

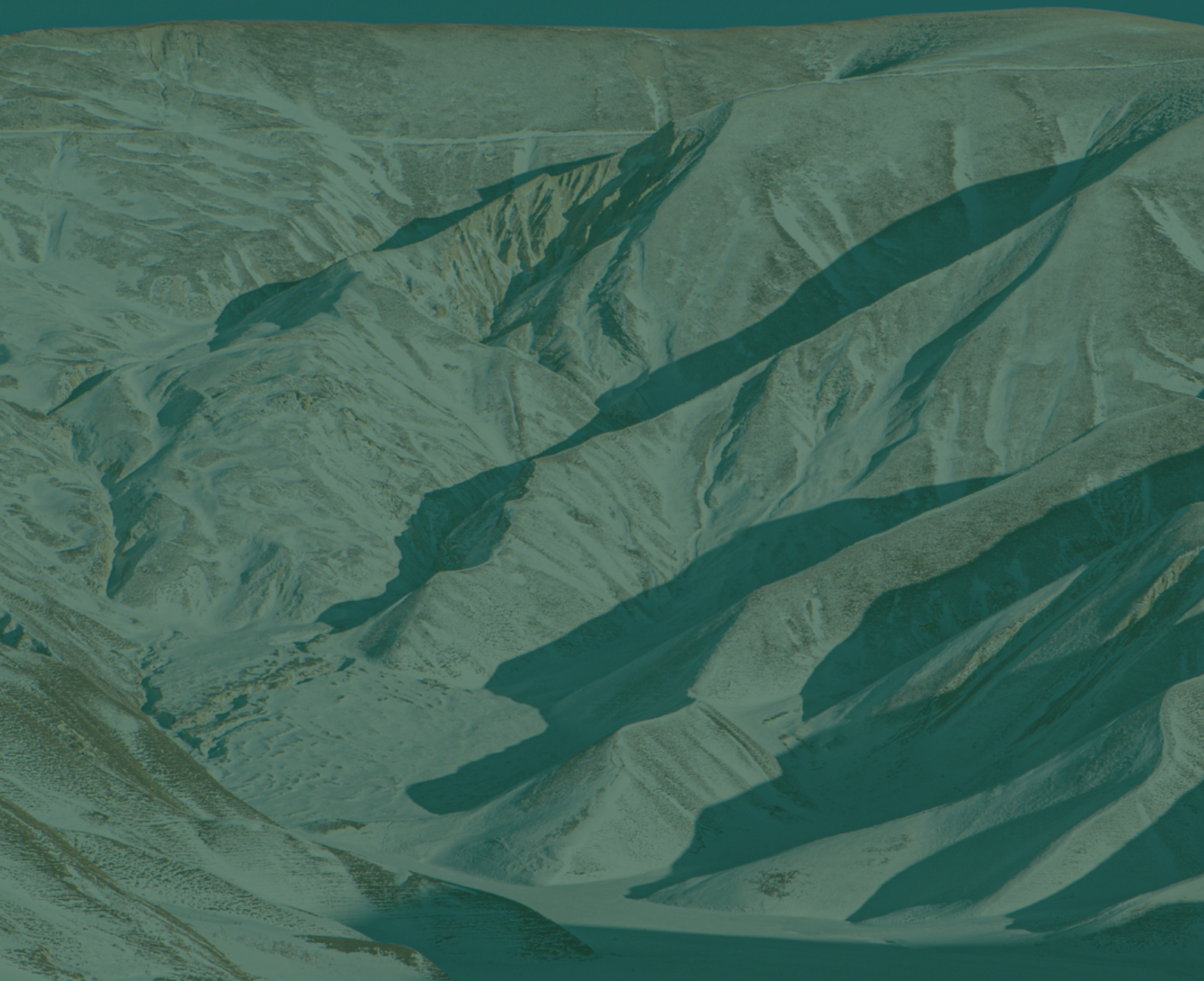
An aerial photograph of a mountain range with a lake in the foreground. The mountains are covered in snow and have distinct ridges and valleys. The lake is calm and reflects the surrounding landscape. The sky is a clear, deep blue.

2023 Scenathon results

Pathways for food  
and land-use systems  
in Russia



**FABLE**  
CONSORTIUM



### **About FABLE**

The Food, Agriculture, Biodiversity, Land-Use, and Energy (FABLE) Consortium is a collaborative initiative to support the development of globally consistent mid-century national food and land-use pathways that could inform policies towards greater sustainability. The Consortium brings together teams of researchers from 24 countries and international partners from the UN Sustainable Development Solutions Network (SDSN), the International Institute for Applied Systems Analysis (IIASA), the Alliance of Bioversity International and CIAT, and the Potsdam Institute for Climate Impact Research (PIK). <https://www.fableconsortium.org/>

### **About the authors**

The pathways for food and land-use systems in Russia was developed by Anton Stokov (Russian Presidential Academy of National Economy and Public Administration - [stokov-as@ranepa.ru](mailto:stokov-as@ranepa.ru))

### **Recommended citation**

Stokov, A. (2024). FABLE Scenathon 2023 Pathways for food and land-use systems in Russia. Paris: Sustainable Development Solutions Network (SDSN). 10.5281/zenodo.11550651

### **Acknowledgements**

The work of the authors has been supported by the State research assignment of RANEPA.

