



**Waste to Protein  
on the World's  
Smallest Footprint**

**How to Produce, Apply and Utilize  
Insect Products Now and in the Future**

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***Livin Farms***

***2023***











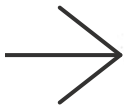
































**1957**

905 g



**1978**

1,808 g



**2005**

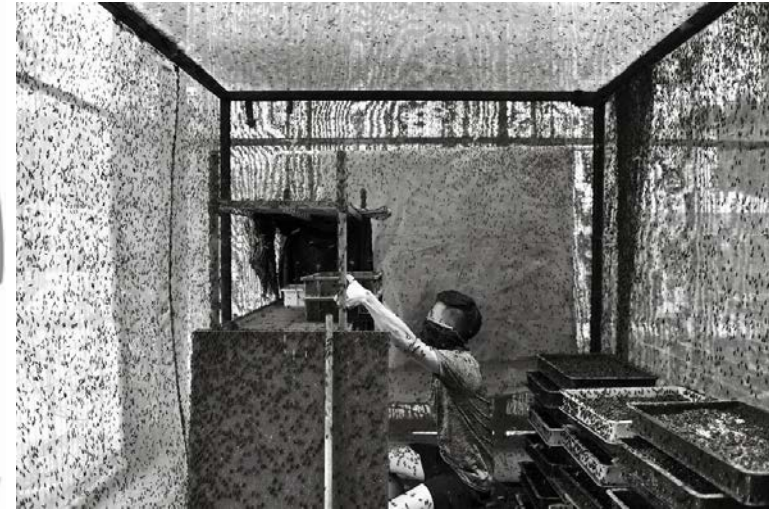
4,202 g



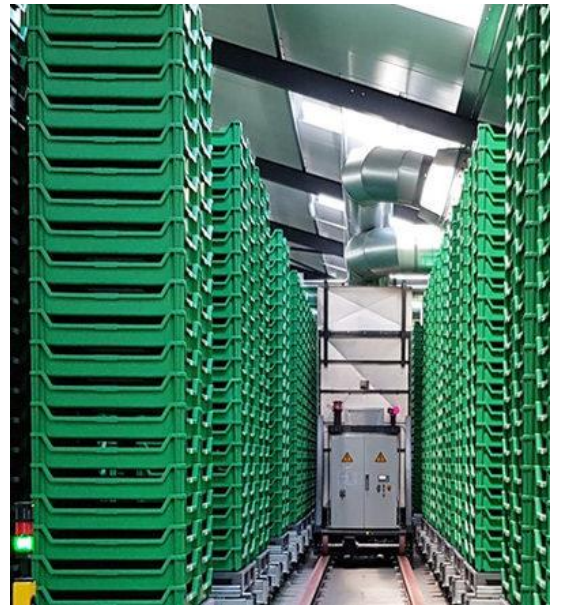


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# KEY PARAMETERS OF BSF REARING

- Differentiate Pre-Rearing (0 to 1-DOL) + Rearing (5 to 12-DOL)
- Grow-out Period varies depending on environmental parameters, feed and density
- Constant Ambient Environment; Temperature = 27°C, Humidity = 60%, Ventilation
- Fermentation, Microorganisms benefit positively
- Density of larvae suitable for Pre-Rearing and Rearing Phase
  
- Feed Substrate:
  - Nutritional Component (Carbohydrate- Protein Ratio)
  - Micronutrients
  - Texture (“Fluffiness”)
- Temperature of Feed





