

The Food, Agriculture, Biodiversity, Land Use and Energy Pathways (FABLE) Consortium and Ethiopia

KIFLU GEDEFE MOLLA

POLICY STUDIES INSTITUTE

Ethiopia-background

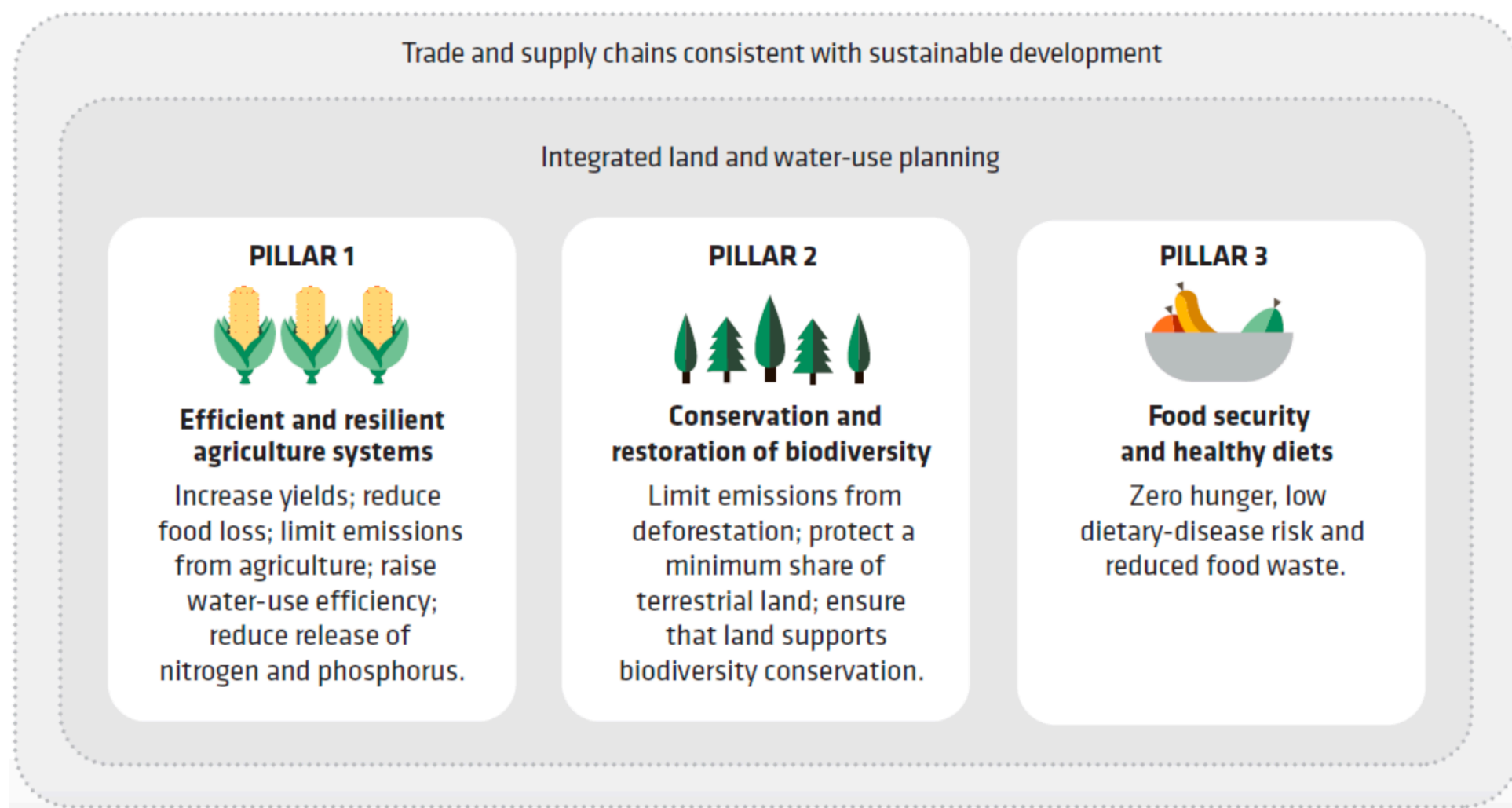
- In terms of population size, about 110 million, 2nd largest country in Africa
- With 2018 GDP of 84.36 Billion USD (7th largest in Africa), and has recorded double digit economic growth over the past decade or so
- A major decline in the proportion of people living below the national poverty line from 44.2% (1999/2000) to 23.5% in 2015/2016.
- Achieving food security is still a major challenge
- In 2016, 38% of Children under the age of 5 are undernourished

Ethiopia-background

- Food and Land-use systems in Ethiopia are unsustainable, undermining the achievement of the SDGs and the Paris Climate Agreement.
- This can be seen in light of increasing population pressures and urbanization that forces farmers to:
 - convert their farm and grazing lands into urban dwellings, cultivate steep slopes and undergo deforestation ==> leading to land degradation and adverse climatic change
- All of these potentially harming the performance of the agri. sector, resulting in food security problems
- to make land-use and food systems sustainable, it is important to have robust tools to model impacts of policies

THE FABLE CONSORTIUM

- FABLE is a global initiative that focuses on identifying scientific pathways for sustainable LU and FS in line with meeting the Paris Agreement and the SDGs.
- Identified three pillars for designing integrated strategies to achieve sustainable LU & FS