## Contents

1. National context
2. Methods
3. Results
4. Scenarios and assumptions

Our food and land-use systems are critical for staying within our planetary boundaries and the Earth’s system resilience. Among the [six Transformations](#) required to achieve the Sustainable Development Goals (SDGs), the fourth Transformation—focusing on food, land, and water—is crucial. This Transformation is key to achieving SDG 2 (Zero Hunger), SDG 6 (Clean Water and Sanitation), SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action), SDG 14 (Life Below Water), and SDG 15 (Life on Land). Moreover, it significantly supports the remaining SDGs, underscoring its crucial role in fostering a sustainable future.

In this document, we present the results of the 2023 ‘Scenathon’, a modelling exercise by the FABLE Consortium exploring three alternative futures for national and regional food and land-use systems. The term ‘[Scenathon](#)’ stands for ‘a marathon of scenarios’ and refers to FABLE’s iterative process for ensuring that national and regional pathways have coherent trade assumptions and align with global sustainability targets (see the [2024 Sustainable Development Report](#) for more information).

Through these long-term pathways, we can identify trade-offs and synergies between different goals and see the impact of various actions, as well as key levers for guiding sustainable development policies through 2030 and 2050. These results, together with our modelling tools and methods, are designed to support decision-making and the development of better policies and targets to drive the transformation of our food and land-use systems.

Figure 1. Historical share of GHG emissions from Agriculture, Forestry, and Other Land Use (AFOLU) to total AFOLU emissions and removals by source in 2020

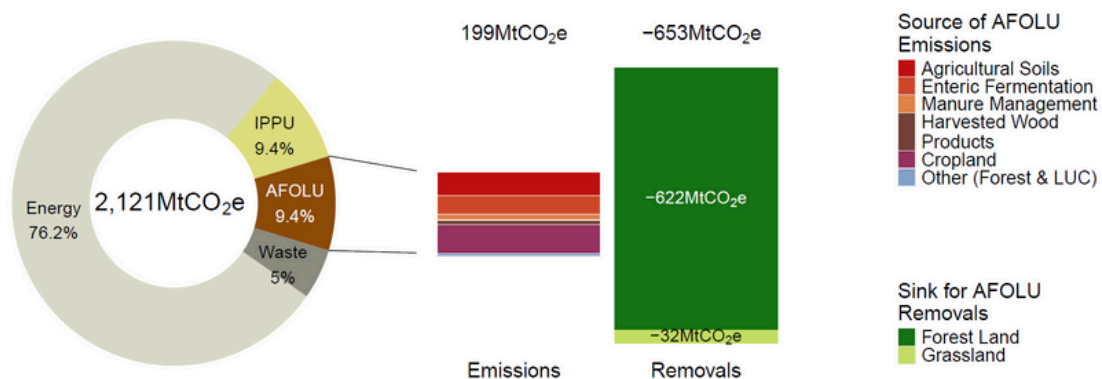
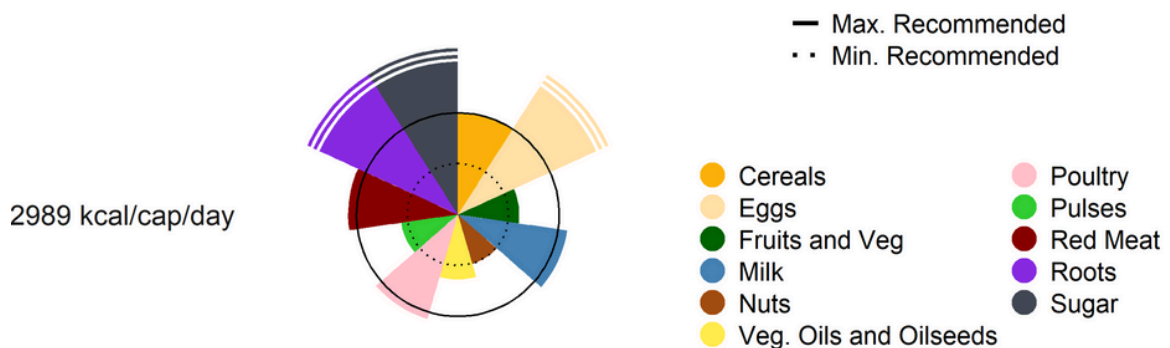






Figure 2. Daily average kilocalorie intake per capital per food category in 2020



This table summarizes national targets for food and land use, derived from national commitments, policies, and strategies. It provides an overview of the country's current ambitions to transform its food and land-use systems. Where countries lacked quantitative national targets, we have estimated targets based on qualitative pledges.

