doi: 10.25750/1995-4301-2024-3-234-239

Drained peatlands rewetting as a promising trend for carbon offsets in Russia: legal and economic aspects

© 2024. Y. M. Gordeeva[1, 2] ORCID: 0000-0003-4337-6721,
Yu. V. Fursa[3] ORCID: 0009-0006-4381-8859,
K. L. Shahmatov[3, 4] ORCID: 0009-0009-9285-310X,
[1]Vyatka State University,
36, Moskovskaya St., Kirov, Russia, 610000,
[2]Hasselt University,
42, Campus Hasselt, Martelarenlaan, Belgium, 3500,
[3]Center for technologies of sustainable development,
50, building 2, room 433, 29/2, Aviamotornaya St., Moscow, Russia, 111024,
[4]Tver State Technical University,
22, Afanasyi Nikitin St., Tver, Russia, 170026,
e-mail: em_gordeeva@vyatsu.ru, yelena.gordeeva@uhasselt.be

"Zero" greenhouse gas (GHG) emissions is one of the most pressing climate protection goals worldwide. The most important questions for the Russian Federation are about the significance and role of the country's ecological systems in achieving "carbon neutrality": creating conditions to reduce emissions and increase the GHG absorption by ecosystems, the implementation of natural climate projects to protect the climate in the country, and recognition climate outcomes of such projects at the national and international levels. This article analyzes legal and economic aspects of the emerging trend of Russian drained temperate peatlands rewetting as a new carbon offset strategy. We discuss the regulatory context and evaluate non-climate benefits. Drained peatlands rewetting holds promise for substantial GHG reduction in the country. However, further development of the methodology and alignment with relevant international standards is required for international recognition of the national carbon offset projects focused on drained peatlands rewetting.

Keywords: carbon offsetting, greenhouse gas emissions, nature-based solutions to climate change, rewetting of drained peatlands.

УДК 341:349.6

Вторичное обводнение осушенных торфяников как перспективное направление реализации климатических проектов в России: юридический и экономический аспекты

© 2024. Е. М. Гордеева[1, 2], д. ю. н., доцент,
Ю. В. Фурса[3], к. э. н., директор,
К. Л. Шахматов[3, 4], к. т. н., директор по науке,
[1]Вятский государственный университет,
610000, Россия, г. Киров, ул. Московская, д. 36,
[2]Университет Хасселт,
3500, Бельгия, г. Хасселт, Мартеларенлаан, Хасселт Кампус, д. 42,
[3]ООО «Центр технологий устойчивого развития»,
111024, Россия, г. Москва, ул. Авиамоторная, д. 50,
строение 2, комната 433, 29/2,
[4]Тверской государственный технический университет,
170026, Россия, г. Тверь, Набережная Афанасия Никитина, д. 22,
e-mail: em_gordeeva@vyatsu.ru, yelena.gordeeva@uhasselt.be

Достижение «климатической нейтральности» или «нулевых» выбросов парниковых газов – это одна из наиболее актуальных целей в области охраны климата во всём мире. Для Российской Федерации наиболее актуальными являются вопросы о значении и роли экологических систем страны в достижении «углеродной нейтральности»: создание условий для снижения выбросов и увеличения поглощения парниковых газов экосистемами, реализация природных климатических проектов по защите климата в стране и признание климатических результатов таких проектов на национальном и международном уровнях. Целью исследования является анализ юридического и экономического аспектов нового направления реализации природных климатических проектов по компенсации выбросов углерода в России – вторичного обводнения ранее осушенных торфяных болот. Оценивая климатические и другие экологические «выгоды» реализации такого типа климатических проектов и исследуя законодательный контекст, авторы приходят к выводу, что обводнение торфяников – это перспективное направление реализации климатических проектов в России, открывающее перспективы для существенного сокращения выбросов парниковых газов в стране. Однако потребуется дальнейшая разработка методологии и приведение её в соответствие с международными стандартами по компенсации выбросов углерода для того, чтобы обеспечить международное признание.

