Research Institute of Organic Agriculture FiBL
info.suisse@fibl.org | www.fibl.org




Organic Agriculture and its Benefits for Climate and Biodiversity

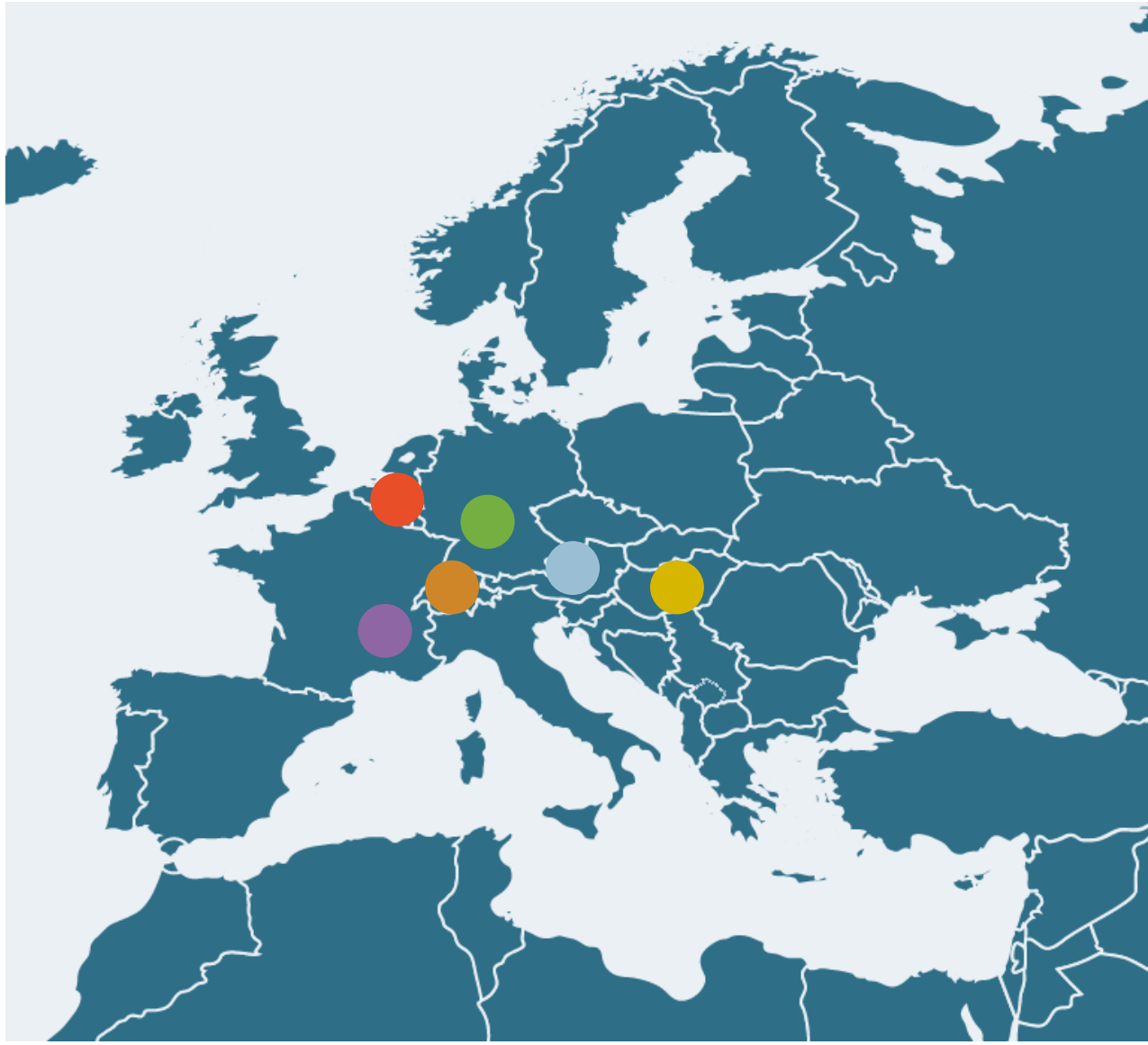
Rewarding organic farmers for their climate action: what are challenges and needs?

Climate Farm Demo: Thematic Exchange Events, 27.02.2025

Lin Bautze (lin.bautze@fibl.org)

FiBL group

- **FiBL Switzerland**
  Founded 1973
  290 employees
- **ÖMKI Hungary**
  Founded 2011
  22 employees
- **FiBL Germany**
  Founded 2000
  65 employees
- **FiBL France**
  Founded 2016
  7 employees
- **FiBL Austria**
  Founded 2004
  36 employees
- **FiBL Europe**
  Founded 2017
  7 employees



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Department of Soil Sciences

Main areas of work

- **Soil fertility & climate**
- Nutrient management & symbioses
- Cultivation techniques in arable farming
- Long-term trials such as the DOK trial in Therwil

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Looking back: organic and climate change

International Trade Centre
UNCTAD/WTO

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Organic Trade

ORGANIC FARMING AND CLIMATE CHANGE

2008: https://www.fibl.org/fileadmin/documents/shop/1500-climate-change.pdf

Members

The participating members

Intergovernmental organisations

> Food and Agriculture Organisation of the United Nations FAO

Institutions

> FiBL - Research Institute of Organic Agriculture, Switzerland
> International Centre for Research in Organic Food Systems ICROFS, Denmark
> Louis Bolk Institute, The Netherlands
> Organic Research Centre Elm Farm, UK
> Rodale Institute, U.S.

