

Article

Issue of Accumulation and Redistribution of Oil and Gas Rental Income in the Context of Exhaustible Natural Resources in Arctic Zone of Russian Federation

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Abstract: The significant resource potential of the Arctic has attracted the attention of its adjacent countries and extra-regional states. The mineral and raw material base of the Arctic Zone of the Russian Federation (AZRF) comprises a wide range of minerals. However, due to its hydrocarbon reserves, the Arctic is considered to be the most important geopolitical and geo-economic macro-region for Russia. A significant portion of the Arctic hydrocarbons (about 19%) is concentrated in the territory of Russia's shelf. The extraction of Arctic marine oil and gas resources and ensuring the sustainability of the Russian energy complex depend significantly on the level of Arctic development. Thus, the pace and quality of the development of AZRF are strategically important to ensure the national interests of the country. It has been proven that the implementation of the state program for AZRF development and strategic plans of the largest companies operating in the region consolidate the raw material nature of AZRF development. Rent becomes the main form of income. This article addresses the main directions of the region's development and the factors that prevent a high level of industrialization, which increase attention to the withdrawal and redistribution of rental income. The article considers the Russian and foreign experiences of withdrawal and redistribution of oil and gas rental income, and analyzes the level of socio-economic development of AZRF. The authors suggest a methodology for assessing the impact of a country's area and population size on the ability to achieve a high income due to hydrocarbons. The authors also explain the principles of rental income redistribution in the region as a basis for improving the level of AZRF's socio-economic development and as a condition for transition from the "colonial model" of development to the "sustainable development" model. The study results can be used to elaborate a mechanism for rental income redistribution in AZRF and state programs for the region's development.

Keywords: the Arctic Zone of the Russian Federation; oil and gas resources; Arctic shelf; rent; sustainable development

1. Introduction

The Arctic is now a major attraction, not only to the near-Arctic states (Russia, the USA, Canada, Norway, and Denmark), but also to extra-regional states (China, Japan, India, etc.) due to its significant resource potential.

Russia, a leading country in hydrocarbon production, mines 83% of all produced gas and 12% of all produced oil in the Arctic zone [1]. The raw material base of the Russian oil and gas industry is characterized by the fact that large and highly profitable deposits are largely exhausted, and the most

investment-attractive part of the subsoil use fund has been distributed (98.4% of oil and 97.45% of gas in A, B, C1 categories) [2]. Because production is naturally declining in traditional areas, oil and gas companies have to focus on zones with hard-to-recover reserves [3]. The exhaustion and deterioration of the raw material base of the oil and gas complex add strategic importance to the Arctic region.

Thus, the Arctic shelf territories could eventually become the main oil and gas producing region globally. In the structure of the initial total resources (ITR) of Russian’s oil shelves (on 1 January 2018), accumulated production comprises 1%, reserves of the categories A + B1 + B2 + C1 + C2 comprise 8%, resources of the category D0 comprise 26%, and resources of the category D comprise 65%¹ (Figure 1) [2].

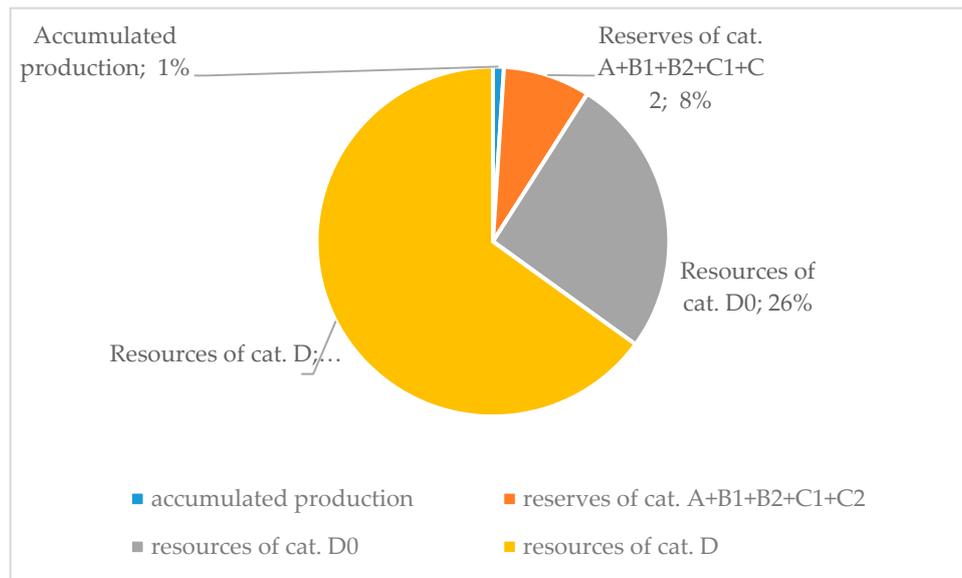


Figure 1. Structure of the initial total resources (ITR) of Russian’s oil shelves (on 1 January 2018), %.

In the structure of initial total resources (ITR) of Russian’s free gas shelves (on 1 January 2018), accumulated production accounts for 0.5%, reserves of the categories A + B1 + B2 + C1 + C2 for 12%, resources of the category D0 for 12%, and resources of the category D for 75.5% (Figure 2) [2].

In addition, AZRF plays an important role in ensuring military security. The region’s logistical potential is growing, and global warming has led to the active development of the Northern Sea Route (NSR). Thus, AZRF has become not only the most important resource region, but also a geopolitical and geo-economic macro-region. Russia’s presence in the region, the pace and quality of development of AZRF are of strategic importance to ensure the national interests of the country.

The possibility of developing Arctic offshore oil and gas resources largely determines the level and quality of the region’s development.

“Basic Principles of Russian Federation State Policy in Arctic to 2035” [4] and strategic plans of the largest companies operating in the region consolidate the raw material nature of AZRF development. Rent becomes the main form of income. Mining companies have become systemically important for regions, where they are operating, as they have established a complex system of social and economic interests for businesses, the state, indigenous population, and society as a whole.

¹ According to the Order of the Ministry of Natural Resources and Environment of the Russian Federation as of 1 November 2013, No. 477 “On Approval of the Classification of Reserves of Oil and Combustible Gases”, oil and gas reserves are subdivided by the extent of commercial development and by the degree of geological knowledge into the following categories: A (developing, drilled), B1 (developing, not drilled, known), B2 (developing, not drilled, estimated), C1 (known), and C2 (estimated). Oil, gas, and condensate reserves are subdivided by geological knowledge into the categories D0 (prepared) and D (localized, prospective, and expected).

