

2023 Scenathon results

Pathways for food
and land-use systems
in the Rest of North
Africa, Central Asia
and Middle East
region



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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Countries in the “Rest of North Africa, Central Asia and Middle East” region

Afghanistan, Algeria, Armenia, Azerbaijan, Egypt, Georgia, Iran, Iraq, Israel, Jordan, Kazakhstan, Kuwait, Kyrgyzstan, Lebanon, Morocco, Oman, Pakistan, Saudi Arabia, Tajikistan, Tunisia, Turkmenistan, United Arab Emirates, Uzbekistan, Yemen.

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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.

Countries in the “Rest of North Africa, Central Asia and Middle East” region: Afghanistan, Algeria, Armenia, Azerbaijan, Egypt, Georgia, Iran, Iraq, Israel, Jordan, Kazakhstan, Kuwait, Kyrgyzstan, Lebanon, Morocco, Oman, Pakistan, Saudi Arabia, Tajikistan, Tunisia, Turkmenistan, United Arab Emirates, Uzbekistan, Yemen.

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

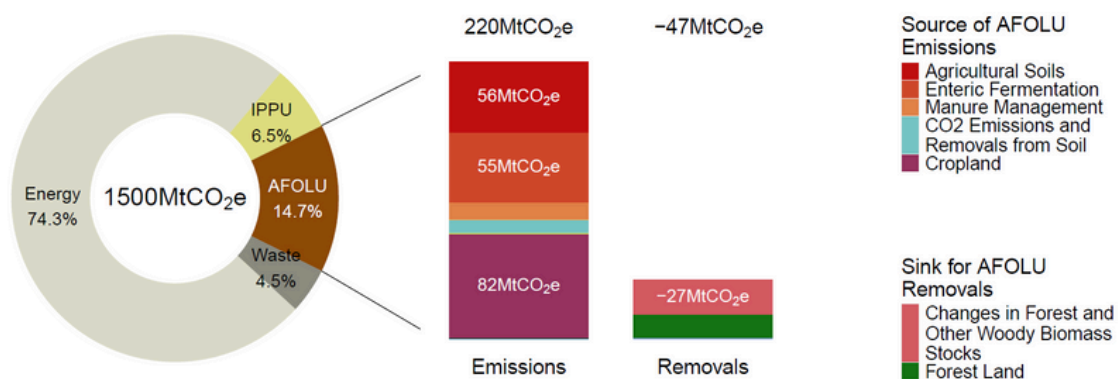
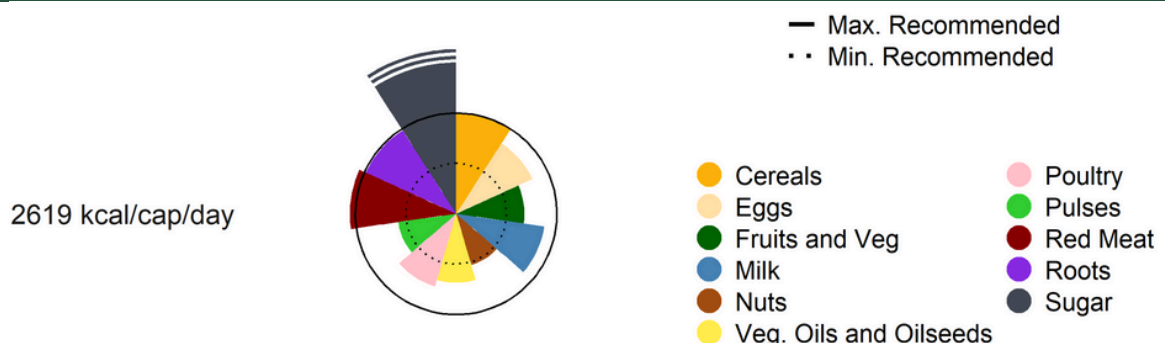







