**vi) Watering the vermi bed**

Worms breathe through their skin and must have a moist environment in which to live.The bed should be able to absorb and retain water. Daily watering is not needed.Moisture level should be maintained at 60 %.Water should be sprinkled on the bed. Watering should be stopped before harvesting the vermicompost.

**vii) Harvesting vermicompost**

The compost is ready when the material is moderately loose and crumbly and the colour of the compost is dark brown. The castings are formed at the top layer of the container and needs to be collected periodically(preferably once in a week).This periodical harvesting needs to be done,otherwise the compost gets compacted when watering is done. In small beds the vermicompost is harvested at the end of the process. In one bed of size 6Ft* 4Ft* 2Ft, a farmer can harvest 4-5 cycles in a year.In each cycle,depending upon the quantity of biowaste & dung (70:30 ratio), 150- 200 kgs of good quality vermicompost can be harvested.

**viii) Storage**

The harvested vermicompost should be stored in a cool,dark place, away from sunlight, with a minimum moisture level of 40%. It should be kept away from sunlight to prevent loss of moisture and nutrient content. Periodic watering may be done to maintain the moisture level and microbial activity.

**Nutritive value of vermicompost**

The nutrient content in vermicompost varies depending on the waste materials that are being used for compost preparation. If the waste materials are heterogeneous, there will be a wide range of nutrients available in the compost. If the waste materials are homogenous, there will be only certain nutrients available. These castings have been shown to contain reduced levels of contaminants and a higher saturation of nutrients than do organic materials before vermicomposting.

**The percentage of nutrients in vermicompost is as follows:**

| | |
|---|---|
| Organic carbon | : 9.5 – 17.98% |
| Nitrogen | : 0.5 – 1.50% |
| Phosphorous | : 0.1 – 0.30% |
| Potassium | : 0.15 – 0.56% |
| Sodium | : 0.06 – 0.30% |
| Calcium and Magnesium | : 22.67 to 47.60 meq/100g |
| Copper | : 2 – 9.50 mg kg-1 |
| Iron | : 2 – 9.30 mg kg-1 |
| Zinc | : 5.70 – 11.50 mg kg-1 |
| Sulphur | : 128 – 548 mg kg-1 |

## Cost & Benefit Analysis

### A. Fixed Cost

| Sl.No. | Particulars | Unit | Requirement | Approx Amount (Rs.) |
|---|---|---|---|---|
| 1 | Worm | Kg | 1 Kg | 300/- |
| 2 | Vermi bed (plastic bed, brick) | Number | 1 plastic Bed | 1200/- |
| 3 | Bamboo for constructing lifted frame | Piece | 6 | 800/- |
| 4 | Roofing material | Meter | 10 | 500/- |
| | Total Cost | | | 2800/- |
| 5 | Labour (Can be contributed by farmer) | L. days | 2 | |
| | Total Cost including Labour | | | 2800/- |

### B. Recurring cost

| Sl.No. | Particulars | Unit | Requirement | Approx Amount (Rs.) |
|---|---|---|---|---|
| 1 | Labour (contributed by farmer) for repairing | L. days | 2 | |
| 2 | Worm (Normally not required if properly managed) | Kg | 1 | 200/- |
| | Total Cost including Labour | | | 200/- |
| | Total investment (A+B) | | | 3000/- |

Gross Income (Annual basis):
Production per cycle (Kg) * No. of cycles in a year*
Market price =>200 * 4* 10= 8000/-
Net profit per annum: 5000/-


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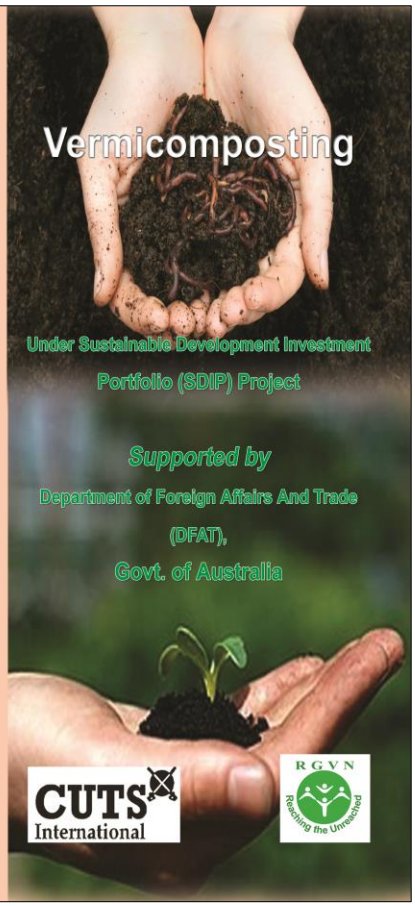
This pamphlet has been produced by RGVN with the financial assistance from CUTS International, Jaipur under the project entitled Sustainable Development Investment Portfolio (SDIP) funded by Department of Foreign Affairs and Trade (DFAT), Government of Australia. The views expressed here are those of RGVN and can therefore in no way be taken to reflect the positions of CUTS International or DFAT.


