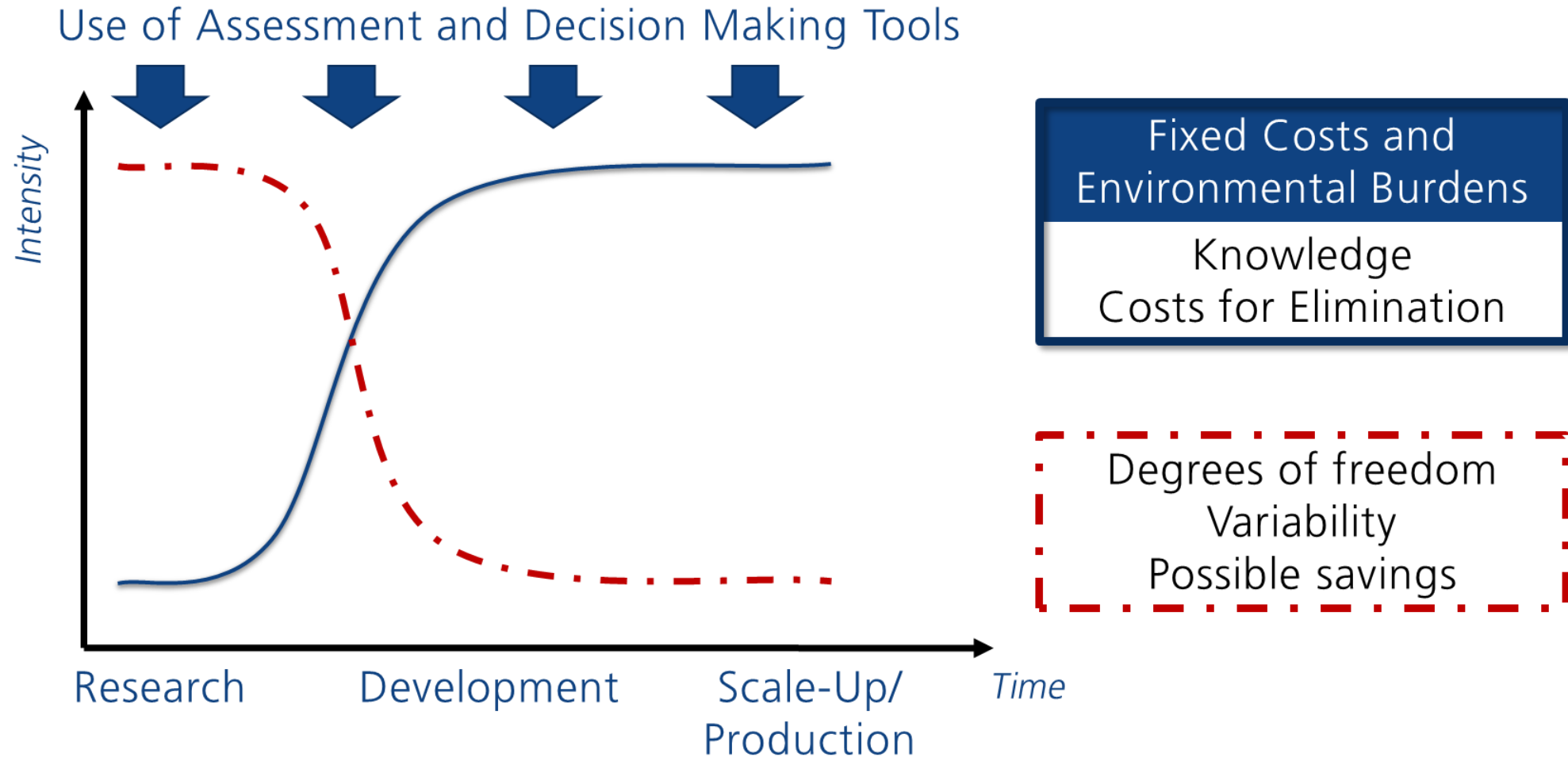


# LCA as Decision Support Tool in the Food and Feed Sector: R&D Case Studies

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H.O. Gutzeit, J. Liebscher, J. Dautz, Th. Monin, H. De Steur, X. Gellynck, E. Zannini



# R&D ACCOMPANYING ECOLOGICAL ASSESSMENT





Bundesministerium  
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und Forschung

