regional environmental issues*, 2016, no. 5, pp. 131–139. (In Russian).
10. Zomonova E.M. *Strategiya perekhoda k «zelenoi» ekonomike: opyt i metody izmereniya* [The strategy of transition to “green” economy: experience and measurement techniques]. Novosibirsk: GPNTB SO RAN, 2015. Series “Environment”. Issue 104. 283 p.
11. Lipina S.A., Agapova E.V., Lipina A.V. *Zelenaya ekonomika. Global'noe razvitie* [Green economy. Global development]. Moscow: Prospekt, 2016. 234 p.
12. Lipina S., Shevchuk A., Lipina A., Agapova E. Analysis of International Documents on the Development of ‘Green’ Economy and ‘Green’ Growth (May 18, 2016). Available at: <https://ssrn.com/abstract=2812603> or <http://dx.doi.org/10.2139/ssrn.2812603>. (In Russian).
13. Tereshina M.V., Onishchenko M.V. Political and management barriers to “green” growth in Russia. *Chelovek. Soobshchestvo. Upravlenie =Human. Community. Management*, 2015, vol. 16, no. 3, pp. 50–74. (In Russian).
14. Dudin M., Kalendzhyan S., Lyasnikov N. “Green economy”: practical vector of sustainable development of Russia. *Ekonomicheskaya politika=Economic policy*, 2017, vol. 12, no. 2, pp. 86–99. DOI: 10.18288/1994-5124-2017-2-04. (In Russian).
15. Lavrikova Yu.G., Malyshev E.V. Green economy in cluster development. *Vestnik UrFU. Seriya «Ekonomika i upravlenie»=UFU Bulletin. Series “Economics and Management”*, 2014, no. 3, pp. 120–133. (In Russian).
16. Shvarts E.A., Babenko M.V., Boev P., Martynov A.S., Knizhnikov A.Yu., Ametistova L.E., Pakhalov A.P. Rossiiskaya natsional'naya model' «zelenoi» ekonomiki i dobrovol'nye mekhanizmy ekologicheskoi otvetstvennosti [The Russian national model of “green” economy and voluntary mechanisms of environmental responsibility]. *Doklad o chelovecheskom razviti v Rossiiskoi Federatsii za 2017 god. Ekologicheskie priorityety dlya Rossii* [Report on human development in Russia for 2017. Environmental priorities for Russia]. Moscow: Analiticheskii tsentr pri Pravitel'stve Rossiiskoi Federatsii, 2017. Pp. 189–211.
17. Pearce D., Markandya A., Barbier E. *Blueprint for a green economy*. London: Earths can Publications Ltd., 1989. 192 p.

18. Pearce D. Green Economics. *Environmental Values*, 1992, vol. 1, no. 1, pp. 3–13. Available at: <http://www.environmentandsociety.org/node/5454>.
19. Narloch U., Kozluk T., Lloyd A. Measuring inclusive green growth at the country level. Taking stock of measurement approaches and indicators. *GGKP Research Committee on Measurement & Indicators*. February 2016. Available at: http://www.greengrowthknowledge.org/sites/default/files/downloads/resource/Measuring_Inclusive_Green_Growth_at_the_Country_Level.pdf.
20. Life beyond growth. Alternatives and complements to GDP-measured growth as a framing concept for social progress. 2012. *Annual survey report of the Institute for Studies in Happiness, Economy, and Society – ISHES* (Tokyo, Japan). Available at: <https://lifebeyondgrowth.wordpress.com/>.
21. *Global'nyi zelenyi novyi kurs* [Global new “green” course]. Report. March, 2009. UN Environment Programme. Available at: http://greenlogic.by/content/files/GREENTRANSPORT/UNEP90_RUS.pdf.
22. *Future we want. Outcome document*. UN Conference on Sustainable Development. Rio-de-Janeiro, Brazil, June, 20–22, 2012. United Nations. June, 19th, 2012. 66 p.
23. Towards a green economy: pathways to sustainable development and poverty eradication. UNEP, 2011. 738 p. (In Russian).
24. *Towards green growth. A summary for policy makers*. May, 2011. 26 p. Available at: <https://www.oecd.org/greengrowth/48634082.pdf>. (In Russian).
25. *Inclusive green growth: the pathway to sustainable development*. World Bank, 2012. Available at: <https://openknowledge.worldbank.org/handle/10986/6058>.
26. *Green growth indicators 2017*. OECD Publishing, Paris, 2017. Available at: <http://dx.doi.org/10.1787/9789264268586-en>.
27. *The little green data book 2017*. World Bank, 2017. Washington, DC: World Bank. DOI:10.1596/978-1-4648-1034-3.
28. *Sistema global'nykh pokazatelei dostizheniya tselei v oblasti ustoichivogo razvitiya i vypolneniya zadach Povestki dnya v oblasti ustoichivogo razvitiya na period do 2030 goda* [The system of global indicators of SGD achievement and implementation of the 2030 Agenda for Sustainable Development]. UN Statistical Commission, approved by the General Assembly, 6th, July, 2017. Available at: https://unstats.un.org/sdgs/indicators/Global%20Indicator%20Framework_A.RES.71.313%20Annex.Russian.pdf (accessed: 21.09.2017).
29. *Khod dostizheniya tselei v oblasti ustoichivogo razvitiya* [Progress towards sustainable development goals]. Secretary-General of the UN report. UN Economic and Social Council. 11th, May, 2017. Available at: <https://unstats.un.org/sdgs/files/report/2017/secretary-general-sdg-report-2017--RU.pdf> (accessed: 21.09.2017).
30. *Atlas of sustainable development goals 2017: from world development indicators*. World Bank Group, 2017. Available at: <https://openknowledge.worldbank.org/handle/10986/26306>.
31. *Doklad o chelovecheskom razviti v Rossiiskoi Federatsii za 2016 god* [Report on human development in Russia for 2016]. Moscow: Analiticheskii tsentr pri Pravitel'stve Rossiiskoi Federatsii, 2016. 298 p.
32. *Doklad o chelovecheskom razviti v Rossiiskoi Federatsii za 2017 god. Ekologicheskie priority dlya Rossii* [Report on human development in Russia for 2016. Environmental priorities for Russia]. Moscow: Analiticheskii tsentr pri ravitel'stve Rossiiskoi Federatsii, 2017. 292 p.
33. *Measuring distance to the SDG Targets. An assessment of where OECD countries stand June 2017*. OECD, Paris, 2017. 62 p. Available at: <http://www.oecd.org/std/OECD-Measuring-Distance-to-SDG-Targets.pdf>.
34. *Norway initial steps towards the implement of the 2030 Agenda*. New York, 2016. Available at: https://sustainabledevelopment.un.org/content/documents/10692_NORWAY%20HLPF%20REPORT%20-%20full%20version.pdf.
35. Distelkamp M., Meyer M. Pathways to a resource-efficient and low-carbon Europe. *Ecological economics*. Article in Press. 17 p. Available at: <https://www.sciencedirect.com/science/article/pii/S0921800917302720>

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