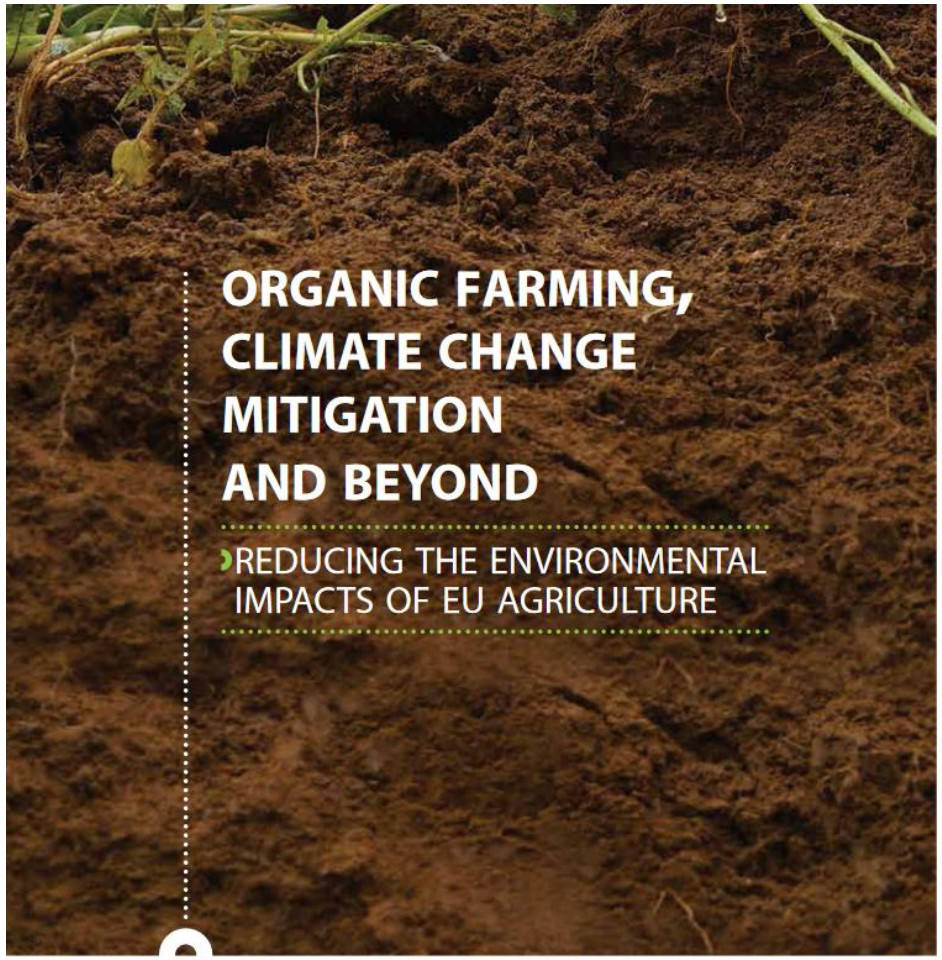
Advocacy Organisations, Networks and Standard Setters and Certification Bodies of the Organic Movement

> Agricultural & Processed Food Products Export Development Authority APEDA, India
> bio.inspecta, Switzerland
> CAAE Association
> CEDECO, Costa Rica
> Institute for Ethical and Environmental Certification ICEA, Italy
> International Federation of Organic Agriculture Movements IFOAM, Germany

Organic Agriculture and Climate Change

- no synthetic fertilizers (production, spreading..)
- reduced emissions of livestock feed
- higher C-sequestration potential (Gattinger et al., 2012)
- lower area N2O emissions (Skinner et al., 2014)

→ **17% of EU agriculture emissions could be avoided by organic agriculture** (Muller et al. 2016)



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IFOAM EU GROUP MAKING EUROPE MORE ORGANIC

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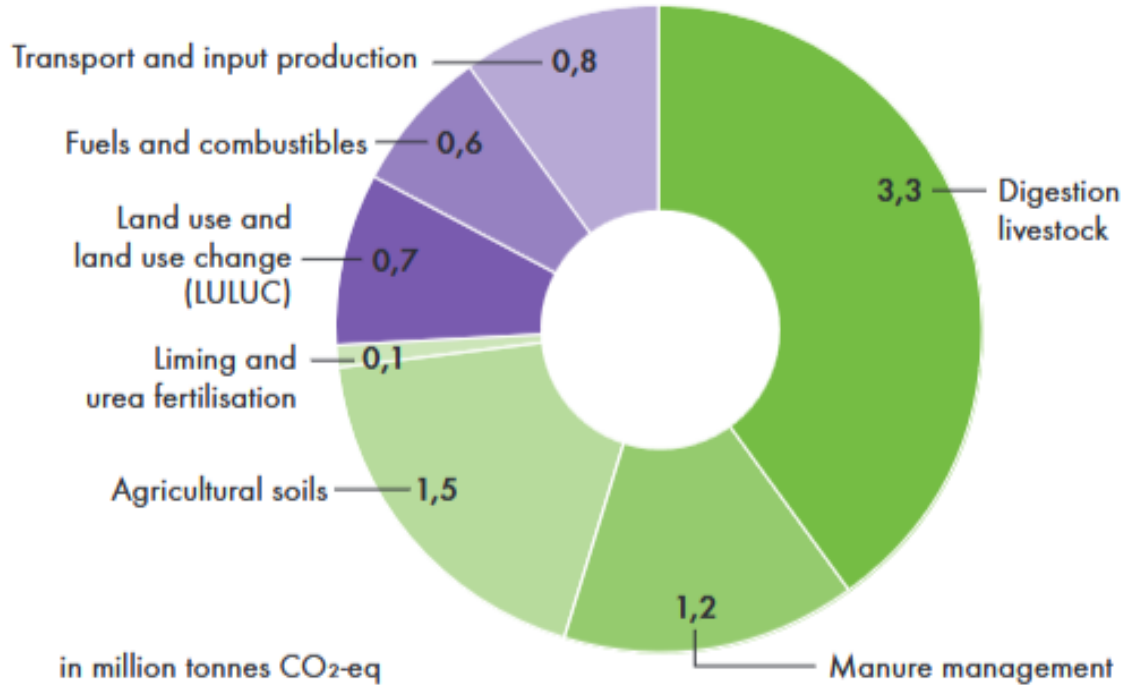
Emission Accounting: what is included?