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**WACHSTUM**  
Die Hightech-Strategie für Deutschland

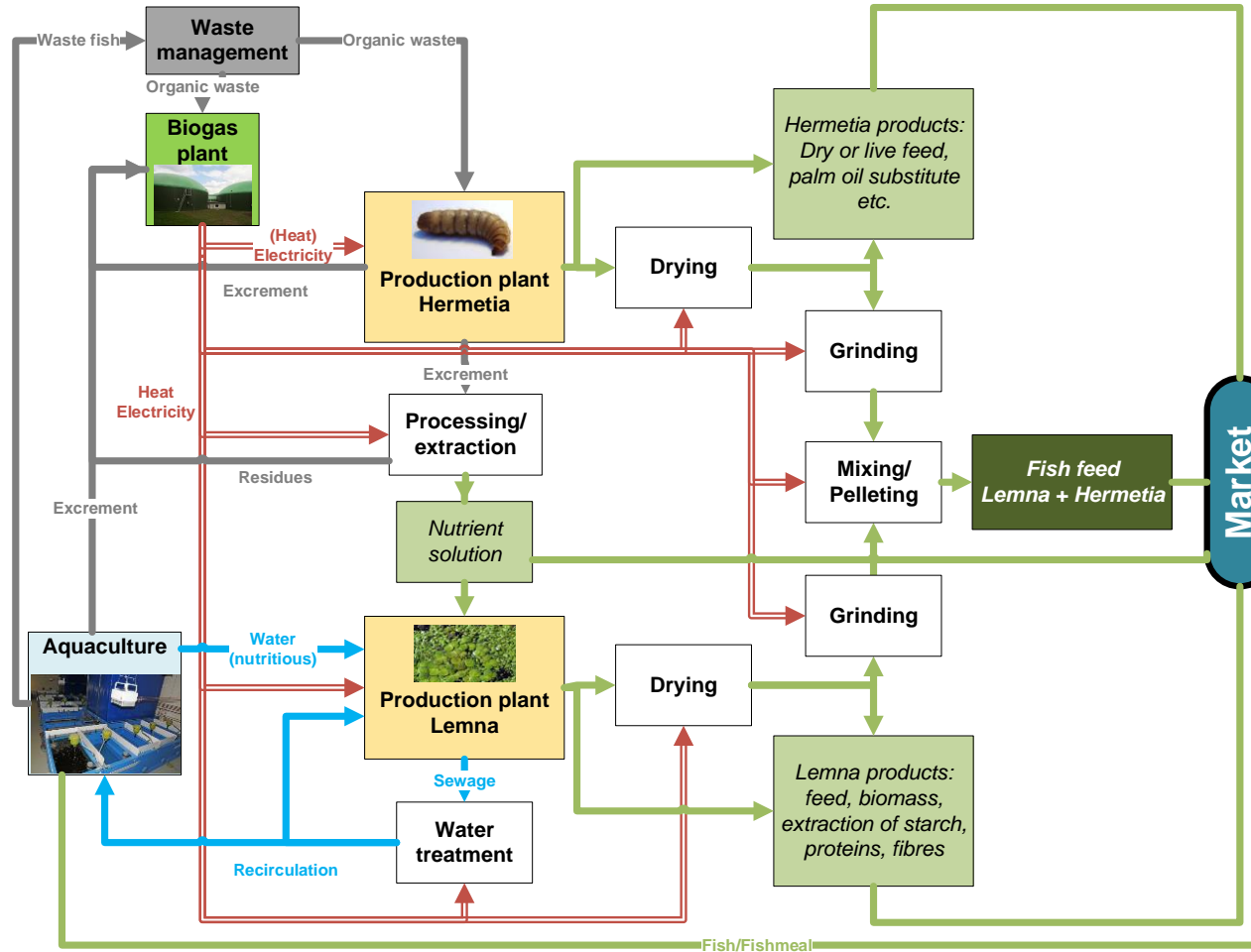
The project has received funding by the German Federal Ministry of Education and Research "KMU-innovativ" funding initiative, funding code 033RK048E.

