

# VERMICOMPOST & VERMILWASH TECHNOLOGY DEVELOPMENT IN BUSINESS MODE

1

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# ORGANIC WASTES

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# INTRODUCTION OF EARTHWORMS TO VERTICOMPOSTING BED

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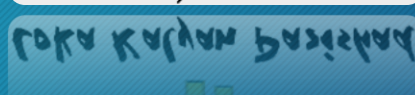
*Eudrilus eugeniae*



*Eisenia foetida*

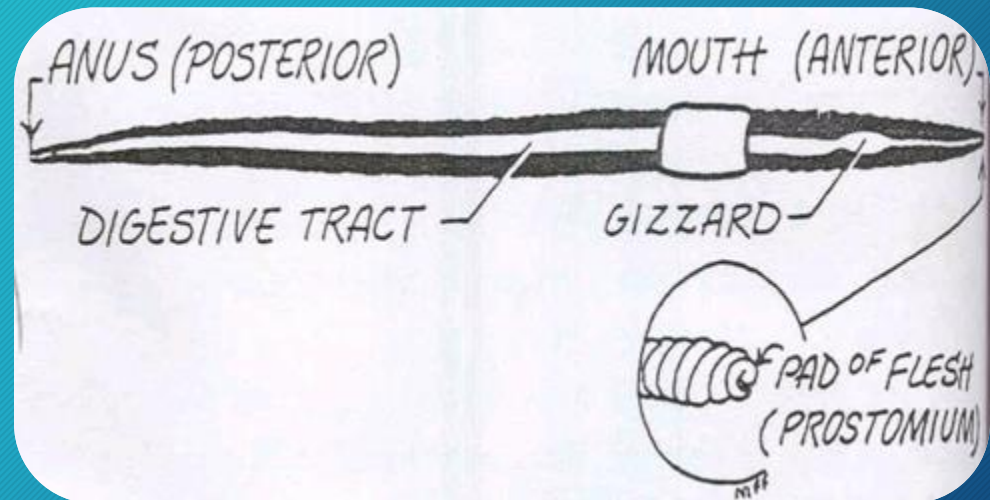
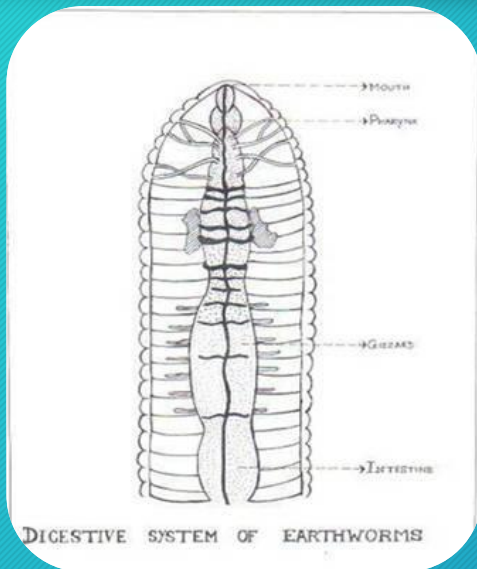


*Perionyx excavatus*



# ANATOMY OF EARTHWORM

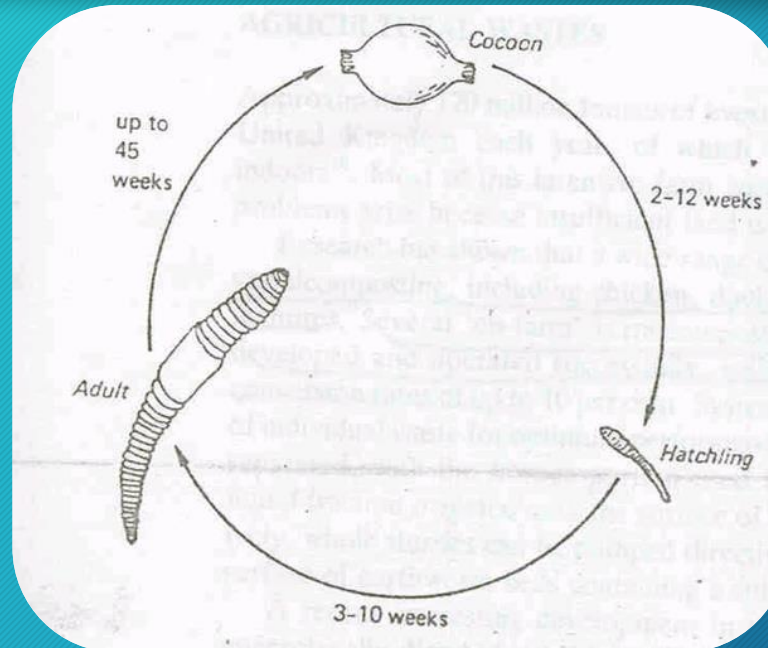
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# LIFE CYCLE OF EARTHWORM

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# COLLECTION OF ORGANIC WASTES