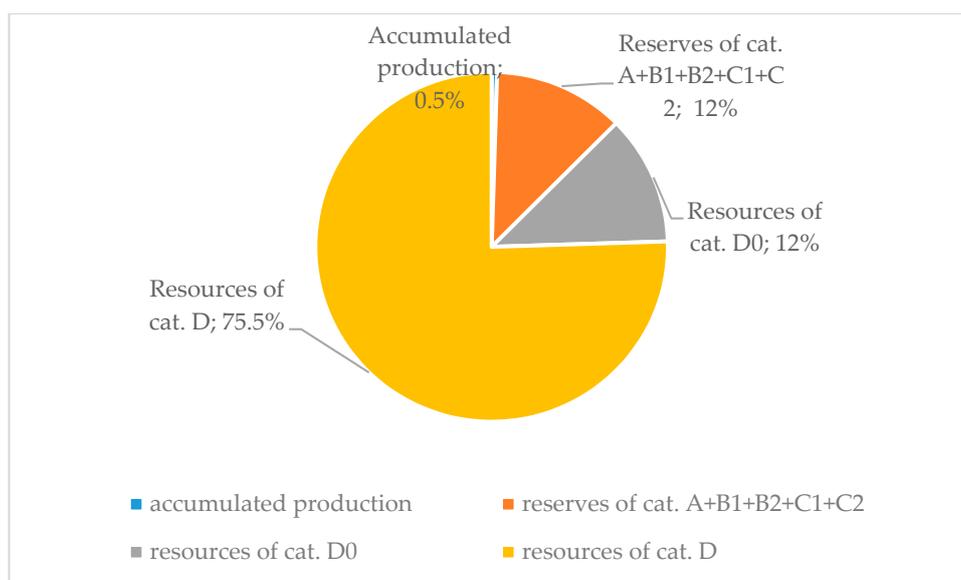


Figure 2. Structure of initial total resources (ITR) of Russian’s free gas shelves (on 1 January 2018), %.

Intensification of industrial and transport development in AZRF will naturally lead to the growth of rental income, but it will not stay in the region. According to Article 9 of the Constitution of the Russian Federation “1. Land and other natural resources shall be used and protected in the Russian Federation as the basis for the life and activities of peoples living in the respective territory. 2. Land and other natural resources may be in private, state, municipal and other forms of property” [5].

The wording of the article rules may lead to different interpretations of natural resource use and management. For example, the idea that land and natural resources are the property of “the peoples of the respective territory.” However, Article 9 refers to the protection and use of land and other natural resources as the basis for “lives and activities of peoples living in the respective territory.” [5]. This does not mean that the right of ownership (ownership/disposal) belongs to the constituent entities of the Russian Federation. In this regard, according to the Law of the Russian Federation “On Subsoil Resources” adopted in 1992 [6], the subsoil resources are the state property and are under the joint competence of the Russian Federation and its constituent entities [7].

The issue of exhaustible natural resources and the raw material nature of AZRF development have increased the focus not only on the issues of withdrawal, but also on the redistribution of rental income. In the long term, the establishment of the raw material development model with full withdrawal of rental income will lead to exhaustion of the resource potential and will not allow creating “the future potential for meeting human needs and aspirations”, which contradicts the concept of “sustainable development”. (Sustainable development means a process of economic and social changes where the exploitation of natural resources, the investment direction, the direction of scientific and technological development, personal development and institutional changes are mutually compatible and strengthen the current and future capacities to meet human needs and aspirations.)

The aforesaid determines the relevance of the research and sets the following tasks: to analyze the directions of AZRF development; to assess the level of the region’s socio-economic development; to consider the principles of rental income withdrawal and redistribution in Russia and the Arctic countries with successful experiences; to justify the principles of redistribution and use of rental income in order to improve the level of socio-economic development of AZRF and to transit to the “sustainable development” model in the region.

2. Materials and Methods

During the study of issues of accumulation and redistribution of oil and gas rental income under exhaustible natural resources in the Arctic zone of the Russian Federation, the authors used the following methods: economic–statistical, comparative and geographic, historical analysis; forecasting effort; method of analysis, comparison, and summarizing of available information about the implementation of public policy projects in the Arctic zone, strategies for the rent redistribution both in Russia and abroad. The authors conducted a thorough analysis of national and foreign periodicals, fundamental scientific materials, documents of ministries, official websites of companies and foundations engaged in the investigated issues.

The methods were chosen in accordance with the study objective: to justify the principles of rental income redistribution in AZRF that will allow improving the level of socio-economic development of AZRF, switching to the “sustainable development” model, and reducing inequality in regional development. The system of research methods allows studying the theoretical basis and history of issues, collecting data on the current state of the issue, observing the principles of objectivity and systematic research, as well as the principle of results reproducibility.

After the forced interruption period in the 1990s and early 2000s due to the difficult economic situation in Russia, research activities related to the Arctic have intensified in recent years [8–10]. The main reason for the increasing number of published materials is the strategic importance of the Arctic region. However, the elaboration of recommendations on how to improve the processes of rent withdrawal, assignment, and use in the mining industries requires further development taking into account both national and international experiences [11,12].

The following representatives of classical economics contributed greatly to the development of the theory of rent: Sir William Petty, James Anderson, Adam Smith, David Ricardo, John Stuart Mill, Karl Marx, and others; as well as physiocrats: François Quesnay and Anne Robert Jacques Turgot; neoclassicists and marginalism followers: Alfred Marshall, John Bates Clark, and others. The following Russian researchers studied issues of rent in mining industries: S. G. Strumilin [13], N. V. Volodomonov [14], A. S. Astakhov [15], V. P. Pakhomov [16], L. G. Khazanov [17], S. = A. = Bulat [18], D. S. Lvov [19], S. Yu. Glazyev [20], V. S. Nemchinov [21], N. N. Lukyanchikov [22], V. A. Meshcherov [23], Yu. V. Razovskiy [24], S. A. Kimmelman [25], V. K. Shkatov [26], V. T. Ryazanov [27], and others. Issues of oil and gas rent withdrawal were investigated in the works of A. E. Kontorovich [28], V. I. Nazarov [29], M. D. Belonin [30], A. N. Aleshin [31], and others.

