

# The Food, Agriculture, Biodiversity, Land, and Energy (FABLE) Consortium: Reconciling sustainable pathways across national and global scales

Aline Mosnier

Scientific Director of the FABLE Consortium, SDSN

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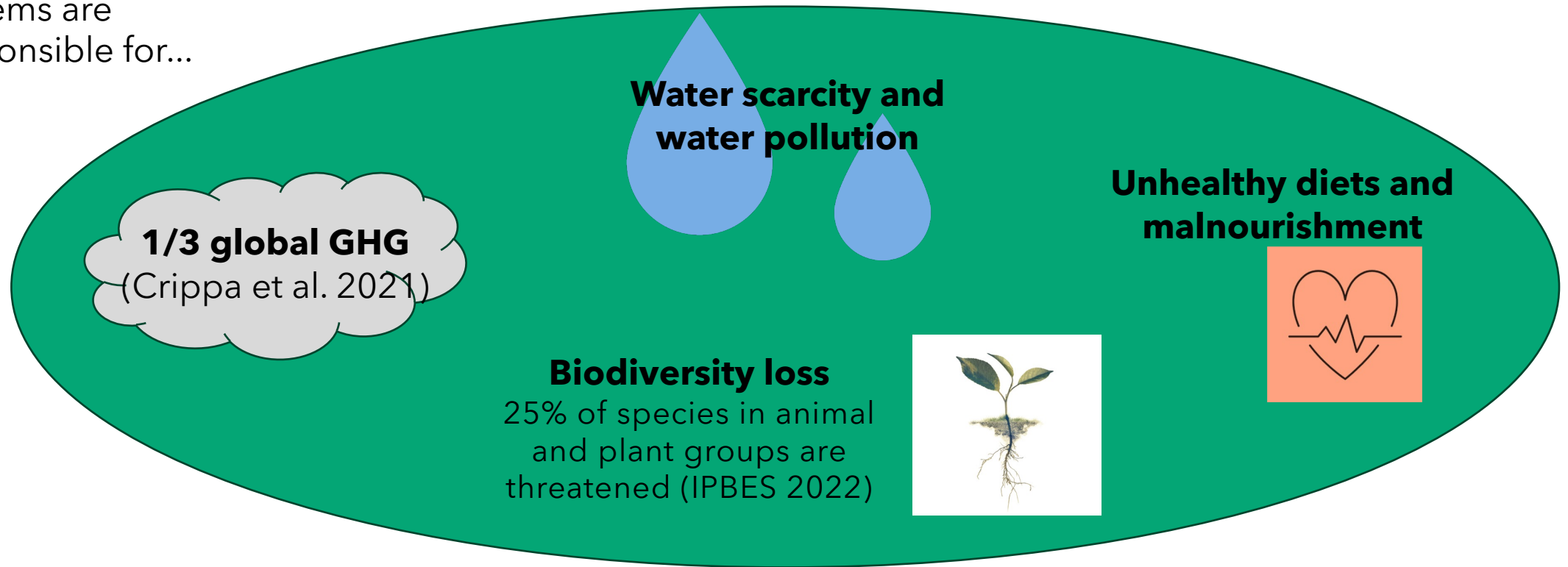
# INTRODUCTION

The background is a solid teal color. It features faint, dark teal silhouettes of a monkey hanging from a branch on the left, a person standing in the center, and a pig on the right. The overall aesthetic is clean and modern.

# Our challenges

Food and land systems are responsible for...

An **integrated approach** can limit trade-offs and increase synergies

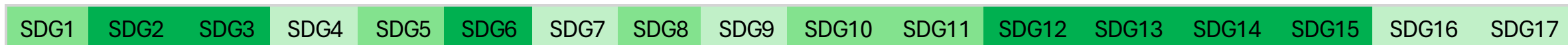


Agriculture and forestry **will be the most impacted by climate change and losses of ecosystem services, but many actors are still defending the status quo**

# Transformation 4 - Sustainable food, land, water, and oceans



**The 4<sup>th</sup> transformation has impacts on all the SDGs :**



# The mission of the Food Agriculture Biodiversity Land and Energy (FABLE) Consortium



- ❖ **To help countries transition towards sustainable food and land systems**
- ❖ **Without displacing problems to other countries (« leakage ») so that we remain within the safe planetary boundaries**
- ❖ **By strengthening the role of local researchers who want to work with the rest of the society**