Figure 2: Total cross-sectoral greenhouse gas emissions of Swiss agriculture in 2015



direct emissions

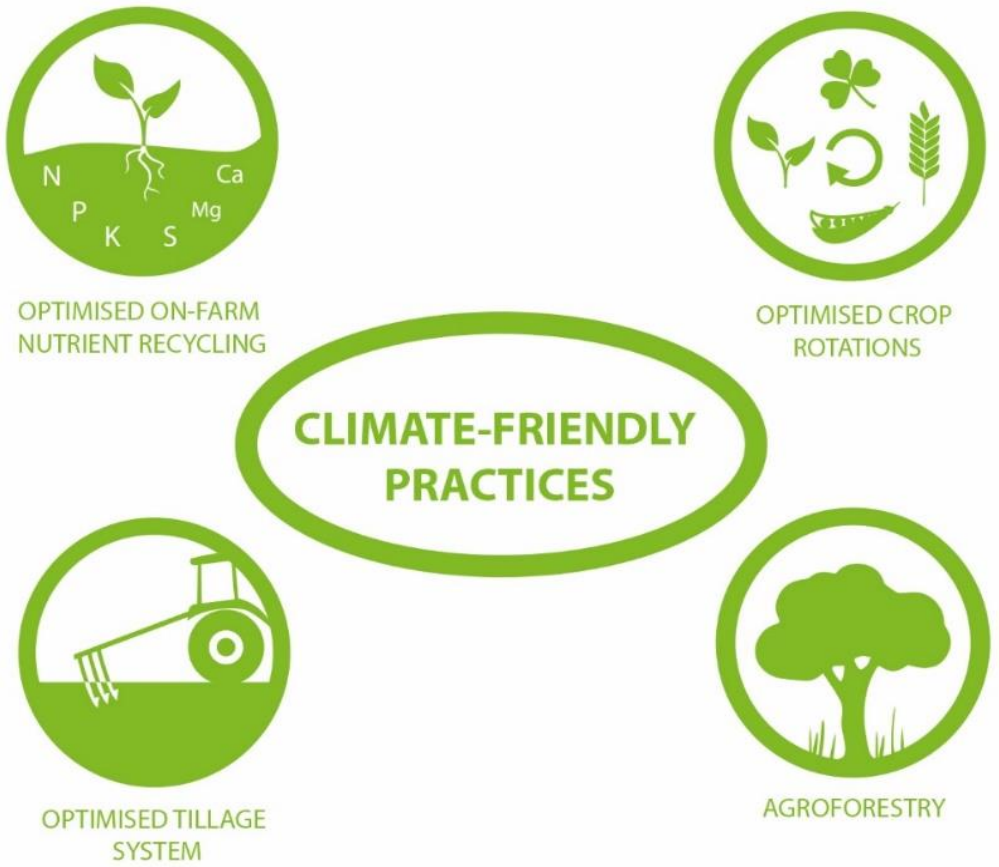
additional indirect emissions

FiBL Figure Source: https://www.fibl.org/en/shop-en/1349-soil-and-climate

Reducing Emissions in Organic Agriculture

SOLMACC Projekt (2013-2018)
https://solmacc.eu/

- 3 countries, 12 farms, 48 measures
- successful collaboration between farmers, advisors and researchers



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Lessons Learnt SOMACC

- Both direct and indirect emissions are important to consider! Include food system perspective
- Working as a team of farmers, farm advisors, scientists was very effective for mainstreaming practices and policy advise
- Organic agriculture is already having benefits for the climate (in most cases) and climate-practices are further improvements (steps to reduction are smaller)
- It takes time to implement solutions and soil carbon can be an interesting leverage point