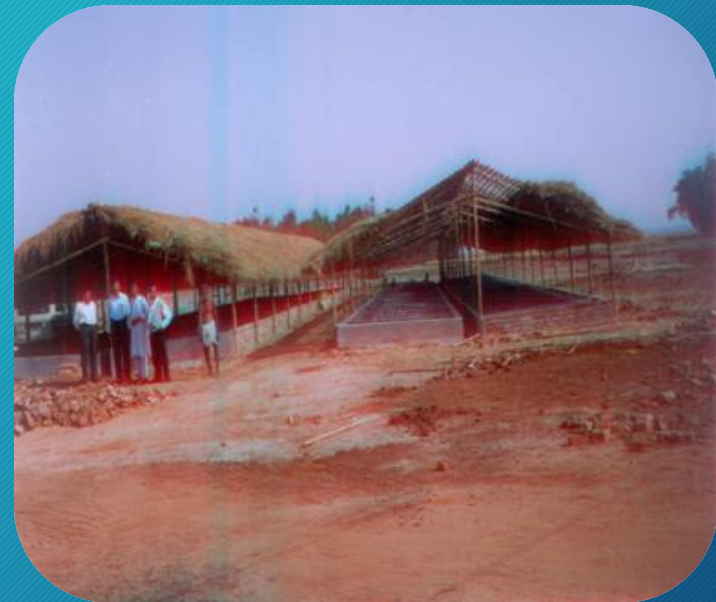
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# VERTICOMPOST SHADE

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# INTRODUCTION OF EARTHWORMS TO VERTICOMPOSTING BED

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# METHODS OF VERTICOMPOSTING

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Cocoons



Earthworm laying Cocoons



# METHODS OF PREPARATION

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1. Select one sufficiently large container made of concrete or plastic bucket or earthen pot.
2. Drill a hole at the base of the container to fix a tab to it.
3. A base layer of gravel or broken small pieces of bricks are place to a height of 10-15 cm.
4. Above the gravel layer another layer of coarse sand of 1-15 cm is put.
5. On the coarse sand layer place 40-45 cm pre-decomposed organic wastes and moistens the different layer by using water.
6. Introduce about 2000 Nos of earthworms into the container.
7. To get vermiwash continuously suspend a mud pot or a small bucket with some holes. Cotton wicks/or bamboo sticks are place in the holes so that water can trickle down.
8. Fill the container with 4-5 lits water everyday.
9. After 10 days vermiwash starts forming in the container.
10. Everyday about 3-4 lits of vermiwash can be collected.





# UTILITIES OF VERMI COMPOST

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1. Vermi-Compost is an odorless, clean, organic material containing adequate quantities of N.P.K. secondary nutrients like Calcium (Ca), sulphur (S), Magnesium (Mg), carbon (C) and 7 several micronutrients like Zinc (Zn), Boron (B), Manganese (Mn), Copper (Cu) and Chloride (Cl).
2. Vermi Compost slowly releases nutrients needed for healthy plant growth and increases fruits, vegetables, flower, crop and tea production.
3. It is rich in Vitamins, Enzymes, Antibiotics and growth hormone which make it complete plant food.
4. Vermi-Compost has an adequate water holding capacity which reduces the cost of irrigation.



# METHODS OF VERMICOMPOSTING

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1. By maintaining the proper pH+ level Vermi Compost controls the acidity and alkaline of the soil.
2. Vermi Compost contains Humic acid and high percentage of Humus which helps soil particles to form into cluster ,which create channel for passage of air and improve soil fertility.
3. Vermi Compost has zibralic acid which makes the gloss of tree and leaves, essential for Tea & Indoor plants.
4. It has ability to perform outstanding well diverse situations.
5. By developing the natural strength of the plant Vermi-Compost .helps plants to fight the attack of pests fungus and other soil borne disease such as root rot.
6. It is proved that vegetables and fruits grown by vermi-Compost stay fresh for longer time and also improve their taste.
7. I is eco-friendly & non toxic fertilizer which helps mother nature and plants to produce the healthy and hygienic fruits, vegetables, crops and Tea.





# WHY VERMICOMPOSTING

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1. Vermicompost
2. Vermicompost is nothing but the excreta of earthworms, which is rich in humus and nutrients. We can rear earthworms artificially. By feeding these earthworms with biomass and watching properly the food (bio-mass) of earthworms, we can produce the required quantities of vermicompost.
3. Advantages of Vermicompost
4. Vermicompost is rich in all essential plant nutrients.
5. Provides excellent effect on overall plant growth, encourages the growth of new shoots / leaves and improves the quality and shelf life of the produce



# PREPARATION OF VERMICOMPOSTING

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1. Materials for preparation of Vermicompost
2. Any types of biodegradable wastes-
3. Crop residues
4. Weed biomass
5. Vegetable waste
6. Leaf litter
7. Hotel refuse
8. Waste from agro-industries
9. Biodegradable portion of urban and rural wastes.





