EXECUTIVE SUMMARY

TECHNICAL CONSULTATION MEETING
23-25 January 2012, Lebanon Room (D209), FAO, Rome, Italy

"Assessing the Potential of Insects as Food and Feed in assuring Food Security"

The expert consultation "Assessing the Potential of Insects as Food and Feed in assuring Food Security" took place from 23-25 January 2012 at FAO's headquarters in Rome, Italy. Jointly organized by FAO and Wageningen University with financial support of the Government of the Netherlands, the meeting aimed to open a dialogue and foster an exchange of information and expertise on the potential benefits of using insects for food and feed as part of a broader strategy to achieve global food security. A total of 37 experts from international agencies, scientific institutions and private sector stakeholders, together with staff from relevant FAO disciplines (nutrition, aquaculture, livestock, veterinary science, food safety, forestry, biodiversity and nature conservation) attended the meeting. These experts and entrepreneurs—specialized in different aspects of insect rearing, plant protection and food engineering—together mapped the state of the art and identified knowledge gaps along the following thematic topics: insect ecology and biology, farming insects, insects as livestock- and fish feed, nutrition, processing and trade, food and feed safety, communication strategies, and policies to achieve food security. Critical base-line data for each of these thematic areas was compiled and reviewed through plenary presentations and through further discussions in working groups (list of presentations and summary notes of the working groups). In addition, participants proposed an Action Plan to move insects as food/feed sources higher on the agenda of [inter-] national food/feed related agencies.

Insect ecology and biology was reviewed by region: Asia – Pacific, the Americas, and Africa. The presentations showed great variation across the world on how insects are produced and utilized as food. Indeed insect consumption varies greatly by country and is often a matter of food preference. In some countries like Thailand, demand for edible insects increases as living standards improve. The vast majority of insects for food are harvested from wild populations. In turn promoting its consumption might unleash unintended consequences, such as overexploitation of certain insect species. Key priorities in this domain are: managing and conserving ecosystems, developing sustainable harvesting practices, assessing the impacts of climate change, making an inventory of traditional knowledge, documenting ethno-taxonomical practices with data that includes not only insects but all edible arthropod species, and conserving the gene pool.

Farming insects for food is currently practiced on a rather limited scale. In temperate zones, insects are reared by companies who sell them as pet or fish feed. Farming insects at the household level occurs mainly in South East Asia. In Thailand alone, there are some estimated 20 000 insect "farmers" who mainly rear crickets and palm weevils. Key bottlenecks for insect farmers are the availability of low cost insect feed (alternatives for expensive chicken feed), control of insect sale price by middlemen, lack of knowledge on insect pathology and inbreeding in rearing systems, lack of information and support from extension services, and lack of cooperation, networking and communication among producers.

Mass production at an industrial scale was defined as producing one ton/day or more. Major challenges are: selecting suitable insect species and strains, finding cheap rearing substrate (if possible by utilizing organic waste side-streams), managing diseases and setting

up sanitation procedures, producing a constant supply, developing innovative production technologies with cost-effective production systems, increasing mechanization, safeguarding animal welfare (ethical concerns), elaborating an industrial code of practices/standards and finally, quality assurance. Setting up an international body of insect producers was considered a necessity.

Raising insects for livestock and fish feed was deemed to have great potential in the short term, mainly because of the urgency to find a replacement for increasingly expensive fish meal and soybeans. Insects are being recognized by the feed sector as a promising alternative protein source, which will likely lead to easy market acceptance. Major considerations are: selecting the most suitable insect species or strains, producing insect proteins cost effectively, reliability and maintaining a constant supply of high quality insects, assuring feedstock safety when rearing insects on organic waste and manure, establishing a regulatory framework, developing [inter-] national industrial standards on sanitation, marketing and production, and finally, developing automated processing technologies to turn insects into feed.

The nutritional value of insects depends on species, insect stage, and the type of feed for insects. The nutritional contribution of insects to diets in traditional and informal food systems is poorly documented. It is known that protein quality is generally high, similar to other animal meat sources. Fat content is variable, but in general a good source of essential polyunsaturated fatty acids. Insects are also a significant source of iron, zinc and vitamin A. This is important in light of the fact that some 2 billion people are deficient in zinc, 1 billion have iron-deficiency anaemia, and vitamin A deficiency affects some 250 million people, mainly young children and pregnant women in developing countries. However, bio-availability of minerals, in particular iron, needs to be demonstrated. More research is also needed on food hygiene standards, and allergies caused by insects. Nutritional compositions of several insects have recently been added to the international INFOODS Food Composition Database for Biodiversity.