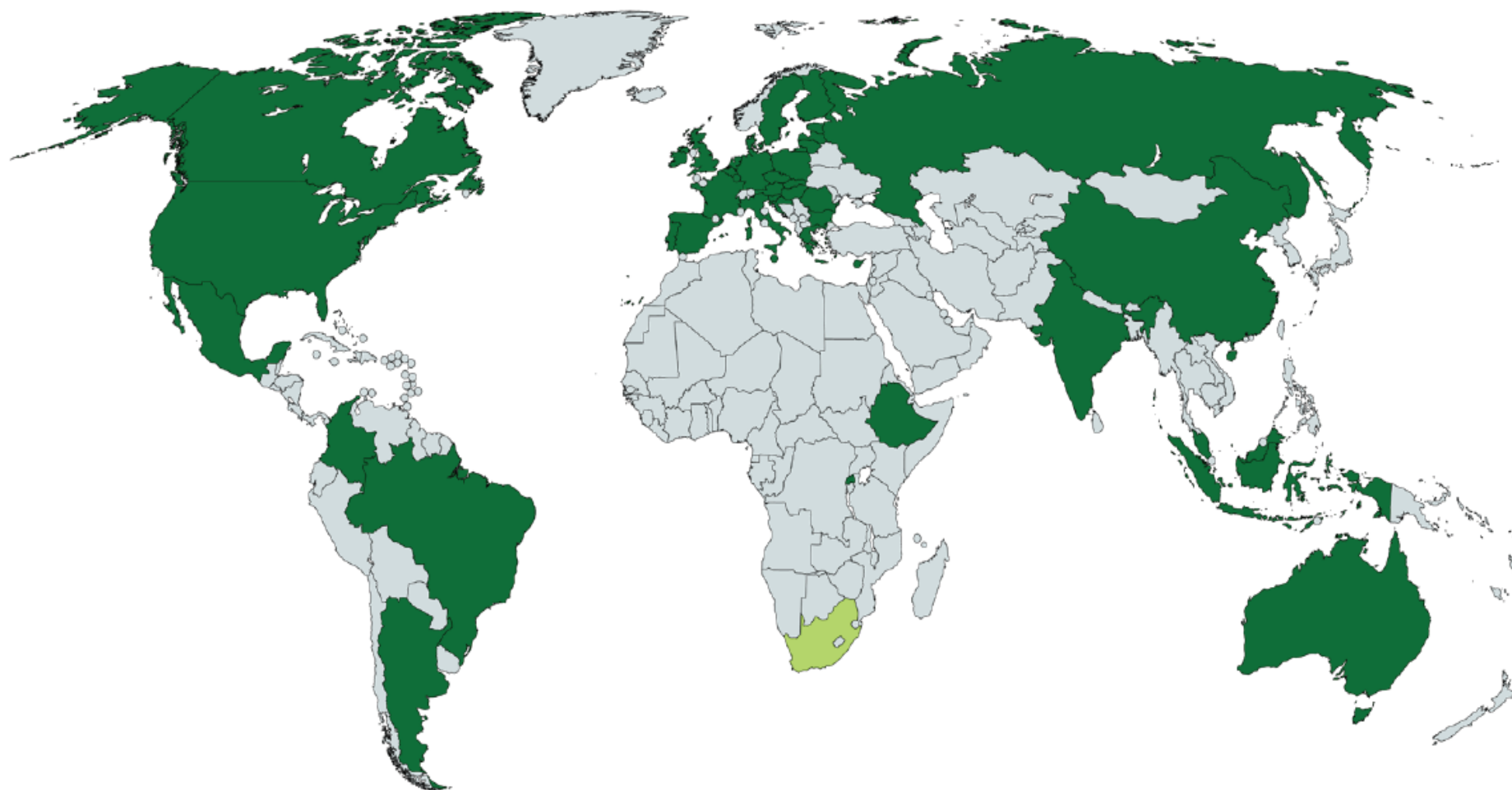


Source: Schmid-Traub et al. (2019)

THE FABLE CONSORTIUM

- FABLE is part of the Food and Land-Use Coalition (FOLU)
- It mobilizes top knowledge institutions from around the globe to support the development of the data and modeling tools
 - capacity development, national pathways, and national policy options
 - 20 countries from different parts of the world, including the EU
 - Ethiopia, Rwanda and S. Africa being the 3 countries from Africa
- The International Institute for Applied Systems Analysis (IIASA) and the Sustainable Development Solutions Network (SDSN) coordinate the FABLE Consortium