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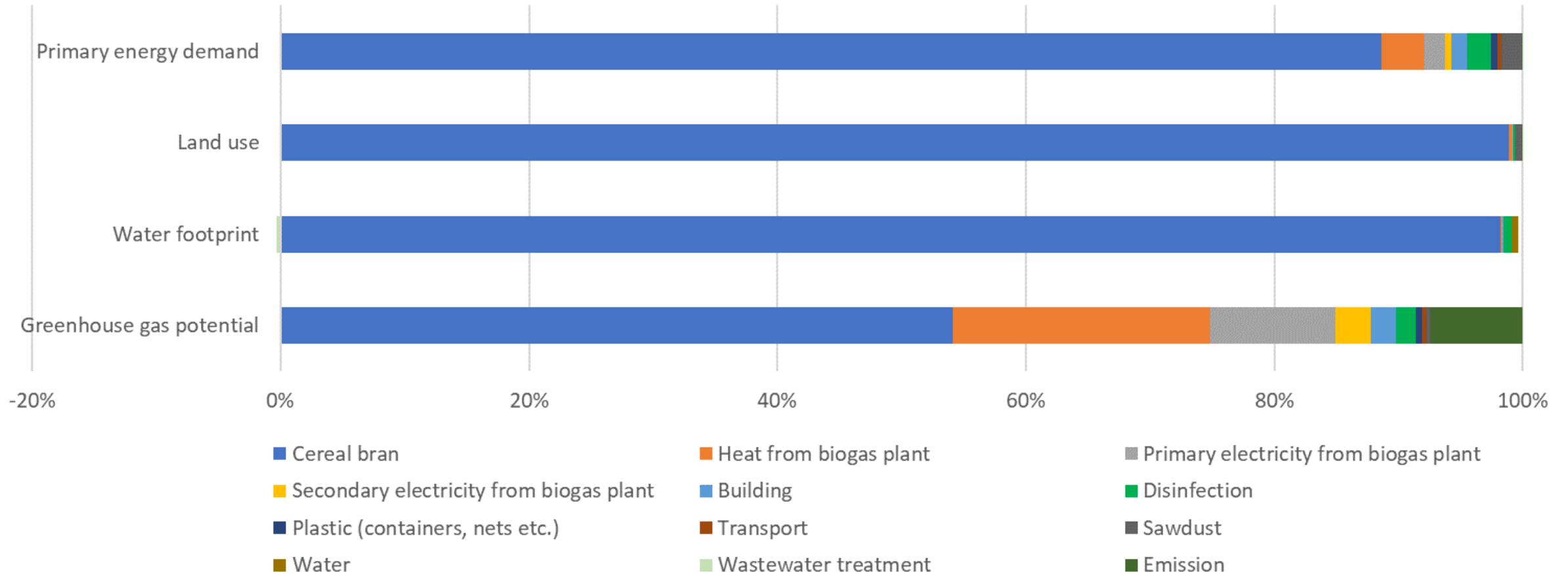
# CASE STUDY I: LEMNA & HERMETIA

