

RUSSIA

LAND USE

*As Russia's climate policy comes under fire,
burning forests risk depleting carbon sinks.*

DOWNLOAD THE GLOBAL REPORT AND OTHER CASE
STUDIES AT WWW.CLIMATE-CHANCE.ORG





As Russia's climate policy comes under fire, burning forests risk depleting carbon sinks.

Angelina Davydova • Office of Environmental Information • Timothy Nutter • Office of Environmental Information
Alexey Kokorin • WWF Russia • Antoine Gillod • Climate Chance Observatory

As the world's largest country, located in the Northern lands of the Northern hemisphere, Russia is home of dense boreal forests as well as immense swaths of low-vegetation lands. In recent years, those lands have been fighting with a double edge sword: intense climate warming reaching record-highs in some of the coldest lands on Earth is increasing the frequency and intensity of wildfires, while contributing to the melting of permafrost which, in return, liberate potent greenhouse gases that reinforce the warming effect. This climate change positive feedback is of great concern not only for Russia, but for the whole world's capacity to balance emissions with absorption from biomass. This case study proposes to explore the policies the Russian Federation and non-state actors have implemented over the last years to mitigate this trend.

CONTENTS

- 1 RUSSIAN FORESTS, A POTENT CARBON SINK IN DEPLETION.**
- 2 FACING AGEING FORESTS THREATENED BY INTENSE WILDFIRES, THE FEDERAL GOVERNMENT ENGAGES REFORMS.**
 - Drivers of transformation in Russian forests
 - Russian 2030 climate objectives' high dependency on reversing the trend of LULUCF absorption.
 - Reforms in forestry management engaged at national level.
- 3 FEDERAL AND REGIONAL GOVERNMENTS ON THE FRONTLINE TO ADAPT TO INCREASING CLIMATE-DRIVEN FIRES.**
- 4 THE RUSSIAN MAJOR WOOD INDUSTRY DEMONSTRATES LEADERSHIP IN FORESTRY CERTIFICATION.**
- 5 NGOS, A DRIVING FORCE TO EDUCATION AND TO SUPPORT BUSINESS INITIATIVES AND RAISE EDUCATION ABOUT FORESTRY.**



Key takeaways



Russian national greenhouse gases levels are almost stable, around 32% of 1990 levels excluding net-absorption/emissions from Land Use, Land-Use Change and Forestry (LULUCF), and 49% of 1990 levels including LULUCF (2017). As Russia's mitigation targets fail to live up to expectations, the country relies a lot on the absorption capacity of its forest to maintain at level its carbon footprint.



Yet, according to BAU scientific scenarios, Russia is facing a slow but steady depletion of the net-absorption capacity of its forests by the 2040s, due ageing trees, record-breaking forest fires and change in purpose of felling trees. Losing its net carbon-sink would lead Russia off track of its NDC target, and even further away from Paris Agreement targets.



Facing record-breaking forest fires over the last few years, the Federal government has engaged in reforms to extend local governments ability to fight fires remote from human settlements, protect areas from exploitation and encourage effective forestry management. While focusing on adaptation, Russia recognizes the importance of forest to reach its emission targets, but falls short of implementing effective LULUCF strategy for mitigation purposes.



With over 56 million FSC-certified hectares of forest in 2020, up from 49 million in 2019, Russia stands out as a leading country in forest management certification. Certification programmes have been one of the most efficient tools to embark companies into sustainable forestry management.



International and local NGOs prove indispensable to drive voluntary initiatives from business such as reforestation, sustainable forestry management and deforestation-free supply chains. Massive tree planting initiatives often sprout after drought episodes and intense forest fires, through NGO-companies partnerships.

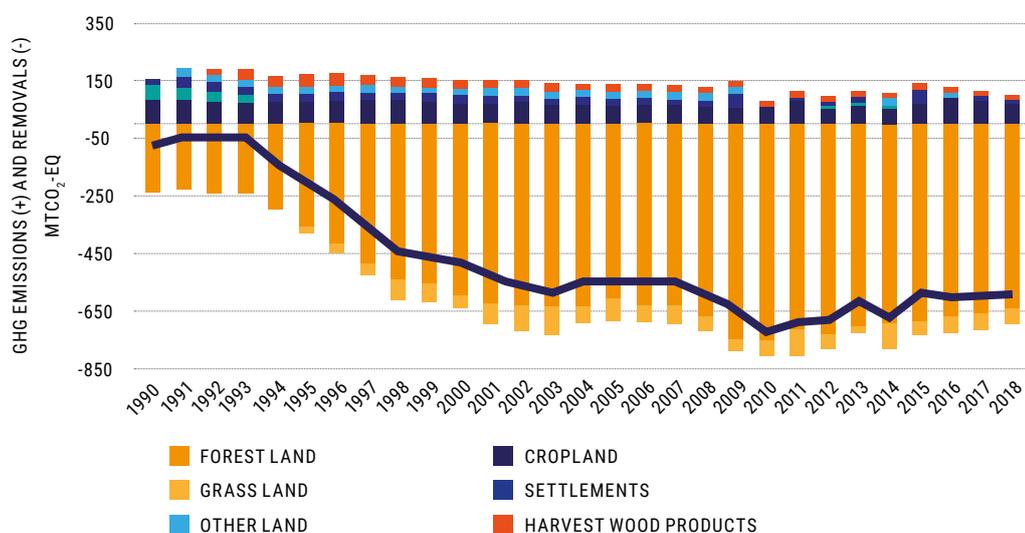
1. Russian forests, a potent carbon sink in depletion

During the 1990-2000 decade in Russia, the Land Use, Land-Use Change, and Forestry (LULUCF) sector became a significant net absorber of CO₂ from the atmosphere. Since then the growth of absorption has stopped, and the maximum net absorption values were registered in 2009-2012: 670-720 MtCO₂e per year, after which there was a decrease (Russian Federation, 2020). In 2016, 2017 and 2018, the net absorption in the LULUCF sector was 601, 591 and 591 MtCO₂e respectively (fig. 1). Such net absorption offset more than 25% of greenhouse gas (GHG) emissions in the energy sector and other sectors of the Russian economy.

FIGURE 1

GHG EMISSION AND REMOVALS ON MANAGED LANDS OF THE RUSSIAN FEDERATION, MTCO₂E

Source: Russian Federation, 2020



Both official national reports (Russian Federation, 2017) and scientific works (Zamolodchikov et al., 2013; Kokorin, Lugovaya, 2018) project the Russian LULUCF sector to show a strong decrease in net absorption. This contrasts with forecasts for the country's energy sector and general economic development, both of which project stable (or slightly decreasing) emissions through 2030 (Makarov et al., 2019). The value of the Land Use sector is at least 20% of all emissions from Russia in 1990, while in other sectors of the economy the combined reduction of emissions will not exceed 5%.

However, recent changes in the carbon sequestration methodology, which calculates the amount of carbon absorbed by forests and ecosystems imply that the "managed forests" category will also include reserve forests and forests on agricultural land (Executive Order of the Ministry of Natural Resources of the Russian Federation of January 20, 2021 No. 3-r on amendments to the guidelines for quantifying the volume of absorption of greenhouse gases). Besides, carbon emissions now are accounted for according to the actual areas of forests that died because of forest fires, pests, clear-cuts, windblows and other unfavourable factors, rather than to the average areas. According to the Ministry statement, the cumulative effect of these adjustments may amount to the recording of an additional 270–450 million tons of CO₂ sequestration. As a consequence, the balance of GHG absorption by Russian forests would grow from about 0.55 to 1.1 GtCO₂ per year.

