

Chicken: feed or insects, eggs or meat?

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IFW 2022, Québec, CA

POULTRYNSECT – PROJECT OVERVIEW



Organic Food Side Streams



Live *Hermetia Illucens* larvae



Slow growing local chicken breeds



Organic, high quality chicken meat

POULTRYNSECT – PROJECT OVERVIEW



Project objectives:

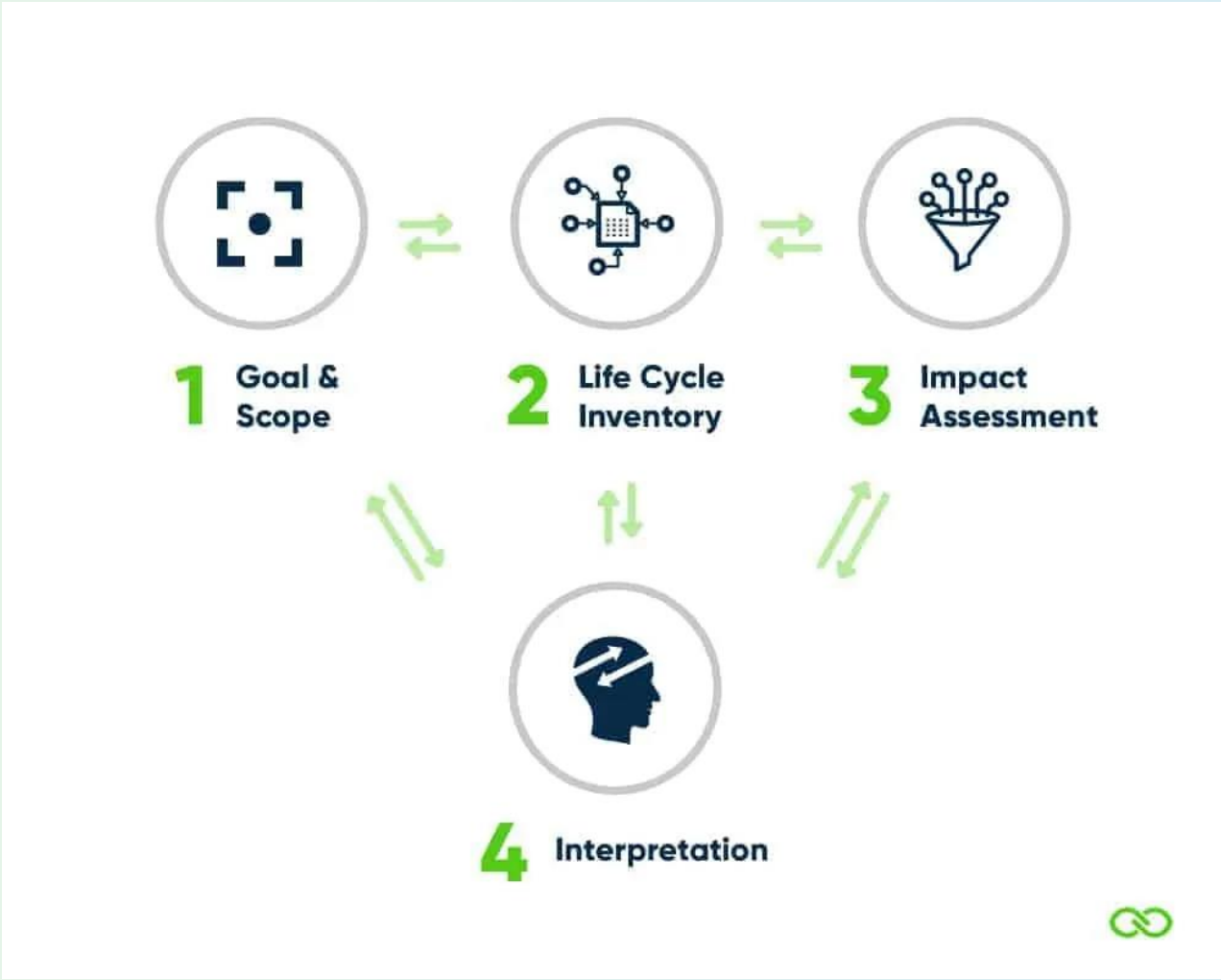
1. Optimization of *Hermetia Illucens* diet
2. Valorization of agronomic potential of the frass
3. Finding out the optimal level of *Hermetia Illucens* larvae in chicken diet
4. Larval influence on the bird welfare status
5. The impact of larvae bioactive compounds on chicken gut
6. Larval influence on poultry meat quality
7. The environmental impact of the chicken meat