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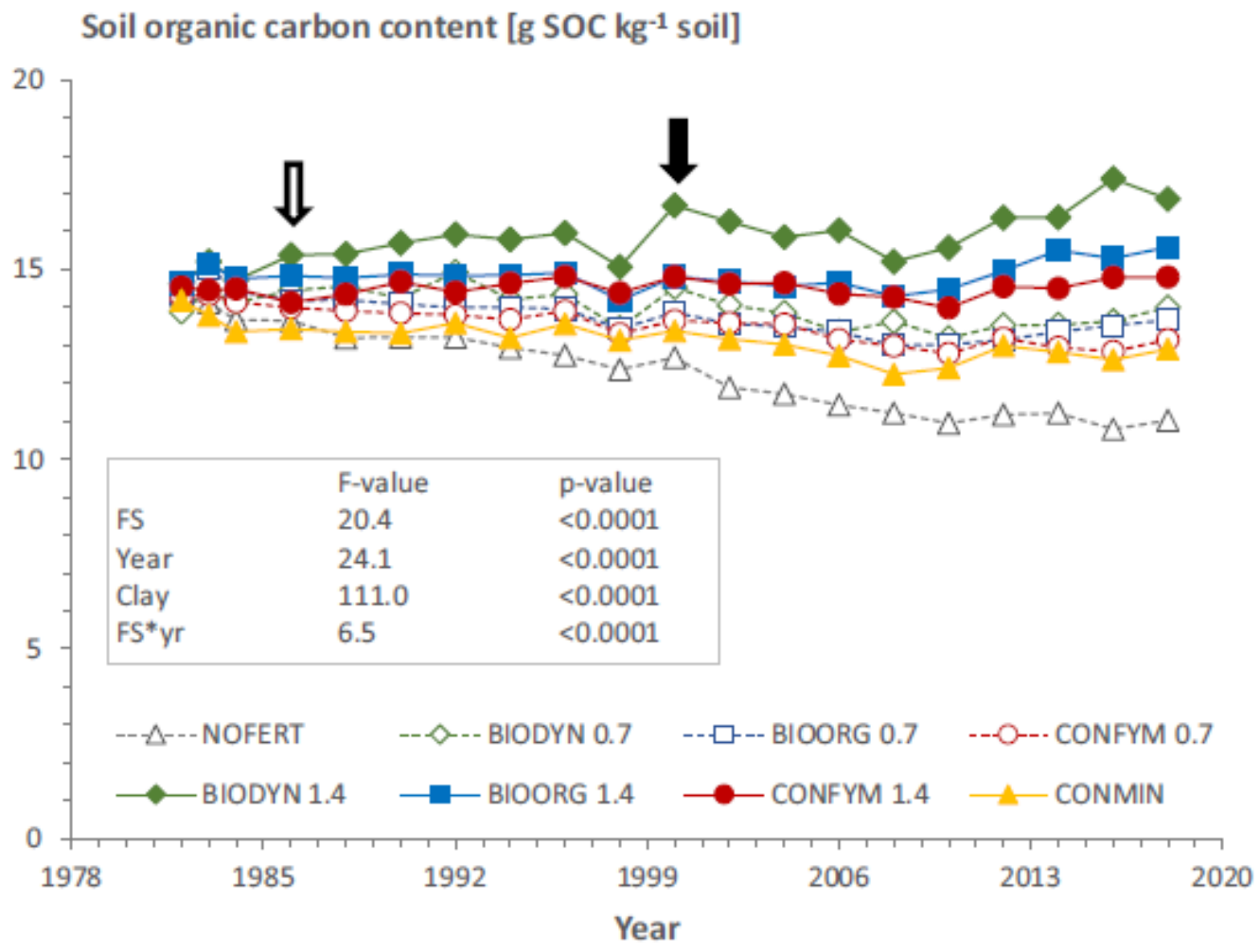
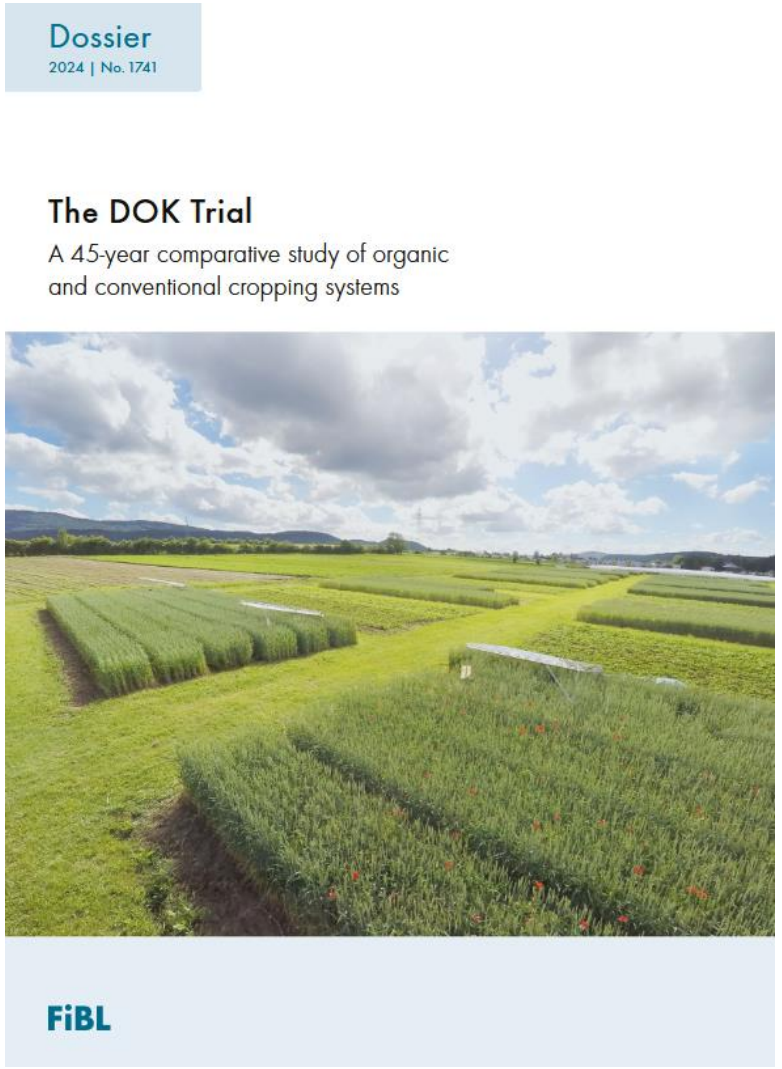
Climate mitigation and SOC needs a long-term perspective





