Vermicomposting Training Manual

The following manual is a modified version of a training tool used in DA's vermicomposting project.

What is Vermicompost?

Put simply, vermicompost is the castings of earthworms. Organic waste gets decomposed by micro-organizms and is consumed by earth worms. The castings of these worms is popularly known as vermicompost.

Vermicompost can be prepared easily. The essentials are space, cowdung, organic wastes, and *epigeic phytophagous* earthworms. Vermicompost is a good organic manure as it improves soil quality. Conversely, over time, inorganic fertilisers can deprive the soil of fertility.

Sources of organic waste for manure production:

The organic wastes that are available in agricultural areas include cattle dung, sheep dropping, biogas slurry, stubble from harvested crops, husks and corn shells, weeds, kitchen waste etc. All these materials can be used to produce vermicompost.

Requirements

- **Housing:** Sheltered culturing of worms is recommended to protect the worms from excessive sunlight and rain. All the entrepreneurs have set up their units in vacant cowsheds, poultry sheds, basements and back yards.
- **Containers:** Cement tanks were constructed. These were separated in half by a dividing wall. Another set of tanks were also constructed for preliminary decomposition.
- **Bedding and feeding materials:** During the beginning of the enterprises, most women used cowdung in order to breed sufficient numbers of earthworms. Once they have large populations, they can start using all kinds of organic waste. Half of the entrepreneurs have now reached populations of 12,000 to 15,000 adult earthworms.

Process

The bedding and feeding materials are mixed, watered and allowed to ferment for about two to three weeks in the cement tanks. During this period the material is overturned 3 or 4 times to bring down the temperature and to assist in uniform decomposition. When the material becomes quite soft, it is transferred to the culture containers and worms ranging from a few days to a few weeks old are introduced into them.

A container of 1 metre by 1 metre by 0.3 metres, holds about 30-40 kgs of the bedding and feeding materials. In such a container, 1000 - 1500 worms are required for processing the materials. The material should have 40 to 50 percent moisture, a Ph of 6.3 to 7.5, and a temperature range of 20 to 30 degree celsius.

The earthworms live in the deeper layers of the material. They actively feed and deposit granular castings on the surface of the material. The worms should be allowed to feed on the material until it is converted into a highly granular mass.

The earthworms take 7 weeks to reach adulthood. From the 8th week onwards they deposit cocoons. One mature worm can produce two cocoons per week. Each cocoon produces 3-7 young after an incubation period of 5-10 days depending on the species of worms, quality of feed, and general conditions. The resulting increase is about 1200-1500 worms per year. The population doubles in about a months time.

Harvesting of Vermicompost

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The harvesting of vermicompost involves the manual separation of worms from the castings. For this purpose, the contents of the containers are dumped on the ground in the form of a mound and allowed to stand for a few hours. Most of the worms move to the bottom of the mound to avoid light. The worms collect at the bottom in the form of a ball. At this stage, the vermicompost is removed to get the worms. The worms are collected for new culture beds. The vermicompost collected is dried, passed through a 3 mm sieve to recover the cocoons, young worms, and unconsumed organic material. The cocoons and young worms are used for seeding the new culture beds. The vermicompost recovered is rich in macro-nutrients, microbes such as *actinomycetes* and nitrogen fixers, and is used as a manure.

Pests and Predators

Earth worms have a large number of predators, including: birds, fowl, rodents, frogs, toads, snakes, ants, leeches, and flat worms such as *bipalium*. To avoid attacks of these predators vermiculture should be practised in protected places.

Benefits

By establishing vermiculture units entrepreneurs can recycle their own resources and create an effective fertiliser in the process. The extra worms that are produced can be used as feed for poultry and fish. The advantages of this technology include:

1. Recycling of organic wastes.
2. Production of energy rich resources.
3. Reduction of environmental pollution.
4. Provision of job opportunities for women and jobless people.
5. Improvement of soil pH. (vermicompost acts as a buffering agent).
6. Improvement in the percolation property of clay soils (from the compost's granular nature).
7. Improvement of the water holding capacity in sandy soils.
8. Release of exchangeable and available forms of nutrients.
9. Increase of oxidizable carbon levels, improving the base exchange capacity of the soil.
10. Improvement of the nitrate and phosphate levels.
11. Encouragement of plant root system growth.
12. Improvement in the size and girth of plant stems.
13. Early and profuse plant flowering
14. Creation of a substitute protein in poultry and fish feed.

One disadvantage of this technology is that pesticides and heavy metals accumulate in the bodies of the worms that are raised on contaminated organic wastes. If such worms are used as protein source in animal feeds, health hazards may result.

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