The analysis of scientific and applied research and published materials has shown that it is important to improve distribution and allocation processes for rental income gained in AZRF. The scale and complexity of rental income redistribution are connected with property relations in the sphere of subsoil use. Subsoil resources are state property in Russia. So the state has the right to establish and control the system of rent relations. However, the level of socio-economic development of AZRF calls into question the existing principles of rental income withdrawal and redistribution.

Opinions about principles of rent withdrawal and assignment vary: either rent should be distributed among citizens and transferred to their personal accounts, or it should be withdrawn for the benefit of certain groups of the country population, or rent should be used centrally: to establish funds, etc., [32–37]. However, what method of rent redistribution is appropriate for Russia and its regions that have their own peculiarities? Many studies have been devoted to issues of rental income withdrawal. However, the peculiarities of AZRF and its level of socio-economic development require further studies of the principles of rental income redistribution and their adaptation to the regional conditions.

An important stage in justifying the principles of rental income redistribution and use is the analysis of the efficiency of hydrocarbon use in countries with the rent economy. The authors have put forward a hypothesis that the ability to achieve a high income due to hydrocarbons depends not only on the strength of social and political institutions, but is also largely determined by the area of a country and its population size. The authors propose the following analysis algorithm:

1. Select ten major countries producing oil and gas. Recalculate their oil and gas production into tonnes of a standard fuel in order to compare the figures.
2. Select countries funding sovereign wealth funds with hydrocarbon revenues from the list.
3. The authors propose to assess the impact of the area and the population size using an n-fold multiplicative model:

$$Ira = \frac{Q}{\sqrt[2]{S*N}}, \text{ where}$$

Ira is the resource availability index.

Q is hydrocarbon production in tonnes of a standard fuel.

S is the area of a country in thousands of km².

N is the population size in millions of people.

The authors suppose that not only the population size but also a country’s area should be taken into account while estimating a country’s provision with hydrocarbons. If the provision is estimated via the ratio of production to the population (*Q/N*), the result is misrepresented, because countries with large areas have to maintain a large and power-consuming transport infrastructure and have larger production facilities. It leads to increasing local demand and consumption of power resources. As a result, export opportunities and rent income decline. So, the authors propose to consider a country’s area for the correct estimation. *Ira* provides a generalized estimation of a country’s provision with hydrocarbons. The lack of standards leads to the use of comparative analysis by country.

4. Countries are ranked by the Gross National Income (GNI) per capita (the purchasing power parity, PPP, \$). The average GNI per capita is calculated for the selected countries. The countries are divided into two groups: with the GNI per capita above the average level and below it.
5. The performed calculations allow determining the *Ira* value required for the population to gain high incomes in countries possessing hydrocarbon reserves.

The analysis algorithm is shown in Figure 3.

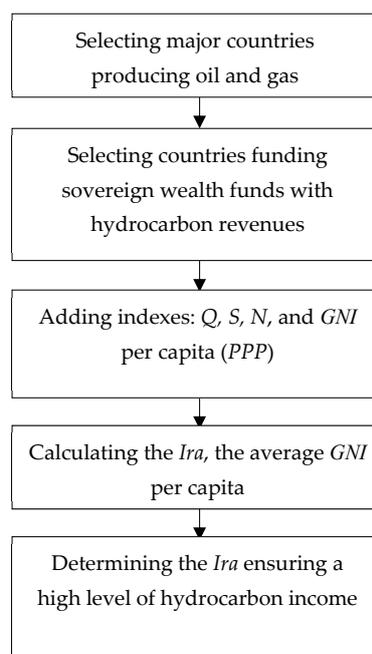


Figure 3. A flow chart of the methodology for assessing the impact of a country’s area and its population size on the ability to achieve a high income due to hydrocarbons.

The proposed methodology allows analyzing if it is possible to conduct a state policy for raising the population's income via rent and to decide how rental income should be used and redistributed. Nevertheless, the authors' approach has some restrictions. Rent is a multidimensional category arising not only in case of execution of the ownership right to resource factors. Non-economic resources can also generate rent income, which leads to political rent, administrative rent, monopoly rent, etc. The proposed methodology can be used only to estimate a possible rise of income due to hydrocarbon reserves.

3. Results

On 5 March 2020, the President of Russia signed decree No. 164 "Basic Principles of Russian Federation State Policy in Arctic to 2035", which defined the state policy in the national security and protection of national interests of Russia in the Arctic zone. According to the Decree, acceleration of socio-economic development of AZRF is mainly connected with "the development of the Arctic zone of the Russian Federation as a strategic resource base" and "the development of the Northern Sea Route" (NSR) [4].

The current economic situation in the country and in the world, as well as the changing climate on Earth and in the Arctic region, have influenced the decisions of the Russian Government.

Global warming, the consequent melting of the Arctic ice, as well as implementation of projects to upgrade and broaden the fleet of nuclear-powered icebreakers have prolonged the navigation season and the possibility of cargo transportation by NSR. In 2019, freight transportation by NSR totaled 31.5 million tonnes [38]. According to AZRF's development strategy, the figure will amount to 80 million tonnes by 2024, to 120 million tonnes by 2030, and to 160 million tonnes by 2035. Today, mineral raw materials (oil, liquefied natural gas, gas condensate, and coal) account for 96% of cargoes transported by NSR. Olga Surikova, the head of Far East Practice, KPMG, supposes that "the situation will not change significantly by 2024" [39].

The AZRF's mineral and raw material base comprises a wide range of minerals: high-quality coal [40–43], iron, manganese, gold, nickel, copper, etc. However, due to hydrocarbon reserves [44,45], the Arctic is considered to be the most important geopolitical and geo-economic macro-region. A significant part of the Arctic hydrocarbons (about 19%) is concentrated in the territory of Russia's shelf. AZRF accounts for 25% of the country's oil reserves and for 70% of gas reserves [1].

Implementation of projects for the extraction of the Arctic hydrocarbons is impeded not only by traditional restrictions (severe natural and climatic conditions, underdeveloped industrial and logistics infrastructure, low density and uneven settlement of the population, etc.), but also by the geopolitical situation (sanctions imposed on offshore production), a decline in demand for hydrocarbons and as a result decreased prices connected with the COVID-19 pandemic. However, on 18 August 2020, at the meeting of the President of the Russian Federation V. Putin and the head of PJSC Rosneft Oil Company I. Sechin, they noted that "This situation will run its course sooner or later, and economic growth will resume both internationally and in Russia" [46]. This statement preserves the importance and role of AZRF in Russia's economy and in ensuring the country's geopolitical position.

