



REPORTING 2025 EVIDENCE



Agroecology Modeling Supports Sustainable Agrifood System Pathways to 2050

OVERVIEW OF THE RESULTS

To tackle interconnected food-climate-biodiversity challenges, the Alliance of Bioversity International and CIAT, together with the Sustainable Development Solutions Network (SDSN), developed an agroecology module within the Food, Agriculture, Biodiversity, Land-Use and Energy (FABLE) Calculator, a food and land-use open-source model.

HIGHLIGHTS

- **Practices quantified at scale:** Cover crops, reduced tillage, embedded natural, organic farming and cultivar mixtures assessed for impacts on yields, soil organic carbon sequestration, biodiversity, and labor.
- **Global institutional uptake:** Agroecology module integrated into 26 national FABLE models to assess 2050 food-climate-biodiversity pathways.
- **Context-specific pathways co-developed:** Ethiopia and Guatemala teams customized the module with stakeholders to design tailored, desirable transitional pathways.
- **Global policy influence achieved:** 100% cropland under diversified farming cropland practices scenario featured in the EAT-Lancet Commission on healthy, sustainable, and just food systems, strengthening the case for agroecology in international food system debates.

GEOGRAPHIC SCOPE: GLOBAL



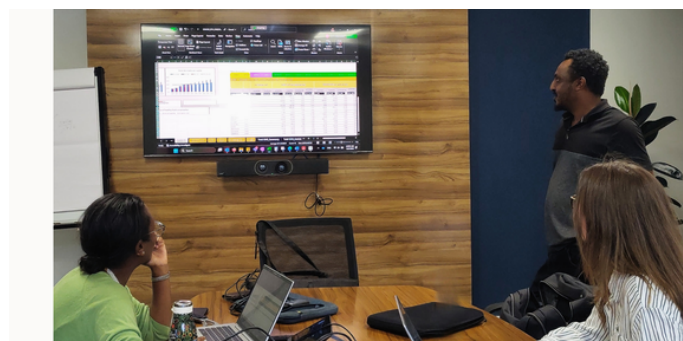
SDG TARGETS



FABLE Consortium meeting in Oaxaca, Mexico, in 2024

CONTRIBUTING EXTERNAL PARTNERS:

1. International Institute for Applied Systems Analysis (IIASA)
2. Sustainable Development Solution Network (SDSN)
3. Universidad del Valle de Guatemala (UVG)



Capacity building event in Addis Adaba, Ethiopia, in 2025

ELABORATION OF OUTCOME/IMPACT STATEMENT

The interconnected challenges of food insecurity, climate change, biodiversity loss, and water scarcity require integrated solutions. Agroecology and nature-positive agricultural practices are increasingly recognized as promising approaches for addressing these global challenges simultaneously. Modeling tools play a key role in testing the potential of agroecology to deliver solutions at scale. When used in participatory processes, modeling results can stimulate cross-sector policy dialogue, shared learning, and collective exploration of future pathways, increasing the likelihood that promising agroecological approaches are reflected in policy and planning. The Alliance of Bioversity International and CIAT, in collaboration with SDSN, developed an agroecology module within the Food, Agriculture, Biodiversity, Land-use and Energy (FABLE) Calculator—an open-access integrated food-system assessment model used by national research teams worldwide [1].

The module has been presented to the FABLE Consortium members during the 15th Consortium meeting in Mexico end of 2024 [2]. It allows users to simulate how adopting diversified cropping systems could increase crop yields, safeguard biodiversity, increase soil organic carbon (SOC) sequestration, and reduce labor requirements in forward-looking pathways. Practices represented in the default module include cover crops, reduced tillage, embedded natural, organic farming, and cultivar mixtures. Users can also easily add locally relevant practices and customize practice coverage and parameter values to better reflect national contexts [3].

Today, 26 FABLE country teams—composed of local scientists and practitioners—have integrated the agroecology module into their national models. This enables them to explore agrifood system pathways that include the scaling of nature-positive agricultural practices [4]. In 2025, through a collaboration with the United Nations Food and Agriculture Organization (FAO) and with the support of the Alliance and UVG, two countries, Ethiopia and Guatemala, adapted the module to their national contexts and used it in stakeholder dialogues to co-develop pathways towards 2050, addressing food security and climate goals.

For example, the Ethiopia FABLE team used the customized module to assess the potential of scaling integrated soil fertility management (ISFM) and the implications on agrifood system performance [5, 6, 7].

