2 ZERO HUNGER

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The 17 Rooms initiative is co-hosted by the Center for Sustainable Development at The Brookings Institution and The Rockefeller Foundation. Within the 2022 global flagship process, each Room, one per SDG, was asked to identify actionable priorities that can be advanced by the end of 2023 to improve some component of 2030 outcomes for its respective goal. Room 2, a working group for Sustainable Development Goal 2 on Zero Hunger, focused on promoting insect-based products across the African continent. This document summarizes the ideas and actions that emerged from Room 2 meetings and presents a roadmap for implementation.

Enabling policies for scaling insect proteins through a circular economy in Africa

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ROOM FOCUS

Room 2[1] seeks to champion a harmonized continental strategy at the African Union that focuses on developing and mainstreaming enabling policies for scaling the circular economy of insect proteins in Africa for food, feed, and frass fertilizer.

CONTEXT AND PROBLEM STATEMENT

Africa's population is growing at 2.7 percent annually, and it is anticipated to reach 2.5 billion by 2050, contributing to a 50 percent increase in the global demand for food. The demand for protein, especially for animal feed, is expected to increase by 70 percent by the year 2050 (Erdaw and Beyene, 2022). Rapid urbanization, climate change, diminishing land and water resources, undernutrition, and persistent poverty, continue to pressure current food, environment, and economic systems.

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The demand for meat proteins for human consumption is being driven by population growth, urbanization, and increased income. The growth in global consumption of animal proteins is projected to increase by 14 percent by 2030 compared to the period average between 2018 and 2020, driven largely by income and population growth. The demand for poultry meat and eggs in sub-Saharan Africa is projected to increase by 121 and 65 percent, respectively, by 2050 (Erdaw and Beyene, 2022). Crop productivity in Africa also remains a challenge due in part to low availability of organic fertilizers and high costs of imported synthetic fertilizers.

Poultry, fish, and pig farming are among the fastest-growing agro-enterprises in sub-Saharan Africa. Women account for over 40 percent of the producers but are less prominent in the higher nodes of the value chain. However, these industries are severely constrained, mostly by prohibitive feed costs and inadequate access to finance that hinder the realization of their full potential from contributing to the growth and economic development in the region.

Access to high-quality proteins, a key ingredient in animal feeds, remains a critical determinant of the production of meat and eggs. Conventional protein sources widely used in the animal feed industry include plant sources (such as soybean meal, cotton, and sunflower seed cakes, as well as several other grain products) and animal (particularly fish meal) sources. The production of these ingredients continues to put unsustainable pressure on land use and tends to induce overfishing. Strong competition also exists between human and animal nutrition in the use of these products. Annually, a staggering 20 to 30 million metric tons of fish, which is approximately one-third of the global fish caught, are used to produce fishmeal for aquaculture feeds.

Protein-based resources have recently been increasing in price and account for 60 to 70 percent of the total cost of animal production. With such high costs for production, most farmers in the developing world are left with little to no profit margins. The Russia-Ukraine war, which started in 2022, has exacerbated the food and feed challenges. Unprecedented demand for soybean protein emerged due to the significant reduction in sunflower seed cake exports from Russia and Ukraine, constraining its supply as animal feed protein.

Furthermore, increasing population and rural-to-urban migration resulting in rapid urbanization have created an enormous accumulation of over 125 million metric tonnes of organic waste annually in Africa. Less than 5 percent of this waste is effectively recycled. Accumulation of waste has multiple repercussions on development, such as greenhouse gas emissions, degradation of the environment, groundwater contamination, and risk for the spread of communicable diseases.

