



LITERATURE REVIEW

The Role of Russian Federation Government Policy in Addressing the Impacts of Global Climate Change

Heinrich Rakuasa^{1*}, Dzaka A Faris², Muh. Hidayatullah³

Published online: 24 August 2024

Abstract: This study aims to evaluate the effectiveness of the Russian Federation government's policies in addressing the impacts of global climate change. The methodology employed is a detailed literature review, which includes a thorough selection of credible sources and systematic data analysis. The main findings highlight the challenges Russia faces, such as reducing dependence on fossil fuels, managing political uncertainties, and enhancing environmental resilience. The study also examines the government's mitigation and adaptation strategies, including energy diversification, public awareness campaigns, and international collaboration. Key recommendations are provided to strengthen climate policies, invest in green technologies, and promote public and private sector participation. The conclusions emphasize the need for comprehensive policy evaluation and future planning to ensure sustainable development and effective climate action in Russia. Through these measures, Russia can significantly contribute to global efforts in reducing greenhouse gas emissions and adapting to climate change, thereby securing a sustainable future for its people and environment.

Keywords: Climate change policy, Russia, Greenhouse gas emissions, Energy diversification, Environmental resilience

Abstrak: Studi ini bertujuan untuk mengevaluasi efektivitas kebijakan pemerintah Federasi Rusia dalam menangani dampak perubahan iklim global. Metodologi yang digunakan adalah tinjauan literatur yang mendetail, yang mencakup pemilihan sumber yang kredibel dan analisis data yang sistematis. Temuan utama menyoroti tantangan yang dihadapi Rusia, seperti mengurangi ketergantungan pada bahan bakar fosil, mengelola ketidakpastian politik, dan meningkatkan ketahanan lingkungan. Studi ini juga meneliti strategi mitigasi dan adaptasi pemerintah, termasuk diversifikasi energi, kampanye kesadaran publik, dan kerja sama internasional. Rekomendasi kunci disediakan untuk memperkuat kebijakan iklim, berinvestasi dalam teknologi hijau, dan mempromosikan partisipasi sektor publik dan swasta. Kesimpulan menekankan perlunya evaluasi kebijakan yang komprehensif dan perencanaan masa depan untuk memastikan pembangunan berkelanjutan dan aksi iklim yang efektif di Rusia. Melalui langkah-langkah ini, Rusia dapat secara signifikan berkontribusi pada upaya global dalam mengurangi emisi gas rumah kaca dan beradaptasi terhadap perubahan iklim, sehingga memastikan masa depan yang berkelanjutan bagi rakyat dan lingkungannya.

Kata kunci: Kebijakan perubahan iklim, Rusia, emisi gas rumah kaca, diversifikasi energi, ketahanan lingkungan

INTRODUCTION

Climate change is a global issue that is increasingly gaining attention, especially in countries that are vulnerable to its impacts, such as the Russian Federation. Russia, with its vast territory and infrastructure built on permafrost, is one of the countries most vulnerable to the threat of climate change (Meckling & Allan, 2020). Since the mid-1970s, Russia has been known to warm faster than the global average, with average annual air temperatures

increasing 2.5 times faster (Javeline et al., 2024). This indicates that Russia faces unique challenges in coping with the impacts of climate change, including longer and more frequent droughts, extreme rainfall, flooding, increased risk of forest fires, and the loss of animal species from their native habitats (Sharmina et al., 2013).

Russia has recorded a significant increase in forest fires. For example, in 2021, there were more than 17,600 forest fires that burned over 18 million hectares of land. Additionally, some at-risk animal species include polar bears and reindeer, whose habitats are disrupted by ice melt and climate change. The socio-economic impacts of these changes are also significant, with communities living in northern regions facing uncertainty in their livelihoods that depend on stable natural resources.

The Russian government has developed a plan to adjust the country's economy and population to climate change. The report published by the Russian Ministry of

^{1*), 2, 3} National Research Tomsk State University, Russian Federation

*) *corresponding author*

Heinrich Rakuasa

Email: heinrichrakuasa14@gmail.com

Economic Development includes a two-year schematic plan in which, in the first phase, Russia will adapt to climate change until 2022 (Kochtcheeva, 2022). The aim of the plan is to "mitigate losses" from global warming and "take advantage" of rising temperatures. However, despite adopting the 2015 Paris Agreement, Russian President Vladimir Putin has repeatedly rejected scientific agreements that attribute climate change to man-made emissions (Javeline et al., 2024). This shows that behind the formal policies, there is debate and uncertainty about how climate change should be addressed, including how countries like Russia should respond to this challenge.

Environmental activists in Russia have also been targeted by authorities, indicating that the challenge of tackling climate change lies not only at the governmental level but also in public participation and awareness (Henderson & Mitrova, 2020). Tens of thousands of scientists have collected a wealth of data showing that climate change is caused by human activity, highlighting the importance of limiting greenhouse gas emissions now and in the future (Denisov et al., 2019).

