

# On the Implementation of the Russian National Plan for Adaptation to Climate Change in the Arctic

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*The process of adaptation to climate change is extremely relevant for the Arctic: warming here occurs twice as fast as in other regions of the planet. The results of many assessments show that this trend will continue in the long run. Extreme natural phenomena become a threat to the security, health and well-being of the Arctic regions and are associated with risks for economic activity in the polar regions, affecting the development of natural resources, sea and land transport, serving infrastructure, buildings and structures, housing and communal services and agriculture. Adaptation is becoming not only one of the new priorities of the Arctic agenda for sustainable development at the national and international levels, but also an everyday challenge for the northern regions.*

## Introduction

A large part of the territory of Russia is experiencing climate changes, and the consequences of these changes have a significant impact on the socio-economic development of the country, living conditions and human health, as well as on the state of the economy.

According to many years of observations by the Federal Service of Russia for Hydrometeorology and Monitoring of the Environment, the average annual air temperature at the Earth's surface in the Russian Federation since the mid-1970s has been increasing by an average of 0.47°C over 10 years. This exceeds the growth rate of average global air temperature by 2.5 times, which is 0.18 °C for 10 years.

According to various estimates, 60% to 65% (about 11 million km<sup>2</sup>) of the territory of Russia is permafrost. The boundaries of the Arctic zone and the permafrost zone of the Russian Federation are shown in Figure 1. It is most widespread in Eastern Siberia and Transbaikalia. The deepest limit of permafrost is observed in the upper reaches of the Vilyui River in Yakutia. The maximum occurrence depth is 1,370 meters (recorded in February 1982). The permafrost temperature is not constant, it changes with depth. In the north of Yamal, the thickness of the permafrost layer reaches 400 meters, and its temperature drops below minus eight degrees. With such a huge area

of permafrost in Russia, global warming of the climate can lead to significant adverse consequences, economic and environmental disasters.



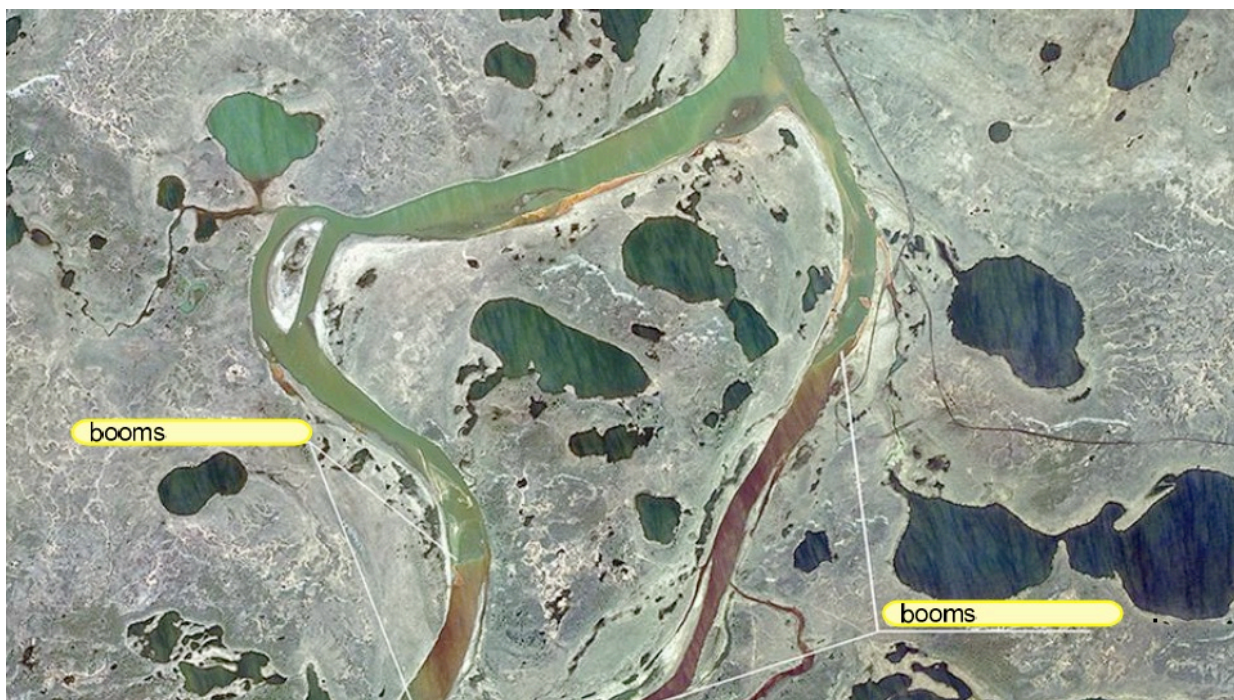
**Figure 1.** Arctic zone and zone of distribution of permafrost rocks of the Russian Federation

