



Vigyan Ashram  
**Startup Saarthi**

**Business Plan**  
**BSF**

*Supported By*



सत्यमेव जयते

विज्ञान एवं  
प्रौद्योगिकी मंत्रालय  
MINISTRY OF  
**SCIENCE AND  
TECHNOLOGY**



# Industrial Overview

## About Product/Service



Black Soldier Fly larvae (BSFL), who are voracious feeders of organic waste, efficiently convert waste to valuable protein, even in artificial environments. The BSF larvae contain extremely high proportions of protein and fats, thereby producing a superb quality source of feed that can act as substitute of soymeal and fishmeal that are being used conventionally in poultry and aquaculture. This points to the fact that the food waste stream can become a profitable, revenue-generating inputs to the feed sector, hence giving impetus to the circular economy and improving eco-consciousness as well as saving us from the hazards of overfishing.

Additionally, BSF larvae and many other forms of insect farming bear a lower carbon footprint, generate lesser GHG emissions and require a lesser fraction of water, land and feed inputs as compared to the traditional animal agriculture methods. Given that in the recent years the food security woes have increased globally, resulting in food shortage and under-nutrition due to adverse climate conditions and increasing prices of animal protein, insect farming can be seen as a potential solution towards bettering the food security challenges, particularly for the developed nations. More so, as beyond the aquaculture space, even chicken, cattle and various types of household pets could also benefit from insect-derived feed, with recent research indicating that insects have higher palatability and that insect-based larvae enzymes can drastically improve the feed conversion ratios amongst cattle! In addition, as a growing number of unprecedented use-cases for insect farming or insect rearing are being explored now, such as insect frass as fertilizers and by deriving raw materials or finished products for the cosmetics and pharmaceutical industries, among others, these will certainly unlock the doors to many more new opportunities and commercial usage prospects.

## Future Potential



the global insect protein industry is estimated to be valued at US \$7.9 billion by 2030, while growing at a CAGR of over 27 per cent. In India as well, while there is today a lack of statistics and/or industry estimates, but even so, it can be said with confidence that the size and scope of insect farming (including edible insects) in India is growing at rapid pace, and shall continue to grow furthermore in the upcoming years.



## Competition Analysis

For a small-scale player entering the black soldier fly (BSF) farming market, competition analysis is crucial. Assess existing players in terms of production scale, product offerings, and market presence. Identify potential niche markets or unique value propositions, such as sustainable practices, organic production, or localized distribution. Analyze pricing strategies, production efficiency, and supply chain logistics to pinpoint areas for differentiation. Additionally, consider regulatory aspects and certification requirements for insect farming. Collaborate with local communities or businesses for mutual benefit. Leverage your agility to adapt quickly and innovate, focusing on quality, sustainability, and tailored solutions to gain a competitive edge in the growing BSF



