2023 Scenathon results

Pathways for food and land-use systems in Brazil

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

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National context

Brazil

Contents

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 2016

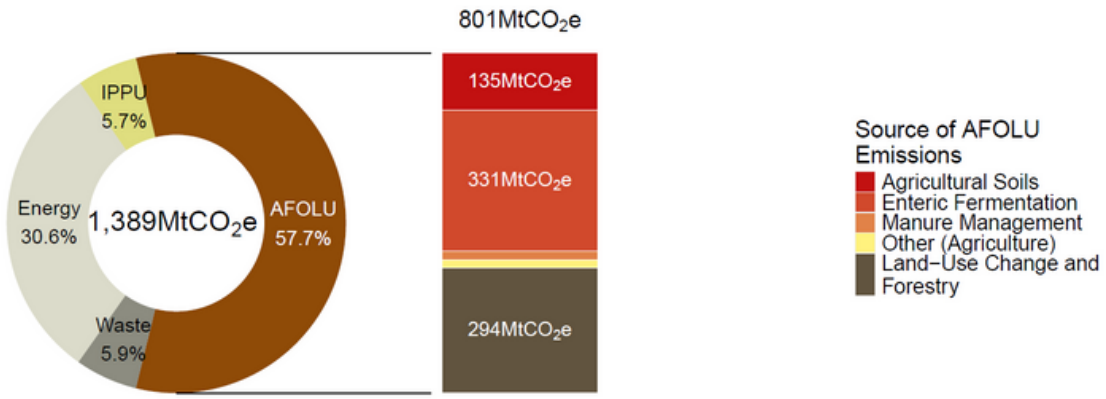
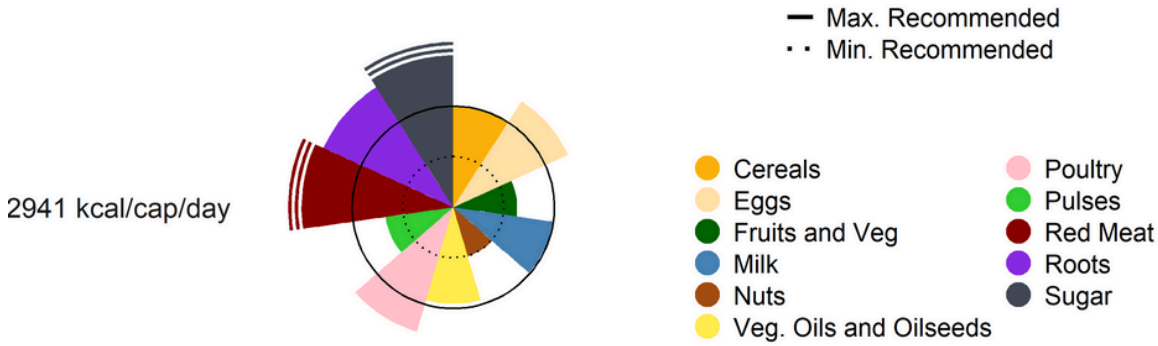


Figure 2. Daily average kilocalorie intake per capital per food category in 2020



National context

Brazil

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 Note: (OS) Official source, (A) Assumption by the team.
2 ZERO HUNGER	Undernourishment	• Remove the country from the World Food Programme's Hunger Map by 2026 and achieve zero hunger by 2030. (OS)
	Farmers' income	• Increase farmers' income by 23% compared to 2020 level by 2030. (A)
	Self-sufficiency	• Maintain food self-sufficiency for black beans, rice, cassava, and animal protein sources (A).
15 LIFE ON LAND	Reduce or halt loss of natural ecosystems	• Protect at least 30% of terrestrial, inland water, coastal and marine areas by 2030 (OS).
	Expand cropland area under agroecological practices	• Reach 35 Mha of total cropland under agroecological practices (Integrated Cropland-Livestock-Forestry) by 2030 (A).
	Promote afforestation	• 12 Mha of reforestation/afforestation by 2030 (OS).
	Expand protected areas or 'Other effective area-based conservation measures' (OECMs)	• Protect 30% of Amazon and 17% of each of remaining biomes by 2030 (OS).
	Reduce or halt use of agrochemicals and other agricultural practices that harm biodiversity	• Reduce by 50% the use of chemical pesticides by 2030 (OS).
13 CLIMATE ACTION	Agriculture GHG emissions reduction	• Reduce at least 30% of its anthropogenic methane emissions by 2030 (OS).
	Total GHG emissions reduction	• Reduce greenhouse gas emissions by 50% below 2005 levels by 2030 (OS). • Climate neutrality by 2050 (OS).
	Land use and land use change GHG emissions reduction	• Negative GHG emissions from LULUCF by 2050 (A).
	Reduce or halt deforestation	• Achieve zero illegal deforestation in the Amazon biome by 2030 (OS).
14 LIFE BELOW WATER	Limit nitrogen use	• Achieve 1.9 million tons per year by 2030 (OS). • 2.8 million in 2050, in terms of installed capacity (OS).
	Limit phosphorous use	• Achieve 14 Mt/year 2030 (OS). • 27 Mt/year in 2050, in terms of installed capacity (OS).
	Limit water use	• Increase of 4.2 Mha of irrigated crop area by 2040 (A).

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.