The effects of climate change in the Arctic are already evident. There is an increase in the frequency and intensity of dangerous natural processes: floods, ice jams, tundra fires, etc. They become a threat to the safety, health and well-being of the population and are associated with risks for economic activity (development of natural resources, sea and land transport, buildings and structures, housing and utilities and agriculture) (Nikitina, 2019).

In such circumstances, action to adapt to climate change is simply necessary. The changes occurring in permafrost lead to the vulnerability of all facilities located on it and to enormous economic and environmental damage. For example, on May 29 this year in Norilsk, due to thawing of frozen rocks, fuel storage piles at thermal power plants dropped, and an accident resulted in a fuel spill. Environmental damage to water bodies alone is estimated at over \$86 million (Fig. 2&3).

What is adaptation? Adaptation of society refers to the process of adapting to the actual and future consequences of climate change to prevent related damage and reduce risks, as well as to take advantage of the opportunities for sustainable development (Climate Change, 2014). Adaptation to global climate change is relevant for the Arctic: warming here occurs two times faster than in other regions. The results of expert assessments show that this trend will continue in the long term.

On December 25, 2019, a national action plan for Russia's adaptation to climate change for the period until 2022 was signed (National Plan, 2019). What does this mean? This means that economic and social measures have been identified that will be implemented by federal and regional authorities in order to reduce the vulnerability of the Russian population, the economy and natural objects to the effects of climate change, as well as to take advantage of the opportunities arising from such changes.



**Figure 2.** Top view of the pollution of the Ambarnaya and Daldykan rivers (PhotoRoskosmos, June 2020)



**Figure 3.** Rescue work on the Ambarnaya river (Photo Rosmorrechflot Maritime Rescue Service, June 2020)

This plan was developed for two years. The plan was prepared in accordance with a plan of measures to improve state regulation of greenhouse gas emissions and prepare for the ratification of the Paris Agreement (Russia joined it in September 2019).

The plan consists of four blocks:

- risks from climate change for the Russian economy;
- a list of federal events for three years;
- measures to prepare departmental adaptation plans by industry; and
- efforts to prepare regional plans.

The national action plan of the first stage of adaptation of the country to climate change was approved by a special Order of the Government of the Russian Federation and was calculated until 2022. Its structure is presented in the following sections. The first part is devoted to the statement of climate change in Russia and the consequences associated with it. The second part describes the planning of adaptation measures at different levels of management. The third part reveals the content of organizational, regulatory, methodological, informational and scientific support for the implementation of the national plan.

An analysis of the structure and content of the National Plan shows the following features of the Russian vision of the adaptation of various aspects of economic, economic and social life to ongoing and predicted climate changes. Highlighting the first stage of adaptation indicates an understanding of the high degree of uncertainty associated with the pressure of climate change, as well as the correct assessment of the priorities of adaptation measures. The structure of adaptation measures is tied to industries, which should ensure that the specifics of damage associated with climate change are taken into account.

