

IITA BBEST

BSF FOR BIO CIRCULAR ECONOMY
AND ENVIRONMENTAL SUSTAINABILITY



Vegetable demonstration field established by the BBEST project and INRAN in Niamey.

In the Issue

- The **BBEST** project promotes the adoption and the use of the **BSF** frass among smallholder farmer groups in Ghana.
- Farmers in Niger were introduced to the **BSF** frass, an alternative organic fertilizer through established demonstration plots.
- The **BBEST** Project exhibits and markets its **BSF** frass and larvae during an **Agrifair** in Ghana.
- IITA showcases the **BSF** technology during the **Made in DRC Expo** and **Kinshasa Economic Forum**.
- Farmer groups, and researchers engaged by the **BBEST** Project in Mali.

The **BBEST** project promotes the adoption and the use of the **BDF** frass among smallholder farmer groups Ghana.

The IITA-led BBEST project in Ghana recently hosted farmer groups from Kawukudi, from the Ayawaso East municipality, Evandy from the Ayawaso West Wuogon municipality and GAEC from the Ga East Municipality at its vegetable demonstration field established at Kofisah in Nsawam.

This activity conducted in collaboration with Biotechnology and Nuclear Agriculture Research Institute (BNARI) aimed at promoting the adoption and use of the black soldier fly frass (BSFF), a by-product of the BSF technology.

About twenty farmers and extension agents, were introduced to the BSF frass. During the informative session, the facilitators highlighted the advantages of the use of the frass, which is a nutrient rich organic fertilizer, produced in an environmentally- friendly way.



Okra harvested from the demonstration plot established by the BBEST project in Ghana.

It contains nitrogen, phosphorus, potassium and beneficial microorganisms that improve yield and strengthen the health of the soil. These unique advantages position the BSF frass as an alternative organic fertilizer to grow vegetables.

The facilitators provided farmers with insights on the application of the BSF frass and its combination with inorganic fertilizer to obtain good yield. Farmers observed the effects of the frass and its combination with other inorganic fertilizers on the vegetables cultivated namely: Okra, African eggplant, Amaranthus, and sweet pepper.



Farmers harvesting vegetables from the demonstration field established in Ghana.

They shared their perspectives on the yields and recognized the importance of the integrated soil fertility management for yield increase and long-term crop cultivation.

One of the farmers who used the frass told us; “the application of the BSF frass helped in controlling weeds in his farm. He added that he obtains more yield using the BSF frass”.

The farmers visited the BSF larvae facility to sight the production of the BSF larvae, another product of the BSF technology, rich in protein and used in poultry, aquaculture and pig production.

They expressed their appreciation to the IITA and the BNARI team for introducing them to the BSF products and showed interest in purchasing the BSF frass, while others expressed their desire in being trained to produce the BSF larvae and frass.

The BSF larvae and frass are both certified products in Ghana respectively by the Ghana Standard Authority (GSA) and the Plant Protection and Regulatory Service Directorate (PPRSD) under the Ministry of Food and Agriculture (MoFA).

The BBEST project in Niger showcase the potential of the BSF frass, an alternative organic fertilizer to farmers through established demonstration plots.

Following years of collaborative research with the World Vegetable Center (WorldVeg) and INRAN, the BBEST Project has established a demonstration field to showcase the potential of the BSF Frass in vegetable production in Niamey and Maradi in Niger.

The project invited farmers to the demonstration fields to witness the positive effects the BSF Frass, an organic fertilizer in vegetable farming in Niger. The BSF frass is a Nutrient-rich organic fertilizer, locally produced and can be used alone or in combination with conventional fertilizers to improve yields. It reduces dependence on inorganic fertilizers, preserves water quality and sustainably strengthens soil health.

According to Dr Abasse Tougiani the project coordinator in Niger, “tomatoes and onions are two flagship vegetable crops in Niger and are central to the country's agriculture and food and are important sources of income for producers, especially in the dry season”.

These crops play a strategic role in the fight against poverty and the strengthening of the resilience of rural households. Onions, especially the Violet de Galmi variety, are a major export product to coastal countries in West Africa, while tomatoes contribute strongly to food security and the diversification of diets.

He added that poor soils are one of the main constraints of vegetable farmers in Niger; and the objective of this demonstration is to validate the agronomic and economic performance of the frass and to promote its adoption.

The experiments conducted during the year 2024, have significantly improved yields. The demonstration fields were set for continuous evaluation and validation by farmers in Niamey, with a view to identifying strategies for the use of the frass.



Farmers taking part in the demonstration field activities at the BSF unit in Niamey.