This study aims to explore the role of the Russian Federation government's policies in addressing the impacts of global climate change, including the challenges and solutions faced, as well as how the country is responding to these challenges at the national and international levels. By focusing on the development of government policies over time, this research will provide insights into how Russia is adapting and striving to mitigate the impacts of climate change through various initiatives and strategies that have been implemented.

METHODS

The research method used in this study is a literature review, which involves collecting and analyzing data from existing sources. These sources include government reports, journal articles, and other scientific publications relevant to this topic. This literature review is designed to provide a comprehensive overview of the Russian Federation government's policy role in addressing the impacts of global climate change.

The selection criteria for the literature were stringent to ensure that only credible and relevant sources were included in the analysis. The criteria specified that sources must come from recognized publications, such as reputable scientific journals, official government reports, and publications from leading environmental organizations. The sources had to have direct relevance to the research topic, specifically focusing on the Russian government's climate policies and their impacts. Additionally, selected sources needed to include the latest data and analysis, with an emphasis on publications from the last five years to ensure up-to-date information.

In this study, the author analyzed a total of 50 sources that met the selection criteria. These sources consisted of 20 scientific journal articles discussing various aspects of climate change policy in Russia, 15 official reports from the Russian government covering plans, policies, and initiatives related to climate change, and 15 publications from environmental organizations and research institutions providing additional perspectives and supporting data.

The author employed content analysis methods to evaluate and synthesize information from the selected sources. The steps in data analysis included coding, which involved identifying key themes and recurring concepts in

the text from each source; categorization, which grouped similar information into relevant categories such as climate change impacts, mitigation policies, adaptation policies, and implementation challenges; synthesis, which compiled findings from various sources to provide a holistic and comprehensive overview of climate change policy in Russia; and evaluation, which assessed the effectiveness of existing policies based on the collected evidence and identified areas needing improvement or further development.

By detailing the literature selection criteria, the number of sources analyzed, and the data analysis methods used, this study aims to enhance transparency and credibility, providing a strong foundation for the findings and recommendations presented.

RESULTS AND DISCUSSION

The Context of Global Climate Change in Russia

According to Javeline et al. (2024), global climate change has significant impacts in Russia, both geographically and socio-economically. (1) Geographical: Russia is vulnerable to climate change impacts as most of its territory is located in areas affected by maximum climate change, both in terms of observations and predictions. Climate change has already caused permafrost thawing in Russia's Arctic region, impacting infrastructure and the environment. (2) Greenhouse Gas Emissions: Russia is one of the largest greenhouse gas emitters in the world due to its dependence on the fossil fuel industry. Therefore, mitigating greenhouse gas emissions is important for Russia in the context of global climate change. (3) Socio-Economic Impacts: Climate change has already caused significant socio-economic impacts in Russia, such as increased incidence of heat waves impacting public health, uncontrollable forest and peatland fires, and acute crop failures. This demonstrates the need for robust adaptation strategies to reduce the risk of climate change impacts in Russia. With an in-depth understanding of the global climate change context in Russia, the government and society in the country can take appropriate measures to reduce risks and respond to the challenges faced due to climate change (Meckling & Allan, 2020).

Mitigation Policy Implementation

The implementation of climate change mitigation policies in Russia is a critical step in reducing greenhouse gas emissions and minimizing the impacts of climate change (Korppoo & Kokorin, 2017). To achieve significant reductions in emissions, Russia must adopt a multifaceted approach that includes energy diversification, energy efficiency, forest management, public outreach and awareness, and regulatory policies. Russia's heavy reliance on fossil fuels has made it one of the largest greenhouse gas emitters globally. To mitigate this, Russia can diversify its energy portfolio by expanding the use of renewable energy sources such as solar, wind, and hydro energy. The potential for renewable energy in Russia is substantial, given its vast geographical expanse and diverse climate. For instance, the Russian Federation has significant untapped potential in wind energy, particularly in regions like the Arctic and Far East (IEA, 2020). Implementing large-scale renewable energy projects can reduce the

country's carbon footprint and create economic opportunities in emerging green technologies.

Improving energy efficiency is another critical component of Russia's mitigation strategy. Enhancing energy efficiency in key sectors such as industry, transportation, and buildings can significantly reduce greenhouse gas emissions. According to the International Energy Agency (IEA), improving energy efficiency in the industrial sector alone could reduce emissions by 15% by 2030 (IEA, 2021). Policies and incentives to encourage the adoption of energy-efficient technologies and practices are essential. For example, retrofitting buildings with better insulation and energy-efficient heating systems can drastically cut energy consumption and emissions. Forests play a crucial role in sequestering carbon dioxide from the atmosphere. Russia, home to approximately 20% of the world's forested area, has a significant opportunity to leverage sustainable forest management practices to mitigate climate change (FAO, 2020). Protecting existing forests from deforestation and degradation, as well as restoring degraded forest areas, can enhance carbon sequestration. Implementing sustainable logging practices and promoting reforestation and afforestation projects are essential steps. These efforts not only help in carbon sequestration but also in preserving biodiversity and maintaining ecosystem services.