# METHODS OF VERMICOMPOSTING

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1. Pits below the ground
2. Pits made for vermicomposting are 1 m deep and 1.5 m wide. The length varies as required.
3. Heaping above the ground
4. The waste material is spread on a polythene sheet placed on the ground and then covered with cattle dung. Sunitha et al. (1997) compared the efficacy of pit and heap methods of preparing vermicompost under field conditions. Considering the biodegradation of wastes as the criterion, the heap method of preparing vermicompost was better than the pit method. Earthworm population was high in the heap method, with a 21-fold increase in *Eudrilus eugeniae* as compared to 17-fold increase in the pit method. Biomass production was also higher in the heap method (46-fold increase) than in the pit method (31-fold). Consequent production of vermicompost was also higher in the heap method (51 kg) than in the pit method (40 kg).



# TANKS ABOVE THE GROUND

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Tanks made up of different materials such as normal bricks, hollow bricks, shabaz stones, asbestos sheets and locally available rocks were evaluated for vermicompost preparation. Tanks can be constructed with the dimensions suitable for operations. At ICRISAT, we have evaluated tanks with dimensions of 1.5 m (5 feet) width, 4.5 m (15 feet) length and 0.9 m (3 feet) height. The commercial biodigester contains a partition wall with small holes to facilitate easy movement of earthworms from one tank to the other.





# QUALITY OF VERMICOMPOSTING

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Recommended quantity and time of application of vermicompost

Quantity	Time to Crop to apply per acre	apply
Rice	1 tonne	After transplanting
Sugarcane	1 1/2 tonnes	Last ploughing
Cotton	1 tonne	Last ploughing
Chilli	1 tonne	Last ploughing
Groundnut	1/2 tonne	Last ploughing
Sunflower	1 1/2 tonnes	Last ploughing
cabbage, cauliflower		
Teak, red Sandal-	3 kg per tree	At planting



# MICROBIAL DECOMPOSER

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*Trichoderma Viride*  
*Paceiliomyces Fuisporus*  
*Phanerocrete Crysosporium*



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# DECOMPOSITION BY CELLULOLYTIC & LIGNOLYTIC MICROBES

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# MIXING AND TRANSFER OF MIXED MATERIAL TO DECOMPOSITION TANK

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# TRANSFER OF PRE-DECOMPOSED MATERIALS TO VERTICOMPOST BED

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पश्चिम बंगाल

# IRRIGATION SYSTEM FOR VERTICOMPOSTING

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MICROSPRINKLER





# TRANSFER OF PRE-DECOMPOSED MATERIALS TO VERTICOMPOST BED

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# MULTI-TIER VERTICOMPOSTING BED