SDG	Indicator	National Target
 2 ZERO HUNGER	Self sufficiency	Maintain food <u>self-sufficiency</u> for grain, oilcrops, potato, vegetables, sugar, meat, milk and fish and fishery products.
	Overweight / obesity	Reducing the growth rate of the primary incidence of obesity to <u>5%</u>
	Diet related disease	To <u>increase</u> the consumption of vegetables, fruits, fish, and sea products. To decrease the "superfluous" consumption of salt, sugar, and fats.
 13 CLIMATE ACTION	Land use and land use change GHG emissions reduction	A constant level of sequestration in the <u>BAU</u> scenario: -500 Mt CO <sub>2</sub> e (in all three years 2019, 2030, 2050).
	Total GHG emissions reduction (CO <sub>2</sub> e)	GHG emissions in 2019 - 2100 Mt CO <sub>2</sub> e. In <u>BAU</u> scenario in 2030 - 2250 Mt CO <sub>2</sub> e; in 2050 - 2500 Mt CO <sub>2</sub> e
 15 LIFE ON LAND	Promote afforestation	Increasing afforestation to increase the level of carbon sequestration up to -1200 Mt CO <sub>2</sub> e by <u>2050</u> in "innovative" scenario.
	Reduce or halt loss of natural ecosystems	By <u>2020</u> , the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.
	Expand cropland area under agroecological practices	To increase the area of organic products from 0.6 Mha up to 4.2 Mha by <u>2030</u> .
 14 LIFE BELOW WATER	Other than limit water use	To improve facilities on irrigated areas up to 1.2 Mha by <u>2030</u> .
	Limit nitrogen and phosphorous use	To improve the quality of applied N fertilizers. To use more N fertilizers with low nitrogen release (emission) ability. To apply more precision farming <u>technologies</u> .

## Model

Using the open-access [FABLE Calculator](#) and the FABLE decentralized modelling infrastructure, we have developed three alternative pathways —Current Trends, National Commitments, and Sustainable Pathway— to explore the impact of various practices and policies on achieving sustainability targets through 2050. We compare our results with targets across food security and nutrition, GHG emissions reduction, forest and biodiversity conservation, and sustainable use of water, nitrogen, and phosphorus.

For each of these pathways, we have established various assumptions regarding the evolution of several model parameters. These parameters include population growth, dietary patterns, food waste, food import and export levels, crop and livestock productivity, agricultural expansion, afforestation, livestock density, protected areas expansion, post-harvest losses, biofuel demand, urban expansion, agricultural practice coverage, and irrigation area expansion. These assumptions detail the extent to which these factors will drive changes in food and land systems from 2020 to 2050.

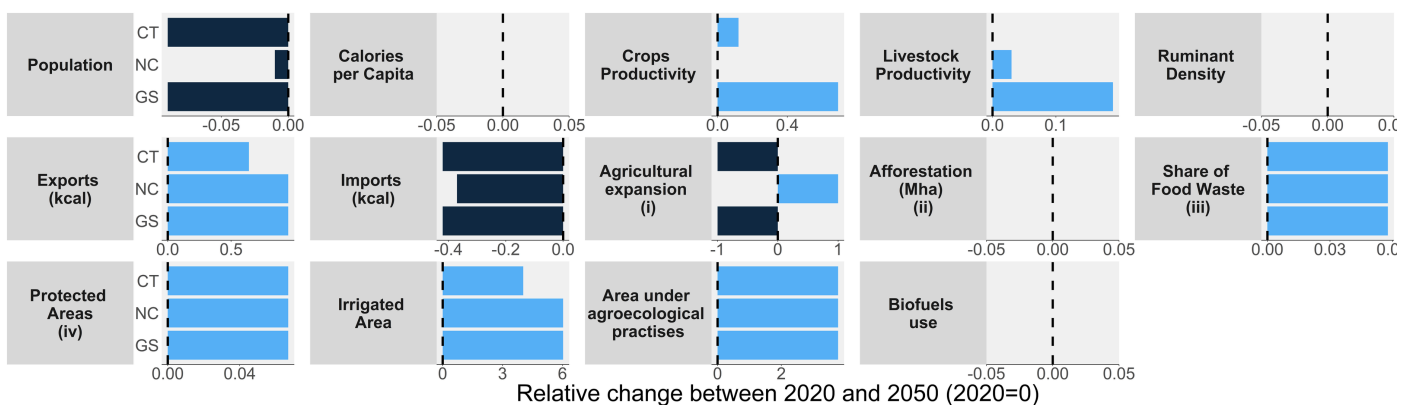
## Pathways

**Current Trends:** Stable land use in agriculture and increased productivity, based on Rosstat and FAO data for Russia in the 2010-2020 period.