Factors causing reduced absorption in LULUCF include the slow, inexorable change in the age structure of forests and the rapid, preventable impact of fires and clearcutting. Possibilities for increasing



CO₂ absorption in LULUCF ([Romanovskaya et al., 2019](#)) and avoiding its catastrophic reduction, as well as measures to adapt the sector to climate change ([Torzhkov et al., 2017](#)) have already been studied by Russian scientists. The total mitigation potential of managed land in Russia is estimated at about 545–940 MtCO₂e/year, which would compensate for an additional 4.5–7.8% of current global net GHG emissions from land use ([Romanovskaya et al., 2019](#)).

Factors causing net absorption of CO₂ by LULUCF are twofold: absorption due to above-ground biomass growth of about 900 MtCO₂/year is the main part, but accumulation in dead wood and soil is also significant and adds about 200 MtCO₂/year ([Russian Federation, 2019a](#)). These are annual net values reflecting natural cycles, in particular the difference between growth and decay of living biomass, the increase in the amount of carbon stored in dead biomass, litter and soil.

The total net absorption is “resisted” by emissions from external factors, such as logging and fires. Their total effect is approximately 600 MtCO₂/year, which “eats” half of the net absorption. Contributions of felling and fires are approximately the same at 300 MtCO₂/year each ([Russian Federation, 2019a](#)). Also, the main role of biomass losses is the same during felling and fires, accounting for 2/3 of the effect, with the remainder being derived from the loss of soil carbon and dead wood (dead before felling or fire). At the same time, it is essential to note that in Russian bioclimatic conditions, the loss of forests directly in case of fire is relatively small, since these are mainly lowland fires. However, from a climatic point of view, these lowland fires reduce CO₂ absorption in forests for decades afterwards, an effect due to the large quantity of decomposing dead biomass and the stopping of tree growth.

Still, land use is a broader area, which, apart from the forest absorption also includes carbon sequestration in soils. For example, soil degradation leads to soil carbon losses. Soils of temperate latitudes, especially in the boreal zone, are giant carbon sinks, storing twice as much carbon in their soil as they reserve in phytomass. Carbon sequestered in managed forests in Russia is estimated at 45–65 billion tons of carbon for soil carbon, 25 billion for phytomass, and 10 to 20 billion tons for mortmass and litter, according to different assessments ([Zamolodchikov et al., 2013](#)).

The accurate calculation of the Russian inventory of GHG and removal remains a contested field. The figures presented here differ from those provided by Russia to FAO due to differences in methodology. In the reports of the Russian Federation to FAO the average value for the life of forest stands is used, which is approximately 100 years in Russia. This approach tends to overestimate the absolute values of net absorption and underestimates the changes in net absorption. Additionally, it does not consider such effects of felling and fires as the long-term decomposition of dead trees and cuttings ([Kokorin, Lugovaya, 2018](#); [Romanovskaya et al., 2019](#)).

IPCC methodology distinguishes land use categories and calculates the dynamics of carbon stocks in terms of wood products (an increase in reserves means absorption and a decrease means emissions). For example, forest land is the main contributor and net sink of CO₂ (components of this process, such as felling, fires and other factors are discussed below), cultivated agricultural land a small net source, and hayfields a small net sink.

Russia’s expert, business and NGO communities is slowly becoming more aware of the importance of the land use sector and efforts in sustainable forestry management, reforestation and fighting the wildfires. Several NGOs and business initiatives have been realised in recent years aimed at reforestation or fighting with forest fires.

2. Facing ageing forests threatened by intense wildfires, the Federal government engages reforms

• **DRIVERS OF TRANSFORMATION IN RUSSIAN FORESTS** • Forested lands in the Russian Federation accounts for 70% of boreal forests (**Box 1**) and 25% of total forest worldwide, an area measured by the State Forestry Register at 1,188 million hectares, ([Russian Federation](#), 2019a). The area covered by forest vegetation saw only an insignificant decrease between 2010 and 2018.

KEYS TO UNDERSTANDING

BOREAL FOREST, A CRUCIAL BIOME FOR GLOBAL CLIMATE REGULATION

Boreal forests are forests growing in an environment of high latitudes, where negative temperatures persist from six to eight months a year and trees can reach a minimum height of five metres with a canopy cover of 10% or more. Historically, boreal forests have developed under the constraints of short growing seasons and harsh winters, during which snow cover occurs for several months. About a third of their territory is underlain by permafrost. Boreal forests are characterized by a low variety of tree species, of which gymnosperms such as *Larix*, *Pinus*, *Abies* and *Picea* usually predominate with varying amounts of *Betula*, *Populus* and *Alnus* angiosperms in plantations, which nevertheless support thousands of living organisms. Boreal forests account for about 30% of the world's forest area, contain more surface freshwater than any other biome, and include large areas of mostly low-productivity unmanaged forests in high-latitude regions of Canada, Russia and Alaska. Boreal forests are one of the most important regulators of the planet's climate through the exchange of energy and water. They also store enormous amounts of biogenic carbon – as much as, if not more than, tropical forests – approximately 20% of the carbon absorbed by all of the Earth's forests is stored in the boreal zone ([Gauthier et al.](#), 2015).

BOX 1

FIGURE 2

A MAP OF ALLOCATION OF MANAGED FOREST LANDS ON THE TERRITORY OF THE RUSSIAN FEDERATION. PERCENTAGE SHOWS A SHARE OF MANAGED FOREST LANDS FROM THE TOTAL SQUARE OF THE REGION. BLUE AREAS SHOW TUNDRA SPACES.

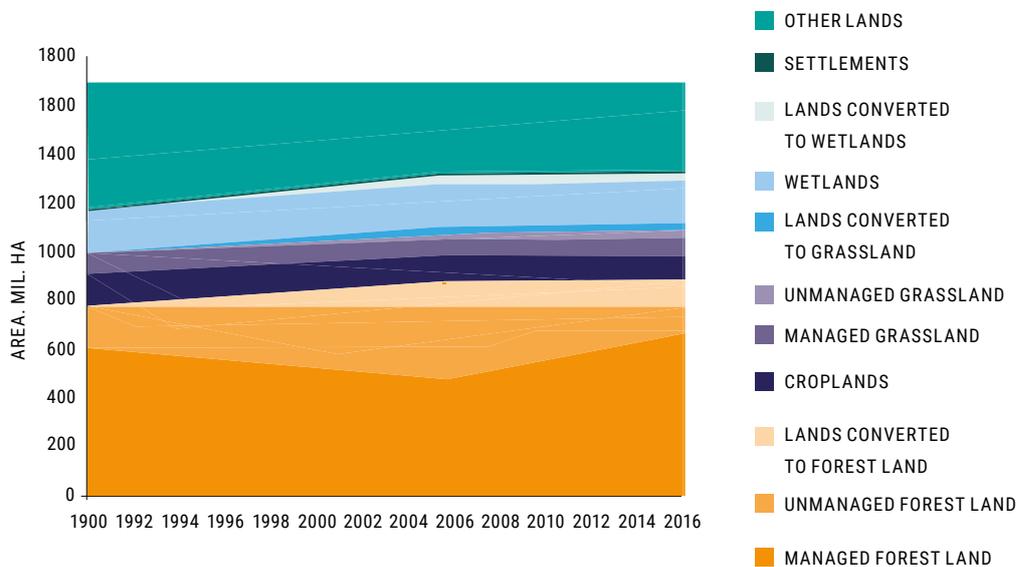
Source: *National Inventory of Anthropogenic Emissions and Absorptions by Carbon Sinks, not regulate by the Montreal Protocol, 2020*





FIGURE 3

DYNAMICS OF LAND AREAS OF THE RUSSIAN FEDERATION.