## Fish Feed from Insects and Duckweed

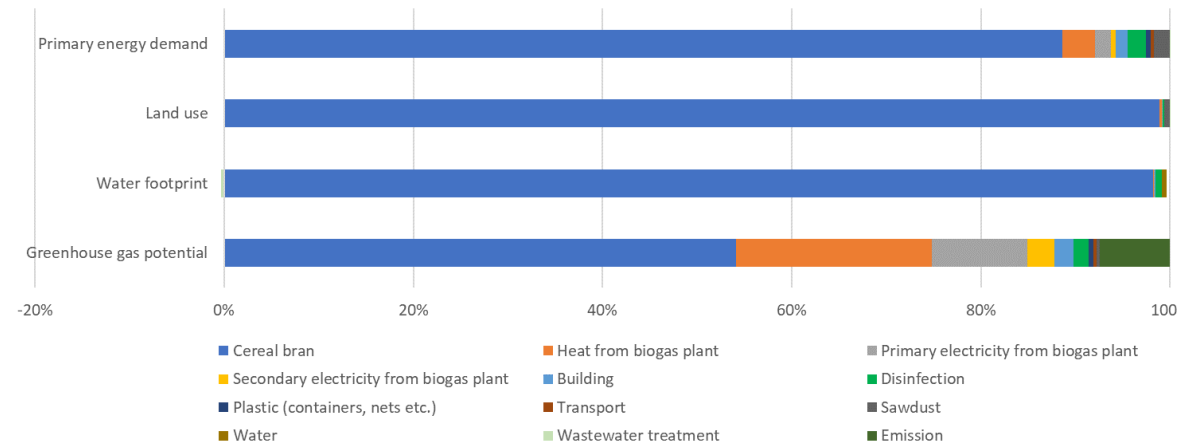
# CONCEPT OF LEMNA & HERMETIA



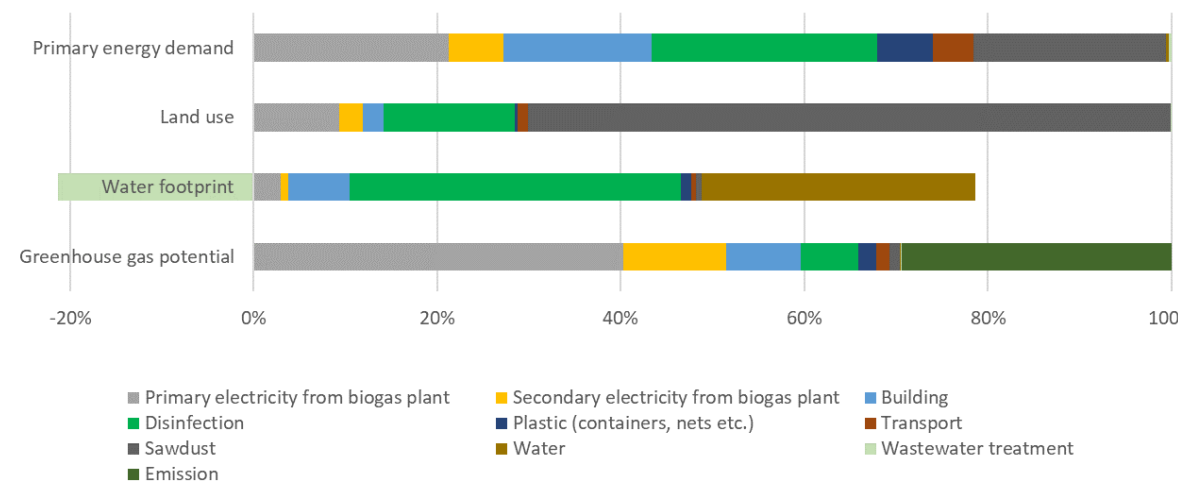
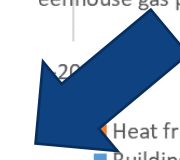
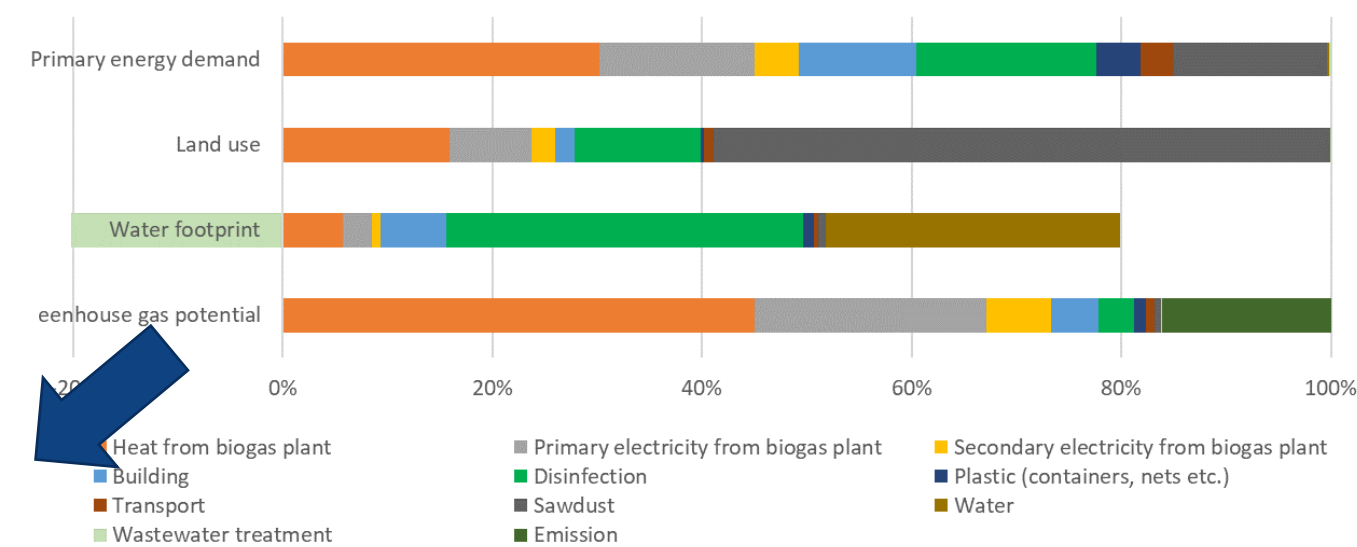
# ENVIRONMENTAL ASSESSMENT OF INSECT FARMING



