FiBL






Why efficient food systems need “climate-inefficient” animals

FoU-dagarna 11–12 November 2026

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Introduction : When climate metrics challenge organic farming

The pressure

- Reduce greenhouse gas emissions per kilogram of product

The concern:

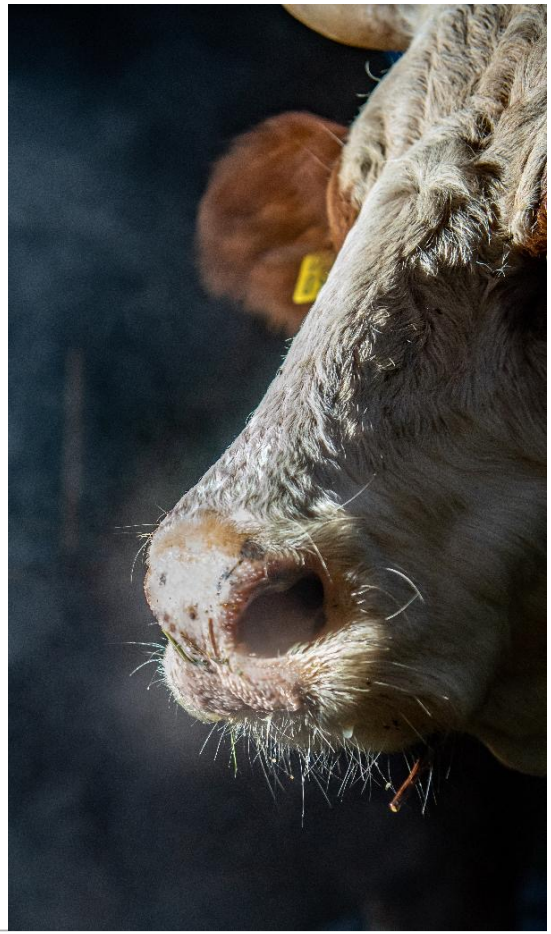
- Grass-based, extensive systems can appear climate-inefficient

What is at stake:

- Organic livestock needs to demonstrate its contribution to food production and nutrient cycling while addressing its environmental impacts

Objective :

Make the climate case for grass-based organic livestock.

