



## **Vegan diets and organic farming: opportunities, challenges, and impacts on nutrition, food security and the environment**

Biofach 2023, Nürnberg, February 15, 2023

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# FÖRDERKREIS Biozyklisch-Veganer Anbau

## Biocyclic Vegan Farming

BIOFACH

15. February 2023

Alina Gieseke

## Biocyclic vegan farming – Basic principles

- From gr. bios = life and kyklos = cycle
- Preserving healthy life cycles (soil – plants – humans)
- vegan objective from field to fork
- no commercial livestock keeping or slaughtering
- no use of animal-derived fertilizers or other inputs of animal origin
- Encouraging humus build-up, promoting soil life, and fertilization with plant-based methods
- Closing natural cycles via e.g. N-fixing legumes



## BIOCYCLIC VEGAN FARMING



Biocyclic Vegan Standard  
Biozyklisch-Vegane Richtlinien  
Standard Biocyclique Végétalien  
Πρότυπο Βιοκυκλικής Φυτοπονίας



## The Biocyclic Vegan Standard

- First world-wide stand-alone standard for vegan farming
- 2017: Admission of the standard to the IFOAM Family of Standards
- 2017: first biocyclic vegan farms certified
- Controlled by an approved & independent organic inspection body
- CERES: certification body



## Biocyclic vegan farming, vegan organic farming, and organic agriculture

- Biocyclic vegan farming = vegan organic farming that follows **guidelines** and is (usually) **certified** and **inspected** accordingly
- Vegan organic farming = organic agriculture that is (usually) **certified organic** and uses **vegan practices**
- Main differences to organic agriculture
  - Vegan from field to fork
  - Heavy focus on biodiversity, e.g. mixed cultivation
  - Fertilizing methods





## Biocyclic vegan farming – Fertilization

- Compost (green waste, clover grass, crop residues...)
- Biocyclic Humus Soil
- Cut & Carry
- Grists & Pellets
- Biogas substrate
- Residues from food production (pomace, vinasse, tofu whey, ...)
- Plant-based commercial fertilizers



# BIOCYCLIC VEGAN FARMS



## PlantAge eG & Strassner Family Farms



- CSA (Germany) / arable farm (Austria & Hungary)
- 30 ha / 400 ha
- Crops: ca. 50 different vegetables, herbs, and fruits (indoor and outdoor) / wheat, Einkorn wheat, vetch, soy & other beans, sunflower
- certified biocyclic vegan since: 2021 / 2019
- Fertilization: green manure, compost, crop rotation, malt sprout pellets / green manure, crop rotation, some commercial fertilizers



**THANK YOU**



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**[www.biozyklisch-vegan.org](http://www.biozyklisch-vegan.org)**  
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## Modeling environmental and nutritional impacts of large-scale vegan organic agriculture

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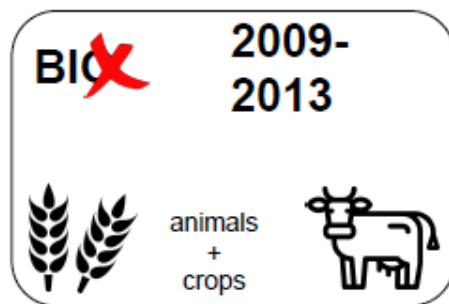
Patricia Krayer and Adrian Müller

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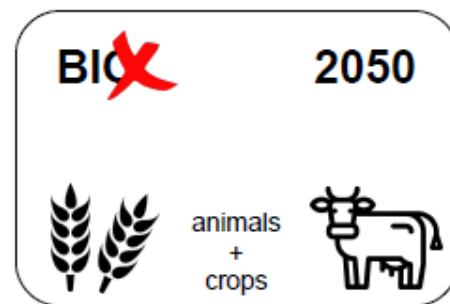
## Key questions

- To what extent is it possible to feed the world with vegan agriculture in the year 2050?
- How would a transition to vegan agriculture affect the environmental impacts related to the global food system in the year 2050?
- How does the implementation of vegan agriculture affect the feasibility and environmental performance of organic agriculture – and vice versa?