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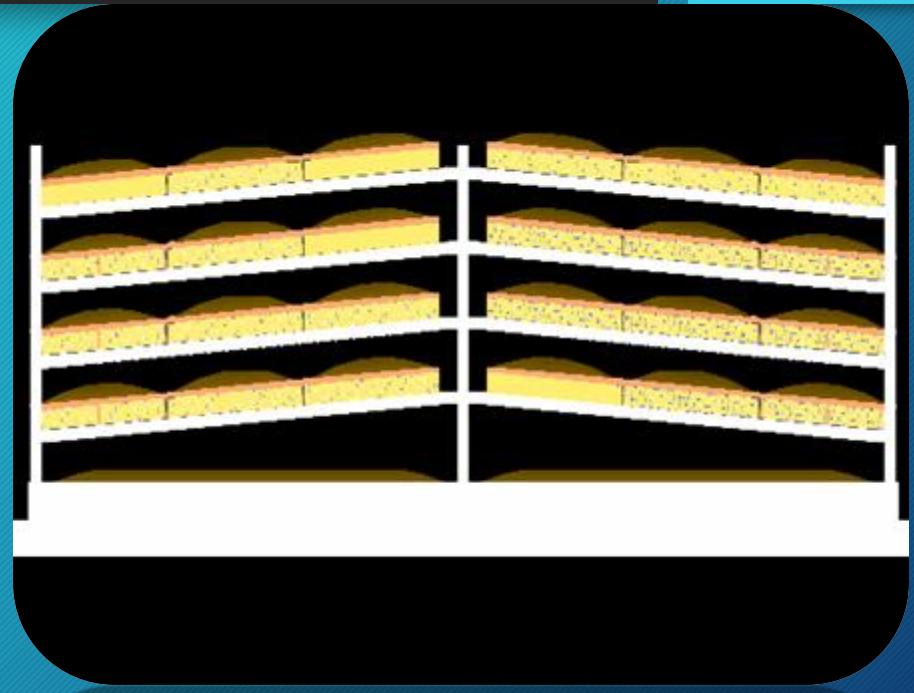
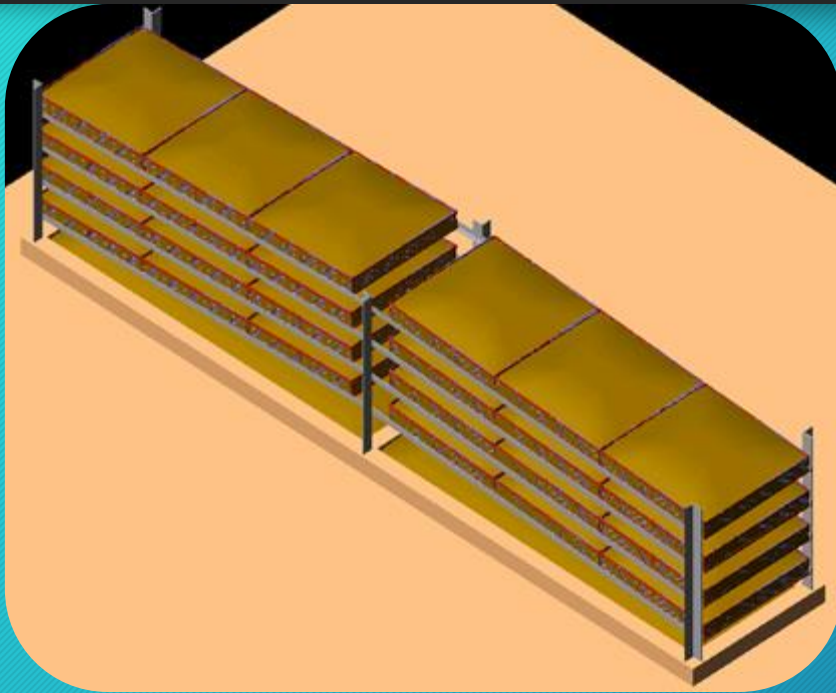
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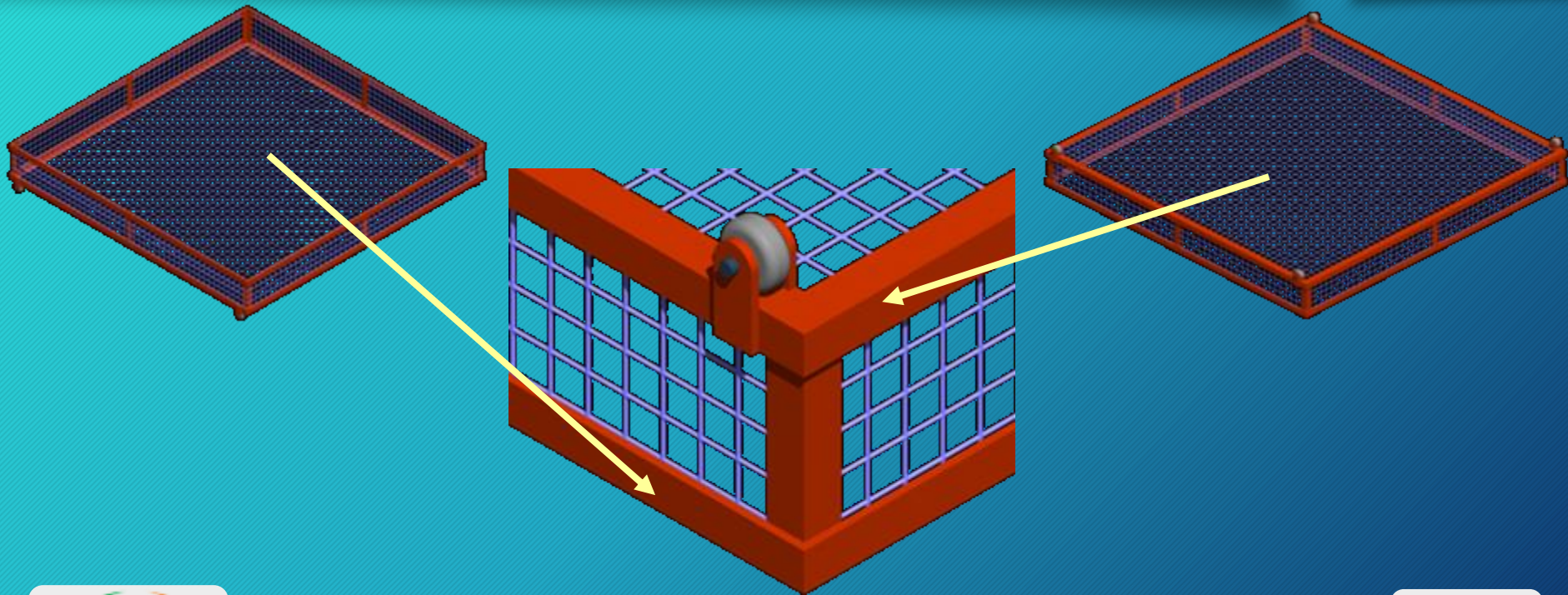
# FIVE-TIER TWO SEGMENTED VERTICOMPOST UNIT

