



Vermi Compost



Dhaka Ahsania Mission
Commonwealth of Learning





Learning material for the enhancement of livelihood skills for
people with limited reading skills

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Publisher

Dhaka Ahsania Mission
House 19, Road 12
Dhanmondi Residential Area
Dhaka 1209, Bangladesh

First Edition

December 2012 (5,000 copies)

Edited by

Shahnewaz Khan
Mohammad Mohsin
Zahirul Alam Badal

Authored by

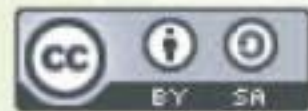
Umme Farwa Daisy

In collaboration with

Dr. Sohela Akhter
Senior Scientific Officer
Bangladesh Agriculture Research Institute

Cover & Graphics

Sekander Ali Khan



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Kecho shar (Vermi Compost): Learning materials for the enhancement of livelihood skills designed for neo-literates and persons having limited reading skills, developed by Center for International Education and Development (CINED) and published by Dhaka Ahsania Mission with support from Commonwealth of Learning. English translation of original Bangla version.

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Preface

Bangladesh is a country of enormous possibility. Yet, the majority of its people live in poverty, suffering from malnutrition, unemployment, superstition and many other forms of deprivation including natural disasters. Development workers, however, think that this situation can be changed by providing people with education and enhanced skills for livelihoods.

With this prospect in mind, Dhaka Ahsania Mission (DAM), since the early onsets of its development drive has focused on education, and has operated various non-formal education programs for different groups of people. DAM has taken up the initiative to impart skills development training to those people and thus create a pool of human resource. Considering the prime tool to execute all these activities, DAM has consistently prepared education materials of various types and merit as per the needs of different groups of people for their basic and continued education. Presently, Dhaka Ahsania Mission has, to its credit, more than 400 basic and continuing education materials of different titles.

In line with the previous publications, during 2003 - 2004, DAM developed a series of 21 books on skills enhancement and income generating activities. Later, in 2009, three more materials were developed for the workers in the Ready Made Garments (RMG) sector. Basing on that experience, DAM's 'Center for International Education and Development' (CINED) has taken an initiative to develop one more series of livelihood skills enhancement education material with the heading '**let's work and build our lives**'. In this series, 5 booklets have been developed on 5 different topics. Each book in this series is complemented with an animation video. The users of these booklets will benefit from the videos as they can better understand the learning content after watching the videos alongside reading the booklets.

A list of competences that the learners would achieve after reading this booklet has been given at the end of this book. The organizations that are providing training on skills development will play an effective role in imparting competency-based training to the informal sector using the booklets and animated videos of this series. We hope that these materials will be used extensively in the topic-based training of the post-literacy and continued education activities under the non-formal education programs. The booklet '**Vermi Compost**' is one of the five books in this series. The other booklets in this series are: Flower Gardening, Poultry Rearing, Batik Print and Nursery. The booklet '**Vermi Compost**', is discussed in an easy to understand language about the methods of producing vermin compost, how to market and sell it.

Chief Executive Officer of CINED Mr. Shahnewaz Khan was responsible for the overall coordination of the planning & development of the booklets and the animation videos of this series. "I like to convey my gratitude and thanks to all who were involved in the development of this booklet. We are sincerely grateful to Commonwealth of Learning (COL) for their generous financial assistance to develop the series."

We believe that, after reading these booklets, watching the animated videos and using the information, rural women and men will be able to build their home-based small businesses. As a result, their quality of their life will be improved, and they can contribute effectively to the process of national development. We would consider would welcome any suggestions for improvement regarding the booklets and the animation videos.