**National Commitments:** A plan to use more land in agricultural activities along with productivity growth, based on proposed targets of the Russian Strategy of Rural Development and Russian Program of Agricultural Land Use (Rehabilitation) up to 2030 and some other Government Acts.

**Global Sustainability:** Productivity growth is accompanied by a decrease in agricultural land use, likely leading to more CO<sub>2</sub> sequestration.

Figure 3. Assumptions on the levers for change in each pathway



**Notes:** (i) Results are expressed in code, taking the value 1 for 'Free expansion scenario', -0.5 for 'No deforestation' and -1 for 'No Agricultural expansion'.  
 (ii) Results are expressed in a net increase rather than relative change.  
 (iii) Results are expressed % of consumption that is wasted.  
 (iv) Results are expressed in % of total land in 2050.

Figure 4. Computed daily average intake per capita over 2000-2050

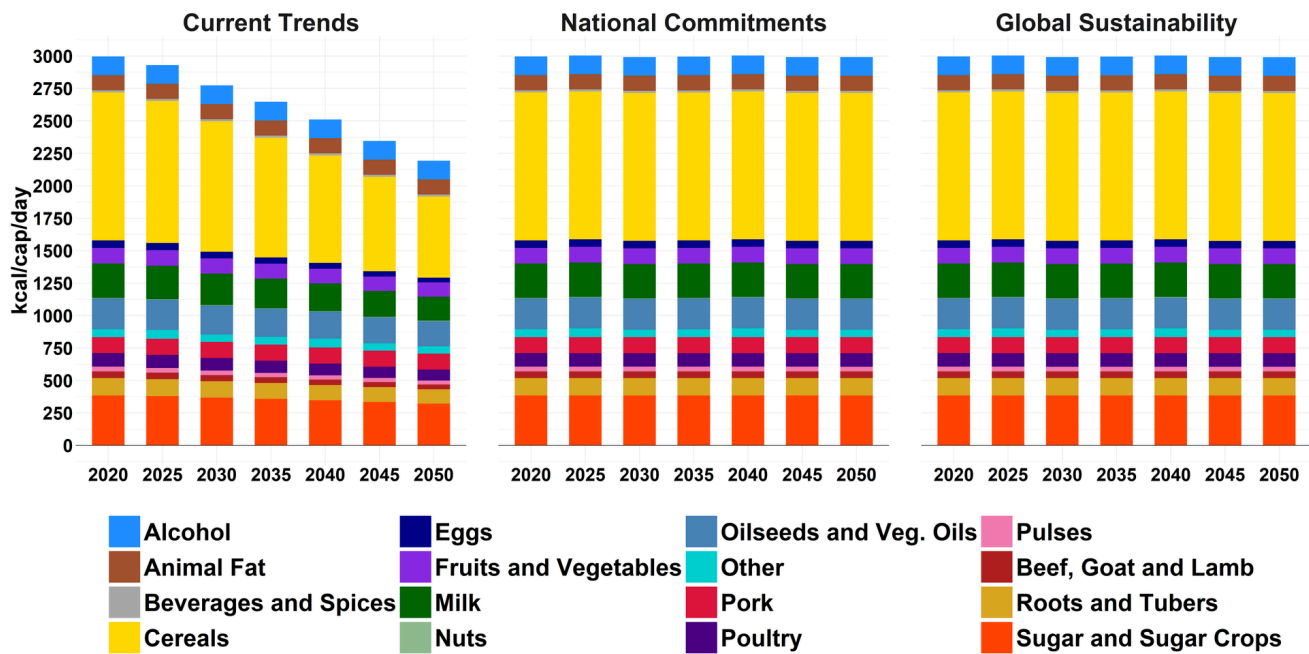


Figure 5. Comparison of the computed daily average kilocalorie intake per capital per food category across the three pathways and the prevalence of undernourishment in 2050