## Global BSF Players





# BSF Lifecycle

Pupa to adult  
Temperature: 26-27 degree celcius

Pupation



14 days



Prepupa

Growth and development  
Salinity of substrate  
Survival rate=50%



Adults, mate  
Acquisition about 4 days

Life cycle of BSF~ 44 days

Larval or feeding stage  
22~24 days



Light Intensity:  
150-200 mu mol/m^2

Mating



1 BSF lays 400-600 eggs

Egg laying



Relative humidity:  
60-70%  
Survival rate=50%

Take 4 days to hatching

Larvae density: 1to 3 kg larvae/gram of eggs  
Survival rate=



# BSF Lifecycle-Size and Weight



Size of BSF at every stage

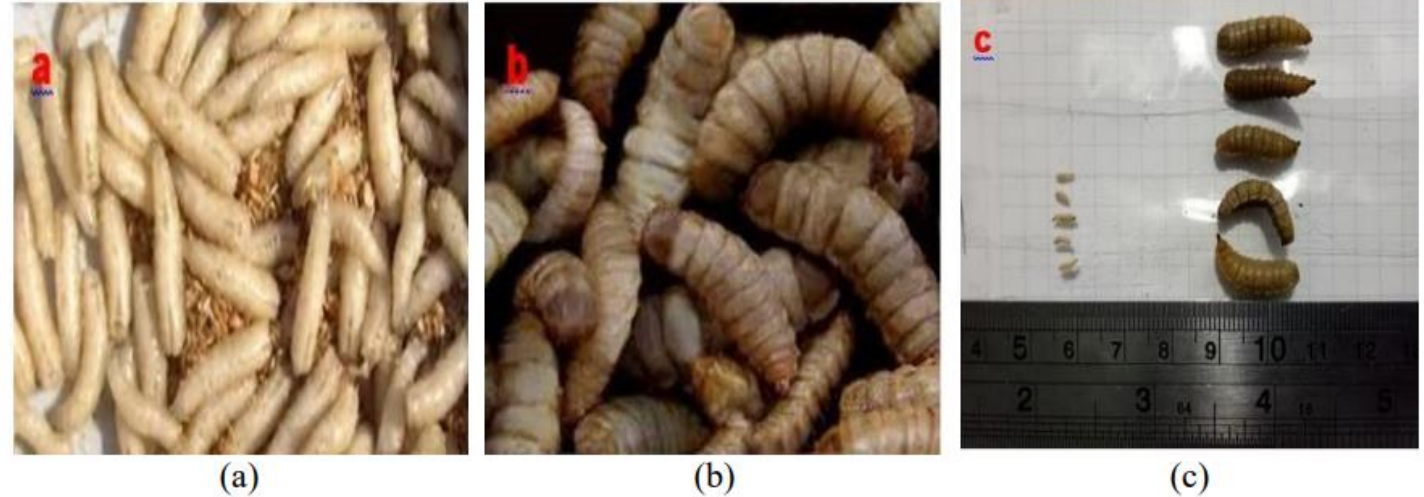


Figure 1. (a) larvae  $\pm 5$  dol, (b) larvae  $\pm 17$  dol, and (c) difference size between  $\pm 5$  dol and  $\pm 17$  dol

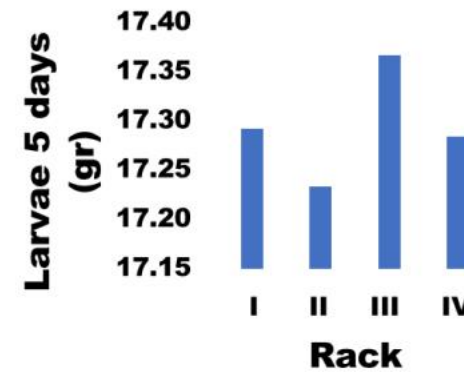


Figure 2. The total weight of  $\pm 5$  dol (5 days age) in each rack (a rack contains 12 boxes)