# Who we are

**A collaborative initiative  
launched in 2017**

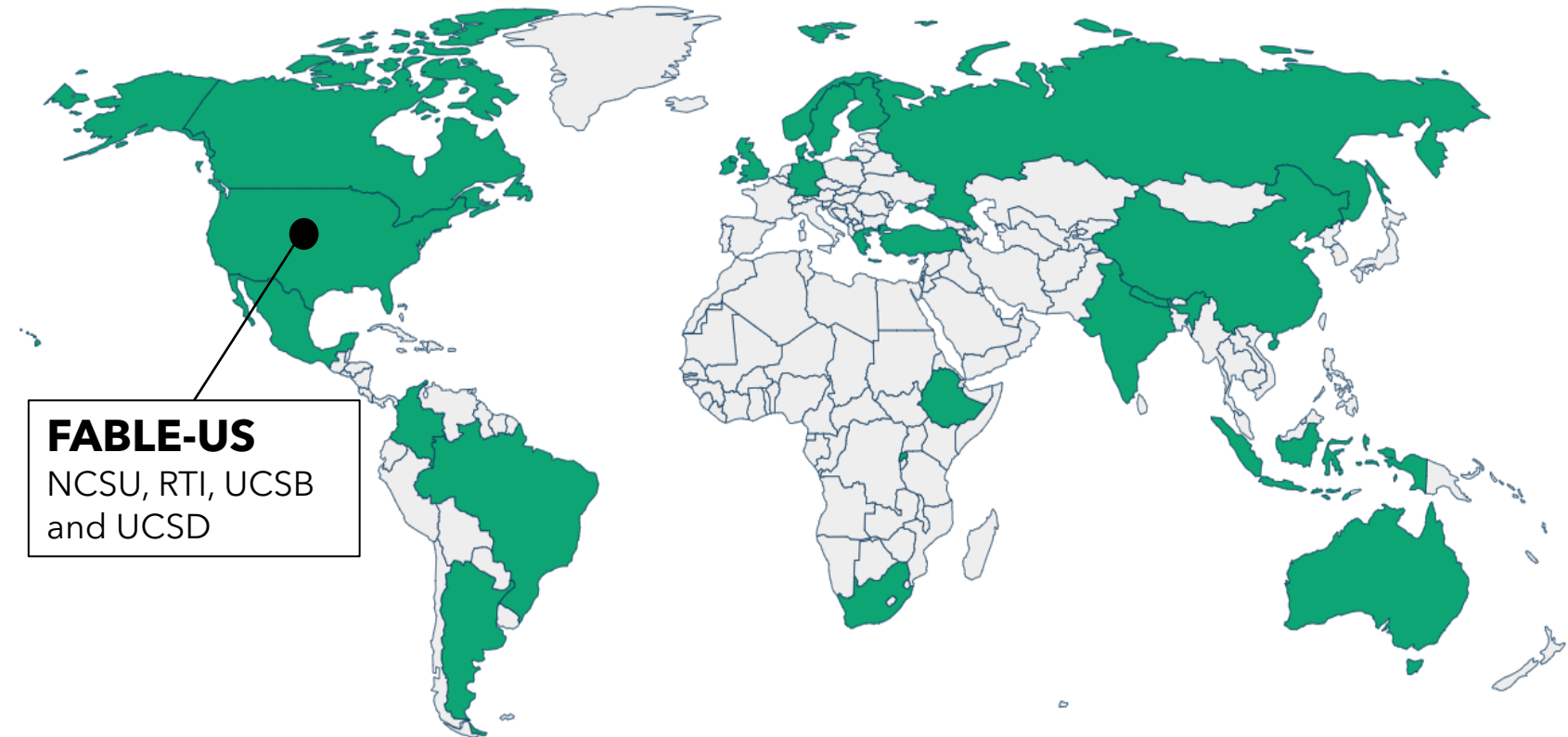
## **FABLE Country Teams:**

independent research  
teams

- 24 countries
- ~200 researchers,
- ~80 national institutes

+ technical partners  
such as PIK

**FABLE Advisory Council** elected internal  
and external members for 2 years



**FABLE-US**  
NCSU, RTI, UCSB  
and UCSD

**FABLE Secretariat** formed of SDSN, IIASA and the  
Alliance of Bioversity-CIAT

# What we do



- 1. Build in-country modeling capacity** to assess the impacts of national policies on food security, GHG emissions, biodiversity, resource use, and socio-economic development