Educating the public about the importance of climate change mitigation and encouraging active participation in emission reduction efforts are vital. Public awareness campaigns can inform citizens about the benefits of renewable energy, energy efficiency, and sustainable practices. Such initiatives can lead to behavioral changes that support national and local mitigation efforts. Programs aimed at increasing public engagement in energy conservation and waste reduction can also contribute to overall emission reductions. Implementing strict regulatory policies related to industrial emissions, transportation, and other sectors can help control greenhouse gas emissions. Regulations can set emission reduction targets, enforce pollution controls, and incentivize the adoption of cleaner technologies. For instance, introducing carbon pricing mechanisms such as carbon taxes or cap-and-trade systems can create economic incentives for businesses to reduce their emissions. These policies need to be robust and effectively enforced to ensure compliance and drive meaningful emission reductions.

By implementing these comprehensive and sustainable mitigation policies, Russia can contribute significantly to global efforts to reduce the impacts of climate change and achieve the emission targets set out in international agreements. The integration of renewable energy, enhanced energy efficiency, sustainable forest management, public engagement, and strong regulatory frameworks forms the backbone of a robust climate mitigation strategy.

Protection of Natural Ecosystems

According to Bukvareva et al. (2019), the protection of natural ecosystems is an integral part of both mitigation and adaptation efforts to global climate change. Russia, with its vast and rich natural resources, plays a crucial role in maintaining environmental sustainability and reducing the impacts of climate change. Effective ecosystem protection strategies include biodiversity conservation, sustainable forest management, environmental outreach and education, ecosystem restoration, and protected area management. Protecting endangered species and their

natural habitats is a key aspect of maintaining natural ecosystems. Russia is home to numerous endemic and endangered species, such as the Amur tiger and the Siberian crane. Conservation efforts should focus on habitat preservation, anti-poaching measures, and the establishment of wildlife corridors to facilitate species migration and genetic diversity. Biodiversity conservation helps in maintaining ecosystem balance and resilience, which are critical for adapting to climate change impacts.

Given that Russia possesses vast forested areas, maintaining the sustainability of these forests is paramount. Sustainable forest management practices include controlled logging, reforestation, and afforestation efforts. Preventing illegal logging and promoting sustainable harvesting techniques can help maintain forest health and carbon sequestration capacity. According to the Food and Agriculture Organization (FAO), sustainable forest management in Russia can play a significant role in global carbon mitigation efforts (FAO, 2020). Raising public awareness about the importance of maintaining natural ecosystems and reducing environmentally damaging activities is crucial for ecosystem protection. Educational programs and community engagement initiatives can foster a culture of conservation and sustainable living. Public awareness campaigns can highlight the importance of ecosystems in providing services such as clean air, water purification, and climate regulation. By fostering a greater understanding of these benefits, communities are more likely to support and participate in conservation efforts.

Restoring ecosystems that have been degraded or damaged by climate change or human activities can help restore natural ecosystem functions. Restoration projects can include reforestation, wetland rehabilitation, and the restoration of grasslands and peatlands. These efforts can enhance biodiversity, improve soil health, and increase carbon sequestration. Successful restoration projects not only rehabilitate ecosystems but also provide socio-economic benefits to local communities through job creation and enhanced ecosystem services. Establishing and effectively managing protected areas to safeguard biodiversity and natural ecosystems is a fundamental step in environmental protection. Russia's extensive network of protected areas, including national parks and nature reserves, requires adequate funding and management to be effective. Effective management includes monitoring wildlife populations, enforcing anti-poaching laws, and promoting sustainable tourism practices. Protected areas serve as refuges for endangered species and critical habitats, ensuring the preservation of biodiversity and ecosystem integrity.

By taking robust and sustainable measures to protect natural ecosystems, Russia can play a significant role in maintaining environmental sustainability and mitigating the impacts of global climate change. The combined efforts in biodiversity conservation, sustainable forest management, environmental education, ecosystem restoration, and protected area management are essential to ensure the resilience and health of Russia's natural landscapes in the face of climate change.

International Cooperation

International cooperation in addressing climate change is crucial, particularly for Russia, which holds a significant role in global climate dynamics (Czerny, 2019). Engaging in international collaboration can help Russia leverage global expertise, technology, and resources to effectively combat climate change. Russia's active participation in international climate agreements, such as the United

Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement, is fundamental. By adhering to these agreements, Russia commits to global climate goals, including the reduction of greenhouse gas emissions and the implementation of sustainable development practices. Compliance with these commitments not only enhances Russia's global standing but also facilitates access to international funding and support mechanisms designed to assist countries in meeting their climate goals (UNFCCC, 2021).