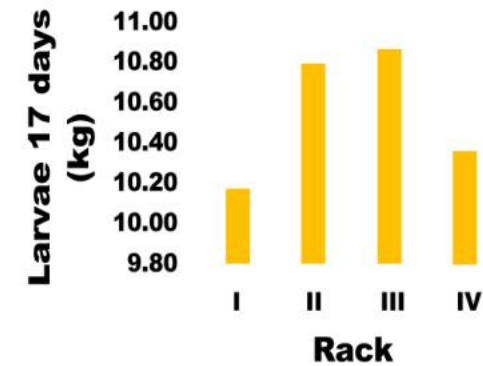
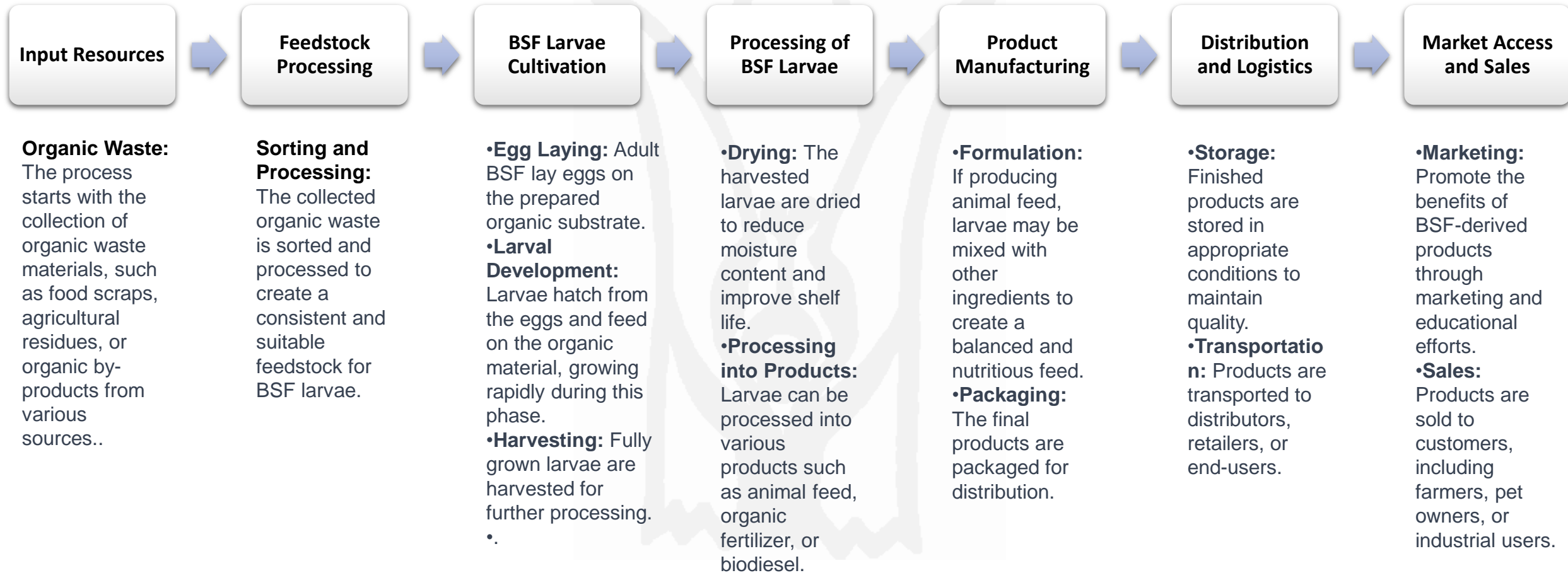


Figure 3. The total weight of  $\pm 17$  dol (17 days age) in each rack (a rack contains 12 boxes)



# Value Chain of Business

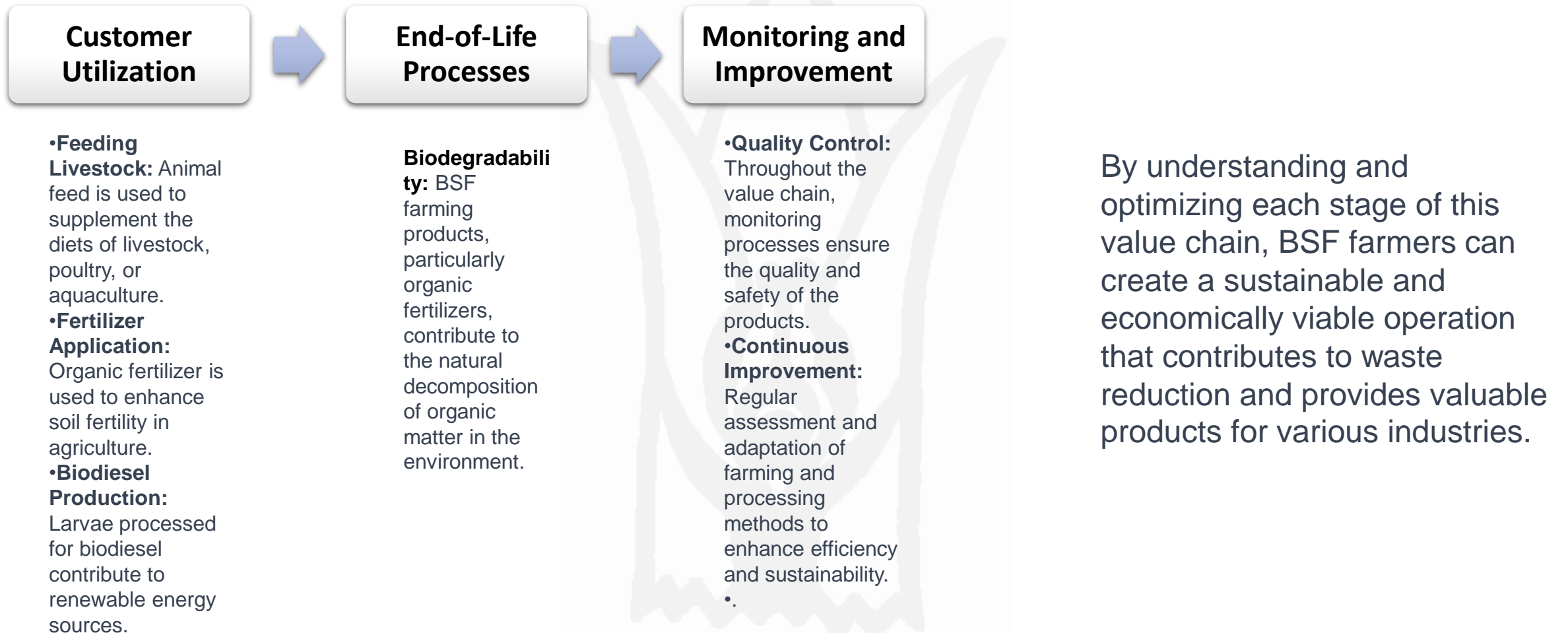
## General overview of the process involved in simple BSF:





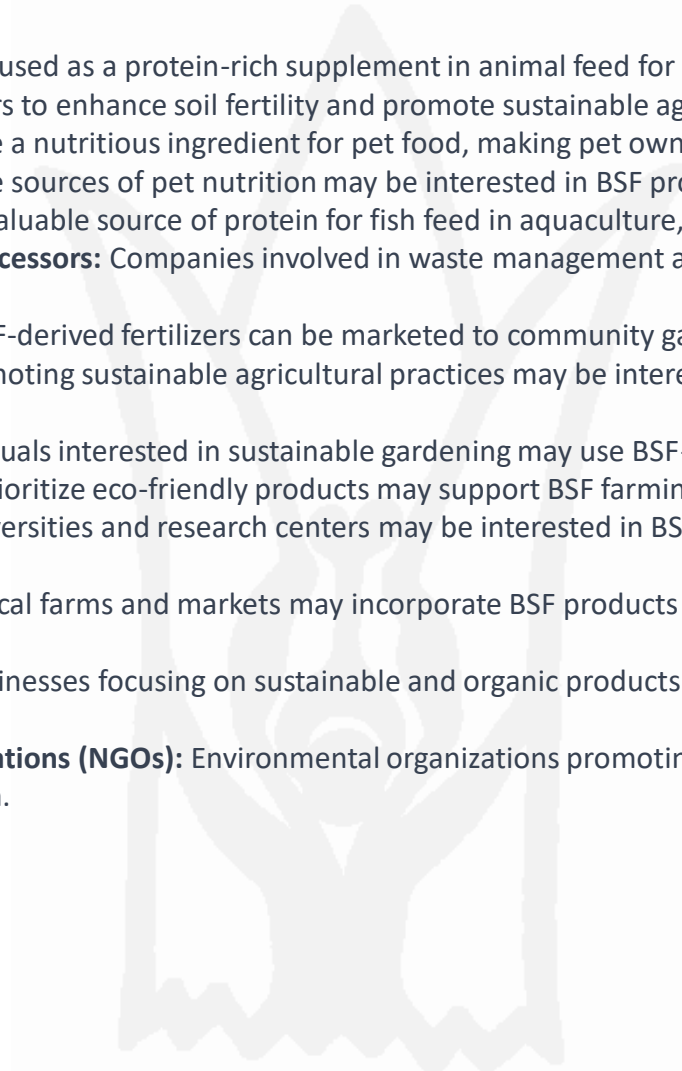
# Value Chain of Business

General overview of the process involved in simple BSF:





- 1. Local Farmers: Livestock Farmers:** BSF larvae can be used as a protein-rich supplement in animal feed for livestock, poultry, and aquaculture. **Crop Farmers:** Farmers can use BSF-derived organic fertilizers to enhance soil fertility and promote sustainable agriculture.
- 2. Pet Owners: Pet Food Manufacturers:** BSF larvae are a nutritious ingredient for pet food, making pet owners a potential customer base. **Individual Pet Owners:** Individuals looking for natural and sustainable sources of pet nutrition may be interested in BSF products.
- 3. Aquaculture Industry: Fish Farms:** BSF larvae are a valuable source of protein for fish feed in aquaculture, making fish farmers a potential market.
- 4. Waste Management Companies: Organic Waste Processors:** Companies involved in waste management and composting can benefit from BSF larvae's ability to process organic waste efficiently.
- 5. Agricultural Communities: Community Gardens:** BSF-derived fertilizers can be marketed to community gardens and local agricultural initiatives. **Sustainable Agriculture Initiatives:** Organizations promoting sustainable agricultural practices may be interested in the eco-friendly benefits of BSF farming.
- 6. Eco-conscious Consumers: Home Gardeners:** Individuals interested in sustainable gardening may use BSF-derived fertilizers for home gardens. **Environmentally Conscious Consumers:** Those who prioritize eco-friendly products may support BSF farming as it contributes to waste reduction.
- 7. Educational Institutions: Research Institutions:** Universities and research centers may be interested in BSF larvae for studies in entomology, waste management, or sustainable agriculture.
- 8. Local Businesses: Local Farms and Markets:** Small local farms and markets may incorporate BSF products into their operations or sell them directly to consumers.
- 9. Agribusinesses: Small-Scale Agribusinesses:** Agribusinesses focusing on sustainable and organic products may integrate BSF-derived materials into their product lines.
- 10. Environmental NGOs: Non-Governmental Organizations (NGOs):** Environmental organizations promoting sustainable practices and waste reduction may collaborate with or support a small-scale BSF farm.







# Marketing Plan

## Product

- Diversified Products:** Offer a range of products such as BSF larvae for animal feed, organic fertilizers, or raw materials for biodiesel production.
- Quality Assurance:** Emphasize the high nutritional value of BSF products, their sustainability, and adherence to quality standards.
- Packaging:** Use eco-friendly packaging that aligns with the environmentally conscious values of the target market.

## Price

- Competitive Pricing:** Research and set competitive prices based on market standards, considering the value proposition of BSF products.
- Discounts or Bundles:** Consider offering discounts for bulk purchases or creating product bundles to encourage larger orders.
- Value-Based Pricing:** Communicate the value of BSF products in terms of sustainability, nutritional benefits, and waste reduction to justify pricing.

## Place

- Distribution Channels:** Identify and establish relationships with local distributors, farmers' markets, pet stores, and agricultural supply chains.
- Online Presence:** Utilize e-commerce platforms to reach a broader audience and make BSF products accessible to customers beyond the local area.
- Partnerships:** Explore partnerships with local businesses, agricultural cooperatives, and waste management companies to expand distribution channels.

## Promotions

- Educational Marketing:** Create content that educates potential customers about the benefits of BSF farming, its role in waste reduction, and the nutritional advantages of BSF products.
- Social Media Presence:** Leverage social media platforms to share success stories, engage with the community, and showcase the sustainable practices of the BSF farm.
- Participate in Local Events:** Attend local farmers' markets, community events, or agricultural fairs to promote BSF products and engage directly with potential customers.
- Collaborations:** Partner with local influencers, environmental organizations, or agricultural experts to increase awareness and credibility.



# Financial Calculations

## 10 ton per day waste processing

### Fixed cost

| SN | Particular   | Unit cost | Units                 | Amount            |
|----|--|-----------|-----------------------|-------------------|
| A  | Breeding farm  |           |                       |                   |
| 1  | 600 Sq ft tinshed  | 400       | 600                   | ₹240,000          |
| 2  | Breeding chamber, climate controls, trays, eggies etc for 70 kg per day egg production | 8,000     | 35                    | ₹280,000          |
| 3  | Electrical connection , water connection etc   | 5,000     | 2                     | ₹10,000           |
| 4  | Other Misc   | 10,000    | 2                     | ₹20,000           |
|    |  |           | <b>TOTAL A</b>        | <b>₹550,000</b>   |
| B  | Rearing farm   |           |                       |                   |
| 1  | Rearing shed construction  | 400       | 1,500                 | ₹600,000          |
| 2  | Raring baskets   | 700       | 500                   | ₹350,000          |
| 3  | Other misc   |           |                       | ₹50,000           |
|    |  |           | <b>TOTAL B</b>        | <b>₹1,000,000</b> |
|    |  |           | <b>TOTAL (A+B)</b>    | <b>₹1,550,000</b> |
| C  | Depriication   |           | 10%                   | ₹155,000          |
|    |  |           | <b>TOTAL</b>          | <b>₹1,705,000</b> |
|    |  |           | <b>Cost per year</b>  | <b>₹170,500</b>   |
|    |  |           | <b>Cost per month</b> | <b>₹14,208</b>    |
|    |  |           | <b>Cost per day</b>   | <b>₹474</b>       |
|    |  |           | <b>Cost per ton</b>   | <b>₹47</b>        |