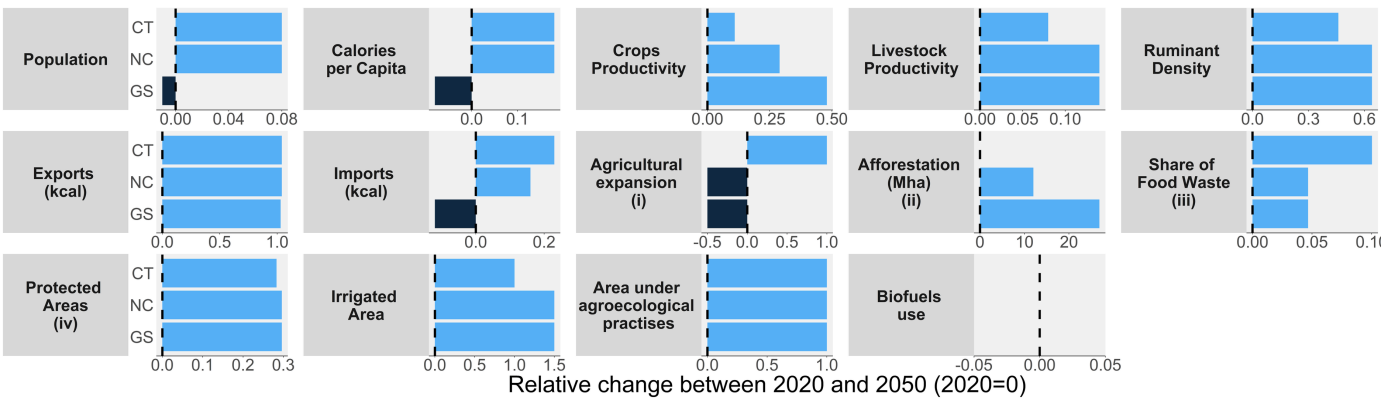
Pathway narratives

Current Trends: In this pathway, we assume a medium population growth, no constraints on agricultural expansion, no afforestation target, no deforestation control, and a BAU scenario regarding feedstock use for ethanol. The future also leads to a considerable increase concerning the volume of exports of the main commodities and low agricultural productivity growth.

National Commitments: Compared to the Current Trends Pathway, we assume that this future considers the restoration of 12 Mha of forest by 2030, the expansion of protected areas, and no deforestation beyond 2030, based on Brazil's commitments. Also, we assume that this future would lead to high livestock productivity growth and medium crop productivity growth. This future also takes into account food waste and post-harvest loss reductions, and a renewable fuel-oriented scenario when compared to the historical trends.

Global Sustainability: Assumptions on population growth, diets and reforestation targets are different from the National Commitments pathway. In this pathway, we assume this future would lead to low population growth, higher crop productivity growth, and an evolution towards a healthier diet (EAT-*Lancet* recommended diet). Additionally, we considered a restoration target of approximately 27 Mha by 2050 to go beyond Brazil's NDC commitment of restoring 12 Mha of forests by 2030. This restoration target considers the amount of environmental debt from the Rural Environmental Cadastre (CAR) for all biomes but the Atlantic Forest, where we consider the Atlantic Forest Pact target of restoring 15 Mha.

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

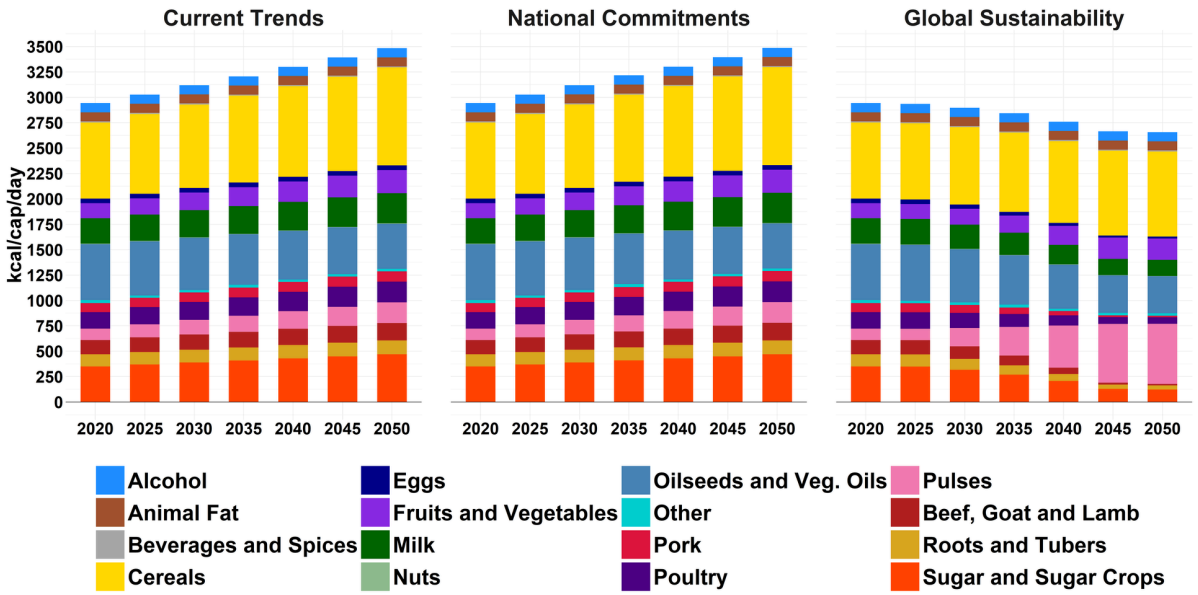


Figure 5. Comparison of the computed daily average kilocalorie intake per capital per food category across the three pathways and the prevalence of undernourishment in 2050