# BIO FEASIBILITY FOR SUITABILITY OF FEED



















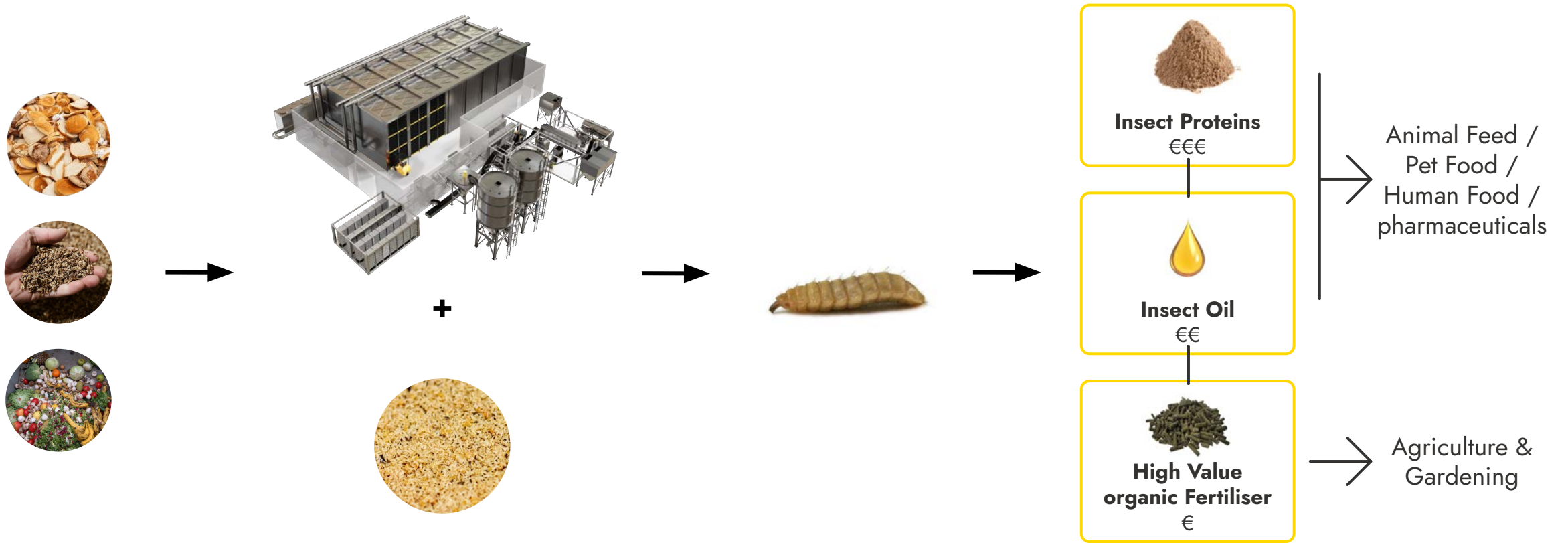
## KEY PARAMETERS OF BSF BREEDING

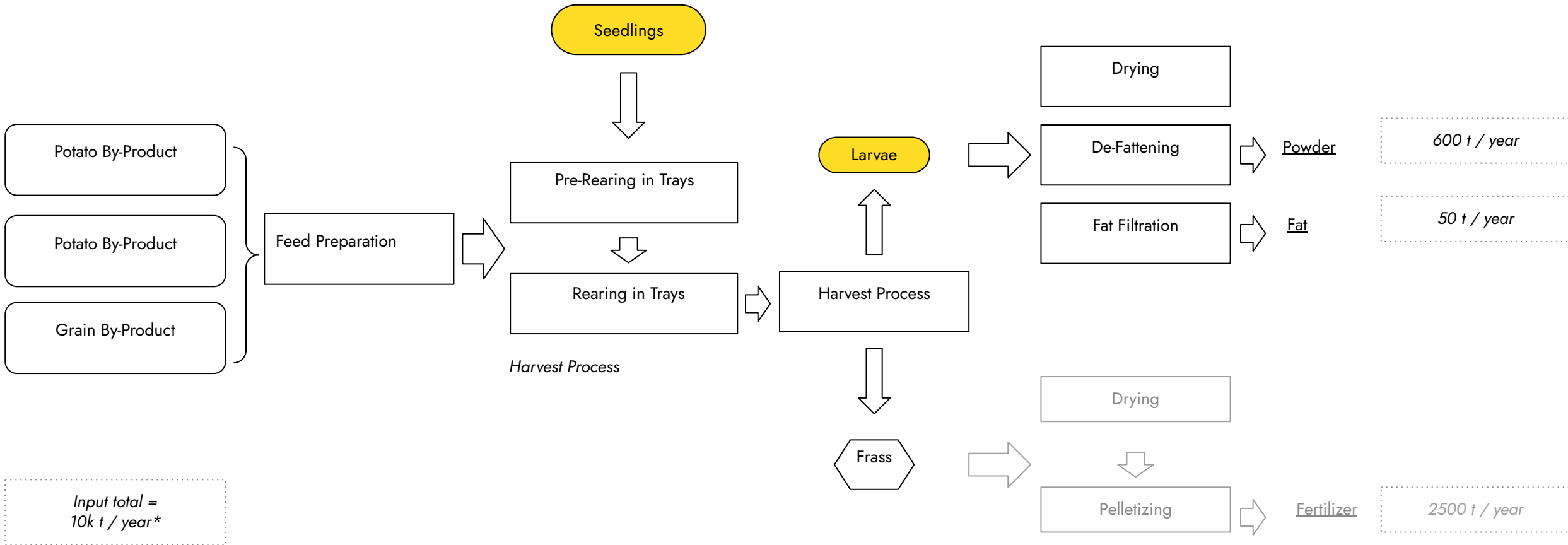
- Fly Mating is critical: light spectrum!
- Constant Ambient Environment; Temperature and humidity range might vary based on breeding strategy used
- Flies lay eggs into “attractive” protected areas: need moisture, shade, geometry that attracts oviposition
- “Dark Rooms” are often used for preparing flies to hatch