Figure 2. Daily average kilocalorie intake per capital per food category in 2020



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

SDG	Indicator	Regional Target
 2 ZERO HUNGER	Diet-related diseases	Reduce <u>diabetes</u>
	Undernourishment	Under 5% (FAO data)
	Overweight / obesity	Reduce <u>overweight</u>
	Other food-related targets	Transition to a healthier national <u>diet</u>
 13 CLIMATE ACTION	Total GHG emissions reduction	On average reduces total emissions by 30% by 2030 compared to 1990 <u>levels</u>
	Land use and land use change GHG emissions reduction	On average keeps land use and land use change emissions at zero or <u>negative</u>
	Reduce or halt deforestation	Reduce deforestation by 2050 to nearly <u>zero</u>
 15 LIFE ON LAND	Promote afforestation	Reforest 6481 (1000 ha) by <u>2050</u>
	Expand cropland area under agroecological practices	Support organic <u>farming</u>
	Reduce or halt loss of natural ecosystems	Enhance conservation (no quantitative target <u>provided</u>)
 8 DECENT WORK AND ECONOMIC GROWTH	Farmers' income	Improve sustainability in farmers' <u>income</u> .
 14 LIFE BELOW WATER	Water related targets	Increase irrigation <u>systems</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.

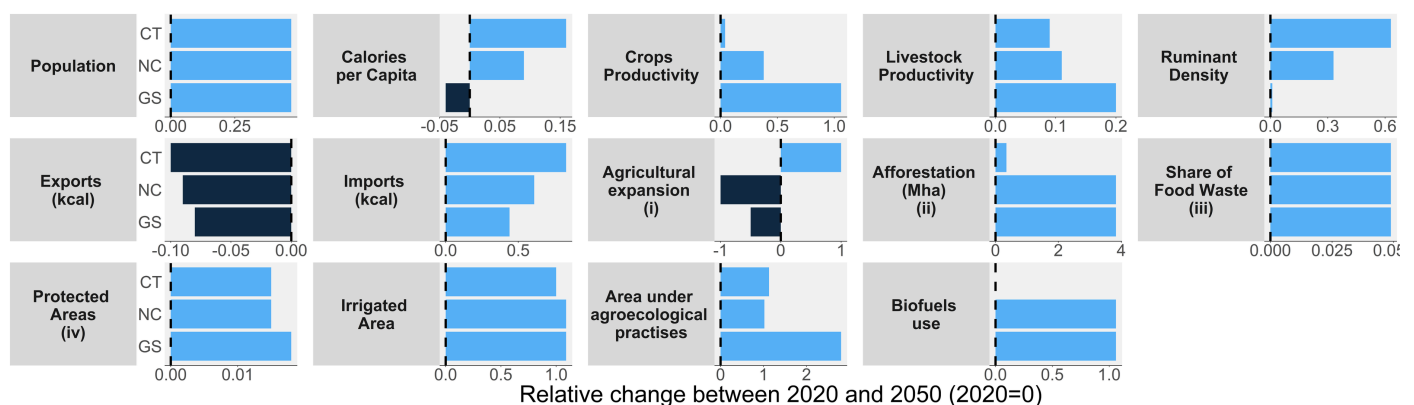
Pathway narratives

Current Trends: Represents a low-ambition trajectory primarily shaped by historical trends and existing policies, offering a glimpse into a future heavily reliant on the current level of implementation and enforcement.

National Commitments: Attempts to predict how food and land systems will evolve if national strategies, pledges, and targets concerning climate, biodiversity, and food systems are met. This is based on a review of policy documents that describe the national climate and biodiversity strategies, the UN food system pathway, the national dietary guidelines, and other relevant policy documents for food and land systems.

Global Sustainability: Identifies additional actions to help closing the gap between the collective outcome of the National Commitments pathway and the global sustainability targets. There may be large overlaps between the 'National commitments' pathway and the Global Sustainability pathway, depending on how ambitious country teams and local stakeholders think the current national commitments are.