Ключевые слова: компенсация выбросов углерода, выбросы парниковых газов, природно-климатический проект, вторичное обводнение осушенных торфяников.

Climate change is considered to be the most significant and urgent issue of the 21st century. The main international framework for climate protection includes the UN Framework Convention on Climate Change (UNFCCC) [1], the Kyoto Protocol to the UNFCCC [2], and the Paris Agreement (PA) [3]. As these instruments are being implemented into national legal systems, some authors [4–7] have noted a myriad of theoretical, regulatory, and practical challenges have surfaced that require attention at both the national and international levels. Achieving carbon neutrality (or "zero" greenhouse gas (GHG) emissions) is a pivotal issue since the adoption of the PA [8–10].

The role and significance of the country's ecological systems in attaining carbon neutrality holds particular importance for the Russian Federation [11]. The country endorsed the PA, underscoring its commitment to safeguarding forests and other ecosystems, enhancing their absorption capacity, and emphasizing the need to consider this capacity extensively in implementing the PA mechanisms [11].

The aim of our study is to consider legal and economic aspects of a new approach to nature-based carbon offset projects in Russia, aligning with the PA. Specifically, the focus is on drained temperate peatlands rewetting.

Materials and methods of research

The study examines the potential of the country's ecological systems to implement a new approach to carbon offsetting – specifically, the rewetting of drained temperate peatlands. Additionally, the study seeks to outline the non-climate benefits associated with such carbon offset initiatives and scrutinize the regulatory framework in the context of this emerging trend.

Our methodology adopts an empirical and interdisciplinary approach. Information was sourced from scientific articles, reports and statistical materials of international organizations and national authorities as well as materials of scientific conferences, focusing on nature-based solutions to climate change, with a particular emphasis on drained peatlands rewetting carbon offset projects. An extensive internet desk research, conducted using Yandex and Google scholar, involved targeted searches employing keywords and their combinations, such as "drained peatlands rewetting", "carbon offset projects", and "nature-based solutions to climate change".

The preliminary findings of this study were presented at the 25th Saint-Petersburg International Forestry Forum, specifically during the session on the climate agenda for forest users held in September 2023 in Saint-Petersburg, Russia (https://spiff.ru/en/#agenda). At a later stage, discussions took place during several session on "Drained peatlands rewetting in temperate climate conditions" at the 28th Conference of Parties to the UNFCCC in Dubai, United Arab Emirates, in December 2023. The above forums provided valuable platforms for exchanging insights and refining the research direction.

Results and discussion

Within the overarching research objective of this article, it is crucial to underscore Russia's continuous commitment to the "Convention on Wetlands" (Ramsar, Iran, 1972), a commitment upheld since 1977. The primary aim of this Convention is the "conservation and rational use of all wetlands" (Article 2). Wetlands, as defined by the convention, encompass areas of marsh, fen, peatland, or water, whether natural or artificial, with static or flowing water, whether

fresh, brackish, or salt, including marine areas with a depth not exceeding six meters at low tide (Article 1) [12].

Peatlands constitute approximately 3% of the global land area, and hold twice the amount found in all the world's forests combined, or nearly as much carbon as the atmosphere [13]. However, drained peatlands have the potential to release stored over millennia carbon into the atmosphere, primarily through management and wildfires. Scientists view the rewetting of drained peat deposits as a promising and effective carbon offset project [14, 15].

Notably, there have been discussions in Russia regarding the possibility of withdrawing from the above Convention since 2023 due to the Resolution XIV.20 adopted by the Ramsar Convention in November 2022 [16]. But the scientific community actively advocates for Russia's continued involvement in this pivotal international treaty, which addresses the conservation and sustainable use of wetlands. They emphasize that at present, there are 96 specially protected areas in Russian wetlands under Ramsar jurisdiction, for which the international Ramsar status is an additional protection. Moreover, some of the Ramsar wetlands in Russia are outside the protected areas boundaries and this international status is the only guarantee of their conservation and sustainable use [17].

