Chapter 79
Sustainable Development Assessment of the NWFD Regions

Michail A. Nikolaev ⓘ**, Marina Yu. Makhotaeva** ⓘ **and Denis P. Malyshev** ⓘ

Abstract The object of this paper is to analyse the essence of the concept of "sustainable development of a region" and develop the methodology to assess the level of sustainable development as exemplified by the NWFD regions. The approaches systematization presented in science literature show that sustainability must be considered in the unity of its economic, social and environmental aspects. This position corresponds to the traditional understanding of the regional social and economic system in the form of the triad "economy - social sphere - ecology". The paper introduces the integrated index of the economic growth environmental load. The economic component is evaluated by the GRP dynamics, the social component—by the consolidated budgets spending index of the constituent entities of the Federation for social and cultural activities, and the environmental component—by the environmental load index. As a result of the research, the NWFD regions are divided into three groups. The Komi Republic, the Arkhangelsk and Murmansk regions, and St. Petersburg have sustainable economic growth. The Vologda, Kaliningrad, Leningrad and Novgorod regions have an average level of economic growth sustainability. Sustainability underdevelopment is characteristic of the Republic of Karelia and the Pskov region. The problems of the Republic of Karelia are caused by problems in the social sphere and ecology, and the social sphere is a weak point in the Pskov region. Increase in innovative activity is considered as a direction to improve the sustainability.

M. A. Nikolaev (✉) · D. P. Malyshev
Economics and Finance, Pskov State University, Pskov, Russia
e-mail: mihaelnikolaev@mail.ru

M. Yu. Makhotaeva
World Economy and International Business, Pskov State University, Pskov, Russia

79.1 Introduction

The unsatisfactory dynamics of social and economic processes, growing uncertainty in the economy, as well as internal and external threats rise made it necessary to form an integrated approach to solve sustainable development problem. In addition, such factors as growing volatility of economic processes, global contradictions development, as well as natural resources shortage contribute to the actualization of sustainable development problem [4].

The main attributes of sustainable economy are: environmental sustainability, social orientation, innovation, energy efficiency, sustainable consumption and production, emphasis on knowledge, risk reduction [2]. At the same time, as mentioned in the paper [10], the prevailing in the country approach to the problem of sustainable social and ecological development is characterized by situationality, fragmentarity and low systemacity.

Thus, official documents constantly emphasize that development opportunities exhaustion within raw-materials export model is one of the main factors of unsatisfactory dynamics of the Russian economy. At that, the need for a transfer to knowledge-based innovative economy is manifested. At the same time, science financing from the Federal budget decreased from 425.3 billion roubles in 2013 to 402.7 billion roubles in 2016 and the consumer price index for the period of 2014–2016 was 132.6%, i.e. in real terms, funding for science declined by about 30%. Innovation activity indicators also have negative dynamics. Thus, the indicator "the ratio of technological innovations costs in the total volume of goods shipped, work and services performed" in industry decreased from 2.1% in 2014 to 1.8% in 2016.

When assessing the economic sustainability level, high importance of territorial factor is to be taken into account. In the paper [6], the expanded reproduction of all types of territory potential, competitive recovery of the economy and living standards of the population are highlighted as attributes of sustainable development of a region. The urgency of sustainable development research at the regional level is also determined by high differentiation level of the social and economic development of territories [5, 8].

The consequence of this is the formation of problem areas, causing low sustainability of the national economy. The issue of providing integrated and balanced development of regions is given priority in the strategic planning documents at the Federal level. So, in the National Security Strategy of the Russian Federation, one of the most important attributes of the national security is balanced, integrated and comprehensive development of the subjects of the Russian Federation. In the Strategy for Economic Security of the Russian Federation for the period till 2030, balanced spatial and regional development is pointed out as a condition for sustainable development.

79.2 Materials and Method

When conducting the research, the authors used the basic principles of classical economic theory, the theory of regional economics. The research was based on the principles of system approach to the study of the economic development of regions and the practical feasibility of the research results. To achieve the objectives of the research, such methods as structural and statistical analysis, system method, and analysis of planning documents were used in the paper. When using these methods, the system approach was observed, due to the fact that each region should be considered in the form of the triad "economy - social sphere - ecology".