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

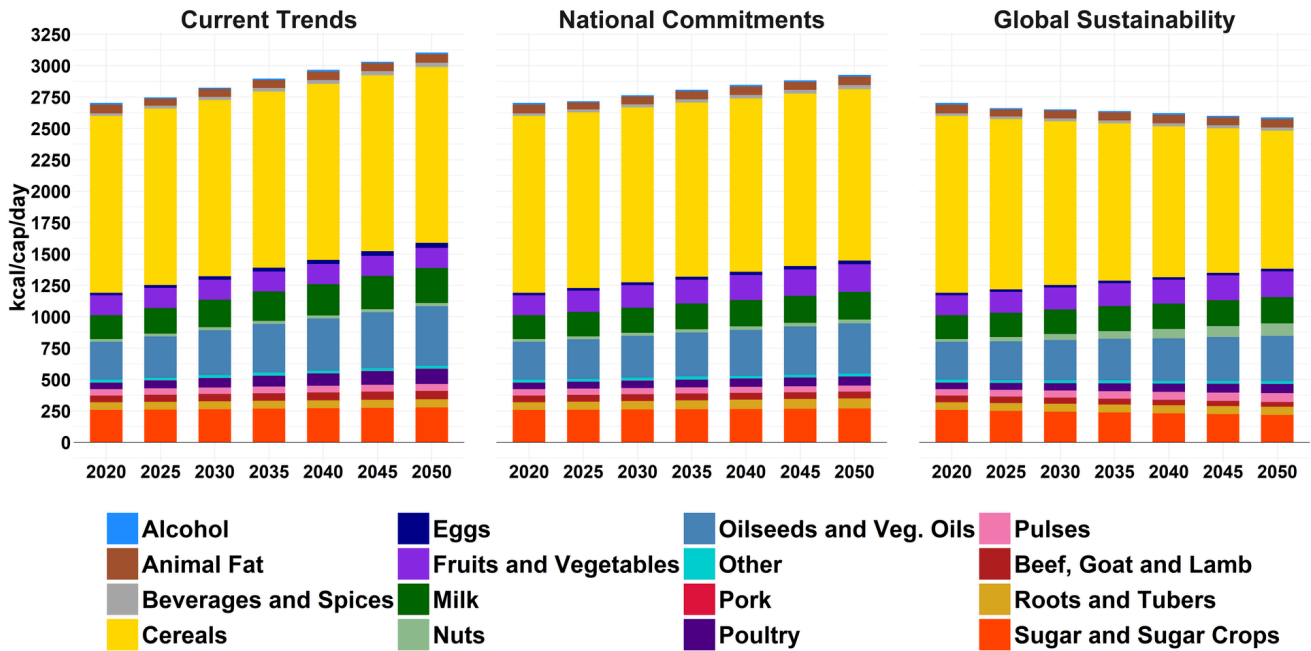


Figure 5. Comparison of the computed daily average kilocalorie intake per capital per food category across the three pathways and the prevalence of undernourishment in 2050