The activity was carried out in a participatory approach to allow vegetable farmers and extension agents to directly assess the effectiveness of the BSF Frass in vegetable production and it involved five researchers, 325 vegetable (men, women and youth), six agents from the State's technical services (agriculture, environment and sanitation) and an NGO around of the Central Unit in Niamey. Explanations of the application process of the BSF frass as well as the evaluation of its effect on onion and tomato productivity were provided to agriculture technical services, environment and sanitation, and NGOs).

Dr. Paul Alhassan Zaato from WorldVeg (Ghana), who took part in one of field demonstration alongside stakeholders shared practical experiences from the Ghana team on the BSF production, especially the vegetable farmers. He spoke about the different stages of the black soldier fly production chain implemented in Ghana. It emerged from these exchanges that, to facilitate the large-scale production of larvae, it is necessary to mechanize certain stages of the production process of the black soldier fly.

Following this training session, Dr. Paul visited one of the vegetable production sites located near the black soldier fly production unit, in order to see first-hand the extent of the gardens and to emphasize the importance of the production and use of black soldier fly frass to reduce vegetable production costs.

The technical services and vegetable producers of Commune IV of Niamey expressed their satisfaction as they discovered the products of the black soldier fly technology and better understand its agronomic and economic benefits. All participants showed a strong interest in this innovation. The farmers expressed their willingness to be trained in order to start agribusiness, while technical services agents recommended raising awareness around the activities of the decentralized unit in Niamey. They also suggested extending it to public and private fish farmers in Niamey.

Finally, in view of the importance of this technology, the participants committed to supporting the technicians in charge in the monitoring of the demonstration system, in order to ensure its success.



Vegetables from the demonstration field established in Niger

The BBEST exhibits and sells the BSF frass and larvae during the Agrifair in Ghana

In a stride to promote the adoption of sustainable agriculture practice, the BBEST project-led by the International Institute of Tropical Agriculture (IITA) exhibited the black soldier fly products at the Agrifair organized by Channel One TV in Accra, Ghana from 28th to 30th November.

During the three-day event held at the Efua Sutherland Children Park, the BBEST project showcased a live display of the stages of the Black soldier fly's life cycle namely: the adult stage, the eggs stage, the larval stage and the pupae stage. This aroused the curiosity of many which were educated on the BSF technology, and its ability to transform the agriculture sector, providing protein for livestock and organic fertilizer for vegetable production.

The production of the BSF Larvae and frass is done in an environmentally friendly way as the larvae feed on organic, reducing the waste in the environment. This also contribute to the promotion of a circular bio economy and to urban waste management.

Visitors were amazed by the rapid growth of the larvae and expressed interest in the dried larvae, upon learning that it has high-quality nutrient rich protein and fat and used in aquaculture poultry and pig feed formulation and the frass, a nutrient-rich organic fertilizer used in vegetable production, which also improves soil fertility.

The dried BSF Larvae which is now available on the market, is certified by the Ghana Standard Authority (GSA) and the BSF Frass is a certified product by the Plant Protection and Regulation Service Directorate (PPRDS), under the Ministry of Food and Agriculture (MoFA) and are safe for consumption.

The BBEST project participation in the fair did not only attract farmers and livestock producers' attention, but it also generated people's interest to start the production of the Black Soldier fly larvae and frass after being educated on its benefits.

This initiative led by IITA is funded by Norwegian Government through Norad. It has established a production unit producing and commercializing the dried BSF larvae and frass to farmers. This reaffirms IITA's commitment to supporting smallholder farmers and contributing to system transformation.



The Production manager of the BSF production facility engaging a visitor during the Agrifair.

IITA Showcases the BSF technology during the Made in DRC expo and Kinshasa Economic Forum.

The Black Soldier Fly (BSF) technology is gradually positioning itself as a sustainable solution in livestock and vegetable production in many countries, and to promote the adoption of the technology in DRC, the IITA led BSF for Bio Circular Economy and Environmental Sustainability (BBEST) project took part in the Made in DRC Expo and Kinshasa Economic Forum held at Pullman Hotel in Kinshasa and exhibited the technology and its products.

The project team highlighted that the BSF technology is addressing two challenges namely: the unsustainable biowaste management and the unsustainable supply of animal feed and organic fertilizer.

The team sensitized visitors on the advantages of the BSF technology and highlighted the advantages of the BSF larvae, which has a high source of protein and is used in livestock and poultry production; and the frass which is an alternative to chemical fertilizer and contributes to vegetable growth and soil health. The live exhibition of the life cycle of the fly enabled visitors to appreciate the differences between the BSF and the normal flies.

Mrs. RUKIYA RAMAZANI Zady, Secretary General at the Ministry of Entrepreneurship, Small and Medium Enterprises, representing her supervisory authority, appreciated this black soldier fly technology.

During the exhibition, the team sensitized visitors on the job creation aspect of the production of the BSF larvae and frass.