For each of the subsystems, the use of relevant indicators is justified: economy—the index of physical volume of GRP for the period, the social sphere—the index of expenditures of the consolidated budgets of the constituent entities of the federation for social and cultural events, ecology—the index of environmental load. These indicators are presented in the official statistics, which assures the reliability of the research. The regions of the North-Western Federal District were considered as the study object.

79.3 Results

When studying the sustainability of territorial systems, it is necessary to proceed from the fact that a region is a complex system with specific features of the course of social and economic processes. Significant factors of sustainable development at a regional level include the existing structure of regional industrial complexes, which not only determines the type and pace of economic development, but also determines the high environmental burden and emergence of different environmental problems not only in regions, but also in the national economy [7].

In the paper [12], with the use of the Adjusted Net Savings Index (ANSI), the relationship between the structure of regional economies and the state of the environment for the Republic of Kazakhstan was investigated. Most industrial regions have average ANSI values; oil-producing regions have negative index values, and agrarian-oriented regions have ANSI above average value.

Economy specialization is the main factor of the environmental state for the Russian Federation regions. So, in the North-Western Federal District, the minimum value of the indicator "emissions of pollutants into the air emanating from stationary sources" in 2017 was observed in agro-industrial regions of the Kaliningrad and the Pskov Regions—26 and 35 thousand tons, respectively. Their lead industry is food production. At the same time, the Komi Republic that specializes in oil and gas production, had the value of 451 thousand tons, and the Vologda region, specializing in metallurgical production, had 420 thousand tons.

The paper [11] presents the integrated approach to the assessing the environmental intensity of economic development. The author identifies two stages to solve this

problem. At the first stage, the economic result is evaluated with the use of such indicators as GRP, production output, etc. Next, the environmental load is calculated using industrial and municipal waste indicators, pollutant emissions into the atmosphere, dirty discharge, and the amount of consumed resources (electric or thermal energy, clean water, fuel resources, etc.). The indicator of environmental intensity of economic development is defined as the ratio of environmental and economic indicators. This methodology was used by the author to analyze the economy development of the NWFD regions in 2011–2015.

Thus, "sustainable economy" is considered by most of the authors in the unity of its economic, social and environmental aspects. This position corresponds to the traditional understanding of the regional social and economic system in the form of the triad "economy - social sphere – ecology".

At that, the main problem is the choice of indicators characterizing each area and methods to calculate the integral indicator of the economic growth environmental load.

Within this research, we propose to evaluate the level of the sustainability of regions' economic development on the basis of the following indicators:

– the economy—the index of physical volume of GRP for the period;
– the social sphere—the index of the consolidated budgets spending of the subjects of the Federation for social and cultural activities, including education, healthcare and social policy;
– the ecology—the environmental load index, which is determined on the basis of indicators of atmospheric pollutants emission, emanating from stationary sources and dirty discharge into surface water bodies. These indicators are presented in the official statistics and make possible to do the comprehensive and system research of both the dynamics of sustainable development and its determining factors.

The presented approach was used to analyze the level of economic growth sustainability in the regions of the North-West Federal District for the period 2011–2016 in the context of economic, social and environmental components. The economic component was estimated by the dynamics of GRP (Fig. 79.1). The maximum GRP growth index among the regions of the NWFD was in the Novgorod Region. Its economy grew by 25.1%. At that, the GRP of the Komi Republic decreased by 3.6%. Thus, the economic component of sustainable development was positive in all regions except the Komi Republic. In general, we can report a high level of the economic growth differentiation of the NWFD regions, which is considered in science literature, as well as in program documents, as a factor of low sustainability of the economy against external shocks.