December, 2012

Kazi Rafiqul Alam
President
Dhaka Ahsania Mission

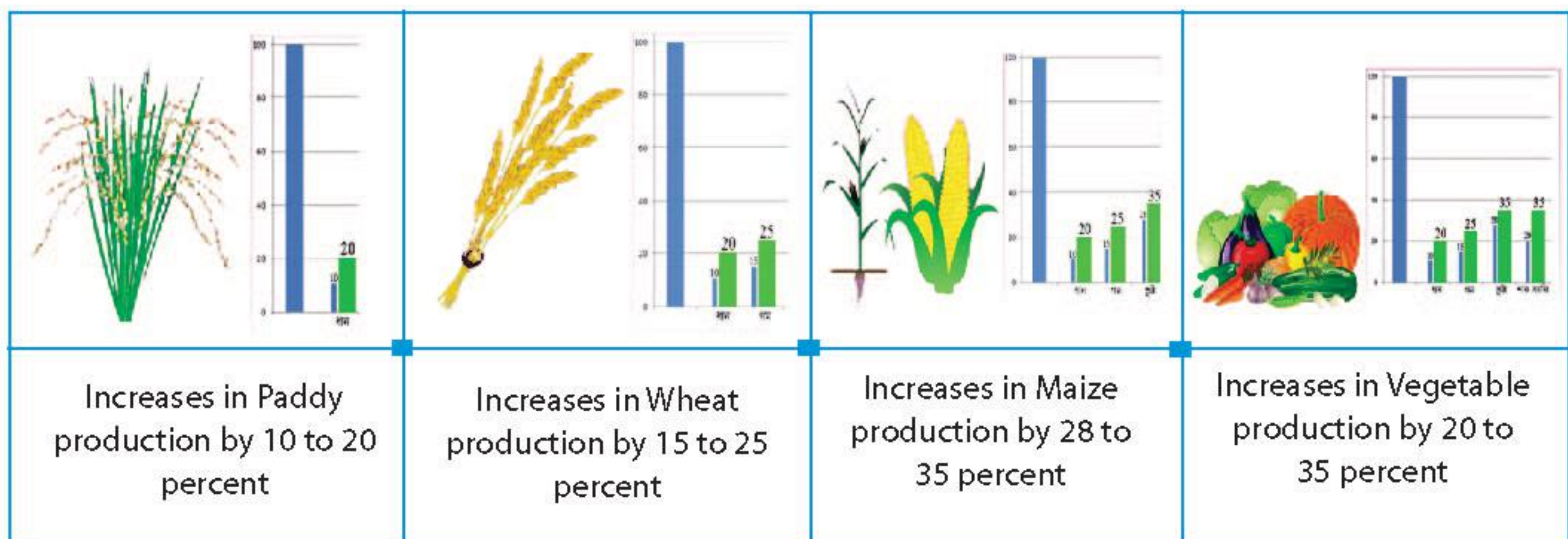


Vermi Compost

Vermi compost is an organic fertilizer, produced from different perishable materials. It is environment friendly. Earthworms defecate after consuming perishable materials and a chemical is released from earthworm's body. The excreta, the chemicals and the perishable materials all mix together and it turns into an improved organic fertilizer. We call it vermi compost. Vermi compost can be used in the cultivation of flowers, fruits and vegetables or in crop fields. This fertilizer conserves the natural properties of soil. It protects our environment.

Benefits of the using vermi compost

- If vermi compost is applied in farmlands, the quantity of the organic matters in the soil increases. As a result, the quality of the soil improves and in turn crop yield increases.
- Usage of chemical fertilizer can be reduced by 50 percent if vermi compost is used instead.
- Producing Vermicompost takes lesser effort and capital. Women can easily do this job at home beside their other chores.
- Organic components in the soil are reducing day by day due to over-use of chemical fertilizers. The reduction of organic components from the soil can be compensated by the use of vermi compost.
- Vermicompost supplies to the soil, the nutrients needed by the crops. It increases the fertility of the soil. It retains water and soil temperature balance.
- Different types of tiny organisms live in the soil that increases the soil's fertility. They are called micro organisms. Vermicompost increases the capability of these micro organisms to work better.
- A piece of land, where vermi-compost is used, requires the least amount of chemical fertilizers. In many cases, farmlands no longer need chemical fertilizers, if vermi compost is used. The use of vermi compost results in:



Material needed to produce vermi compost are:

Two categories of materials are required in the production of vermin compost. They are - Fixed materials and Current or variable materials

1. Fixed material

Materials that can be used for a few consecutive years once they are obtained or collected are called fixed materials. Let us now learn the names and amounts of fixed materials that we will need.



