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GEOGRAPHY

The Greenhouse Gas Absorption Potential of Russian Forests and Possibilities for Carbon Footprint Reduction for Exported Domestic Products

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Abstract—This paper analyzes the possibility to reduce the carbon footprint of exported products by implementing forest climate offset projects amid the introduction of the carbon tax on imports of high-carbon products, including those exported from Russia, by the European Union. The role of forests as absorbers of greenhouse gas (GHG) emissions differs significantly in Russia and in the EU. It is suggested that the EU's climate neutrality policy aimed primarily at the reduction of direct CO_2 emissions by sectors such as power, industry, and agriculture is a consequence of the insignificant role of European forests in greenhouse gas absorption. By contrast, Russia can achieve climate neutrality not only by reducing greenhouse gas emissions, but also by increasing their absorption by forests and implementing forest climate projects (FCPs). Taking into consideration the UNFCCC baseline and additionality requirements, three FCP types can be proposed for implementation in the Russian Federation. The possibility to monetize the carbon sequestration function of Russian forests in the framework of carbon offset projects is assessed.

Keywords: climate policy, greenhouse gas balance in forests, carbon footprint of exported products, forest climate projects

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According to the National Greenhouse Gas Cadastre of the Russian Federation, the total greenhouse gas (GHG) emission in Russia is estimated at 2.155 Bln tonns eq. CO_2 per year as of 2017 [1]. The land use, land-use change, and forestry (LULUCF) sector is a net absorber[1] of greenhouse gases in Russia; the main absorbers are forestlands (some 655 million t-equiv CO_2 per year) and grasslands (some 27 million t-equiv CO_2 per year) [1]. This amount provides some 30% of the total greenhouse gas absorption in Russia. According to alternative GHG balance computation techniques developed for forestlands of Russia by the All-Russia Research Institute For Silviculture and Mechanization of Forestry (ARRISMF) [2] and the IIASA [3], the net greenhouse gas absorption by forests amounts to some 1.8 and 1.9 Bln tonns eq. CO_2 per year, respectively, thus reducing greenhouse gas emissions in Russia by some 85%. In this context, Russian forests are a key natural and material asset for implementation of the national climate policy with regards to the absorption of greenhouse gas emissions. Similarly to other countries rich in forests (e.g., Brazil, etc.), the forests of Russia play a fundamental role in its national climate policy.

By contrast, in industrially advanced countries (e.g., EU members), forests play a significantly smaller role in the absorption of greenhouse gases in comparison with Russia. The net absorption of greenhouse gases by forests in the EU is some 300 million t of GHG, which constitutes only 6.8% of its total GHG emissions (4.39 billion t as of 2018) (Fig. 1) [4]. Accordingly, the main priority of the EU's climate neutrality policy is to reduce GHG emissions in sectors such as power, industry, aviation, transport, construction, and agriculture. The major focus is put on energy efficiency, renewable energy, low-carbon technologies, and adaptation to climate change. Concurrently, a draft amendment to the EU directive on LULUCF for 2021–2030 stipulates the possibility to compensate GHG emissions by implementing LULUCF-related *offset climate projects*[2] in EU coun-

[1] Net absorption is the difference between the greenhouse gas absorption and emission (i.e., greenhouse gas balance).

[2] An offset project is a project making it possible to use accumulated emission mitigation outputs in one sector (e.g., LULUCF) to mitigate emissions in another sector (e.g., energy).

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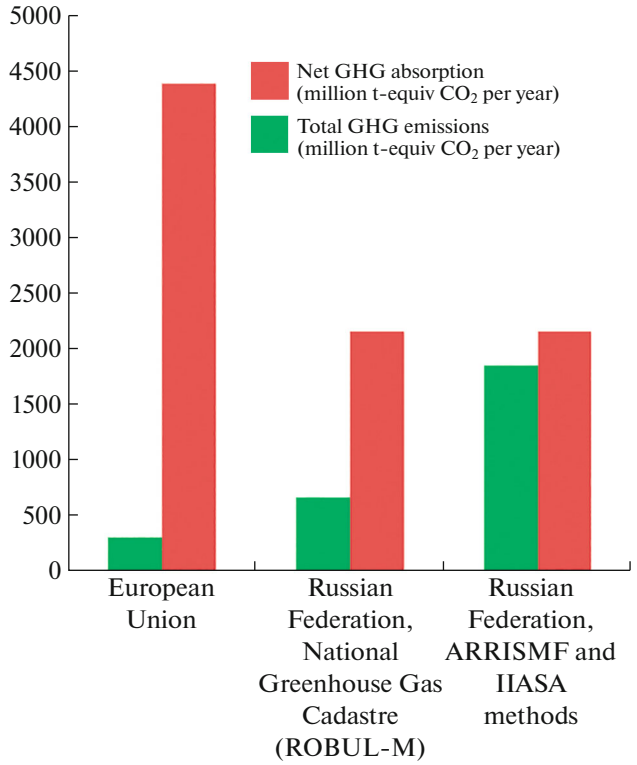

Fig. 1. Role of forests as absorbers of greenhouse gases in Russia and in the EU (computed according to [1] and [5]).

tries; the scope of such projects can be up to 280 million t per year [5].

