



Walloon Agricultural Research
Centre

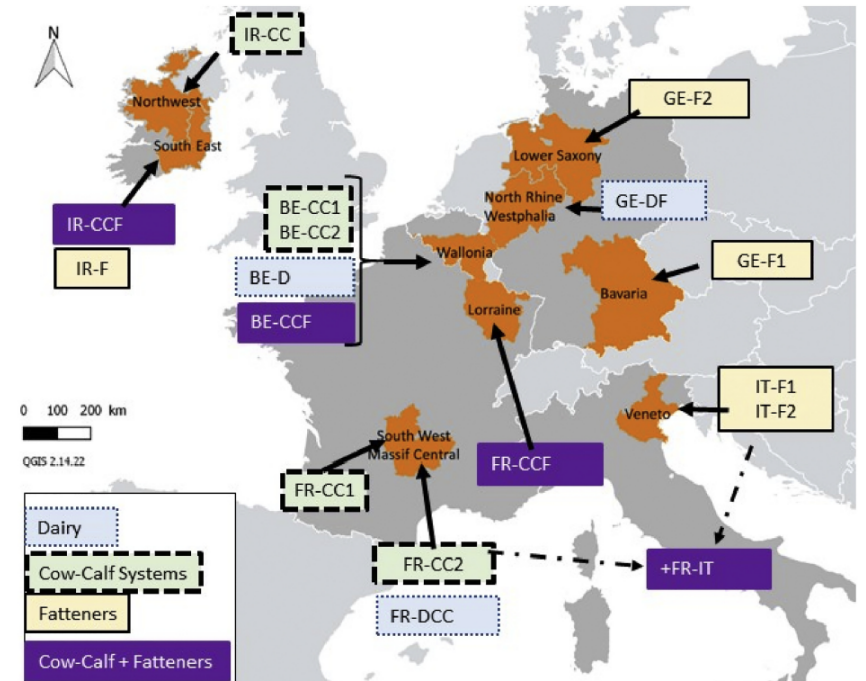
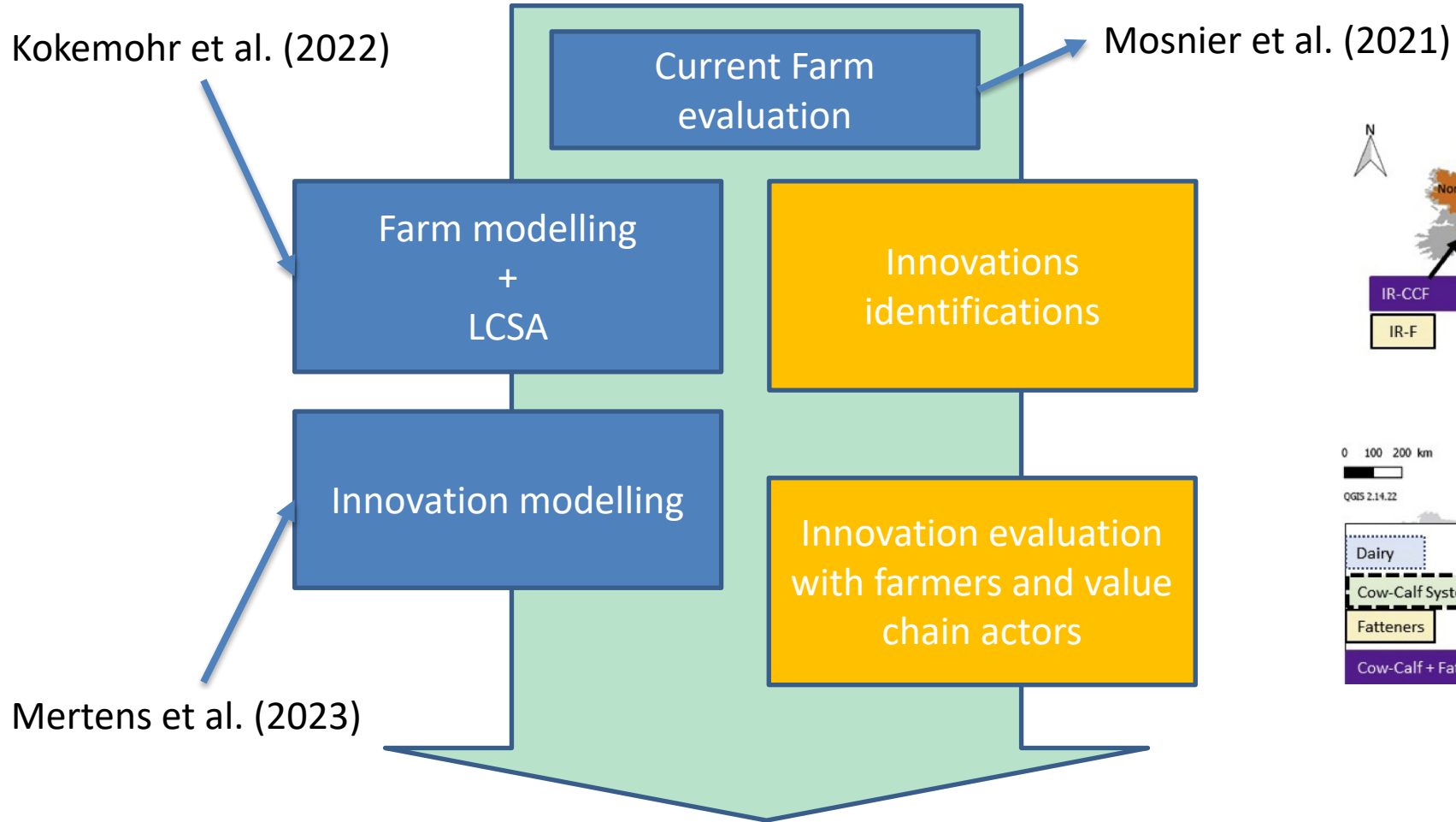