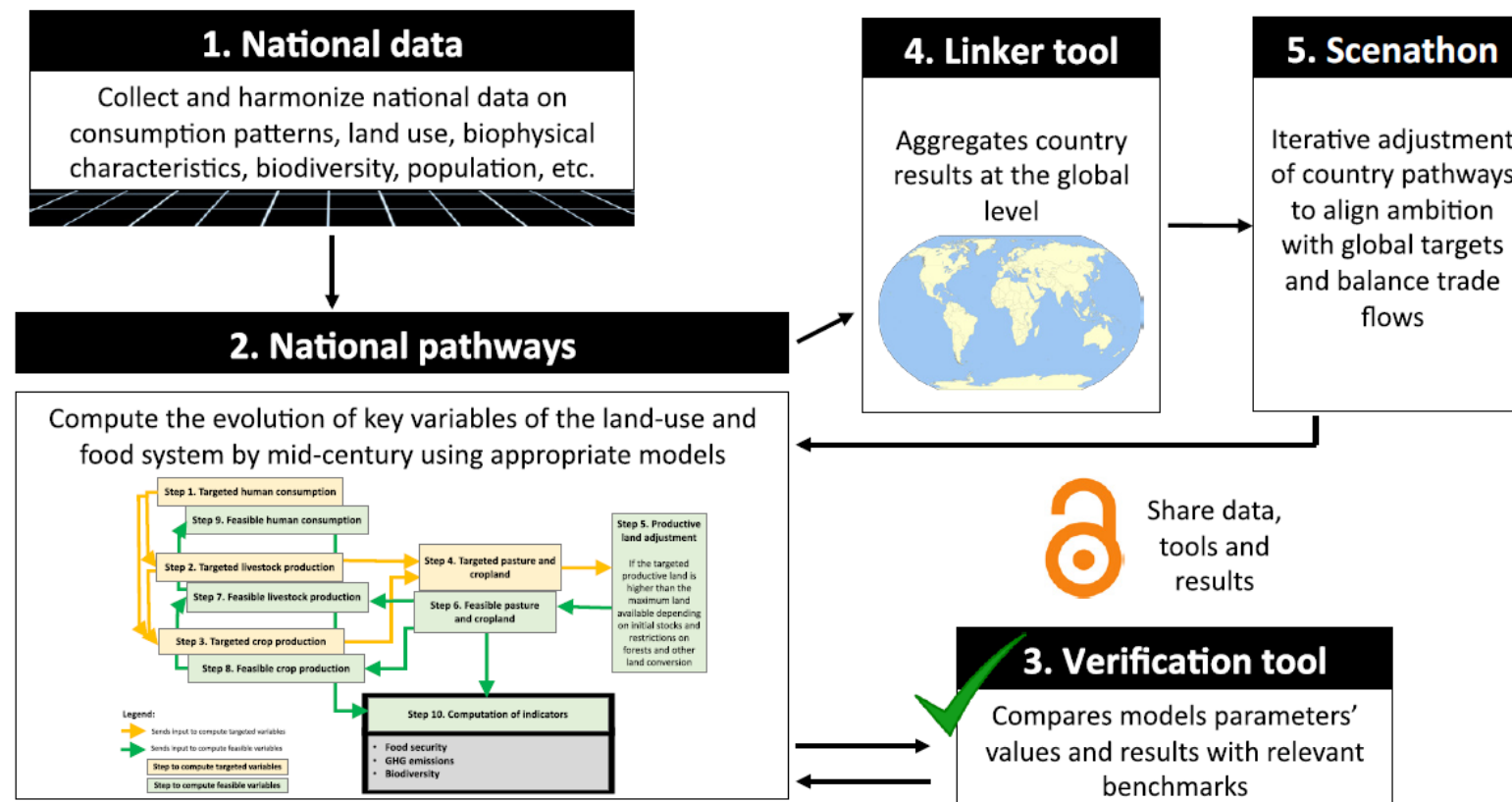
THE FABLE CONSORTIUM



FABLE Country Teams

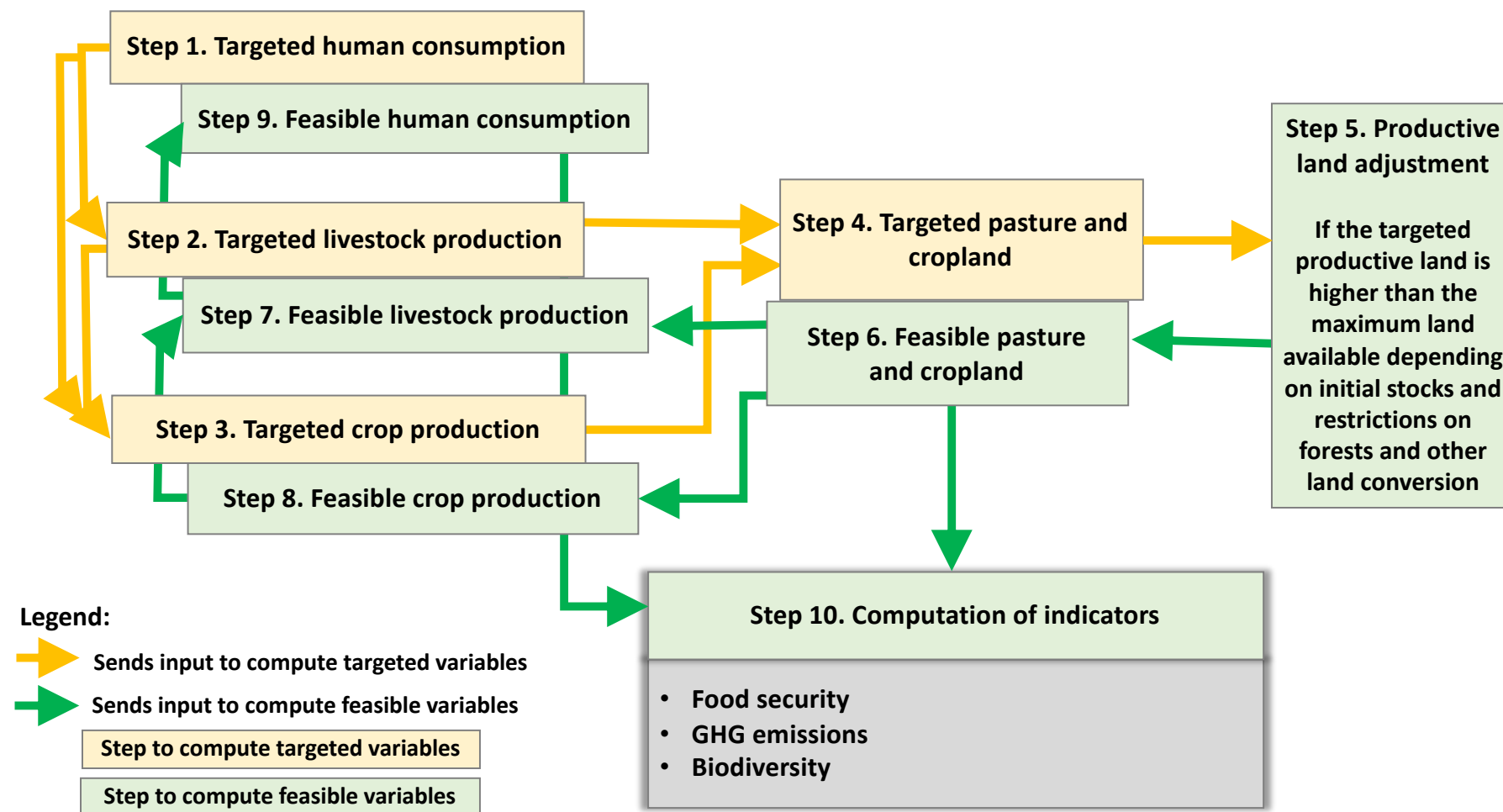
FABLE Calculator

- The FABLE Consortium promotes two complementary types of modeling platforms: FABLE Calculator and PE modeling
- FABLE Calculator is a purpose-built Excel spreadsheet that country teams use to develop national-level scenarios



FABLE Calculator

- Major steps in the FABLE calculator



Partial Equilibrium Modeling

- FABLE supports use of geospatially-explicit, partial-equilibrium models of sustainable land-use and food systems,
- Integrated into a model of global trade in agricultural and forest commodities
- geospatial models to generate maps for policymaking and stakeholder engagement
- country teams' FABLE pathways will be continuously aggregated to test consistency with global targets as well as consistent trade assumptions.
- flexible in terms of specific PE modeling tools country teams use:
 - Global Biosphere Management Model (GLOBIOM) developed by IIASA
 - Model of Agricultural Production and its Impact on the Environment (MAgPIE) developed by the Potsdam Institute of Climate Impact Studies (PIK)

FABLE Ethiopia

- The Policy Studies Institute (PSI), formerly known as Ethiopian Development Research Institute (EDRI)
- Government policy research think-tank
- We have participated in the Scenathon using the FABLE calculator and contributed to the FABLE 2019 report
- With the help of IIASA we are in the process of refining the GLOBIOM to the Ethiopian context
 - A version of the GLOBIOM that is specific to Ethiopia is already developed at IIASA (GLOBIOM-Ethiopia)
 - We have received trainings on GLOBIOM and will continue working with IIASA to further refine the model, with better data and local contexts

Food Security

National Result

- Our results show the average daily energy intake per capita increases between 2000 and 2030 and remains stable after that.
- Calorie intake reaches 2,330 kcal by 2030 and shows a slight decline thereafter, but remains higher than the Minimum Daily Energy Requirement (MDER)

Aggregate Results:

- By 2030 and 2050, all countries achieve an average daily energy intake per capita that exceeds their respective Minimum Daily Energy Requirement (MDER).