Room (6 ft. x 10 ft.) - 1 No.



Big earthen bowl (2 hand in breadth) - 8 Nos.



Gunny bag or thick cloth - 16 yards



Spade or shovel - 1No.



Bamboo woven basket - 1



Sieve (either bamboo or iron made) - 1No.



Gloves - 1 pairs



Red earthworm - 2 kg.

The approximate price of these fixed materials is Tk. 24,000 and the approximate price of constructing a room is Tk.15,000.

2. Current or variable materials

Aside from the fixed materials, many other materials are also needed for production. These materials should only be bought or collected when they are needed. Such materials that are needed only during the actual production process are called current or variable materials. Names of necessary current or variable materials needed to produce vermi compost are given below. The list includes both the materials needed for the production of compost and for bedding. Let us now get familiar with the things that are necessary to prepare compost and bedding.

Material required in preparing the compost are-

- Cow dung, excreta of animals and birds
- Food residues.



Animal excreta
or cow dung



Excreta of
animal and birds



Food residues



Polythene bags

Material required in preparing the bedding are-

- All kinds of perishable matters such as- twigs and tendrils, fruit and vegetable peels, especially banana peels.
- Different kinds of seeds, husk, bran or chaff of grains and egg shells.
- Water hyacinth, tea leaves, waste paper, entrails (intestine) of cow, goat, fish and poultry birds.



Food residues



Fruit and vegetable peels



Banana peel



Husk, bran / chaff



Egg shells



Dead leaves



Water hyacinth



Tea leaves



Straw or dust particles

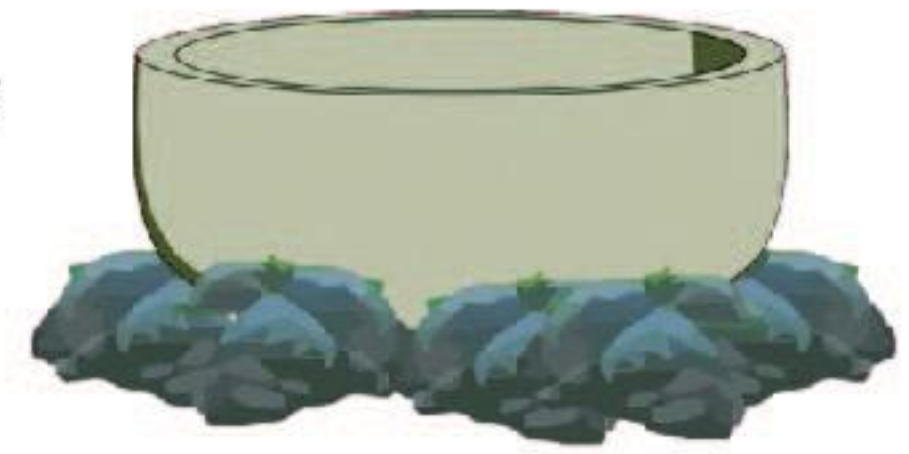


Cow, goat and poultry intestines.

You will need Tk. 5,450.00 approximately to buy cow dung and polythene bags. No money, however, is required to buy compost and bedding materials. You can collect these from your locality.

Earthen bowl for making vermi compost

The earthen bowl needed to make vermi compost can be of any size or shape. The required size depends on how much fertilizer you want to produce, using how much waste products, or how many earthworms you will be using. Note that, 200 earthworms can be kept in a bowl sized two feet across.