The social component of the sustainable growth was estimated according to the dynamics of the consolidated budgets spending of the regions for social and cultural activities (Table 79.1). Thus, for the period under analyses, per capita expenditures on social and cultural activities in nominal terms increased in all regions. At the same time, the consumer price growth index for the period 2011–2016 amounted to 150.5%. Accounting this, in real terms, social expenditures increased only in the Leningrad region by 9.4%. At that, in the Pskov region they decreased by 30.3%.
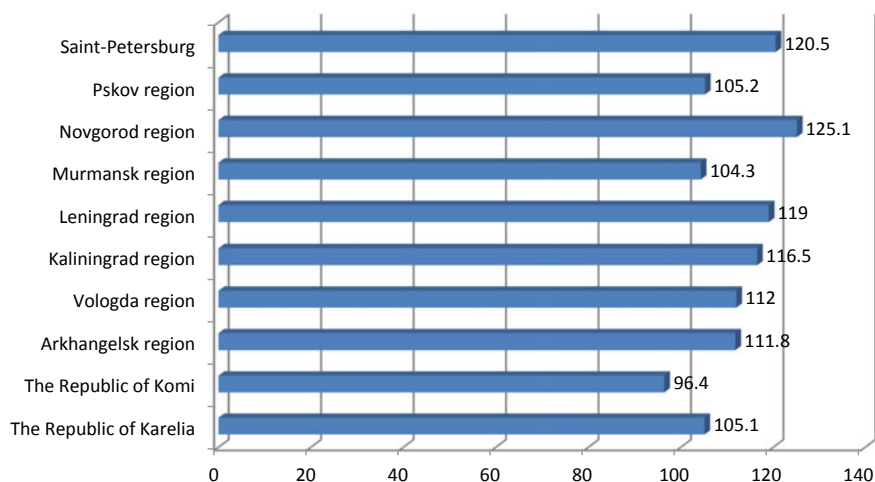
Fig. 79.1 Dynamics of gross regional product for the period 2011–2016

Table 79.1 The Russian Federation Consolidated budget spending of the subjects, per capita, rub

	2011	2016	Growth index	2016 real	Social development index
The Republic of Karelia	39779.5	42535.9	1.07	28357.3	71.3
The Republic of Komi	42787.5	61340.5	1.43	40893.7	95.6
Arkhangelsk region	36654.7	46220.2	1.26	30813.6	84.1
Vologda region	31439.2	34840.6	1.11	23227.1	73.9
Kaliningrad region	25435.1	31189.8	1.23	20793.2	81.7
Leningrad region	26550.2	43562.3	1.64	29041.5	109.4
Murmansk region	46030.1	64107.7	1.39	42738.4	92.8
Novgorod region	27100.6	33624.3	1.24	22416.2	82.7
Pskov region	27849.3	29112.6	1.05	19408.4	69.7
Saint-Petersburg	42329.9	56562.1	1.34	37708.1	89.1

Thus, the social component of the economic growth for the period 2011–2016 turned out to be negative in all regions except the Leningrad region.

Let us further consider the environmental component of the economic growth (Table 79.2). The environmental load indicator was calculated as the product of the growth indices of the two indicators presented in the table. The maximum increase in pollutant emissions into the atmosphere took place in the Novgorod region from 42 to 56 thousand tons. At the same time, the dirty discharge in the region decreased from 92 to 78 million cubic meters. The composite index that characterizes the dynamics

Table 79.2 Economic growth environmental component

	Air pollutant emissions from stationary sources (thousand tons)			Dirty discharge into surface water bodies (million cubic meters)			Environmental load dynamics
	2011	2016	index	2011	2016	index	Composite index
The Republic of Karelia	96	116	120.8	175	221	126.29	152.6
The Republic of Komi	712	569	79.9	129	110	85.27	68.1
Arkhangelsk region	373	245	65.7	375	329	87.73	57.6
Vologda region	469	441	94.0	157	147	93.63	88.0
Kaliningrad region	25	21	84.0	91	111	121.98	102.5
Leningrad region	216	243	112.5	231	272	117.75	132.5
Murmansk region	263	232	88.2	334	312	93.41	82.4
Novgorod region	42	56	133.3	92	78	84.78	113.0
Pskov region	28	33	117.9	45	37	82.22	96.9
Saint-Petersburg	69	78	113.0	1239	1093	88.22	99.7

of the environmental burden of economic growth in the region, turned out to be 113.0%.

The most adverse dynamics of the environmental load in the period under analyses was seen in the Republic of Karelia both due to the increase in pollutant emissions into the atmosphere and due to the dirty discharge. As a result, the region's composite index is 152.6%. From the point of view of the dynamics of the environmental load, the most favourable situation is in the Arkhangelsk region. It must be understood that this region, along with the Komi Republic and the Vologda region, belongs to the regions with high level of the environmental load.