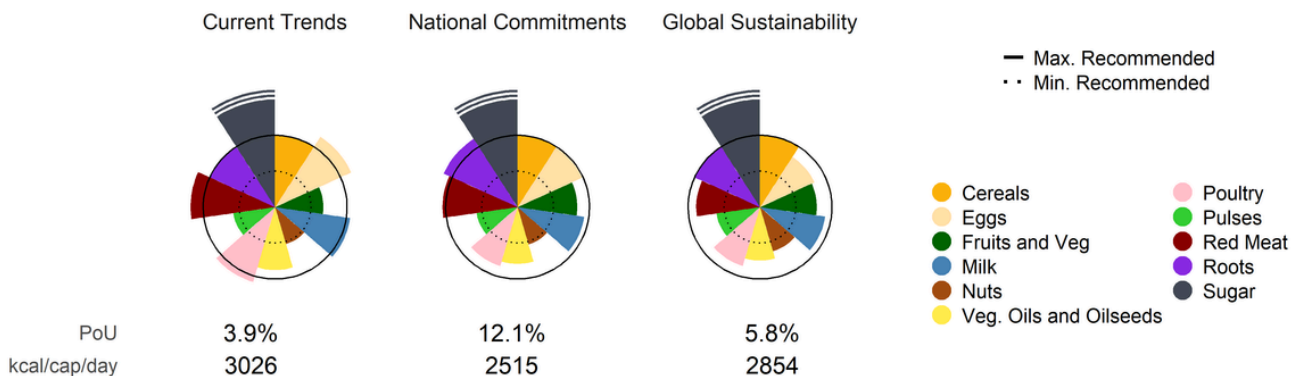


Figure 6. Evolution of land cover 2000-2050

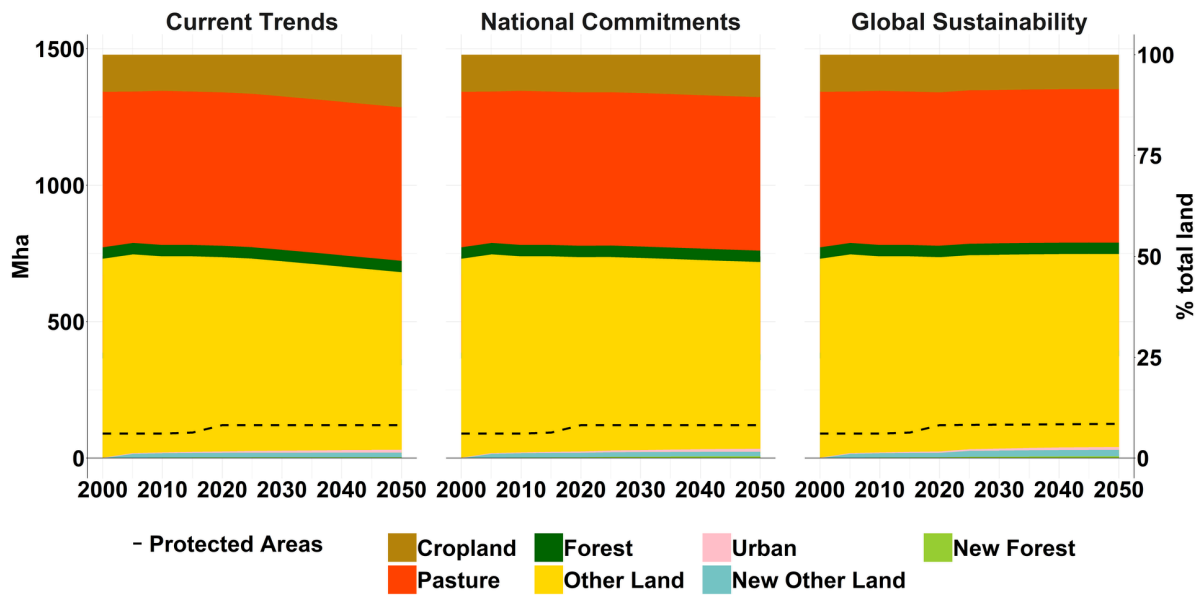


Figure 7. Evolution of the cropland composition 2000-2050