Insects for feed and frass fertilizer

It is against this background that insects are increasingly being considered as promising alternative protein sources and substitutes for fish and soyabean meals in animal feeds, particularly in fish, pigs, and poultry farming. For instance, black soldier fly (BSF) larvae represent an excellent nature-based attainable solution to the protein shortage and can help drive down costs for farmers (Tanga et al., 2021). This is consistent with the 2021 World Bank report, which stated that annual BSF production in Africa alone could recycle over 200 million tons of organic waste and generate over 60 million tons of insect-based animal feed and 60 million tons of organic fertilizer while creating over 15 million jobs and saving 86 million tons of carbon dioxide emissions. The frass fertilizer produced from the composting process by BSF larvae makes very good organic manure and would serve as an economically viable value-added product for emerging insect-based enterprises. This frass fertilizer is also a socially acceptable composting technology for improving soil fertility health and increasing crop yields. Other key benefits of BSF farming include:

- They are highly rich in protein and cheaper in comparison to other major protein additives in animal feeds (Shumo et al., 2019).
- The BSF larvae are estimated to reduce protein cost in feeds by at least 25 to 37.5 percent, which would eventually reduce the price of chicken and the price of fish, making it more affordable to consumers.
- Insect farming has minimal land and water requirements and high-profit margins, making it a suitable option for women and youth in rural areas and providing entrepreneurship opportunities for the urban poor and people working in the informal sector.
- Compared to other livestock, insects are efficient at converting organic matter into protein biomass with significantly lower greenhouse gas emissions.

Effective production of BSF under medium and large-scale production requires optimal conditions of 33±2 degrees Celsius, which is similar to natural climatic conditions across sub-Saharan Africa (Chia et al., 2021). Thus, BSF production in Africa would not require robots or expensive climate control conditions and associated costs. Hence, BSF farming technologies remain effective and highly scalable across sub-Saharan Africa.

Some countries in Africa already have policies in place for insect-based feed and fertilizer, such as South Africa, Kenya, Rwanda, Tanzania, and Uganda. These policies guide rapidly emerging and growing national industries. Prominent insect farming companies in these countries include but are not limited to InsectiPro Ltd, Sanergy Ltd, Bugslife Ltd, The Insectary Ltd, Riverside Farm Ltd, Ecodudu, The Bug Picture Ltd,and Mana Biosystems Ltd in Kenya; Safe for Health Ltd and MagoFarm in Rwanda; Biobuu Ltd and Chanzi Ltd in Tanzania; and Marula proteen Ltd and Protein Kapital Ltd in Uganda.

The impact of enabling policies in East Africa has been highly visible, creating incentives for private sector investments. And in the last three years, the region has witnessed an increase in BSF production from over 5,000 metric tons to 10,000 metric tons of annual production with over 1,000 insect-based enterprises making money from insect farming (Tanga et al., 2021).

In Southern Africa—specifically Zimbabwe, Malawi, and Zambia—insects for feed have been widely adopted by smallholder insect producers who process livestock feed on the farm. Production of feed on the farm is perceived to offer many advantages including low capital costs of equipment and the elimination of expensive feed packaging, which reduces costs of feed. In Zimbabwe, agricultural extension workers have been trained in insect farming and in turn providing training to more than 5,000 farmers. Additionally, through livestock producers' associations, the government has formed membership clusters around poultry, piggeries, fisheries for the sole purpose of supporting insect farming for livestock production.

In Kenya and Uganda, a large majority of poultry, fish, and pig farmers are willing to pay for livestock and fish production (Chia et al., 2020). Also, over 75 percent of feed millers are willing to integrate insect meal as substitute for fish and soyabean meal in animal feed manufacturing in the two countries. These products in the market have registered high consumer acceptance too, with over 70 percent of consumers showing willingness to consume egg and meat products from hens fed with diets consisting of insect-based feeds (Sebatta et al., 2018 and Khaemba et al., 2022). The challenge now is the lack of sufficiently large volumes of insect proteins available.

Many African countries have no existing policies or regulatory frameworks on the use of insects as feed and food. This has significantly constrained scaling, marketing, and investments in the insect sector. Harmonization of existing enabling policies at the continental level can facilitate the scaling of insects for food and feed across Africa.