The regional sustainable development index was calculated as the product of GRP indices and expenditures on social and cultural activities divided by the composite index characterizing the dynamics of the environmental load. In terms of this indicator value, regions can be divided into three groups (Fig. 79.2). The Komi Republic, the Arkhangelsk and Murmansk regions, as well as St. Petersburg have sustainable economic growth. The Vologda, Kaliningrad, Leningrad and Novgorod regions belong to the regions with average level of economic growth sustainability. Low level of sustainability is characteristic of the Republic of Karelia and the Pskov region. The problems of the Republic of Karelia are caused by problems in the social sphere and in the environment, and in the Pskov region—in the social sphere.

High performance of the Komi Republic is due to the considerable reduction in the environmental load with a slight decrease in the economic and social component. In the Arkhangelsk region, significant economic growth was accompanied by a moderate decrease in social spending and a significant reduction in the environmental load. From the point of view of the balanced economic development, it should be
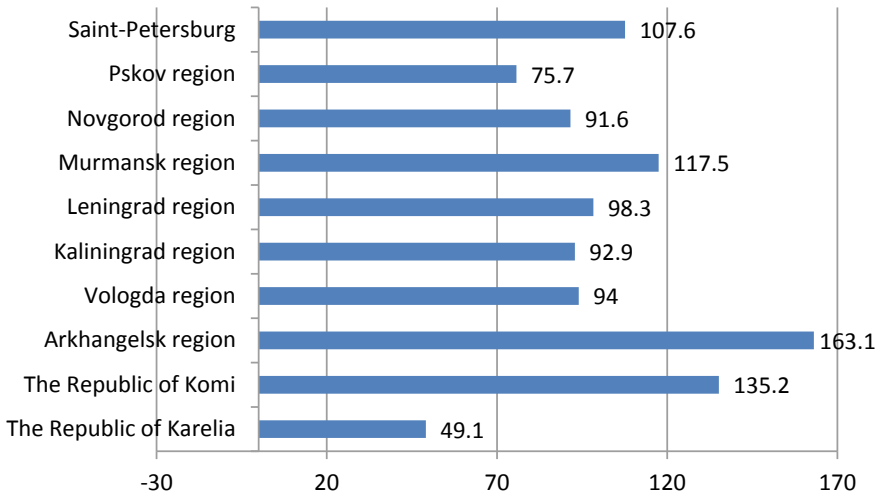
Region	Value
Saint-Petersburg	107.6
Pskov region	75.7
Novgorod region	91.6
Murmansk region	117.5
Leningrad region	98.3
Kaliningrad region	92.9
Vologda region	94
Arkhangelsk region	163.1
The Republic of Komi	135.2
The Republic of Karelia	49.1

Fig. 79.2 Integrated assessment of the sustainable development

noted that no region has a positive dynamics of all three components of the sustainable development. So, the Arkhangelsk, Vologda, Murmansk and Pskov regions have positive economic and environmental components, in the Leningrad region it refers to economic and social components.

The low sustainability level in the Republic of Karelia is due to both a significant reduction in social spending and a significant increase in the environmental load. The low sustainability in the Pskov region is due to social spending by 31.3% in real terms.

The presented economic growth sustainability estimation does not take into account its innovative component, which is an important factor of the sustainable development [3]. Let us consider the dynamics of the indicator "expenditures connected with technological innovation in percentage terms of the volume of goods shipped" for the regions belonging to the group with sustainable economic growth (Fig. 79.3).