SOY OR INSECTS? CHICKEN OR EGGS?



- Protein of animal origin – high environmental costs
- Higher efficiency:
 - 1) less resources used and/or
 - 2) more protein
- Can we use insects to minimize the use of resources?
- How can we get the most protein from chicken production?

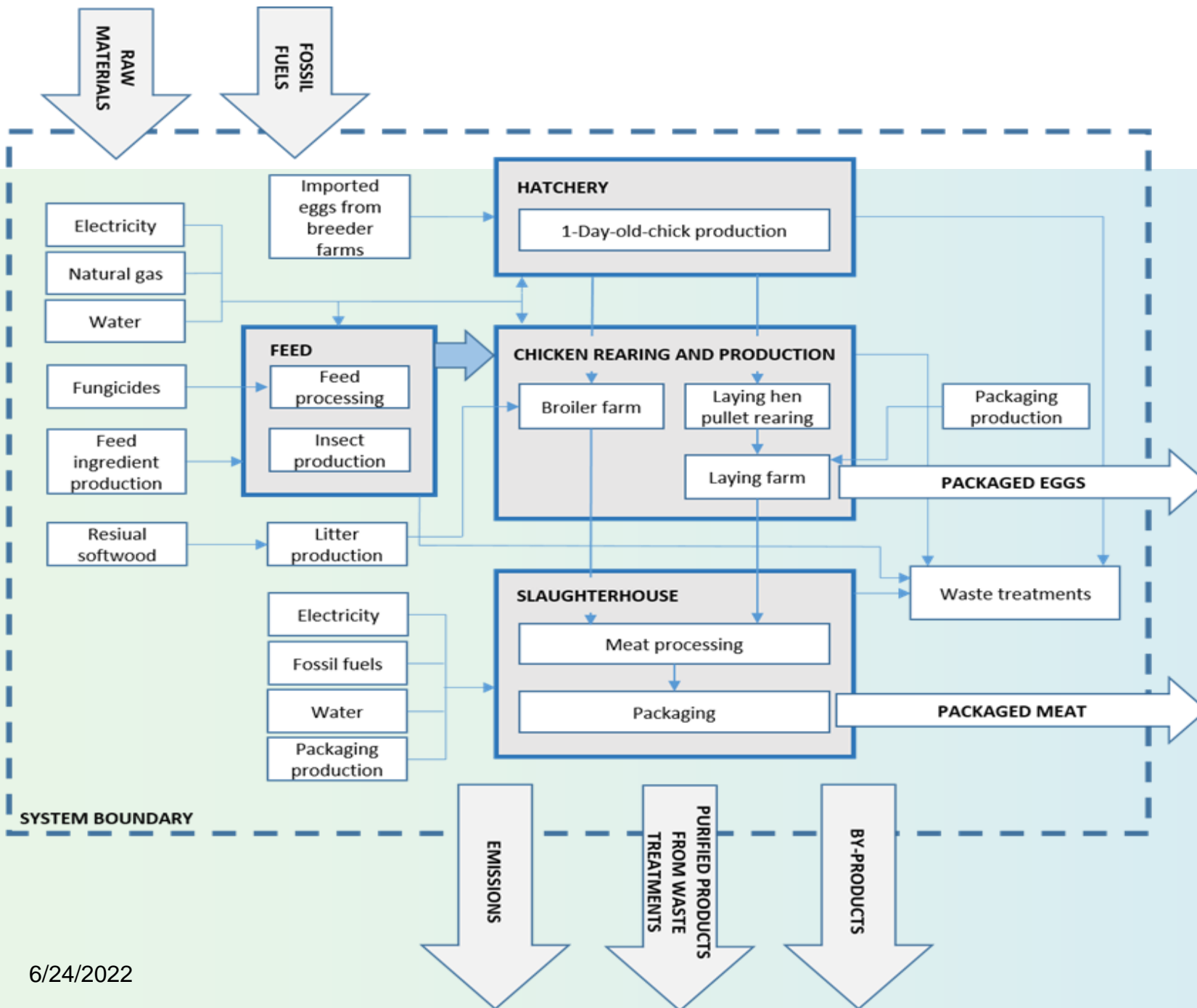
LCA STAGES



GOAL AND SCOPE



- Environmental impact and efficiency of 2 types of chicken protein production
- Estimate the amount of protein produced from feed providing 20t of protein
- Further, it was hypothesized that environmental footprint of protein production can be lowered by inclusion of insects into the commercial feed
- Insects were considered to be fed on 2 different diets



- The data were collected from the literature, mostly:
 1. Dekker et al. (2011) (Netherlands) for laying hen production and
 2. González-García et al. (2014) (Portugal) for broiler production)
- Calculations were done in SimaPro 8.5.2.0 (PRé Consultants, Netherlands)
- Background data were taken from the ecoinvent 3 (ecoinvent, Switzerland) and Agri-footprint (Agri-footprint, Netherlands) database.
- Adapted to the DIN EN ISO 14044:2006

INVENTORY ANALYSIS



- Methodology - IMPACT 2002+
- Two functional units:
 1. Protein conversion ratio, FU1 – amount of chicken protein that can be produced with 20t of feed protein.
 2. Functional unit, FU2 – estimation of production of 1 kg of chicken protein.