The biggest policy challenge lies in enabling financial investment to move startups or SMEs into large-scale commercial production. Most insect farms are managed and driven by self-supported individuals with limited resources and financial capital. The few relatively large BSF farmers are unable to meet the market demand from the feed manufacturers. To unlock investment, there is an urgent need to create standards for insect-based proteins and harmonize standards within the region. This could foster the trust and commitment of financial institutions to support the insect sector as a profitable business by mainstreaming the trade of insect-based feed (IBF) as a novel commodity for animal feeds along existing trade channels and platforms such as the Eastern Africa Grain Council (EAGC) Grain Soko (GSoko) trading platform. This could also be treated as a value-added product for trade across the continent and beyond, perhaps as a lead commodity under the Africa Continental Free Trade Area (AfCFTA).

Insects for food

Insects as food products can also be mainstreamed through traditional and new-generation food products, particularly as complementary foods for women of reproductive age and children. There are roughly over 2000 insect species that can be used for food, more than 500 of which are already consumed in Africa (Kelemu et al., 2015). These insects, when harvested from the wild or commercially farmed, can be enjoyed by consumers as whole insect products after processing by grilling, blanching, stir-frying, deep frying, boiling, and/or oven drying. Further, oven-dried and powdered insect meal have been widely used in the novel food industry. The global value for insects for human food and feed was estimated to be $1.5 billion in 2021 (Food Institute, 2021). Crickets, grasshopper, desert locust, mealworm, palm weevils, saturniid caterpillars, etc. have been the primary focus of the market. By one estimate, the global market for farmed insects for human and animal feed will be worth $8 billion by 2030, with a 24 percent compound annual growth rate (Verner et al., 2021). To become competitive in the larger protein market, the insect-based food sector must innovate and diversify.

Including insects for food in regional food security and country food policy agendas and establishment of quality standards for insects for food products will encourage the development of the sector. Regulations for the sustainable harvest of insects for food from the wild are also critical to conserving their biodiversity. Furthermore, regulation to facilitate cross-border trade will increase market accessibility for farmed insects. The Government of Zimbabwe has adopted legislative bylaws to support stewardship of sustainable insect consumption harvested from the wild with effective coordination from the national to the grassroots levels (Musundire et al., 2021). Such models can be adopted by other countries in the continent, particularly in countries reported as hot spots for edible insects like Congo, Cameroon, Zimbabwe, Botswana, etc.

Cross-border movement and trade of insect commodities are already being facilitated for some insect species. For example, an insect movement permit has been instituted within Southern Africa. It has been accompanied by requisite phytosanitary and import/export permits allowing for easy movement and trading of mopane worms within the region.

Room 2, therefore, seeks to explore actions and pathways needed to advance insect-based food, feed, and frass fertilizer across the African continent. The purpose is to contribute toward the increased use of alternative protein and organic fertilizers in realizing the Sustainable Development Goals, specifically SDG 2.

ROADMAP FOR IMPLEMENTATION

By the end of 2023, Room 2 plans to have successfully drafted, in partnership with the Alliance for a Green Revolution in Africa (AGRA), a harmonized model strategy on insects for food, feed, and frass fertilizer for consideration by the African Union. Buy-in from the African Union, through the United Nations Economic Commission for Africa, will allow guidelines for the formulation of policies that will promote the insect sector to be cascaded down to individual countries for implementation. As ambitious as this may sound, Room 2 is confident that we have the correct stakeholders to enable us to achieve this all-important goal within the intended timeframe.

We will engage and involve different actors from the African Union Commission (AUC), United Nations Economic Commission for Africa (UNECA), African Union Development Agency-New Partnerships for Africa's Development (AUDA-NEPAD) offices to contribute to the formulation and socialization of the continental strategy on insect-based food, feed, and frass fertilizers. This will then be cascaded to the Agricultural ministries of the African Union's member states and the individual regional economic communities for further implementation at the country and regional levels, respectively.

