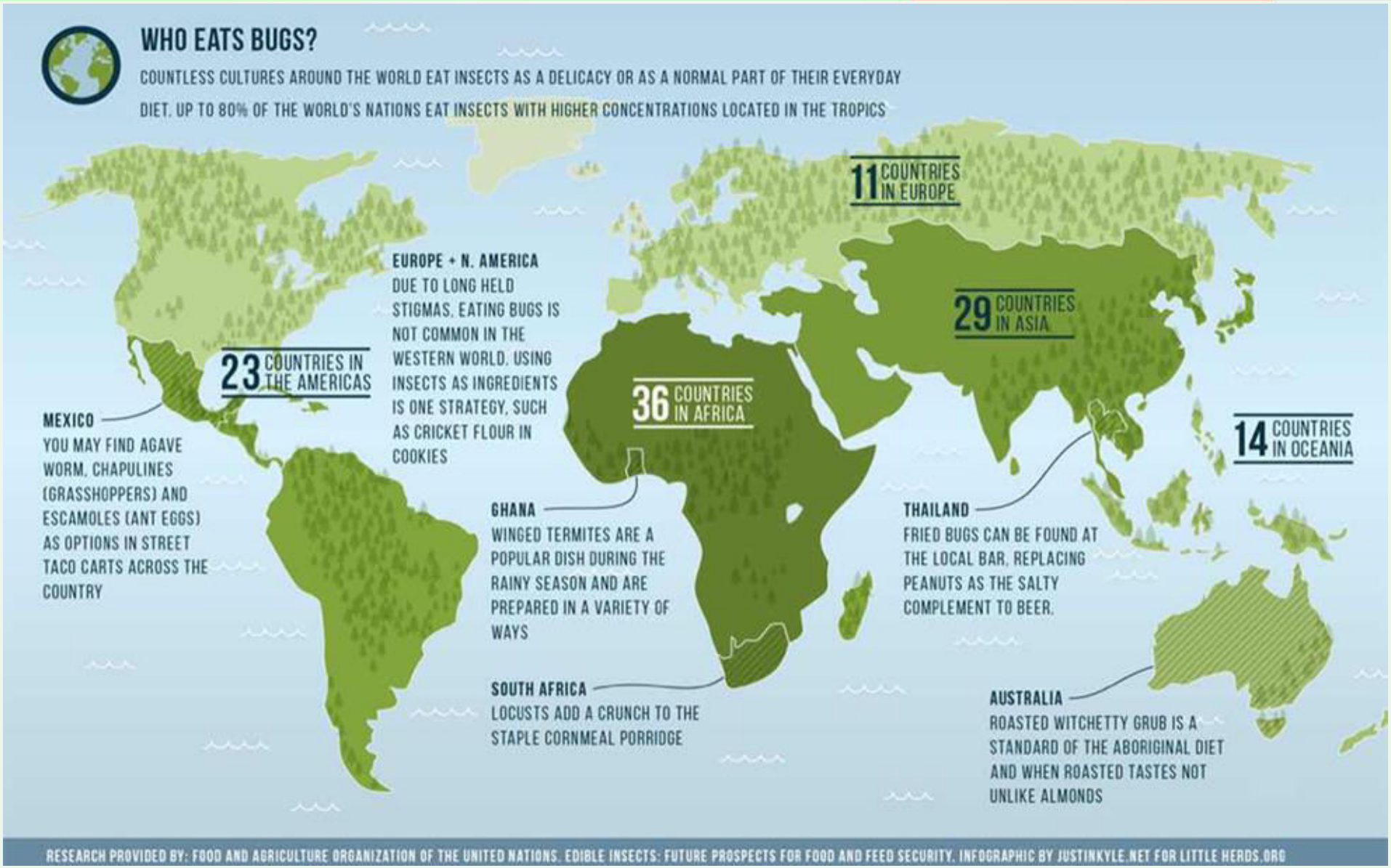
INSBIZ-INSect-based agriBIZiness for sustainable grasshopper and cricket production and processing for food in Kenya and Uganda

