



## Project update

Project title (Acronym):	<b>Bringing Insect Farming to the Next Level – Promoting sustainable insect farming and preserving in Cambodia and Thailand to increase shelf life and obtain innovative foodstuffs based on local resources in order to counteract malnutrition, particularly of mothers and children (IFNext)</b>
Geographical focus:	Southeast Asia (Cambodia, Thailand)
Call reference:	Innovative Ansätze zur Verarbeitung lokaler Lebensmittel in Subsahara-Afrika und Südostasien, die zu einer verbesserten Ernährung beitragen sowie qualitative und quantitative Verluste reduzieren
Cooperating partners:	<p>TiHo: Hannover University of Veterinary Medicine, Foundation, Hannover, Germany (project leader)</p> <p>RUA: Faculty of Veterinary Medicine, Royal University of Agriculture (សាកលវិទ្យាល័យភូមិន្ទកសិកម្ម)</p> <p>LDC: Livestock Development for Community Livelihood Organization (អង្គការអភិវឌ្ឍន៍ការចិញ្ចឹមសត្វដើម្បីជីវភាពសហគមន៍), formerly CelAgrid</p> <p>KMITL: Faculty of Agricultural Technology, King Mongkut's Institute of Technology Ladkrabang (สถาบันเทคโนโลยีพระจอมเกล้าเจ้าคุณทหารลาดกระบัง)</p> <p>MUT: Faculty of Veterinary Medicine, Mahanakorn University of Technology (มหาวิทยาลัยเทคโนโลยีมหานคร)</p>
Duration:	36 months
Budget:	Approx. 640,498.10 €





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Fig. 1: Thailand and Cambodia, the target regions (source: Wikipedia).



Fig. 2: Project logo including those of the participating partners

### **Aim of the project:**

The aim of the project is to promote sustainable insect (several cricket species [e.g. *Gryllus bimaculatus* and *Gryllus assimilis/locorojo*], silkworms [*Bombyx mori*] and mealworms [*Tenebrio molitor*]) farming in participating mothers and their SME enterprises to improve the nutrition of themselves and their children, and to create an extra income by manufacturing novel insect-based products (IBP) with a long shelf life which can be either consumed at home or sold at local markets. For these IBPs, the consumers of each country will be interviewed, and their preferences will be the base for the IBP development. Standards to evaluate the quality will be developed. Information will be shared with the scientific community, insect farmers, and the general public.

### **Results:**

#### ***Insect farming:***

- Rearing methods for all IFNext insect species in all three countries were established. While silkworm rearing remains traditional (Fig. 3), crickets are reared in either containers (Asia; Fig. 4) or boxes (Germany; Fig. 5). Mealworms are raised in special plastic crates (Fig. 6).
- Local differences in the rearing systems in relation to the local conditions
- Sustainability is reached by combining concentrates (which must be purchased) with fresh plants resp. plant offcuts (which are for free), reducing thus the amount of waste created
- Water supply by means of tubes or plastic bottles and cloth that provides water via capillarity (Fig. 7)
- Yield: 20 to 30 kg crickets/container within 40 days resp. 250 to 350 g crickets/box within approx. 60 days and 1 to 2 kg of mealworms/crate within three to four months.

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Fig. 3: Traditional silkworm raising on frames in Thailand; picture: Grabowski.



Fig. 4: Cricket rearing containers in Southeast Asia (Thailand); picture: Grabowski.

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Fig. 5: Cricket rearing in boxes in Germany; picture: Grabowski.



Fig. 6: Mealworm rearing in Germany; picture: Grabowski.



Fig. 7: Solutions for a constant water supply in Thailand (above; picture: Grabowski) and Germany (below; picture: Trögel).

**Quality parameters:**

- No regulatory specifications for the quality of insects neither in Cambodia nor in Thailand that could have been followed when defining quality parameters for the insects and the products derived from them in Asia
- Microbiological criteria in Germany, developed and published the autumn of 2019
- Parameters chosen: German criteria plus yeasts and moulds, chemical nutrient analysis and sensorial description of heat-treated insects, plus a country-individual survey for residues and contaminants

**Consumer survey:**

- Decision by the consumers: insects will be turned into powders and other homogenates of heated or smoked milled insects.



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- Consumer survey in Germany: Typically, men in their 3<sup>rd</sup> life decade and older have had contact with edible insects. Overall, consumption is sporadic and restricted to few servings, despite that the advantages of edible insects are known and the latter are regarded as healthy foodstuffs. In most cases, no health problems occurred after eating them.

***Exploitation of results:***

- So far, two poster presentations and two technical papers (including a manual), for free download
- Extensive presence of the project in the scientific community, on conferences and training events, social media, press and television

**Key statements and policy advice:**

- Insect rearing techniques have been forwarded successfully to the participating farmer families.
- In Cambodia, the families profit from their units already as they can eat the crickets themselves or sell them, even during an epidemic of African Swine Fever which forced many farmers to eliminate their stock.
- Using local plants in Asia that are, apart from being edible for the animals, invasive or would have been discarded as a human foodstuff, reduces the ecological impact of the invasive species and the amount of discarded vegetable foodstuff originally destined for human consumption
- Using vegetable and fruit offcuts in Germany, i.e. vegetable material that would have been thrown away, reduces the amount of waste
- Insect rearing has proven a relatively easy and little time-consuming activity leading to profit (e.g. 2 – 3 €/kg crickets in Thailand, 3 – 4 US\$/kg crickets in Cambodia), particularly during the dry season where agricultural activity is reduced and people either don't find another job or work abroad temporarily
- The system is appropriate to be used, with its due modifications, on a worldwide scale.