The project team answered the questions that were asked by the visitors. When asked about the consumption of black soldier fly larvae, the team said that the larvae are only for animals. They indicated that the black soldier fly is found everywhere in nature and especially in an environment where there is strong smell of waste and does not bite or transmit pathogens.

This exhibition was an eye opening for several visitors, Mr. Aristotle, a young student at the Pedagogical University of Kinshasa got to know about the BSF through the exhibition and learned about its use in agriculture.

Mrs. Séverine LUKOMBO, a livestock producer expressed interest in the training on the BSF larvae production and plan to attend together with his children and use it to feed her animal.

Mr. Christian MUMBAVU, another livestock producer said, "I am very expressed by this technology of the black soldier fly" and expressed interest in being trained.



Dr Agbodzavu, the BBEST project manager engaging visitors during the Made in DRC Expo and Kinshasa Economic Forum.

Mr. Pascal, a farmer, asks the BBEST project to organize training sessions to allow a large number of people to master this technology which provides a solution to livestock producers and farmers.

Farmer groups, and researchers engaged by the BBEST Project in Mali.

The BBEST project engaged about thirty-five people including researchers, extension officers, NGOs, farmer organizations and student trainees through established demonstration fields in Mali, with the aim to demonstrate the effectiveness of the Black soldier fly frass in vegetable production and promote its use among smallholder vegetable farmers.

These fields were established at the research station in at Sotuba in Mali, next to the black soldier fly production unit. The activities began in September with the preparation, the demarcation of the plots, the application of the fertilizers and transplanting of the vegetables. Four key vegetables were tested, namely the African eggplant (*solanum aethiopicum*) Kokun variety planted on 230 m², the blond lettuce variety bet on 200 m², the okra nènèkala on 400 m² and three varieties of shallot (500 m²) planted a few days after the visit.

In the use of the different doses of FRASS on the production of African eggplant and okra, the 100%BSF plus 100NPK dose gave the best yields on both crops followed by 75% BSF plus 25%NPK.

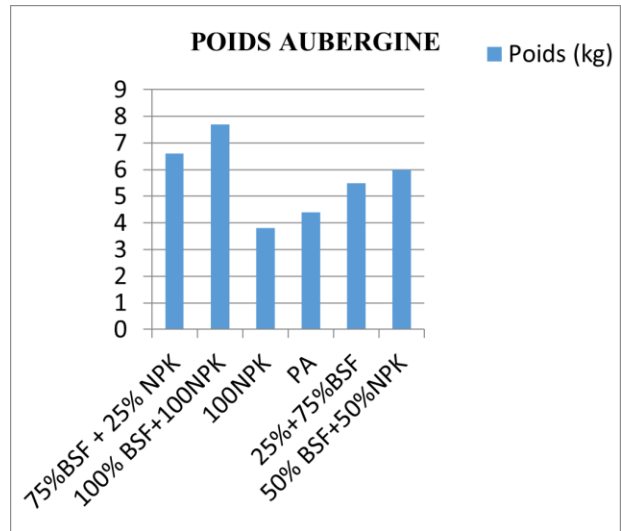
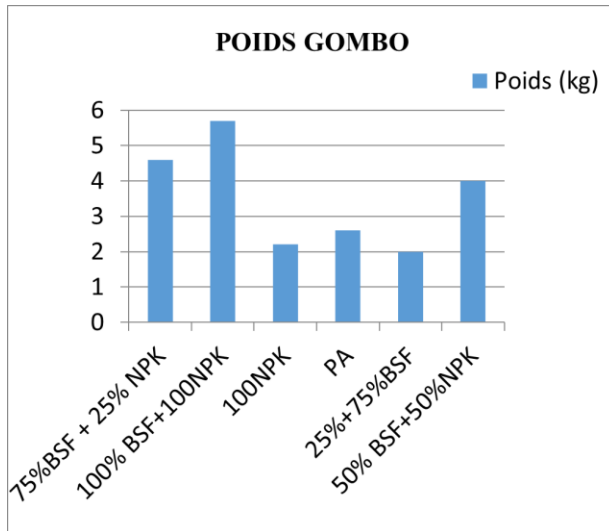
A subsequent field day was carried out on the 30th of September 2025 with the presence of the same thirty-five (35) participants. Farmers had a guided tour to observe the vegetables planted and to appreciate the impact of the different doses of FRASS on each vegetable. They shared different perspectives on the performance of the BSF frass.

New vegetables were tested namely tomato (Nayeli) from WORDVEG, African eggplant variety Kokun 50 m², chili pepper variety (Nissondia) from WORDVEG 50 m², onion (galmi violet) on 400 m², lettuce (blonde de Paris) on 400 m² and amaranth on 50 m².

This participatory approach has enabled a two-way communication between the project and the farmers, where farmers shared their views on the performance of the frass.



Farmers taking part in the demonstration field activities in Mali.



Results of the application of the frass on Okra and Garden eggs in Mali

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