Additionally, the Alliance, with the support of IIASA, led a global analysis exploring the implications of scaling diversified farming practices across all croplands worldwide by 2050. The global analysis results were featured in the widely read 2025 *Eat-Lancet* Commission on healthy, sustainable, and just food systems report. They show that agroecological cropland management is compatible with food security, climate, and biodiversity goals, providing evidence to support the integration of nature-positive and agroecological approaches into global food system and diet policy discussions [8].

EVIDENCE

1. Documentation FABLE Calculator - 2020 Update available [here](#)
2. From Local to Global: Key takeaways from the 15th FABLE Consortium Meeting in Oaxaca (2024) available [here](#)
3. Agroecology module Documentation V2.0 2024 available [here](#)
4. Agroecological Practices for Sustainable Transformations of The Agri-Food System in the Region of Western Greece (2025) available [here](#)
5. Peer-to-peer modelling training on the FABLE Calculator in Addis-Ababa (2025) available [here](#)
6. Food security and climate actions in Ethiopia: A possible way forward (2026) available [here](#)
7. Exploring an illustrative national pathway for Guatemala to achieve food and climate targets in the framework of the FAO Global Roadmap (2025) available [here](#)
8. The EAT-Lancet Commission on healthy, sustainable, and just food systems (2025) available [here](#)

OTHER NOTABLE REFERENCES, PROMOTIONAL PRODUCTS AND COMMUNICATION MATERIALS

9. Fable Consortium website available [here](#)

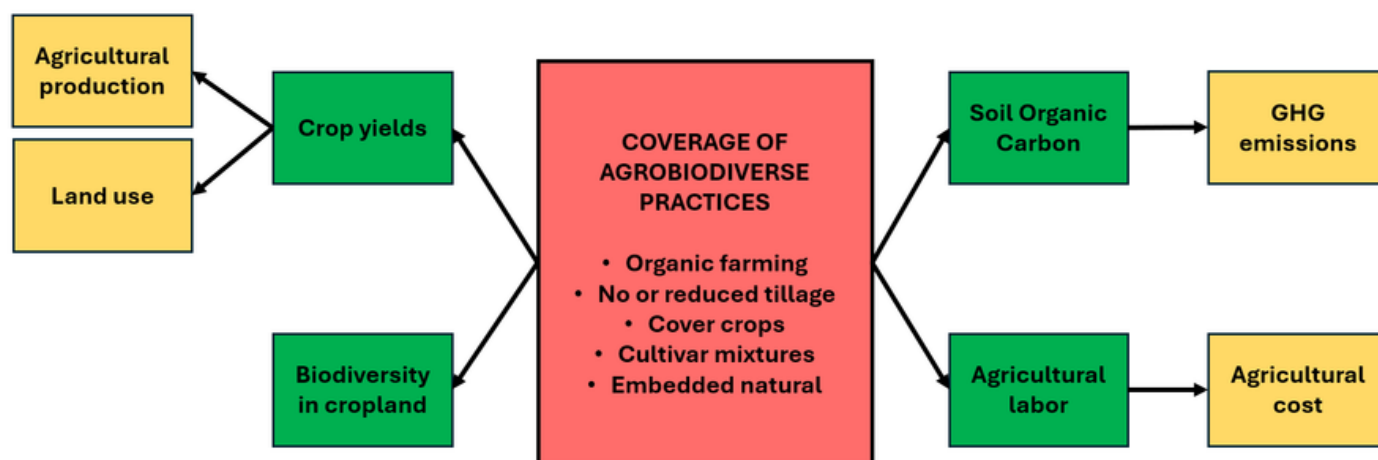


Diagram representing the core functioning of the FABLE Agroecology module.

CONTACT PERSON/ AUTHORS

Chemarin, Charlotte; Research Associate; c.chemarin@cgiar.org
Jones, Sarah; Scientists II

Produced with professional inputs from the Alliance's Performance Innovations Strategic Analysis for Impact Program & the Science Writing Service team.



© 2026. This work is openly licensed via [CC BY NC](#)

The Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT) delivers research-based solutions that harness agricultural biodiversity and sustainably transform food systems to improve people's lives. Alliance solutions address the global crises of malnutrition, climate change, biodiversity loss, and environmental degradation.

The Alliance is part of CGIAR, a global research partnership for a food-secure future.



<http://alliancebioversityciat.org>

www.cgiar.org