

# Scaling Insect-based Solutions to Feed a Global Population: Recent Breakthroughs in Health and Environmental Benefits

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# General Facts about *icipe*

- Center of Excellence - research & capacity building in **insect science & its application**
- Intergovernmental organization - Charter signed by 13 countries
- > 571 staff (>30 nationalities)
- 150-180 graduate students annually
- Organisation with a unique history > 50 years



T.R. Odhiambo



H.R. Herren



C. Borgemeister



S. Kelemu



A. Tenkouano

# The Global Food Challenge

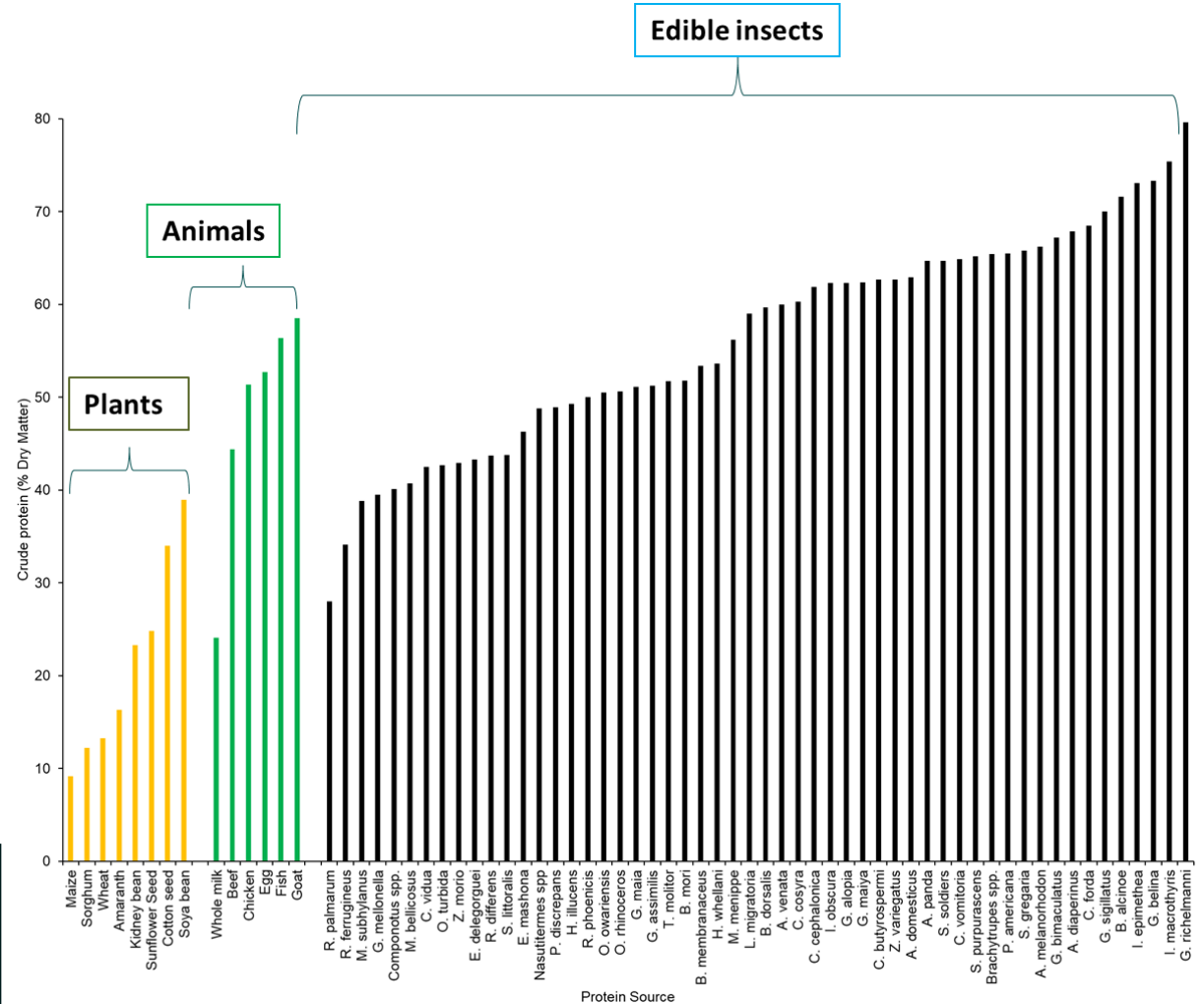
- Global population projected to reach ~10 billion by 2050
- Rising input costs and risks to agricultural production
- Pressure on land, water, and ecosystems
- Climate change disrupting food systems
- **Edible insects are a promising option with great potential to address these challenges**