Source: [Romanovskaya et al., 2019](#)

When it comes to assessing and measuring the impact of lands on carbon emissions, UNFCCC-IPCC rules state that a country is responsible only for forests with at least minimal management activities. If forests are only subject to satellite or aerial observation, they are considered “unmanaged” and their greenhouse gas balances are not included in LULUCF reporting (however, the corresponding flows are estimated). Official statistics note only one large-scale effect over the last decade – the conversion in 2009 of a part of unmanaged forest land to managed forest (**fig. 3**).

However, the last 10 years have also seen three major factors alter Russian land-state and impact carbon emission trends: change in forests’ age structure, large increases in the volume of timber harvested, and areas lost to forest fires.

In recent years, forest fires have increased in range and intensity. In 2019, forest fires were found to have covered an area of about 10 million hectares, although huge discrepancies between data tend to cast uncertainty about the exact toll (**Box 2**). According to the ISDM-Rosleskhov (Russian Forestry Agency) remote monitoring system for forest fires, in 2020 the total area of forest fires on lands of all categories amounted to 16.515 million ha. According to the operational reports of Avialesokhrana (Avia Forest Protection Agency, i.e. official reporting on forest fires on the lands of the forest fund), the area covered by forest fires on these lands decreased in 2020 compared to last year – from 10.079 million hectares to 9.268 million ha, that is, by about 8% ([forestforum.ru](#), 14/01/2021).

The State makes significant efforts to restore forests, on the order of 1 million hectares each year. But by Russian standards this is a small amount, being only a fraction of the area destroyed each year by fires. 20% of this reforestation effort amounts to planting, while the remaining 80% refers to areas where natural reforestation is being assisted. While both are indeed approaches to reforestation, CO₂ absorption from the atmosphere during the first ten years of forest life is lower for natural reforestation than planting.

FOREST FIRES TEND TO INCREASE IN RANGE AND INTENSITY, BUT RUSSIA FALLS SHORT OF CONSISTENT DATA TO TRACK THE RECORD.

From July to September of 2019 Russia experienced one of the most extensive, intense and severe forest fires in its history. Official satellite observations from the remote monitoring system ISDM-Rosleshoz (the Federal Forestry Agency), published by the Ministry of Natural Resources in the report *On the state and protection of the environment of the Russian Federation in 2019*, estimated the total area covered by fires during the height of the fire season at more than 3 million hectares, amounting to around 10.3 million hectares in the overall summer/ autumn 2019: of these, “only” 150 thousands have actually burned. Economic tally of the fire season was estimated to be around 15 billion roubles (~EUR 210 million of 2019) ([TASS](#), 17/12/2019). Yet, those figures reveal how forestry monitoring is difficult in Russia, as they appear very inconsistent according to sources. Indeed, the Space Research Institute of the Russian Academy of Sciences (IKI) estimates that the total land area of all types covered by fires was 16 million ha, 10.3 million of which were forest lands and 4.19 million ha were effectively killed in 2019, i.e. ... 41 times more than the figure provided by the Ministry of Natural Resources and the Federal Forestry Agency ([Bartalev et al.](#), 2020; **fig. 4**). Meanwhile, Global Forest Watch, based on data provided by University of Maryland, Google, US Geological Survey, and NASA, claim the tally of forest areas lost because of wildfires amounted to 2.71 million ha ([Global Forest Watch](#), 2020). In addition, global press articles add up to the general confusion when covering the events and relaying data, as they tend to mix land covered by fires with land killed by them. Among the causes of the fires were higher summer temperatures in Siberia (almost 10°C higher than the long-term average of 1981-2010) and forest mismanagement. By early August, CO₂ emissions from Siberian forest fires amounted to 82 million tons, bringing the total figure for Russia since the beginning of the year to 284 million tons, 1.6 times higher than the average amount, according to Russia’s Institute of Global Climate and Ecology ([RIA Novosti](#), 08/08/2019). A state of emergency was introduced in several affected regions for a few weeks in July and August. Several public campaigns and petitions have called for more aggressive action from Russian authorities.

The Russian *Second Assessment Report on Climate Change* correlates fire risk with global anthropogenic greenhouse gas emissions (IPCC RCP scenarios). In the worst-case scenario of RCP8.5, by the end of the century large forest areas of the country will see increases of 20-30 and even 30-40 days. In case of the more favourable scenario RCP4.5, such areas will see increases of 10-15 and 15-20 days, respectively. Fully 70 regions out of the total 85 regions of the Russian Federation will see increased fire risk by the middle of the century, 75 by the end of the century ([Russian Federation](#), 2014)..

BOX 2

Russian forests are also experiencing a shift in their age structure, towards an increasing proportion of old forests. Such forests store more carbon than younger forests but have much lower net absorption rates of CO₂ (or even negative for some old forests). This shift is an inevitable consequence of large-scale logging in the 1960s and 1980s, which was accompanied by large emissions of CO₂ (in 1990, forests in Russia were net sources of CO₂ in the atmosphere). These logging operations shifted the age structure towards young ages, which led to a strong absorption of CO₂ from the atmosphere in the 2000s with the growth of young trees and continues to do so now. The observed age structure of these forests signals that this effect will soon disappear ([Kokorin, Lugovaya](#), 2018; [Russian Federation](#), 2019).



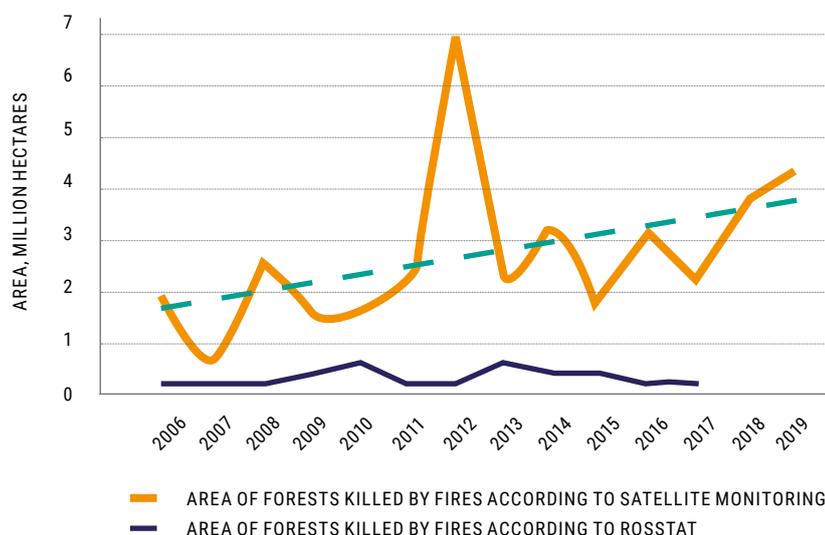
As of 2018, old and very old forests contained about 60% of the total national timber stock. From a GHG emissions perspective, this is an extremely negative state of affairs, implying that Russian forests have the potential to absorb much more CO₂ than they currently do. However, it may serve as an argument for expanding the State and business logging operations. Indeed, the State has established the allowable rate of felling (wood removal) at three times the rate of the actual felling. While the State recognizes the need to adapt forests and forestry to climate change, the mitigation potential of forests for GHG emissions remains unrecognized and underused.