# HOW DOES A REARING FACTORY WORK?











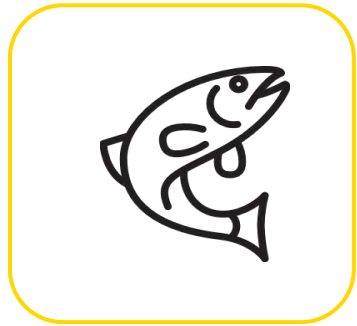


**ROI 2-5 years**



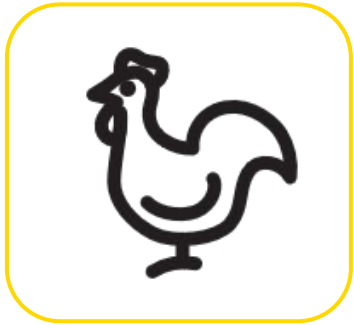
**25 % of production  
cost saved per ton of  
protein**

## APPLICATION IN FISH FEED



- can replace up to **85%** of the conventional fish feeds.
- shows health benefits and have prebiotic impact on the gut microbiome.\*

## APPLICATION IN POULTRY FEED



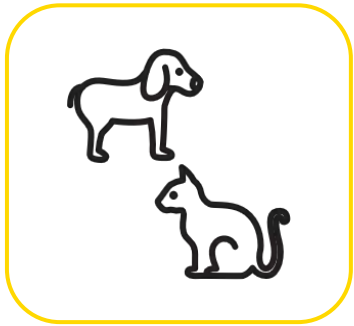
- **results in broiler feed**
- **alternative to soybean and palm kernel oil**
- **improved feed conversion ratio**
- **better growth**
- **reduced mortality**
- **can replace up to 20% of the conventional chicken feeds.**
- **are not affecting egg and the eggshell quality by replacing the fish meal fraction of the feeds.\*\***

## APPLICATION IN POULTRY FEED



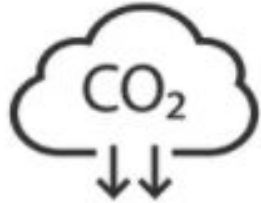
- can replace up to 10% of the conventional pig feeds.
- have shown to improve meat quality.
- insect lipids showed increased feed intake of piglets
- high amount of lauric acid beneficial for piglets
- can be used as an alternative against postweaning diarrhea.\*\*\*

## APPLICATION IN PET FOOD

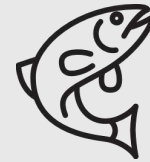


- can replace up to **20%** of the conventional pet foods.
- have good digestibility and good stool quality.
- may be an effective hypoallergenic protein source.
- have shown anti-inflammatory and anti-oxidative properties.\*\*\*\*

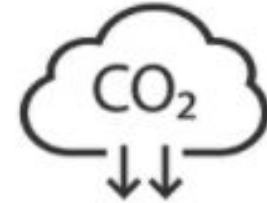
# FEEDING THE WORLD WHILE SAVING THE PLANET