# Why Insects?

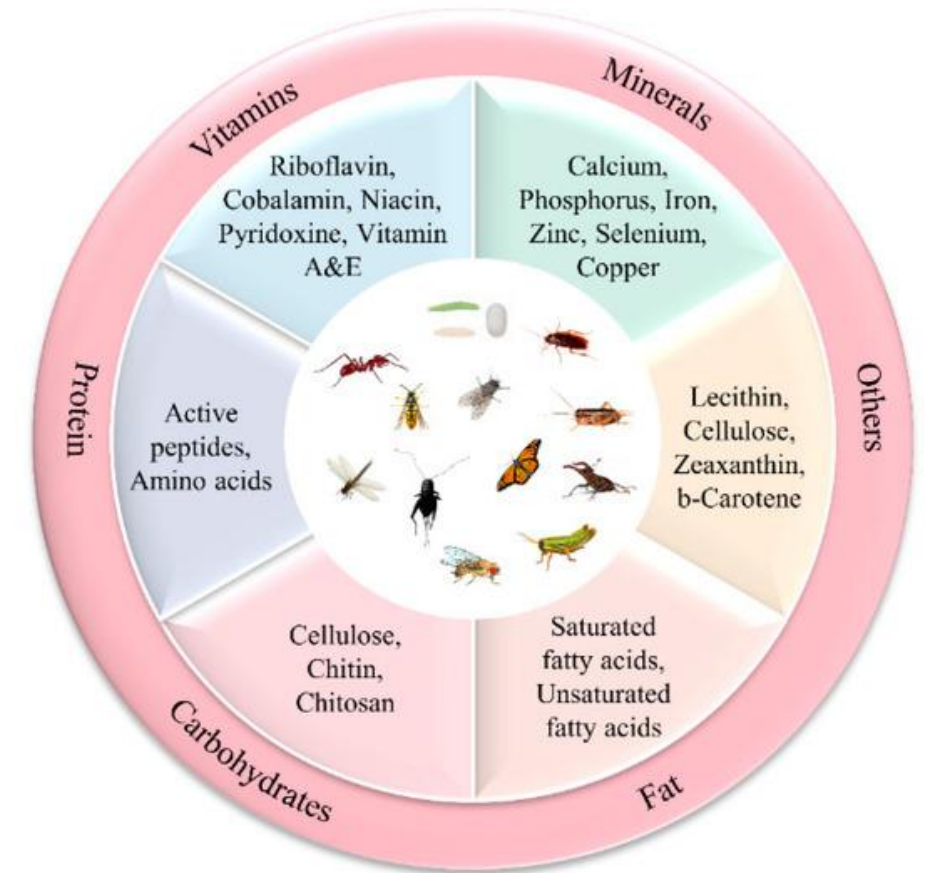
- High feed conversion efficiency
- Rich in protein, fats, micronutrients
- Require less land and water
- Lower greenhouse gas emissions

Edible insect farming is a **PRACTICAL**, not futuristic, solution



# Nutritional & Health Benefits

- Protein content: up to **80%** (species-dependent)
- Rich in iron, zinc, and vitamins, etc.
- Healthy fatty acids (omega-3 & omega-6)
- Bioactive compounds (antioxidants, antimicrobial peptides)



Highly relevant for addressing **malnutrition** in Africa and beyond

Zhou et al., 2022



# Key Insect Species in Scaling Efforts

- Black soldier fly – animal feed
- Crickets – human consumption
- Mealworms – food & feed applications
- Locusts/grasshoppers – traditional + commercial use