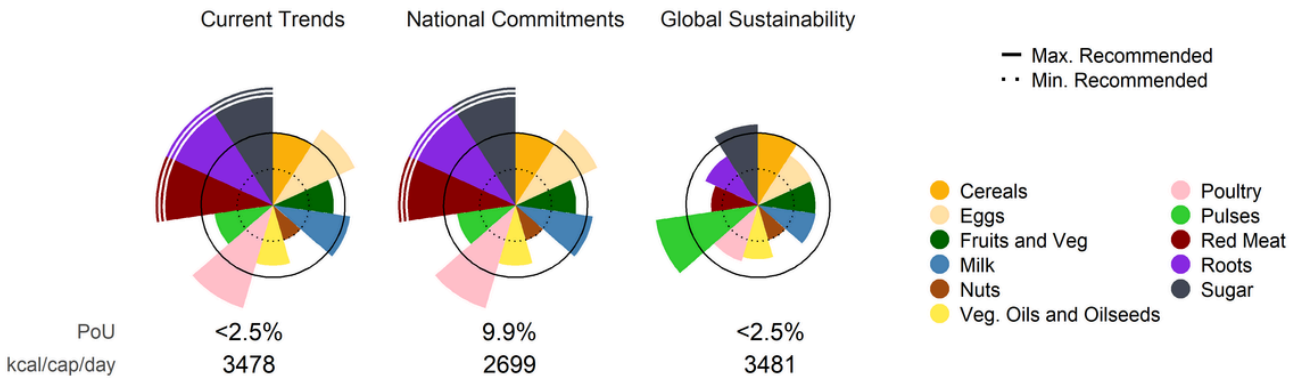


Figure 6. Evolution of land cover 2000-2050

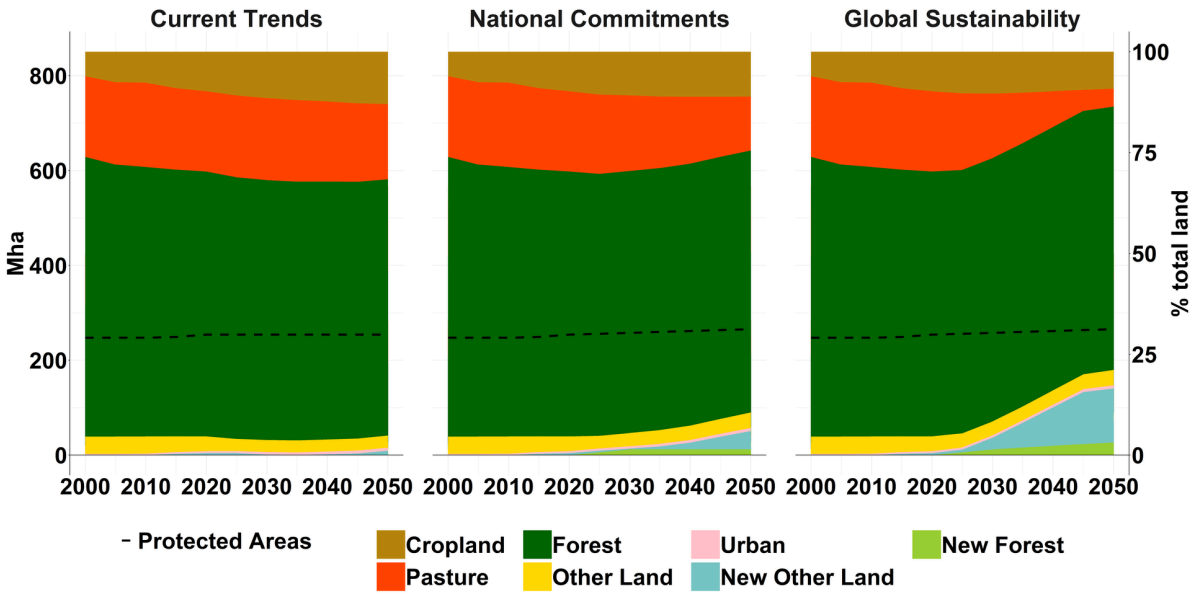


Figure 7. Evolution of the cropland composition 2000-2050

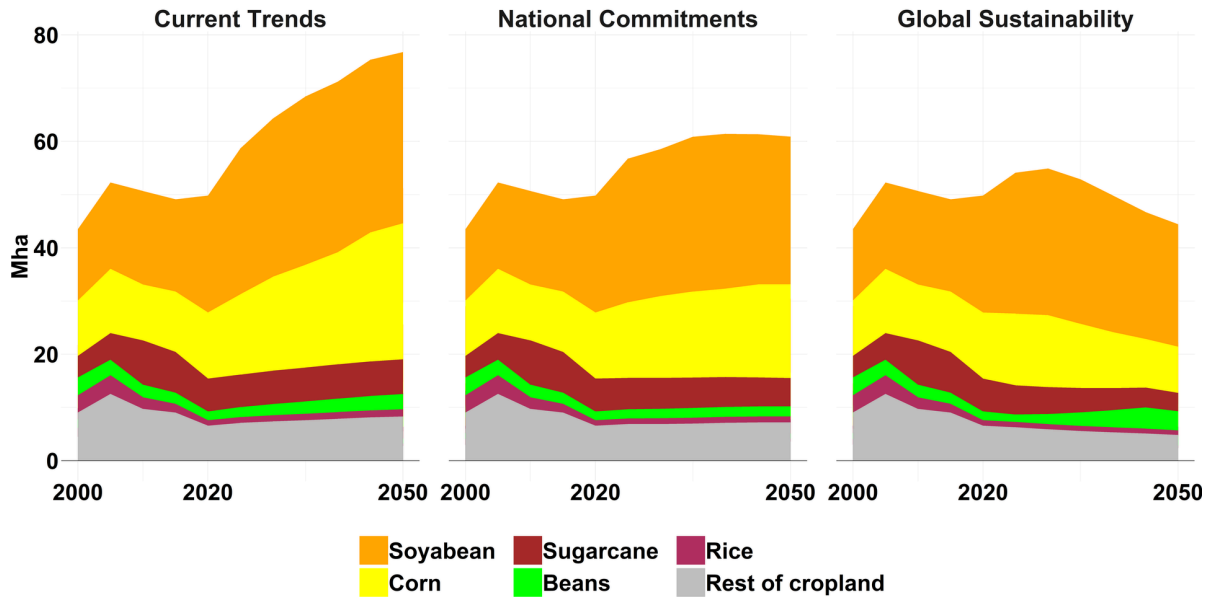


Figure 8. Projected AFOLU emissions and