Baseline



Reference 2050



Scenario 1



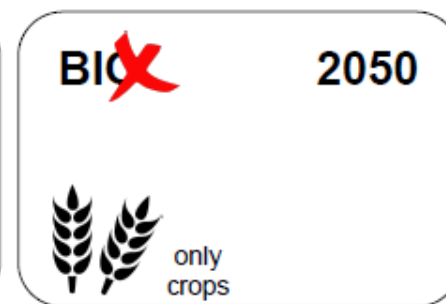
BAU

Scenario 2



BAU

Scenario 3



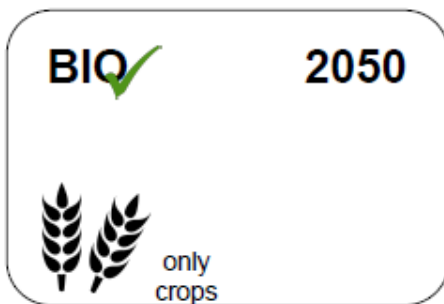
Optimized (nutritionally)

Scenarios 4



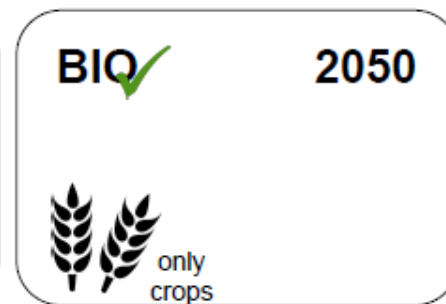
Organic

Scenarios 5



Stockless

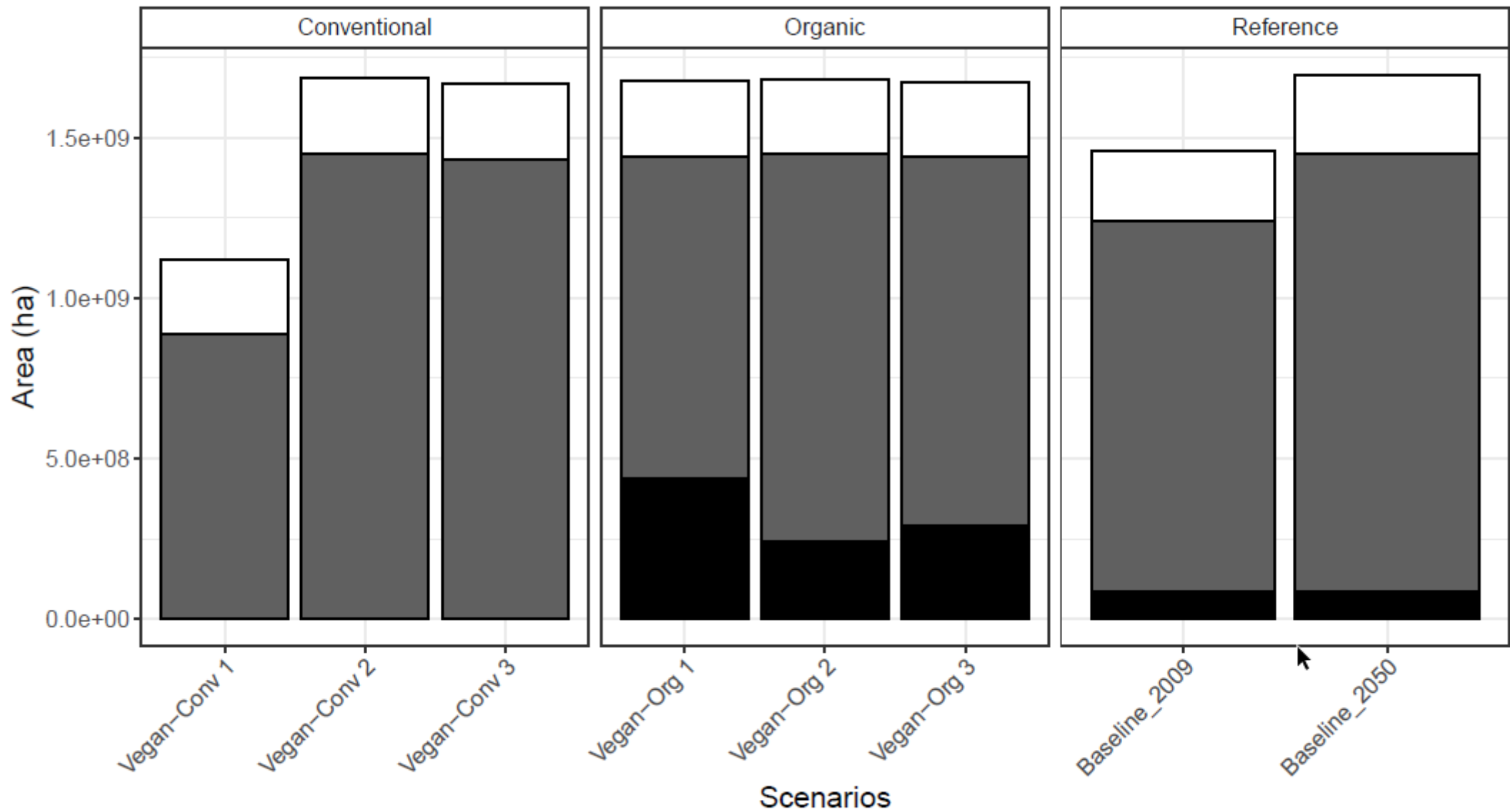
