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Short Communication

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Opinion: Why Africa Should Embrace Black Soldier Fly Farming

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ABSTRACT

Across Africa, organic waste continues to pile up in landfills and uncontrolled dumps, fuelling environmental and public health risks, while farmers grapple with soaring feed and fertiliser costs that threaten food production. Piotr Barczak of Africa Circular argues black soldier fly farming can help tackle both challenges by turning waste into valuable agricultural inputs.

- Mr Barczak is Circular Economy Programme Manager at Africa Circular, a non-profit advancing circular economy solutions on the continent. The organisation implemented the 2024–2026 BUGS project, which used black soldier fly technology to improve food security, reduce greenhouse gas emissions and valorise organic waste in Uganda, Ethiopia and Ivory Coast.
- "The black soldier fly is nature's recycler. During their larval stage, the insects consume large quantities of organic waste, converting it into two valuable agricultural products: larval biomass, a high-quality source of protein and fat for animal feed, and frass, the nutrient-rich residue that can be used to improve soil fertility and structure" he says.

Keywords: Fly Farming, Waste, Agricultural Inputs

Introduction

More details By Piotr Barczak

Across Africa, millions of smallholder farmers face the same challenge: producing more food with fewer resources. The rising cost of animal feed and fertilizers places increasing pressure on household incomes, while at the same time vast quantities of organic waste from households, markets and agriculture remain underutilized. Too often, these valuable resources end up in open dumps or landfills, where they generate methane—a greenhouse gas far more potent than carbon dioxide.

For many farmers, the challenge is not only the price of agricultural inputs but also their availability. Feed ingredients such as fishmeal and soybean meal are often imported or transported over long distances, making them vulnerable to global market fluctuations. Mineral fertilizers have become increasingly expensive and, in some regions, difficult to access. As a result, many farmers apply less fertilizer than their crops require or reduce the quality of animal feed, directly affecting productivity, food security and household income.

The BUGS (Biomass Utilization by Insects for Green Solutions) project was created to address these interconnected challenges through one simple principle: **listen first, innovate second.** It's been funded by the Climate and Clean Coalition (CCAC-UNEP) and PREVENT Waste Alliance (GIZ).

Rather than promoting expensive, industrial-scale technologies, the project responded to a growing demand from African farmers for practical, affordable and decentralized solutions that could strengthen their livelihoods while improving local waste management. The answer was not a new invention, but a natural process that has existed for millions of years: **the black soldier fly (BSF).**

Turning Waste into Valuable Resources

The black soldier fly is nature's recycler. During their larval stage, the insects consume large quantities of organic waste, converting it into two valuable agricultural products.

The first is a **locally produced source of high-quality protein and fat.** BSF larvae can be fed directly to poultry, fish and pigs or processed into insect meal and oil, replacing part of conventional

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feed ingredients. By producing protein locally from locally available organic waste, farmers become less dependent on expensive imported feed while creating greater resilience within local food systems. Instead of relying on volatile international markets, farmers can produce a significant part of their animal feed using resources that already exist in their communities.

The second product is **frass;** the natural residue left after the larvae have consumed the waste. Far more than a simple fertilizer, frass is a biological soil improver. It contains valuable nutrients, beneficial microorganisms that help restore soil life, and compounds such as chitin that can stimulate plants' natural defense mechanisms against certain pests and diseases. In regions where soils have become degraded and fertilizers increasingly expensive, frass offers farmers an affordable way to rebuild soil fertility while reducing dependence on synthetic inputs. Healthier soils also retain more water, improve crop resilience and contribute to long-term agricultural productivity.

Together, these two products create a powerful circular system. Organic waste is transformed into locally produced feed and soil improvers instead of becoming an environmental burden. Nutrients remain within local food systems rather than being lost in landfills or requiring costly imports.

This is circular economy in action. Waste becomes a resource. Local challenges generate local solutions.

A single tonne of clean organic waste can produce approximately **200–250 kilograms of fresh larvae** and **300–400 kilograms of frass,** while significantly reducing the amount of waste requiring disposal. What was once considered waste becomes nearly half a tonne of valuable agricultural products.

A Nature-Based Climate Solution

Beyond its agricultural benefits, black soldier fly farming also offers significant climate mitigation potential.