At present, PJSC Rosneft Oil Company possesses most of the licenses for the development of offshore fields in the Russian Federation. The company considers continental shelf development to be a strategic area of the mineral resource base development. On 1 April 2019, at a meeting with Russian President V. Putin, the head of Rosneft I. Sechin said that the company planned to set up an Arctic cluster in order to ensure NSR loading and to produce up to 100 million tonnes of oil by 2030 [47]. Rosneft expects that "by 2050, the Arctic shelf will cover 20–30% of all Russian oil production" [48].

The close attention to the Arctic during the past decade, approval of the State Policy Framework (2008) and implementation of the AZRF Development Strategy have resulted in the intensification of industrial and transport development of the region and positive dynamics of the Gross Regional Product (GRP) (Table 1).

Table 1. Share of GRP produced in AZRF in the aggregate gross regional product of the Russian Federation’s constituent regions, %.

| | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|------|------|------|------|------|
| Total for the Arctic zone of the Russian Federation | 5.0 | 5.2 | 5.4 | 5.8 | 6.2 |

Source: [49].

However, today AZRF lags behind the average level in Russia in many socio-economic indicators, which is also confirmed by the depopulation process in territories. The resident population of the Arctic decreased 30% during 30 years (Table 2). Migration of the population from the Arctic regions occurs due to numerous reasons. People move to more favorable regions of the country, where climatic, socio-economic, cultural, and living conditions are better [50,51].

Table 2. Dynamics of the resident population of AZRF’s overland territories (number of humans).

| AZRF’s Constituent Region | 1989 | 2019 | Total Population Decline (1989–2019), People | Total Population Decline (1989–2019), % |
|--|------------------|------------------|--|---|
| Arctic zone of the Russian Federation | 3,471,581 | 2,397,509 | –1,074,072 | –30.9 |
| Including: European part: | 2,349,490 | 1,551,461 | –798,029 | –34.0 |
| Murmansk region | 1,164,586 | 748,056 | –416,530 | –35.8 |
| Karelia Republic | 82,141 | 41,605 | –40,536 | –49.3 |
| Arkhangelsk region, excluding | 830,384 | 643,215 | –187,169 | –22.5 |
| Nenets Autonomous Okrug | 53,912 | 43,829 | –10,083 | –18.7 |
| Komi Republic | 218,467 | 74,756 | –143,711 | –65.8 |
| Asian part: | 1,122,091 | 846,048 | –276,043 | –24.6 |
| Yamalo-Nenets Autonomous Okrug | 494,844 | 541,479 | 46,635 | +9.4 |
| Krasnoyarsk region | 379,430 | 228,943 | –150,487 | –39.7 |
| Sakha Republic (Yakutia) | 83,883 | 25,963 | –57,920 | –69.0 |
| Chukotka Autonomous Okrug | 163,934 | 49,663 | –114,271 | –69.7 |

Source: calculated by the authors considering data of [52,53].

At the same time, there is an extreme polarization of AZRF’s economic space. According to the assessment of RIA Novosti based on the data of Rosstat, the largest average income in respect of the cost of a fixed set of goods and services is recorded in Yamalo-Nenets Autonomous Okrug. Another northern oil and gas region—Nenets Autonomous Okrug—ranks second (Table 3).

Table 3. AZRF region ranking by income of population.

| Place in the Ranking of Russia’s Regions | Region | Ratio of Median Income to the Cost of a Fixed Set of Goods and Services | Share of Population below the Poverty Line in 2019, % | Share of Population below the Extreme Poverty Line in 2019, % |
|--|--------------------------------|---|---|---|
| 1 | Yamalo-Nenets Autonomous Okrug | 3.11 | 5.6 | 0.8 |
| 2 | Nenets Autonomous Okrug | 2.92 | 9.5 | 1.5 |
| 4 | Chukotka Autonomous Okrug | 2.27 | 8.7 | 1.1 |
| 12 | Murmansk region | 1.92 | 10.8 | 0.9 |

Table 3. Cont.

| Place in the Ranking of Russia's Regions | Region | Ratio of Median Income to the Cost of a Fixed Set of Goods and Services | Share of Population below the Poverty Line in 2019, % | Share of Population below the Extreme Poverty Line in 2019, % |
|--|--------------------------|---|---|---|
| 15 | Sakha Republic (Yakutia) | 1.71 | 17.9 | 3.3 |
| 22 | Komi Republic | 1.62 | 15.5 | 2.2 |
| 29 | Arkhangelsk region | 1.56 | 12.7 | 1.4 |
| 41 | Krasnoyarsk region | 1.51 | 17.5 | 2.8 |
| 45 | Karelia Republic | 1.50 | 15.7 | 1.7 |

Source: compiled by the authors considering data of [54].

Yamalo-Nenets Autonomous Okrug and Nenets Autonomous Okrug differ from other regions outstripping Moscow (ranks third in the list) with a 20% gap [54]. It is connected with oil and gas production and the northern status of the regions. According to Table 3, other Arctic regions rank considerably lower. This fact demonstrates a high level of income differentiation between AZRF's regions and the Russian Federation in general.

The state program for AZRF development and strategies of the largest companies operating in the region aims at fulfilling the logistic (in the foreseeable future) and mineral (in the long-term) potential of the region, primarily hydrocarbons, making rent the main form of income.

Many studies have been devoted to rent as an economic category, to issues of its withdrawal and redistribution. The rent category has been developed for over 300 years, but even today there are many concepts and approaches. There are different types of rent: raw material (mining, land, forest, etc.), administrative, political, economic and others. Rent is the income of the resource owner; the resource supply is strictly limited and is in demand. It is unearned income (income not acquired through work) and occurs at the owner of the resource as a result of a certain situation and conditions of economic relations. The oil and gas industry features mining, price, and currency rents.

The mining rent consists of absolute (determined by the limit deposit with the worst conditions) and differential rent. The differential mining rent in its turn is divided into rent of the first order (occurs on the medium and the best deposits) and of the second-order (as a result of intensive management). Today, a method of quantitative determination of differential mining rent of the first and second orders does not exist, because practically it's impossible to distinguish the share in the total increase in income obtained due to the best natural characteristics of a deposit and the increase caused by investment factors. So a system of differentiated rent payments and benefits has been developed in the world practice [7].