It should be noted that in parallel with sectoral adaptation plans, regional adaptation plans should be developed. The development and monitoring of the implementation of such plans will be entrusted to the highest executive bodies of state power of the constituent entities of the Russian Federation. Reporting on the implementation of the plan should be generated annually, which is indirectly related to the nature of the variability of climate-related environmental characteristics.

In most regions of the Russian Federation, systematic work is not yet carried out in the field of studying the consequences of climate change for specific territories, developing adaptation measures for various fields of activity. To date, only a few regions are engaged in the development of regional climate strategies (Murmansk Oblast, St. Petersburg, Arkhangelsk Oblast, Moscow, Yamalo-Nenets Autonomous Okrug, Komi Republic, etc.). For various reasons, there is no possibility of transition from the stage of research and planning to the stage of effective implementation of adaptation measures. It is necessary to develop and include in the development strategies of the regions sections with regional climate programs, ending with a list of measures to adapt the regional economy to expected climate changes.

As for the Republic of Sakha (Yakutia), the Government of the Republic proposes the following tasks to prepare adaptation measures to the manifestations of climate change (Kirillina, 2017):

- carrying out fundamental research to identify the main climate-forming factors for the development of real scenarios of climate change in the republic; organization of complex

geocryological monitoring to assess the response of permafrost to climate fluctuations in different natural landscape conditions;

- development of new types of foundations of buildings and structures that could reliably function when temperature conditions and other parameters of frozen soils change;
- organization of monitoring bioecological studies to assess the degree of change in biodiversity under climate fluctuations;
- identification of regularities of changes in the water balance of the northern territories and during climate warming; and
- study of the consequences of the impact of climate change on the health and well-being of the Indigenous peoples of the North of Yakutia.

Russia is one of the few countries in which the consequences of climate change can be both positive and negative. As a positive consequence, we first of all consider the use of the Northern Sea Route for a longer time, and, perhaps, throughout the entire winter, as well as the expansion of the land use zone and its advance to the North, an increase in the productivity of forest ecosystems. The possible positive consequences of climate change are expected:

- reduction of energy consumption during the heating period;
- improving the ice situation and, accordingly, the conditions for the transportation of goods in the Arctic seas, facilitating access to the continental shelf of the Russian Federation in the Arctic Ocean;
- improving the structure and expansion of the plant growing zone, as well as increasing the efficiency of animal husbandry;
- increasing the productivity of boreal forests.

The negative effects of expected climate change for the Russian Federation include:

- increasing the risk of morbidity, including infectious and parasitic diseases;
- an increase in the frequency, intensity and duration of droughts in some regions, and in others, an increase in extreme precipitation, floods and water logging of soil dangerous for agriculture;
- increasing the frequency and scale of forest fires;
- Permafrost degradation in the northern regions with damage to buildings and communications;
- violation of ecological balance, including the displacement of some biological species by others;
- increase in electricity consumption in cities for air conditioning in the warm season.

It should be noted that “... losses and negative consequences come to us themselves, and gaining benefits is possible only if a number of additional conditions are met and certain measures are taken” (Kattsov, 2017: 104).

The National Adaptation Plan is a state system of measures of a political, legislative, regulatory, economic, and social nature, which are aimed at reducing the vulnerability of the system of ensuring national security of the country, economic entities, and citizens. Such a wide range of adaptation measures significantly complicates the planning tasks.

In particular, planning tasks include more economical use of water resources, changing existing building codes with the expectation of the resistance of buildings to the effects of future climatic

conditions and extreme weather events, construction of protective dams against floods, raising the level of existing dams to protect against sea level rise, and others. The establishment of advance planning can generate measurable economic benefits and minimize impacts on ecosystems, human health, economic development, property and infrastructure.

According to some experts, it should be admitted that many tasks in the National Plan are spelled out declaratively and are not very convincing. Among them, we believe, is a very important task of scientific support of the adaptation process, which is practically not feasible due to the lack of practice and procedures for attracting research teams to the processes of making managerial decisions.