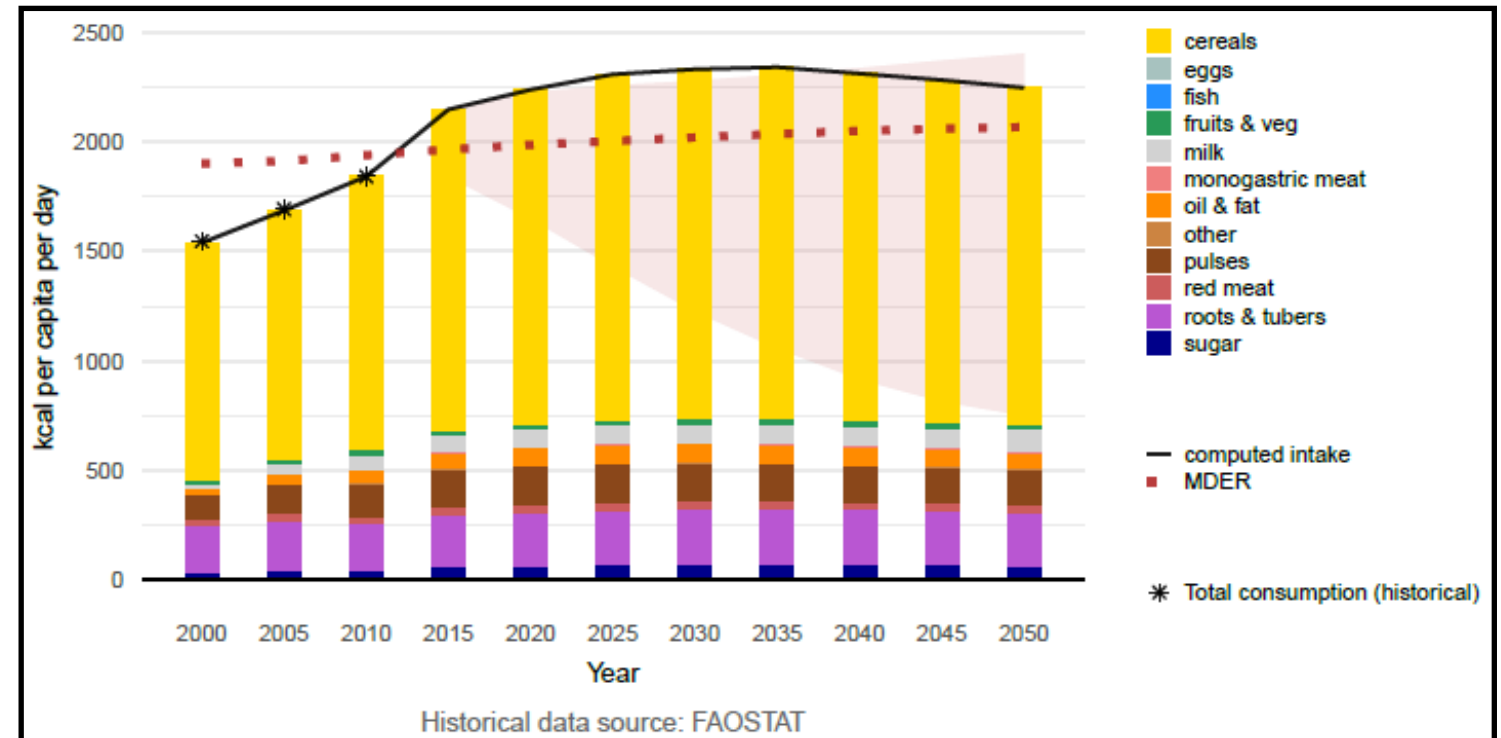
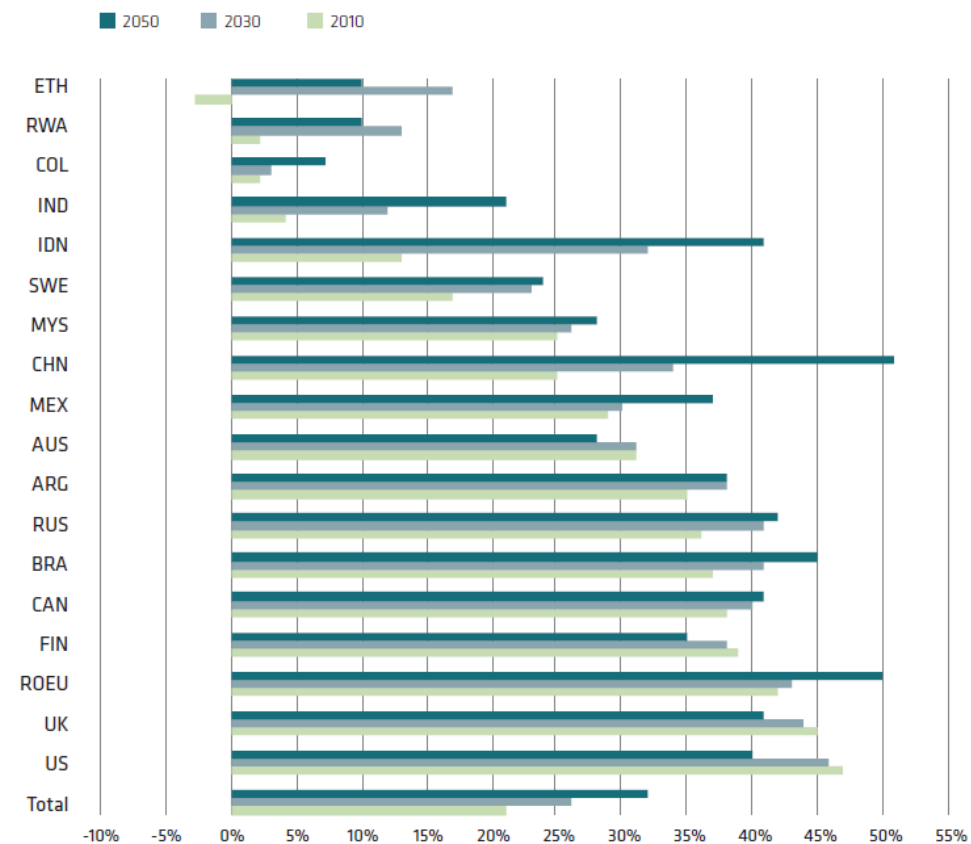


Figure 8 Difference between the computed average daily energy intake per capita and the Minimum Daily Energy Requirement (MDER) for each FABLE country, sorted by 2010 surplus (from lowest to highest)



Note: Energy intake also includes the 2010 consumption level of animal fat and alcohol reported by FAO, as these are not computed in the calculator in 2050. These two items represent 6 percent of average calorie intake in FABLE countries. A surplus indicates that the computed energy intake is higher than the MDER at the national level, while a negative number indicates a deficit compared to the MDER.