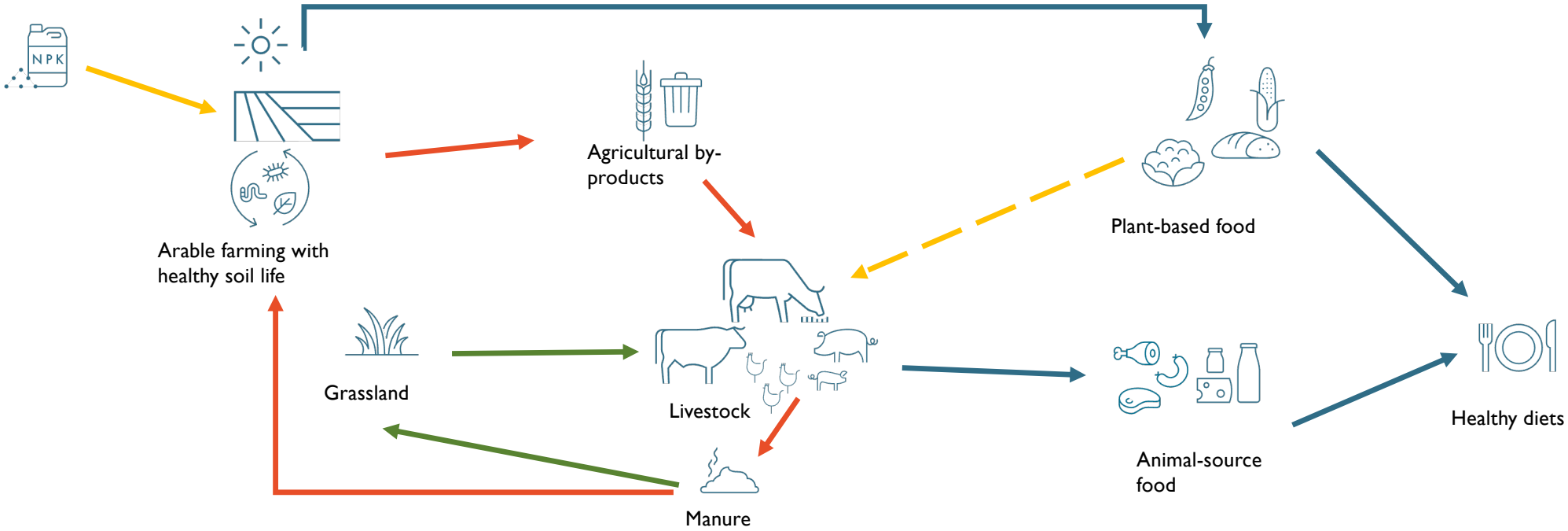


This presentation

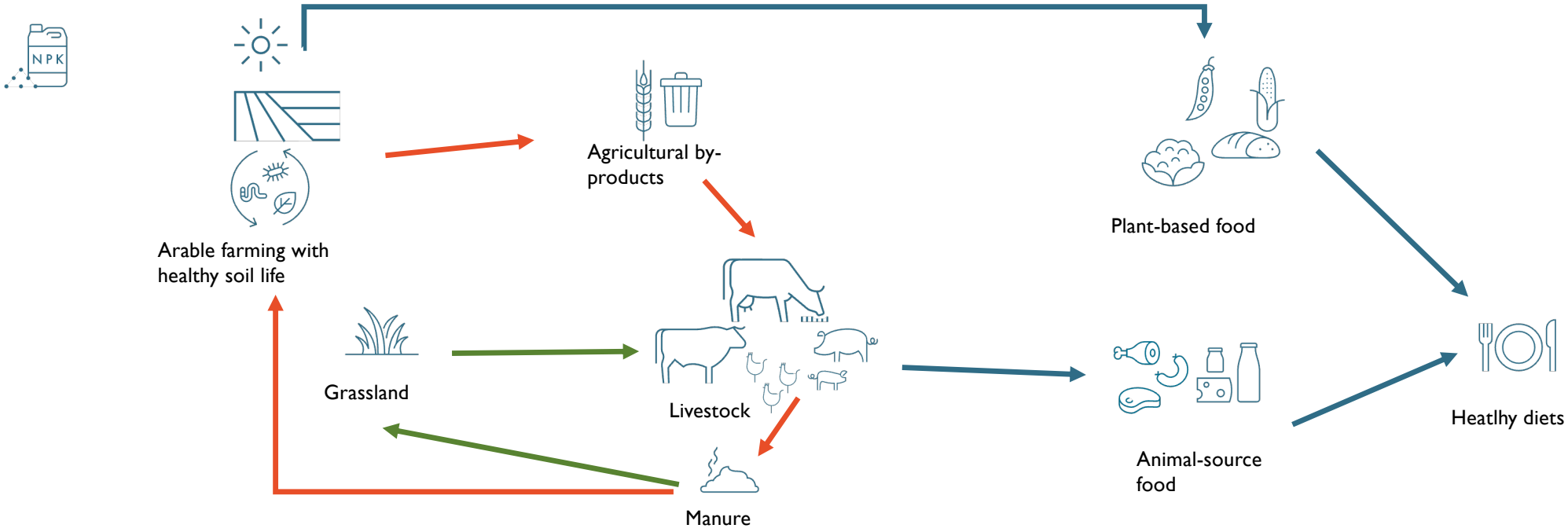
- Role of livestock in the food system
- Exploring the role of livestock through extreme scenarios
  - Extreme scenarios
  - Comparing different indicators
- Reducing greenhouse gas emissions from organic ruminant systems
- Conclusion



Livestock as a circularity actor in the food system



Feed-no-Food: the circularity logic of organic livestock



Especially without artificial fertiliser, livestock is a central link in organic farming between the feed base, food production and soil fertility.