The dynamics of total felling indicates a stable situation, with weak growth in the volume of harvested wood. This is deceptive, however, if one pays attention to the structure of felling. Recent years have seen strong growth of clear-cuts with a simultaneous reduction of sanitary felling and a very low level of felling for forest management (Russian Federation, 2019a). In this situation, an important role falls to NGOs, as well as to science, to convey the problem to the State and strengthen the requirements for the implementation of potential measures to preserve and enhance the absorption of CO₂ in land use in Russia.

FIGURE 4

AREAS KILLED BY FOREST FIRES ACCORDING TO ROSSTAT INFORMATION IN COMPARISON TO REMOTE SENSING DATA FROM THE SPACE RESEARCH INSTITUTE OF THE RUSSIAN ACADEMY OF SCIENCES

Source: [Bartalev et al., 2020](#)



• **RUSSIAN 2030 CLIMATE OBJECTIVES' HIGH DEPENDENCY ON REVERSING THE TREND OF LULUCF ABSORPTION** • With one year leading up to the global revision and expected rise in ambition of National Determined Contributions (NDC) at COP26 in Glasgow (before it was delayed to 2021), Russia finally joined the Paris Agreement on 23 September 2019. Under the pressure of lobbyists, President Putin had for that purpose to bypass Parliament agreement, through a decree signed by the Prime Minister Dmitry Medvedev.

Although a very welcome diplomatic move, it has still yet to prove efficient as Russia – the world's fourth-largest GHG emitter – remains pointed out for having such a weak target in its NDC. The Federation of Russia eventually published its new NDC in November 2020, with a commitment to maintain its emissions by 2030 below 70% of 1990 level (UNFCCC, 2020). A target that implies no additional action compared to 2015 INDC, analysts say, as Russia has already reached this level after emissions plummeted in the aftermath of the dissolution of the Soviet Union in 1990 (IISD, 02/12/2020).

Indeed, Russia had already committed in 2015 to “limiting anthropogenic greenhouse gases (GHG) in Russia to 70-75% of 1990 levels by the year 2030”; however, this 1990 baseline is prior to the collapse of the Soviet Union’s heavy industry-dependent economy, which led to a dramatic downturn of levels of GHG emissions that Russian Federation has never reached again. Excluding the LULUCF sector, Russia’s current emissions account for 67.6% of 1990 levels, and when including LULUCF, only 50.7%. These values refer to 2017, but there have been no significant changes in this ratio for many years ([Russian Federation](#), 2019). As a result of this lacklustre ambition, Russia’s commitments are marked “critically insufficient” by [Carbon Action Tracker](#) (i.e. aligned with >4°C scenario) and recorded the lowest ranking in GermanWatch’s *Climate Change Performance Index 2021* ([GermanWatch](#), 2020).

Russia’s NDC now explicitly claims to “take into account the maximum possible absorptive capacity of forests and other ecosystems”, a matter of importance if Russia is indeed to follow the past decade trend of yearly growing emission ([UNFCCC](#), 2020).

However, just as changes to forest fires, felling, and forest age structure have affected forests in the Russian Federation, so have they affected emission rates and expected emission trends. The prognosis for the land use sector according to Business-as-usual scenarios (BAU) shows that without special measures, the carbon balance in the stands (net absorption of phytomass) may decrease by 2030 by 2-3 times from the 2010 level. A more comprehensive accounting covering all carbon sinks, including soil, predicts an even higher level of reduction ([Russian Federation](#), 2017; [Zamolodchikov et al.](#), 2013). Consequently, the gap between emissions dynamics with and without LULUCF would tighten. In 2017, the difference was 17% (as a percentage of the country’s total emissions in 1990). By 2020, it is expected to decrease to 13%, and by 2030 to 11%, primarily due to decreased net absorption of CO₂ by Russian forests ([Kokorin, Lugovaya](#), 2018). Meanwhile, the BAU scenario prognosis for national emissions in energy and other sectors without LULUCF remains at a stable level of about 70% of 1990 by 2030 ([Makarov et al.](#), 2019). With non-LULUCF emissions stable and LULUCF absorption significantly weakening, there is a risk for Russia not to meet its 2030 targets without additional action to BAU measures.

• **REFORMS IN FORESTRY MANAGEMENT ENGAGED AT NATIONAL LEVEL** • In the meantime, there is ongoing reform of the forestry sector in Russia and also further amendments to regulations of firefighting policies. Three types of major legislation amendments are of paramount importance regarding the land use sector.

The first one is development and support for intensive forestry management systems¹. The St. Petersburg Forestry Research Institute has worked out a [Strategy for the Intensive Use and Restoration of the Forests](#) (commissioned by the Russian State Forestry Agency). The strategy recommends more active forest tending until the forests are mature, to avoid losses in the quality of forests resulting from changes in wood species. Another aim of the new strategy is to receive more forestry products from the area unit. Following the strategy, the Ministry of Natural Resources and Environment developed and adopted amendments for the [forest restoration rules](#) (2019) and for the [forest tending rules](#) (2017). These amendments require the introduction of new regulations and norms for tending and restoration for the four forest areas in Russia, and a further two forest areas in the future. The WWF-Russia forestry experts think that this will allow secondary forests to be used more effectively and to decrease risks and threats for the virgin (frontier) forests. The transfer to the new norms and regulations for private companies, working in the regions (the leaseholders) is voluntary. At the same time, some companies, such as the Ilim Group, Russia’s leader in the pulp and paper industry, Mondi Syktyvkar, another big player in the sector, and a few others have already adopted an intensive model of forest management.

¹ In the context of Russia, “intensive forestry management” refers to the allocations of lots where trees are cut, then reforested for logging purposes later.



KEYS TO UNDERSTANDING

MITIGATION OPTIONS FOR LAND MANAGEMENT.

According to Russia's 2015 INDC, "Rational use, protection, maintenance and afforestation, i.e. forest management, is one of the most important elements of the Russian policy to reduce GHG emissions". This is not a matter of single measures such as mass reforestation, but of integrated forest management change. The question is even broader – changing all land use, and this issue is the subject of close attention of Russian scientists. In particular, [Romanovskaya et al. \(2019\)](#) produced a recent assessment of the mitigation potential of some land management activities, summarized in the table below.

| Measure | Description | Annual Mitigation potential | Complementary measure | Complementary mitigation potential |
|---|---|---|--|------------------------------------|
| Active firefighting | Monitoring fire hazards and rapid extinguishing of fire in all fire-hazardous areas | 220-420 MtCO ₂ /y (15% of anthropogenic emissions in 1990) | Active forest management: timely removal of combustible material from forest | |
| Changes in timber harvesting technology | Gentle logging regime to avoid soil disturbance | 15-59 MtCO ₂ /y + | Use of wood cutting residues | 61-76 MtCO ₂ |
| Optimizing age of felling forests and species composition | Transforming forests into quasi-plantations with no harm to biodiversity | n.d. | Replacing coniferous monocultures with mixed and deciduous species | 50-70 MtCO ₂ |
| Optimal use of organic fertilizers | Reducing to zero loss of soil carbon in arable land | 101-159 MtCO ₂ /y | Eliminating agricultural burning and stop losses of grassland soils | 15-30 MtCO ₂ /y |
| Optimizing use of wood and wood products | Transition from roundwood exports to wood production exports | 17-26 MtCO ₂ /y | Full reuse of paper and use of extra-wood for long-term products only | 51-79 MtCO ₂ /y |
| Other | Land drainage, prevention of peat fires, restoring degraded lands | 13-19 MtCO ₂ /y (reclaiming 50,000ha/y) | | |

Totalling the above measures, the mitigation potential of LULUCF in Russia can be estimated as 545-940 MtCO₂/year, which would compensate for 20-35% of the current anthropogenic emissions of the country. Yet, if fully implemented, these measures would only prevent half of the reduction of net absorption. The specified measures can and should be implemented in ways that are also positive from environmental, food and social perspectives. Their implementation requires vigorous action by the public, as the State and business action alone will be insufficient, many of these measures not being perceived by these sectors as beneficial. In the long term, they clearly benefit agriculture and forestry, but in the short term they are often perceived as "unnecessary" costs.