Exploring Crossbreeding to Reduce GHG Emissions and Feed-Food Competition in Beef Production

Mertens, A., Kokemohr, L., Braun, E., Legein, L., Mosnier, C., Pirlo, G., Veysset, P., Hennart, S., Mathot, M., Stilmant, D

EAAP 2023, Lyon

The Sustainbeef project: Co-definition and evaluation of sustainable beef farming systems based on resources non edible by humans



Innovations identifications

- 20 innovations to reduce feed-food competition
 - with stakeholders and actors of the value chain
- Some of them were studied to have farm level evaluation
 - Cross-breeding

	Trader	Transformer (long supply chain)	Transformer (short supply chain)	Feed Manufacturer	Veterinarian	Feed Manufacturer	Transformer (short supply chain)
Grass fattening	Light Green		Dark Green	Light Green	Light Green	Yellow	Yellow
Dynamic rotational grazing	Yellow		Light Green	Light Green	Light Green	Light Green	Yellow
Hay dried in barn	Yellow		Light Green	Yellow	Yellow	Light Green	Yellow
Crossbreeding (continental breed and breed with an early maturity)	Yellow	Yellow	Light Green	Light Green	Dark Green	Light Green	Orange
Spring calving	Yellow		Yellow	Light Green	Light Green	Yellow	Orange
Genomic selection: favouring the milk production of suckler cows	Dark Green		Light Green	Light Green	Dark Green	Light Green	Dark Green
Terminal crossbreeding with beef breed on dairy herd	Light Green	Yellow	Light Green	Yellow	Dark Green	Dark Green	Light Green
Genomic selection for feed efficiency	Dark Green		Light Green	Yellow	Dark Green	Dark Green	Light Green
Precision livestock: infra-red analysis of fodder	Yellow		Light Green	Light Green	Light Green	Dark Green	

Baselines and System Redesign(SR)

Case-studies:

BE : Integrated crop-livestock farm (BB suckling system)