The price and currency rents may arise as a result of an increase in the world oil prices (if domestic prices differ) and a decrease in the ruble exchange rate.

The following types of rent payments exist in oil and gas production: annual payments (rentals: for the right to explore for hydrocarbons, royalties: for the right to extract hydrocarbons); one-time payments (when certain events occur under the license). In modern Russia, royalties, contributions to the replacement of the mineral raw material base and excise taxes on oil and gas have been replaced with the Mineral Extraction Tax (MET) [55]. MET and export duties are the main instruments for the rent withdrawal from subsoil users. Another specific industry tax is the excise tax on petroleum products, but this value is added to the price and is actually paid by the consumer. It is worth mentioning that since 1 January 2019 MET has been replaced with the Added Income Tax (AIT) as an experiment for a number of fields in Siberia, Komi Republic, Nenets Autonomous Okrug, and the Caspian Sea. AIT is charged not on the gross figures (as MET) but depends on the profitability of a company's project.

The oil and gas industry is not only the main source of currency revenues, but also accounts for a significant part of the budget (Table 4).

Table 4. Extended government budget revenues from taxes and duties related to taxation of oil, gas and petroleum products in 2012–2018 (% of GDP).

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Tax revenues and payments | 31.86 | 30.80 | 31.29 | 28.97 | 28.51 | 30.27 | 32.72 |
| Budget revenues from taxes and duties related to taxation of oil, gas and petroleum products, which includes: | 10.18 | 9.65 | 10.01 | 7.42 | 6.12 | 6.84 | 9.03 |
| MET on oil | 3.13 | 2.99 | 3.11 | 3.25 | 2.72 | 3.64 | 5.04 |
| MET on gas | 0.39 | 0.44 | 0.47 | 0.51 | 0.57 | 0.73 | 0.75 |
| Export customs duties on oil | 3.65 | 3.19 | 3.31 | 1.72 | 1.20 | 1.06 | 1.49 |
| Export customs duties on gas | 0.64 | 0.66 | 0.62 | 0.66 | 0.62 | 0.63 | 0.78 |
| Export customs duties on petroleum products | 1.66 | 1.65 | 1.88 | 0.90 | 0.52 | 0.43 | 0.62 |
| Customs duty (when crude oil and certain categories of petroleum products were exported from Belarus outside the Customs Union) | 0.17 | 0.14 | 0.14 | 0.0 | 0.0 | 0.0 | 0.0 |

Source: [56].

The issue of rent withdrawal by the owner (state) from oil and gas companies is outside the scope of this study. The authors would like to focus on the issue of rent redistribution.

It should be noted that state ownership prevails in the raw material sectors of most countries exporting natural resources. Almost all countries rather tightly control the sphere of subsoil use. Sovereign funds shall be accumulated due to “excessive” (with regard to the level defined by the national legislation) and/or additional incomes (in case of favorable conditions in the world market) of the budget for the following purposes:

- State budget stabilization (Reserve (stabilization) funds)
- Compensation to the population for resource depletion (Future Generation Funds)
- Supporting the economy in times of crisis (Budgetary Reserve Funds)

However, the principles of establishing sovereign funds, redistribution, and use of rental income are different. For example, Saudi Arabia, the United Arab Emirates, and Algeria accumulate excess income on separate accounts. Norway, Chile, Kuwait, and Oman transfer excess income to specially established nonrenewable resource funds.

As an example of successful oil and gas stabilization funds but different in the use of rental income, we can cite the experience of such Arctic countries as Norway and the U.S., Alaska.

The Norwegian Government Pension Fund Global (GPF) was established in 1990 and is the largest in the world [57]. GPF was set up to form reserves in the period of stable or high oil prices, or general economic recovery in view of the worsening demographic situation and reduction of oil revenues in the future due to exhaustion of resources. The state participates in the oil and gas sector as the owner (Statoil, Petoro, and Gassco companies) and as a shareholder of private companies. The fund is formed with the state income from participation in oil and gas projects arising when prices for hydrocarbons exceed the expected level, as well as with the fund’s investments. The Central Bank manages the Fund, but the funds are strictly controlled. Neither the government nor the Central Bank may spend funds without a resolution of the Parliament. The funds are used as follows: in the short term—to cover the budget deficit; in the long term—to finance social expenses that are increasing due to the population aging, and to compensate losses to the future generations due to exhaustion of hydrocarbon reserves. The fund’s money is invested mainly in foreign assets

due to limited opportunities to place it in the country. Norway is the leader of the HDI ranking (Human Development Index) [58], which is indicative of the country’s successful socio-economic policy and effective management of the oil and gas sector.

Alaska Permanent Fund (APF) was established in 1976. Constitutional Budget Reserve Fund (CBRF) was established in 1990. Oil is owned by state citizens only. APF was set up to accumulate rental income and create an investment base for future generations. The fund is formed with oil industry payments (25% of the state budget revenues). The governor and the legislative power annually decide how to use the funds; a part of which (42%) is paid to residents of the state. The remaining part is invested. CBRF is meant to finance the state budget deficit. The fund is formed with a share of tax revenues from the oil industry. Funds allocated to the government must be returned later. Despite the harsh natural and climatic conditions, the state population is increasing [59], which indicates the effectiveness of rental income management and the socio-economic policy.

The Stabilization Fund of the Russian Federation was established in 2004. As a result of the reorganizations, the fund now exists as the Russian National Wealth Fund (NWF), which receives rental income for further redistribution. MET, customs duties from hydrocarbons (including those from Russia’s continental shelf) are transferred to the federal budget of the Russian Federation at 100% standard, forming NWF with additional oil and gas revenues of the federal budget. The money is used to co-finance voluntary pension savings and to cover the deficit of the Pension Fund and the federal budget.

Transferring 100% of rental income to the federal budget is explained by the fact that, according to the Law of the Russian Federation “On Subsoil”, subsoil assets are the state property [6]. Moreover, it has been proven that if the population exceeds 50 million people, the targeted redistribution of rental income will be ineffective [60].

The analysis of the ability to achieve a high income due to hydrocarbons in Russia.

The authors used their methodology to analyze the ability to achieve a high income due to hydrocarbons in Russia:

1. The major countries producing hydrocarbons and establishing oil and gas sovereign wealth funds were selected for the comparative analysis: Russia, Saudi Arabia, Iraq, United Arab Emirates, Iran, Kuwait, Nigeria, Qatar, Norway, and Algeria (Table 5).