The "Strategy of Socio-Economic Development of the Russian Federation with Low Greenhouse Gas Emissions until 2050" (Resolution of the Government of the Russian Federation No. 3052-r from 29.10.2021) is a cornerstone of the socio-economic development plan with low GHG emissions until 2050. This document emphasizes the paramount importance of researching the capacity of water bodies to absorb and accumulate GHGs. Special attention is paid to the advancing applicable technologies and implementing additional measures to augment GHG absorption by water bodies throughout Russia. In order to implement the objectives outlined in both the current and intensive scenarios of the Strategy, various actions are deemed essential. Among these, the strategy highlights the imperative to undertake the rewetting of previously drained peatlands, ensuring their fire safety and effectively managing their water balance [18]. This strategic approach aligns with the overarching goal of fostering sustainable development with reduced GHG emissions, emphasizing the pivotal role of wetlands in mitigating climate change impacts.

Peatlands occupy approximately 8% of Russia, and when considering shallow peatlands, this figure expands to over 20% of the country's territory [14]. Remarkably, Russia harbors over 30% of the world's peatlands, covering an extensive area of 80 Mha. The peat reserves in Russia alone amount to 175 Gt, constituting 35% of the total global reserves.

However, the environmental challenge lies in the fact that drained peatlands globally contribute to over 6% of the total CO_2 emissions. Carbon dioxide emissions from drained peatlands, including those from fires, are more than 2 Gt a^{-1} [19]. This accounts for approximately 25–30% of total emissions in the global agriculture and 5% in the industrial sector [20]. According to [19], GHG emissions associated with drained peatlands may account for 12–41% of GHG emissions in the 2020–2100. This emphasizes the critical role that managing peatlands, particularly addressing their drainage, plays in mitigating global carbon emissions.

In Russia, over 10 Mha of peatlands were drained until 1990: more than 5 Mha for agriculture, over 3 Mha for forestry and more than 1.5 Mha for peat extraction [14]. Presently, a considerable portion of these previously disturbed and drained peatlands remains abandoned or is utilized inefficiently, often resulting in land degradation, peat fires, heightened GHG emissions, and other detrimental outcomes. Therefore, the practice of rewetting drained abandoned peatlands is assumed to be most effective in order to prevent and/or remedy such adverse effects, but primarily to prevent peat fires, which differ from other natural fires in their duration, release of combustion products dangerous to humans and carbon loss [21]. The rewetting involves restoring natural moisture levels to approximate those found in undisturbed wetlands. A professional and ecologically informed application of the rewetting process besides reducing GHG emissions also yields various positive "benefits". These benefits encompass the reinstatement of the territory's hydrological balance, restoring unique flora and fauna habitats as well as biodiversity of wetlands, diminished risk of peat fires, and enhancements in the socio-economic status of surrounding areas, etc. [10–25]. Unfortunately, the majority of previously drained Russian peatlands are not categorized as water bodies, which complicates the legal approval of rewetting measures [21].

Nature-based solutions to climate change encompass deliberate human interventions aimed at reducing emissions and enhancing GHG absorption in ecosystems [26]. Particularly, a carbon offset project focused

on drained peatlands rewetting entails a scientifically grounded set of measures to manage the water regime. This set of actions is directed at the restoration of degraded lands, optimizing ecosystem management, and thereby contributing to the mitigation of GHG emissions while facilitating carbon storage in the form of peat.

The implementation of a carbon offset project on drained peatlands rewetting typically includes the following stages.

1. Mandatory research and surveys.

In-depth examination of information related to selected peatlands, encompassing geomorphology, geology, hydrogeology, stratigraphy, and developmental history. Conducting comprehensive field surveys to provide a thorough and reliable characterization of the current state of the peatland. Pre-selection of project sites to enhance project efficiency and alignment with stakeholder objectives, including the local communities.

2. Development of project documentation and its validation.

Formulating detailed project design document that outlines the strategies, methodologies, and expected outcomes. Subjecting the project documentation to a validation process, ensuring its alignment with established methodologies and standards.

3. Project implementation.

Execution of planned set of actions for drained peatlands rewetting based on validated project documentation.