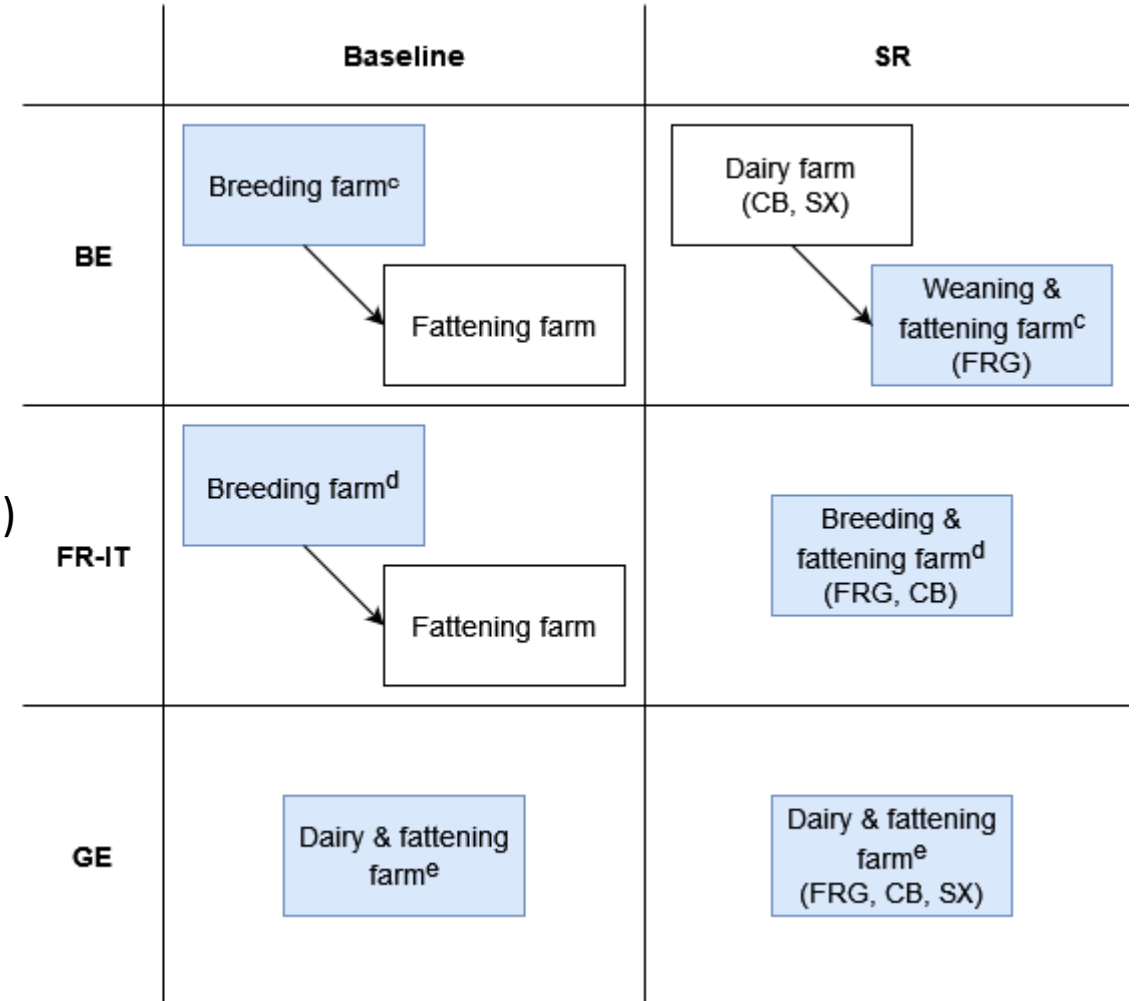
- 155 cows
- 54 ha Arable land, 64 ha Permanent Grasslands
- SR: fattening of dairy cross bred.

FR-IT : Breeding in specialized suckler cow farm (Massif central)

- 79 cows
- 96 ha Permanent Grasslands
- SR: Breeder-fattener Salers x Angus

GE : Integrated crop-dairy with fattening of males

- 130 cows
- 198 ha Arable land, 27 ha Permanent Grasslands
- SR: Fattening of cross-bred (BB)