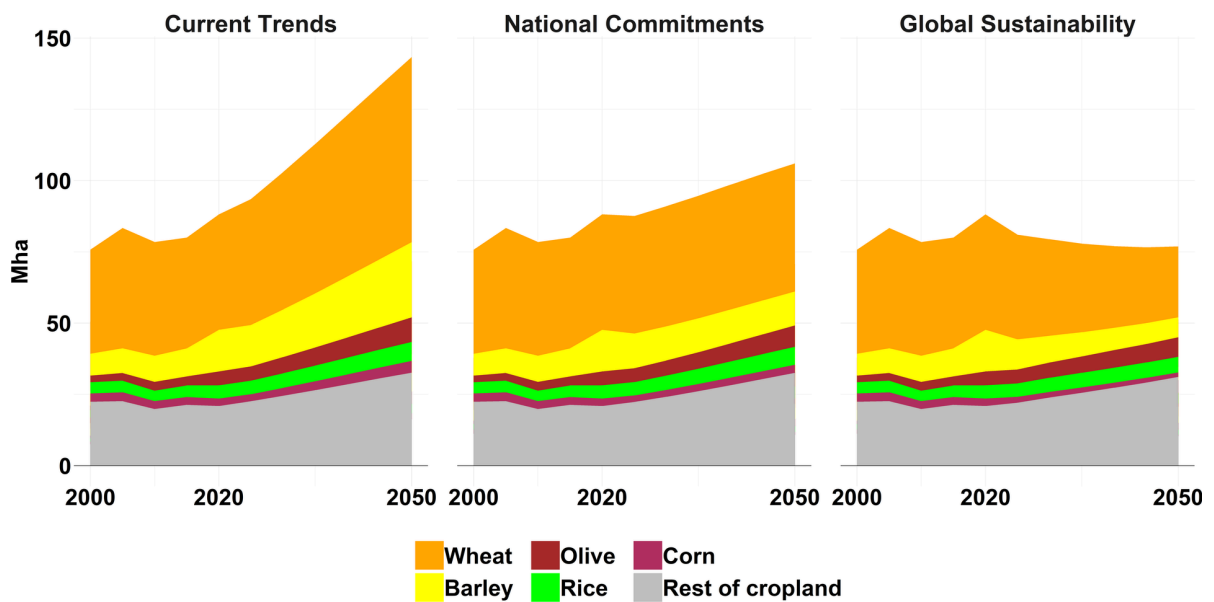


Figure 8. Projected AFOLU emissions and removals between 2020 and 2050 by main sources and sinks across pathways