GHG emissions

National Results:

- Our results show annual AFOLU GHG emissions increase from 37 Mt CO₂e in 2000 to 91 Mt CO₂e in 2025.
- AFOLU GHG emissions reach 71 Mt CO₂e over the period 2046-2050:
- This is mostly driven by GHG emissions from the livestock sector.

Aggregate Results

- The sum of FABLE countries and RoW pathways do not achieve this target.
- By 2050, computed emissions from crops and livestock amount 6 Gt CO₂e per year, i.e. 50% above the target

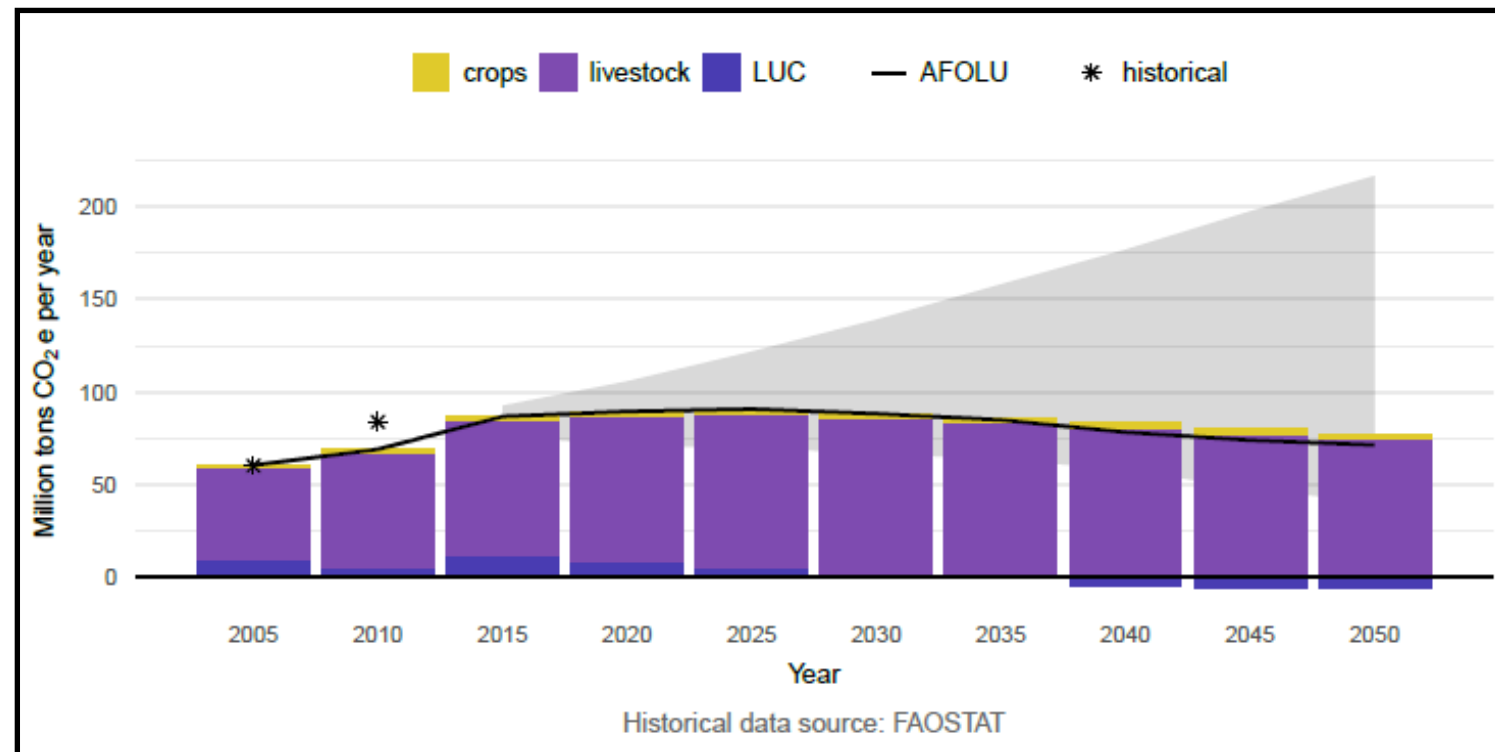
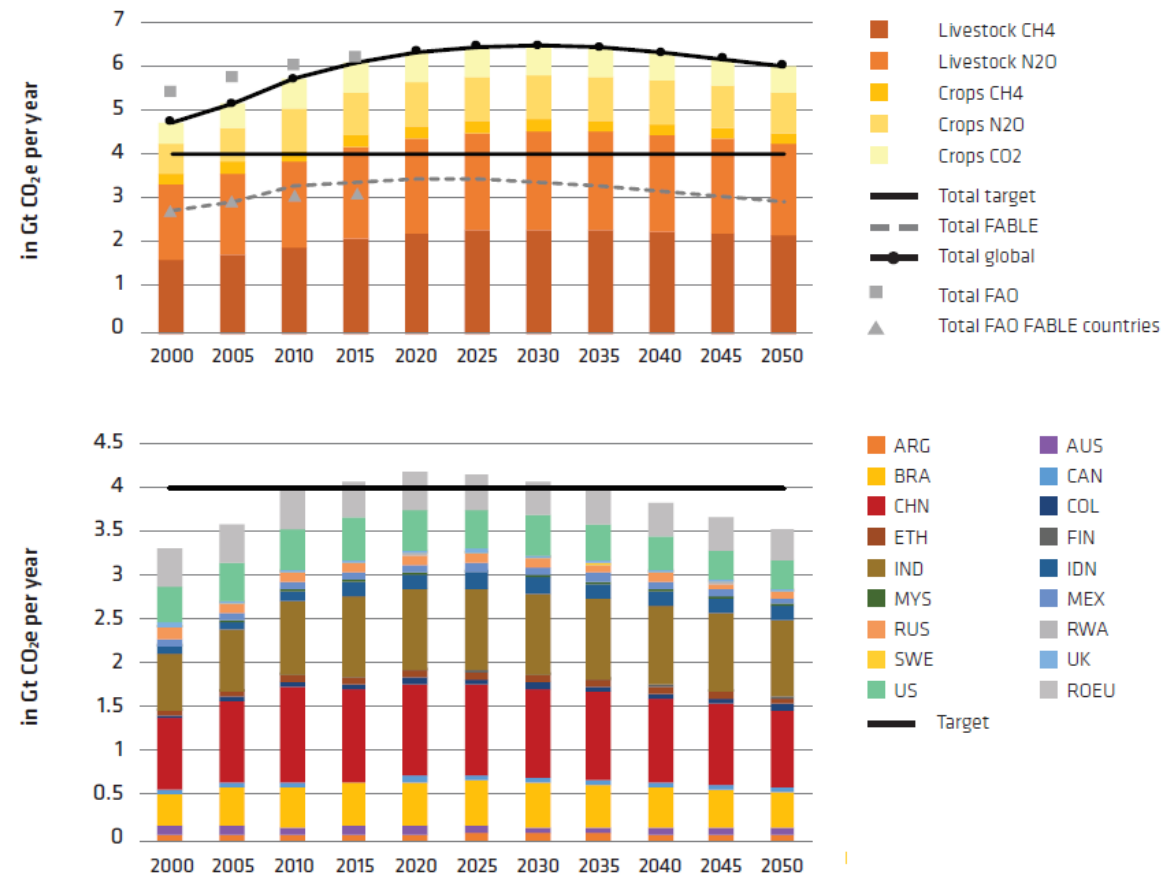