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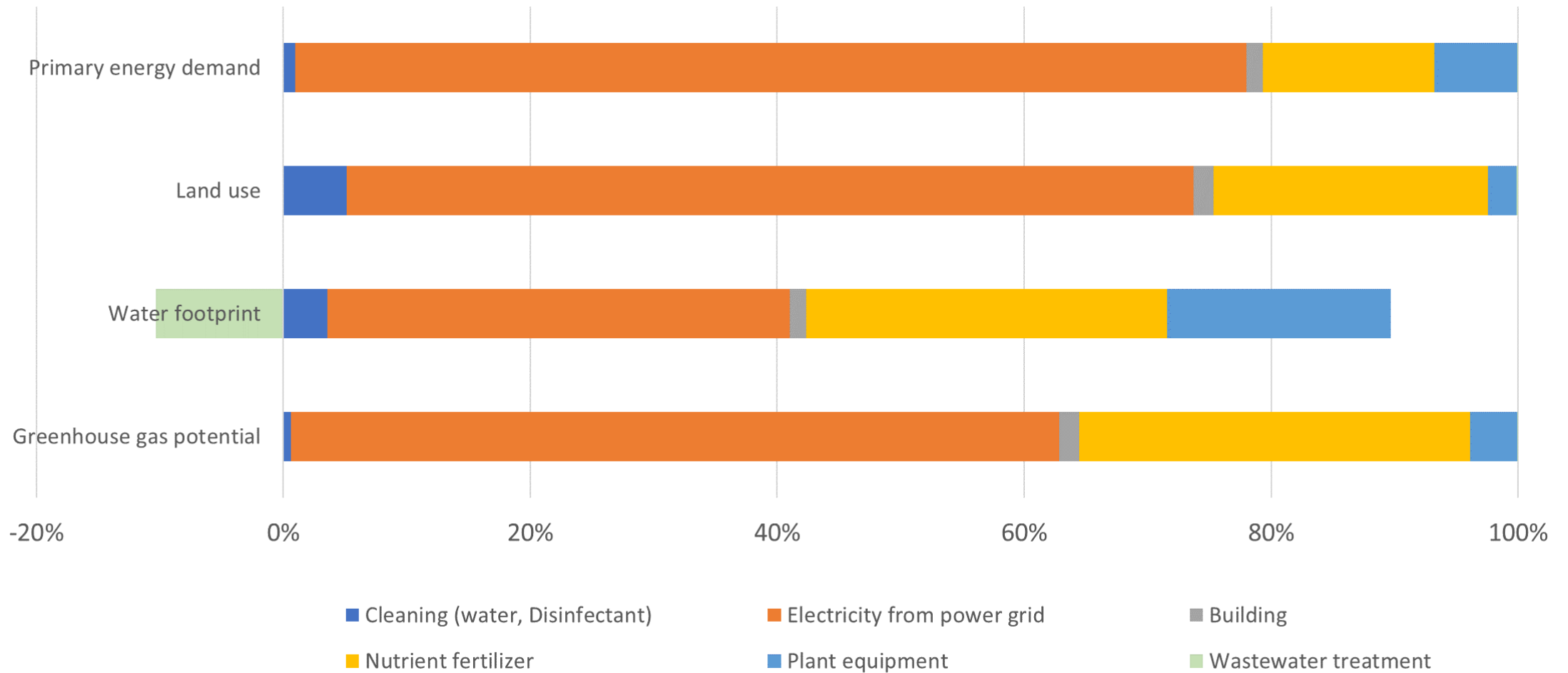