Insect food processing and trade. Issues involved food for human consumption and covered topics like: preservation and improving shelf life of raw/processed food products, processing methodologies, standardization of products to facilitate their trade, and safety issues like setting up tracking and tracing systems. HACCP (Hazard Analysis Critical Control Points) as a preventive food safety system, for example, needs to be incorporated into international and national insect food legislation to reduce the risk of hazards. It was also believed that standard practices may be employed from similar industrial sectors such as meat, fish and crustacean processing.

Food Safety. Participants were briefed on the function of Codex Alimentarius and on how food safety standards, guidelines and code of practices for insects might develop through its existing horizontal/vertical committees and ad-hoc intergovernmental task forces (*see* "Discussion paper for new work on a regional standard for edible crickets and their products" (CCASIA17)). The procedures of The European Food Safety Authority (EFSA) regarding

insects used as food in the EU would require a pre-market safety evaluation and EFSA may be asked to carry out a risk assessment.

Communication Strategies. A critical activity within a communication strategy that aims to promote the role of insects as a viable option for improving food security is to encourage serious media coverage. This can be achieved by providing validated data and content-rich textbooks on the subject, based on respectful understanding and intercultural competency. Media coverage must permeate all levels of society—from schools and government agencies to professional organizations. Media outlets are also a powerful means to establish projects and programmes which maximize food /feed production and improve health, lives and livelihoods, while at the same time minimize energy and environmental costs.

Policies for food security. Insects for food and feed cope well within the four "food security dimensions" (availability, access, utilization and stability). Policies and investment programmes for edible insects should aim to play on these four dimensions of food security for positive outcomes.

Action Plan. On the third day of the expert consultation, participants elaborated an Action Plan aimed at moving insects as food/feed sources higher on the agenda of [inter-]) national food/feed related agencies. Through five concurrent working groups, participants formulated recommendations for developing strategies and actions addressed at the private- and public sector as well as FAO. The groups also made recommendations for developing communication strategies and provided advice for convening a global conference on insects as food and feed.

- Key action points for the private sector included: creating an international industry association with secured funding, developing a position paper to influence policy development, writing a roadmap for the insect protein technology and industry, liaising with regulators, policy makers, scientists and NGOs, and developing quality standards for products (e.g. through self-regulation and certification).
- The strategy and proposed actions for the public sector focussed on: [inter-] national networking for information exchange, supporting research, and improving awareness and collaboration among relevant ministries (health, agriculture, environment, education and research according to country context).
- A wide range of recommendations were compiled to address FAO's role in the sector, such as: acting as a 'centre of excellence' for information exchange and networking among its member countries, recognizing 'edible insects' as an interdisciplinary/ cross departmental activity and as an agenda item for its relevant Committees, and taking the lead to develop a multi-donor trust fund to facilitate further work, including field projects in interested member countries.
- It was agreed that an effective communication strategy needs to differentiate between insects as food and as feed, and also minimize sensationalism surrounding insect consumption by using well-documented literature to increase credibility. Among the

elements to be considered for developing effective communication strategies for governments, international agencies, the private sector and NGOs are: tailoring targeted messages for different audiences, identifying incentives for using insects as food, using success stories and best practices/experiences to promote the consumption of insects, involving (local) media to raise awareness, creating a communication tool kit on the importance/opportunities of insects as food and feed, and seeking endorsements from celebrities to improve the credibility of the sector.

- Logistical and technical considerations were compiled surrounding the possibility of convening a global conference on edible insects, most probably in 2014. Decisions regarding a possible venue, dates, and a potential programme will most likely rest with the preferences of potential conference donors. FAO was asked to compile a proposal and seek interest from potential donors.

Concluding remarks

What began as a small effort in FAO's Forestry Department to recognize traditional livelihood practices and sustainably managed habitats is unfolding into a broad based effort to look into the multiple dimensions of insect gathering and rearing. A growing body of evidence has made it increasingly apparent that insects offer unique opportunities to not only serve as important sources of food and feed—with minimal environmental costs—but to contribute to alleviating malnutrition. This expert consultation—which convened to explore the viability of developing insects as a future source of food and feed—proved to be a significant step forward on the global stage in enhancing awareness, networking and sharing information. The proceedings of this expert consultation will be included into a FAO technical position paper on edible insects and expected to be available by mid 2012.