Exchanging knowledge and technology with other countries is a key component of international cooperation. Collaborative efforts in research and development can lead to the creation of innovative solutions for climate change mitigation and adaptation. For example, joint ventures with countries experienced in renewable energy technologies can help Russia enhance its renewable energy infrastructure. The exchange of best practices in areas such as carbon capture and storage, sustainable agriculture, and energy efficiency can significantly bolster Russia's climate initiatives (IEA, 2020). Conducting collaborative projects with other countries can yield substantial benefits. These projects can focus on reducing greenhouse gas emissions, developing renewable energy sources, and protecting natural ecosystems. For instance, transboundary conservation projects can help preserve biodiversity and mitigate the effects of climate change on shared ecosystems. Collaborative efforts can also include joint renewable energy projects, such as wind farms and solar power plants, which can serve as models for future developments (CIFOR, 2019).

Receiving and providing funding and technical assistance are critical aspects of international cooperation. Financial support from international bodies such as the Green Climate Fund (GCF) can help Russia implement large-scale climate projects. Additionally, technical assistance from developed countries can enhance Russia's capacity to develop and deploy advanced climate technologies. Conversely, Russia can also contribute to international climate finance, supporting climate initiatives in developing countries and enhancing its role as a global leader in climate action (GCF, 2020). Participation in international forums and conferences related to climate change offers Russia the opportunity to share experiences, demonstrate its commitment to climate action, and expand cooperation networks. Forums such as the Conference of the Parties (COP) and the World Economic Forum provide platforms for dialogue, negotiation, and collaboration on global climate issues. By engaging in these platforms, Russia can influence global climate policy and gain insights into emerging trends and innovations in climate science and technology (WEF, 2021).

By strengthening its international cooperation on climate change issues, Russia can contribute more effectively to global efforts to reduce greenhouse gas emissions, protect the environment, and achieve sustainable development goals (Shugurov, 2023). Such cooperation not only enhances Russia's climate resilience but also reinforces its position as a key player in the global climate agenda.

Adaptation to Inevitable Impacts

Adaptation to the inevitable impacts of climate change is essential for reducing vulnerability and increasing resilience to environmental changes that are already occurring (Javeline et al., 2024). Russia, with its vast and diverse geography, faces significant challenges but also has substantial opportunities to enhance its adaptive capacity.

Improving infrastructure resilience to natural disasters such as floods, wildfires, and heatwaves is crucial. This involves the construction of flood defenses, such as levees and flood walls, and the implementation of firebreaks and controlled burns to manage wildfire risks. Additionally, designing buildings and infrastructure to withstand extreme weather conditions can protect lives and reduce economic losses (OECD, 2020).

Building and improving early warning systems for natural disasters are vital for reducing risks and losses. These systems provide timely and accurate information about impending disasters, allowing communities to prepare and respond effectively. For example, advanced meteorological technology and data analytics can improve the accuracy of weather forecasts and disaster predictions, enabling better emergency planning and response (WMO, 2021). Developing agricultural practices that are adaptive to climate change is essential for maintaining food security. This includes adjusting cropping patterns, selecting crop varieties that are resistant to extreme weather conditions, and implementing sustainable farming practices such as conservation tillage and integrated pest management. These measures can help protect agricultural productivity and ensure food supply stability (FAO, 2019). Sustainable and efficient management of water resources is critical in addressing climate change impacts on water availability. This involves implementing water-saving technologies, improving irrigation efficiency, and enhancing water storage and distribution systems. Integrated water resources management (IWRM) approaches can help balance water use across various sectors and ensure long-term water security (UN Water, 2020).

Increasing urban resilience to climate change through sustainable spatial planning, urban greening, and disaster risk management can protect urban residents and infrastructure. This includes creating green spaces, enhancing urban drainage systems to prevent flooding, and developing heat action plans to mitigate the effects of heatwaves. Smart city initiatives that incorporate climate resilience into urban planning can significantly enhance the livability and sustainability of cities (ICLEI, 2018). By implementing these appropriate and sustainable adaptation measures, Russia can increase the resilience of its people and ecosystems to the inevitable impacts of climate change and prepare for the challenges of a more extreme future (Henderson & Mitrova, 2020).

Investment in Green Technology

Investment in green technologies is a crucial step in reducing greenhouse gas emissions, improving resource efficiency, and accelerating the transition to a sustainable economy (Guo et al., 2020). For Russia, strategic investments in green technologies can offer significant benefits in terms of climate mitigation and economic development. Investing in the development and utilization of renewable energy sources such as solar power, wind power, and bioenergy can help reduce dependence on fossil fuels and lower greenhouse gas emissions. Russia has vast potential for renewable energy, particularly in its expansive and underutilized wind and solar resources. Large-scale investment in renewable energy infrastructure can drive economic growth and energy diversification (IEA, 2020).