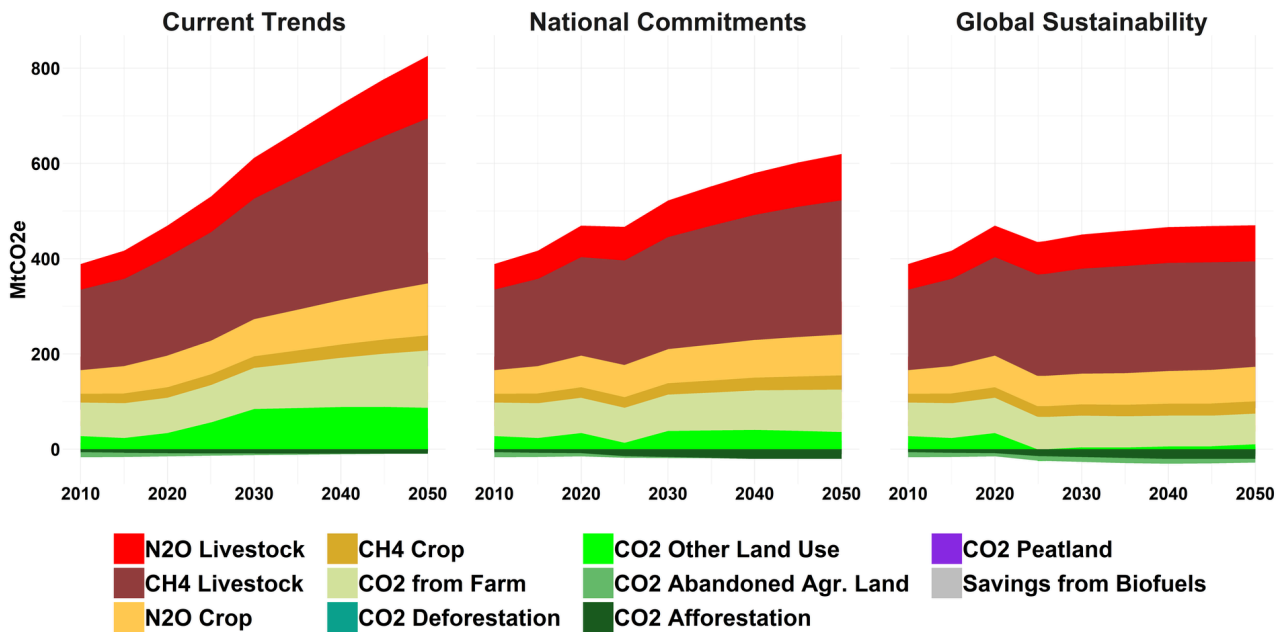


Figure 9. Share of cropland under agroecological practices

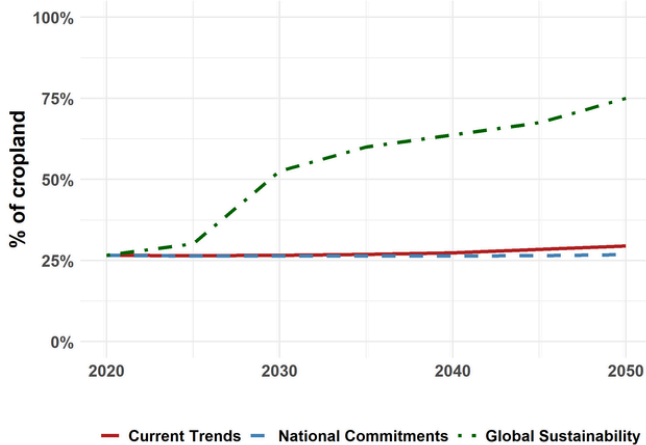
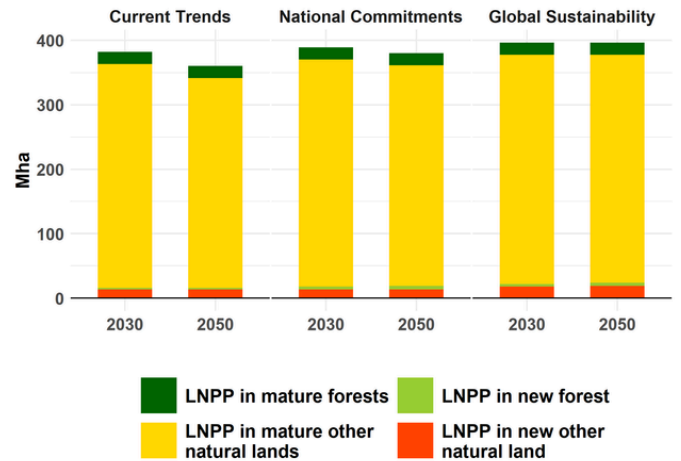


Figure 10. Total area of land where natural processes predominate (LNPP)