Food/Feed



*Black soldier fly*



*Locust*



*Mealworms*



*Crickets*

Food



*Gonimbrasia belina*



*Ruspolia differens*



*Nudaurelia krucki*

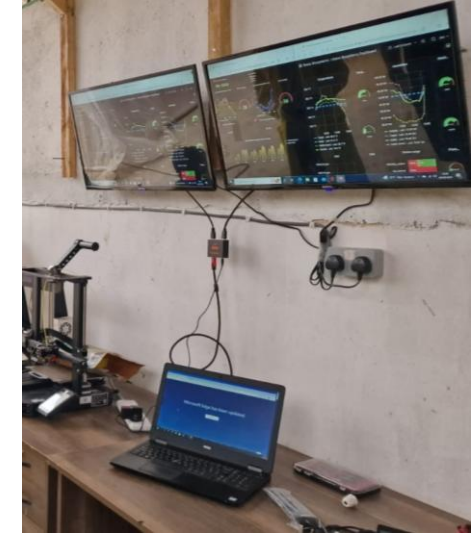


*Bunaea alcinoe*

All central to *icipe's*  
work

# Recent Breakthroughs

- Improved mass-rearing technologies
- Automation and AI in insect farming
- Advances in feed substrates (waste streams)
- Regulatory progress in multiple regions
- New product development (frass fertilizer products, insect-based feeds, protein powders, oils, etc.)