Dorothy Nakimbugwe - INSBIZ Project Leader

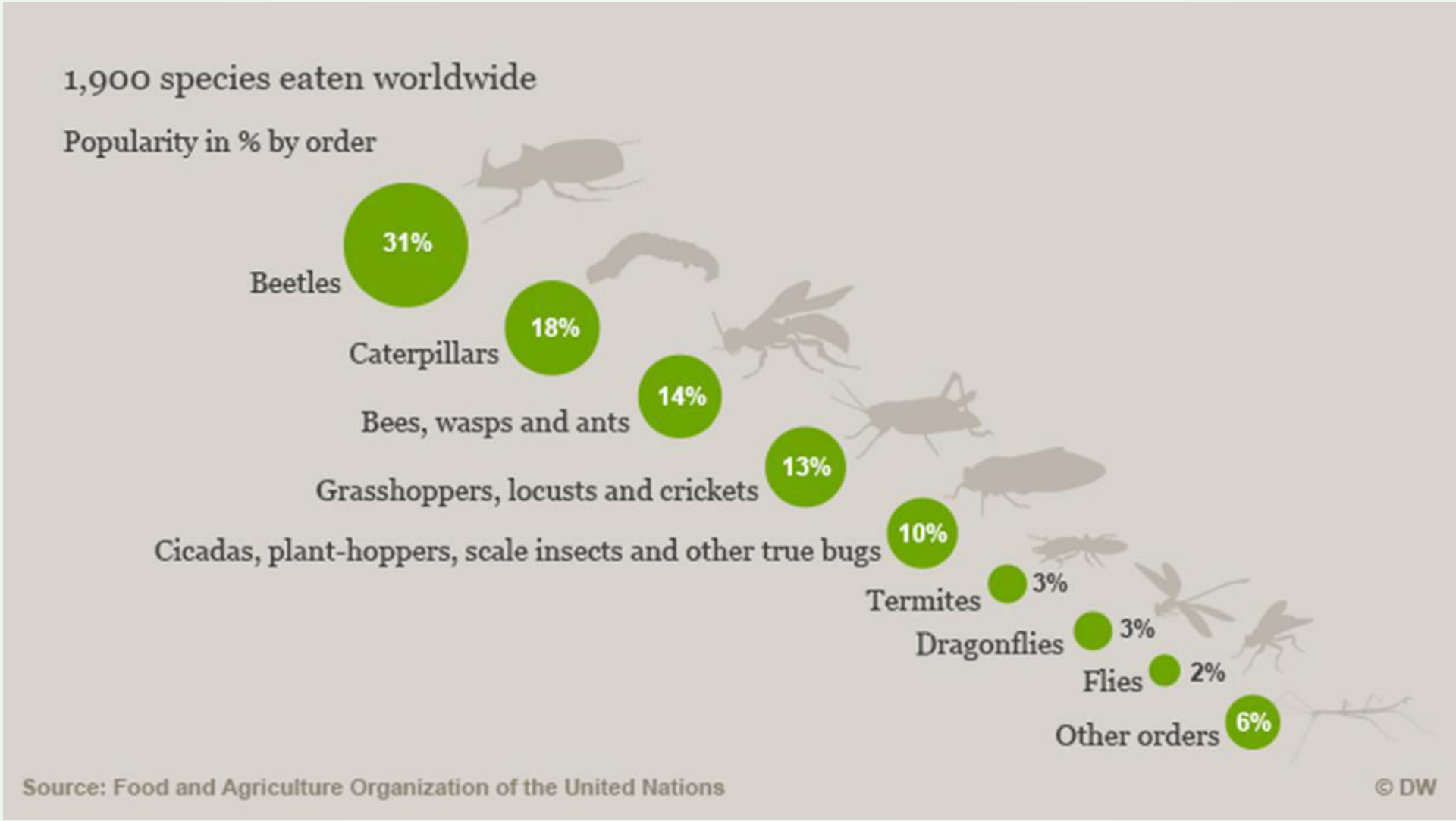
The Insects

Global insect consumption