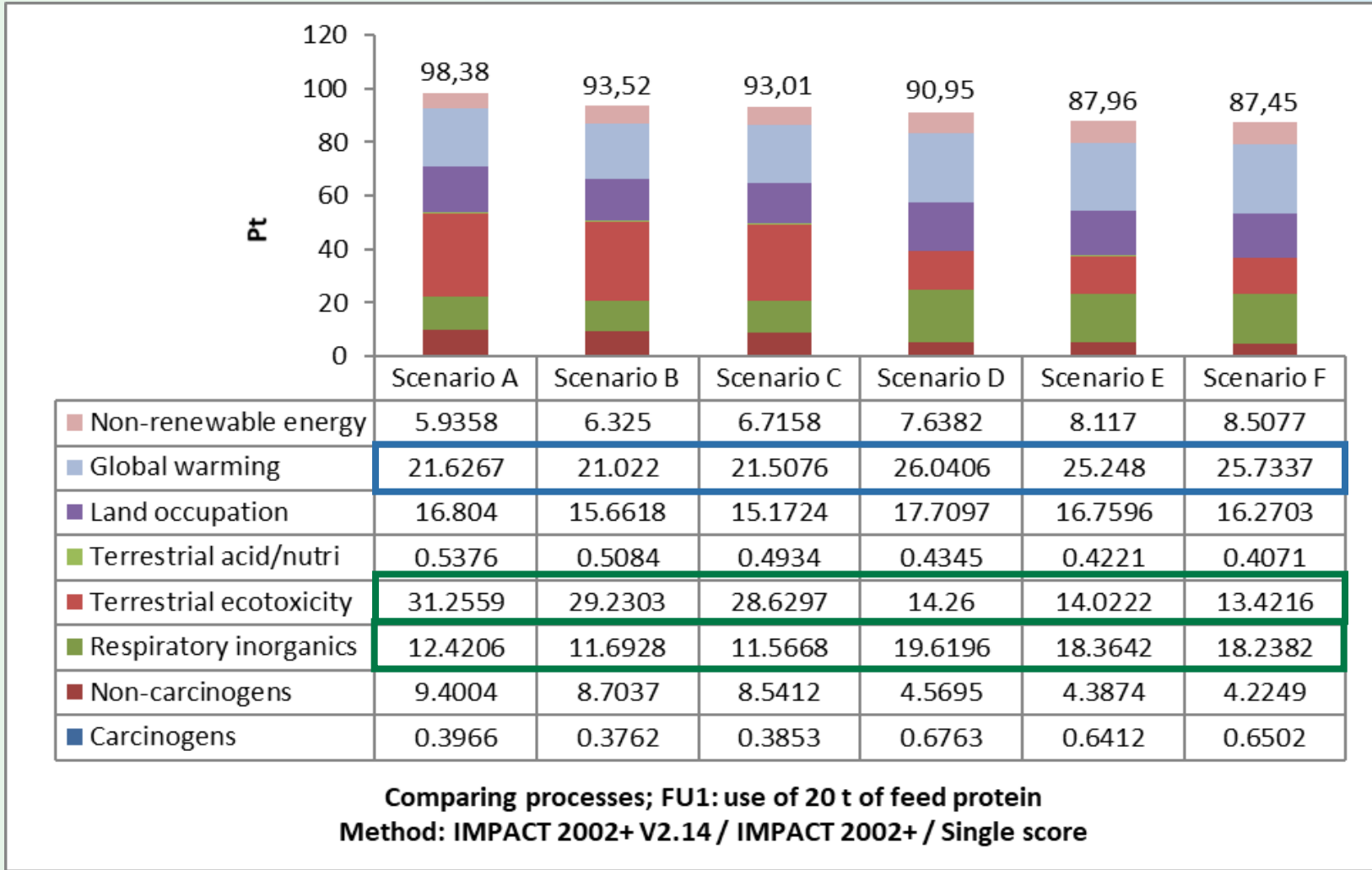
PROTEIN PRODUCED



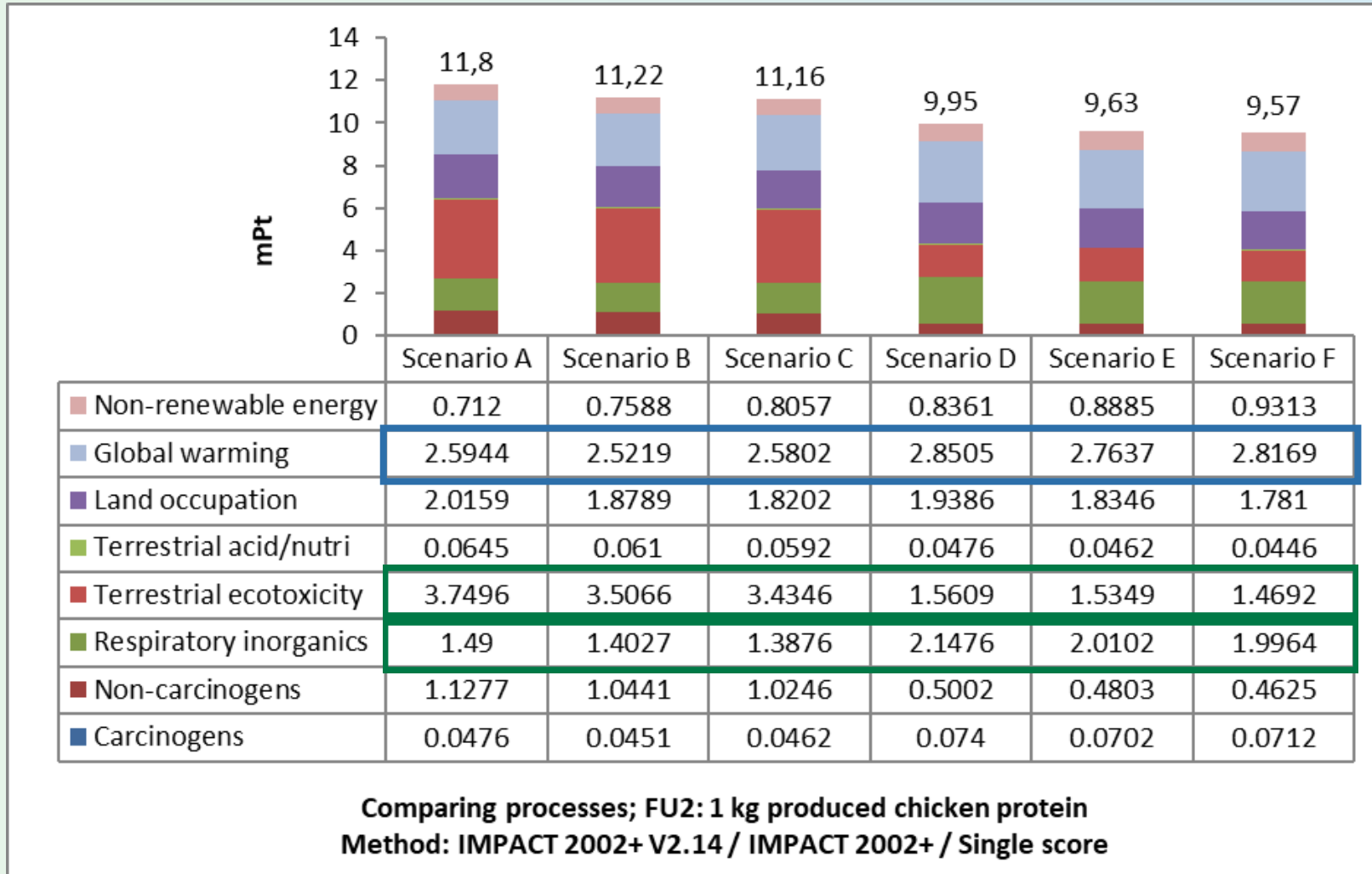
Scenarios		Commercial feed protein (t)	BSFL protein, fed with Gainesville diet (t)	BSFL protein, fed with fruit and vegetable waste (t)	Protein produced (kg)
A	Egg production	20			8,335.75
B	Egg production	18	2		
C	Egg production	18		2	
D	Broiler production	20			9,135.456
E	Broiler production	18	2		
F	Broiler production	18		2	

Protein conversion efficiency: 0.417 for laying hens and 0.446 for broilers.

LCA RESULTS



LCA RESULTS



CONCLUSIONS



- Broiler production has slightly higher protein efficiency than egg production
- Laying hen production achieved higher single score results than broiler production