Scenarios 6



Optimized (nutritionally & agronomically)

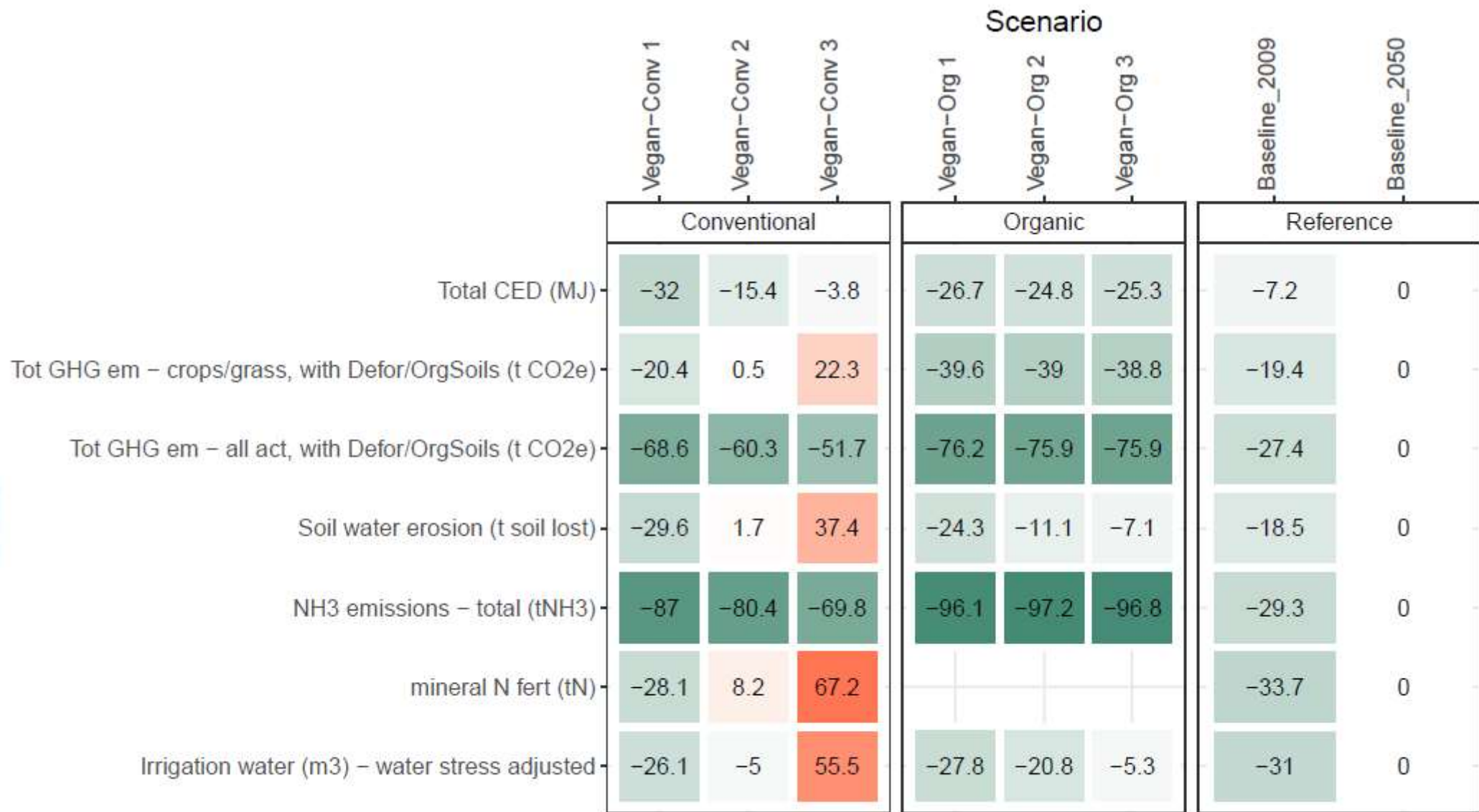
Table 3.1: Shares of a given crop rotation category in the total area. WE: Western Europe, NA: Northern America. \* indicates that the share is calculated country-specific for countries in 'other' regions, based on Equation 3.5.