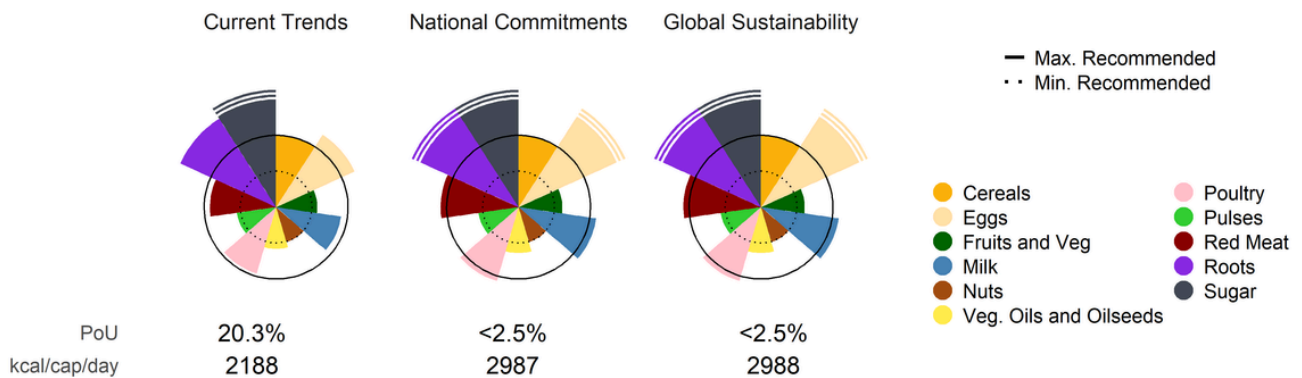


Figure 6. Evolution of land cover 2000-2050

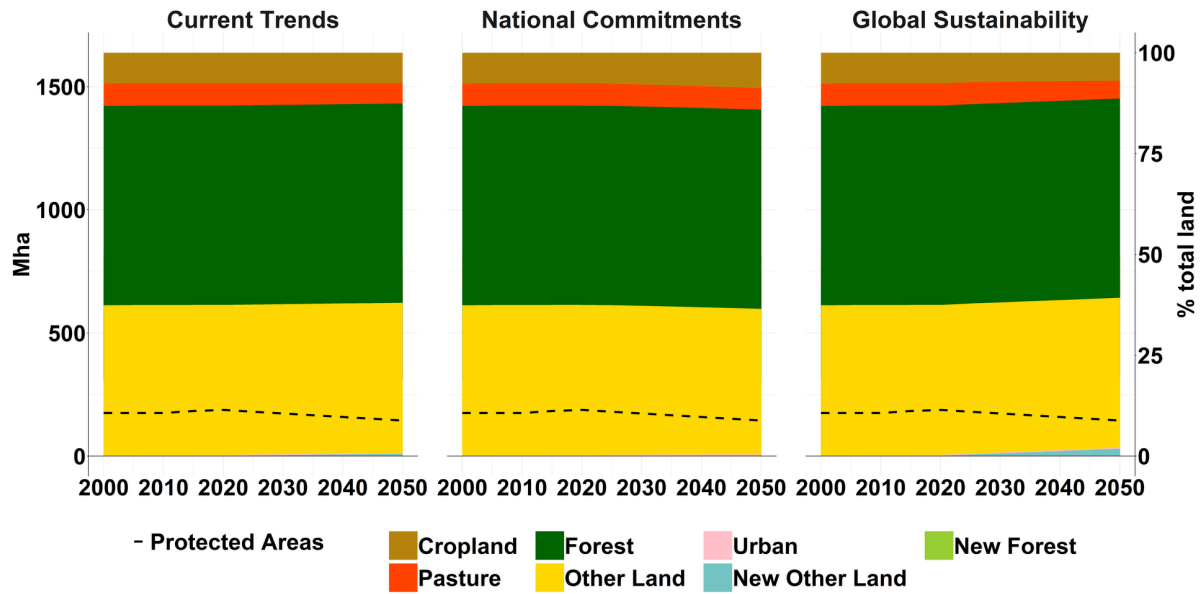


Figure 7. Evolution of the cropland composition 2000-2050

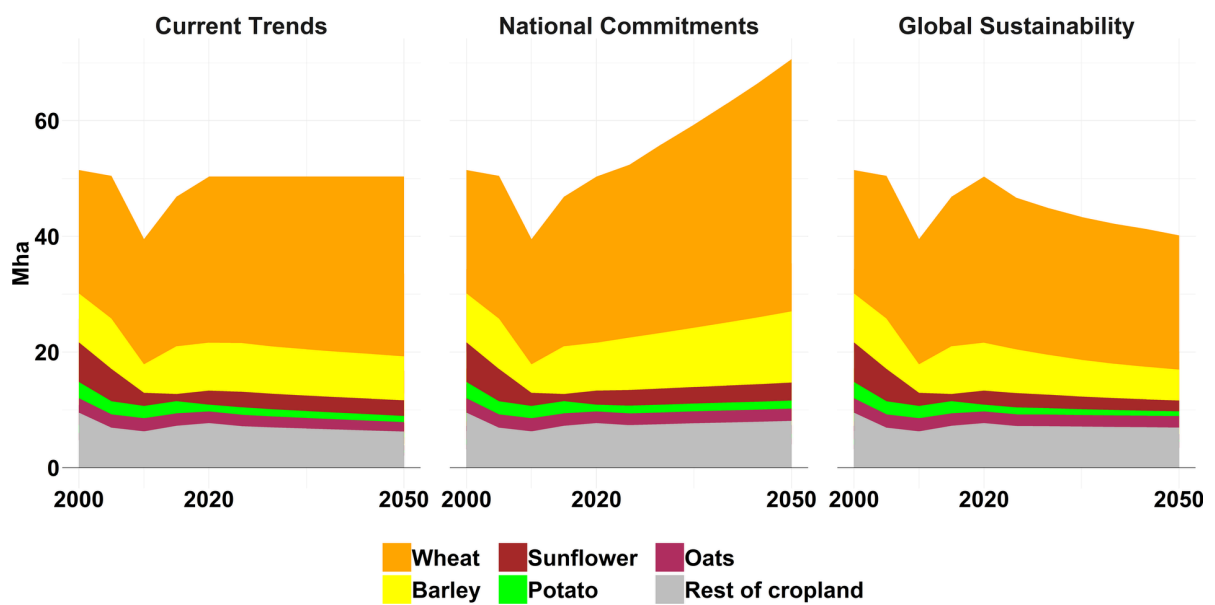


Figure 8. Projected AFOLU emissions and removals between 2020 and 2050 by main sources and sinks across pathways