removals between 2020 and 2050 by main sources and sinks across pathways

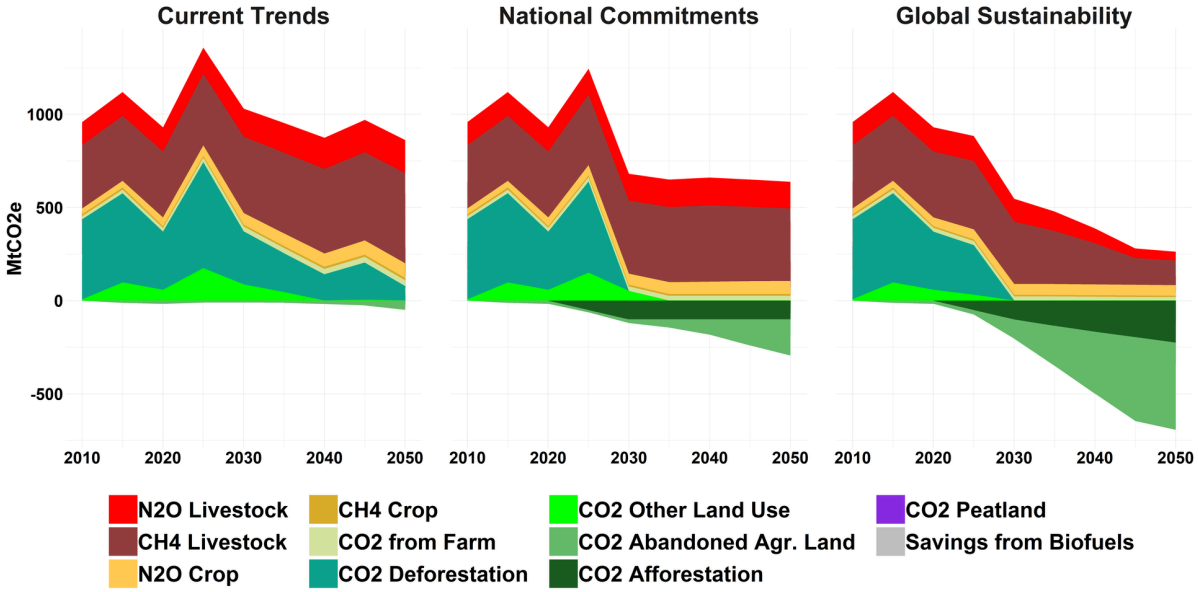
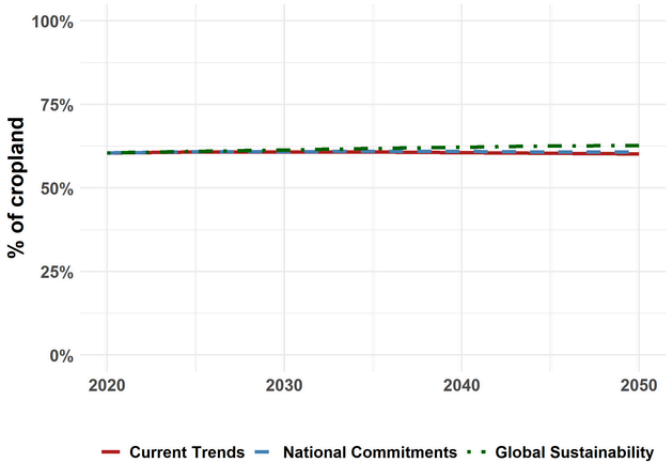


Figure 9. Share of cropland under agroecological practices



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)