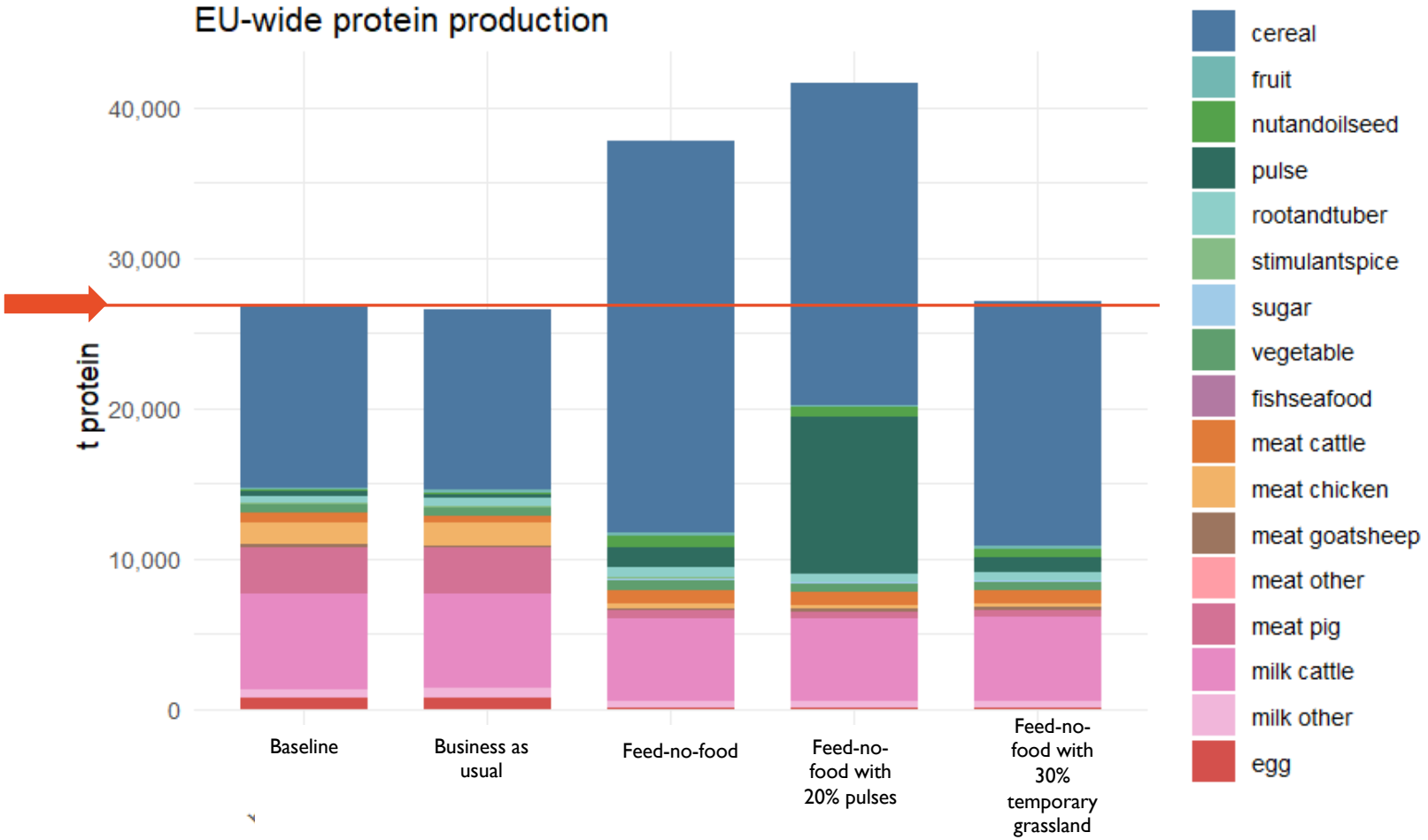
Exploring the food system through extreme scenairos

Geo-SOL: a spatially explicit mass-flow model of the food system.

- **Baseline (status co)**
- **Business as usual : efficiency first (EF-121)**
  All of Europe produces livestock like the «best-in-class» country.
- **Feed-no-food**
  Only grass and by products are use as feed. «organic-inspired» animal productivities .
  - Today crop-rotation without feed crops (FnF-122)
  - Enforcing 20% pulses in the crop rotation (FnF-123)
  - Enforcing a 30% temporary grassland (FnF-124)



Total protein production



Feed-no-food scenarios

- Produce more proteins
- Land not used for feed can be used to produce human edible food
- Massive change on monogastrics
- Relatively minor changes in ruminants

Source : Deliverable 6.4

Calculate climate efficency

Climate-efficient animals

$$\frac{ghg\ from\ livestock}{animal\ sourced\ food}$$

Logic:

- Improve feed conversion
- More concentrates / additives / inhibitors

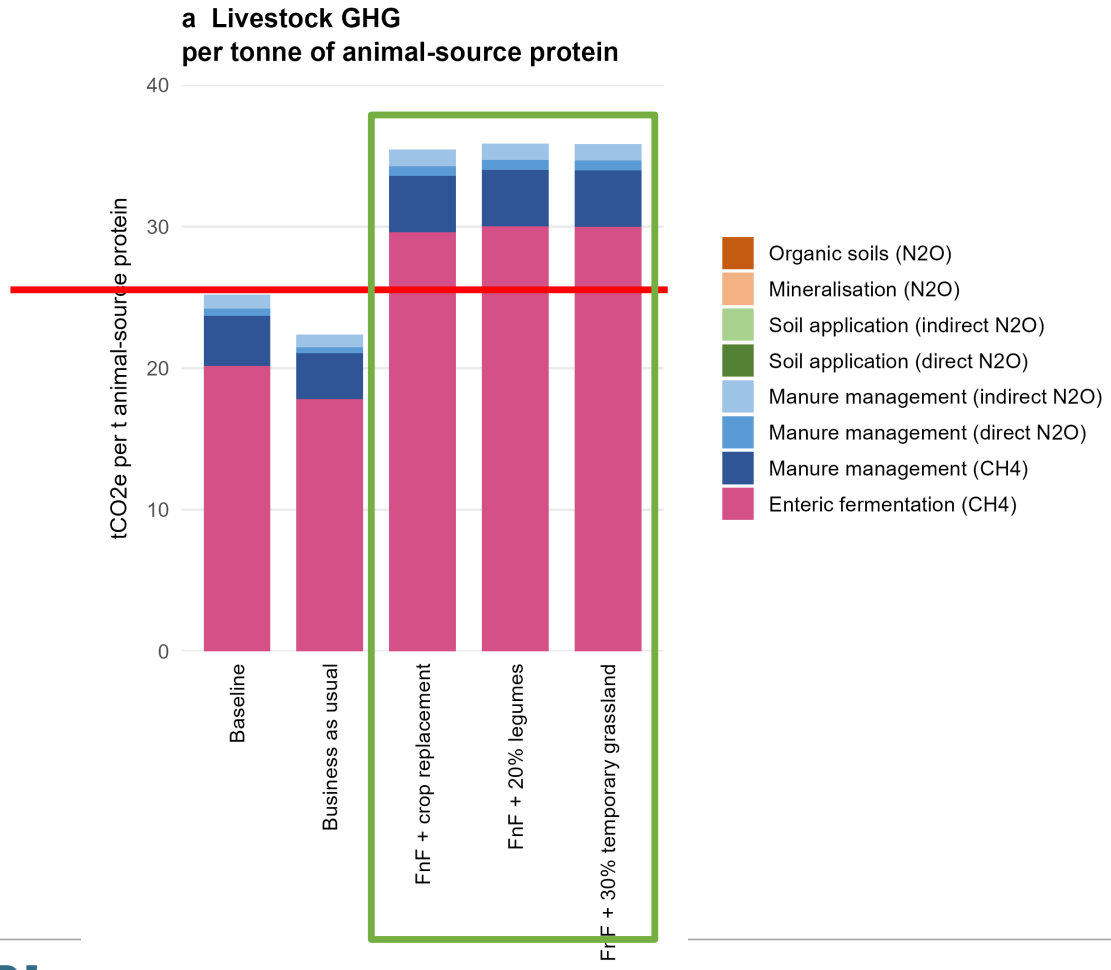
Climate-efficient food systems

$$\frac{ghg\ from\ food}{food}$$

Logic:

- Use grass and by-products
- Avoid feed-food competition
- Lower feed conversion ratio ("inefficient animals")