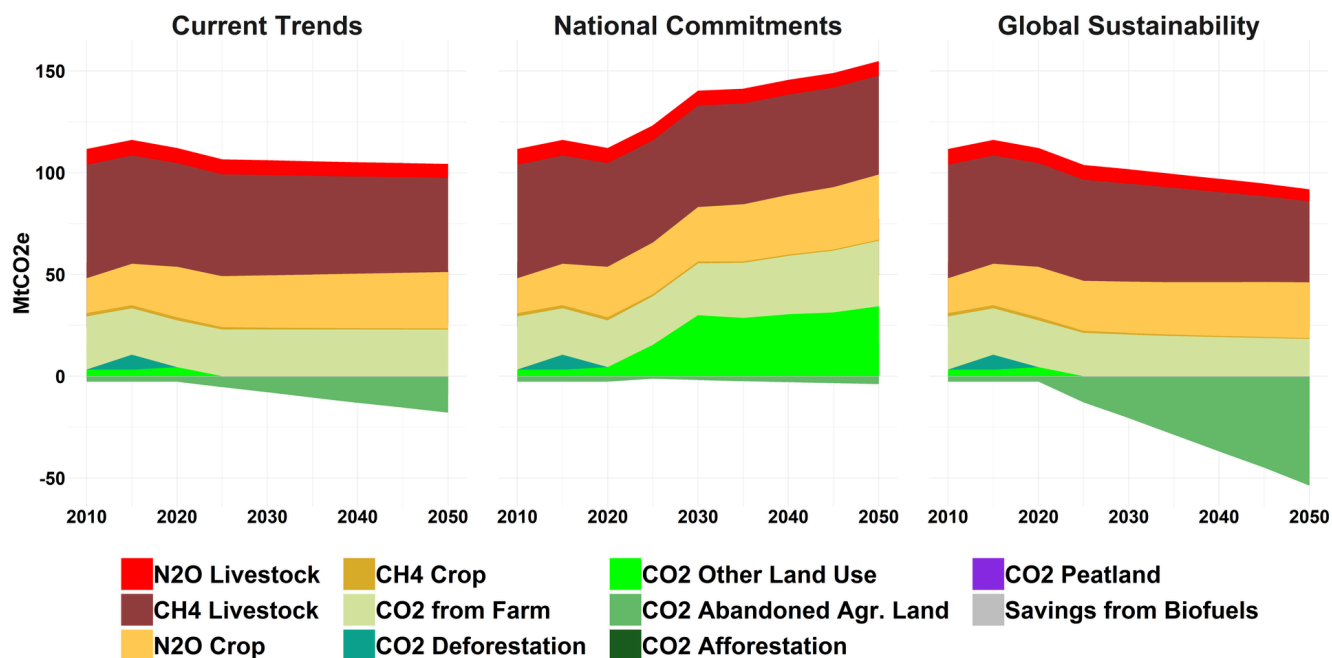
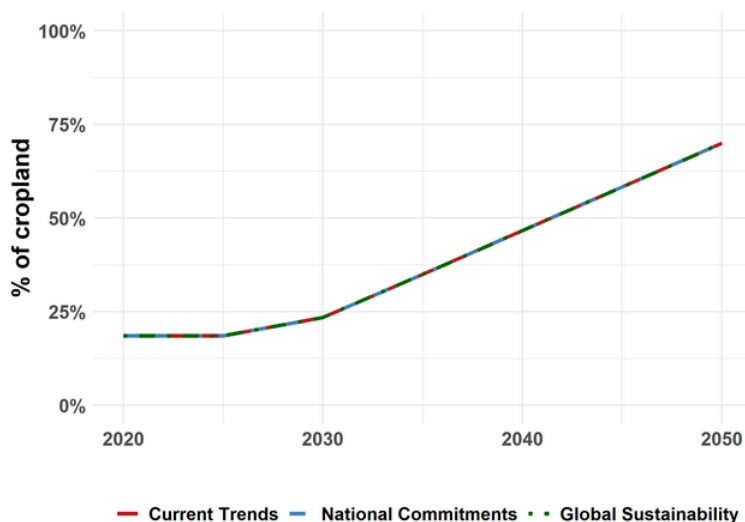