## 10 ton per day waste processing

### Variable cost

| SN | Particular             | Unit cost | Units  | Amount         |
|----|------------------------|-----------|--------|----------------|
| A  | Breeding farm          |           |        |                |
| 1  | Pupa                   | 60        | 150    | ₹9,000         |
| 2  | Feed                   | 35        | 25     | ₹875           |
| 3  | Labour                 | 2         | 500    | ₹1,000         |
| 4  | Electricity & other    | 1         | 200    | ₹200           |
| 5  | Misc                   |           |        | ₹200           |
|    | <b>TOTAL A</b>         |           |        | <b>₹11,275</b> |
| B  | Rearing farm           |           |        |                |
| 1  | Waste                  | 0.5       | 10,000 | ₹5,000         |
| 2  | Labour                 | 10        | 400    | ₹4,000         |
| 3  | Supervisour            | 1         | 577    | ₹577           |
| 4  | Repair & misc          |           |        | ₹500           |
|    | <b>TOTAL B</b>         |           |        | <b>₹10,077</b> |
| C  | Sales                  |           |        |                |
| 1  | Sale manager           | 1         | 1,000  | 1000           |
| 2  | Selling transport      | 1         | 1,000  | 1000           |
| 3  | Packing & distribution | 2         | 1,000  | 2000           |
| 4  | Operational loss       | 0.25      | 1,000  | 250            |
|    | <b>TOTAL C</b>         |           |        | <b>4250</b>    |
|    | <b>TOTAL</b>           |           |        | <b>₹25,602</b> |
|    | <b>Cost per ton</b>    |           |        | <b>₹2,560</b>  |



# Financial Calculations

## Dashboard (Summary)

|                                | Per ton of waste | Per day | Average stage I (0-6 month) per month | Stage II (6-9 month) | Stage III (9-12) |
|--------------------------------|------------------|---------|---------------------------------------|----------------------|------------------|
| TOTAL cost (Fixed + Recurring) | ₹2,608           | ₹26,076 | ₹782,268                              | ₹818,060             | ₹818,060         |
| Kgs of larvae produced         | 100              | 1,000   | 30,000                                |                      |                  |
| Kgs of compost produced        | 100              | 1,000   | 30,000                                |                      |                  |
| Sales revenue larvae           | ₹3,000           | ₹30,000 | ₹900,000                              | ₹1,035,000           | ₹1,138,500       |
| Sales revenue compost          | ₹300             | ₹3,000  | ₹90,000                               | ₹90,000              | ₹90,000          |
| Total revenue                  | ₹3,300           | ₹33,000 | ₹990,000                              | ₹1,125,000           | ₹1,228,500       |
| Total operational profit       | ₹692             | ₹6,924  | ₹207,732                              | ₹306,940             | ₹410,440         |
|                                |                  |         | <b>₹283,211</b>                       |                      |                  |
|                                |                  |         | Total fixed investment                | Break-Even point     |                  |
|                                |                  |         | ₹2,205,000                            | 8                    | Months           |





# Financial Calculations

| Pricing Strategy ( Competitor + Value Based Pricing )                       |   |                                       |                  |
|---|---|---------------------------------------|------------------|
| 17.3 gm of 5 DOL  | = | 10.4 Kgs of full grown (17 DOL) Larva |                  |
| 1 gm Eggs grows to a 4 kg full grown larva under best rearing conditions    |   |                                       |                  |
| Thereby 1 gm of Egg will yield approx. 6.65 gm of 5 DOL                     |   |                                       |                  |
|   |   |                                       |                  |
| Based on market research, it was found that 1gm of egg costs around INR 118 |   |                                       |                  |
|   |   |                                       |                  |
| Thereby calculating for 1 KG of 5 DOL will approx.                          |   |                                       | <b>₹18,000.0</b> |
|   |   |                                       |                  |
| Per day rearing cost of 1 Kg Larva  |   | ₹26.1                                 |                  |
| <b>Cost for rearing an egg to 5 DOL per KG</b>                              |   | <b>₹130.4</b>                         |                  |
|   |   |                                       |                  |
| <b>Estimated Price of 1 KG 5 DOL</b>  |   | <b>₹18,130.4</b>                      |                  |
|   |   |                                       |                  |