Animal level climate efficiency

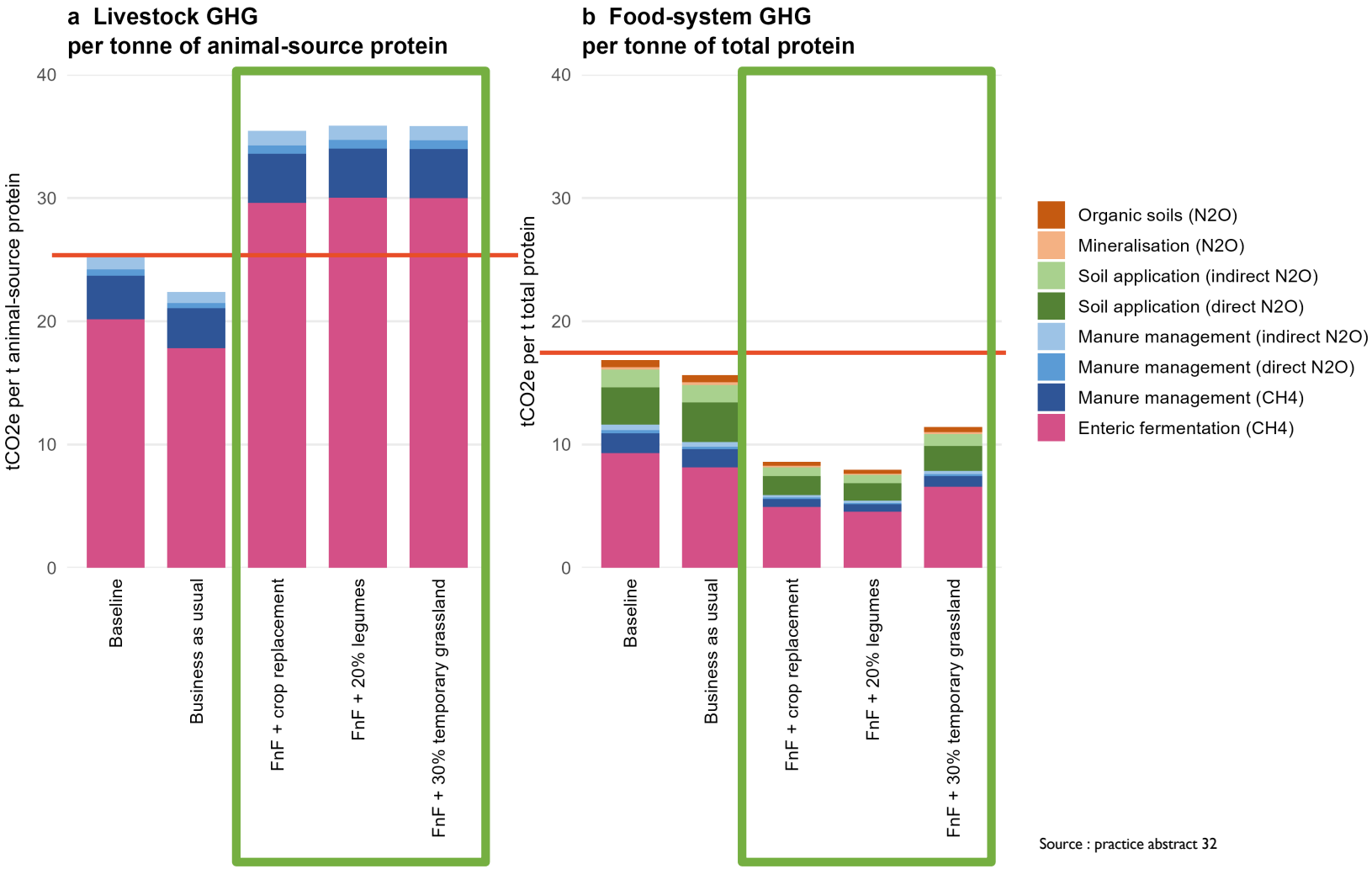


Feed-no-Food scenario have about 60% more emissions per animal-sourced protein

But …

Source : Deliverable 6.4

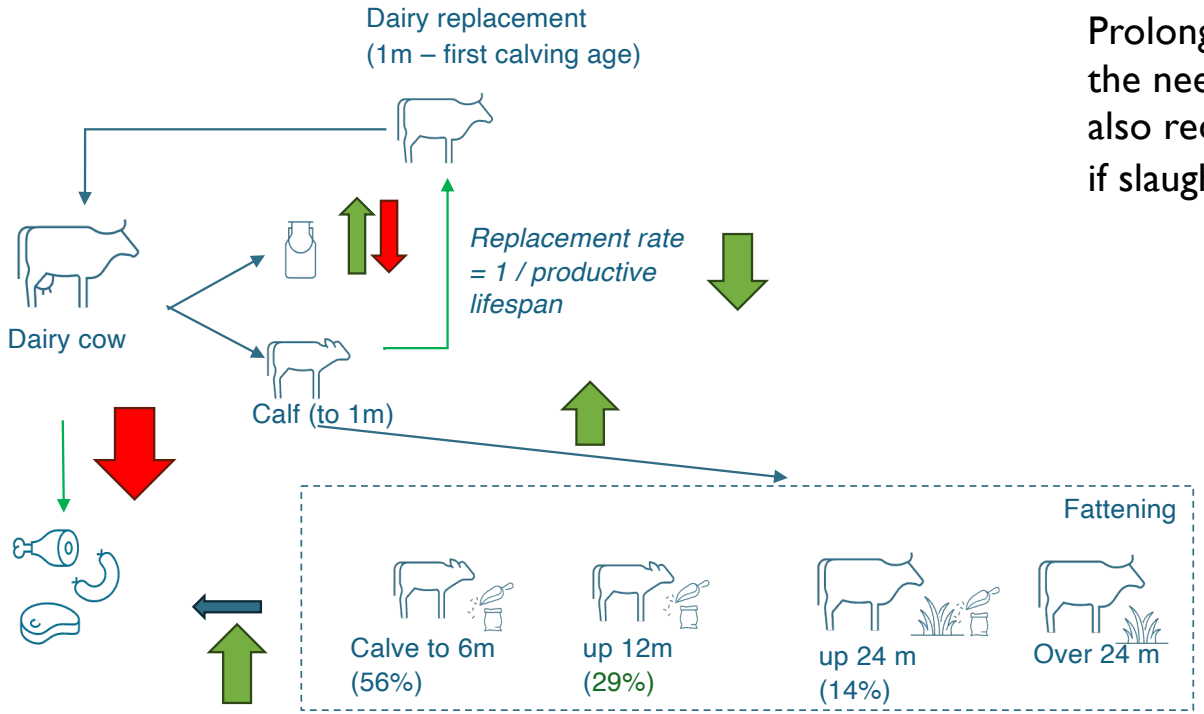
Animal vs food system climate efficiency



Source : practice abstract 32

Feed-no-foo scenario have about half of the ghg emission per consumable protein (plant-based + animal-sourced food)