Vermicompost is an excellent organic fertilizer. Vermicompost is created by the breakdown of organic matter in the digestive process of an earthworm. Earthworms feed on decaying organic material in the soil. After digestion, the undigested organic material is broken down by the chemicals secreted in the digestive canal of the earthworm, into sustainable nutrition. The excreted castings contain these chemicals and together they form vermicompost, which is a natural fertilizer. Earthworm castings have high quantities of nitrogen, potassium, phosphorus, calcium and magnesium.

Earthworms are natural tillers of the soil. They tunnel deep into the soil and mix the subsoil with the top soil. The large number of minute tunnels enhances permeability of water into the subsurface, reduces run off and helps in harvesting rain water. Earthworm castings have excellent aeration, porosity, structure, drainage and moisture holding capacity.

**Essential thriving conditions for compost worms:**

- A suitable living environment or bedding.
- Food for the worms (biodegradable waste).
- Adequate moisture (greater than 50% water content by weight).
- Adequate aeration.
- Protection from extremes of temperature.

**Materials/inputs required for preparation of Vermicompost**

1. Earthworms (1Kg)
2. Vermi bed/Tank (6 Ft*4Ft*2FT)
3. Bamboo frame & Roofing material
4. Any type of biodegradable waste

**Example:**

- ❖ Crop residues
- ❖ Cow dung
- ❖ Weed biomass
- ❖ Vegetable waste
- ❖ Kitchen waste
- ❖ Leaf litter

**Factors contributing to good quality composting:**

Worms are the basic component of vermicompost production, hence they need to be provided with a good thriving environment.

The bed in which vermicomposting is done needs to have proper moisture content (neither very wet, nor too dry, about 50% water content).The bed should not be filled very tightly as it will affect the breathing of the worms. Worms breathe through their skin, if proper aeration is not allowed, the worms may die. The bed should be protected from exposure to high heat. If the bed gets very hot and dry, it will be devoid of earthworms.

**Advantages of vermicompost:**

- **Vermicompost has rich quantities of all essential plant nutrients.**
- **It improves soil structure, texture, aeration and water holding capacity and prevents soil erosion. Vermicompost can hold up to nine times it's own weight in water. Also, the water tends to evaporate slowly while still being available to the plants.**
- **Vermicompost contains earthworm cocoons which increases the population and the beneficial tilling activity of earthworms in the soil.**
- **Vermicompost has lower nutrient content than chemical fertilizers but nutrients do not get washed out of the soil. The nutrients are held in place and released slowly so that the plants receive their nutrients over a longer period.**
- **Vermicompost is environmentally friendly and free from pathogens, toxic elements, weed seeds etc.**
- **Vermicompost minimizes the incidence of pests and diseases due to increased microbial activity.**
- **Decomposition of organic matter in the soil is enhanced.**
- **It contains valuable vitamins, enzymes and hormones like auxins, gibberellins etc.**
- **It leads to faster plant growth and better yields.**
- **Low capital and infrastructure requirements make vermicomposting ideal for widespread adoption, especially in the poor and developing regions of the world.**

**Vermicompost production methodology:**

**i) Earthworm selection**

For vermicompost production, the earthworms which dwell on the surface alone should be used. The African earthworms (Eudrilus eugeniae), Red worms (Eisenia foetida) and composting worms( Perionyx excavatus) are generally used for vermicompost production. All the three worms can be mixed together for vermicompost production. The African worm (Eudrilus eugeniae) produces more young worms and yields higher amounts of vermicompost.


African earthworm (Eudrilus eugeniae)


Tiger worm or Red wrinkle (*Eiseniafoetida*)


Asian worms (*Perionyx excavatus*)

**ii) Selection of production site**

The site has to be cool and shady with high humidity.A shed with a thatched roof may be provided to protect against direct sunlight and rain.If it is to be produced in the open, a shady place is selected,usually near the trunk of trees (especially horticultural trees).The waste heaped for vermicompost production should be covered with moist gunny bags.

**iii) Selection of raw materials**

The quality of the vermicompost depends on the waste used in the process. Cow dung, water hyacinth, straw, other crop residues, farm wastes, vegetable market wastes, flower market wastes, agro-industrial wastes, fruit market wastes and all other biodegradable wastes are suitable for vermicompost production. The cow dung should be dried in the sunlight before being used. All other wastes should be predigested with cow dung for twenty days before being put into the vermi bed for composting.

**iv) Containers**

A cement tub or plastic bed can be made to a height of about 2½ feet and a breadth of about 3 feet. The length may be fixed depending upon the requirement of vermicompost and availability of inputs (vegetable waste, cow dung). The bed of the structure is made sloping in order to drain the excess water from the vermicompost unit. A small jug is necessary to collect the drained water. It is advisable to construct an elevated structure which will allow in easy collection of vermiwash. Also, since there is no direct contact with the soil, it helps in keeping the vermi bed in good condition for a long time.

Vermicompost can also be prepared in a dry pit, well rings, wooden boxes, plastic buckets or any container with a hole at the bottom.

**v) Adding the waste to the container**

The predigested waste material is put in the container.The moisture level should be maintained at 60%.For one meter length,one meter breadth and 0.5meter height of the container,1 kg of worms (1000 in number) are needed.