1. Organic waste (approved as feed) instead of cereal bran:  
Reduction by > 50%

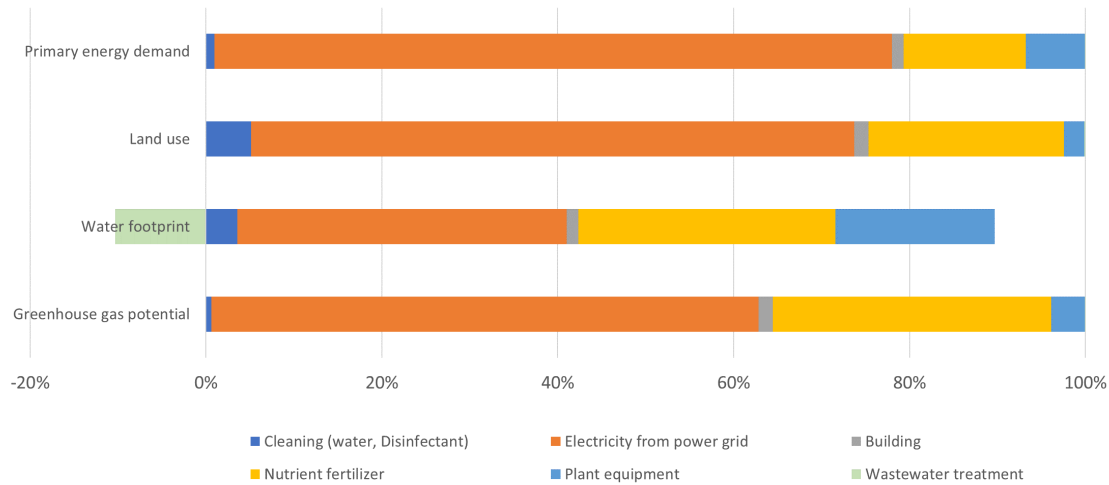


2. Excess heat considered as „waste“:  
Overall reduction up to 70 %

# ENVIRONMENTAL ASSESSMENT OF DUCKWEED BREEDING



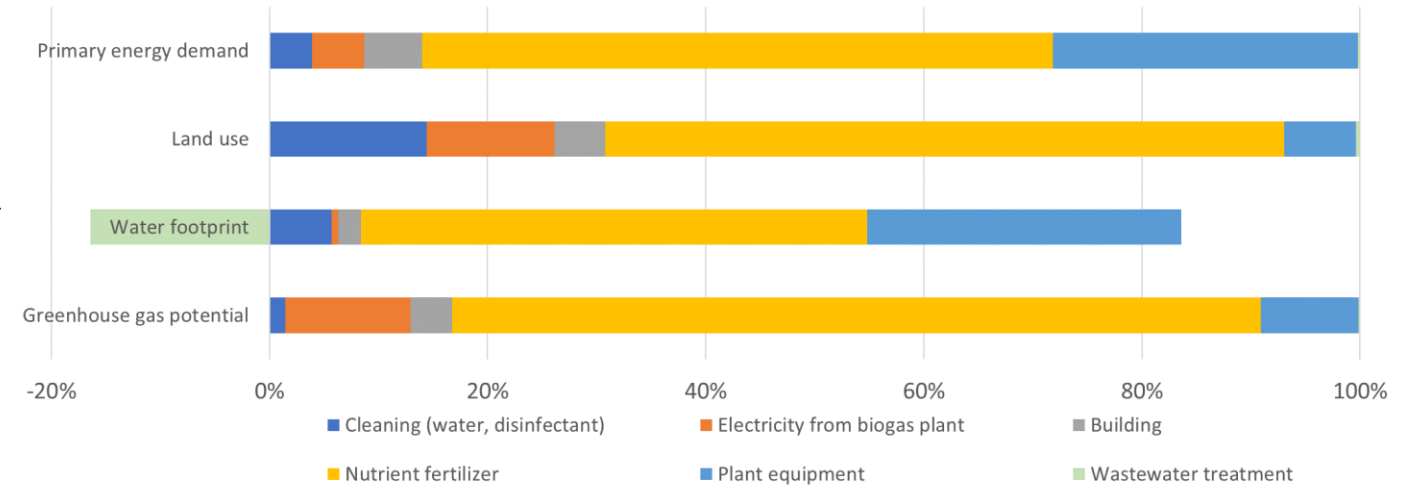
# ENVIRONMENTAL ASSESSMENT OF DUCKWEED BREEDING