Also, one of the objectives of the National Plan is to reduce losses and damage to the country's economy from dangerous natural processes and phenomena. In the context of a reduction in allocations to the environmental monitoring system and other specialized monitoring systems, this task seems to be informationally unsecured. In the same position is the problem of "... obtaining additional benefits in weather-dependent and climate-dependent sectors of the economy. Is it supposed to be solved "by identifying and implementing optimal economic decisions based on information about the current and forecasted state of the environment?" (National plan, 2019: 5).

There is also the task of "...updating strategies for the development of economic activities and sectors of the economy, taking into account the impact of climate change on them. Ensuring their implementation in the framework of state programs and investment projects, as well as projects and programs of public-private partnership" (National Plan, 2019: 5). This task is being realized most clearly in the Arctic zone (through the efforts of the new Ministry for the Development of the Far East and the Arctic). This seems quite justified, since it was in the Arctic that climate change manifested itself especially strongly. Separately, it is necessary to emphasize the importance of the task of ensuring the fulfillment of the international obligations of the Russian Federation under the UN Framework Convention on Climate Change.

The National Plan of Adaptation is quite complete, although again declaratively, the complexity of planning is prescribed, which involves:

- 1) preventive and post-crisis adaptation;
- 2) adaptation to the direct (real and expected) and indirect effects of climate change;
- 3) harmonization and integration of adaptation plans at the federal and regional levels;
- 4) planning hierarchy;
- 5) monitoring the effectiveness of adaptation measures and their adjustment.

Organizational, regulatory, methodological, informational and scientific support for the implementation of the national plan is formulated in the form of a list of activities (table 1), the contents of which raise numerous questions from the scientific community. The main problem of the National Plan is the lack of attention to feedbacks in management and assessment of the effectiveness of adaptation measures. Obviously, the main content of adaptation is the generation of secondary regulations that cannot become meaningful without effective targeted scientific support. In fact, out of 29 activities of the National Plan, only seven are substantive in terms of improving the quality of information support for managerial decision-making:

- Definition of a system of targets for achieving the goals of adaptation to climate change (federal, sectoral, regional);
- Development of statistical indicators that characterize the protection of the population, natural, and man-made and anthropogenic objects from the adverse effects of climate change;
- Development of guidelines for assessing climate risks and ranking adaptation measures according to their priority;
- Preparation of proposals for the creation of new and existing economic, financial instruments and insurance mechanisms, taking into account public and private financing;
- Monitoring the effectiveness of implemented adaptation measures to climate changes in the population, economy and natural objects;
- Re-equipment and modernization of the state observational network for climate monitoring;
- Preparation of the third assessment report on climate change and its consequences in the Russian Federation, including vulnerability assessments and adaptation scenarios.

**Table 1.** Structure of national Russian climate adaptation planning process

Hierarchic Level of Plans	National (Federal)	National (State Control on the Industrial and Social Branches)	Corporative	Regional
National (Federal)	Development of the documentary and of the system of laws with taking into account various aspects of the national security: - Political - Codes - Economical - Social	- Transport - Fuel and Energy - Industry and Trading - Building and Supply - Agriculture and Fishing - Resources - Health - Sanitary and Epidemiology - Emergency - Arctic and Far East territories	- Gazprom Company - Rosneft Company - Energy Holding - Alrosa Company - <other huge companies>	Strategy of regional development in climate change pressing
Regional (including the level of the Federation Subjects)	Development of the documentary and of the system of laws with taking into account various aspects of the regional development: - Economical - Social	–	Corporative plans of adaptation	Regional plans of adaptation
Municipal	Development of the documentary and of the system of laws with taking into account various aspects of the municipal development: - Economical - Social	–	–	To be developed after 2022
Individual and corporative units and objects	To be developed after 2022	To be developed after 2022	To be developed after 2022	To be developed after 2022

## Conclusions

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The Arctic, as is well known, is increasingly being integrated into global processes. This region is simultaneously experiencing growing anthropogenic impacts including climate change and pollution. The Arctic regions experience climate change twice as fast as the rest of the territory. Based on this, there is a paradox in the development of the Arctic, on the one hand, the protection and mitigation of the effects of climate change, and on the other, the desire to increase economic activity.