Crop Rotation Cat.	Organic			Stockless	Optimized (org)	Optimized (conv.)
	WE	NA	Others			
Cereals 1	0.22	0.4	*	0.26/*	0.05	0.1
Cereals 2	0.21	0.12	*	0.25/*	0	0
Grain Legumes	0.14	0.21	0.13	0.14	0.35	0
Oil crops	0.01	0.03	0.02	0.01	0.2	0.35
Root crops	0.09	0.01	*	0.11/*	0.01	0
Vegetables	0.07	0.02	0.03	0.045	0.16	0.55
Fruits	0.01	0.04	0.02	0.005	0	0
Set Aside	0.25	0.17	0.36	0.19	0.23	0
Total starchy crops			0.48	0.62		



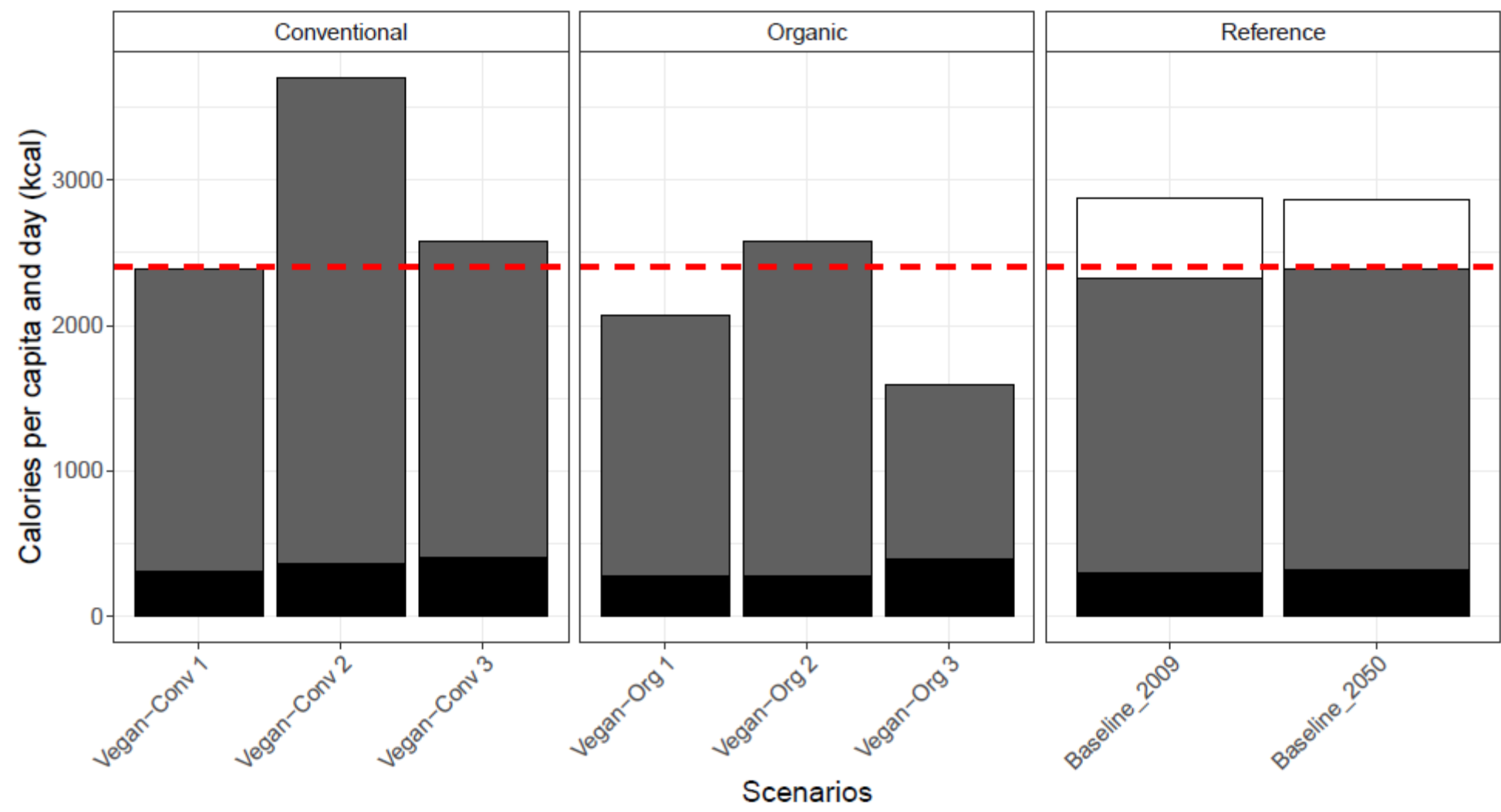
Land use category  Permanent cropland  Temporary cropland  Temporary grassland