Table 5. Major countries producing hydrocarbons and accumulating oil and gas sovereign funds.

| Country | Oil Production in Millions of Tonnes in 2019 | Natural Gas Production in Billions of m ³ per Year in 2019 | Hydrocarbons Were the Source for Funding Sovereign Wealth Funds |
|----------------------|--|---|---|
| USA | 747.7 | 955.1 | |
| Russia | 568.1 | 703.8 | Yes |
| Saudi Arabia | 556.6 | 117 | Yes |
| Canada | 274.9 | 190.5 | |
| Iraq | 234.2 | 11.6 | Yes |
| China | 191 | 170.2 | |
| United Arab Emirates | 180.2 | 55.1 | Yes |
| Iran | 160.8 | 253.8 | Yes |
| Brazil | 150.8 | 23.8 | |
| Kuwait | 144 | 14 | Yes |
| Nigeria | 101.4 | 47.8 | Yes |
| Qatar | 78.5 | 183.6 | Yes |
| Norway | 78.4 | 119 | Yes |
| Australia | 64.3 | 151.9 | |
| Algeria | 20.6 | 89.6 | Yes |

2. Table 6 shows the results of the *Ira* calculation, data on GNI per capita (PPP) by country.

Table 6. Results of assessing the ability to achieve a high income due to hydrocarbons.

| Country | Gross National Income (GNI) Per Capita, PPP, \$ * | Territory of a Country in Thousands of km ² | Population Size in Millions of People | <i>Ira</i> |
|--|---|--|---------------------------------------|------------|
| Countries with GNI per Capita above the Average Value | | | | |
| Qatar | 110,489 | 11.59 | 2.64 | 59.15 |
| Kuwait | 71,164 | 17.82 | 4.59 | 24.58 |
| Norway | 68,059 | 385.21 | 5.37 | 5.53 |
| United Arab Emirates | 66,912 | 83.60 | 10.21 | 11.03 |
| Saudi Arabia | 49,338 | 2149.69 | 34.22 | 3.44 |
| Countries with GNI per Capita below the Average Value | | | | |
| Russia | 25,036 | 17,125.19 | 146.75 | 1.03 |
| Iraq | 15,365 | 435.05 | 37.06 | 2.74 |
| Iran | 18,166 | 1648.20 | 84.20 | 1.41 |
| Algeria | 13,639 | 2381.74 | 38.09 | 0.45 |
| Nigeria | 5086 | 923.77 | 203.01 | 0.46 |
| Average GNI per Capita, PPP, \$ | 40,259 | | | |

* According to (Human Development Index) [58].

The analysis has revealed that the area and population size affect the ability of a country to achieve a high income due to hydrocarbons. Only when the *Ira* exceeds 3, GNI per capita can rise above the average value. Thus, the large territory of Russia and its population size prevent the implementation of a rent-focused government policy to increase income.

In the foreseeable future, it is not possible to create and develop branches of industry, other than mining and related industries, in AZRF for a number of reasons:

1. Specific regional restrictions and risks for companies. It is difficult to imagine that businesses will choose the Arctic to deploy enterprises of light industry, agriculture, chemical industry, high-tech instrumentation, etc. We can find good examples of successful development of agriculture in the Arctic territories both in Russia and in other Northern states (Sweden, Finland, Norway, Iceland, Alaska (the USA)). Due to the climatic peculiarities of the Arctic countries, agriculture is mainly subsidized and is aimed at food self-production. Agriculture development is not considered as a backbone industry in AZRF because the country has Southern regions with more favorable climatic conditions. Launching production facilities in AZRF will lead to higher expenses compared to the average figures in industries. So, companies' activities will be less efficient and their products will be less competitive in AZRF. The main reasons:
 - Production in extreme climatic conditions. Equipment, technologies, and materials are to be adjusted to the Arctic conditions.
 - The Arctic fragile ecosystem must be taken into consideration. Lack of natural light, low temperatures, strong winds, and drifting ice lead to low self-restoring and self-cleaning capacity of the ecosystem.
 - Complicated logistics: material and technical support to remote facilities and remote location from the main centers of the final product consumption.
 - Employee requirements and, as a result, provision of conditions attracting qualified personnel (with the number of employees required for the implementation of the AZRF development programs).
2. The need to preserve the traditional way of life of the indigenous population, which is incompatible with a high level of industrialization. The problem of harmonization of socio-economic interest

system in AZRF, the impact of the industrial development on the traditional way of life of indigenous peoples in the Arctic were considered by the authors in [7].

The existing regional restrictions for launching production facilities not related to the mining industry, lead to increased attention to the rational use of raw materials. Minerals are the main component of AZRF’s regional wealth in the long term [61,62]. Minerals are non-renewable resources. They are not developed in the region, but are exported. This fact reduces AZRF’s regional wealth and leads to resource depletion [63,64]. Rental income is withdrawn to the federal budget, while regional resources are exhausted. At the same time, the local population bears all the consequences of industrial development of the region (deterioration of the environmental situation, threat to the traditional way of life of Arctic indigenous peoples, transformation of natural landscapes, loss of ecosystems, reduction of biodiversity, etc.). As an example, we can cite an environmental disaster in Norilsk on 29 May 2020: 21,163 tonnes of diesel fuel was spilled into the Daldykan and Ambarnaya rivers and their tributaries from CHPP-3 owned by Norilsk-Taimyr Energy Company (which is a part of PJSC MMC Norilsk Nickel). The Russian Federal Service for Supervision of Natural Resources estimated the environmental damage at nearly RUB 148 bn (about USD 2 bn) [65]. According to Greenpeace Climate and Energy Campaign Coordinator V. Yablokov, it will take more than a decade to eliminate the consequences of the disaster [66]. Moreover, during this period, the local population will bear all the consequences of environmental pollution.

Thus, a colonial development model is observed in the Arctic zone. Implementation of strategic federal and corporate programs have allowed achieving economic growth in AZRF (Table 1). However, the authors believe that implementation of the colonial model will lead to a “growth without development”, which contradicts the concept of “sustainable development” [67,68]. Figure 4 shows the changing share of AZRF’s GRP in Russia’s aggregate gross product and the dynamics of AZRF’s resident population through 2014–2018.

