BUGS Project

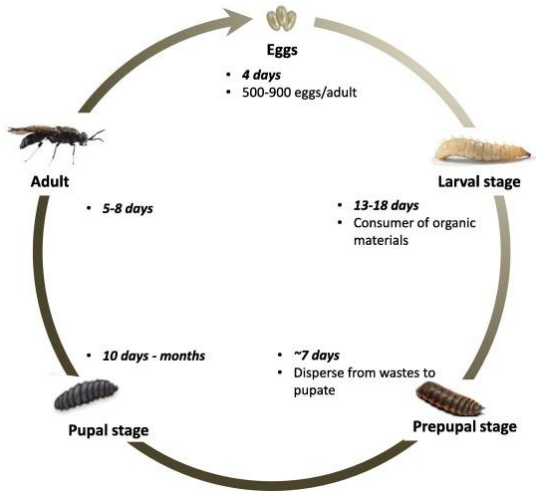
Biomass **U**tilization by Insects for **G**reen **S**olutions in Africa through Black Soldier Fly Technology

Period	12.2023 – 10.2026
Countries	Ethiopia, Cote d'Ivoire, and Uganda
Project partners	ACEN Foundation, Trinomics, Eclose, and EAWAG. The project is co-funded by the Climate and Clean Air Coalition (CCAC) and PREVENT Waste Alliance.

Black Soldier Fly Technology

The Black Soldier Fly (BSF), *Hermetia illucens*, is recognized for its ability to convert organic waste into protein- and fat-rich feed for cattle, pigs, chicken, fish, and pets. The fly larvae are fed with organic waste, reducing its amount by 50–80%. Larvae can be harvested after about 14 days with a waste-to-biomass conversion rate of up to 20% (on a total solid basis). The larvae be processed and used as animal feed, while the remaining residue can be composted and used as fertilizer (frass) and soil conditioner.

Ongoing projects, such as the CCAC-supported site in Lima, aim to demonstrate the business viability of BSF plants for large-scale organic waste treatment.



The Project

PREVENT Waste Alliance members jointly developed a proposal to promote the Black Soldier Fly (BSF) technology in Ethiopia, Côte d'Ivoire and Uganda.

The project is co-funded by PREVENT and the Climate and Clean Air Coalition (CCAC, see also the CCAC TEAP Panel's Waste Brief and BSF infographic).

Implemented by the ACEN Foundation, Trinomics, Eclose, and EAWAG, the project develops a **guide for BSF operators and creates a methodology to assess the feasibility of BSF initiatives** to be piloted in the target countries. It also seeks to capture best practices and foster collaboration among stakeholders, mainstreaming BSF farming into waste management, agriculture, and climate-oriented strategies. The project is also supporting capacity development, job creation and technology transfer.

Workshops held in early 2024 in each country brought together stakeholders to discuss opportunities, explore existing policies, and address technical gaps. The sessions also explored how BSF technology could complement existing composting initiatives, and manage waste from food processing, and design sustainable business models. The multi-year project aims to lay the **groundwork for future BSF initiatives** and create favourable economic and institutional conditions for long-term success.

Requirements for a successful BSF implementation

To establish a successful Black Soldier Fly (BSF) project, several prerequisites must be met.

- BSF larvae require a warm, stable climate and thrive in temperatures between 24°C and 30°C.
- Consistent humidity is also crucial, with optimal levels above 60%.
- Cooperative actors enabling access to a steady, long-term supply of homogenous food- and kitchen waste is essential for larvae feeding.
- There must be a market for the larvae and by-products, such as animal feed or compost.

Challenges and Obstacles

A lack of funding, limited knowledge on BSF technology, poor infrastructure, insufficient stakeholder coordination, and gaps in policy frameworks commonly complicate the scaling of BSF projects. Overcoming these obstacles requires targeted awareness raising and trainings for key stakeholders as well as infrastructure investment. Financial mechanisms and supportive policies can help accessing markets for new natural alternatives to synthetic fertilizers and conventional animal feed.

Climate Impacts

If mismanaged, conventional organic waste treatment methods can emit methane and CO_2, contributing to the climate crisis. Case studies indicate that BSF technology can significantly reduce GHG emissions from the waste sector. Frass (larvae's excrement) boosts soil's capability for carbon sequestration. Since conventional feeds and synthetic fertilizer can be replaced with BSF outputs, it will further contribute to GHG savings in agriculture, therefore efficiently combat global warming. BSF technology thus supports low-carbon waste management and sustainable food production. Adaptable BSF approaches are suitable for diverse contexts, from small-scale household to large-scale industrial plants.

Circular Economy Impacts

The Black Soldier Fly (BSF) technology supports a circular economy by turning organic waste into marketable resources and thereby supporting a functional organic waste management system. This process closes the loop on organic waste, reducing environmental impact, and promoting sustainable resource use. By repurposing waste into products, BSF technology aligns with circular economy principles of resource efficiency and waste minimization. The approach offers employment opportunities for both skilled and unskilled workers.

Expected Achievements

- Assisting governments in developing BSF project proposals.
- Identification of priority areas for BSF implementation providing the most suitable conditions in the three partner countries.
- Face-to-face trainings for 240 BSF operators on applying the technology at local level.
- Case Study with project's lessons learned.
- Three capacity building workshops in target communities.
- Assessment and planning toolkit to ensure replicability in additional countries.
- Creating and mobilizing a BSF Community of Practice across Africa.

PREVENT Waste Alliance

The PREVENT Waste Alliance serves as an international 'think and do tank' for circular economy practitioners. As a platform for knowledge exchange and international cooperation, it brings together organisations from the private sector, academia, civil society and public institutions. PREVENT's mission is to advance the circular economy in low- and middle-income countries by minimising waste, eliminating pollutants, and maximising the reuse of resources in the economy worldwide.

This project was selected in a call for innovative and scalable solutions to build a circular economy.

The PREVENT Waste Alliance was launched in 2019 by the German Federal Ministry for Economic Cooperation and Development.

Federal Ministry
for Economic Cooperation
and Development

PREVENT
Waste Alliance

Imprint

Published by

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
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October 2024

Credits: Figure © Surendra et al. (2020)

On behalf of

German Federal Ministry for Economic Cooperation and Development (BMZ)
Division 121 Water and Circular Economy
Bonn, Germany

This project is funded by the PREVENT Waste Alliance, an initiative of the German Federal Government.

More information on PREVENT: www.prevent-waste.net/

More information on CCAC here.