25



# TRAY WITH WHEEL

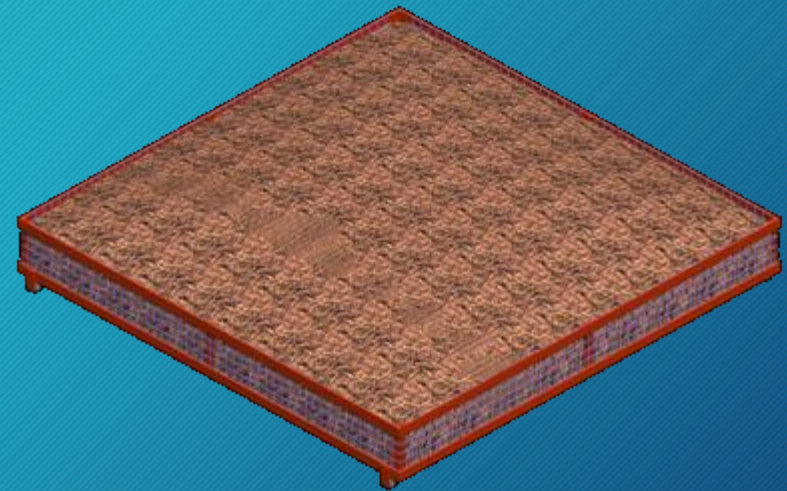
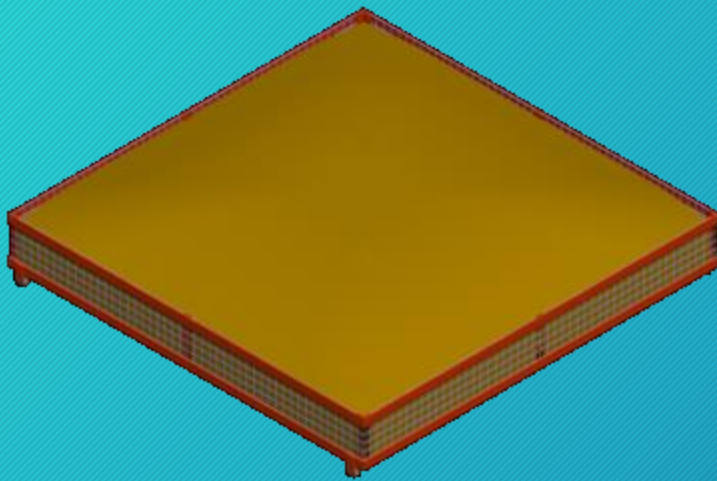
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# TRAY WITH VERTICOMPOST

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# DIFFERENT LAYER OF VERTICOMPOSTING

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WATER AND  
SANITATION  
RESOURCE  
LEARNING  
MODULE



# METHODS OF VERTICOMPOSTING

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# LAYERS OF VERTICOMPOSTING

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EARTHWORM





# METHODS OF VERTICOMPOSTING

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# METHODS OF VERTICOMPOSTING

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# METHODS OF VERTICOMPOSTING

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# MANUAL SCREENING OF EARTHWORMS

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# HARVESTING

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# HARVESTING OF MATURE VERMICOMPOST FROM THE BEDS

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# SUN DRYING OF VERTICOMPOST

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# VERMICOMPOST DRIER

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# VERMICOMPOST DRIER

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# SCREENING MACHINES

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# MANUAL AND MECHANICAL SCREENING OF VERTICOMPOST

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# GOODRICKE GROUP, AIBHEEL, DOOARS

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# GOODRICKE GROUP, THURBO, MEERIK

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# GOODRICKE GROUP, THURBO, MEERIK

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# GOODRICKE GROUP, THURBO, MEERIK

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# VERMICOMPOST UNIT AT BASANTAPUR

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# GREEN FIELD AGROTECH, CHANDRAKONA

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# GREEN FIELD AGROTECH, CHANDRAKONA

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# GREEN FIELD AGROTECH, CHANDRAKONA

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# GREEN FIELD AGROTECH, CHANDRAKONA

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# GREEN FIELD AGROTECH, CHANDRAKONA

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# GREEN FIELD AGROTECH, CHANDRAKONA

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# METHODS OF VERTICOMPOSTING

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# METHODS OF VERTICOMPOSTING

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# METHODS OF VERTICOMPOSTING

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# METHODS OF VERTICOMPOSTING

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# METHODS OF VERTICOMPOSTING