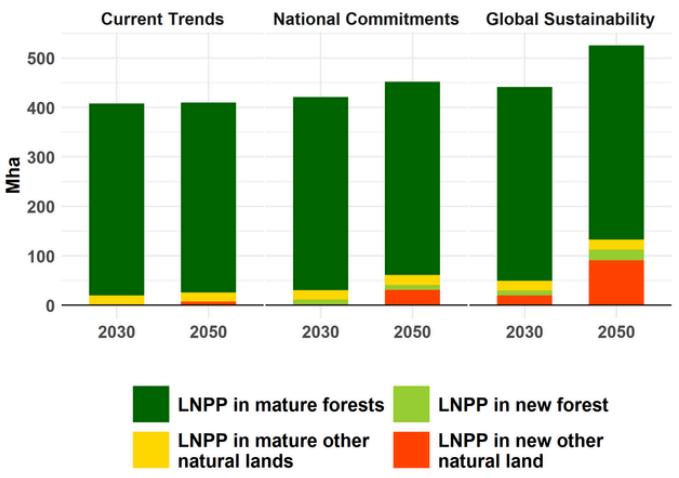


Figure 11. Nitrogen application

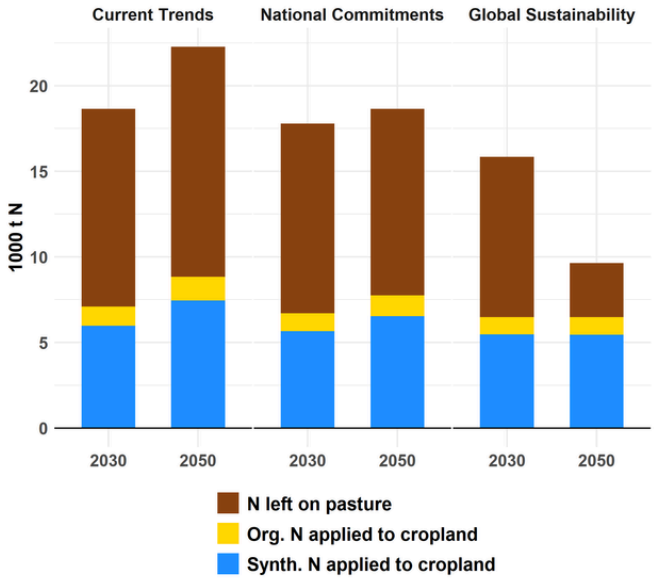
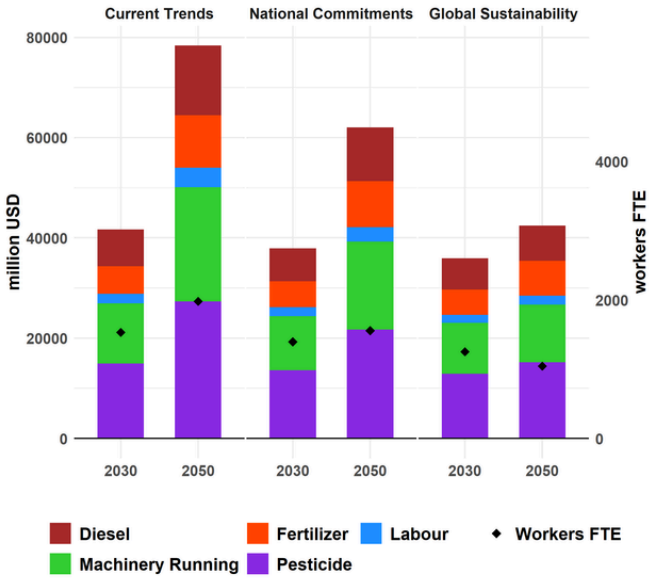


Figure 12. On-farm production costs



FTE: Full-time equivalent

For more detailed results and visual data, visit www.scenathon.org

Scenarios and assumptions

		A) CURRENT TRENDS	B) NATIONAL COMMITMENTS	C) GLOBAL SUSTAINABILITY	Justification
1. Macroeconomics	**1.1)** GDP per capita	Total of USD 2,950 billion USD by 2050 (SSP2)	Same as Current Trends	Same as Current Trends	GDP follows the projections given by IIASA for SSP2 (embedded in Calculator). OECD projects USD 5,168 billion by 2050. We need to investigate these values in a future iteration. Source: OECD. (2022). Real GDP long-term forecast (indicator) [Data set] We chose the same SSP for the three pathways since the selection of alternative GDP scenarios will not impact your results for now. In a future iteration, a sustainable scenario is found to be close to SSP1 (OECD, 2016) and we will change the assumption of Global Sustainability to SSP1 if the option is available. Source: OECD. (2016). Alternative Futures for Global Food and Agriculture. Paris, OECD Publishing. Retrieved here
	1.2) Population	230.89 million inhabitants in 2050 (UN-Medium Scenario)	Same as Current Trends	211.75 million inhabitants in 2050 (UN-Low Scenario)	The population will peak 232.93 million by 2050, according to data from IBGE, of which the closest assumptions are the SSP2 and UN_Medium (IBGE, 2020). Source: IBGE. (2020). IBGE - Projeções da população [Data set]. Retrieved here Regarding the Global Sustainability pathway, a sustainable scenario is found to be close to SSP1. We will use the UN-Low assumption instead of SSP1, since the population variation are similar in both assumptions.
	1.3) Inflation	Prices under inflation based on the average change in the 2000-2020 period (Average scenario)	Same as Current Trends	Same as Current Trends	According to IBGE, the index IPCA, used as base to define the inflation rates in Brazil, decreased 24.5% in 2000-2020. During this period, there is significant fluctuation in the index.