Figure 10 Computed greenhouse gas emissions from agriculture globally (top) and in FABLE countries (bottom)



Note: Since CO₂ emissions from energy use in crop cultivation are not available for 2015, we use the same emission level as reported for 2010 in the total FAO emissions.

Forests

National Results

- Deforestation peak is computed in 2015 at 230 kha/year. This is mostly driven by expansion of pasture and cropland (until 2025).
- It decreases over time after 2015.
- Zero net deforestation can be achieved by 2021-2025.

The aggregate results

- zero net deforestation could be achieved already by 2016-2020 for FABLE countries as a group, and by 2026-2030 globally.

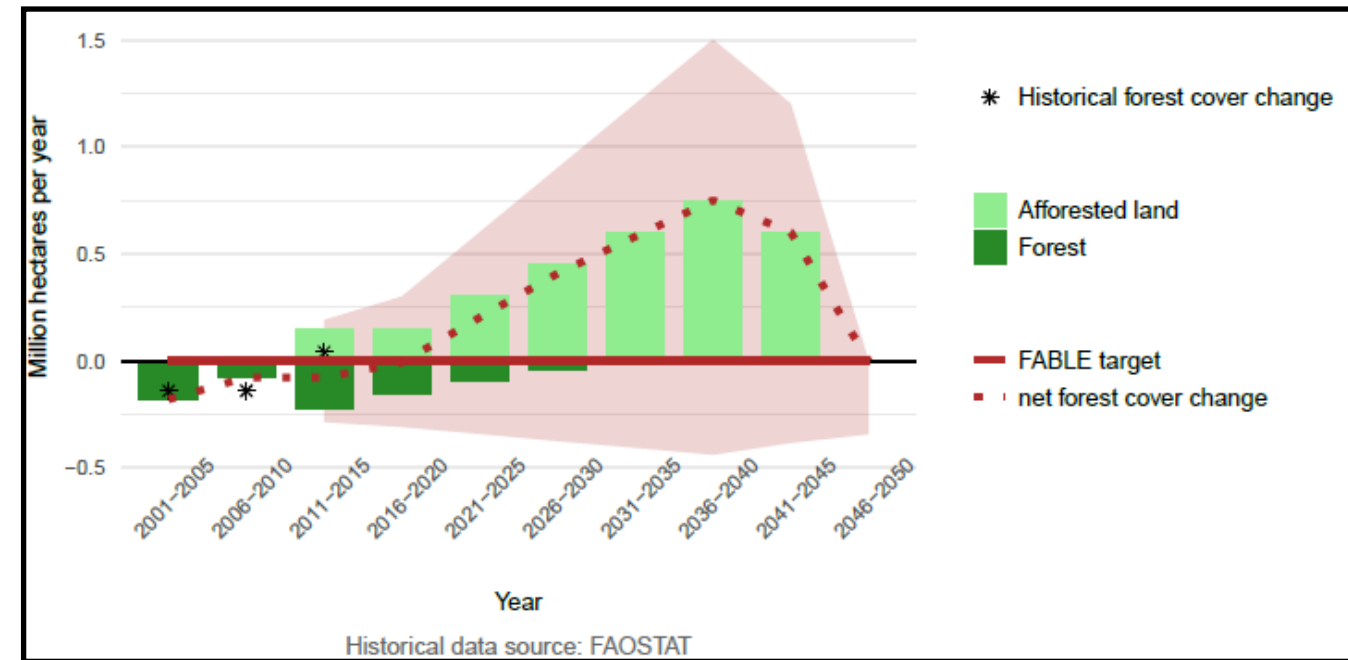
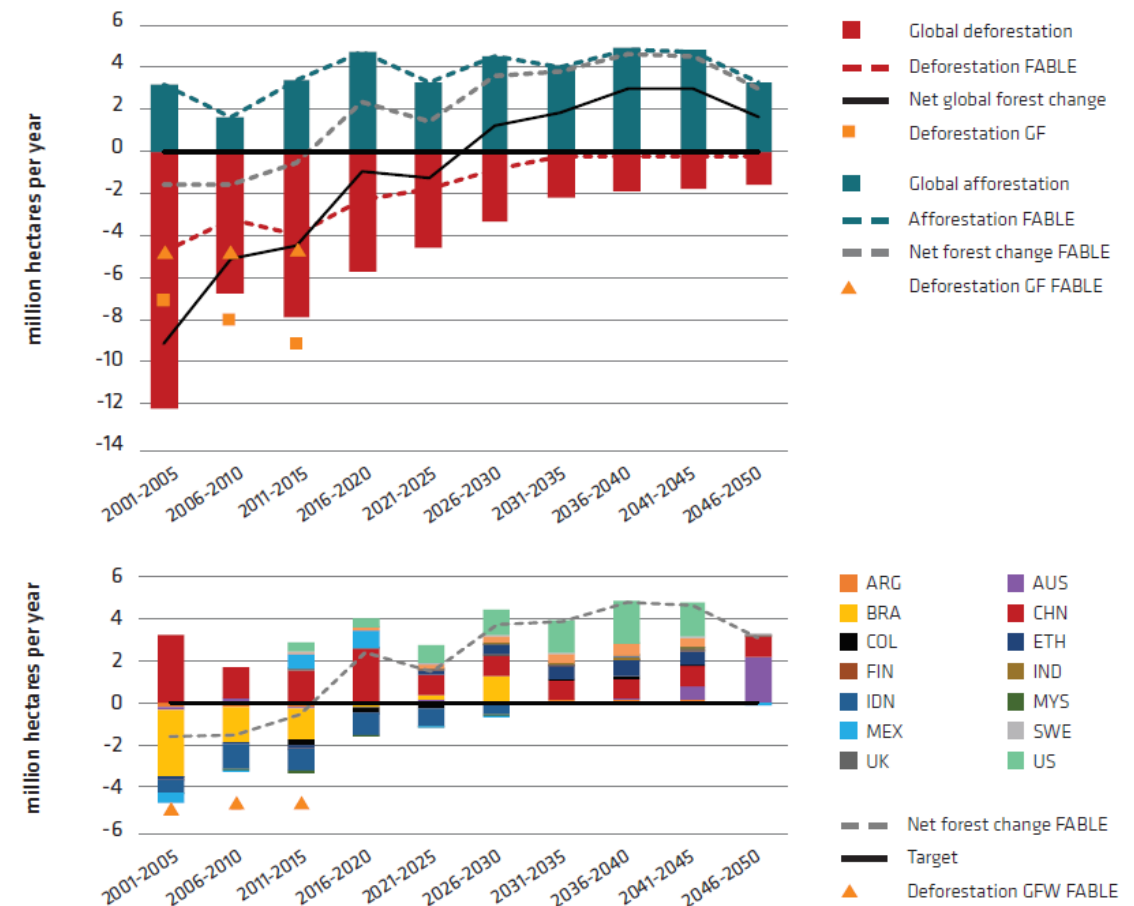


Figure 9 Computed forest cover change globally (top) and in FABLE countries (bottom)



Note: Our computation includes only deforestation caused by the expansion of cropland, pasture and urban areas. For comparison with our estimates for the historical period we use deforestation from commodity expansion, urban expansion and shifting cultivation from Global Forest Watch (GFW) database (GFW, 2019). Dashed lines represent computed results for FABLE countries only, as well as the triangles for GFW historical deforestation.

Next Steps

- Using the FABLE calculator for engagement with stakeholder of land-use and food systems
- Further refining the Ethiopian version of the GLOBIOM
- Using the GLOBIOM to analyze:
 - Impacts of government's plan to expand medium-large scale irrigation in the country
 - Impacts of Ethiopia's joining of the African Continental Free Trade Agreement (Afr-CFTA)

Thank you!