**92% of emissions saved per ton of protein as compared to soy**

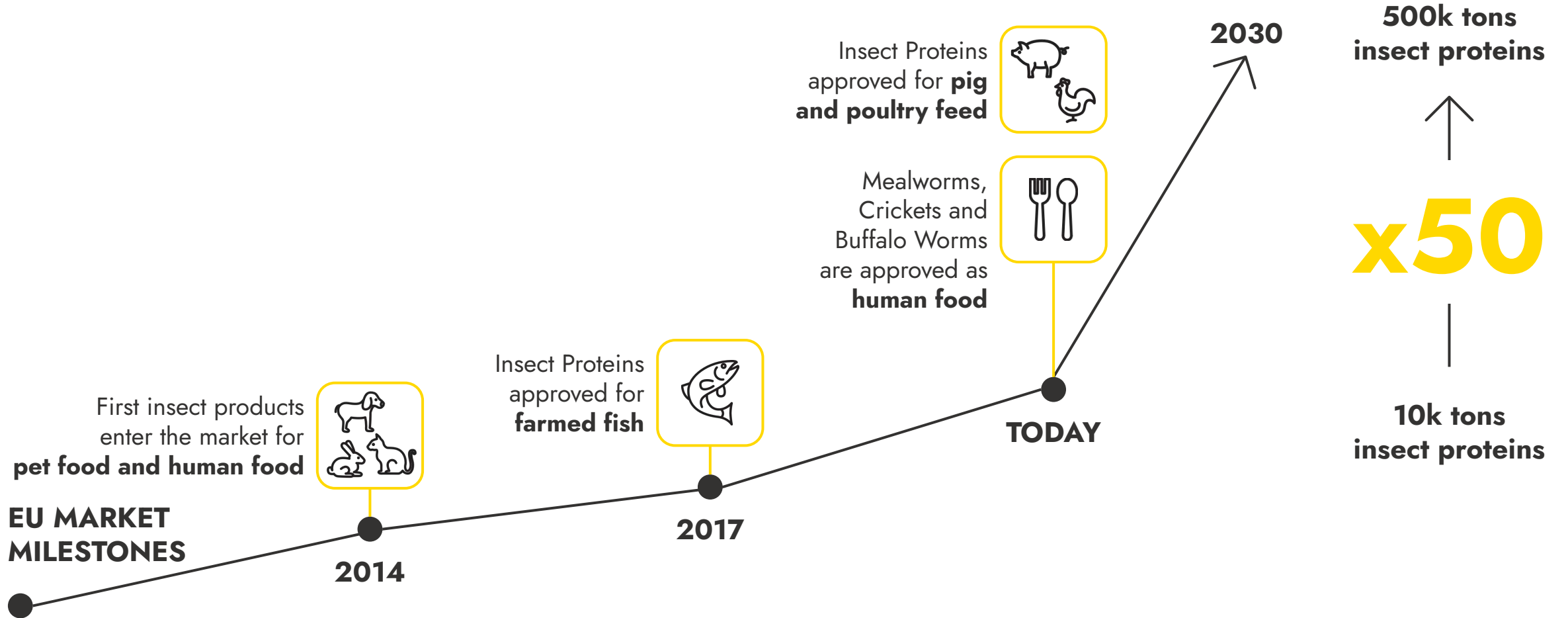


**5 tons of fish in the ocean saved for every ton of insect protein produced**



**70% of emissions saved as compared to composting**

# REGULATION - EU



Source: Rabobank Projections, 2021: <https://www.agrarzeitung.de/nachrichten/wirtschaft/insektenproteinfutter-rabobank-erwartet-hohe-nachfrage-95621?crefresh=1>



# REGULATION FOR FEEDSTOCK



**EU**

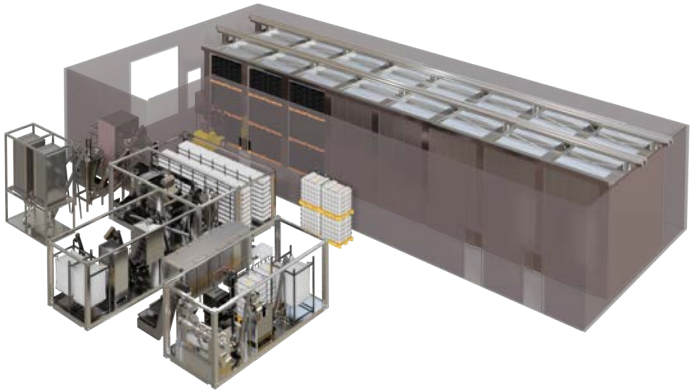


**NON- EU**





# FUTURE OUTLOOK: SEGMENTATION OF MARKET



**Engineering Companies**

**Seedling Companies**

**Insect Producers**



**Simplified Protein production chain**



# FUTURE OUTLOOK: DECENTRALIZATION



# FUTURE OUTLOOK: DEVELOPMENT OF PREMIUM PRODUCTS AND APPLICATIONS





## FUTURE OUTLOOK: HUMAN FOOD



# FUTURE OUTLOOK: ANIMAL WELFARE FOR INSECTS





YOUR IMPACT

**LET'S SECURE THE FUTURE OF FOOD TOGETHER**



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