4. Development and implementation of monitoring:

Establishment of a robust monitoring framework to systematically assess the project's progress and impact. Regular monitoring activities to track ecological and climate-related parameters.

5. Obtaining climate results and verification.

6. Registration of the project and climate results.

These stages collectively constitute a comprehensive and systematic approach to the successful implementation, validation and verification of a carbon offset project focusing on drained peatlands rewetting.

Previous scientific research demonstrated that carbon offset projects focusing on ecosystem restoration can yield substantial climate benefit [19, 27–29].

Scientists estimate that the climate impact of a carbon offset project focused on drained peatland rewetting can vary widely, ranging 2–40 t CO_2-eq. ha^{-1} a^{-1} [14]. This variability is influenced by diverse factors. The amalgamation of a broad spectrum of positive effects encompassing environmental, social, and economic aspects contributes to elevating the market value of carbon units generated through the implementation of such projects.

Recognizing drained peatland rewetting as a promising category of carbon offset projects, Russian scientists advocate for its inclusion in the Operational Plan of the Low Carbon Development Strategy-2050 [14]. This recommendation underscores the potential of such projects to not only mitigate GHG emissions but also to deliver a multifaceted array of benefits, reinforcing their significance within the broader framework of sustainable development.

Considering the positive impacts associated with drained peatlands rewetting and recognizing the potential for implementing such carbon offset projects in Russia, the Federal State Budgetary Institution of Global Climate and Ecology has formulated a national methodology for the execution of carbon offset projects focusing on the rewetting of drained temperate peatlands. In July 2023, the draft methodology, titled "Rewetting of Drained Temperate Peatlands", underwent extensive public consultations, including solicitation of feedback on the official website of the national registry of carbon units (https://carbonreg.ru/en/). Until September 2023, the draft methodology remained accessible online for all interested stakeholders, providing an opportunity to submit comments and insights for consideration.

The formulation of a methodology for carbon offset projects focusing on drained peatlands rewetting, along with its open discussion, holds the potential to serve as a catalyst for the widespread implementation of such projects across various regions in the country. According to [21], the assessment of the program of rewetting of fire-prone peatlands in the Moscow region (2010–2013; the peatland area was 1.5 thousand ha) showed a whole reduction of carbon emissions by 33.4 kt by 2022; this reduction can reach almost 113 kt by 2050. This could have a positive impact on reducing GHG emissions, not only on a national scale but also globally. Prominent industrial entities in Russia are already actively engaged in initiating pilot carbon offset projects centered on drained peatlands rewetting in various regions, exemplified by Severstal in the Vologda region, SIBUR in the Nizhny Novgorod region, and RUSAL in the Leningrad region [14].

Conclusion

In conclusion, the rewetting of drained temperate peatlands emerges as a promising trend for carbon offset projects in Russia. The nation possesses substantial ecological potential for the successful implementation of such initiatives, supported by the development of a national methodology. Noteworthy prominent industrial entities are already actively pursuing pilot carbon offset projects in various regions of the country, signaling a tangible commitment to this environmentally impactful endeavor. The outcomes of these projects extend beyond the reduction of GHG emissions and the long-term sequestration of GHGs in peat. The outcomes also encompass the mitigation of fire hazards in regional landscapes and the restoration of the unique biodiversity inherent to wetland ecosystems.

Presently, we explore avenues to showcase Russia's potential for implementing such carbon offset projects at the international level. This outreach seeks to garner attention from international experts, scientists, and investors, highlighting the novel trend of drained temperate peatlands rewetting as a viable carbon offset strategy in Russia.

The authors of this paper emphasize the crucial need for continued efforts to ensure that the results of carbon offset projects on drained peatlands rewetting, implemented in accordance with the national methodology within the country's territories, may also satisfy international standards. This underscores the importance of ongoing collaboration, advocacy, and engagement with international entities to promote the acknowledgment of the methodology on drained temperate peatlands rewetting on a global scale. The commitment to international recognition aligns with the broader objective of contributing to worldwide efforts for climate mitigation and sustainable ecosystem management.

References

1. United Nations Convention on Climate Change (UNFCCC) [Internet resource] https://unfccc.int/resource/docs/convkp/conveng.pdf (Accessed: 04.07.2021).