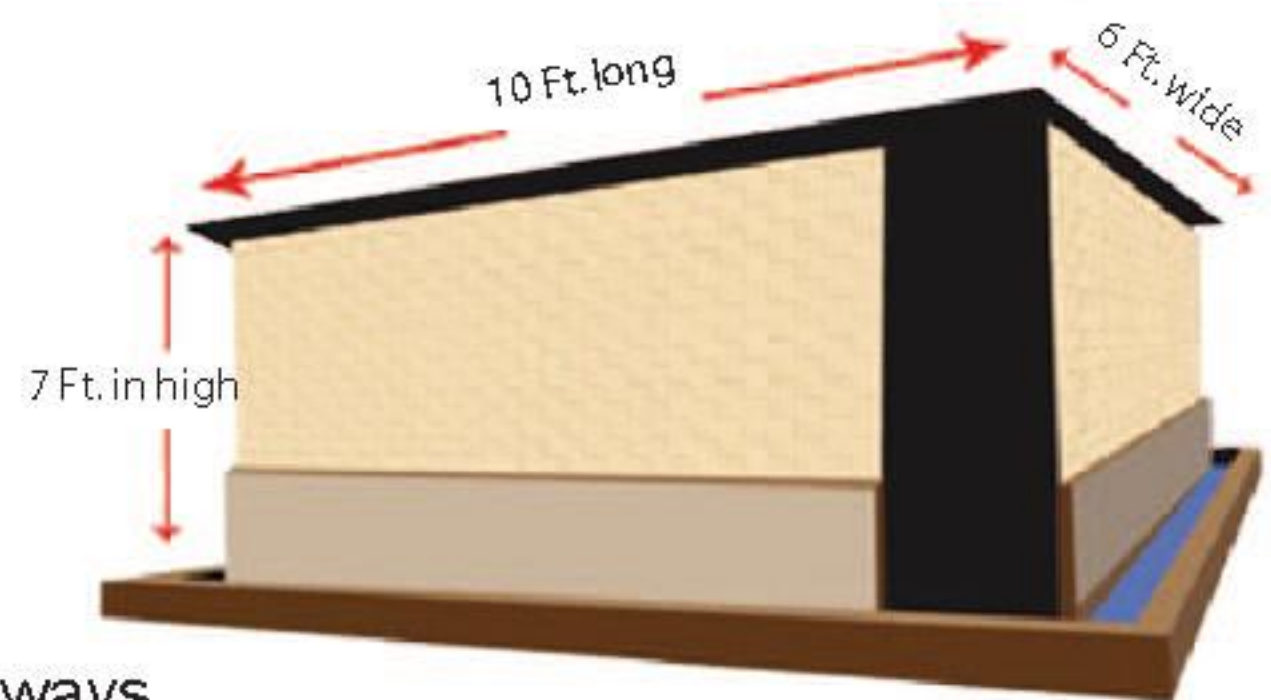


The steps of producing vermi compost from earthworms

You have to follow five steps to make vermi compost from earthworm. The steps are:

Step - 1: Making the room

- The ideal measures of the room are 10 feet in length, 6 feet in breadth and 7 feet in height.
- The roof of the room can be made of tin.
- The walls of the room can be made from bamboo woven mats, or with other materials.
- The floor of the room should be made from cement.
- The room should be surrounded by a canal or drain, containing water. This will ensure that ants or other insects cannot enter the room.
- It is better to build the room at a shady place, so that the interior of the room can always stay sodden.



Step - 2: Decomposing cow dung and waste materials

- Decomposing cow dung:** At first, collect cow dung as the raw material for making the compost. The cow dung needs to be decomposed in the open for 10 - 15 days. The raw cow dung should never be put into the earthen bowl directly. You can use the poultry excreta as a substitute of cow dung. The poultry excreta will have to be decomposed for 10 - 15 days as well, just like the cow dung
- Decomposing waste materials:** Collect the waste materials that are easily decayed. For e.g. twigs and tendrils, fruit and vegetable peels, weed, water hyacinth, straw and dusty particles, entrails of the poultry birds etc.
- The next step is to dig a hole in the ground, put all these waste matters in it and close the opening tight with a lid. You can also put them into black polythene bags, and tightly close the opening so that air cannot enter the bags. Keep the bags in an airtight condition for 7 - 8 days at least. They should be kept at a temperature of 50 - 60 degree centigrade. Anything kept inside an airtight polythene bag will stay at that desired temperature.