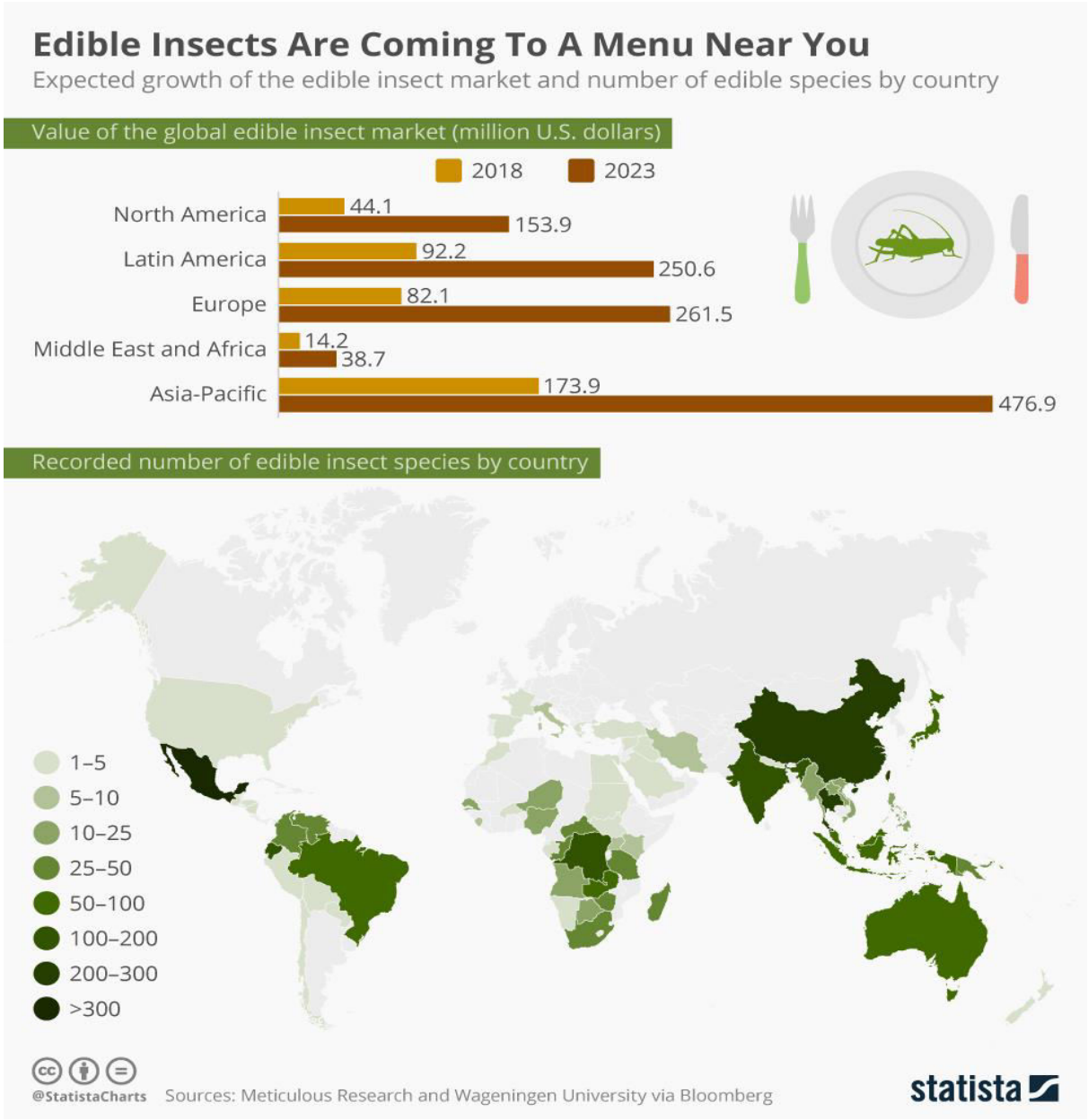
Source: https://www.foodbev.com/news/helping-consumers-to-catch-the-edible-insects-bug/