Electricity from biogas plant:  
Reduction by a factor of 2

Further optimization by:

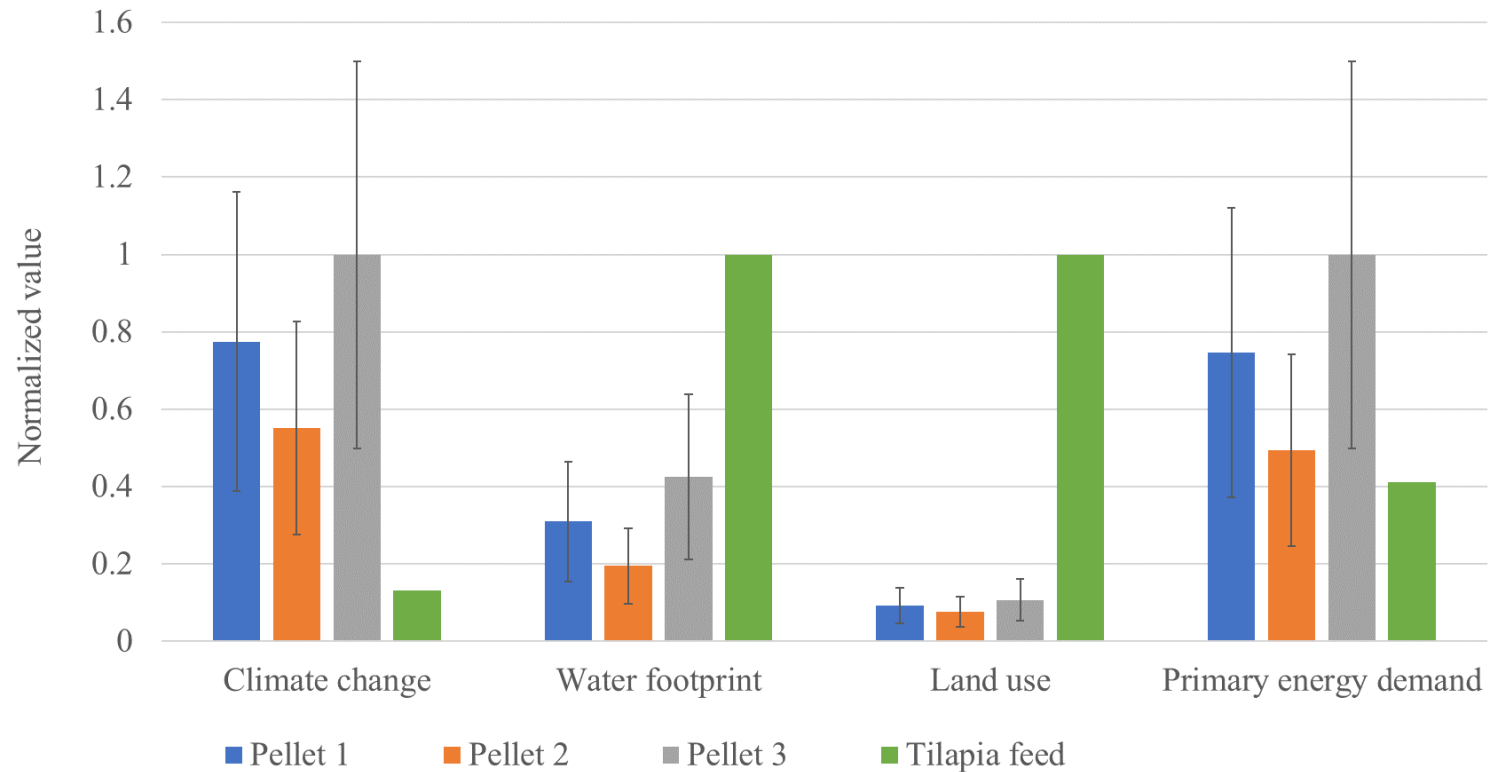
- Use of insect faeces instead of artificial fertilizer
- Recirculation of nutrient-rich water
- Adaption of harvesting procedure