BOX 3

The second type of reform is further amendments to the State Forestry Strategy which require keeping precious frontier forests from any kind of commercial exploitation. The recent amendments put around 2 million hectares of such forests into this category in several regions in the North of European part, Altay Region and the Far East of Russia, which over the next five years will prevent the emission of 450 MtCO₂ (90 MtCO₂ per year), according to WWF-Russia estimations.

The third type of legislative reform is the regulation of forest firefighting policies. In early November 2019, Russia's Ministry of Natural Resources and Environment prepared a draft legislation amending the rules for putting down forest fires ([Kommersant](#), 07/11/2019). It addresses forest fires in areas far from human settlements, which previously have not been put down if potential costs for fighting the fires were higher than potential damages. The new legislation draft suggests that more extensive areas where forest fires originate will be covered by firefighting activities, which, according to Greenpeace's estimations, can be up to a half of all forest area, which could potentially lead to more effective firefighting and prevention strategies. As for now, the legislation is still in the pipeline. The Ministry is reportedly thinking of cancelling the so-called "control zones", those areas where regional authorities are not obliged to put down the forest fires because they are too far away from human settlements. Now, those areas cover around half of Russia's forest area, while the Ministry suggests bringing a total area of "control zones" down to 6% of the total forest area ([Kommersant](#), 23/06/2020).

3. Federal and regional governments on the frontline to adapt to increasing climate-driven fires.

Covering more than 17 million km², Russia is by far the largest country in the world. Its vast territory is administratively divided into 85 "Federal subjects of Russia" sharing the same constitutional status but bearing different names for historical reasons and with various degrees of autonomy/self-regulation. Forty-six of them are called *oblasts*, the equivalent of regions in the most populated areas. Besides, 22 *Republics*, formerly autonomous under the Soviet Union, have their own languages, constitution, and nationalities (Komi, Chechnya, Tatarstan, etc.). Nine *Krai* refers to regions that used to integrate national subdivisions under Soviet Union. Four autonomous districts (*Okrougs*) were created on an ethnic basis but three of them are now placed under the authority of an oblast. And finally come one Jewish Autonomous Oblast, which is located near the north-east border to China, and three cities of federal importance ("federal cities") which are Moscow, Saint Petersburg, and Sevastopol, in Crimea. All of them will be referred to as "regions" in the following lines.

Climate change risks are already widely recognized by the Russian government, businesses, and the public. But both federal government and non-state actors (cities, regions or companies) are focusing primarily on adaptation, leaving prevention (and mitigation) for the future. Russia's national climate target has been extremely timid, while regions and cities generally lack emission reduction targets entirely.

Large, federal cities such as Moscow and Saint Petersburg are exceptions, as they have been tracking their inventory of GHG emissions over the last few years and have also developed local climate adaptation strategies. Moscow is the only Russian member of the C40 (a network of the world's megacities committed to addressing climate change) and has been hosting the [Climate Forum of Cities](#) from 2017 to 2019, before the 2020 event was cancelled because of the pandemic.

The government has recently adopted the first National Adaptation Plan which identifies "positive" and "negative" consequences of climate change for Russian forests ([Reuters](#), 10/01/2020). On the one hand, boreal forest "productivity" is expected to grow under warmer climate; on the other hand, the frequency and scale of forest fires should increase. Regional leaders continue speaking about adaptation, including forestry and agriculture. Much less attention has been paid to mitigation measures, especially to those that would increase the absorption of CO₂ in the land use sector. This may be explained, as aforementioned, by the fact that official statistics do not show the decrease in absorption rates.



The Federal Ministry of Economic Development and the Ministry of Natural Resources and Environment lead the development and implementation of climate action both in mitigation and adaptation, with analytical support from [Roshydromet](#), its weather and climate service, and [Rosleshoz](#), the federal forest authority. While Ministries involved in climate change policy develop sectoral risk assessments and strategies, regional and city governments oversee their respective regional development programmes and adaptation strategies. These are typically designed and implemented by local environment authorities.

The overall national policy strategies, plans and actions (as well as standards) in the forestry sector are being defined by the federal authorities, however, regional authorities are responsible for day-to-day running of the sector, making contracts with businesses, providing statistics and fighting forest fires. When regions the area and intensity of forest fires become too large, regions receive federal help both in financial and technical form.

The cooperation between the Federal State and the regional and local authorities is particularly important, especially in fighting forest fires. The peculiarity of forest fires in Russia is that they are mainly concentrated in Siberia and the Far East, where they are extinguished only when the fire starts to threaten populated areas or infrastructure (roads, bridges...), protected nature areas, etc. Firefighting measures, both preventive, which reduce the risk of fire spread, and operational, require large amounts of money and a leading role for the State is to quickly detect and extinguish fires at an early stage, regardless of their remoteness. While business is ready to participate in these measures only when fires directly affect its facilities, the local community becomes active earlier, at the first sign of fire or smoke. But in sparsely populated areas such community response is almost non-existent.

In addition, the role of the Russian public – NGOs in general, in Moscow, in the centres of the Federal Districts and regions – becomes even more important. For instance, in October 2019, the Arkhangelsk region adopted a resolution on the establishment of Regional Dvina-Pinega Landscape Reserve, to protect 300,000 hectares of taiga that counts among the latest intact forests in Europe. This resolution was inspired by the 17 year-long work of NGOs and scientists to understand and highlight the ecological value of the site. The Institute of Ecological Problems of the North of the Ural Branch of the Russian Academy of Sciences, along with WWF-Russia, led several negotiations and managed to gradually integrate the region into Arkhangelsk territorial planning, while leading dialogue with timber companies to fix the reserve's frontiers ([WWF Russia](#), n.d.).

Yet, the role of regional authorities to act on the issues is not likely to increase over the next few years, since fighting forest fires will require more direct financial and technical assistance from the federal government.

4. The Russian major wood industry demonstrates leadership in forestry certification.

Russia stands out as a leading country in forest management certification, including logging, according to the Forest Steward Council (FSC) standard. Certification programmes have been the most efficient tool to embark companies into sustainable forestry management.

With over 56 million FSC-certified hectares of forest in 2020, up from 49 million in 2019, Russia has recently overtaken the long-term leader, Canada. The total volume of annual certified wood products produced in Russia exceeds 50 million m³ (FSC Russia, 2020). By December 2020, Russia recorded 228 holders of forest management certificates, and 877 supply chain certificate holders. They include majors companies as Ilim Group, or **Segezha Group, the leading Russian paper packaging industry and reportedly “the largest forest user in Russia”, whose leased wood are 86% certified** (Segezha, n.d.). Yet the driving force of this voluntary quest for certification from companies is rising demand for environmental responsibility from importers, rather than concern about absorption of CO₂ (Lukashevich et al., 2016). This can be viewed as another opportunity to promote more sustainable forestry practices as well as building more diverse multi-stakeholder regional networks supporting and promoting sustainable forest use, including companies, local authorities, representatives of local NGOs, communities, activists and indigenous groups where applicable.