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# VERMI COMPOST

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# VERMICOMPOST IS A MIXTURE

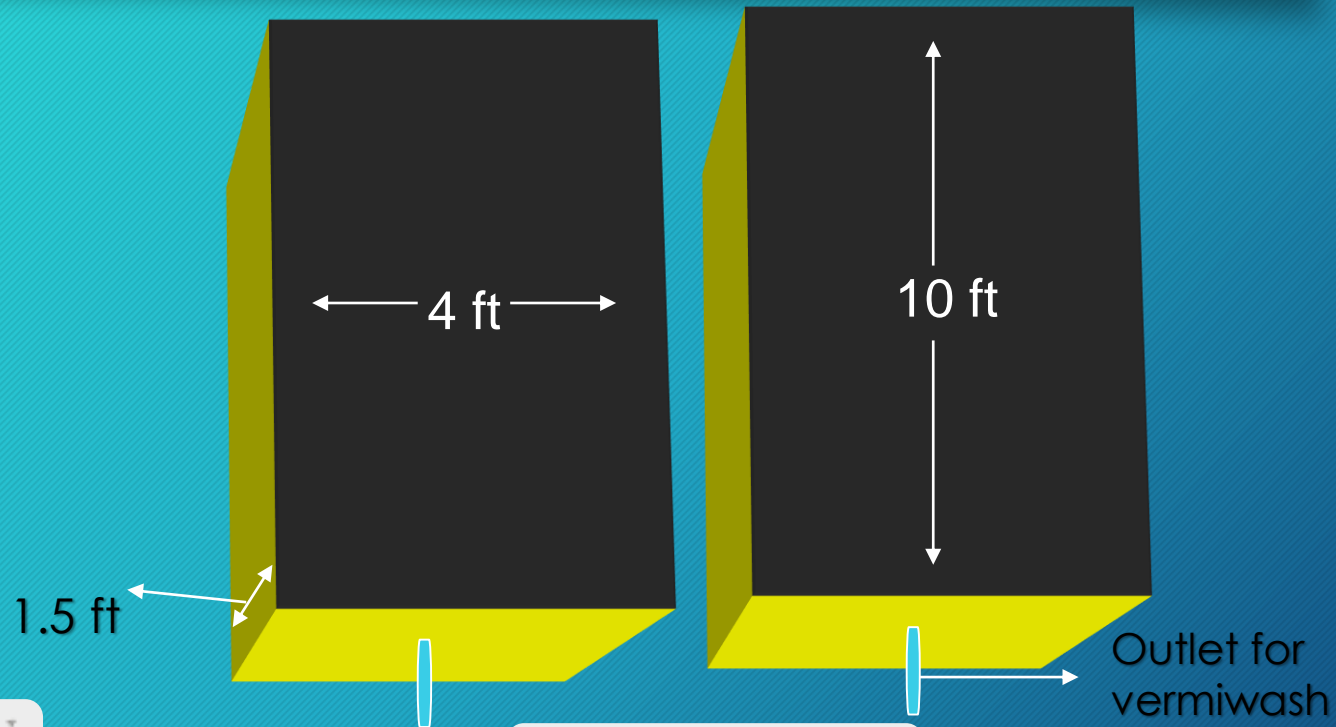
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- Worm casting
- Organic material
- Living earthworm
- Bacteria
- Enzyme – protease, amylase, cellulase, lipase, chitinase
- Remnants of plant materials
- Cocoon
- Other Organisms



# LAYOUT OF VERMICOMPOST BEDS

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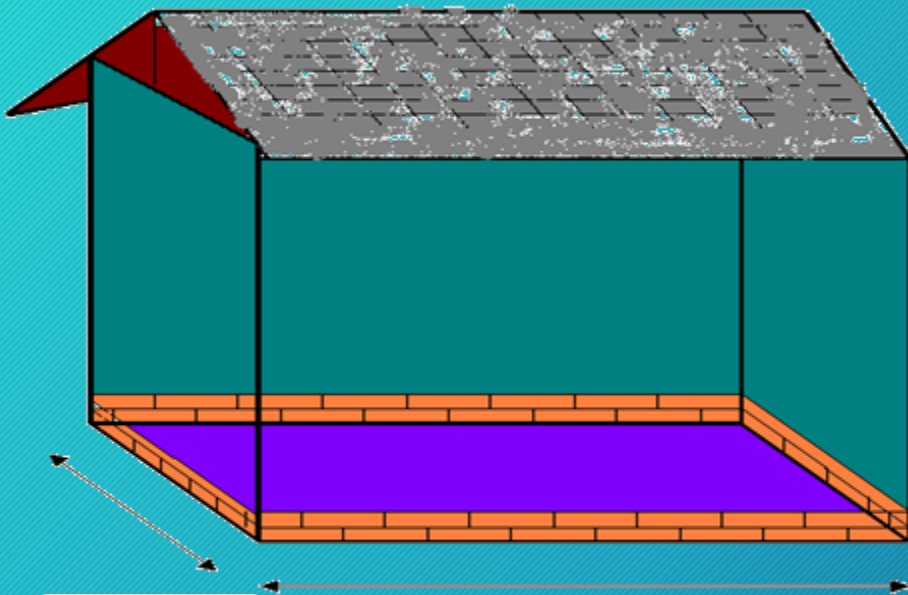
# VERMICOMPOST BEDS