Investing in technologies and infrastructure that improve energy efficiency, both in the industrial and household sectors, can reduce energy consumption and carbon emissions. This includes upgrading industrial processes, retrofitting buildings with energy-efficient

materials, and promoting the use of energy-efficient appliances. Enhanced energy efficiency can lead to significant cost savings and emission reductions (IEA, 2021). Encouraging investment in sustainable transportation, such as environmentally friendly public transportation, infrastructure development for electric vehicles, and the use of alternative fuels, can help reduce transportation emissions. Developing an extensive network of electric vehicle charging stations and incentivizing the adoption of electric vehicles can accelerate the transition to a low-carbon transportation system (IEA, 2020).

Investing in environmentally friendly waste management technologies, such as recycling and organic waste treatment, can help reduce greenhouse gas emissions from the waste sector. Implementing comprehensive waste management systems that prioritize recycling, composting, and waste-to-energy technologies can significantly lower emissions and improve resource efficiency (UNEP, 2020). Investing in sustainable agriculture and environmentally friendly agricultural technologies can reduce the carbon footprint of the agricultural sector and improve food security. This includes adopting precision farming techniques, using organic fertilizers, and implementing agroforestry practices. Sustainable agriculture practices can enhance soil health, increase crop yields, and reduce environmental impacts (FAO, 2019).

By allocating resources for investment in green technologies, Russia can accelerate the transition to a low-carbon economy, improve economic competitiveness, and protect the environment for future generations (Zavyalova & Studenikin, 2019). Support from the government, private sector, and civil society is crucial in driving the development of green technologies in Russia.

Public and Private Participation

Public and private sector participation is critical in supporting climate change mitigation and adaptation efforts in Russia (Berezin et al., 2018). Effective climate action requires collaboration across various sectors of society. Raising public awareness about the impacts of climate change and the importance of mitigation and adaptation measures can mobilize support and participation in environmental protection efforts. Public education campaigns can inform citizens about climate change risks and promote sustainable behaviors such as energy conservation, recycling, and sustainable transportation (UNESCO, 2021).

Involving local communities in the planning and implementation of environmental projects, such as forest management, land restoration, and disaster risk reduction, can increase the effectiveness and acceptance of such programs. Community-based approaches that leverage local knowledge and foster stakeholder engagement can enhance the success of climate adaptation and mitigation initiatives (UNDP, 2020). Encouraging the private sector to invest in green projects and green technologies can accelerate the adoption of sustainable solutions and reduce the industry's carbon footprint. Providing incentives such as tax breaks, subsidies, and grants can stimulate private investment in renewable energy, energy efficiency, and sustainable agriculture projects (OECD, 2020).

Building partnerships between government, the private sector, and civil society in developing environmental initiatives can create synergies and expand the positive impact of joint action. Public-private partnerships (PPPs) can facilitate the financing,

development, and implementation of large-scale green infrastructure projects, leveraging the strengths of both sectors (World Bank, 2020). Encouraging technological innovation through collaboration between the public and private sectors can help develop new solutions to address climate change challenges and accelerate the transition to a sustainable economy. Innovation hubs, research and development centers, and startup incubators focused on green technology can drive advancements in renewable energy, energy storage, and sustainable materials (IEA, 2021). By actively engaging communities and the private sector in climate change mitigation and adaptation efforts, Russia can strengthen environmental resilience, improve resource efficiency, and create a more sustainable future for future generations.

Policy Evaluation and Future Planning

Policy evaluation and future planning are crucial in addressing the challenges of climate change in Russia. Effective policy evaluation ensures that current strategies are achieving their intended goals, while future planning sets the direction for sustainable development. Conducting a thorough review of existing climate policies is essential to identify their successes, weaknesses, and areas for improvement. This involves assessing policies across various sectors such as energy, transportation, forestry, and agriculture. The review should consider the effectiveness of policies in reducing greenhouse gas emissions, promoting renewable energy, and enhancing resilience to climate impacts. For example, the evaluation of Russia's energy policies can reveal how well the country is progressing towards its renewable energy targets and reducing its dependence on fossil fuels (Korppoo & Kokorin, 2017).