For a small-scale Black Soldier Fly (BSF) farming company, here are some recommendations to enhance operations, sustainability, and overall success:

- 1.Start Small and Scale Gradually:** Begin with a manageable scale to understand the nuances of BSF farming. Gradually expand based on experience, demand, and market trends.
- 2.Quality Feedstock:** Ensure a high-quality and consistent feedstock for the BSF larvae, as their nutritional intake directly impacts their growth and quality.
- 3.Efficient Farming Systems:** Invest in efficient and scalable farming systems that optimize space, resources, and environmental conditions for BSF growth.
- 4.Biosecurity Measures:** Implement biosecurity measures to prevent the spread of diseases and ensure the health of the BSF colony.
- 5.Value-Added Products:** Explore value-added products such as organic fertilizers, animal feed supplements, or biofuel derived from BSF larvae.
- 6.Local Partnerships:** Establish partnerships with local farms, waste management facilities, or businesses to secure a consistent and diversified source of organic waste.
- 7.Regulatory Compliance:** Stay informed about local regulations regarding insect farming and waste management to ensure compliance.
- 8.Educational Outreach:** Conduct educational outreach programs to create awareness about the benefits of BSF farming and its role in sustainable waste management.
- 9.Digital Integration:** Leverage digital tools for monitoring and managing farm conditions, allowing for real-time adjustments and data-driven decision-making.
- 10.Customer Engagement:** Engage with customers through transparent communication about your farming practices, sustainability initiatives, and the benefits of BSF-derived products.
- 11.Continuous Learning:** Stay updated on industry trends, research findings, and technological advancements in BSF farming through continuous learning and networking.
- 12.Sustainability Focus:** Emphasize sustainability in your operations, showcasing how BSF farming contributes to reducing organic waste and promoting eco-friendly practices.
- 13.Market Research:** Regularly conduct market research to identify emerging trends, customer preferences, and potential niches within the market.
- 14.Monitoring and Quality Control:** Implement robust monitoring and quality control measures to ensure the consistent production of high-quality BSF larvae.
- 15.Community Engagement:** Build positive relationships with the local community, emphasizing the environmental and economic benefits of your BSF farming practices.



# Sources of Funding & Government Support Available

## Legal requirements

- Initially Company registration is required along with Udyam Aadhaar number, & PAN card for business.
- On later stage further licensing is required but at start no major licenses are required in this business.

## Funding Sources

- Self-Financed
- Loan available from Family and Friends
- Loan from local banks
- Loan from NGOs (Like Rang De Foundation)

## Government Support available (Major Schemes available)

- **Start-Up India**

The Startup India scheme offers a range of incentives and benefits to startups, including tax exemptions, funding opportunities, and a simplified regulatory framework. The scheme also provides mentoring, networking, and other support services to entrepreneurs.

For more information [Click here](#)

- **Stand-Up India Scheme**

The Stand-Up India scheme aims to provide loans to at least one woman and one person from SC/ST community per bank branch for setting up a greenfield enterprise. The scheme provides bank loans ranging from Rs. 10 lakh to Rs. 1 crore for setting up a new enterprise in manufacturing, trading or services sectors.

For more information [Click here](#)

- **Pradhan Mantri Mudra Yojana**

MUDRA stands for Micro Units Development and Refinance Agency. Under this scheme, small businesses and entrepreneurs can avail loans up to Rs. 10 lakh from banks, non-banking financial companies (NBFCs), and microfinance institutions. The scheme provides loans under three categories: Shishu (up to Rs. 50,000), Kishore (up to Rs. 5 lakh), and Tarun (up to Rs. 10 lakh).

For more information [Click here](#)

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