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# SINGLE STORED BED

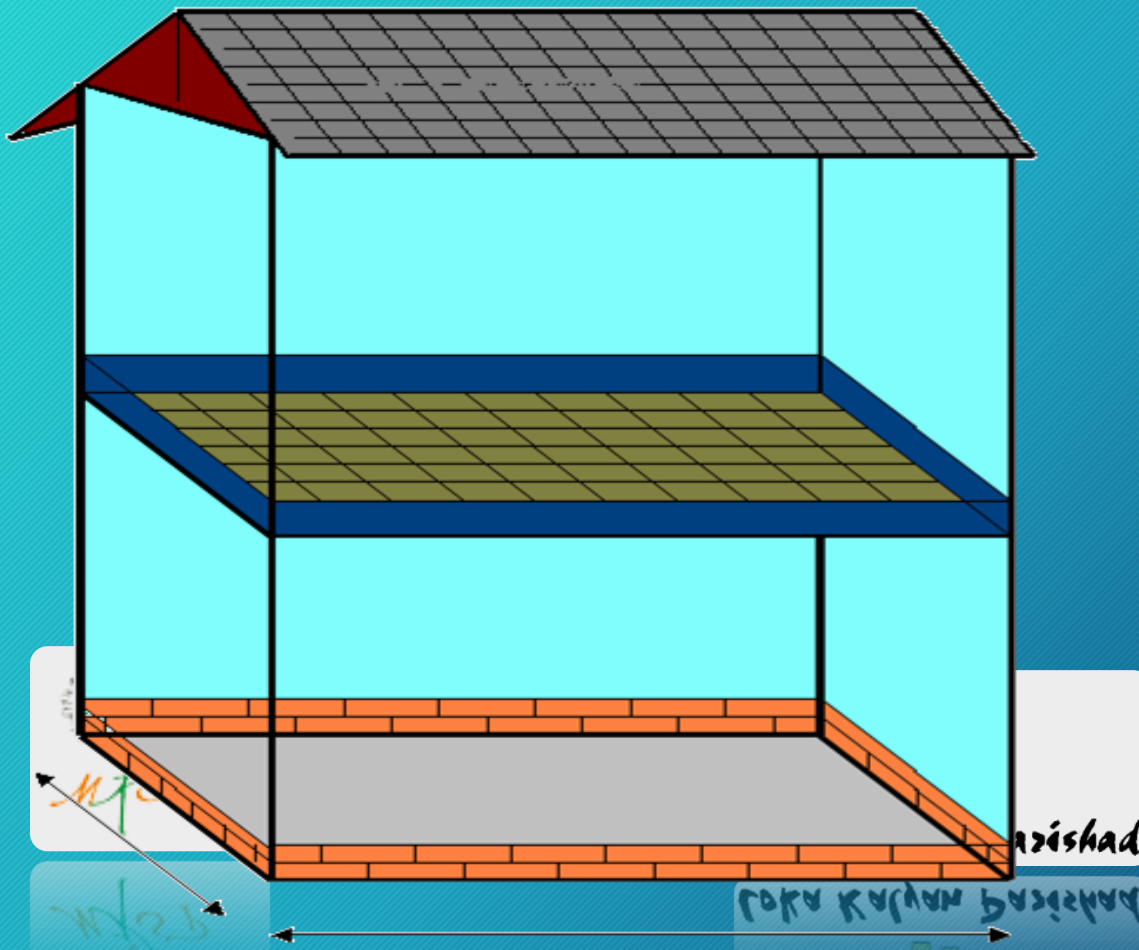
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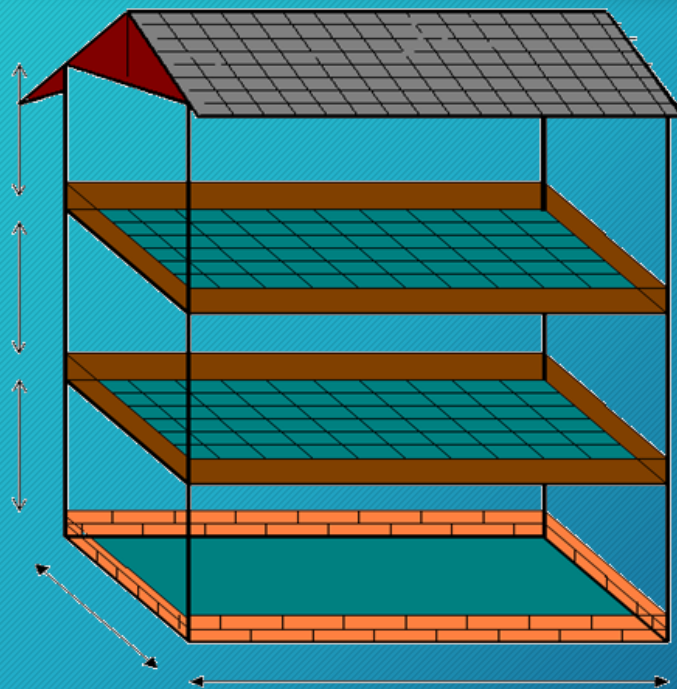
# DOUBLE STORED BED