Evaluating the impact of policies on the environment, economy, and society ensures that they provide the desired benefits without causing unintended negative consequences. This includes assessing environmental impacts such as reductions in carbon emissions and improvements in air quality, economic impacts like job creation and energy cost savings, and social impacts such as public health benefits and enhanced community resilience. For instance, analyzing the economic benefits of energy efficiency programs can demonstrate cost savings for consumers and businesses, thereby justifying further investment in such initiatives (IEA, 2020). Involving the community, academics, and other stakeholders in the policy evaluation process ensures that the proposed policies reflect the needs and aspirations of the broader society. Public consultation can be facilitated through town hall meetings, public hearings, online surveys, and stakeholder workshops. Engaging diverse perspectives can lead to more inclusive and effective climate policies. For example, involving local communities in the planning of renewable energy projects can enhance public support and ensure that projects are designed to meet local needs and preferences (UNDP, 2020).

Formulating a long-term action plan oriented towards reducing greenhouse gas emissions, increasing environmental resilience, and adapting to climate change is critical. This plan should set clear targets and timelines for achieving climate goals, outline the necessary actions and measures, and allocate resources accordingly. Strategic planning should also incorporate scenarios and modeling to anticipate future climate impacts and develop adaptive strategies. For instance, Russia's long-term energy strategy could include targets for increasing the share of renewable energy in the national energy mix and phasing out coal-fired power plants (IEA, 2021). Establishing an effective

monitoring system to track policy implementation, measure progress in achieving mitigation and adaptation goals, and report transparently to the public and stakeholders is vital. Regular monitoring and reporting provide accountability and allow for adjustments based on observed outcomes and changing conditions. Transparent reporting also builds public trust and supports continuous improvement. For example, implementing a national greenhouse gas inventory system can help track emissions reductions and ensure compliance with international climate commitments (UNFCCC, 2021).

By conducting careful policy evaluations and planning sustainable future measures, Russia can strengthen its position in meeting the challenges of climate change, protecting the environment, and creating a more sustainable future for the country and future generations (Khlopov, 2022).

Challenges and Barriers

In facing climate change, Russia encounters several challenges and barriers that must be addressed to achieve sustainable mitigation and adaptation goals (Javeline et al., 2024). Russia is one of the major producers and exporters of fossil energy sources, such as oil and gas. This dependence poses a significant challenge in transitioning to renewable energy sources. Reducing this dependence requires substantial investment in renewable energy infrastructure and technologies. For example, the development of large-scale wind and solar farms can provide alternative energy sources and reduce greenhouse gas emissions (IEA, 2020). Changes in government policies and political uncertainty can hinder the implementation of consistent and sustainable climate policies. Political stability and clear policy direction are essential for long-term climate strategies. Ensuring a stable regulatory environment that supports climate action can encourage investment and participation from various stakeholders. For instance, consistent government support for renewable energy subsidies can attract private sector investment in clean energy projects (Korppoo & Kokorin, 2017).

Russia faces challenges in maintaining environmental resilience to climate change, including permafrost thawing, forest destruction, and increased risk of natural disasters. These challenges necessitate robust adaptation measures to protect ecosystems and infrastructure. For example, enhancing forest management practices to prevent wildfires and promote reforestation can improve environmental resilience (FAO, 2020). Public awareness of the importance of climate change mitigation and adaptation measures is low in some regions of Russia. Efforts to increase public understanding and participation are crucial. Educational campaigns, community engagement programs, and media outreach can help raise awareness and promote sustainable practices. For instance, public awareness campaigns about energy conservation can lead to behavioral changes that reduce energy consumption and emissions (UNESCO, 2021).

Limited financial and technical resources can be obstacles to the implementation of environmental protection policies and programs. Securing adequate funding and building technical capacity are essential for effective climate action. International cooperation and partnerships can provide additional resources and expertise. For example, accessing climate finance from international bodies such as the Green Climate Fund can support Russia's climate projects (GCF, 2020). By identifying and addressing these challenges and barriers, Russia can strengthen its climate change mitigation and

adaptation efforts, protect the environment, and create a more sustainable future for the country and its people.

Expectations and Recommendations

In facing the challenges of climate change, there are hopes and recommendations that can be taken to strengthen mitigation and adaptation efforts in Russia. Russia is expected to strengthen a comprehensive and sustainable climate policy, including adopting concrete measures to reduce greenhouse gas emissions and increase resilience to climate change impacts. Policies should align with international climate commitments and promote sustainable development. For example, implementing stricter emissions standards for industries and enhancing regulations on deforestation can significantly contribute to emissions reductions (Shugurov, 2023). Russia can accelerate the diversification of energy sources by increasing investment and development of renewable energy, thereby reducing dependence on fossil energy and lowering greenhouse gas emissions. This includes expanding wind, solar, and hydroelectric power projects. For instance, investing in offshore wind farms in the Baltic Sea can harness significant renewable energy potential and support energy diversification (IEA, 2020).