Important insects in global diets

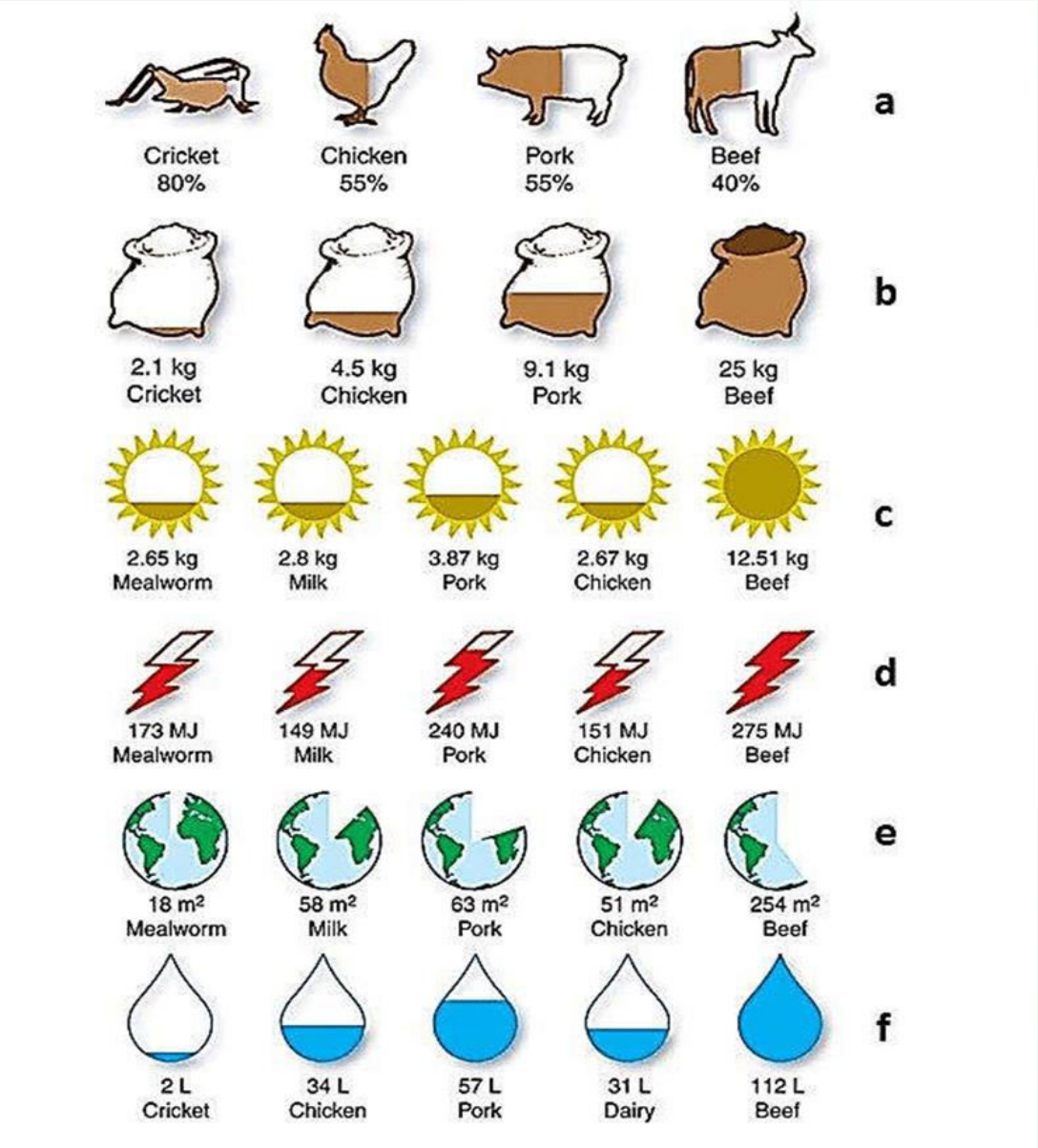


Source: http://www.dw.com/en/locusts-are-the-tastiest-insects/a-17641920

Africa derives limited economic gain



Insect farming benefits vs. conventional livestock



Key:

a: % digestible biomass

b: feed conversion ratio

c: global warming potential

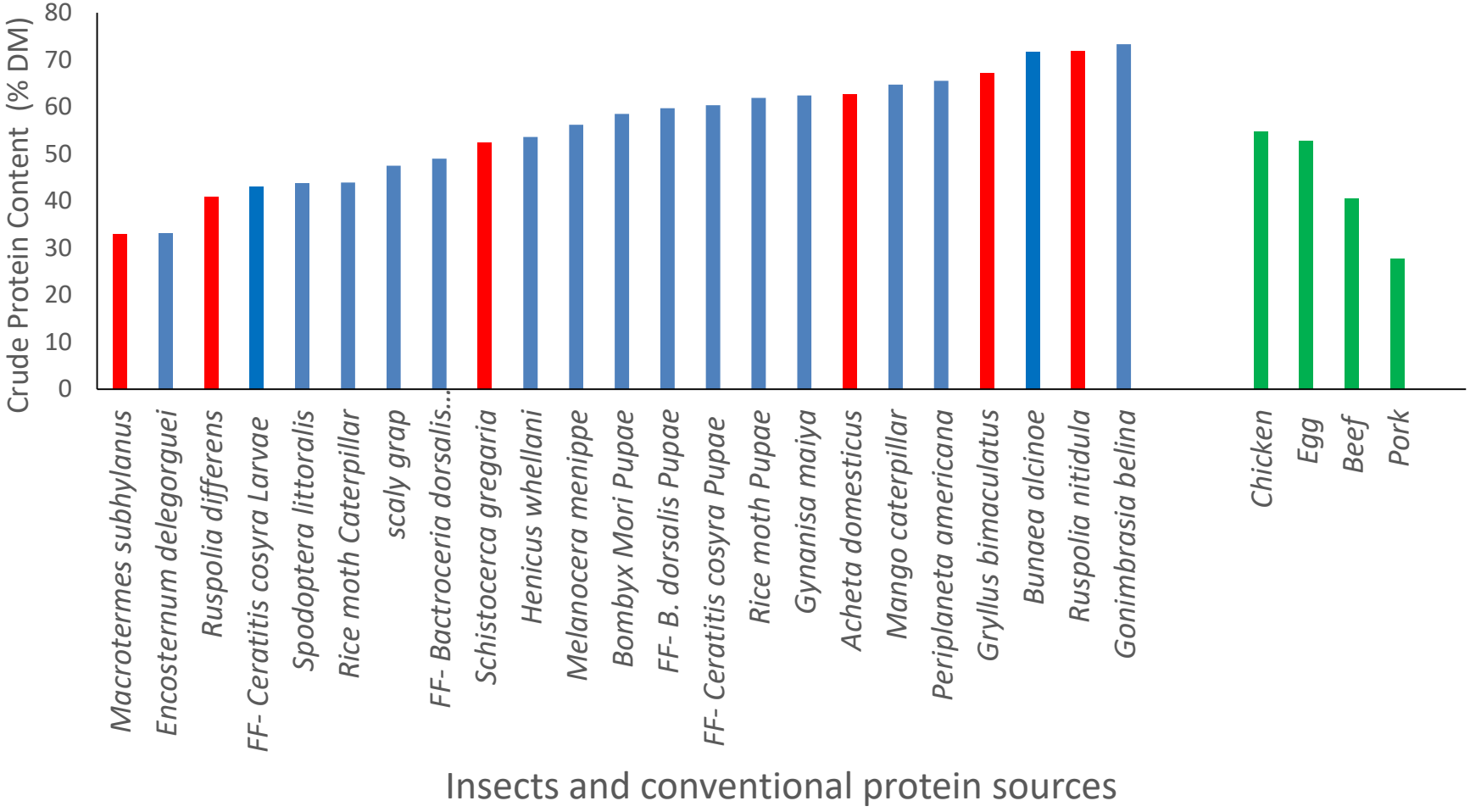
d: energy use

e: land use

f: water use

Source: Dossey et. al. 2016; Mondal & Gunguly, 2019

Crude protein content of some edible insects compared to conventional meats



Mal-nutrition - Uganda

- **Rampant malnutrition** - < 5yrs: 29% stunting, 9% are severely stunted, 4% are wasted and 1% are severely wasted, 11% are underweight and 2% are severely underweight (UBOS, 2017).

- In Uganda **> 53% of 6-59 months** old children ≈ **1 in 3 women** aged 15-49 (32%) are anaemic (UBOS and ICF, 2017).

- High Vitamin A and Zinc deficiency.

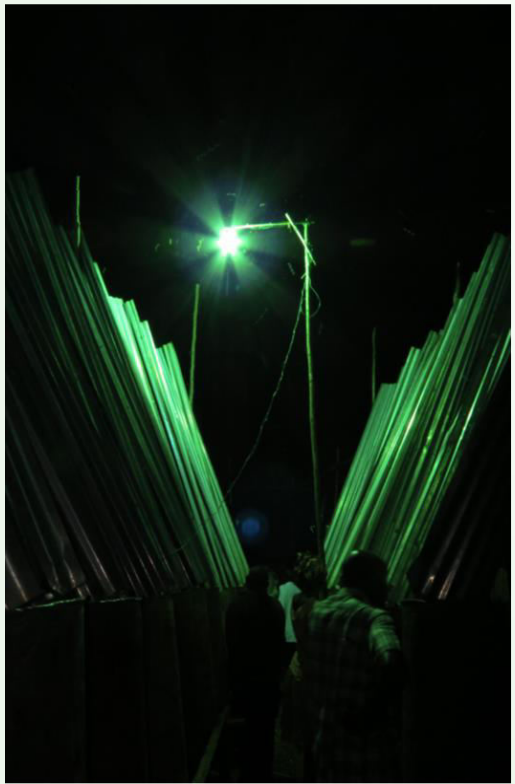
Mal-nutrition – underlying causes

- Poor quality, cereal and legume based **diets**, **low in high quality animal foods** - Only **14% of children** 6-23 months – get min. acceptable diet (UBOS, 2017)

- Uganda's **economic loss** due to **micronutrient deficiencies is ≈$145 million** (World Bank, 2009, based on DALY's).

Challenges facing the edible Insect VCs

1. **Seasonal, un-sustainable** & declining wild harvesting
2. **High perishability** ≈ 24 hours
3. **Informal, unregulated sector & VCs** – risky for consumers & Businesses



INZBIZ Development objective

The INSBIZ project aimed to contribute to improved **food and nutritional security, job** creation and **income** generation and, reduction of **gender gap** for the most vulnerable groups in East Africa in general and specifically in Kenya and Uganda through **edible insect** production and processing

Specific objectives

1. Assessing the **market size** and testing the **market performance** of insect based foods
2. Adapting and piloting of **mass rearing** protocols for **crickets and grasshoppers**
3. Developing, characterising and **commercializing insect-enriched food** products
4. Creating a favourable **enabling environment** for insect based food through **policy/standards**, advocacy and awareness creation.