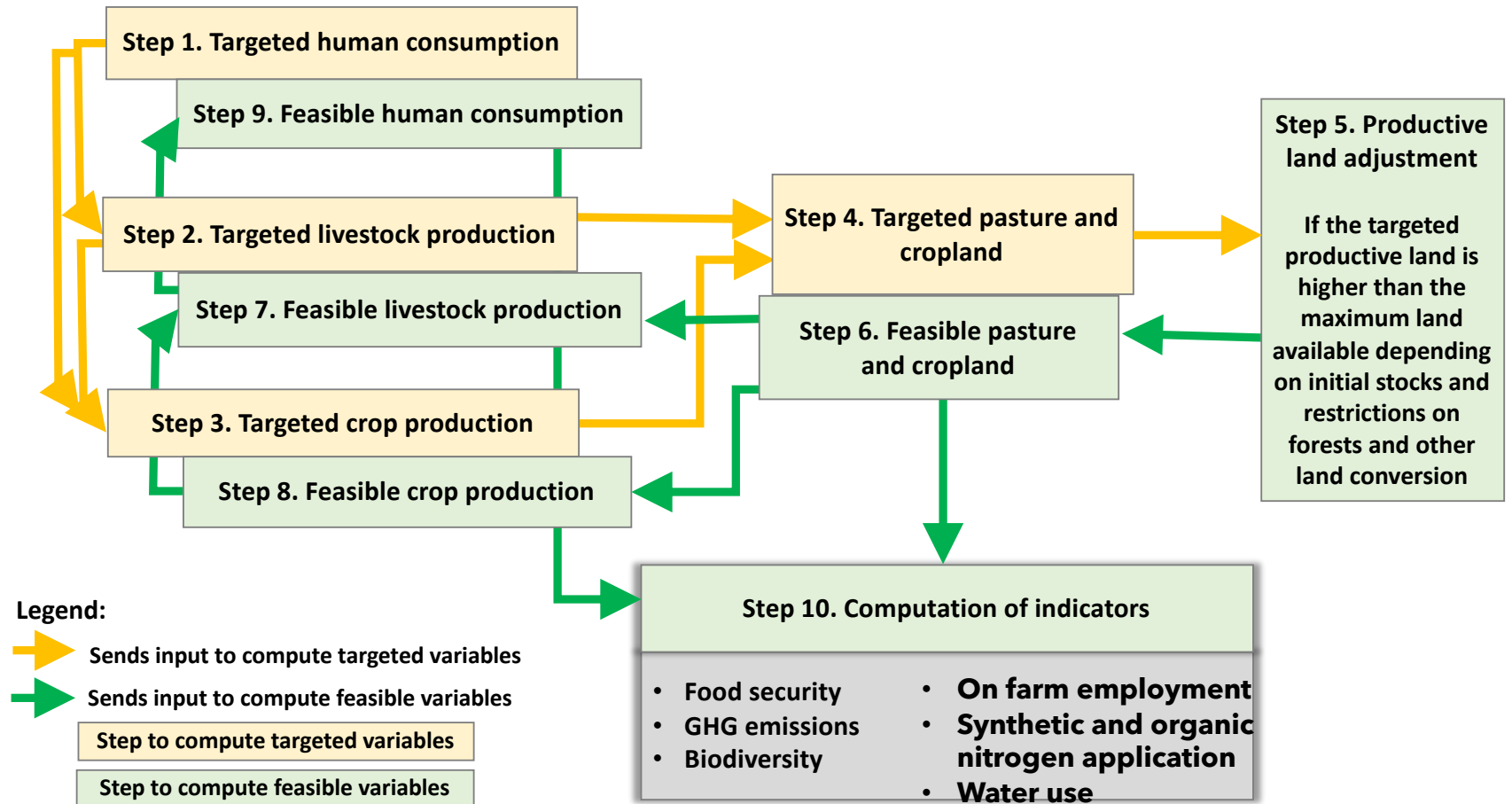
- 2. Coordinate national-to-global integrated pathways** to show interdependencies across countries and the need for collaboration to achieve the Paris Climate agreement and the SDGs (“Scenathons”).



- 3. Support science-policy interactions** for pragmatic research and informed decision making

# The FABLE Calculator

- Excel based tool
- Open and free
- At national or subnational level
- Focus on agricultural sector (>70 commodities)
- Forestry sector newly added and under testing
- 2000-2050, 5yr time step
- **No optimization - equilibrium based on quantities only**





# SCENATHON 2023

The background is a solid teal color. It features faint, dark teal silhouettes of animals and trees. On the left, a monkey is hanging from a vine. In the center, a gorilla is standing. On the right, a pig is walking. The overall theme is nature and animals.