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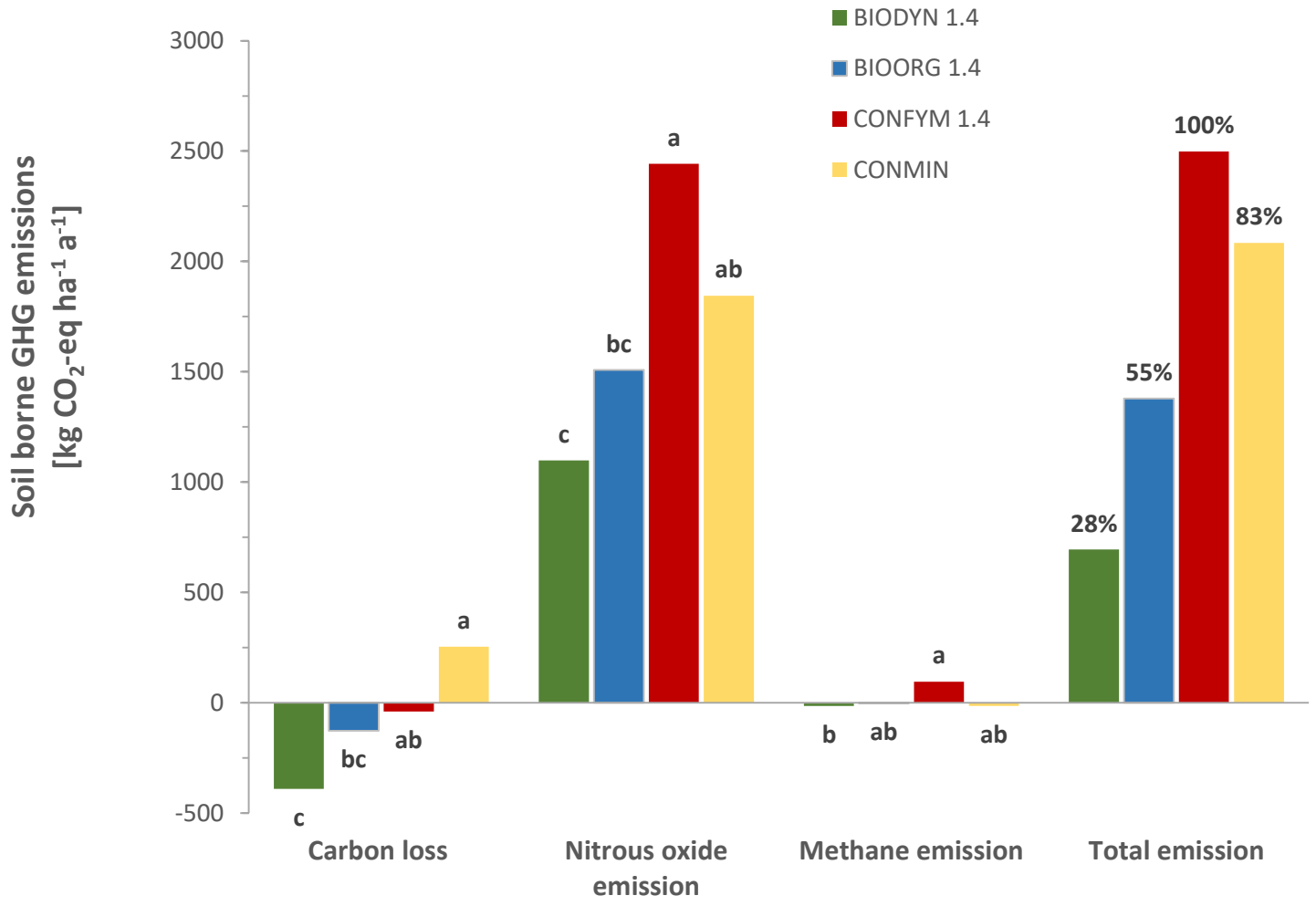
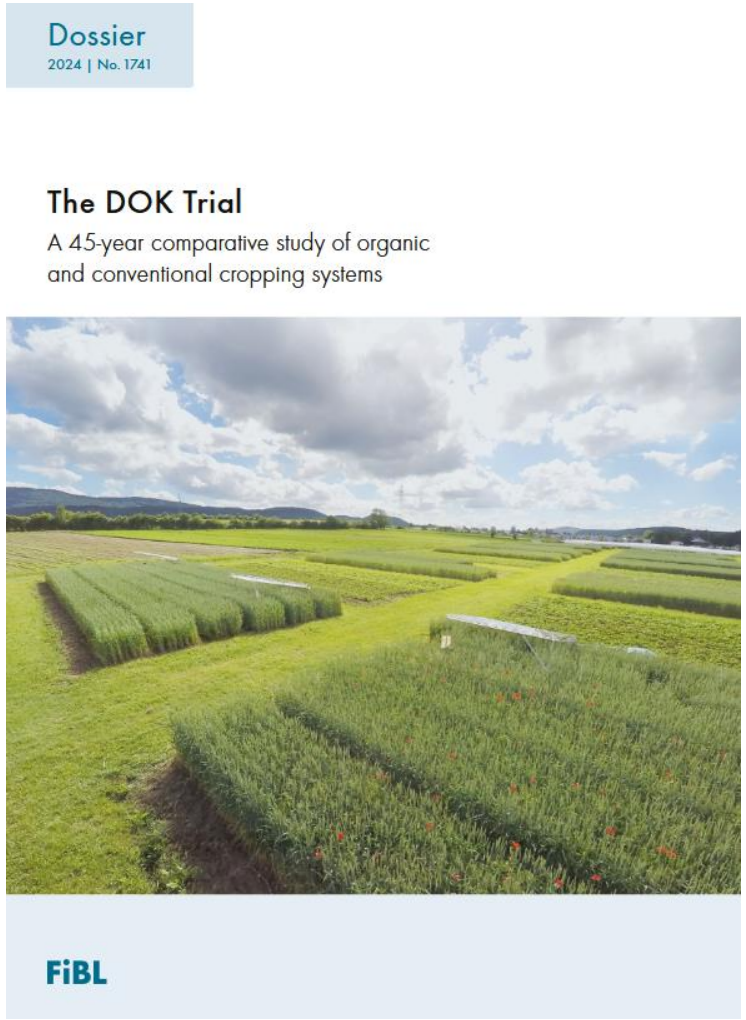
DOK-trial: Synthesis climate effect of organic agriculture





https://www.fibl.org/de/shop/1741-dok-dossier-en

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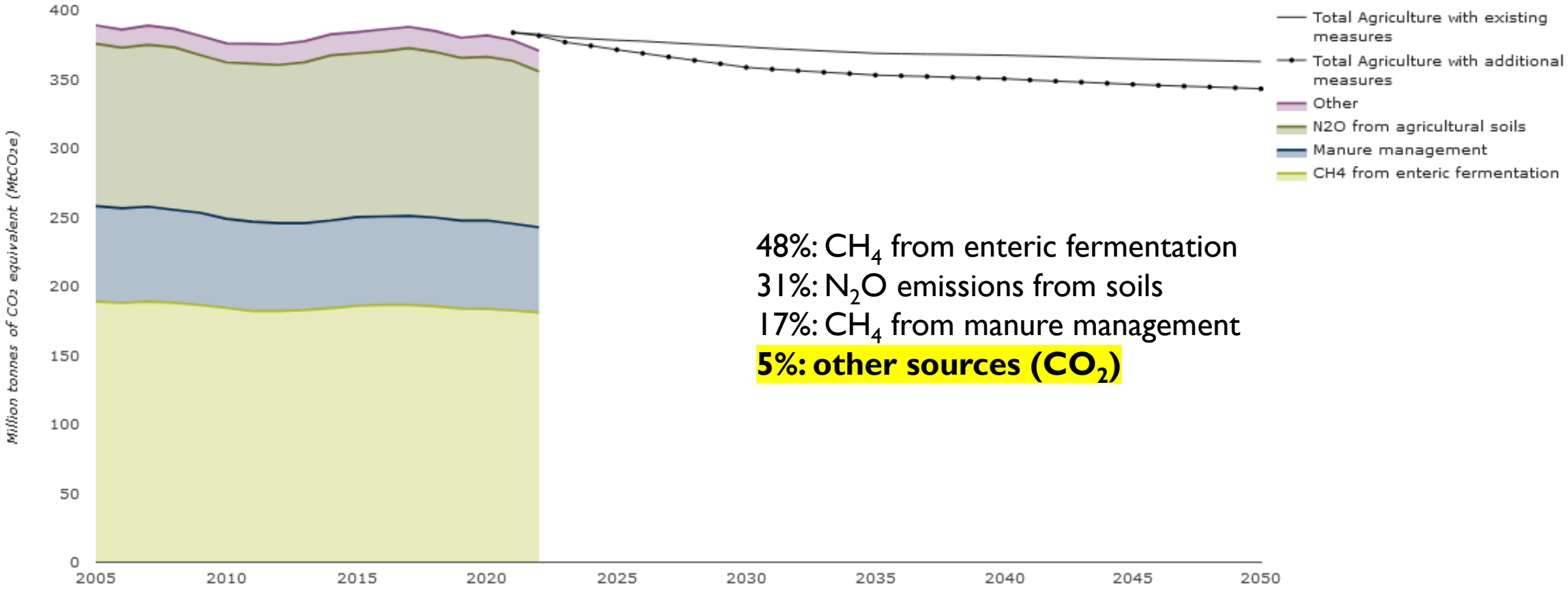
Krause

What is our goal? Climate mitigation or sustainable systems?