Indicator

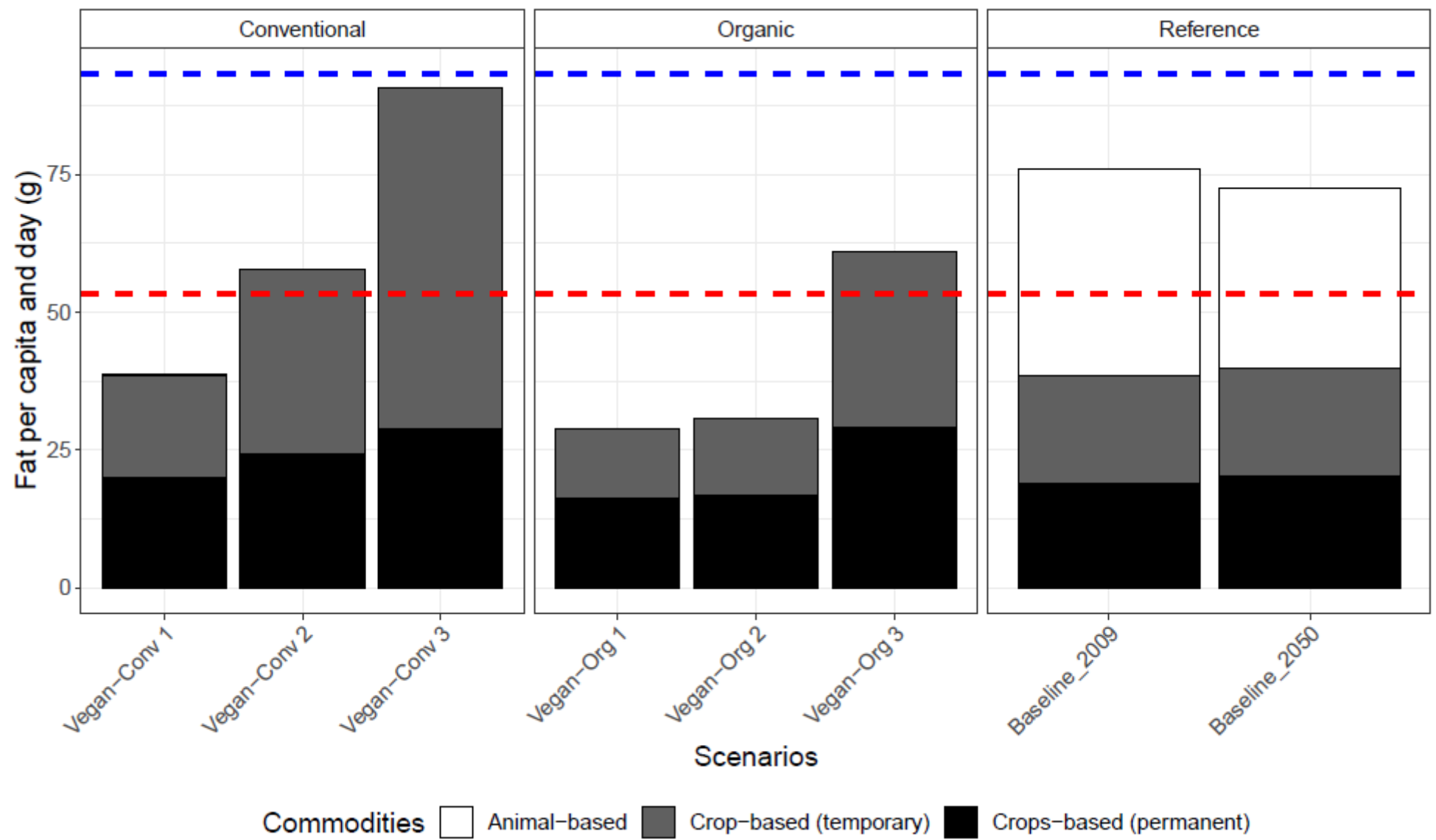


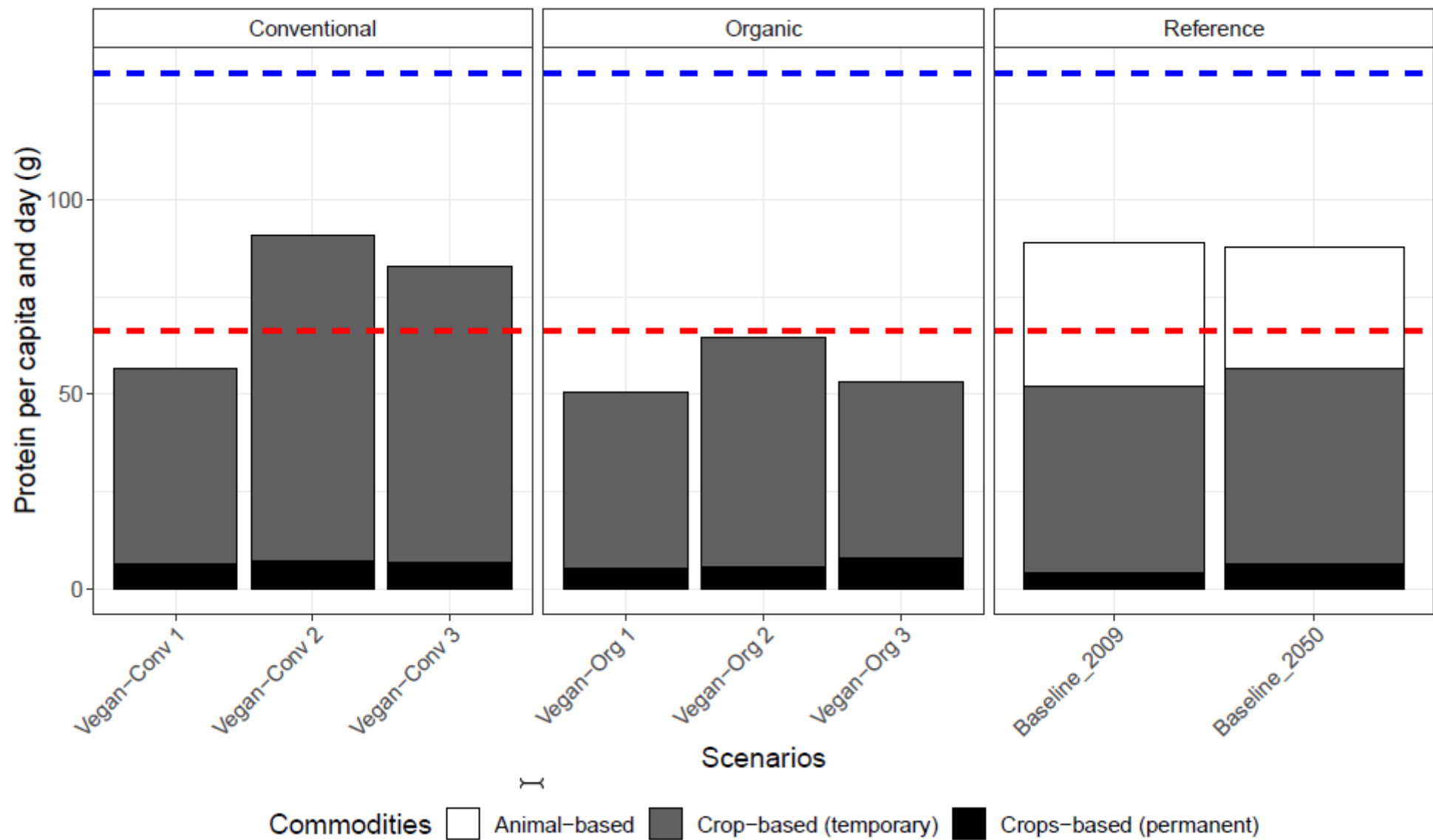
Change in % ■ -50 ■ 50





Commodities  Animal-based  Crop-based (temporary)  Crops-based (permanent)