# What is a Scenathon?

*"scenario marathon"*

**It is an iterative approach to integrate national and global scales**



**1. Agree on global sustainability targets**



**2. Local researchers design and compute national mid-century pathways**



**3. Aggregate national pathways, ensures international trade is consistent, and compare with global targets**

# FABLE Scenathon 2023

## Current Trends

What will happen **if we do not act differently** than the past decade / today

## National Commitments

What will happen **if national commitments/targets are met**

## Global Sustainability

What will happen **if national actions/policies are aligned with global sustainability targets**

- 22 countries participating + 6 rest of the world regions
- Online and in-person stakeholder consultations

# Results

	Global Targets	Current Trends	National Commitments	Global Sustainability
<b>Food security</b>				
Kcal/cap/day	<b>at least 10%&gt;MDER</b> <b>lower than 30%&gt; MDER</b> <b>&lt;5% by 2030</b> <b>&lt;5% by 2030</b>	yes	yes	yes
Undernourishment		no	no	no
Obesity				
<b>Biodiversity</b>				
Protected areas	<b>30% by 2030</b>	23%	24%	25%
Agroecological practices	<b>50% of cropland by 2030</b>			
Deforestation	<b>0 by 2030</b>	31	4	0.08
LNPP area	<b>0 loss by 2030</b>	38	9	22
	<b>increase &gt;15% by 2050</b>	-12%	-9%	-10%
<b>Climate</b>				
CO2e from agriculture	<b>&lt;4 Gt by 2050</b>	8.6	6.4	4.7
CH4 from agriculture	<b>reduced by 10 Mt by 2030</b>	21	10	0.4
	<b>reduced by 28 Mt by 2050</b>	67	21	-20
CO2 from LUC	<b>&lt;-1.3 Gt by 2050</b>	3.1	0.4	-2.2
Cumulative CO2 from AFOLU	<b>&lt;40 Gt 2020-2050</b>			
<b>N &amp; P</b>				
Nitrogen use	<b>&lt;68 Tg by 2050</b>	150 (120)	123 (100)	117 (94)
Phosphorous use	<b>&lt;16 Tg by 2050</b>	32	29	31

# Results

- **It is getting harder to meet all our global targets**

- We have more targets (15) - potential trade-offs between different objectives become more obvious
- Some targets have been narrowed, e.g. zero deforestation instead of zero net deforestation, and more precise e.g. methane
- By shifting calibration year from 2010 to 2020, the challenge to meet our targets just got bigger as too little progress has been done during the past decade

