

Lesson 14

Developing investment plans for vermicomposting

Learning outcomes

- The trainee knows the variables that define the scale for the vermicompost production facility.
- The trainee knows the technical equipment required for the vermicompost production facility.
- The trainee customizes the equipment required for vermicomposting depending on the variables available.

Instructions for the trainer

- The trainer shares theoretical knowledge through presentation.
- The trainer asks the trainees to list the infrastructure and equipment required to produce 2 tons of vermicompost.
- The trainer asks the trainees to list the infrastructure and equipment required to produce 360 tons/year of vermicompost.

Basic requirements: Projector, computer

14. Developing investments plans for vermicomposting

Many variables need to be taken into consideration when determining the scale of investment for vermicompost production. Some of them follow:

- Whether it is for commercial or personal farm needs,
- Amount of accessible input organic waste,
- Financial resources owned,
- Environmental and climate conditions,
- Logistics and technical facilities,
- Traditional approach or technology usage preferences,
- Continuity of demand for Vermicomposting.

14.1. Small-Scale Investment

Small farms use pits and bins of various sizes (or IBC tanks) to meet their worm compost needs. These systems, which do not require advanced mechanization, make sustainability possible for small agricultural enterprises with low investment costs. In this section, the requirements for annual 5 tons of vermicomposting production with IBC tanks are reported (Table 8).

Table 8. Investment budget for small-scale vermicomposting facility.

| Equipment&Material | Quantity | Unit Price | Total Price (Euro) |
|-------------------------------|-----------------|-------------------|---------------------------|
| IBC Tank | 10 | 40 | 400 |
| Transport IBC | 1 | 200 | 200 |
| Gravel (150 kg) | 1 | 150 | 150 |
| Sand (100 kg) | 1 | 50 | 50 |
| Wood for lids | 10 | 25 | 250 |
| Pallets | 20 | 3 | 60 |
| PVC Pipes (3 meter) | 10 | 5 | 50 |
| Manure (kg) (farm waste) | 4.000 | 0 | 0 |
| Irrigation pipes (3 meter) | 2 | 5 | 10 |
| Earhworms (E. fetida) (kg) | 10 | 90 | 900 |
| Sprinklers | 50 | 0,4 | 20 |
| Haystacks | 4 | 25 | 100 |
| Thermometer | 1 | 84 | 84 |
| Hygrometer | 1 | 106 | 106 |
| Total Budget | | | 2.380 |

14.2. Large Scale Investment

This section will provide an overview of the investment requirements and costs for a large-scale vermicomposting plant (Table 9). People who are considering investing in this field can increase or decrease the technical equipment needed depending on the production scale, mechanization preference, amount of solid waste, and human resources. Windrow, raised bed and continuous flow (flow through) systems are commonly used techniques in large-scale vermicompost production.

The presented facility will have a production capacity of 720 tons/year of solid vermicomposting (Table 10). Creating a process with a continuous flow

system in the facility was simulated. The most important advantages of this system are that it enables the fertilizer to be supplied continuously at the desired time and also saves time by performing the sifting process. The return of investment is 2.1 years. The internal return rate of the investment is 41%.

Table 9. Machinery and equipment required for worm compost production in continuous flow system.

| Material/equipment | Qty/unit price | Total Price (Euro) |
|--|-----------------------|---------------------------|
| Earthworm | 500.000 | 5.000 |
| Continuous Flow System | 5 | 54.000 |
| Heat Treatment Furnace | 1 | 8.000 |
| Fertilizer Mill / Crusher | 1 | 4.800 |
| Vibrating Fertilizer Screening Machine | 1 | 1.900 |
| Fertilizer Packaging Machine | 1 | 9.100 |
| Pellet Machine | 1 | 6.900 |
| Forklift | 1 | 31.650 |
| Office Furnishing | 1 | 3.200 |
| Total | | 124.550 |

Table 10. Investment cost (Large scale vermicomposting facility)

| No | Quantity | Price (Euro) | Total |
|--------------------------|--|---------------------|---|
| 1 | Preliminary Work Expenses | 4.405 | It is envisaged as 3% of the total construction cost. |
| 2 | Engineering and Project Expenses | 3.126 | It is envisaged as 2% of the total construction cost. |
| 3 | Land and Landscaping | 2.936 | It is the cost required for the excavation of the area where the facility will be established and the transportation of the excavation by trucks. It was determined as 3% of the construction cost. |
| 4 | Construction Work Expenses | 146.840 | The total closed area is 800 m2. |
| 5 | Main Facility Machinery and Equipment Expenses | 124.550 | It is the cost of machinery and equipment and furnishing, the details of which are given in Table. |
| 6 | Vehicles, General Expenses | 20.000 | The facility will need 1 forklift to transport and store the products produced by the business. |
| 7 | Working Capital Need | 25.000 | Invested period working capital requirement |
| Investment Amount | | 326.857 | |

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