2. Kyoto Protocol to the United Nations Framework Convention on Climate Change [Internet resource] https://unfccc.int/sites/default/files/resource/docs/cop3/l07a01.pdf (Accessed: 04.07.2021).

3. Paris Agreement [Internet resource] https://unfccc.int/sites/default/files/english_paris_agreement.pdf (Accessed: 05.06.2021).

4. Syrchina N.V., Kantor G.Ya., Pugach V.N., Ashikhmina T.Ya. Contribution of carbon dioxide and water to the greenhouse effect // Theoretical and Applied Ecology. 2021. No. 4. P. 218–223 (in Russian). doi: 10.25750/1995-4301-2021-4-218-223

5. Domrachev D.G., Kirillovykh A.A. The legal regime for limiting greenhouse gas emissions as a climate protection tool // Theoretical and Applied Ecology. 2022. No. 1. P. 191–197 (in Russian). doi: 10.25750/1995-4301-2022-1-191-197

6. Gordeeva E.M., Pugach V.N. The Paris Agreement and "climate neutrality": the role of the "Agriculture, forestry and other land use" sector // Theoretical and Applied Ecology. 2021. No. 3. P. 219–227 (in Russian). doi: 10.25750/1995-4301-2021-3-219-227

7. Gershinkova D. Unresolved issues of Article 6 of the Paris Agreement – is a compromise possible in Glasgow? // International Organizations Research Journal. 2021. V. 16. No. 3. P. 69–84. doi: 10.17323/1996-7845-2021-03-03

8. De Andrade Correa F., Voigt C. The Paris Agreement and net-zero emissions: what role for the land-sector? // Carbon Clim. Law Rev. 2021. V. 15. No. 1. P. 1–12. doi: 10.21552/cclr/2021/1/3

9. Ptichnikov A.V., Shvarts E.A., Kuznetsova D.A. On the potential of greenhouse gas absorption by forests of Russia to reduce the carbon footprint of domestic products export // Doklady Earth Sciences. 2021. V. 499. No. 2. P. 181–184 (in Russian). doi: 10.31857/S2686739721080120

10. Zwick S. Article 6 and its Glasgow Rulebook: the basics [Internet resource] https://www.ecosystemmarketplace.com/articles/article-6-and-its-glasgow-rulebook-the-basics/ (Accessed: 09.03.2022).

11. Gordeeva E.M., Vedernikova I.E. Forest carbon projects in Russia: current legal infrastructure // Theoretical and Applied Ecology. 2022. No. 2. P. 209–215 (in Russian). doi: 10.25750/1995-4301-2022-2-209-215

12. Convention on wetlands of international importance especially as waterfowl habitat [Internet resource] https://www.ramsar.org/sites/default/files/documents/library/current_convention_text_e.pdf (Accessed: 04.07.2023).

13. Assessment on peatland, biodiversity and climate change. Main Report / Eds. F. Parish, A. Sirin, D. Charman, H. Joosten, T. Minayeva, M. Silvius, L. Stringer. Wageningen: Global Environment Centre, Kuala Lumpur and Wetlands International, 2008 [Internet resource] https://globalclimateactionpartnership.org/app/uploads/2015/12/Assessment-on-peatlands-biodiversity-and-climate-change-main-report.pdf (Accessed: 04.07.2023).

14. Gordeeva Y., Bakhtina I., Fursa Yu., Shakhmatov K., Belik A. Wetlands – a new direction for the implementing climate projects in Russia // Klimaticheskiy vestnik. 2023. No. 11. P. 3–7 (in Russian).

15. Ptichnikov A.V., Shvarts E.A., Popova G.A., Baibar A.S. The role of forests in the implementation of Russia's Low-Carbon Development Strategy // Doklady

Earth Sciences. 2022. V. 507. P. 981–985. doi: 10.1134/S1028334X22700465

16. Resolution XIV.20. The Ramsar Convention's response to environmental emergency in Ukraine relating to the damage of its Wetlands of International Importance (Ramsar Sites) stemming from the Russian Federation's aggression [Internet resource] https://www.ramsar.org/sites/default/files/documents/library/xiv.20_ukraine_e.pdf (Accessed: 04.07.2023).