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# THREE TIRE BED

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# MULTI-TIER VERTICOMPOSTING BED

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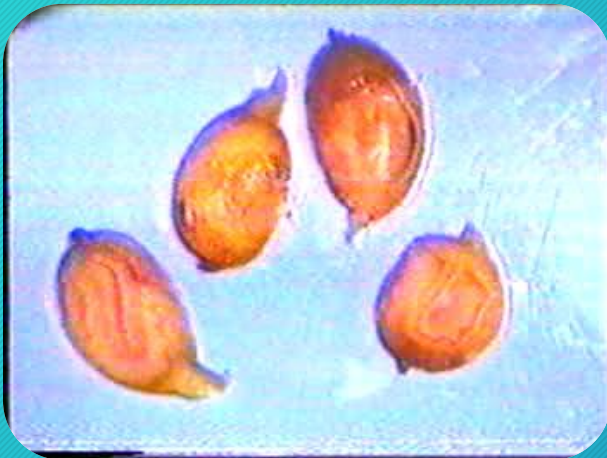


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पशुधन  
संसाधन केंद्र

# EARTHWORM HATCHING OUT OF COCOON

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# DIFFERENT SPS. OF VERMICOMPOSTING

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*Eisenia foetida*



*Eudrilus eugeniae*



*Perionyx excavatus*



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# WATERING OF VERMICOMPOST BEDS

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# WATERING OF VERTICOMPOST BEDS IN COMMERCIAL UNITS

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सुखसुविधा

# HARVESTING OF MATURE VERMICOMPOST FROM THE BEDS

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# MANUAL SCREENING OF EARTHWORMS

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# AIR DRYING OF VERMICOMPOST

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# MANUAL SCREENING OF VERMICOMPOST

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# EARTHWORM SEPARATOR CUM DRIER

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# SCREENING OF VERMICOMPOST AND EARTHWORM

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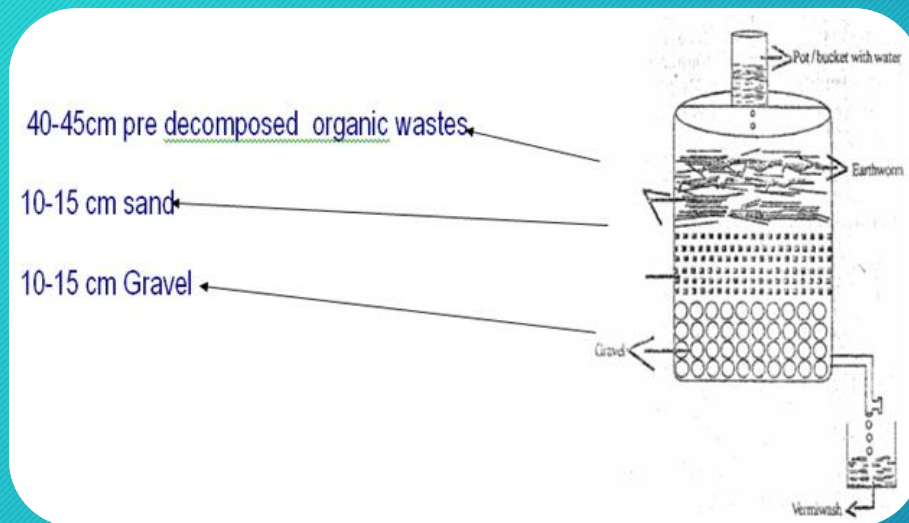


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# VERMI-WASH

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It is a liquid manure obtained from earthworms and is used as a foliar spray. It contains plant growth hormones like auxins and Cytokinins apart from nitrogen, phosphorus, potash and other micro-nutrients.





# APPLICATION OF VERTICOMPOSTING

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## APPLICATIONS

Dilute 1 lits of vermiwash with 4-5 lits of water and spray as foliar spray during the late evening hours.  
A mixture of vermiwash (1 lit ) with cow urine (1 lit) in 10 lits of water acts as bio-pesticide and liquid manure.

## BENEFITS

It acts as a plant tonic and help to reduce many plant diseases.



# NUTRIENTS OF VERMICOMPOSTING

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Parameters	Vermicompost	Vermiwash
<b>pH</b>	6.9	6.9
<b>Organic carbon (%)</b>	21.2	-
<b>N (%)</b>	1.8	0.005
<b>P (%)</b>	0.98	0.0025
<b>K (%)</b>	1.1	0.063
<b>Ca (mg/kg)</b>	2760	786
<b>Mg (mg/kg)</b>	4100	328
<b>S (mg/g)</b>	0.6	-
<b>Cu (mg/kg)</b>	38	0.117
<b>Zn (mg/kg)</b>	180	0.132
<b>Fe (mg/kg)</b>	11200	0.151
<b>Mn (mg/kg)</b>	1290	213





# QUALITY CONTROL AND PRODUCTS READY FOR MARKET

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Azotobacter sp



# Thank You

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