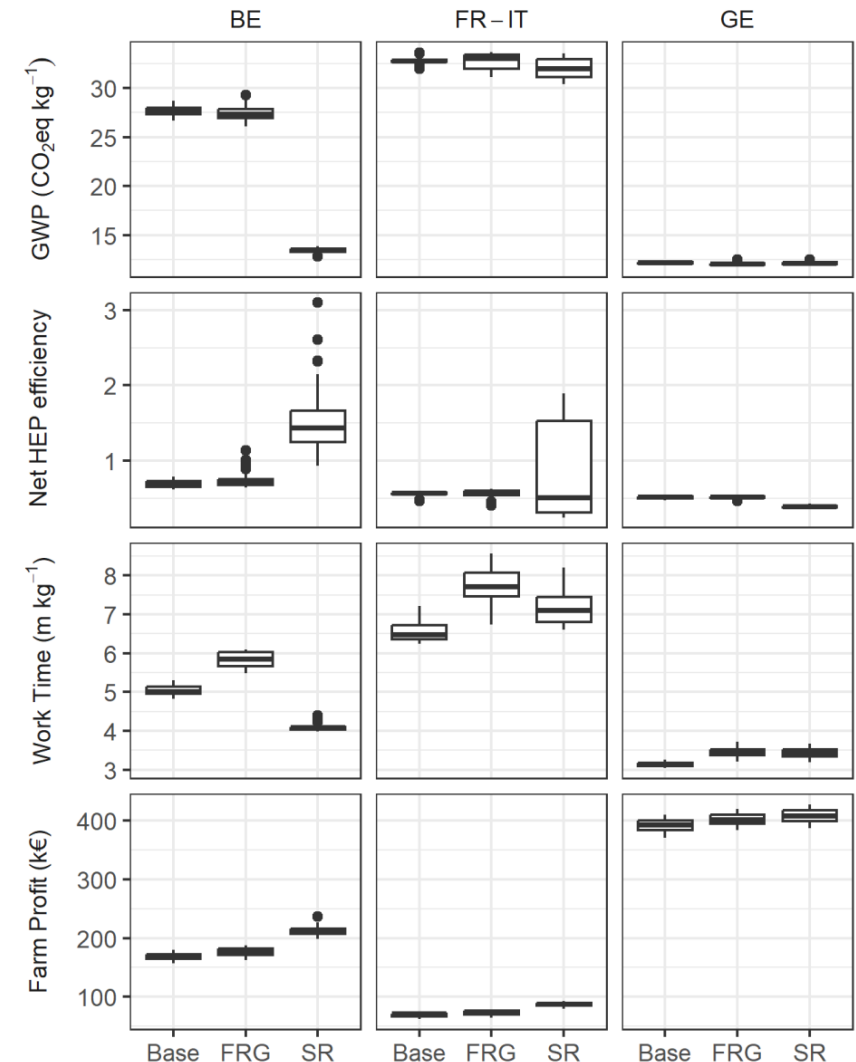
Sustainability indicators

GWP: Strong differences between suckler and dairy-calf to beef systems.

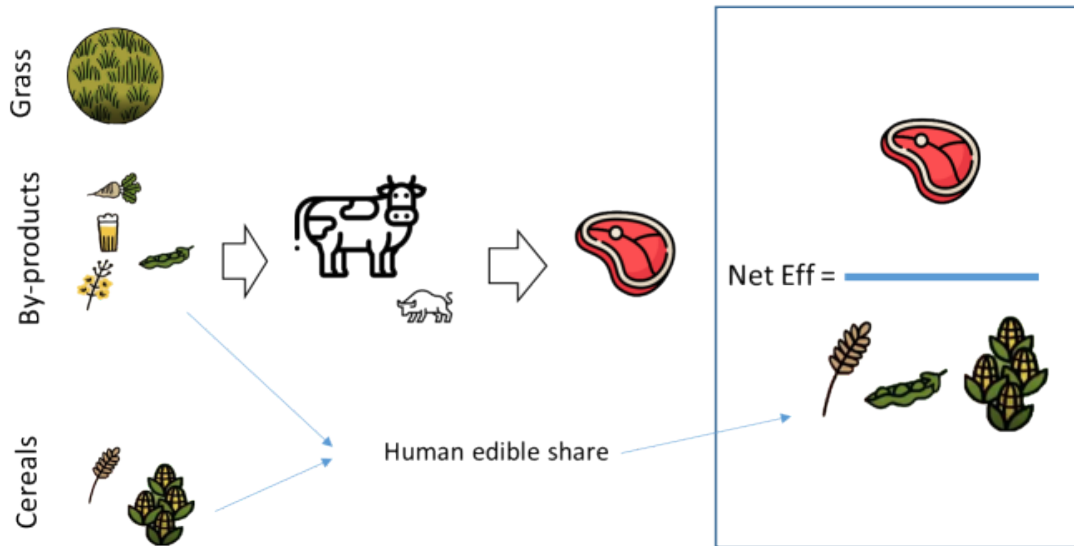
- Dairy cows emissions allocated to milk production (>< mother cow)
- Similar to (Kearney, 2022)

Possibility to also improve the farm profit (BE and FR-IT)

- to be checked experimentally
- Market development?