Reducing GHG emission through prolonging productive lifespan



Prolonging productive livestock reduces the need for replacement animal but also reduced the overall meat produced if slaugher pattern remains unchanged

Pfeifer et al 2026

Reducing GHG emission through prolonging productive lifespan

Scenario	First calving age	Birth rate	Productive life (in lactation)			Milk yield (kg/cow per year)		
			Short	Medium	Long	Short	Medium	Long
BV-LH-C	30	0.87	2.7	3.5	5	6,932	7,196	7,009
HO-LH-C	28	0.88	2.3	3.1	4.4	7,343	7,808	7,875
BV-LM-C	32	0.88	2.6	3.4	4.7	6,299	6,552	6,294
SF-LM-C	29	0.92	2.4	3.7	5.6	5,878	6,366	6,790
SI-LM-O	32	0.96	1.9	3.5	5.3	4,006	4,937	4,950
BV-UM-O	34	0.90	2.8	3.7	5	5,980	5,881	5,556
SI-UM-O	32	0.94	2.7	3.9	5.7	4,429	4,882	4,786

Classification based on quartiles from 10 years of herd book data

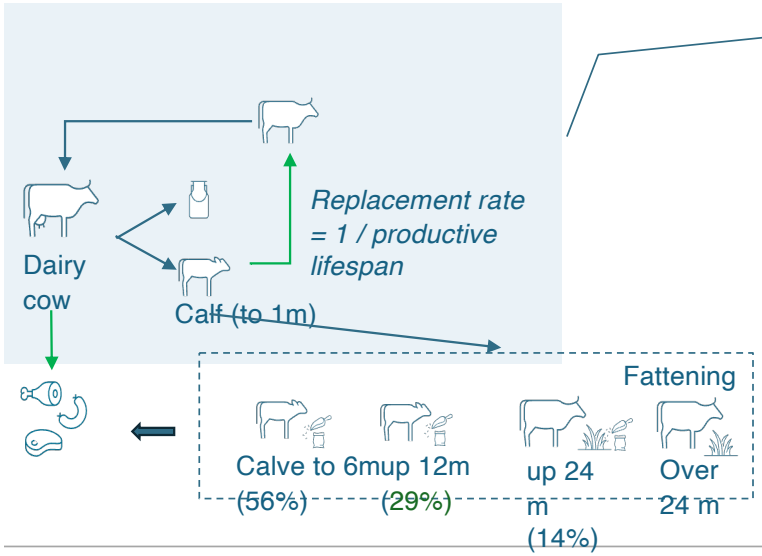
Pfeifer et al 2026

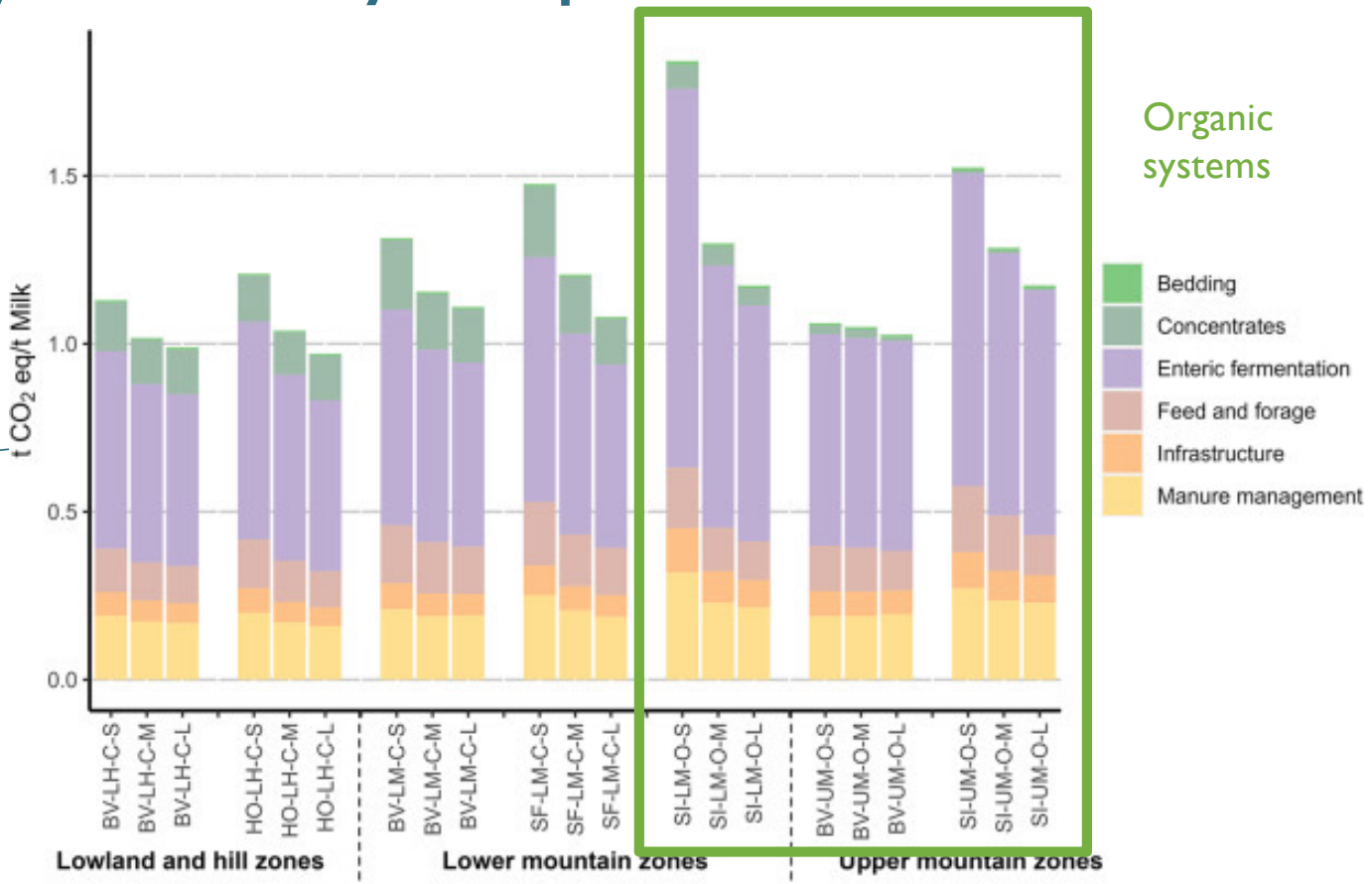
Productive livespan of dairy cows at dairy entreprise level