Organic waste is one of the largest sources of methane emissions from the waste sector. When food waste and other biodegradable materials are disposed of in landfills or open dumps, they decompose in the absence of oxygen and release methane, a greenhouse gas with a warming effect many times greater than carbon dioxide over the short term. In many African cities, organic waste represents more than half of municipal solid waste, making its proper management one of the greatest opportunities for reducing greenhouse gas emissions.

Black soldier fly farming changes this equation. Instead of allowing organic waste to decompose and generate methane, the waste is rapidly consumed by larvae and converted into valuable products before significant emissions can occur. Every tonne of organic waste diverted from landfill therefore contributes directly to climate mitigation while simultaneously generating economic value.

The climate benefits extend even further. Locally produced insect protein reduces dependence on conventional feed ingredients whose production and transport often carry substantial environmental footprints. At the same time, healthier soils supported by frass require fewer external inputs and become more resilient to drought and changing climatic conditions.

In this way, one decentralized BSF facility contributes simultaneously to waste management, climate mitigation, sustainable agriculture, food security and rural livelihoods. It is a powerful example of how one circular economy intervention can generate multiple environmental, social and economic benefits at the same time.

This recognition of BSF's climate potential was one of the reasons why the Climate and Clean Air Coalition (CCAC) supported the BUGS project. By demonstrating how organic waste can be transformed into valuable agricultural resources instead of becoming a source of methane emissions, the project shows that climate action can also strengthen local economies and improve people's lives.

Building an Enabling Ecosystem

Recognizing that technology alone is never enough, BUGS combines practical implementation with policy engagement. The project works simultaneously with farmers, entrepreneurs, municipalities and national governments to build an enabling environment for sustainable insect farming.

Implemented in **Uganda, Ethiopia and Côte d'Ivoire,** BUGS trained more than **100 farmers and entrepreneurs** through hands-on workshops while engaging over **200 policymakers and stakeholders** in discussions on circular economy, sustainable agriculture, waste management and climate policy. Participants learned not only how to rear black soldier flies, but also how to integrate them into viable farm businesses that improve productivity and create new income opportunities.

One of the strongest messages emerging from the workshops was the enthusiasm of farmers for decentralized, low-cost production systems. Many participants were not looking to build large industrial facilities. They wanted practical solutions that could be integrated into their existing farms using locally available materials and organic waste streams.

To ensure that learning continues beyond the workshops, the project established an international BSF Community of Practice with around **1,800 members,** bringing together farmers, researchers, investors, policymakers, city authorities, development organizations and technical experts. The platform enables members to exchange practical advice, troubleshoot production challenges, identify funding opportunities and build partnerships across countries. It has become a vibrant network where knowledge continues to grow well beyond the lifetime of the project itself.

Beyond training, BUGS developed a comprehensive suite of practical tools, including Standard Operating Procedures for reproduction and grow-out units, a Policy Guide for Governmental Actors, greenhouse gas and business calculators, and Technical Toolkit based on the simplified SIMBA approach. These resources enable farmers, entrepreneurs and decision-makers to establish decentralized systems that are technically sound, economically viable and adapted to local realities.

Lessons for the Circular Economy

One of the project's strongest messages is that scale is not the goal—fit is the goal.

The greatest impact will not necessarily come from the largest insect factories, but from thousands of appropriately sized facilities embedded within local food systems, processing organic waste close to where it is generated and supplying nearby farmers with locally produced feed and soil improvers.

Another important lesson is that circular economy solutions cannot simply be copied from one place to another. Every community has different waste streams, agricultural practices, regulations and market opportunities. Successful implementation therefore starts with listening to local communities, conducting thorough feasibility assessments and designing solutions that respond to local realities rather than imposing predetermined models.

The BUGS project demonstrates that the circular economy is not only about recycling materials—it is about redesigning systems so that waste becomes a valuable resource, environmental challenges become economic opportunities, and local communities become active drivers of sustainable development.

By working with nature rather than against it, African farmers are showing that one of the smallest insects can help address some of the continent's biggest challenges: improving food security, regenerating soils, reducing methane emissions, creating green jobs and building more resilient local economies. Sometimes the most powerful innovations are not the most complex—they are the ones that fit the needs of the people they are designed to serve.