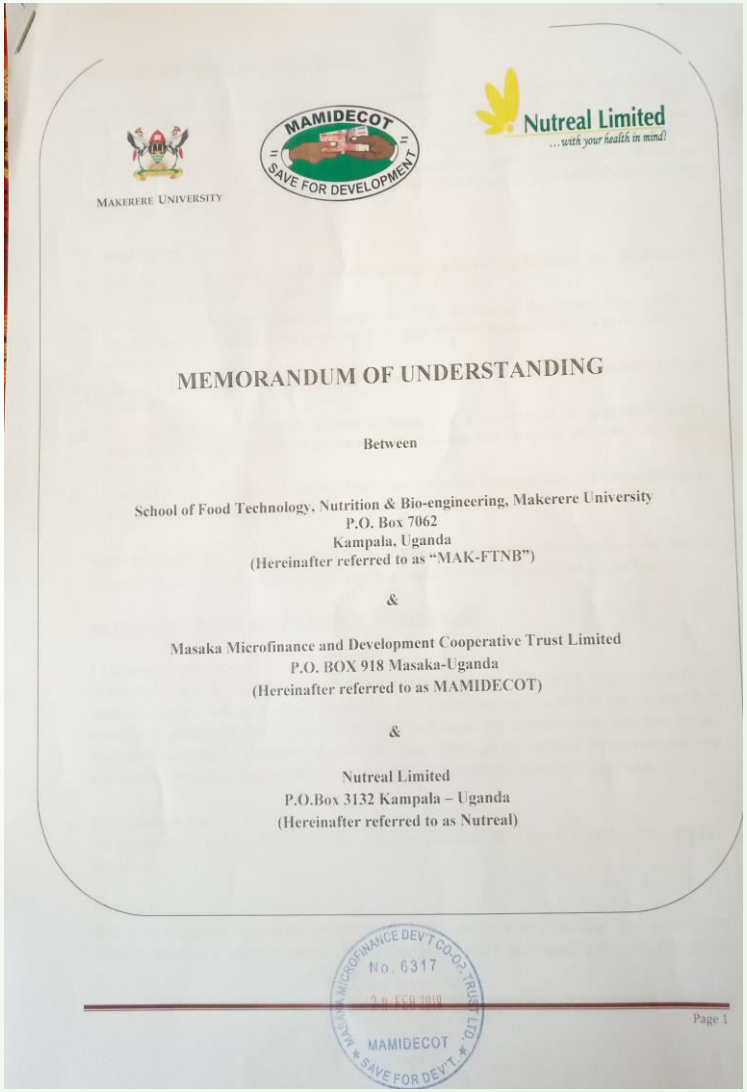
Activities & results (1)

OBJECTIVE	ACTIVITIES	OUTPUTS
1. Assessing Market size & performance	1.1. Estimated demand and supply of edible insects in Uganda	• Estimated demand and supply of harvested grasshoppers • Annual production of crickets
	1.2. Test marketed & assessed consumer acceptability of insect food products	Consumer acceptability established for 10 insect foods in Kenya & Uganda

Research results (2)

OBJECTIVE	ACTIVITIES	OUTPUTS
2. Adaptation, piloting and up-scaling of edible insect mass rearing protocols	2.1. Adapted and piloted grasshopper and cricket rearing protocols to medium scale enterprises	- Pilot facilities for cricket rearing at Makerere & *icipe* as well as at partner SMEs in Kenya & Uganda - Cricket feed free of human food ingredients - Pilot facility for up-scaled Grasshopper production at *icipe*
	2.2. Assess and mitigate pests and diseases affecting insect colonies	- Pathogens (fungi & bacteria), parasites and predators that affect cricket and grasshopper colonies identified - Production manuals that include mitigation measures - Training manuals for researchers/farmers
	2.3. Adapt and upscale post-harvest handling protocols for crickets and grasshoppers under SMEs rearing and trading conditions	- A post-harvest handling protocol for crickets - Training modules for farmers (developed and implemented)

Sample outputs



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MEMORANDUM OF UNDERSTANDING

Between

School of Food Technology, Nutrition & Bio-engineering, Makerere University
P.O. Box 7062
Kampala, Uganda
(Hereinafter referred to as "MAK-FTNB")

&

Masaka Microfinance and Development Cooperative Trust Limited
P.O. BOX 918 Masaka-Uganda
(Hereinafter referred to as MAMIDECOT)

&

Nutreal Limited
P.O.Box 3132 Kampala – Uganda
(Hereinafter referred to as Nutreal)