### Surplus over target amount (%)

Content	Scenario							
	Vegan-Conv 1	Vegan-Conv 2	Vegan-Conv 3	Vegan-Org 1	Vegan-Org 2	Vegan-Org 3	Baseline_2009	Baseline_2050
	Conventional			Organic			Reference	
Zinc, Zn (mg)	1.2	76.8	55.9	0.9	25.9	-15.7	18	27.7
Vitamin D (D2 + D3) (ug)	-98.9	-98.5	-96.4	-99.1	-99.1	-98.3	-93.8	-93.9
Vitamin C, total ascorbic acid (mg)	28	81.9	572	30.6	60.5	147.2	0	22.4
Vitamin B-12 (ug)	-99.6	-99.3	-98.9	-99.5	-99.3	-99.4	-64.9	-67
Selenium, Se (ug)	-13.6	53.7	-12.8	-17.9	-2	-61.8	19.8	21.9
Riboflavin (mg)	-28.3	8.6	87.1	-30.4	-15.3	-16.2	-16.9	5.6
Potassium, K (mg)	-11.9	44.8	171	-14.1	19.3	7.9	-18.2	-4.5
Niacin (mg)	-4.7	68.2	48	-1.3	29.9	-32.5	4.6	14.5
Iron, Fe (mg)	18.4	100.6	169.6	13.8	41.6	28	17.5	27.9
Fiber, total dietary (g)	73.3	198.1	224.5	72.4	115	65.2	54.1	72.2
Carbohydrate, by difference (g)	20.3	91.1	35.9	16.5	47.2	-24.4	9.2	21.6
Calcium, Ca (mg)	-72.2	-57	65	-75.6	-68.9	-39	-51.7	-51.6
18:3 n-3 c,c,c (ALA) (g)	-31.4	8.3	111	-41.7	-29.9	6.2	-37.1	-23.5
18:2 n-6 c,c (g)	111.5	201.7	328.6	87.9	122.8	157.3	54.7	137.4

## Some key points

- Assumptions on crop rotations matter greatly
- Trade-offs between various indicators are very relevant
- Waste reduction and nutrient recycling from outside agriculture will be central

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## Vegan diets, nutrition and health

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## A vegan diet...

	Foods that are eaten	Foods that are avoided
<b>Pesco vegetarians</b>	plant-based foods, fish, eggs, milk and dairy products	Meat and all products derived thereof
<b>Ovo-lacto vegetarians</b>	plant-based foods, eggs, milk and dairy products	meat, fish (including other aquatic animals) and all products derived thereof
<b>Lacto vegetarians</b>	plant-based foods, milk and dairy products	meat, fish (including other aquatic animals), eggs and all products derived thereof
<b>Ovo vegetarians</b>	plant-based foods, eggs	meat, fish (including other aquatic animals), milk and dairy products and all products derived thereof
<b>Vegans</b>	plant-based foods	all animal foods, also honey

**Is a vegan diet healthy?**

**Can be healthy, but:**

**Potential nutrient deficiencies**

Most critical: vitamin B12

Long-chain n-3 fatty acids (EPA and DHA)

Other vitamins (riboflavin, vitamin D)

Minerals (calcium, iron, iodine, zinc and selenium)

**Protein quality**

Indispensable amino acids



# How could a vegan diet look like?



GRAINS &  
STARCHY  
VEGETABLES  
5+ SERVINGS

FRUIT  
2+ SERVINGS

SEEDS & NUTS  
1-2 SERVINGS

BEANS &  
LENTILS  
3+ SERVINGS

VEGETABLES  
4+ SERVINGS

Source: American Society for  
Nutrition (2014)  
<https://nutrition.org/can-vegetarian-diet-healthy/>

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