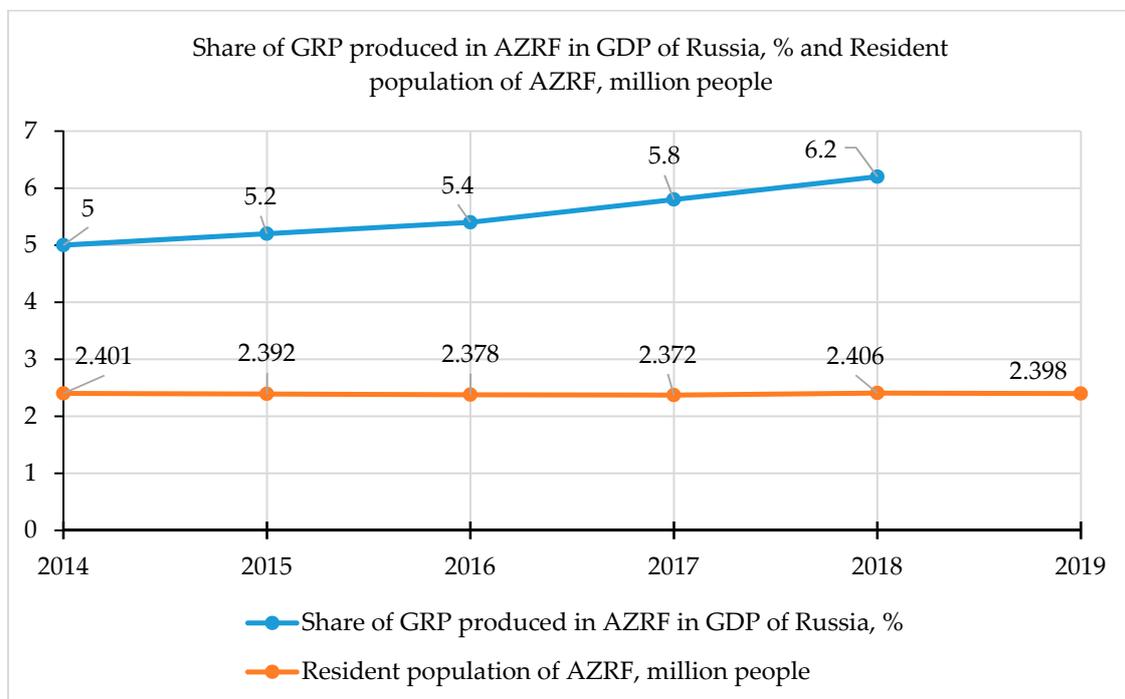


Figure 4. Dynamics of AZRF’s GRP share in Russia’s GDP and population of AZRF (compiled by the authors considering data [49,53]).

The analysis of the dynamics of AZRF’s GRP share in Russia’s GDP and population of AZRF (Figure 3) proves the hypothesis: a colonial economic model has been established in AZRF. The gross

product growth is not accompanied by improving quality of life, as there is no direct correlation between the changing GRP and the population size. Intensification of the regional industrial development occurs together with a decrease in population, which indicates extensive economic growth. Development of the resource potential of Russia's Arctic territories should not deteriorate the situation in the Arctic region. According to the authors, it is possible to change the quality of economic growth only by increasing the level of the region's socio-economic development. The main indicator of a change in this area will be the dynamics of territory depopulation processes.

In 2015, 193 member states of the United Nations adopted 17 Sustainable Development Goals within Transforming our world: the 2030 Agenda for Sustainable Development [69]. The Sustainable Development Goals are integrated and indivisible and balance the three dimensions of people's lives: the economic, social, and environmental. The authors have proven [7] that AZRF is a high responsibility zone for the state. Among risks directly depending on the state control of the Arctic development, are the following economic, social, environmental, and financial risks:

- Risks connected with social and economic underdevelopment: shortage of manpower; decline in labor efficiency; migration of the population to more favorable regions, etc.
- Risks of technical and scientific lagging behind: lack of technology in mineral resource exploration and production.
- Environmental safety risks: subsoil users spill oil, emit hazardous air pollutants, violate waste disposal standards, and do not contribute to mined-land reclamation.
- Risks of insufficient state funding: absence, or underdevelopment of infrastructure, housing construction, etc.

Maintaining the existing principles of rent income redistribution endangers fulfillment of the Sustainable Development Goals concerning the population, health and prosperity of people, ensuring decent and efficient work, and successful entrepreneurship.

The Ministry for Development of the Russian Far East and Arctic has cut down the financing of the state program for AZRF development till 2025 by RUB 50 bn, from RUB 190 bn to RUB 140 bn [70]. At the same time, in order to increase investment activity, the government plans to introduce tax benefits for the income tax, VAT, MET, property tax, land tax, etc., up to zeroing rates for a number of taxes (including MET) [71]. These measures seem to be reasonable considering a decline of the Russian economy and the world economy in general caused by the COVID-19 pandemic. Nevertheless, the authors doubt that rent tax rates should be zeroed due to their special nature. Preferential rates on income tax, property tax, etc., increase the profit of mining companies. The government can take this measure in order to improve the attractiveness of investment projects and business activity in AZRF. However, the zeroing of rent taxes leads to appropriation of unearned income by a company. Thus, rental income neither remains in AZRF nor is transferred to the federal budget but is redistributed to mining companies.

The issue of exhaustible natural resources requires not only rational use of the income received, but also makes one think about how this income should be redistributed in the society. According to the authors, in order to change the quality of economic growth and to improve living standards in AZRF, it is necessary to leave rental income in the region until its level of socio-economic development reaches at least the average Russian level. For attraction of additional manpower needed to implement the strategic directions of AZRF development, the region's level of social and economic development should be higher than the Russian average one in order to compensate for the harsh natural and climatic conditions of the region and to achieve a growth rate of manpower corresponding to the pace of AZRF's industrial development.

It has been proven that it is possible to achieve an acceptable standard of living at the expense of resource rent with a population of about 5 million people [72]. As of 2019, AZRF's permanent population totaled 2.4 million people (Table 2). So, the redistribution of rental income received by

AZRF from the federal budget in favor of the Arctic regions may create the necessary conditions for improving the region’s level of socio-economic development.

AZRF is characterized by extremely low population density. About 1.6% of Russia’s population lives in AZRF, which accounts for 20% of the country’s total area. Moreover, AZRF is characterized by very uneven settlement (Figure 5).