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

Figure 11. Nitrogen application

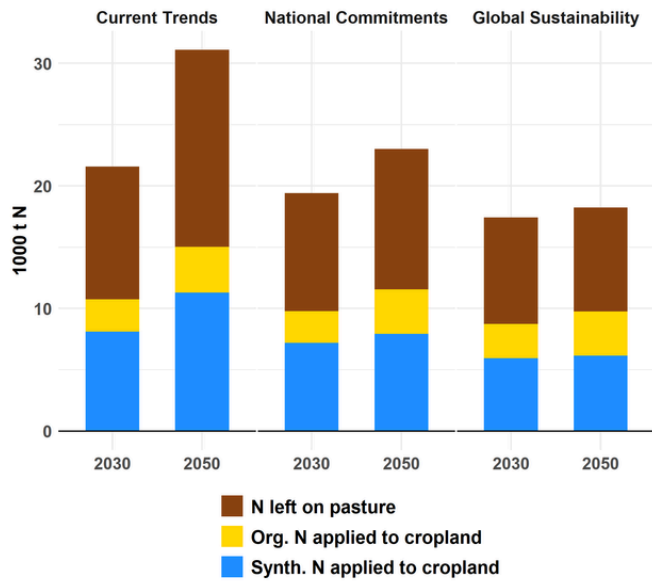
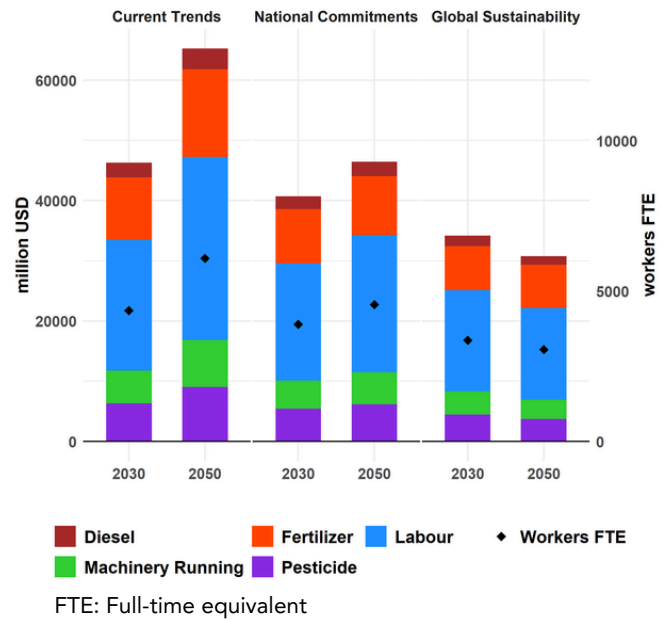


Figure 12. On farm production costs



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

Scenarios and assumptions

		A) CURRENT TRENDS	B) NATIONAL COMMITMENTS	C) GLOBAL SUSTAINABILITY
1. Macroeconomics	1.1) GDP per capita	SSP2	SSP2	SSP2
	1.2) Population	UN Medium	UN Medium	UN Medium
	1.3) Inflation	Current US Dollar	Current US Dollar	Current US Dollar
	1.4) Inequalities	Current trend	Slight Decrease	Slight Decrease
2. Land	2.1) Constraints on agricultural expansion/deforestation	FreeExpansion	NoDefor2050	NoDef2030
	2.2) Afforestation, and forest plantations targets	Current Trends	BonnChallenge	BonnChallenge
	2.3) Urban and settlements area	Follow Pop scenario	Follow Pop scenario	Follow Pop scenario
	2.4) Protected areas	No additional areas	No additional areas	PAExpansion - 17% protected area in 2050 target
3. Productivity and management	3.1) Crop productivity for the key crops	Low Growth	Middle Growth	High Growth
	3.2) Cropland under agroecological practices	Embedded natural	20% organic farming	Mixed (30% organic farming, 30% minimal tillage)
	3.3) Livestock productivity for the key livestock products	BAU Growth	Slight increase in growth but low	HighGrowth
	3.4) Pasture stocking rate	Optimal	Optimal	Optimal
	3.5) Forest management	No change	No change	No change
4. Trade	4.1) Share of consumption which is imported for key imported products (%)	I2 stable imports	I2 stable imports	I2 stable imports

Scenarios and assumptions

		A) CURRENT TRENDS	B) NATIONAL COMMITMENTS	C) GLOBAL SUSTAINABILITY
	4.2) Evolution of exports for key exported products (1000 tons)	E2 export multiplied by 2	E2 export multiplied by 2	E2 export multiplied by 2
5. Food	5.1) Average dietary composition	Fat dietary	More sustainable - own-defined diet	EatLancet adapted to the current NMC diet.
	5.2) Share of food consumption which is wasted at household level	Current share	Current share	Reduced
6. Biofuels	6.1) Targets on biofuel and/or other bioenergy use	NoChange	OECD_AgLINK	OECD_AgLINK
	6.2) Targets on other non-food use	-	-	-
7. Water	7.1) Irrigated crop area	Same irrigated area as in 2010	Increase by 10% up to 2050	Increase by 10% up to 2050