More importantly, we will also undertake dialogue with the implementers of the Africa Continental Free Trade Area (AfCFTA) to advance use of these guidelines at the various levels of the insect value chain. The availability of enabling policies will benefit private sector actors and lead to a consequent injection of private capital into the sector, enabling a lot of small and medium enterprises to scale up their businesses and ensure the creation of sustainable livelihoods and profit-making entities. Consumers will ultimately benefit from increased awareness regarding the safety and quality of the insects they consume; the goal is to increase their confidence in consuming insect foods as part of their diets and in the overall food chain.

While we advocate for insects as alternative sources of food and feed proteins, we must also be cautious, particularly when it comes to rearing as well as farming and the potential risks.

Room 2's 2023 success will contribute toward a more diversified protein production and consumption food chain. We aim to do this by 1) developing a continental strategy for insects for food, feed, and frass fertilizer, 2) Scaling up insect production systems in Africa, and 3) shifting existing linear food economies into circular food economies. The expected result will likely bring down costs for the formal and informal insect industry while increasing the competitiveness of insect farming. In the longer-term, the efficiency of insects in converting organic material into high-demand products will also protect the environment.

Room 2 members will also be taking part in and making presentations at a number of continental conferences and summits this year to help create awareness and promote investments within the

insect sector. Some of these events include the Africa Climate Week, The AU Nutrition Champion, The Africa Day of Food and Nutrition Security, the Regional Universities Forum for Capacity Building in Agriculture Summit and the Food and Agriculture Organization Science and Innovation forum, all of which will be taking place in different African countries throughout the last quarter of 2022.

Who will contribute the needed mix of actions?

Room 2 is made up of thought leaders who hail from different sectors to help advance our agenda. We are made up of academics, entrepreneurs, policy shapers, researchers, and development practitioners. Further to this, we are engaging with AGRA to shepherd this process, by providing technical and advisory support, of getting a continental strategy for insects for food, feed, and frass fertilizer that can be anchored at the African Union.

What practical actions will be taken to advance Room 2's work over the next 12-18 months? How will the shared action plan be coordinated?

Over the next 12 months, Room 2 will be holding monthly meetings to ensure that we are all kept abreast of the developments in the project. We will develop a work plan and Gantt chart highlighting all the activities that need to be done and within what timelines. The activities will grouped into three broad domains: 1) creating awareness on use of insects for food, feed and frass fertilizers; 2) exploring partnership with AGRA, review the policy needs of the insects for food, feed and frass fertilizer sector across the continent and develop a continental strategy for the sector addressing policy gaps; and 3) anchoring the continental strategy at the African Union and further cascade them at country and regional level through organization of stakeholder workshops.

Room 2 aims to participate in international fora that will help create more awareness on using insects for food, feed, and frass fertilizer and how the transition can also help reduce greenhouse gas emissions. Being at these events will also help us drum up more support for our initiative and help crowdsource funding and create other impactful partnerships. A budget plan will also be drafted to help visualize how many resources will be needed to get our activities going in the coming months.

The coordination of activities will be done by the room co-leads, and they will ensure the timely dissemination of information related to the Room's progress and any challenges encountered as a result.

What resources are most essential to ensure progress, and how will they be secured?

Financial resources are the most critical right now to set our agenda items in motion. We have received commitments from the FAO, EAGC, and ICC, though the exact amounts are yet to be communicated. AGRA may provide technical and advisory support throughout this process based on further analysis of business case on smallholder farms.

We are also exploring other avenues and options to ensure that we have adequate funding to see us through to the end of 2023.

Major milestones or metrics will indicate the Room is on track for success in 2023:

1. Having initial meetings with AU and UNECA partners to learn their feedback and promote buy-in.
2. A draft continental strategy showing how the policy can cascade down to individual countries for uptake and implementation.
3. Publication of a position paper.

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