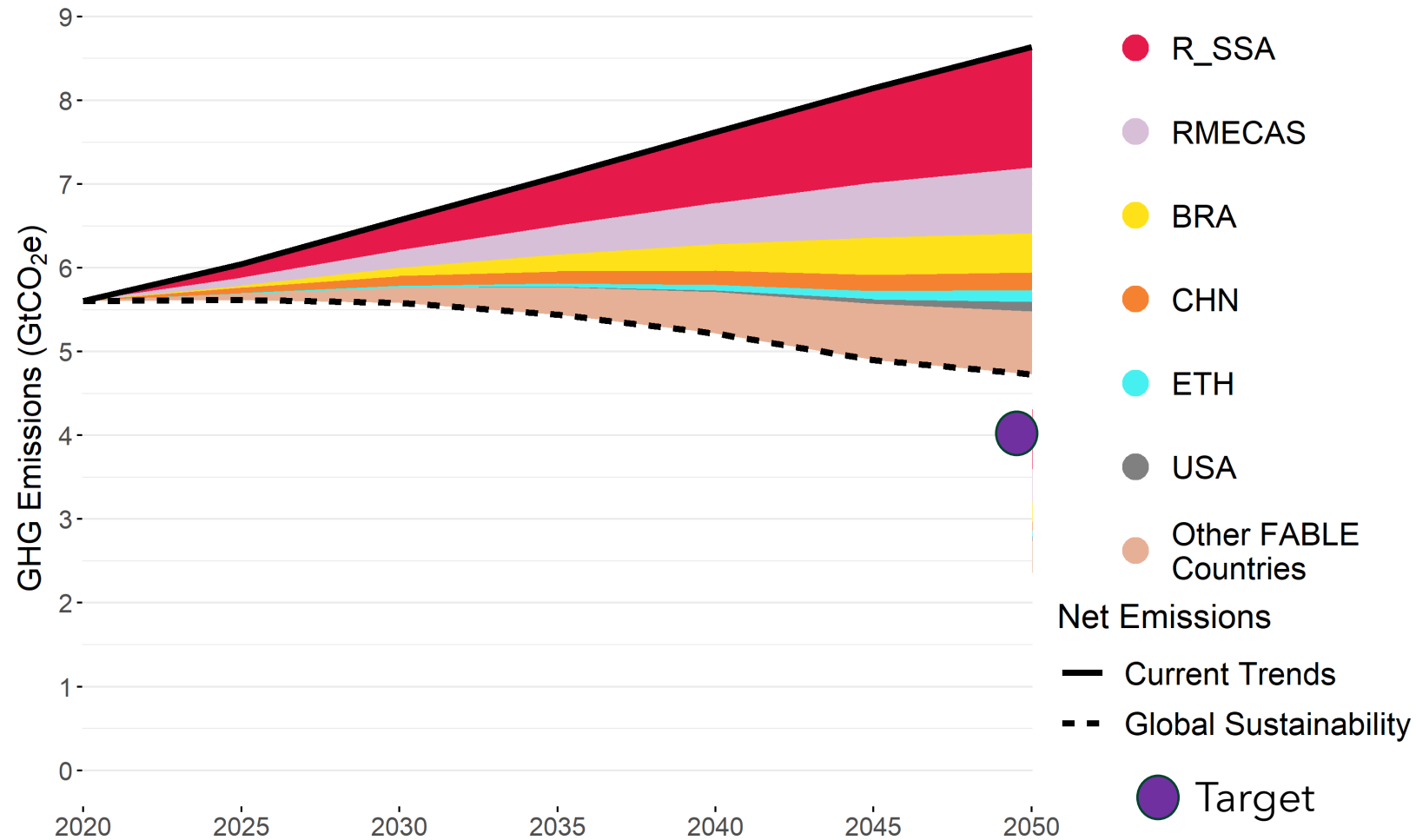
- **National Commitments**

- Hard to translate vague commitments into quantitative targets specific to the food and land systems
- Some commitments outside the boundaries of what can be computed with the FABLE Calculator
- Difficulties to implement the commitments into the tool for some countries

- **Global sustainability**

- Some countries did not differentiate a lot national commitments from global sustainability

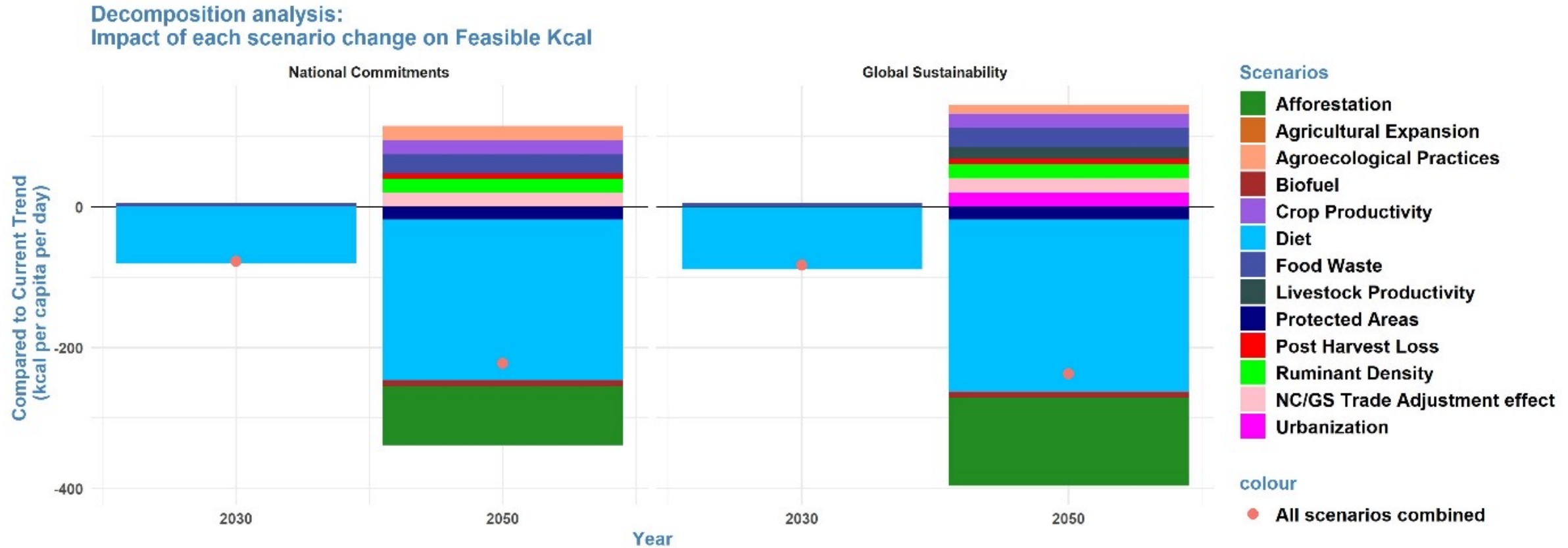
# Results



Who has made efforts to reduce GHG emissions compared to what would be fair:

- capability
- responsibility
- equality

# Results



What are the scenarios / actions that drive most impact? Example from the UK

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# **ONLINE INVENTORY**

**[afolomitigationinventory.org](http://afolomitigationinventory.org)**

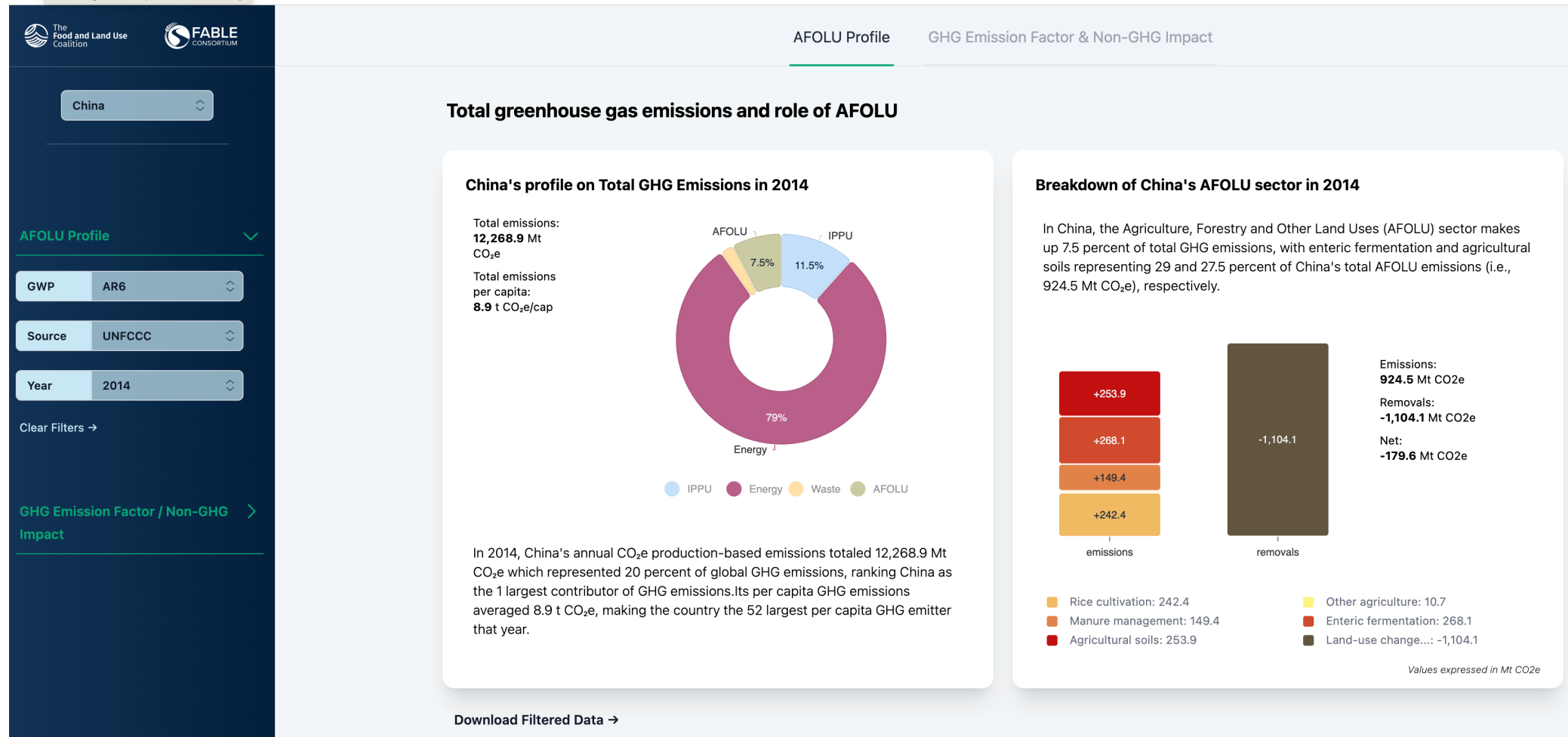


# GHG mitigation option online inventory

## **Objectives**

- To show the role of agriculture and land use in current greenhouse gas emissions by country
- To gather more detailed data on mitigation options for AFOLU which account for heterogeneity
- To facilitate usage and comparison of GHG emission reduction factors for alternative mitigation options by AFOLU sub-sectors in a transparent and collaborative way
- To highlight the impacts of mitigation options on on-farm inputs, productivity, and biodiversity