Scenarios and assumptions

		A) CURRENT TRENDS	B) NATIONAL COMMITMENTS	C) GLOBAL SUSTAINABILITY	Justification
					Source: IBGE (2020). IBGE - Índice Nacional de Preços ao Consumidor Amplo. [Data set]. Retrieved here
	1.4) Inequalities	Inequality based on the difference of the Gini index during 2010-2020.	Same as Current Trends	Same as Current Trends	Between 2011-2020, according to the historical series from World Bank, the Gini index decreased from 52.9 to 48.9. Source: The World Bank (2023). Gini index - Brazil. Retrieved here
2. Land	**2.1)** Constraints on agricultural expansion/deforestation	Free expansion of productive land under the total land boundary	No deforestation beyond 2030	No deforestation beyond 2030	Current Trends: In the last decade, the low enforcement of environmental protection laws in the last years provides multiple opportunities for infractions to go undetected or unpunished (Carvalho et al., 2019). Source: Carvalho, W. D., Mustin, K., Hilário, R. R., Vasconcelos, I. M., Eilers, V., & Fearnside, P. M. (2019). Deforestation control in the Brazilian Amazon: A conservation struggle being lost as agreements and regulations are subverted and bypassed. Perspectives in Ecology and Conservation, 17(3), 122-130. National Commitments and Global Sustainability: In line with Brazil's NDC (Brazil, 2022) which commits to strengthen its policies and measures with a view to achieve zero illegal deforestation in the Brazilian Amazonia by 2030. Source: Brazil. (2022). Intended Nationally Determined Contribution: towards achieving the objective of the United Nations Framework Convention on Climate Change (p. 10). Retrieved here
	2.2) Afforestation, and forest plantations targets	No afforestation/restoration targets.	Afforestation / reforestation target in line with Bonn Challenge and NDCs commitments -	Afforestation / reforestation target in line with Bonn Challenge and NDCs commitments by	Current Trends: There is an upward trend in deforestation occurring since 2012 in Brazil (INPE, 2023).

Scenarios and assumptions

		A) CURRENT TRENDS	B) NATIONAL COMMITMENTS	C) GLOBAL SUSTAINABILITY	Justification
			reforestation of 12 Mha by 2030	2030 the Atlantic Forest Pact and restoration of environment debts per municipality by 2050. We assume a total of 26.84 Mha reforested by 2050	Source: INPE (2023). Programa de Monitoramento da Amazônia e demais biomas. Retrieved here National Commitments: The Brazilian government pledged to reforest 12 million hectares by 2030 under Brazil's NDC pledge (Brazil, 2022). Source: Brazil. (2022). Intended Nationally Determined Contribution: towards achieving the objective of the United Nations Framework Convention on Climate Change (p. 10). Retrieved here Global Sustainability: We assume total afforested/reforested area reaches 26.84 Mha by 2050. In addition to the Brazil's NDC commitment by 2030, we take into account the Atlantic Forest Pact, which aims to restore 15 Mha of degraded/ deforest lands in Atlantic Forest by 2050 (Crouzeilles et al., 2019). The assumption also includes to restore by 2050 the environment debts per municipality based on the Rural Environmental Cadastre (CAR) (Guidotti et al., 2017). Sources: Guidotti, V., Freitas, F. L., Sparovek, G., Pinto, L. F. G., Hamamura, C., Carvalho, T., & Cerignoni, F. (2017). Números detalhados do novo código florestal e suas implicações para os PRAs. Sustentabilidade Em Debate, (5), 1–11. Crouzeilles, R., Santiami, E., Rosa, M., Pugliese, L., Brancalion, P. H., Rodrigues, R. R., … Matsumoto, M. H. (2019). There is hope for achieving ambitious Atlantic Forest restoration

Scenarios and assumptions

		A) CURRENT TRENDS	B) NATIONAL COMMITMENTS	C) GLOBAL SUSTAINABILITY	Justification
					commitments. Perspectives in Ecology and Conservation, 17(2), 80–83.
	2.3) Urban and settlements area	Increase by 49% between 2020 and 2050 (Current Trend scenario)	Same as Current Trends	Same as Current Trends	The increase was computed based on the urban area growth during 2000-2020 using MapBiomas data (Souza et al., 2020) Source: Souza, C. M., Z. Shimbo, J., Rosa, M. R., Parente, L. L., A. Alencar, A., Rudorff, B. F. T., … Azevedo, T. (2020). Reconstructing Three Decades of Land Use and Land Cover Changes in Brazilian Biomes with Landsat Archive and Earth Engine. Remote Sensing, 12(17).
	2.4) Protected areas	254 Mha of protected areas by 2050	266 Mha of protected areas by 2050	Same as National Commitments	Current Trends: Brazilian protected areas were computed using the 2010 data from World Database on Protected Areas (WDPA, 2020). National Commitments and Global Sustainability: an expansion of protected areas is expected if policies are put in practice, such as an effective implementation of Brazil's Forest Code.
3. Productivity and management	**3.1)** Crop productivity for the key crops	Between 2020 and 2050, crop productivity increases: -from 3.22 t/ha to 3.37 t/ha for soybeans -from 5.6 t/ha to 5.84 t/ha for corn	Between 2020 and 2050, crop productivity increases: -from 3.22 t/ha to 3.88 t/ha for soybeans -from 5.7 t/ha to 7.5 t/ha for maize	Between 2020 and 2050, crop productivity increases: -from 3.22 t/ha to 4.13 t/ha for soybeans -from 5.7 t/ha to 8.61 t/ha for maize	Current Trends: The crop productivity values are based on a low growth scenario. National Commitments and Global Sustainability: The ABC Plan (MAPA, 2012) focuses on the nationwide adoption of technologies such Crop-Livestock-Forestry, No-Till, and Double Cropping. Based on these policies, we assume a medium and higher productivity growth in National Commitments and Global Sustainability pathways, respectively. Source: MAPA. (2012). Plano setorial de mitigação e de adaptação às mudanças