48%: CH_4 from enteric fermentation
31%: N_2O emissions from soils
17%: CH_4 from manure management
5%: other sources (CO_2)

European Environment Agency, 2023: Greenhouse gas emissions from agriculture in Europe

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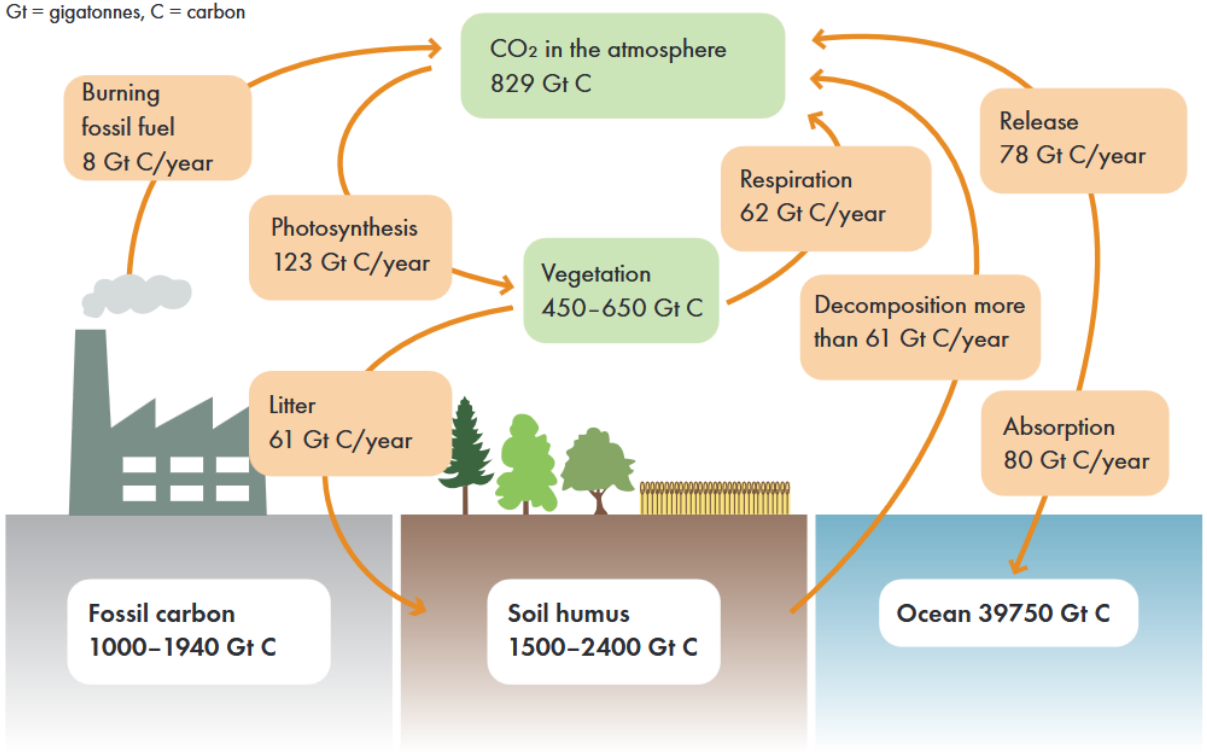
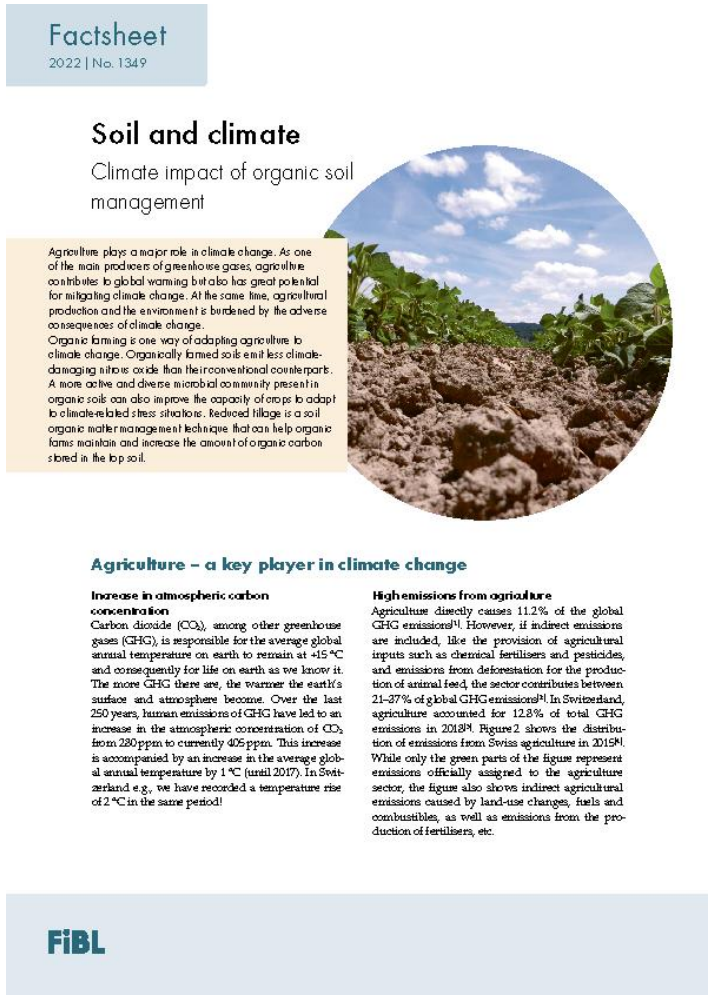
Climate relevance of soil organic carbon