Under these conditions, the adoption of measures to adapt to climate change is simply necessary. The ongoing climate change in Russia creates new opportunities for the country's economy, the use of which also relates to the field of adaptation.

In Russia, there are significant opportunities for adaptation of the economy and social sphere, which will reduce the negative consequences and increase the possibilities of using the positive consequences.

Adaptive capacity is closely related to social and economic development. The economic costs of adapting to climate change are likely to be worth billions of dollars annually over the next several decades, although the exact amount of money required is not known.

On the territory of Russia, the implementation of the National Adaptation Plan will encounter additional difficulties associated with a vast and naturally diverse territory, which, moreover, has been developed very unevenly (Fauzer, 2017).

Two large groups of tasks are identified that need to be addressed in the process of adaptation. First, it is necessary to highlight those areas and aspects that need special attention in the formation of adaptation programs. One way or another, all these aspects are related to the economic well-being of risk recipients associated with climate change (Porfiriev, 2017). Second, it is necessary to formulate a list of key indicators of the state of natural-technical and socio-economic systems by which it will be possible to judge the effectiveness of adaptation procedures. There is no single point of view on this issue. It is proposed to use indicators of sustainable regional development as a basis for organizing adaptation measures.

Russia, like many countries, is taking into account the importance of adaptation measures, pursuing an active state policy, and developing adaptation strategies both at the sectoral (in the sectors of the economy) and at the regional levels (taking into account the geographical and climatic characteristics of the region).

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## **References**



- Fauzer V.V., Lytkina, T.S., & Smirnov, A.V. (2017). Arctic Territories Differentiation by Density of Population and Economic Development. *The Arctic: ecology and economy*, 4 (28), 18-31.
- Climate Change-2014. *Impacts, Adaptation and Vulnerability. Part B: Regional Aspects (Polar Regions)* (2014). IPCC, Cambridge: Cambridge University Press. Available at: [https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Front-MatterB\\_FINAL.pdf](https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Front-MatterB_FINAL.pdf), accessed 12.12.2019
- Kattsov V.M. (Ed.): Kattsov, V.M., B.N. Porfiriev, V.A. Govorkova, D.O. Eliseev, S.V. Efimov, A.A. Kiselev, V.P. Meleshko, T.V. Pavlova, A.A. Pikaleva, B.A. Revich, P.V. Sporyshev, N.E. Terentiev, E.I. Khlebnikova, I.M. Shkolnik, 2017: *Arctic Climate Change: the place of climate science in planning adaptation*. Climate Centre of Roshydromet, 104 pp.
- Kirillina, K.S. (2017). *Development of a regional climatic program for the Republic of SAKHA (Yakutia)*. Dissertation for the degree of candidate of geographical sciences, St. Petersburg.
- National action plan for the first stage of adaptation to climate change for the period until 2022*. Order of the Government of the Russian Federation of December 25, 2019, 17 pp. No. 3183-r. <https://www.garant.ru/products/ipo/prime/doc/73266443/#1000>.
- Nikitina, E.N. (2019). Climate change in the Arctic: adaptation to new challenges. *Outlines of global transformations: politics, economics, law*, 12(5), 177-200.
- Porfiriev B.N., Voronina S.A., Semikashev, V.V., Terent'ev N.E., Eliseev, D.O., & Naumova Yu.V. (2017) Climate Change Impact on Economic Growth and Specific Sectors' Development in the Russian Arctic. *Arctic: Ecology and Economy*, N 4(28), pp. 4–17 (in Russian). DOI: 10.25283/2223-4594-2017-4-4-17.