Figure 9. Share of cropland under agroecological practices



Agroecological practices included: Cover crops, cultivar mixtures, diversified farming systems, embedded natural, organic farming, no/minimal tillage

Figure 10. Total area of land where natural processes predominate (LNPP)

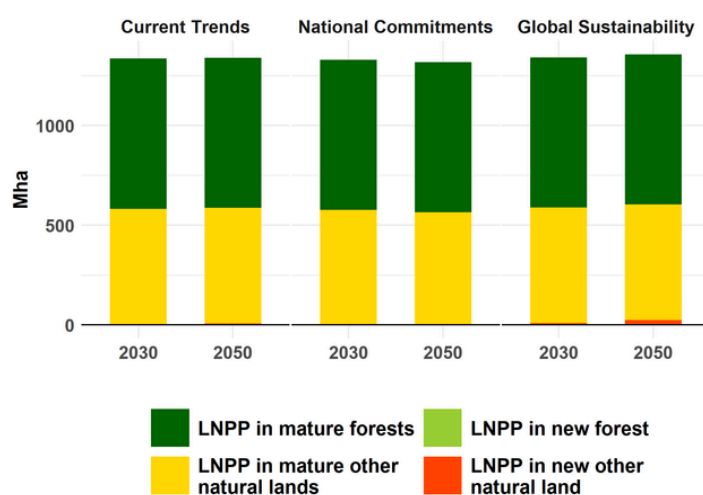




Figure 11. Nitrogen application

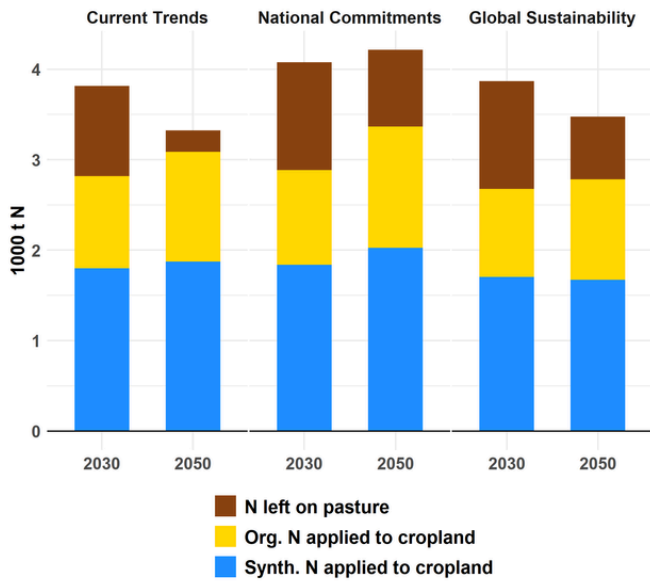
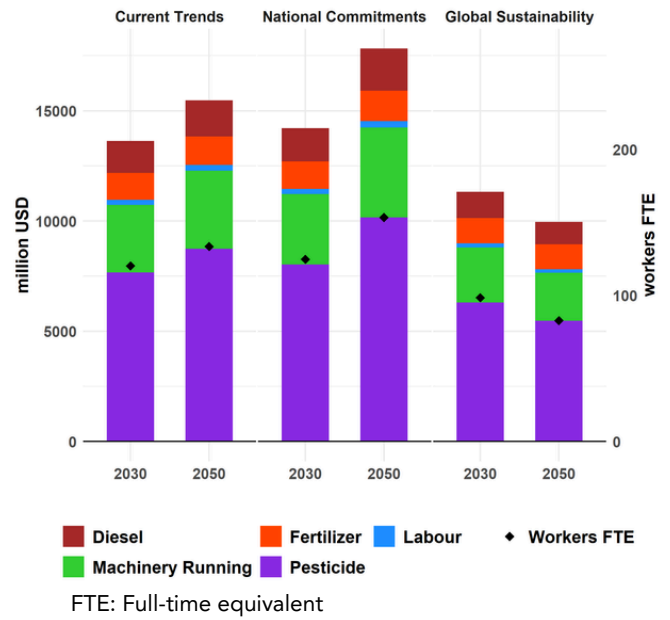


Figure 12. On-farm production costs



For more detailed results and visual data, visit [www.scenathon.org](http://www.scenathon.org)