Figure 1: Simplified representation of the global carbon cycle

Gt = gigatonnes, C = carbon



Humus build-up and decomposition play an essential role in the carbon cycle relevant to the climate. The CO_2 content of the atmosphere is currently increasing by 3.3 Gt C annually. C exchange with carbonate rocks, by far the largest carbon sink, is much slower and is therefore not listed here. Source: Graphic designed by Heinz Flessa, adapted by FiBL, using IPCC data[2]



Factsheet
2022 | No. 1349

Soil and climate

Climate impact of organic soil management

Agriculture plays a major role in climate change. As one of the main producers of greenhouse gases, agriculture contributes to global warming but also has great potential for mitigating climate change. At the same time, agricultural production and the environment is burdened by the adverse consequences of climate change.
Organic farming is one way of adapting agriculture to climate change. Organically farmed soils emit less climate-damaging nitrous oxide than their conventional counterpart. A more active and diverse microbial community present in organic soils can also improve the capacity of crops to adapt to climate-related stress situations. Reduced tillage is a soil organic matter management technique that can help organic farms maintain and increase the amount of organic carbon stored in the top soil.

Agriculture – a key player in climate change

Increase in atmospheric carbon concentration

Carbon dioxide (CO_2), among other greenhouse gases (GHG), is responsible for the average global annual temperature on earth to remain at +15 °C and consequently for life on earth as we know it. The more GHG there are, the warmer the earth's surface and atmosphere become. Over the last 250 years, human emissions of GHG have led to an increase in the atmospheric concentration of CO_2 from 280 ppm to currently 405 ppm. This increase is accompanied by an increase in the average global annual temperature by 1 °C (until 2017). In Switzerland e.g., we have recorded a temperature rise of 2 °C in the same period!

High emissions from agriculture

Agriculture directly causes 11.2% of the global GHG emissions[1]. However, if indirect emissions are included, like the provision of agricultural inputs such as chemical fertilisers and pesticides, and emissions from deforestation for the production of animal feed, the sector contributes between 21–37% of global GHG emissions[3]. In Switzerland, agriculture accounted for 12.8% of total GHG emissions in 2018[4]. Figure 2 shows the distribution of emissions from Swiss agriculture in 2015[4]. While only the green parts of the figure represent emissions officially assigned to the agriculture sector, the figure also shows indirect agricultural emissions caused by land-use changes, fuels and combustibles, as well as emissions from the production of fertilisers, etc.

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Figure Source: https://www.fibl.org/en/shop-en/1349-soil-and-climate

Challenges of measuring soil carbon

- different soil potential
- additionality
- permanence
- new practices potentially create new emissions
- leakage effects

ELSEVIER

Journal of Environmental Management

Volume 330, 15 March 2023, 117142

Research article

Carbon farming: Are soil carbon certificates a suitable tool for climate change mitigation?

Carsten Paul [a], Bartosz Bartkowski [b], Cenk Dönmez [a i], Axel Don [c], Stefanie Mayer [d], Markus Steffens [e], Sebastian Weigl [a], Martin Wiesmeier [d f], André Wolf [g], Katharina Helming [a h]

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https://doi.org/10.1016/j.jenvman.2022.117142

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Highlights

- Soil-based carbon certificates are sold as voluntary emission offsets.
- Private certification schemes provide financial incentives for carbon farming.
- However, they are not a suitable tool for climate change mitigation.
- Permanence, additionality and monitoring are not ensured; leakage effects may occur.

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What is our goal? Climate mitigation or sustainable systems?

https://tensquaregames.com/2022/07/27/our-commitment-to-carbon-neutrality/

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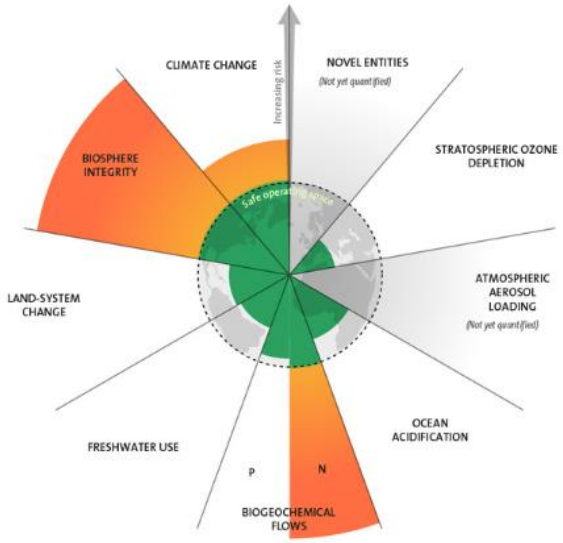
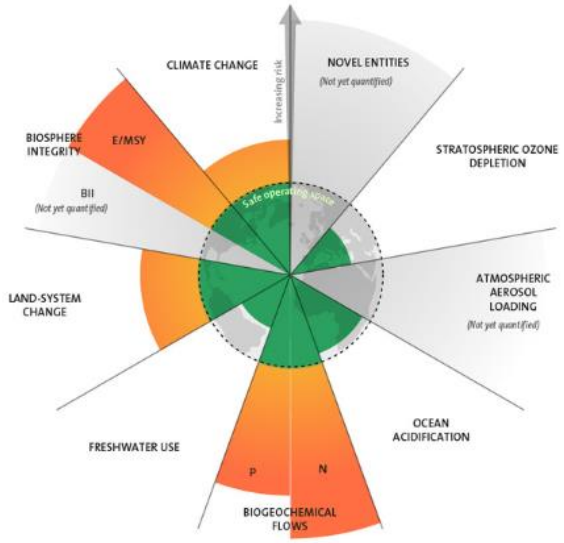
Don’t forget….

