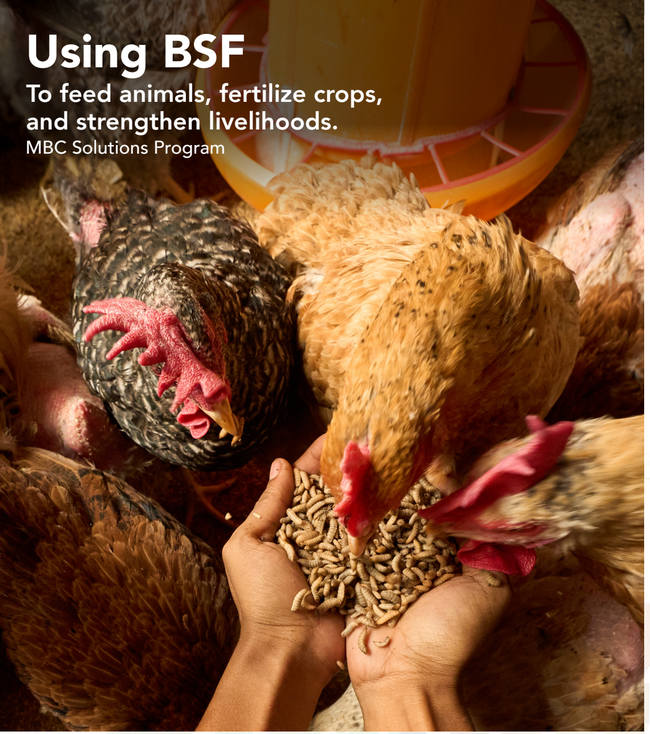

Using BSF

To feed animals, fertilize crops, and strengthen livelihoods.

MBC Solutions Program

MADAGASCAR BIODIVERSITY CENTER

siani

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Nutritious BSF, boosting livestock

Nutrients in dried BSF

Protein: helps animals grow, produce (milk, meat, eggs) and stay healthy.

Fat: energy for growth, better digestion, tastier meat.

Calcium and Phosphorus: strengthen and improve bone growth, essential for egg production.

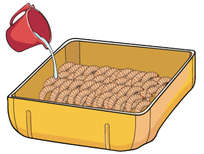
Methionine and Lysine: support rapid growth and strengthen immunity.

Protein	38,5 - 63 %
Fat	6,6 - 39 %
Calcium	1,7 - 3,2 g/kg
Phosphorus	3 - 4,5 g/kg
Methionine	6 - 8 mg/g
Lysine	4 - 5 mg/g

(Barragan-Fonseca *et al.*, 2017; Shumo *et al.*, 2019)

Types of BSF processing for animal feed

Fresh BSF larvae



Rinsed BSF

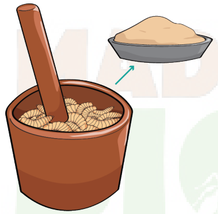
- Rinse thoroughly with clean water.

Boiled BSF

- To kill them and ease digestion.
- Boil for 3–5 minutes.

Dried BSF

- Easier to store.
- Easier to turn into powder.
- Dry for 2–3 days, depending on the weather.

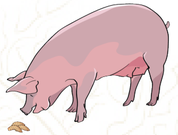


BSF Powder

- Mix with regular feed.
- Store in a dry, tightly closed container.
- Keep in a dry place away from sunlight.
- Can be stored for 3–6 months.

All these types can be fed to chickens, fish, and pigs.

Introducing BSF into livestock feed



Common feed that can be partially replaced with BSF:

- Fish meal
- Soy
- Corn
- Rice bran

Replacement rate: 10–50% of the regular feed.

Guidelines:

- Do not change the feed suddenly, introduce BSF gradually.
- Start by replacing 10% of the regular feed with BSF.
- Can be fed daily according to the animals' needs.
- Do not exceed 75% BSF in the total feed.
- Alternate BSF forms (dried / fresh / powdered).
- Monitor feed intake, health, growth, production and adjust if needed.

BSF frass: a natural superfertilizer for better yields

Manure
Exuviae
Uneaten feed
Dead BSF

Nitrogen (N):
-Helps leaves grow and stay green.
-Increases plant height.

Phosphorus (P):
-Strengthens roots.
-Improves stem growth.
-Increases yield (fruits and vegetables).

K (Potasioma):
-Improves plant health.
-Protects against diseases.
-Enhances quality of fruits and vegetables.

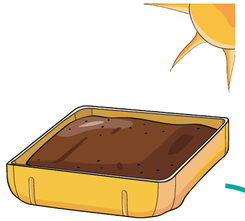
Nutrients	BSF frass fertilizer (%)	Cattle manure (%)	Chicken manure (%)
Nitrogen (N)	0,6 - 5,1	0,3 -1,6	0,6 - 1,6
Phosphorus (P)	0.2 - 5,2	0,1 - 0.3	0,1 - 0,7
Potassium (K)	0.2 - 4,5	0,2 - 1,1	0,1 - 0,7

(FAO, 2005; Lomonaco *et al.*, 2024)

How to process BSF frass

When the waste is fully decomposed, it can be used immediately.

Drying



- Place on clean ground or tray.
- Leave to dry in the sun for a few days, depending on the weather, and mix frequently.
- Once fully dry, store in a tightly closed bag.

Usage

- Smaller amounts needed because it is richer in nutrients.
- Can be used on all crops: maize, rice, vegetables,...

Crops	BSF fertilizer amount (kg/are)	Cattle manure amount (kg/are)
Rice	35	100
Vegetables	50	150

Composting

- Layer the different elements alternately.
- Water every 7 days.
- Turn every 15 days.
- After 5–8 weeks, compost is ready when it has no bad smell, dark in color, and soft.

- 1/3 dry leaves
- 1/3 fresh leaves
- 1/3 BSF frass
- 1/3 dry leaves
- 1/3 fresh leaves
- 1/3 BSF frass

Harvesting

- If there is still a lot of rice bran or leftover waste that hasn't been decomposed, it should be turned into compost.

Benefits for livestock farming

- Reduces spending on animal feed.
- Supports faster growth and healthy weight gain in animals.
- Improves animal growth, health, and product quality (meat, milk, eggs).
- Leads to better food for people due to higher-quality products.
- Increases overall production, improving livelihoods.

Benefits for agriculture

- High-quality natural fertilizer.
- Improves soil and increases crop yield.
- Saves money: reduces fertilizer costs for farmers.
- Strengthens natural defenses: helps plants protect themselves against diseases and pests.

*This booklet was produced by **Madagascar Biodiversity Center (MBC)** as part of the Circular Farming Program.*
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