Longer productive lifespan always reduced GHG/liter milk even when

1. Milk production is reduced
2. Productive livespan is already high

3. Organic system are not per-se worse than organic



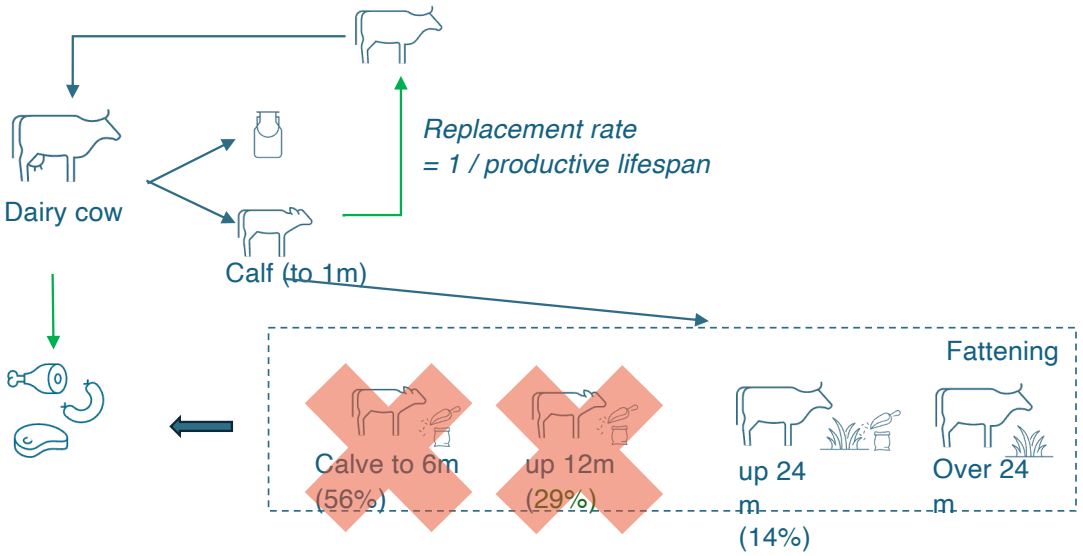


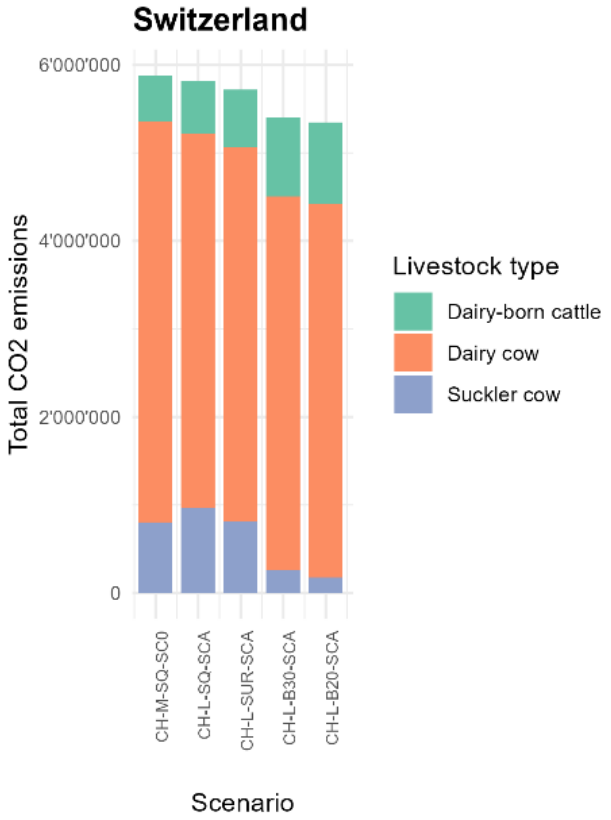
Pfeifer et al 2026

Prolonging livespan without reducing animal protein produced (compensate with suckler cows) at Swiss level

Total greenhouse gas is always lower

1. Even if more suckler cows have to be kept to compensate for meat loss
2. With dual-use dairy-born calves fattened to M18 we can reduce the number of suckler cows and reduce GHG emissions by 9%

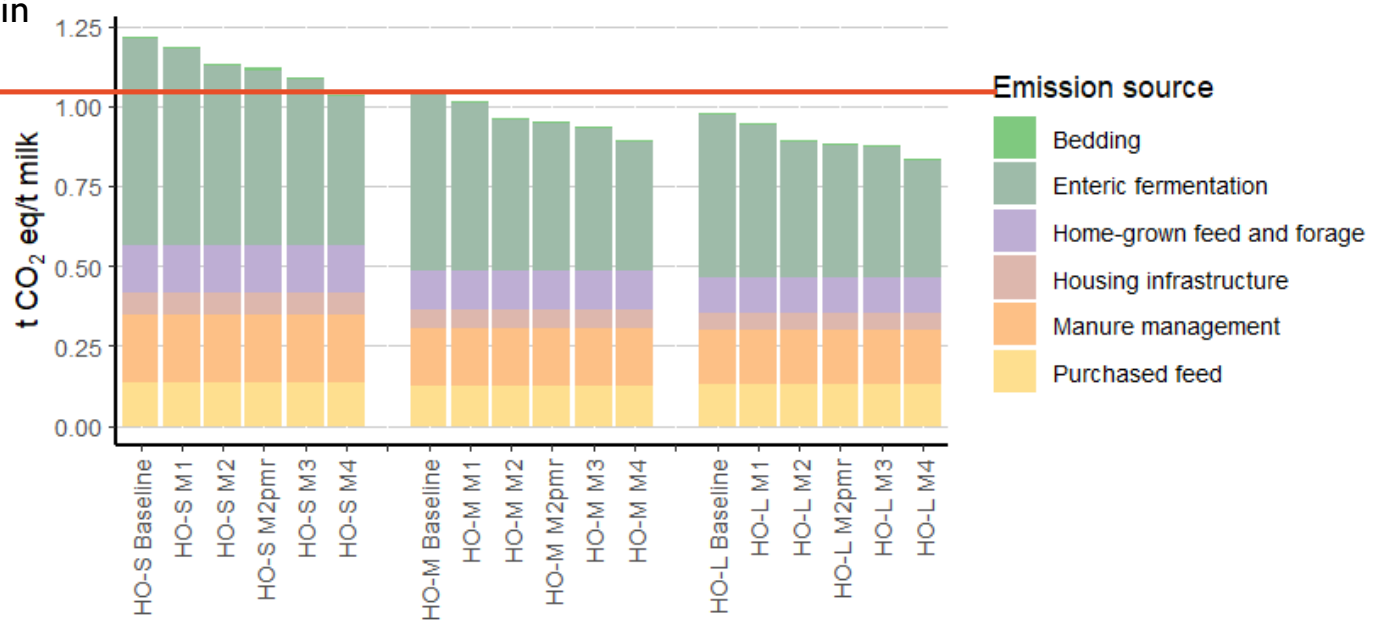




Pfeifer et al in preparation

Comparing prolonging lifespan with 3nop in conventional Holstein systems

Maximum reduction of 3nop on short-lived Holstein cows



Longer productive lives + 3-NOP give the lowest emissions per tonne of milk.

Without 3-NOP, long-lived herds still beat short-lived herds with it.

Pfeifer et al in preparation

Conclusion

- "Climate-inefficient" animals can make a food system more efficient when a feed-no-food principle is followed.
- Organic cows tend to live longer, cutting replacement emissions already today.
- Longer productive lives beat 3-NOP on herd emissions.

It's time to challenge industry product-based efficiency metrics and demand a fair comparison.



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