# GHG mitigation option online inventory

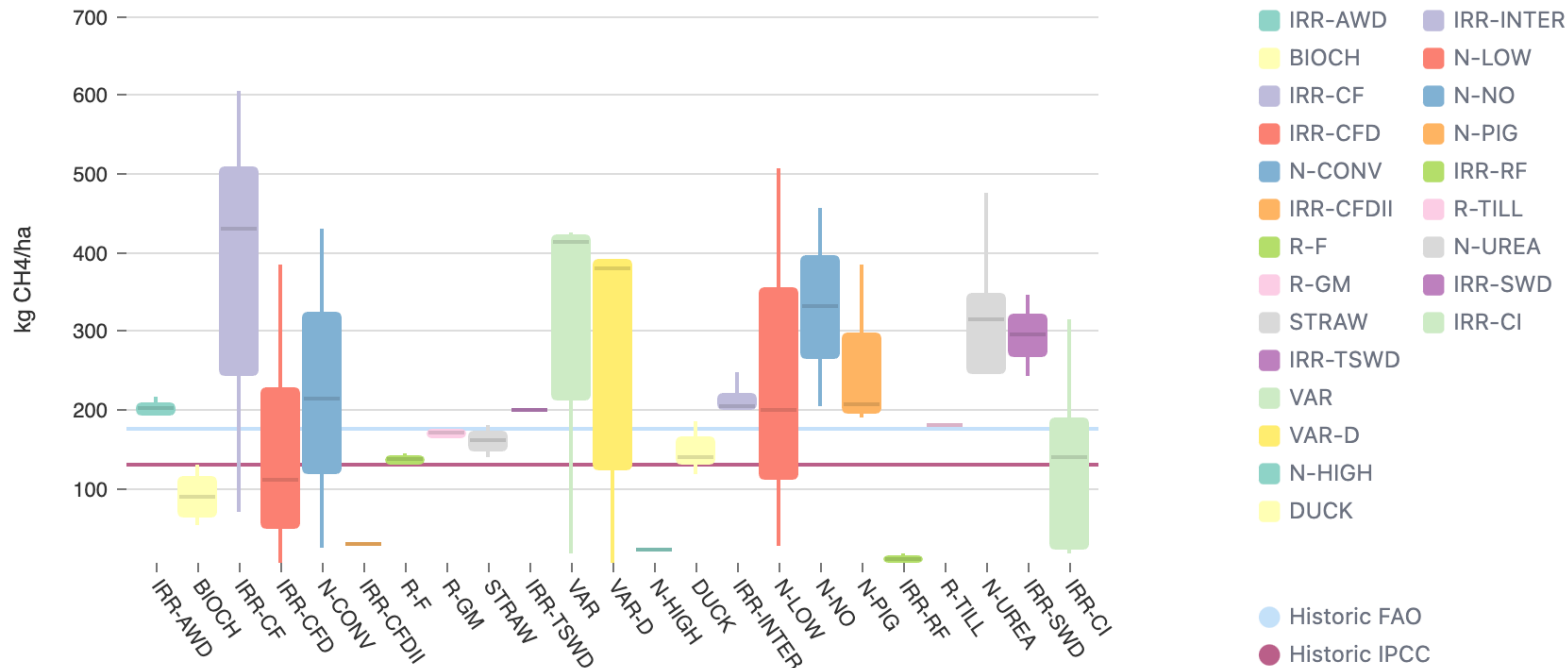


<https://afolumitigationinventory.org/>

# GHG mitigation option online inventory

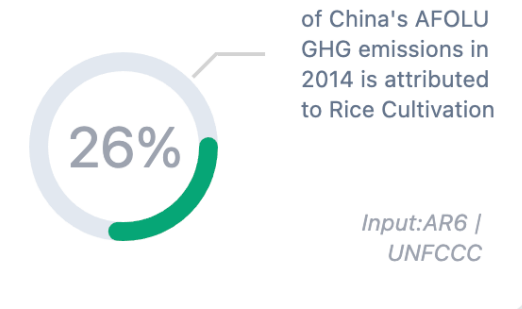
## Emission Factor per Farming System expressed in kg CH<sub>4</sub>/ha

Rice Cultivation - Conventional rice farming



[Download Filtered Data →](#)


Conventional rice farming refers to the traditional method of growing rice using the flooding of the fields and using a variety of pesticides, fertilizers, and other inputs. This approach is widely used for rice production around the world.



Emissions		Removals	
Mt CO <sub>2</sub> e	2014	Mt CO <sub>2</sub> e	2014
242.4		-	
Rice Cultivation		Input: AR6 / UNFCCC	

# GHG mitigation option online inventory

## Trade-offs and synergies

-  strongly increase
-  increase
-  stay neutral
-  decrease
-  strongly decrease
-  data not available

	Yield (output)	Irrigation water (input)	Aboveground biomass (output)
IRR-CF	...	...	...
IRR-CFD	↓	↑	...
IRR-AWD	↘	↓	↓
VAR	...	...	...
VAR-D	↑	↑	↘
IRR-CI	↗	...	↓
IRR-INTER	→	...	↘
IRR-SWD	↘	...	↓
N-UREA	→	...	...