KEYS TO UNDERSTANDING

THE FOREST STEWARDSHIP COUNCIL (FSC)

The Forest Stewardship Council (FSC) is a global standard that delivers voluntary certifications to promote sustainable management of forests. Established in 1993 in the follow-up of the Earth Summit in Rio, the FSC was founded by a group of timber-product businesses, environmental NGOs and representatives of local communities. After 27 years of existence, it now claims 1,165 international members in 87 countries, and more than 220 million certified hectares, which makes it the biggest forest certification scheme in the world.

Regarding forest management standards, FSC delivers certifications to forest managers and owners after an audit that proves the compliance to FSC’s 10 founding Principles, introduced in 1994 and revised in 2015, covering environmental, social, and economic requirements. Those Principles are backed by 70 criteria, assessed through a set “international generic indicator”. Audits are conducted by FSC accredited third party, and certifications are delivered for a period of five years. This system helps harmonize criteria around the world, while allowing local offices to develop national stewardship criteria to locally adapt forest management practices. Thus, Russia recently launched its revised national forest certification standard in September 2020, after a public consultation open to companies, NGOs and representatives of indigenous people.

In addition to this system, FSC provides a “chain of custody standard” to prove that “*forest products sold as FSC certified originate from well-managed forests, controlled sources, reclaimed materials, or a mixture of this*”. This certification can be provided to both timber and non-timber products, providing holders with the possibility to “*market their products and services as the result of environmentally appropriate, socially beneficial and economically viable forest management.*”

Sources: [fsc.org](https://www.fsc.org); FSC Principles and Criteria for Forest Stewardship, 2015; Standard Setting in FSC, 2016

BOX 4



Some companies also provide their own guidelines to their suppliers. In October 2020, UPM, a Finnish company delivering forestry products of many sorts as an alternative to fossil-based products, released its *Guidelines on Sustainable Forest Management for Wood Suppliers in Russia*, in partnership with WWF-Russia, to provide wood suppliers with all the “requirements set out in both Russian legislation and international voluntary forest certification schemes” and a set of best practices ([UPM](#), 08/10/2020).

According to the analytical centre TransLes, Russia ranks fifth in the world in terms of timber harvesting. Russia’s share in world timber harvesting is 6%. According to Russian Federal State Statistic Service, in the structure of Russian exports of goods, wood and pulp and paper products accounted for 3% in 2019. The leading importer of Russian wood and wood products is China (around 54% of the volume), ahead of Finland, Kazakhstan, Japan, and EU countries ([Federal Customs Service](#), 2019).

Measures to reduce soil carbon losses in agriculture also require a combination of government regulation, business interest in greener products and amplified public opinion campaigns. NGO calls can be made not so much on climate as such but rather on the need for sustainable land use and maintenance for future generations, neither being a hot topic in Russia. The same considerations apply to land reclamation measures.

A good example of cross-sector cooperation is the communication platform [forestforum.ru](#), run and moderated by the Greenpeace forestry experts in Russia. This online platform functions as the main communication tool between companies, state forestry authorities (on various levels, including municipal), NGO and academia experts. Issues of land use and role of forests in climate are also often discussed, with the latest scientific data brought to experts and public awareness.

EXPERIENCE FEEDBACK

A PLATFORM TO FACILITATE A SUSTAINABLE USE OF BOREAL FOREST BY THE PRIVATE SECTOR

Launched in May 2015, the Boreal Forestry Platform (BFP) unites academia, business, and NGO experts, as well as local governments and forestry regional authorities around the issue of promoting intensive forest use and saving frontier/virgin forests. It is an open exchange platform for companies and forest management authorities operating within the Boreal areas of Russia to sharing knowledge and support for projects in the sector. Other stakeholders across the forestry supply chain such as buyers and investors, public and non-governmental organizations interested in the preservation of forest-related ecological and social forest values are also encouraged to join the platform.

The BFP is meant to provide help to the relevant players and stakeholders in the Russian boreal forestry sector to achieve a balance between timber industry development and the protection of high conservation values of forests.

Another focus of the platform is to facilitate the transition to sustainable intensive forestry in Russia, using the knowledge and experience of local forestry companies and management organizations. The Platform aims to achieve this through encouraging and maintaining a dialogue among all stakeholders; developing proposals and initiatives for improving the legislation necessary for the transition to intensive forestry; setting socio-economic and environmental priorities and their combination based on landscape planning.

Source: [Boreal Forest Platform](#)

BOX 5

Some timber-related businesses are also carrying out projects to improve circularity of their commodities, often through cooperation with NGOs. In 2018, IKEA launched a programme to collect back and recycle furniture textiles with the NGO [Vtoroe Dykhanie](#) ("Second Breath") as a partner for recycling (IKEA, 2018). In 2019, IKEA also launched a programme of furniture recycling, granting a discount for further purchases or even buying back furniture in good condition to give them to a charity foundation [Perspektivy](#). Consumers can also give furniture for charity purposes themselves (a Moscow charity association [Vse Vmeste](#), "All together", runs the project jointly with Ikea). As of September 2020, the company had collected back 70 tons of furniture in its stores across Russia. Another example of this type is OptiCom, a Russian company selling packaging, stationery and other office supplies, that has launched a project called Bumagovorot ("PaperCycle") which collects used paper from their clients to send them to recycling facilities ([OptiCom](#), n.d.).

Some forestry companies are also engaging in volunteer tree planting activities. UPM, which does not own any forestry land in Russia but buys wood from certified companies, has been helping their contractors in Russia in reforestation efforts since 2007 as part of the corporate volunteer activity programme. Since then, more than 110,000 seedlings of pine and spruce trees have been planted on an area of 49 hectares in the North-Western regions of Russia, 1,070 employees of the company took part in this programme ([UPM](#), 26/05/2019).

Most of the above-mentioned campaigns, however, tackle and speak about topics and aspects of forestry problems very close to consumers and public (e.g. recycling, reduction of use of new products, including wood), rarely delving into CO₂ absorption or climate mitigation. Nevertheless, such initiatives play a positive role in promoting sustainability and the climate agenda in Russia.

5. NGOs, a driving force to education and to support business initiatives and raise education about forestry.

Once a year, all Russian NGOs working in the area of climate, energy efficiency, forestry and renewable energy gather for a meeting shortly before the next COP, to work out a joint civil society position on climate-related topics. Organized by the [Russian Socio-Ecological Union](#), an umbrella organization helping smaller and regional NGOs with lobbying, knowledge sharing and public relations, it gathered 115 people from 29 regions and some foreign guests during the latest meeting on 7–8 November 2019, in Saint Petersburg, in the lead-up to COP25. Despite no dedicated session to land use issues, the meeting came down to the adoption of a common [position](#), including some advocacy statements on the accounting of land use on emission absorption. These NGOs specifically recommended:

"To adopt a separate goal of carbon sequestration by forest ecosystems and wetlands. Include unaccounted and unmanaged forests (forests on agricultural lands, urban forests, etc. —more than 60 million hectares) in the accounting for removal. Extremely important is the exclusion from economical use of intact and especially valuable forest ecosystems, the development of sustainable forest management in already developed territories, the effective protection of forests from fires, and the preservation of wetlands as natural regulators of carbon metabolism."²

Besides ongoing mobilization from environmental local associations and local branches of international NGOs, large-scale, civil society-led campaigns of reforestation spring up from the ashes of burnt trees in the aftermath of massive wildfires or drought episodes.