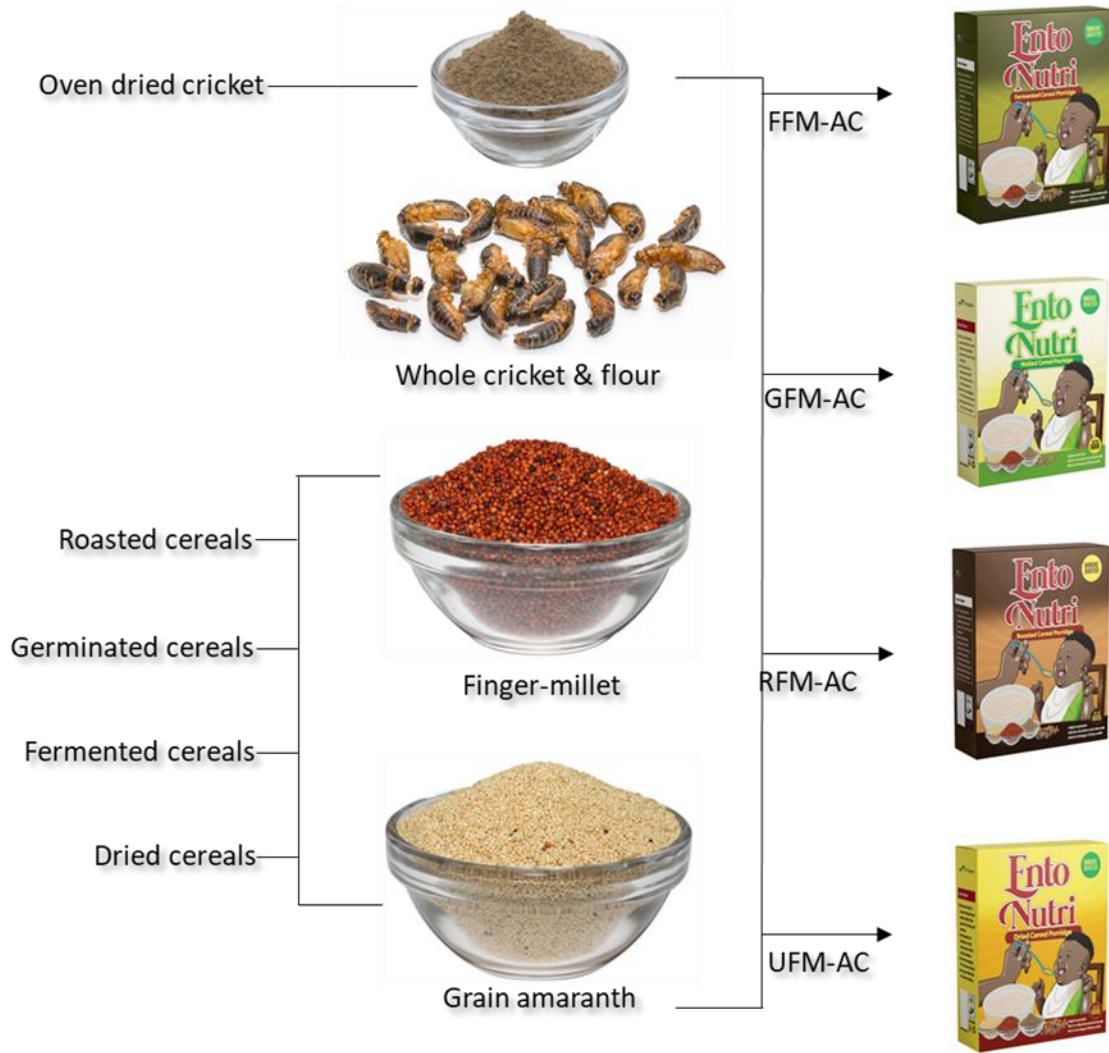
Dried larvae



Larvae meal



# Recent Breakthroughs - Emerging insect-based food products



# Scaling Challenges

- Regulatory barriers and standards
- Consumer acceptance (cultural perceptions)
- Supply chain and infrastructure gaps
- Cost competitiveness vs. traditional protein

Realism - scaling is not automatic!!!



# Capacity Building

## Hands-on training BSF farming

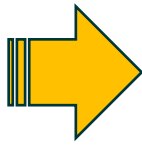
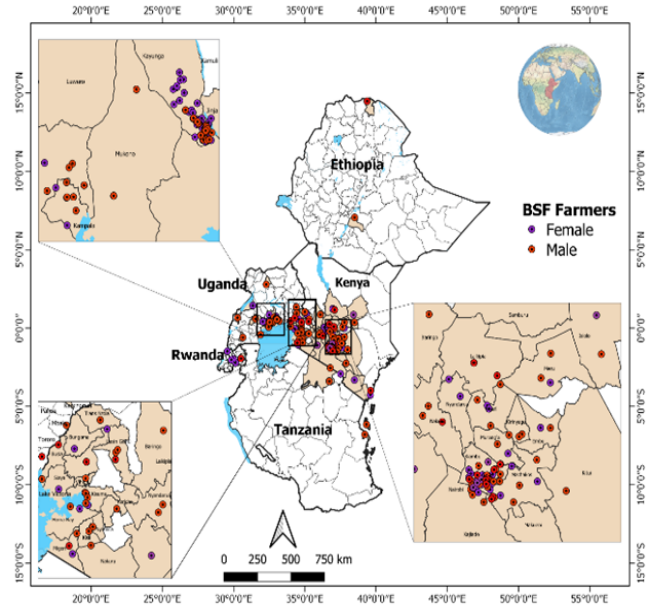
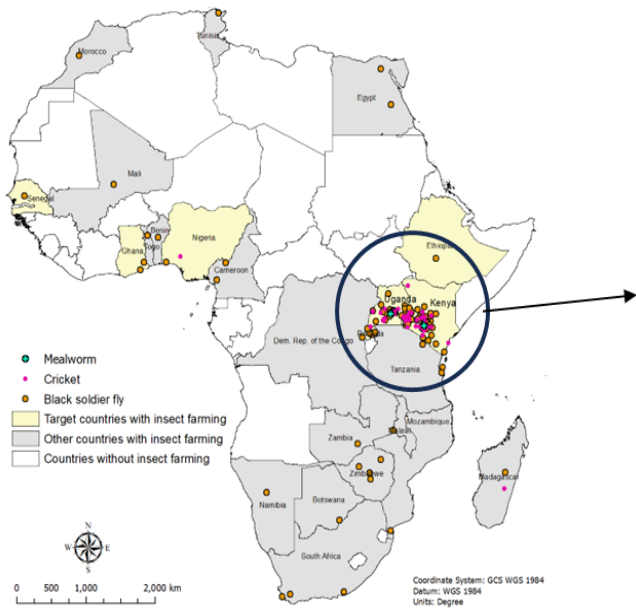



# Pathways to Scale


- Public-private partnerships
- Policy support and harmonization
- Investment in R&D and startups
- Awareness and education campaigns
- Integration into existing food systems




# Insect Farming in Africa



 >160,000 farmers (38% females)

 >3000 Small-Medium-Large Scale enterprises (52% females): 16 – 3,600 MT/years

 >450 (41% females) extension officers.

# Key Take-Home Message

- Insects offer a scalable, sustainable protein solution
- Proven health and environmental benefits
- Critical moment for investment and policy support
- Collaboration is key to global impact

Scaling insect-based solutions is no longer optional – it is essential

# Thank you

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[www.icipe.org](http://www.icipe.org)