Scenarios and assumptions

		A) CURRENT TRENDS	B) NATIONAL COMMITMENTS	C) GLOBAL SUSTAINABILITY	Justification
					climáticas para a consolidação de uma economia de baixa emissão de carbono na agricultura: Plano ABC (Agricultura de Baixa Emissão de Carbono) (p. 173). Retrieved from here
	3.2) Cropland under agroecological practices	35 Mha of total cropland under agroecological practices by 2030 (agroforestry)	Same as Current Trends	Same as Current Trends	In the 2020/2021 crop season, Brazil increased the agroforestry area to 17.4 Mha (Polidoro et al., 2020). The ICLF Network has set a goal to double this amount by 2030 and reach 35 million hectares of ILPF (REDE ILPF, 2023). Sources: Polidoro J. C., De Freitas, P. L., Hernani, L. C., Dos Anjos, L. H. C., Rodrigues, R. D. A. R., Cesário, F. V., ... & Ribeiro, J. L. (2020). The impact of plans, policies, practices and technologies based on the principles of conservation agriculture in the control of soil erosion in Brazil. Authorea Preprints. REDE ILPF (2023). ICLF in numbers. Retrieved here
	3.3) Livestock productivity for the key livestock products	Between 2020 and 2050, the productivity per head increases: -from 66kg/TLU to 75 kg/TLU for cattle beef -from 2285L/TLU to 2455 L/TLU for cattle milk	Between 2020 and 2050, the productivity per head increases: -from 66 kg/TLU to 84 kg/head for cattle beef -from 2281L/TLU to 2579 L/TLU for cattle milk	Same as National Commitments	Current trends: Most of the Brazilian pasturelands still maintain an extensive system that depends basically on the nutrient supply of the pastures (Barbosa et al., 2015). Source: Barbosa, F. A., Soares Filho, B. S., Merry, F. D., de Oliveira Azevedo, H., Costa, W. L. S., Coe, M. T., … de Oliveira, A. R. (2015). Cenários para a pecuária de corte amazônica (p. 154). Retrieved from Universidade Federal de Minas Gerais website National Commitments and Global Sustainability: The use of sustainable technologies can contribute to the increase in animal yield and welfare due to thermal comfort, mitigation of the effects of greenhouse gases, and the recovery of

Scenarios and assumptions

		A) CURRENT TRENDS	B) NATIONAL COMMITMENTS	C) GLOBAL SUSTAINABILITY	Justification
					degraded areas (Pereira, 2019). We assume a higher productivity growth than 2000–2020. Source: Pereira, M. de A. (2019). Avaliação econômica de sistemas de Integração Lavoura-Pecuária-Floresta: As experiências da Embrapa. Embrapa Gado de Corte-Documentos (INFOTECA-E). Retrieved here
	3.4) Pasture stocking rate	Increase from 0.90 TLU per ha to 1.31 TLU per ha pasture between 2020 and 2050.	Increase from 0.90 TLU per ha to 1.46 TLU per ha pasture between 2020 and 2050.	Same as National Commitments	Current Trends: Despite recent advances, the productivity of Brazilian pasturelands is still below its potential (Strassburg et al., 2014), we keep the BAU scenario for this pathway. Source: Strassburg, B. B. N., Latawiec, A. E., Barioni, L. G., Nobre, C. A., Silva, V. P. da, Valentim, J. F., … Assad, E. D. (2014). When enough should be enough: Improving the use of current agricultural lands could meet production demands and spare natural habitats in Brazil. Global Environmental Change, 28, 84–97. National Commitments and Global Sustainability: Source: The ABC Plan (MAPA, 2012) focuses on the adoption of sustainable technologies such as Crop-Livestock-Forestry. We assume a higher productivity growth.
	3.5) Forest management	**TBA**	**TBA**	**TBA**	**The assumptions will be quantified after the implementation of the forestry module.**
4. Trade	**4.1)** Share of consumption which is imported for key imported products (%)	The share of total consumption that is imported remains constant at the 2020 level (I2 scenario)	Same as Current Trends	Same as Current Trends	Brazilian imports will be almost stable for 2030 for the main imported agricultural products (MAPA, 2023). Source: MAPA. (2023). Projeções do Agronegócio: Brasil 2022/23 a 2032/33 [Report]. Retrieved here