In the regions under analysis, the indicator of innovation is characterized by a high level of volatility, and in all regions, with the exception of St. Petersburg, it is at a low level. In these conditions, it is difficult for the innovative component to be included in the comprehensive assessment of the regional development sustainability. Thus, the priority direction of increasing the sustainability of the regional systems development is to improve the innovative activity level. In science literature, as well as in regional planning documents, clusters are identified as an efficient tool for sustainable development [1, 9].
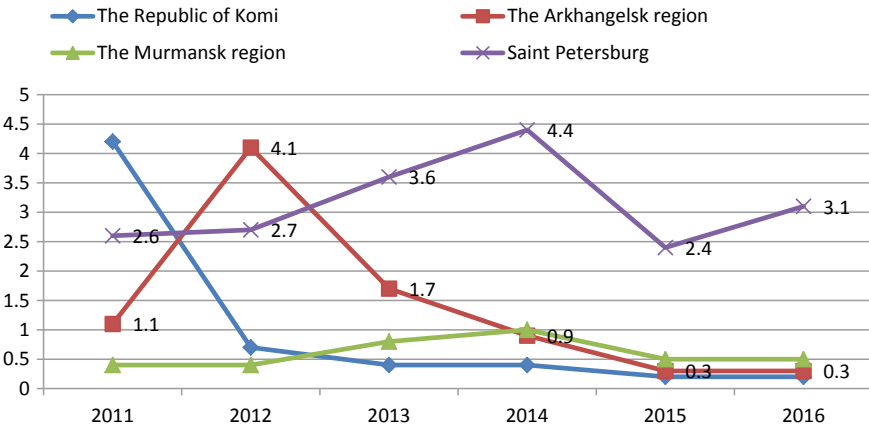
Fig. 79.3 Indicator of innovation

79.4   Conclusions

The analysis showed that the comprehensive approach to assess the sustainability of territories development prevails in science literature. The regional system is considered in the unity of its economic, social and environmental spheres. To assess the sustainability of economic growth, the integrated indicator is proposed which takes into account the development dynamics of each of these areas. The proposed methodology has been tested for the regions of the NWFD. According to the results of the research, regions are divided into groups with high, medium and low levels of economic growth sustainability.

References

1. Akif HS, Vladyka M, Rashina E (2019) Cluster approach to sustainable development of the national economy. 37th international scientific conference on economic and social development—socio-economic problems of sustainable development, Baku, Azerbaijan, 2019, pp 14–15, 720–727
2. Bobylev SN, Kudryavtseva OV, Yakovleva YY (2015) Regional priorities of green economy. Ekonomika Regiona/Econ Reg 2:148–159
3. Bogolib T (2016) Ensuring smart, sustainable, inclusive development of the regions of the Ukraine in the conditions of structural crisis. Balt J Econ Stud 2:10–16
4. Kormanovskaya IR (2013) Ensuring sustainable development of the region: principles, concept, mechanism. Probl Mod Econ 4(48):260–266
5. Kulov AR, Gadieva AN, Fedosova EV (2019) Strategy of spatial development of the North Caucasus: theoretical and applied aspects. At conference on social and cultural transformations

in the context of modern globalism (SCTCGM), Russian Acad. Sci, Complex Res. Inst. Kh. I. Ibragimov, Groznyi, Russia, 2018, pp 971–979

6. Loktev AV, Menshchikova VI (2012) Sustainable development of the region's economy: basic conditions and support mechanism. Socio-Econ Phenom Process 10(44):115–122

7. Malykh OE, Polyanskaya IK (2018) Climatic aspects of the global economy transformation: increase of regions and municipalities' impact. At the international scientific conference on global challenges and prospects of the modern economic development (GCPMED). Samara State University of Economics, Samara, Russia, 2018, pp 1769–1776

8. Nikolaev MA, Makhotaeva MYu (2015) The role of the territorial factor in economic dynamics. Economist 3:42–49

9. Nikolaev M, Makhotaeva M, Bakumenko O, Malyshev D (2019) Tools for sustainable investment climate formation in the region. Proceedings of the international scientific and practical conference "business cooperation as resource of sustainable economic development and investment attraction" (ISPCBC 2019), 2019, pp 449–453

10. Pakhomova NV, Richter KK, Malyshkov GB (2013) Sustainable development strategy and the transition to green economy: updating priorities and mechanisms. Bull St Petersburg State Univ 4:35–54

11. Tretyakova EA (2019) Environmental intensity of economic growth in the Baltic Sea region. Balt Reg 11(1):14–28

12. Varavin EV, Kozlova MV (2018) Assessment of the development of the green economy in the region: Exemplified by the Republic of Kazakhstan. Econ Reg 14(4):1282–1297