# HOLISTIC ENVIRONMENTAL COMPARISON

Scenario	Lemna (wt-%)	Hermetia (wt-%)	Characteristics
Pellet 1	50	50	Protein:fat 1:1
Pellet 2	30	70	High fat content
Pellet 3	70	30	High protein content
Control (Tilapia feed)			Protein:fat 2:1



## CASE STUDY II: SMART PROTEIN

From Farm to Fork: The next generation of smart protein food

One of the most **innovative** plant-based projects

A collaboration of **33 partners** from more than **20 countries**



**4 years** duration  
(2020- 2024)

A **EU-funded research project** (Horizon 2020) with a €9+ million budget

# PLANT-BASED PRODUCTS TO BE PRODUCED



A **circular economy** will  
be created by upcycling  
side streams



Chickpeas, lentils, quinoa,  
fava beans

**Novel protein**  
products from  
plants

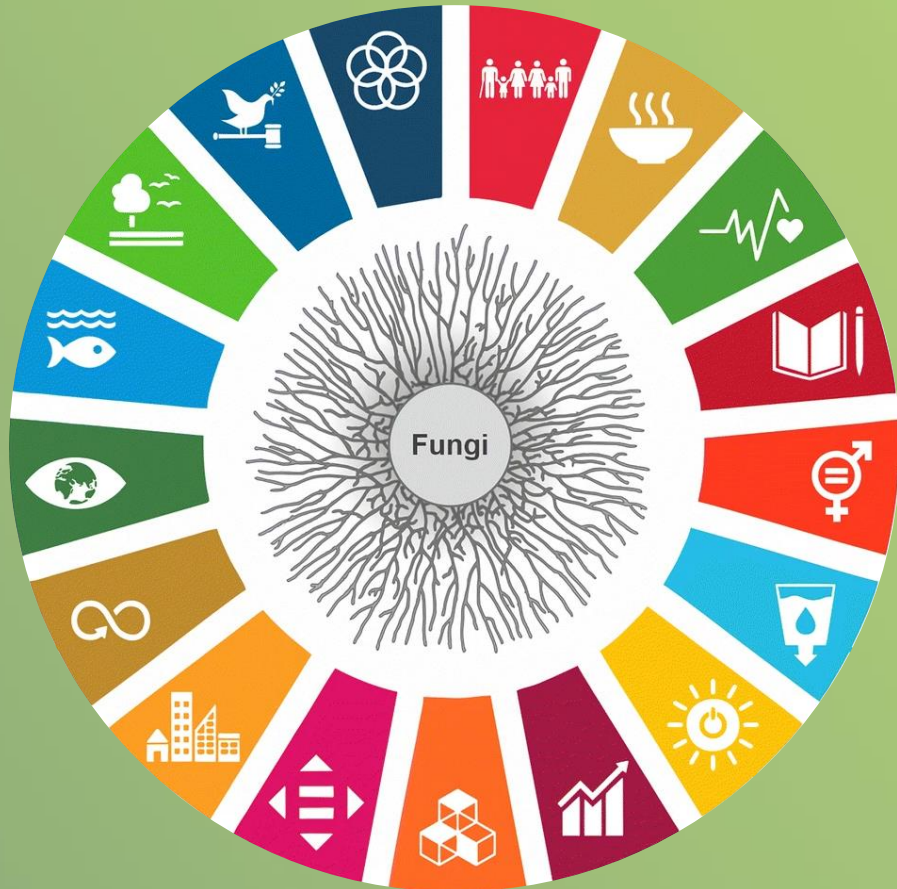


Yeast and fungi

**New**  
**ingredients**



# FUNGAL BIOMASS: MYCOPROTEIN PRODUCTION FROM SIDE STREAMS



Per kg mycoprotein	CMP	Promyc	Soy	Pulses
Land use change (m <sup>2</sup> a)	0.002	0.69	3.8	5.5
Water use (l)	130	377	2500	6000
Climate change (kg CO <sub>2</sub> eq.)	0.84	1.14	1.49	0.68

Circular mycoprotein production (CMP): Mycoprotein production using side streams as a substrate.  
 Promyc: Mycoprotein production using new resources for substrate.



# THANK YOU FOR YOU KIND ATTENTION

Questions? Get in touch with us!

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