Effect of the stocking rate on net efficiency

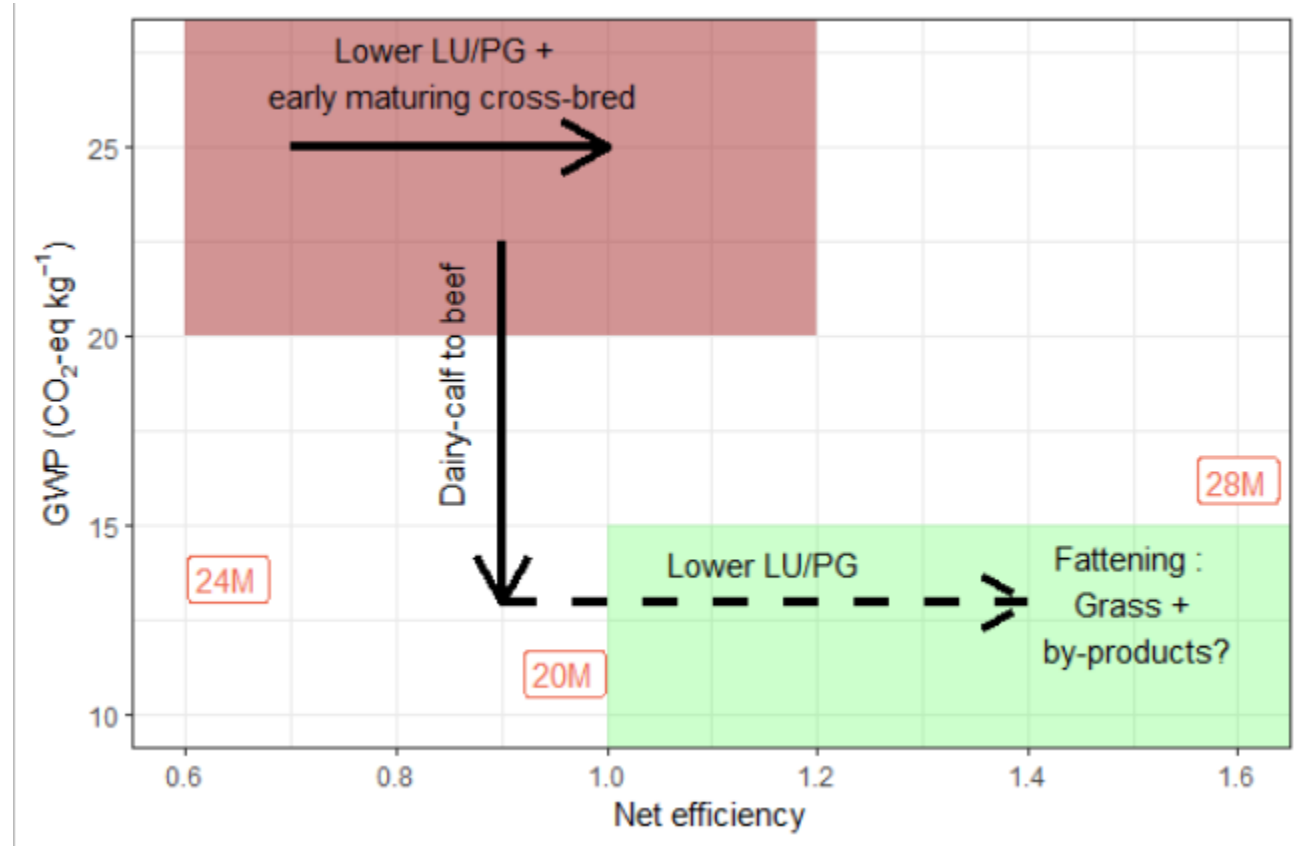


- Net efficiency limited by the feeding during fattening phase
- Net Eff >1 are possible at
 - Low stocking rate (>< lower production)
 - Grass based fattening
 - With early maturing cross-breds (FR)
 - With high by-product available (BE)



Discussion: GWP vs Net Efficiency of beef production

- Trying to reduce the culling age of dairy crossbred (Kearney et al. 2022)
- Possibility to combine low emissions and high net efficiency by optimizing grass and by-product (sugar beet pulp) as in BE. Feasible in practice?
- Bulls vs Steers? By-product availability?