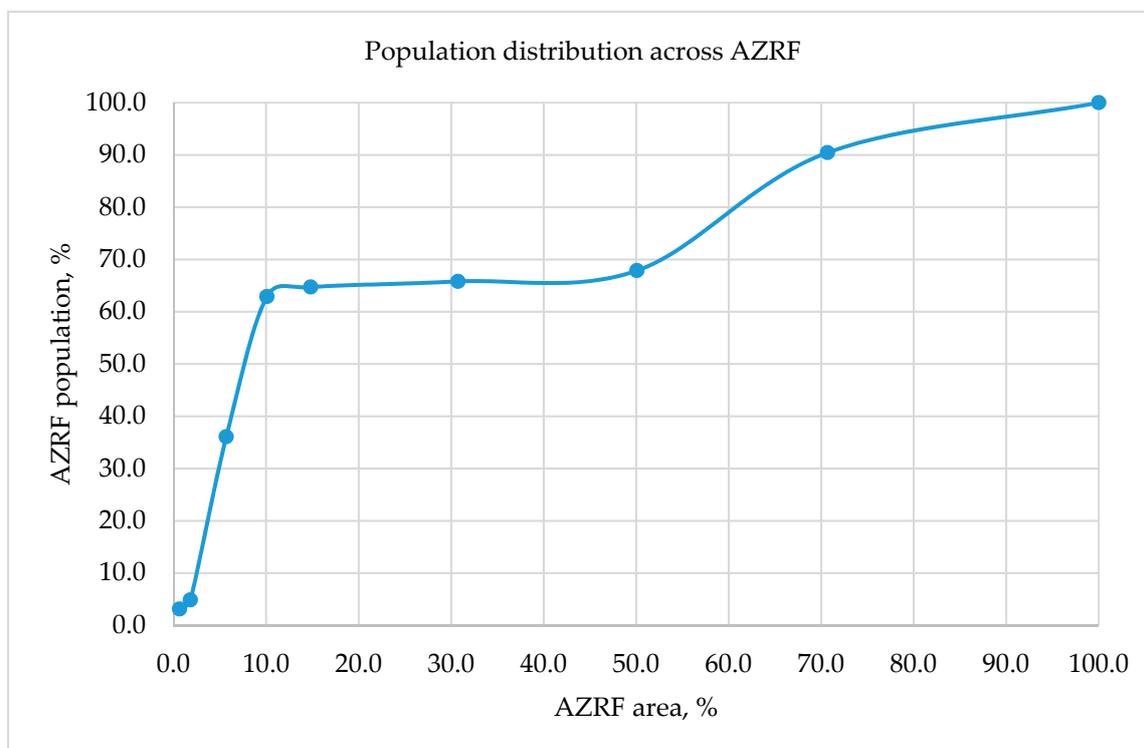


Figure 5. Population distribution across AZRF (calculated by the authors considering data of the Federal State Statistics Service (Rosstat)).

The analysis has revealed that over 60% of the region’s population lives in the territory occupying 10% of AZRF’s total area. The Arctic Zone’s large territory requires consolidation of rental income to increase the region’s level of socio-economic development (to develop transport and social infrastructure, power supply, etc). The large territory, low population density, and uneven settlement prevent the region’s development with the targeted redistribution of rental income. So, Alaska’s successful experience (targeted redistribution of the rental income) seems to be hardly applicable in AZRF conditions.

By the order of the President of Russia Vladimir Putin as of 23 November 2020, [73] the government plans to optimize development institutions in Russia, including the Arctic development institutions: some of them will be closed down, others will be enlarged. The development institution reforming period is the right time to revise the principles of rent income redistribution. Results of the authors’ research show that the targeted redistribution of rental income will be ineffective in AZRF. So, it seems expedient to set up the Arctic fund, where rental income from oil and gas field development will be transferred. It will allow the state to accumulate funds for the implementation of infrastructure and social projects, as well as for the region’s development. Still, the elaboration of a mechanism for rental income redistribution remains the subject of further research in improving the system of rental relationship in AZRF.

4. Discussion and Conclusions

Rent issues have been developed for decades, remaining in the focus of scientific and applied research. Different aspects of the issue are considered in the works of representatives of classical, neoclassical economic theory and institutional economics. The system of rental relationship (the core of economic relations for countries with the rental economy model) determines the efficiency of withdrawal and redistribution of rental income considering exhaustibility of resources and the ability of countries to conduct a successful socio-economic policy and modernization of the economy. It is still a debatable issue whether the abundance of natural resources is a “Resource Curse” causing the “Dutch disease”, or competitive advantage for achieving a high standard of living [71,74–77]. Currently, the world’s practice shows that some countries very successfully use their raw material potential providing a high standard of living for their citizens (Norway, UAE, Qatar), while other states are lagging behind in terms of the main indicators of socio-economic development (Venezuela, Nigeria). The efficiency of the system of the rental relationship depends on many factors: the quality of economic policy, institutions, principles of rental income redistribution, population size, and territory of countries.

Russia has chosen consolidation of rental income in the federal budget. It is reasonable due to the large population and territory of the country [5]. However, considering the current world crisis, the ongoing mobilization policy intensifies the issue of “exhaustibility of resources” in AZRF, threatening possible sustainable development of the region.

As a result of the research, we make the following conclusions:

1. AZRF is and will remain the most important geopolitical and geo-economic macro-region of the country. However, the level of socio-economic development of AZRF’s territories threatens the country’s strategic plans for large-scale development of the Arctic. Possible extraction of the Arctic offshore oil and gas largely determines the level and quality of the region’s development.
2. Principles of the state policy in the Arctic and strategic plans of the largest companies operating in the region consolidate the raw material nature of AZRF development, making rent the main form of income.
3. The existing regional restrictions for launching production facilities not related to the mining industry, lead to increased attention to the rational use of raw materials. A colonial development model is observed in the Arctic zone: minerals are not developed in the region, but are exported. This fact reduces AZRF’s regional wealth and leads to resource depletion. At the same time, rental income is withdrawn to the federal budget, while the local population bears all the consequences of the industrial development of the territories.
4. An improving level of AZRF’s socio-economic development and a reduction of territory depopulation will indicate the changing quality of economic growth and the transition from the colonial model of AZRF development to the sustainable development model.
5. It seems reasonable to leave rental income in the region until the level of AZRF’s socio-economic development reaches at least the Russian average one. Development of the resource potential should not deteriorate the situation in the Arctic region.

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