- The production of feed has by far the largest share of the environmental impact of the entire production
- Decrease of environmental impact due to introduction of larvae:

Decrease in environmental impact achieved by introduction of HI larvae into the diet of:	Larvae fed on Gainesville diet	Larvae fed on fruit and vegetable waste
Laying hens	5%	5.50%
Broilers	3.30%	3.80%

ACKNOWLEDGEMENTS



The authors acknowledge the financial support for this project provided by transnational funding bodies, being partners of the H2020 ERA-net project, CORE Organic Cofund, and the SUSFOOD2 cofund from the European Commission.

Special thanks goes to Wiebke Heines for her valuable contribution to this research.

The project is supported by funds of the Federal Ministry of Food and Agriculture (BMEL) based on a decision of the parliament of the Federal Republic of Germany via the Federal Office for Agriculture and Food (BLE) under the Federal Programme for Ecological Farming and Other Forms of Sustainable Agriculture



Gefördert durch:



BÖLN

Bundesprogramm Ökologischer Landbau
und andere Formen nachhaltiger
Landwirtschaft

aufgrund eines Beschlusses
des Deutschen Bundestages



These projects have received funding from the European Union's Horizon 2020 research and Innovation programme under grant agreement No. 727473 and No. 727495, respectively.

**Thank you for your
attention!**

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