



GREEINSECT - Policy brief

The GREEINSECT project was initiated on the wave of recognizing the untapped potential of farming edible insects following the publication 'Edible insects - Future prospects for food and feed security' published by the Food and Agricultural Organization of the United Nations (FAO), Rome, in 2013. While consumption of insects had a long history of being a part of some traditional diets in Kenya, the development of insect farming as a formalized and integrated part of the food system was novel.

The GREEINSECT project has made a significant contribution to the development of two important insect farming systems in Kenya: **Cricket** (*Acheta domesticus*, *Gryllus bimaculatus* and other species) and **Black Soldier Fly, BSF** (*Hermetia illucens*). Though the sector is still emerging, GREEINSECT has contributed important basic research for transferring cricket rearing technology from Thailand, the most developed edible insect sector globally. The research covered technical aspects such as identification of indigenous cricket species suitable for farming in Kenya (including the discovery of a new species, *Scapsipedus icipe*) and establishment of optimized rearing and feeding management under different climatic conditions.

To compensate for the early and premature stage of an insect farming sector in Kenya, a Life Cycle Analysis (LCA) was conducted in Thailand to inform about the perspectives of cricket farming as a sustainable animal food sector. The LCA study was the first study ever to quantify the environmental impacts, including the global warming potential of a fully developed commercial insect farming system. The results showed that crickets can be produced with significant less environmental impact than broilers, in a comparable system in Thailand. The feed source for rearing crickets was identified as the key component for further reduction of greenhouse gas emissions.

The potentials of crickets as a nutritious animal-source food for children at risk of malnutrition were investigated, showing that dried powdered crickets can be incorporated into biscuits and porridge with high acceptability among children. The results indicated that the provision of a

cricket-based porridge to pre-school children over a six months period may impact the gut microbiota though not conclusive from the research under this project.

Black Soldier Fly (BSF) production for small-scale animal feed production was investigated for optimal production and feeding practices using locally available waste sources, including studies using human waste conducted in collaboration with the sanitary social enterprise Sanergy, Nairobi. BSF has since the project start in 2014 emerged as the dominating industrial scale insect farming system worldwide. The GREEINSECT project has contributed research which supports that BSF production system has a potential to be developed to contribute also to recycle biowaste in small-scale systems which can provide high-value protein for fish and chicken feed, a limited resource in high demand in Kenya.

Another aspect of incentives for insect farming is the consumer's perception and willingness to buy insect-based food products. Studies contributed important knowledge of the diversity and nature of the Kenyan consumers, essential for the development of a commercial sector. Also the nutritional contribution of insects in foods targeted food insecure children has been investigated. This research is important to inform the private sector about the potentials and complexity of introducing insects in the context of modernized diets in a yet food insecure population.

For the development of institutional framework to address food safety and other risks related to introducing a new animal production system, an important outcome of the project was the outreach to national and regional stakeholders supporting the establishment of Kenyan standards for insects as food and feed.

Insect farming is still in the emergence and more investment in research is needed. Additional to technical investment in optimization of the production systems, more research in nutritional impact, there is a need for systematic research in the factors driving small- and medium scale farmers and entrepreneurs to take up insect farming in Africa.

GREEiNSECT: Insect Production and the Sustainable Development Goals



The GREEiNSECT consortium researches insects for food and feed in Kenya. We support capacity building and the production of scientific evidence in the fields of insect production, food product development, environmental and livelihood assessments.

Insects have been a part of traditional diets in many regions of the world. However, insect farming in Kenya is relatively new, beginning in 2013. To strengthen the impact of the project, we also draw from the experiences of other countries, namely Thailand, USA and South Africa.

Below, we discuss how insect production, or farming, can contribute to achieving many of the Sustainable Development Goals.



- Insect farming generates employment in rural areas. For example, over 20,000 households in rural Thailand are engaged in cricket farming

- Insects can be sold to help rural households gain an additional income
- Insect farming may increase household resilience through the diversification of income channels



- The consumption of insects can address undernutrition by providing vital micronutrients, like zinc and iron, and animal-source protein

- Small-scale insect production can potentially increase household food security by providing access to nutritious ingredients



- 71% of cricket farmers in Kenya are women and insect farming can be a source of economic empowerment



- Producing insects as food or animal feed can develop a new agricultural sector and create job opportunities
- Farmers in Thailand enjoy farming crickets as the working conditions are more favourable when compared to other forms of agricultural labour



- Some species of insects, like Black Soldier Flies, have the capacity to consume food waste and other agricultural by-products
- Research into insects as food and feed ingredients strengthens our scientific and technological capacity to move towards more sustainable patterns of consumption and production



- A life cycle assessment of cricket farming showed that crickets have lower environmental impacts than most traditional sources of animal protein



- Producing insects as an alternative feed ingredient can help to reduce the consumption of fish meal in aquaculture and animal production systems



- Insect farming can prevent the unsustainable overharvesting of wild insect species



- Over the past four years, GREEiNSECT has built capacity in the insects for food and feed sectors in Kenya
- Public and private partnerships for research and development are an essential element in the formation of sustainable agricultural innovation and entrepreneurship

For more information, please contact project investigator, Dr. Nanna Roos: nro@nexs.ku.dk

Brief prepared by Afton Halloran and Christopher Münke-Svendsen

Led by:

UNIVERSITY OF COPENHAGEN



Website: www.greeninsect.ku.dk

Financed by:

MINISTRY OF FOREIGN AFFAIRS OF DENMARK
DANIDA INTERNATIONAL DEVELOPMENT COOPERATION



@GREEiNSECT