Discussion and conclusion

Other innovations tested (FRG, algae, spring calving)

These results (with their limits) were very helpful during focus groups with farmers and value chain actors.

- Motivated experimental evaluation of dairy calf to beef in Wallonia -> New projects
- Understand or generalize existing experimental project (Salers-Angus)



Thanks



ERA-NET **SUSAN**

This research was made possible by funding from **SusAn**, an ERA-Net co-funded under European Union's Horizon 2020 research and innovation programme (www.era-SusAn.eu), under Grant Agreement n°696231

Avec le soutien de la

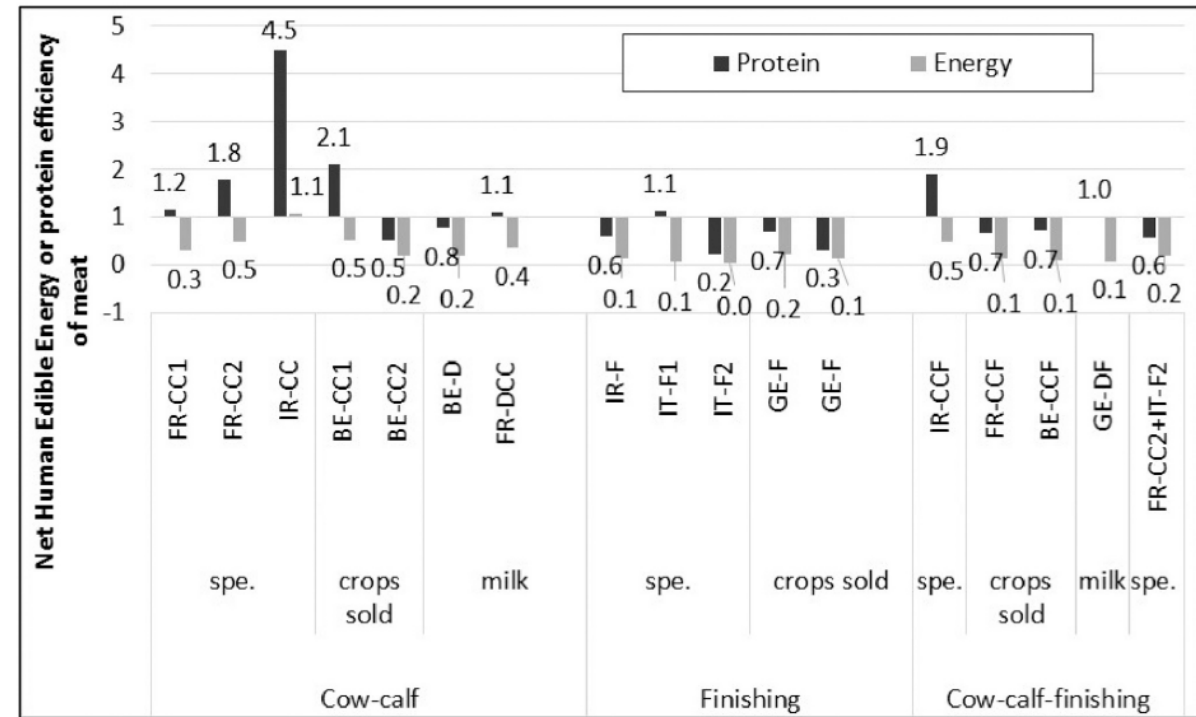
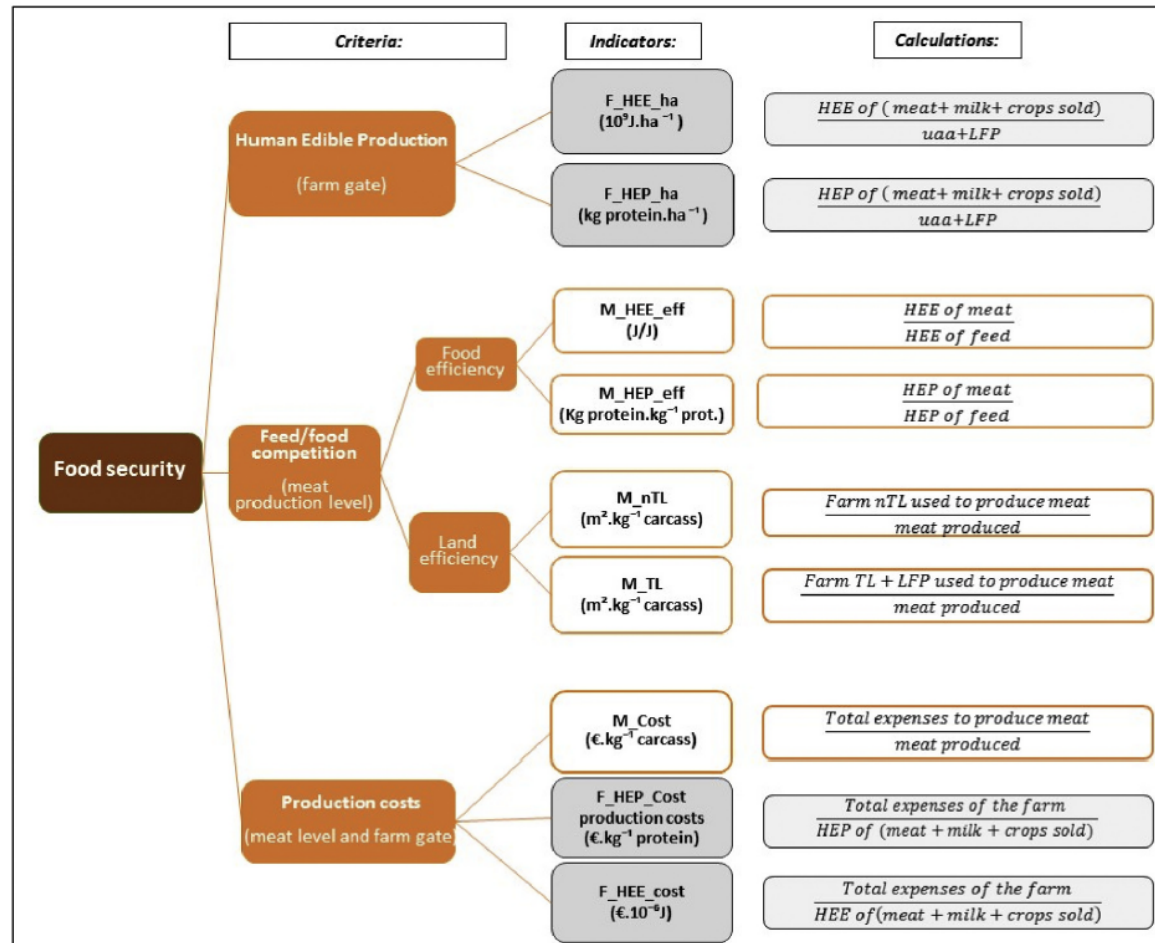


With the support of France
(ANR-16-SUSN-0006-01)

Agence Nationale de la Recherche



Food security: 16 european farm evaluation



Farm-level modelling to test innovation

Inputs:

- Available lands (Tillable, permanent grasslands)
- Possible Crops and Expected yields
- Zootechnical performances (milk prod, lwg, carcass yield)
- Prices, premiums, ...
- Work time, machinery, ..



Outputs: Optimized (€) farm

- 🌀 Herd description
- 🌀 Crop share
- 🌀 Feeding (bought feed, Intra Consumed, ...)
- 🌀 Sustainability evaluation

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New crop, input or practice.
i.e. possibility to use cross-breeding

Impact of the innovation

Modelling and sustainability evaluation

- FarmDyn
 - Bio-economic single-farm optimization model (Bonn University).
 - Modules (Feeding, Herd, Cropping, Manure, Investment, ...)
- Sustainability evaluation (Kokemohr et al. 2022)
 - Env: GHG, FEP, MEP, etc..
 - Social (Working hours, Protein and energy production)
 - € : Farm profit, Contribution margin, variables costs
- Cradle to farm gate
- Possibility to combine two farms