The EU strives to become climate neutral (i.e., to become an economy with zero net greenhouse emissions[3]) by 2050 [5]. In view of this, the EU is going to introduce a carbon border adjustment mechanism (CBAM) in the next 2–3 years. The purpose of this mechanism is to reduce the carbon footprint of products imported into the EU (6). Expected to be introduced in 2023 the CBAM is a challenge for exporters of high-carbon products from Russia, including metals, cement, fertilizers, etc. Carbon emissions caused by the production of a unit of a given product in Russia are subject to a special carbon tax. Russian exporters *potentially* can reduce their carbon tax either by mitigating their GHG emissions, or, similarly to the EU, by participating in LULUCF-related offset climate projects (provided that such a decision is approved at the negotiations on CBAM implementation between the Russian Federation and the EU) at later stages.

Forest fires and clear cuttings are the main sources of GHG emissions in the LULUCF sector. GHG emissions in forestlands are estimated at some 600 million t-equiv CO_2 per year; approximately half of this amount is associated with forest fires; while the other half is connected with clear cuttings [1]. Offset climate projects can be implemented with the purpose to reduce the emissions and increase the GHG absorption by introducing better forest management practices.

The Paris Agreement adopted in the framework of the UNFCCC stipulates several cooperation mechanisms between the Parties in relation to the transfer of *GHG emission mitigation outcomes*[4] (paragraphs 6.2 and 6.4). The key concept there is *mitigation of GHG emissions*: only carbon units generated by conscious activities resulting in mitigation of emissions can be transferred. Therefore, only the net GHG emission reduction achieved as a result of purposeful actions in excess of the Business as Usual (BaU) forest management scenario can be considered *GHG emission mitigation*. *Climate projects* ensuring the fulfillment of all the above-listed conditions are the main transfer mechanism for *emission mitigation outcomes*.

In the period when Russia was a party to the Kyoto Protocol (2008–2012), Russian organizations registered 93 national climate projects with the UNFCCC structures. According to Forest Trends, in total, 254 Forest Climate Projects (FCPs) have been or are being implemented worldwide [7].

We have identified two main "monetization" directions for the LULUCF carbon sequestration potential: (1) accumulation and realization of *carbon units* (CU) accumulated in projects on the market; or (2) their 'assignment' from forest climate projects to exporters in order to meet the requirements set for the carbon footprint of their products.

According to the UNFCCC requirements, the mandatory components of any project are its baseline (i.e., the Business as Usual scenario, BaU) and additionality; transferable carbon credits can be accumulated only in the framework of the additionality component. For instance, in a basic forestry scenario, the lessee fells 100% of trees within the cutting area and performs the minimum reforestation and fire prevention procedures stipulated in the legislation. The additionality appears if the lessee uses better forest management practices (i.e., reduces the clear cutting area, introduces enhanced reforestation techniques, puts emphasis on partial improvement felling, etc.). In other words, it is not the entire net amount of carbon accumulated by forests that is eligible for "monetization," but only the part of it generated in excess of the baseline scenario. The current net GHG absorption by Russian forests is estimated at 655 Mln tonns eq. CO_2 per year, but its "monetization" potential is significantly lower. Our assessment indicates that it does not exceed 25–30% of the net absorption value (i.e., 165–200 million t-equiv CO_2 per year), which makes it possible to offset some 10% of the total GHG emission in Russia.

[3] Taking into account the GHG absorption in the LULUCF sector.

[4] Emission mitigation outcomes can be transferred either free of charge or on a reimbursable basis. In the latter case, this refers to international trade in GHG emission mitigation outcomes.

Table 1. Types of forest climate projects suitable for implementation in Russia

FCP type	Baseline	Additionality
FCPs involving voluntary preservation of forests by lessees: preservation of high conservation value forests under the FSC/PEFC certification	100% of trees within the cutting area are felled	Lessees voluntarily preserve forests from felling and fires using enhanced fire prevention and suppression techniques
FCPs in the framework of improved forest management that contributes to a better GHG absorption: intense forest use and forest regeneration projects	Extensive forest use	Wood growth increases as a result of active forest maintenance, selective felling, and enhanced fire prevention techniques
FCPs in the framework of protective afforestation and reforestation programs implemented on treeless forest fund lands (earlier covered by forests) and on agricultural lands (field and erosion-preventing afforestation)	Treeless areas, degraded forest ecosystems	Formation of forests resistant and resilient to climate changes; restoration of native forest ecosystems

We propose several FCP types aimed to increase the natural capital of forests in terms of carbon sequestration and to enhance forest management in the Russian Federation (Table 1).

To reduce the impact of the planned EU's carbon taxes on exporters, the respective government authorities have to create favorable conditions for implementation of forest climate projects in the LULUCF sector, without jeopardizing the environment and biodiversity of forest ecosystems. An example of regulation that reduces the possibilities for FCP implementation is order No. 3-r of the Ministry of Natural Resources and Environment of the Russian Federation (Minprirody) of January 20, 2021. This order effectively makes the implementation of FCPs aimed at the prevention and suppression of forest fires in reserve forests unprofitable and reduces the national FCP potential by some 100 million tons per year.

Climate neutrality is the primary goal for the low-carbon development strategy of the Russian Federation. Achievement of this goal requires a coordinated policy aimed at the fundamental improvement of forest management and creation of favorable conditions for FCP implementation.

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COMPLIANCE WITH ETHICAL STANDARDS

Conflict of Interest

The authors declare that they have no conflict of interest.

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