Hover over a value to quickly view more details, and click on one of them to anchor the content.

	Yield (output)	Irrigation water (input)	Aboveground biomass (output)
R-GM	→	...	...
R-F	→	...	...
CISB	↗	↘	...
CI	→	↘	...
CFMSD	→	→	→
CF	↗	→	↘
AWD	→	...	→
ASR-W	→	...	...
ASBBRR-W	→	...	...

**CFMSD** →

**Yield (output)** stayed neutral

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**Mitigation Option Description** i Fields are continuously flooded up to mid-season when they are drained. Mid-season drainage involves the removal of surface flood water from the rice crop for about seven days towards the end of tillering. The

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**Non-GHG Indicator Description** i The thin-shallow-wet-dry (TSWD) method is a technique used in rice cultivation that aims to improve water use efficiency and reduce the amount of water required for rice production. It involves

[Download Filtered Data →](#)

# GHG mitigation option online inventory

- China used as pilot in the framework of the FOLU-China country platform and in collaboration with the Chinese Agricultural University
- Data on historical emissions can be displayed for other countries
- We are looking for:
  - relevant papers (scientific and grey literature) that could enrich the database
  - collaborations
  - funding

# Publications



## Global Reports:

Pathways to Sustainable Land-Use and Food Systems (2019 & 2020)



## Policy Briefs:

- National food and land mitigation pathways for net zero (2022).
- Pathways for food and land use systems to contribute to global biodiversity targets (2022).
- Environmental and agricultural impacts of dietary shifts at global and national scales (2021).

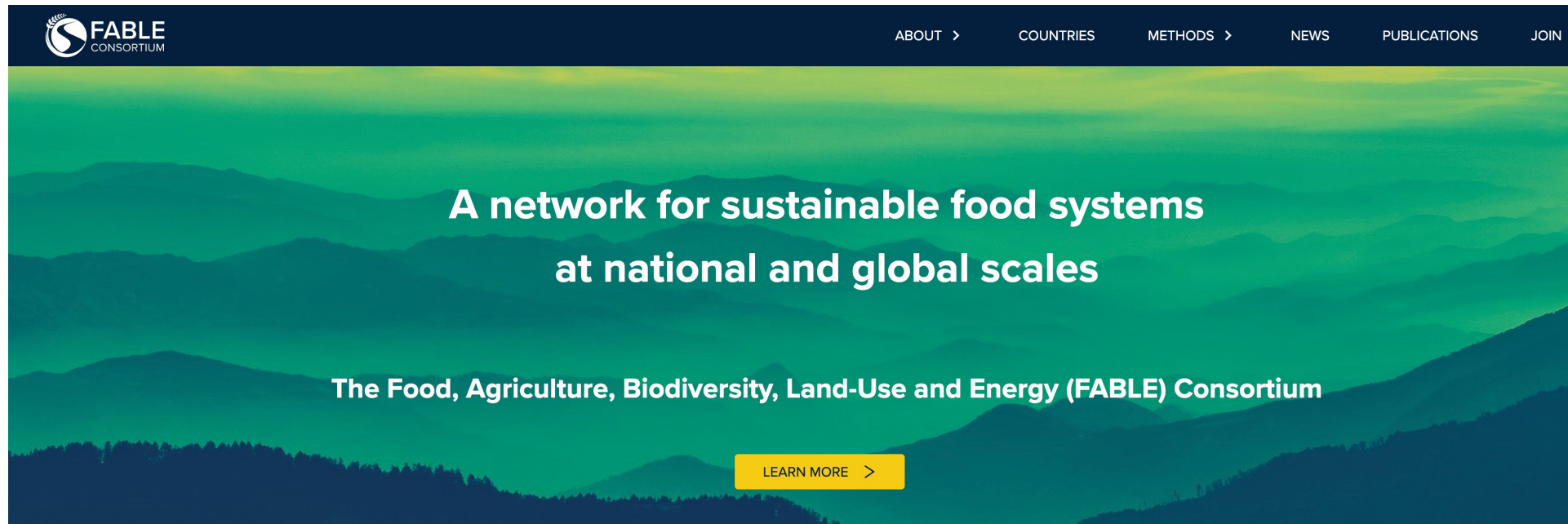


## FABLE Special Issue in Sustainability Science

- Globally-Consistent National Pathways towards Sustainable Food and Land-use Systems. (2022)

## Environmental Research Letters (2023)

# Thank you!



**fableconsortium.org**