Step- 3: Collecting earthworms

Two kinds of earthworms can be used to produce vermi compost. However, red earthworms are usually used to produce this fertilizer. It is called Esina Fetida. This fertilizer can also be produced using earthworms named Lubricus Lubata. Both these earthworms live in waste products and feeds on wastes as well. They do not make holes. They are typically 2.5 - 3.0 inches long. July and August is the usual breeding period of earthworms. However, if the environment remains favorable, earthworms can reproduce throughout the year. You can collect



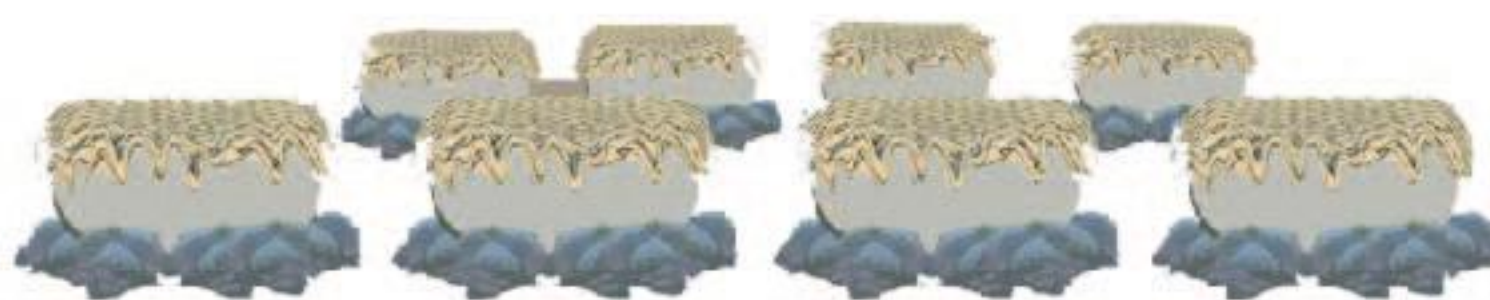
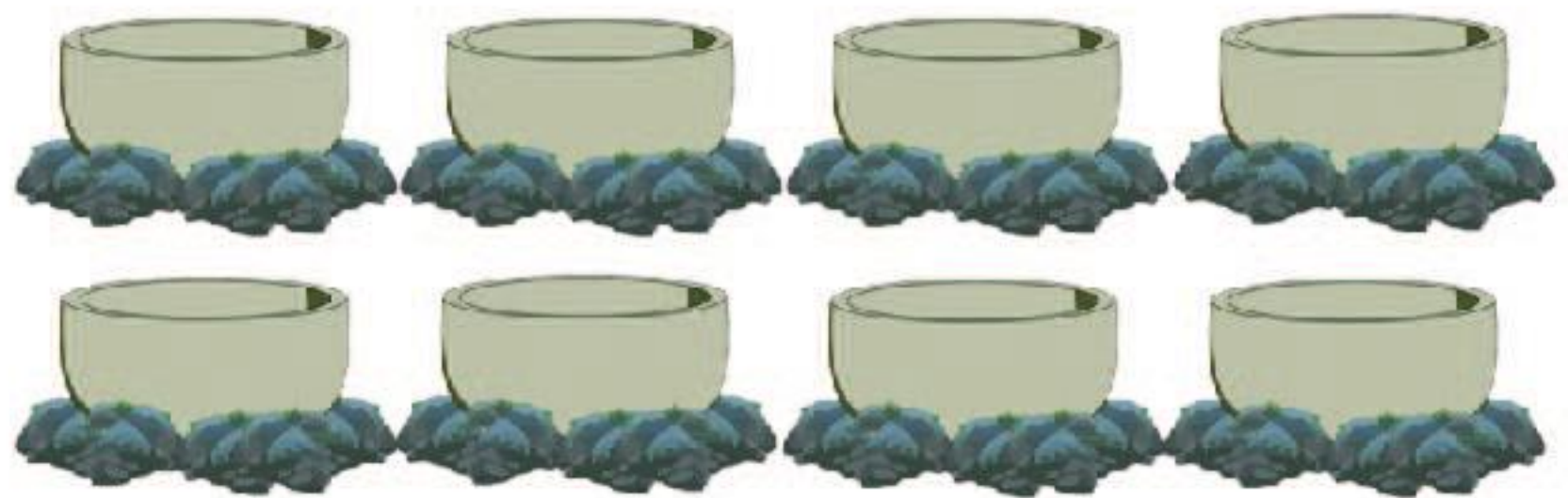
earthworms directly from the government agriculture offices or from some of the NGO offices.