17. Preserve Russia's membership in the Ramsar Convention asks the head of the Ministry of Foreign Affairs Expert Council on Nature Reserves [Internet resource] https://zapovedcouncil.ru/sohranit-chlenstvo-rossii-v-ramsarskoj-konvenczii-prosit-glavu-mid-ekspertnyj-sovet-po-zapovednomu-delu/?ysclid=m0nkueevzp279019364 (Accessed: 04.07.2023)

18. Orlov T.V., Shakhmatov K.L. Efficiency analysis of rewetting peatbogs in Tver oblast on the basis of remote sensing data // Geoekologiya. Inzhenernaya geologiya, gidrogeologiya, geokriologiya. 2020. No. 6. P. 74–82 (in Russian). doi: 10.31857/S0869780920060089

19. Günther A., Barthelmes A., Huth V., Joosten H., Jurasinski G., Koebsch F., Couwenberg J. Prompt rewetting of drained peatlands reduces climate warming despite methane emissions // Nat. Commun. 2020. V. 11. Article No. 1644. doi:10.1038/ s41467-020-15499-z

20. Joosten H., Tapio-Biström M.L., Tol S. Peatlands – guidance for climate change mitigation through conservation, rehabilitation and sustainable use. Mitigation of climate change in agriculture. Series 5. 2012. 114 p. [Internet resource] https://www.fao.org/3/i3013e/i3013e.pdf (Accessed: 20.02.2024).

21. Sirin A.A., Medvedeva M.A., Itkin V.Yu. Rewetting of disused drained peatlands and reduction of greenhouse gas emissions // Izvestiya RAN. Seriya geograficheskaya. 2023. V. 87. No. 4. P. 597–618 (in Russian). doi: 10.31857/S258755662304012X

22. Tuittila E.S., Vasander H., Laine J. Impact of rewetting on the vegetation of a cut-away peatland // Appl. Veg. Sci. 2000. V. 3 (2). P. 205–212. doi: 10.2307/ 1478999

23. Richert M., Dietrich O., Koppisch D., Roth S. The influence of rewetting on vegetation development and decomposition in a degraded fen // Restor. Ecol. 2000. V. 8. No. 2. P. 186–195. doi: 10.1046/j.1526-100x.2000.80026.x

24. Van Dijk J., Stroetenga M., Van Bodegom P.M., Aerts R. The contribution of rewetting to vegetation restoration of degraded peat meadows // Appl. Veg. Sci. 2007. V. 10. No. 3. P. 315–324. doi: 10.1111/j.1654-109x.2007.tb00430.x

25. Peacock M., Evans C.D., Fenner N., Freeman C. Natural revegetation of marsh pools after peatland restoration involving ditch blocking – the influence of pool depth and implications for carbon cycling // Ecol. Eng. 2013. V. 57. P. 297–301. doi: 10.1016/j.ecoleng.2013.04.055

26. Natural climate solutions. Review of international approaches. 2022 [Internet resource] https://www.economy.gov.ru/material/file/4cc45c240a939c79ffd2ca08b0d57715/071122.pdf (Accessed: 05.07.2023).

27. Strack M., Davidson Sc.J., Hirano T., Dunn Ch. The potential of peatlands as nature-based climate solutions // Curr. Clim. Change Rep. 2022. V. 8. P. 71–82. doi: 10.1007/s40641-022-00183-9

28. Leifeld J., Menichetti L. The underappreciated potential of peatlands in global climate change mitigation strategies // Nat. Commun. 2018. V. 9. Article No. 1071. doi: 10.1038/s41467-018-03406-6

29. Nugent K., Strachan I., Roulet N., Strack M., Frolking S., Helbig M. Prompt active restoration of peatlands substantially reduces climate impact // Environ. Res. Lett. 2019. V. 14. Article No. 124030. doi: 10.1088/1748-9326/ab56e6