MASAKA MICROFINANCE DEV'T CO-OP TRUST LTD.
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Page 1

Research results (3)

OBJECTIVE	ACTIVITIES	OUTCOMES
3. Developing, characterising and commercializing insect-enriched food products	3.1. Analyzed the nutritional characteristics of the reared crickets and grasshoppers	Proximate and nutritional quality of the insects confirmed and used for product formulation
	3.2. Developed and characterize insect-based products to meet the Recommended Daily Intakes (RDIs) level of nutrients for women of reproductive age and children aged five years and below	A wide range (10) products developed, characterized and branded - Snacks (salty and sweet) - Flours for porridge - Ready-to-eat grasshoppers

Sample of branded insect foods

Research results (4)

OBJECTIVE	ACTIVITIES	OUTCOMES
4: Creating an enabling environment for insect based food through policy, advocacy and awareness	4.1: Provided technical data to inform national standards development	- Edible insects' standards developed and approved in Uganda and Kenya - Bureaus of Standards are using standards to certify edible insect foods
	4.2: Undertook awareness creation activities on value and benefits of insect based foods	- Increased awareness and interest about insect Value chains - Radio and TV programs aired on several stations - Article & manuscripts

Human capacity developed

- 2 post-docs (1M, 1F)
- 3 PhDs (all females)
- 8 MSc (4M & 4F)
- 5 BSc (2M & 3F)
- 4 Fellows (all Female)

Project outcomes

1. Strengthened edible insect value chains – cricket farmers linked to markets
2. Large scale production, processing and marketing of cricket and grasshopper products.
3. Approved insect based food standards in Kenya and Uganda
4. Improved grasshopper trapping method (cost-effective, sustainable and safer).
5. More sustainable cricket rearing – using developed feed and container prototypes

Contribution to impacts

Societal impacts:

- Improved ***food and nutritional security*** through increased diversity of available nutritious and safe edible insect foods. All the products developed have shelf-life of over 6 months. For the grasshopper product, this implies all-year availability to consumers.
- Improved ***consumer health and safety*** through consumption of UNBS (and KEBS)-certified insect food products, made possible by the standards developed during the project.

Economic Impacts:

- ***Increased incomes*** as a result of lower post-harvest losses for cricket farmers and grasshopper harvesters through use of improved post-harvesting techniques to maintain quality and safety
- Increased ***jobs creation and job security*** through improved capacity of young researchers, technicians and actors along the edible insects' value chains.
- ***Higher profile of and support*** for insect foods due to increased public awareness of their nutritional and commercial importance, through radio programs, articles and publications, etc.

Project beneficiaries

Direct beneficiaries:

- 4 MSMEs engaged in the production, processing and marketing of insect-based food
- Policy makers and regulatory authorities – Bureaus of standards in Kenya & Uganda
- Students, fellows & researchers
- Cricket farmers' cooperative – 100 farmers
- Grasshopper harvesters – improved PH handling protocol
- Consumers – Nutritious and Safer food products

Challenges & Opportunities

Challenges

- High mortality of grasshoppers
- Delayed funds
- Lengthy procurement procedures
- COVID19 related restrictions and delays

Opportunities

- High media and industry interest
- High consumer acceptance
- Project partners – entire VC
- Farmers' cooperative – out growers
- Enhanced human & infrastructural capacity

What next?

- Scaling-up production and processing of insect foods
- More consumer awareness creation
- Certification of insect foods

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Project Partners

	Rearing	Processing	Regulator
Uganda	AgrarianSystems Ltd IDEAL FARMING SOLUTIONS	Insfoods Limited Your sustainable protein	UNBS
	MAMIDECOT SAVE FOR DEVELOPMENT	Nutreal Limited …with your health in mind!	
Kenya	T.I.L. TREASURE INDUSTRIES LTD.	Nutria PRODUCTS	KEBS Kenya Bureau of Standards Standards for Quality life
	INSECTIPRO		
Funder	BioInnovate Africa		

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