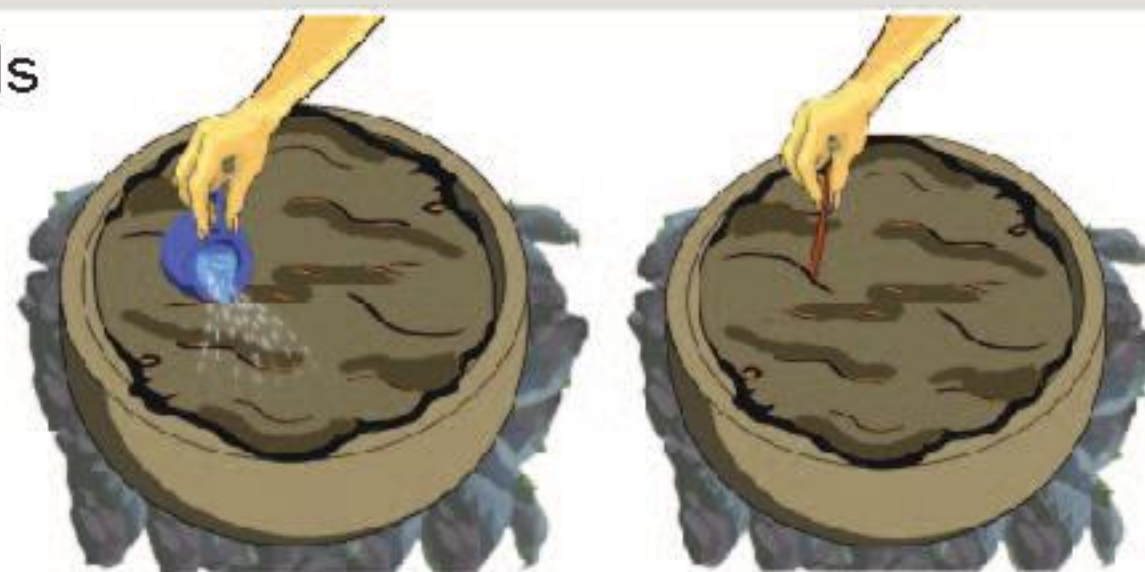
Generally, one kilogram of earthworm contains about one thousand adult earthworms. Earthworms can be carried in a wet or damp plastic pot with holes and a lid on top. Around 500 earthworms can be carried in a one-liter pot for a limited amount of time. However, if you want to carry the earthworms for over 24 hours, you have to take alternative measures. In this case, you have to mix the bedding and the composting materials with the earthworms, and carry it in a clean pot. You will need a larger pot for this.