² Unofficial translation. The original version is available on [rusecounion.ru](#)



Following the droughts of summer 2010 in Russia, an environmental movement dedicated to environmental education, ЭКА (ECA), together with some corporate sponsors as Faberlic, Russia's biggest cosmetic retailer, and the support of local authorities launched the five-year campaign "More Oxygen!". From 2010 to 2015, 10 million trees were reportedly planted across 47 regions, and ECA activists supervised the creation of 5,000 school plant nurseries, with the help of volunteers. Once the programme completed, the initiative became permanent through the creation of a platform called PosadiLes.ru, a crowdfunding service that allows individuals and businesses to finance tree planting online. ECA local members manage the planting and negotiate with forest owners to select plots in need of reforestation, mainly in suburban areas that have suffered from fires, freezing rain, or died from pests. PosadiLes now claims 8,335 users having supported the planting of 203,429 trees ([Posadiles.ru](https://posadiles.ru); ECA, n.d.).

Educational efforts support this initiative. ECA jointly with WWF Russia developed online lessons for schools "Forest and Climate" and "Climate Change in Russia", at the moment around 20,000 schools around Russia are using these educational tools ([WWF](https://www.wwf.org), n.d.).

Again, in the fall of 2019, following the huge forest fires in Siberia during summer, activists planted more than 270,000 trees in 18 Russian regions. Trees were planted in forest areas affected by fires, hurricanes, and wastelands. During the last 10 years, ECA has coordinated the efforts of more than 6,000 volunteers in restoring 174 hectares of forest. Almost 700 thousand trees have been planted in 22 regions of Russia since 2010.

ECA was a partner in a corporate initiative [We Are Siberia](#) led by a Siberia-born airline S7 (previously called Sibir/Sibiria). Launched in summer 2019, following the forest fires in Siberia, the initiative raised funds to replant one million trees in the areas affected by the fires, by redirecting 100 roubles (~€1.4 in 2019) from every ticket sold to Siberia. Collection of funds is complete, and has allowed the reforestation programmes to start. Progress reports have been regularly published on [PosadiLes website](#) to account for the use of funds.

To raise public awareness about forests and their complex ecosystems, ECA and PosadiLes also bet on "gamification", i.e. the application of game-design concepts for a non-game purpose, with a mobile application called "Plant the Forest". *"Players can complete exciting quests and learn fascinating facts about the forest ecosystem. The main part of funds raised from users' purchases is directed to reforestation companies, which plant the trees. Players will receive photos and GPS coordinates of the planted trees,"* reports the website EcoTourism Experts ([EcoTourism Experts](#), 19/03/2020).

2019 wildfires have also triggered support from foreign initiatives to restore burned lands and raise public awareness. In France, Franco-Russian personalities launched the initiative [Run for planet](#) through a crowdfunding platform to organize the planting of 15 million trees across Siberia. Russian universities drive the initiative in partnership with coordination team, in parallel with a spectacular communication campaign: an ultra-marathoner is about to run 12,600km from Montreuil sur Mer (France) to Vladivostok in 300 days to raise awareness about the Siberian taiga role as a carbon sink and shelter of a highly valued biodiversity. Due to start in 2020, the initiative is postponed to April 2022.

Besides, several NGOs in Russia carry out forestry and forest fires awareness programmes. Greenpeace, together with the Ministry of Emergency Situations, Federal Forestry Agency, Aerial Forest Protection Agency and the Volunteer Forest Fire Society, have developed and launched a large-scale informational campaign "Stop Fire" to prevent arson and change people's behaviour

when handling fire in everyday activities (dlpinfo.ru, n.d.). Russian Greenpeace also supports 12 regional groups of voluntary forest firefighters: from the Far East to the Northwest region. Volunteers put out fires: they protect villages, cities and their environments from fire and valuable natural territories: for example, wildlife sanctuaries and national parks (Greenpeace, n.d.).

Similarly, and as described before (part 3), NGOs often prove to be a driving force to support business initiatives through technical support and cooperation. Thus, WWF-Russia and the Yves Rocher Foundation successfully partnered to plant Siberian pines in the Altai Republic in Russia, as part of the “Plant for the Planet” operation of Yves Rocher Foundation. This mountainous region suffered immense loss of forests under natural disasters and extensive logging during the Soviet period. The first stage of the programme of the Altai-Sayan branch of WWF and Yves Rocher for the restoration of degraded natural landscapes in the Altai Republic was implemented in 2012–2015, where some forests of most typical and adapted species to the climate of the site such as Siberian cedar pine, Siberian spruce, Siberian larch, Siberian pine. From 2012, 8.7 million transplants have been planted all over the sites of the operation, covering 2,657.15 ha (WWF Russia, 30/11/2020).

EXPERIENCE FEEDBACK

PRESERVING FORESTS ON ABANDONED AGRICULTURE LAND.

Almost one tenth of Russia’s forests do not officially exist at all. These are abandoned agricultural lands overgrown with trees. Until last year, instead of growing and preserving their forest, the owners had either to cut down or burn young trees, or pay a fine. As a result, fire from agricultural land often spread to forest lands and peatlands and threatens settlements. Yet, forests growing on former agricultural lands are one of the most important resources for the potential development of rural areas, creation of jobs, the sustainable production of economically valuable timber, prevention of natural disasters and improvement of the environmental situation.

Greenpeace estimates that since 1985, about 76 million hectares of former agricultural land suitable for forest growth has been abandoned in Russia. Part of this land (12 million ha) is planned to be returned to agriculture. Another part can remain as a reserve for the further development of agriculture or be used to preserve and restore valuable non-forest ecosystems. The bulk of the area of abandoned agricultural land – estimated 50 million hectares – cannot be used for agriculture in the foreseeable future, but is suitable for various forms of forestry (plantation forestry, protective afforestation, agroforestry...). Of these 50 million hectares, about 30 are already overgrown with forests, and about 20 are lands not yet overgrown, but suitable for afforestation and intensive forestry.

In September 2020 Russian government published a [decree](#) “On the peculiarities of the use, protection, reproduction of forests located on agricultural lands”. It legalizes most types of forest use on agricultural land, including timber harvesting. The WWF Russia has called it a “little revolution” in the forestry sector in Russia, estimating that during the next 100 years, these forests could absorb an average of about 580 million tCO₂ annually.

However, in February 2021, the Ministry of Natural Resources [opened](#) to public discussion further amendments to the government decree regulating the use of forests on agricultural land. Proposed amendments suggest introducing some administrative and *de facto* restrictions for such activities. Landowners will have to apply and expect a positive decision of special commissions formed by regional authorities and specialized departments. At the same time, the document establishes a wide list of reasons for refusal. But even in the case of a positive decision, “forest farmers” will have to draw up a forest development project, fill out a forest declaration and other reports. Most importantly, the amendments provide that the landowner will be able to use the forest for no more than ten years “from the moment the commission makes a positive decision.” ([Kommersant](#), 15/02/2021).

NGOs, including WWF Russia and Greenpeace have launched a new campaign again calling for rejecting these amendments and maintaining the right to grow and legalize forests on agricultural lands ([WWF](#), 12/02/2021).