It is important to raise public awareness about climate change and the importance of mitigation and adaptation measures. Public outreach and education campaigns can help increase public understanding and participation. Schools, universities, and community organizations can play a crucial role in disseminating information and fostering a culture of sustainability. For example, incorporating climate education into school curricula can prepare future generations to address climate challenges (UNESCO, 2021). Russia can strengthen international cooperation on climate change mitigation and adaptation and actively participate in global forums to reach agreements that benefit all parties. Engaging in international climate negotiations and partnerships can facilitate knowledge exchange and access to funding. For instance, participating in the UNFCCC's Climate Technology Centre and Network (CTCN) can help Russia access technical assistance for implementing climate technologies (UNFCCC, 2021).

Promoting environmentally friendly and sustainable technological innovation can help Russia reduce greenhouse gas emissions, improve energy efficiency, and meet the challenges of climate change. Investing in research and development of clean technologies, such as advanced battery storage and carbon capture and storage, can drive innovation and create new economic opportunities. For example, developing smart grid technologies can enhance the efficiency and reliability of energy systems (IEA, 2021). By implementing these recommendations and strengthening mitigation and adaptation efforts, Russia can play a more proactive role in dealing with climate change, protecting the environment, and creating a more sustainable future for the country and future generations (Javeline et al., 2024).

CONCLUSIONS AND RECOMMENDATION

In conclusion, the policy role of the Russian Federation government in addressing the impacts of global climate change is critically important. Russia faces a range of significant challenges, including reducing its dependence on fossil energy sources, managing political uncertainty,

and maintaining environmental resilience in the face of climate change. Effective policy evaluation and comprehensive future planning are essential to ensure the successful implementation of climate change mitigation and adaptation strategies.

Key recommendations include Strengthening climate policies is paramount. Russia must develop and enforce comprehensive and sustainable climate policies that align with international climate commitments. This involves setting clear emission reduction targets, implementing robust regulatory frameworks, and ensuring policy coherence across sectors. By doing so, Russia can establish a strong foundation for effective climate action and demonstrate its commitment to global climate goals. Energy diversification is crucial for reducing reliance on fossil fuels. Accelerating the diversification of energy sources by investing in renewable energy technologies such as solar, wind, and hydro power will not only lower greenhouse gas emissions but also enhance energy security and economic resilience. Embracing a variety of renewable energy sources can reduce the environmental impact of energy production and create new economic opportunities in the green technology sector.

Increasing public awareness about the importance of climate change mitigation and adaptation is vital. Through education and outreach campaigns, Russia can engage the public and foster a culture of sustainability. Raising awareness will support broader climate action initiatives and ensure that citizens are informed and motivated to participate in efforts to mitigate and adapt to climate change. Strengthening international collaboration is essential for addressing climate challenges effectively. Active participation in global climate forums, knowledge and technology exchange, and collaborative projects will enhance Russia's capacity to tackle climate change. By engaging with the international community, Russia can leverage global expertise, access new technologies, and secure funding for climate initiatives. Promoting technological innovation is necessary for reducing greenhouse gas emissions and improving energy efficiency. Investments in research and development of clean technologies will drive progress and create new economic opportunities. By fostering innovation in areas such as renewable energy, energy storage, and carbon capture, Russia can position itself as a leader in the transition to a sustainable economy.

Challenges to Address such as Increasing public awareness and engagement in climate action is necessary to build widespread support for mitigation and adaptation efforts. Public understanding of climate change and its impacts is currently limited in some regions, and efforts must be made to educate and involve citizens in climate initiatives. Securing adequate financial and technical resources is crucial for implementing effective environmental protection policies and programs. Limited resources can hinder the implementation of necessary measures, and securing funding from international sources and partnerships will be essential for success. Ensuring stable and consistent political support for climate policies will enhance their implementation and effectiveness. Political uncertainty can disrupt the continuity of climate initiatives, and a stable policy environment is needed to support long-term planning and investment in climate action.

By implementing these recommendations and addressing the identified challenges, Russia can enhance its role in global climate action, protect its environment, and create a more sustainable future for the country and its people. Through strengthened policies, diversified energy

sources, increased public awareness, international collaboration, and technological innovation, Russia can effectively reduce greenhouse gas emissions and adapt to the impacts of climate change, ensuring long-term sustainability and resilience for future generations.