2009



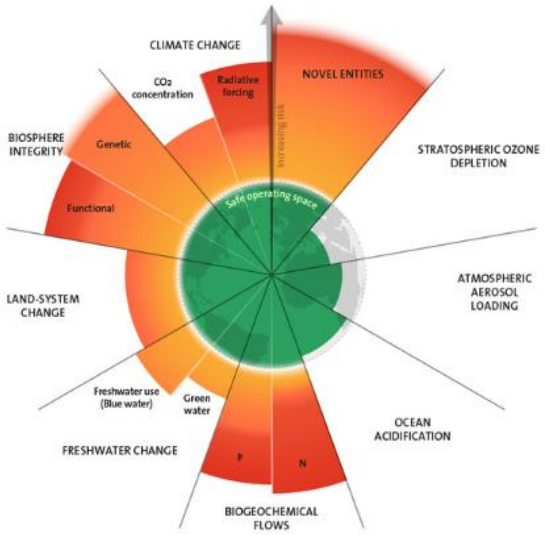
7 boundaries assessed,
3 crossed

2015



7 boundaries assessed,
4 crossed

2023



9 boundaries assessed,
6 crossed

https://www.stockholmresilience.org/research/planetary-boundaries.html

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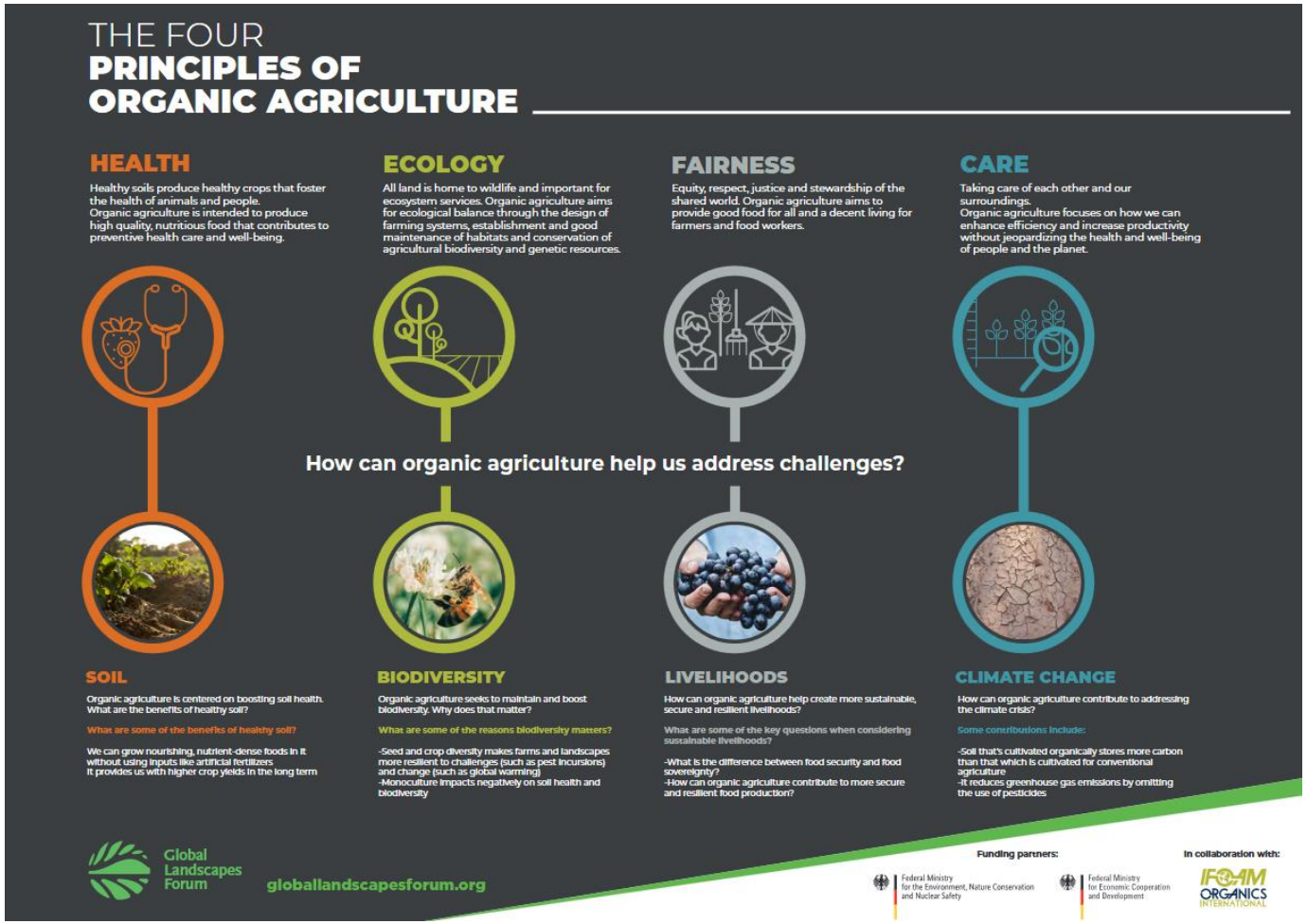
Organic Agriculture as a System



Organic agriculture has a long tradition and history related to integrating many sustainability aspects into farming:

- Biodiversity
- Water management
- Animal health
- Income
- Local structures, such as Community Supported Agriculture (CSAs)
- …...

https://www.globallandscapesforum.org/infographic/what-are-the-four-principles-of-organic-agriculture/

OrganicClimateNET

- ✓ **Network around 250 farms** established for long term
- ✓ **Individual Farm carbon assessments** and **individual climate farming strategies** developed.
- ✓ **120+ climate and carbon knowledge materials** adapted, improved and translated.
- ✓ **Decision support toolbox** freely accessible via the Organic Farm Knowledge Platform.
- ✓ **Carbon farming** business models in the organic context.
- ✓ **Quantitative assessment** of the emission reduction and sequestration potential of the EU organic sector
- ✓ **Engagement of all stakeholders** involved in the process.

OrganicClimateNET will be a key EU project **supporting the EU-goal to become climate neutral by 2050.**

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Thank you for your Attention!

Research Institute of Organic Agriculture FiBL
Ackerstrasse 113, Box 219
5070 Frick
Switzerland

Lin Bautze
lin.bautze@fibl.org

Markus Steffens
markus.steffens@fibl.org

www.fibl.org

www.bioaktuell.ch

@FiBLaktuell

linkedin.com/company/fibl

fiblfilm

@fiblorg

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