Source: [Greenpeace](#); WWF Russia, [TASS](#)



BOX 6

CONCLUSION

Climate change is posing a daunting challenge to Russia's forests, with yearly wildfires becoming more frequent and intense in Siberia, while the net sink obtained by the balance between emissions and absorption is slightly shrinking. Despite national climate targets widely criticized for lacking ambition, Russian Federation has engaged in several reforms of its forestry policies to strengthen prevention and emergency responses to wildfires, as forest sinks remain one of its main assets. For that purpose, regional authorities are about to play a more prominent role to intervene in forest management. Some businesses stand out with proactive forest management certification, while NGOs prove an driving force in working with local communities and authorities to restore and protect degraded lands.

REFERENCES

REPORTS AND DATABASES

- Bartalev, S.A., Egorov, V.A., Zharko, V.O., Lupyan, E.A., Stytsenko, F.V., Khvostikov, S.A. (2020). [Development of satellite monitoring methods for Russian forests](#). *Space Research Institute of the Russian Academy of Sciences*
- Burck, J., Hagen, U., Höhne, N., Nascimento, L., Bals, C., Essop, T. (2020). [The Climate Change Performance Index 2021: Results](#). *GermanWatch, Climate Action Network, NewClimate Institute*
- Climate Action Tracker (up. 22/09/2020). [Russian Federation](#)
- [Fire Map Service](#), by ScanEx
- Makarov, A.A., Mitrova, T.A., Kulagin, V.A. (2019). [Prognosis of Energy of the World and Russia](#). *Energy Research Institute of the Russian Academy of Sciences – Moscow Management School Skolkovo*, 210 pp. (in Russian).
- Russian Federation (2014). [Second assessment report on climate changes and their consequences on the territory of the Russian Federation](#). Roshydromet. Moscow. 1009 pp. (in Russian)
- Russian Federation (2017). [Seventh National Communication of the Russian Federation to the UNFCCC](#). Roshydromet. Moscow. 348 pp. (in Russian).
- Russian Federation (2018). [National Inventory Report to the UNFCCC](#). Vol. 1, 470 pp., vol. 2, 106 pp. (in Russian).
- Russian Federation (2019). [National Inventory Report to the UNFCCC](#). Vol. 1, 471 pp., vol. 2, 104 pp. (in Russian).
- Russian Federation (2019a). [State Report "On Status and Protection of the Environment in the Russian Federation in 2018"](#). *Ministry of Natural Resources and Ecology*. Moscow. NPP "Kadastr", 844 pp.
- Russian Federation (2020). [National Inventory Report to the UNFCCC](#). Vol. 1 490 pp., vol. 2 116 pp. (in Russian).
- UNFCCC (2015). [Database INDC Submission Portal](#).

POLICY FRAMEWORK

- Russian Federation (2020). [Nationally Determined Contribution of the Russian Federation as part of the implementation of the Paris Agreement of December 12, 2015](#). *UNFCCC*
- Decision of the Russian Government as of 03 Nov. 2016, #2344-r "On Plan of Implementation of Policy on Improvement of State Regulation of the Greenhouse Gas Emissions and Preparation to Ratification of the Paris Agreement Adopted 12 December 2015 on the 21st Session of the Conference of the Parties to the UNFCCC. (in Russian)
- MINISTRY OF NATURAL RESOURCES AND ECOLOGY OF THE RUSSIAN FEDERATION [ORDER dated March 25, 2019 N 188 On the approval of the Rules for reforestation, the composition of the reforestation project, the procedure for the development of the reforestation project and amending it](#)

SCIENTIFIC ARTICLES

- Gauthier, S., Bernier, P., Kuuluvainen, T., Schvidenko, A. Z., Schepaschenko, D. G. (2015). [Boreal forest health and global change](#). *Science*, 349 (6250), pp. 819-822
- Kalashnikov, Y.A. (1985). Improving the Efficiency of the Integrated Use of Wood Waste. Pushkino, Gosleskhoz of USSR (In Russian)
- Kokorin A., Lugovaya D. (2018). [Absorption of CO₂ by Russian Forests in Context of the Paris Agreement](#). *Sustainable Forestry Journal*. No. 3 (55), pp. 13-18 (in Russian).
- Lukashevich, V., Shegelman, I., Vasilyev, A., Lukashevich, M. (2016). [Forest certification in Russia: Development, current state and problems](#). *Central European Forestry Journal*, 62(1)
- Romanovskaya, A. A., Korotkov, V. N., Polumieva, P. D., Trunov, A. A., Vertyankina V. Y., Karaban, R. T. (2019). [Greenhouse Gas Fluxes and Mitigation Potential for Managed Lands in the Russian Federation](#) *Mitigation and Adaptation Strategies for Global Change*, vol. 25, pp. 661-687
- Torzhkov, I.O., Koroleva, T. S., Konstantinov, A. V., Kushnir, E. A. (2017). [Economic Efficiency Analysis of the Adaptation to Climate Change in Forestry in Russia](#). *Trudy SPbNIIKKh*, No. 3, pp. 13-22. (In Russian)
- Zagladin V.V., Frolov I.S. 1985. Material Resources: Rational Use and Economy. *Economica*, Moscow (In Russian)
- Zamolodchikov, D.G., Grabovskii, V.I., Korovin, G.N., Gitarskii, M.L., Blinov, V.G., Dmitriev, V.V., Kurz, W.A. (2013). [Carbon Budget of Managed Forests in the Russian Federation in 1990–2050: Post-Evaluation and Forecasting](#). *Russian Meteorology and Hydrology*, Vol. 38 (10), pp. 701–714. Original Russian text in *Meteorologiya i Gidrologiya*, 2013, No. 10, pp. 73–92.

PRESS AND COMMUNICATIONS

- Greenpeace Russia (12/08/2019). [2019 could be a record year for forest fires](#). *Greenpeace*
- Makarova, A. (19/03/2020). [A mobile game, created in Russia, helps planting real trees](#). *EcoTourism Experts*



- Savage, R., Davydova, A. (10/01/2020). [Sluggish climate action may see warming do Russia more harm than good](#). *Reuters*
- TASS (05/06/2020). [Rosleshoz has developed rules for growing forest on agricultural land](#). *TASS*
- TASS (17/12/2019). [The Ministry of Natural Resources and Environment estimated the damage from forest fires in 2019 at 15 billion rubles](#). *TASS*
- UPM (08/10/2020). [WWF Russia and UPM release guidelines on sustainable forest management for wood suppliers](#). *UPM*
- Vasilieva, A., Mordiusenko, O., Shapovalov, A. (15/02/2021). [Who's in the woods, who's out for firewood](#). *Kommersant*
- Vasilieva, A. (23/06/2020). [A spark will ignite plans](#). *Kommersant* (in Russian)
- Vasilieva, A., Voronov, A. (07/11/2019). [Fires are stripping boundaries](#). *Kommersant* (in Russian)
- WWF-Russia (30/11/2020). [WWF and Yves Rocher Planted 8,7 million trees in Russia](#). *WWF-Russia*
- WWF-Russia (n.d.). [Everything about the creation of the Dvinsky reserve](#). *WWF-Russia*
- RIA Novosti (08/08/2019). [Scientists calculate CO₂ emissions from forest fires in Siberia](#). *RIA Novosti* (in Russian)

INITIATIVES

- [PosadiLes.ru](#)
- [ECA](#)
- [Run for the Planet](#)
- [S7 Tree planting operation for Siberia](#) and available [progress reports](#)
- [Forestforum.ru](#), animated by Greenpeace
- [Boreal Forest Platform](#)