# Scenarios and assumptions

		A) CURRENT TRENDS	B) NATIONAL COMMITMENTS	C) GLOBAL SUSTAINABILITY	Justification
<b>1. Macroeconomics</b>	<b>1.1)</b> GDP per capita	Same as National Commitments.	In the BSU <sup>1</sup> ("Inertia") scenario a 1.2%-year growth rate during the 2031-2050 period.	Same as National Commitments.	Government of Russia. <a href="#">Decree №3052-p of 29th of October 2021. "Low-carbon Strategy of Russian Federation until 2050"</a> , page 15
	<b>1.2)</b> Population	146.741 thousand people in 2020	By 2036 Rosstat projects an "average" scenario with an estimate of 142.993 thousand people as a total population of Russia.	-	Rosstat. <a href="#">"Rosstat presented a corrected demography projection scenario up to 2036"</a> . Published on the 28th of December 2019.
	<b>1.3)</b> Inflation	No assumption	No assumption	No assumption	-
	<b>1.4)</b> Inequalities	No assumption	No assumption	No assumption	-
<b>2. Land</b>	<b>2.1)</b> Constraints on agricultural expansion/deforestation	From 2007 until 2017 the Russian cropland increased by 6 Mha (from 74 up to 80 Mha). Current levels of cropland are 80-81 Mha per year.	By 2031 to return to agricultural use 13.2 Mha of agricultural land (without specification of cropland or pastures).	No specific target. The model shows a decrease in land use due to higher productivity growth.	Government of Russia. <a href="#">Act of 14th of May 2021 - #731. On the Government Program of Efficient Use (Rehabilitation) of Agricultural Land and Melioration Sector of Russian Federation.</a>
	<b>2.2)</b> Afforestation, and forest plantations targets	No assumption	No assumption	No assumption	-
	<b>2.3)</b> Urban and settlements area	No assumption	No assumption	No assumption	-
	<b>2.4)</b> Protected areas	Nowadays, the protected area is 255.7 Mha. We assume this value will remain stable over time.	To keep the share of protected areas no less than 17% of the land territory of Russia.	No assumption	Ministry of Natural Resources of Russia. Concept of Strategy of Protected Areas up to 2030.

<sup>1</sup> Business as Usual.

# Scenarios and assumptions

		<b>A) CURRENT TRENDS</b>	<b>B) NATIONAL COMMITMENTS</b>	<b>C) GLOBAL SUSTAINABILITY</b>	<b>Justification</b>
<b>3. Productivity and management</b>	<b>3.1)</b> Crop productivity for the key crops	Small (10-20%) increase in crop yields due to historical trends.	Proposed growth of crop intensification without numerical targets.	No assumption	Government of Russia. <a href="#">Act of 2nd February 2015 - #151-p. The Strategy of Rural Development of the Russian Federation up to 2030.</a>
	<b>3.2)</b> Cropland under agroecological practices	No assumptions	To increase the area of organic crops from 0.6 Mha to 4.2 Mha by 2030.	No assumptions	Government of Russia. <a href="#">Act of 4th of July 2023 - #1788-p. The Strategy for the development of organic production in Russian Federation up to 2030.</a>
	<b>3.3)</b> Livestock productivity for the key livestock products	No assumption	No assumption	No assumption	-
	<b>3.4)</b> Pasture stocking rate	Decrease of pastures due to current trends and major continuous decrease of livestock herd in the 2000-2020 period.	By 2031 to return to agricultural use 13.2 Mha of agricultural land (without specification of cropland or pastures).	Same as the Current Trend	Government of Russia. <a href="#">Act of 14th of May 2021 - #731. On the Government Program of Efficient Use (Rehabilitation) of Agricultural Land and Melioration Sector of the Russian Federation</a>
	<b>3.5)</b> Forest management	No assumption	No assumption	No assumption	-
<b>4. Trade</b>	<b>4.1)</b> Share of consumption which is imported for key imported products (%)	Decreased imports of beef and poultry due to increased domestic production.	Decreased imports of beef and poultry due to increased domestic production.	Decreased imports of beef and poultry due to increased domestic production.	Based on current (2010-2020) trends.
	<b>4.2)</b> Evolution of exports for key exported products (1000 tons)	Increased exports of wheat, sunflower oil, barley, pork, and poultry meat due to current trends and large stocks.	Increased exports of wheat, sunflower oil, barley, pork, and poultry meat due to current trends and large stocks.	Increased exports of wheat, sunflower oil, barley, pork, and poultry meat due to current trends and large stocks.	Based on current (2010-2020) trends.
<b>5. Food</b>	<b>5.1)</b> Average dietary composition	No assumption	No assumption	No assumption	-

# Scenarios and assumptions

		A) CURRENT TRENDS	B) NATIONAL COMMITMENTS	C) GLOBAL SUSTAINABILITY	Justification
	<b>5.2)</b> Share of food consumption which is wasted at household level	No assumption	No assumption	No assumption	-
<b>6. Biofuels</b>	<b>6.1)</b> Targets on biofuel and/or other bioenergy use	No assumption	No assumption	No assumption	-
	<b>6.2)</b> Targets on other non-food use	No assumption	No assumption	No assumption	-
<b>7. Water</b>	<b>7.1)</b> Irrigated crop area	No assumption	To improve facilities in irrigated areas up to 1.2 Mha by 2030.	To improve facilities in irrigated areas up to 1.2 Mha by 2030.	Government of Russia. <a href="#">Act of 14th of May 2021 - #731. On the Government Program of Efficient Use (Rehabilitation) of Agricultural Land and Melioration Sector of Russian Federation.</a>