Scenarios and assumptions

		A) CURRENT TRENDS	B) NATIONAL COMMITMENTS	C) GLOBAL SUSTAINABILITY	Justification
	4.2) Evolution of exports for key exported products (1000 tons)	The exported quantity: -increases from 81.8 Mt in 2020 to 161.9 Mt in 2050 for soybeans -increases from 33.1 Mt in 2020 to 66.6 Mt in 2050 for maize -increases from 2.5 Mt in 2020 to 5.1 Mt in 2050 for beef	Same as Current Trends	Same as Current Trends	We assume the scenario in which the evolution of exports is multiplied by 2 by 2050. The three pathways use the E2 scenario. This scenario is found to be close to the projections from MAPA for the main commodities (MAPA, 2023). We will investigate the exports for soybeans, maize, and beef in more detail, and we will make the necessary adjustments before the final submission in October. Source: MAPA. (2023). Projeções do Agronegócio: Brasil 2022/23 a 2032/33 [Report]. Retrieved here
5. Food	**5.1)** Average dietary composition	By 2050, the average daily calorie consumption is based on projections given in FAO (2018) for a Business-as-Usual scenario	Same as Current Trends	By 2050, average daily calorie consumption is based on the EAT-Lancet recommendations for a healthy diet (EAT-Lancet scenario)	Current trends and National Commitments: the diet assumption is based on historical trends from FAO (FAOSTAT, 2023) and projections of food consumption in 2050 given in FAO (2018), adjusted to reproduce national statistics values in 2015 and 2020. The national food intake data was retrieved from the Brazilian Household Budget Survey (POF) conducted by the Brazilian Institute of Geography and Statistics (IBGE), surveyed in 2017-2018 (IBGE, 2021). Sources: FAOSTAT. (2023). FAOSTAT database. Retrieved from here. FAO (2018). The future of food and agriculture – Alternative pathways to 2050. Rome. 224 pp. Licence.CC BY-NC-SA 3.0 IGO. IBGE (2021). Pesquisa de Orçamentos Familiares 2017-2018. Perfil das despesas do Brasil. Indicadores de qualidade de vida. Rio de Janeiro. Global Sustainability: the diet scenario is based on EAT-Lancet Commission's dietary recommendations (Willet et al., 2019).

Scenarios and assumptions

		A) CURRENT TRENDS	B) NATIONAL COMMITMENTS	C) GLOBAL SUSTAINABILITY	Justification
					Source: Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., Garnett, T., Tilman, D., DeClerck, F., Wood, A., Jonell, M., Clark, M., Gordon, L. J., Fanzo, J., Hawkes, C., Zurayk, R., Rivera, J. A., Vries, W. D., Sibanda, L. M., … Murray, C. J. L. (2019) Food in the Anthropocene: The EAT–Lancet Commission on healthy diets from sustainable food systems. The Lancet, 393(10170), 447–492. https://doi.org/10.1016/S0140-6736(18)31788-4
	5.2) Share of food consumption which is wasted at household level	Same share as in 2020	The share of final household consumption which is wasted at the household level is reduced by 5%.	Same as National Commitments	National Commitments and Global Sustainability: The Brazilian government committed to the United Nations (SDG 12.3.1br) to reduce per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains by 2030 (IPEA, 2016). Source: IPEA. (2016). ODS 12—Consumo e Produção Sustentáveis. Retrieved May 21, 2020, from here
6. Biofuels	**6.1)** Targets on biofuel and/or other bioenergy use	Following the projections from OECD-FAO Agricultural outlook for 2019-2028. Also, the data used for the biofuel feedstock use for sugarcane were replaced by the ones computed for the BAU scenario in de Andrade Junior et al. (2019).	Increasing the share of sustainable biofuels in the Brazilian energy mix to approximately 18% by 2030	Increasing the share of sustainable biofuels in the Brazilian energy mix to approximately 18% by 2030	Current Trends: In addition to using the OECD-FAO Agricultural outlook for 2019-2028, the biofuel feedstock use for sugarcane was replaced by the data computed in de Andrade Junior et al. (2019). We used the data related to the BAU scenario, mapped with the macroeconomic elements of the SSP2. National Commitments and Global Sustainability: In Brazil's NDC (Brazil, 2022), the government pledges to increase the share of sustainable biofuels in the Brazilian energy mix to approximately 18% by 2030. For these scenarios, we used for the biofuel feedstock used for sugarcane was replaced by the ones

Scenarios and assumptions

		A) CURRENT TRENDS	B) NATIONAL COMMITMENTS	C) GLOBAL SUSTAINABILITY	Justification
					computed for the RFO (Renewable Fuels Oriented) scenario in de Andrade Junior et al. (2019). Source: de Andrade Junior, M. A. U., Valin, H., Soterroni, A. C., Ramos, F. M., & Halog, A. (2019) Exploring future scenarios of ethanol demand in Brazil and their land-use implications. Energy Policy, 134, 110958. Retrieved from here
	6.2) Targets on other non-food use	-	-	-	-
7. Water	**7.1)** Irrigated crop area	No growth scenario	High growth scenario	Same as National Commitments	The assumptions for National Commitments and Global Sustainability are based on projections provided by the National Water Agency (ANA). According to the data provided by the agency, it is estimated an increase of 4.2 million hectares of irrigated crop area (+76%) by 2040, with a smaller impact on the expansion of use of water (+66%) (ANA, 2021). Source: ANA. (2021). Atlas Irrigação. Uso da Água na Agricultura Irrigada. 2a. Edição. Brasília. Retrieved from here