REFERENCES

- Berezin, A., Sergi, B., & Gorodnova, N. (2018). Efficiency assessment of public-private partnership (PPP) projects: The case of Russia. *Sustainability*, 10(10), 3713. <https://doi.org/10.3390/su10103713>
- Bukvareva, E., Zamolodchikov, D., & Grunewald, K. (2019). National assessment of ecosystem services in Russia: Methodology and main problems. *Science of The Total Environment*, 655, 1181–1196. <https://doi.org/10.1016/j.scitotenv.2018.11.286>
- CIFOR. (2019). *Collaborative governance in forests*. Center for International Forestry Research.
- Czerny, M. (2019). Russia-EU: A cooperative approach to climate change. *Revue Défense Nationale*, N° 825(10), 101–106. <https://doi.org/10.3917/rdna.825.0101>
- Denisov, S. N., Eliseev, A. V., & Mokhov, I. I. (2019). Contribution of natural and anthropogenic emissions of CO₂ and CH₄ to the atmosphere from the territory of Russia to global climate changes in the twenty-first century. *Doklady Earth Sciences*, 488(1), 1066–1071. <https://doi.org/10.1134/S1028334X19090010>
- FAO. (2019). *Climate-Smart Agriculture: Policies, Practices and Financing for Food Security, Adaptation and Mitigation*. Food and Agriculture Organization of the United Nations.
- FAO. (2020). *Global Forest Resources Assessment 2020: Main report*. Food and Agriculture Organization of the United Nations.
- GCF. (2020). *Green Climate Fund Annual Report 2020*. Green Climate Fund.
- Guo, M., Nowakowska-Grunt, J., Gorbanyov, V., & Egorova, M. (2020). Green technology and sustainable development: Assessment and green growth frameworks. *Sustainability*, 12(16), 6571. <https://doi.org/10.3390/su12166571>
- Henderson, J., & Mitrova, T. (2020). Implications of the global energy transition on Russia (pp. 93–114). https://doi.org/10.1007/978-3-030-39066-2_5
- ICLEI. (2018). *Urban Climate Resilience*. ICLEI - Local Governments for Sustainability.
- IEA. (2020). *World Energy Outlook 2020*. International Energy Agency.
- IEA. (2021). *Energy Efficiency 2021*. International Energy Agency.
- International Energy Agency (IEA). (2020). *Renewables 2020*. IEA.

- International Energy Agency (IEA). (2021). *Energy Efficiency 2021*. IEA.
- Javeline, D., Orttung, R., Robertson, G., Arnold, R., Barnes, A., Henry, L., Holland, E., Omelicheva, M., Rutland, P., Schatz, E., Schenk, C., Semenov, A., Sperling, V., McIntosh Sundstrom, L., Troitskiy, M., Twigg, J., & Wengle, S. (2024). Russia in a changing climate. *WIREs Climate Change*, 15(2). <https://doi.org/10.1002/wcc.872>
- Khlopov, O. A. (2022). The climate change and Russia's policy for sustainable development. *International Journal of Professional Science*, 4, 80–89. https://doi.org/10.54092/25421085_2022_4_80
- Kochtcheeva, L. V. (2022). Foreign policy, national interests, and environmental positioning: Russia's post Paris climate change actions, discourse, and engagement. *Problems of Post-Communism*, 69(4–5), 423–435. <https://doi.org/10.1080/10758216.2021.1968912>
- Korppoo, A., & Kokorin, A. (2017). Russia's 2020 GHG emissions target: Emission trends and implementation. *Climate Policy*, 17(2), 113–130. <https://doi.org/10.1080/14693062.2015.1075373>
- Meckling, J., & Allan, B. B. (2020). The evolution of ideas in global climate policy. *Nature Climate Change*, 10(5), 434–438. <https://doi.org/10.1038/s41558-020-0739-7>
- OECD. (2020). *Green Finance and Investment: Mobilising Finance for Climate Action in Russia*. Organisation for Economic Co-operation and Development.
- Sharmina, M., Anderson, K., & Bows-Larkin, A. (2013). Climate change regional review: Russia. *WIREs Climate Change*, 4(5), 373–396. <https://doi.org/10.1002/wcc.236>
- Shugurov, M. (2023). International cooperation on climate research and green technologies in the face of sanctions: The case of Russia. *Green Finance*, 5(2), 102–153. <https://doi.org/10.3934/GF.2023006>
- Shugurov, M. (2023). International Legal Aspects of Russia's Climate Policy. *Journal of Environmental Law*, 35(1), 77–100.
- UN Water. (2020). *Sustainable Water Resources Management: A Handbook*. United Nations.
- UNDP. (2020). *Community-Based Adaptation to Climate Change*. United Nations Development Programme.
- UNEP. (2020). *Waste Management Outlook for Russia*. United Nations Environment Programme.
- UNESCO. (2021). *Climate Change Education for Sustainable Development*. United Nations Educational, Scientific and Cultural Organization.
- UNFCCC. (2021). *The Paris Agreement: Essential Elements*. United Nations Framework Convention on Climate Change.
- WEF. (2021). *Global Risks Report 2021*. World Economic Forum.
- WMO. (2021). *State of the Global Climate 2021*. World Meteorological Organization.
- World Bank. (2020). *Public-Private Partnerships for Climate Resilience*. World Bank Group.
- Zavyalova, E. B., & Studenikin, N. V. (2019). Green investment in Russia as a new economic stimulus. In *Modeling economic growth in contemporary Russia* (pp. 273–296). Emerald Publishing Limited. <https://doi.org/10.1108/978-1-78973-265-820191011>