Step- 4: Compost bed preparation

- To prepare the compost bed, you will need 8 earthen bowls to start with. The earthen bowls or pots should be 2 feet in length and two feet in breadth.
- First, you have to mix rotten cow dung with waste froth. Then divide the mixture into 8 equal portions, and fill each of the bowls equally. Release 200 earthworms into each bowl. You can also weigh 2 kg of earthworms into 8 fractions and release each fraction into each of the bowls.
- You must dig a drain around the room and fill it up with water before the earthworms are released into the bowls. This will keep ants or insects away from eating up the earthworms.
- The earthen bowls have to be kept at a constant temperature of 25 - 30 degree centigrade and a humidity of 65 - 70 percent. The bowls should be covered with gunny bag or thick cloth, so as to provide a dark environment suitable for earthworms to live in. Apart from that, earthworms can also eat better in dark environments.



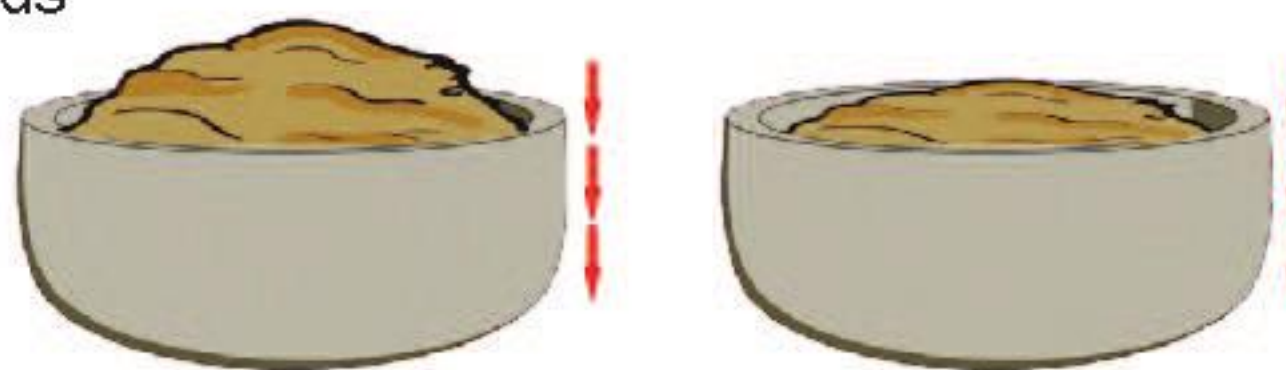
- You must keep an eye on whether the waste materials at the top of the bowls are drying out, after a couple of days. If it dries, you have to moisten it with water. You'll also have to churn the waste inside the bowls. If the waste turns a color of dark brown, then water should no longer be added to the bed.



Step- 5: Collecting the compost

- Earthworms usually grow to double its size in 6 months. It means, within 6 months, 2 kgs of earthworm should weigh 4 kgs.
- The first cycle of vermi compost production takes about 60 - 70 days.
- Gradually, as both the bacteria and earthworms multiply, the production time of vermi compost is lessened. As a result, during the next cycle, vermi compost will be produced in 30 - 40 days, and in 20 - 25 days in the cycle next.

- Usually, earthworms stick to the top of the beds where they eat the waste materials. After feeding they slowly move to the lower levels. Once the waste materials gets into minute particles like tea leaves, you will know that the fertilizer has already been produced.



- At this stage, you have to remove the fertilizer from the bedding by scraping it slowly and keeping it on one side of the bowl. You have to be keep it there for another 6 - 24 hours, but it should be swayed out often. If any adult earthworm is found in the fertilizer, it has to be kept into another pot of composting materials.



- The compost should be sieved after being collected from the bed.
- If you find earthworms, their eggs or cocoon in the sieve, you have to be place it in the bed again.
- The fertilizer or the compost needs to be dried well in the sun after collecting.
- After that, the fertilizers have to be put in an airtight gunny bag or polythene bag, and kept in a dry place. Make sure that the poly bags are thick. The fertilizer can be kept in 1 kg to 50 Kg sized poly bags. If preserved in this way, the fertilizer can be stored in good health for up to 1 year.



After collecting the fertilizer, new waste materials should be prepared and mixed with the old froth, and kept in the bowls again in the same manner. This way, you can collect fertilizer again after 20 - 25 days.

Selling vermi compost

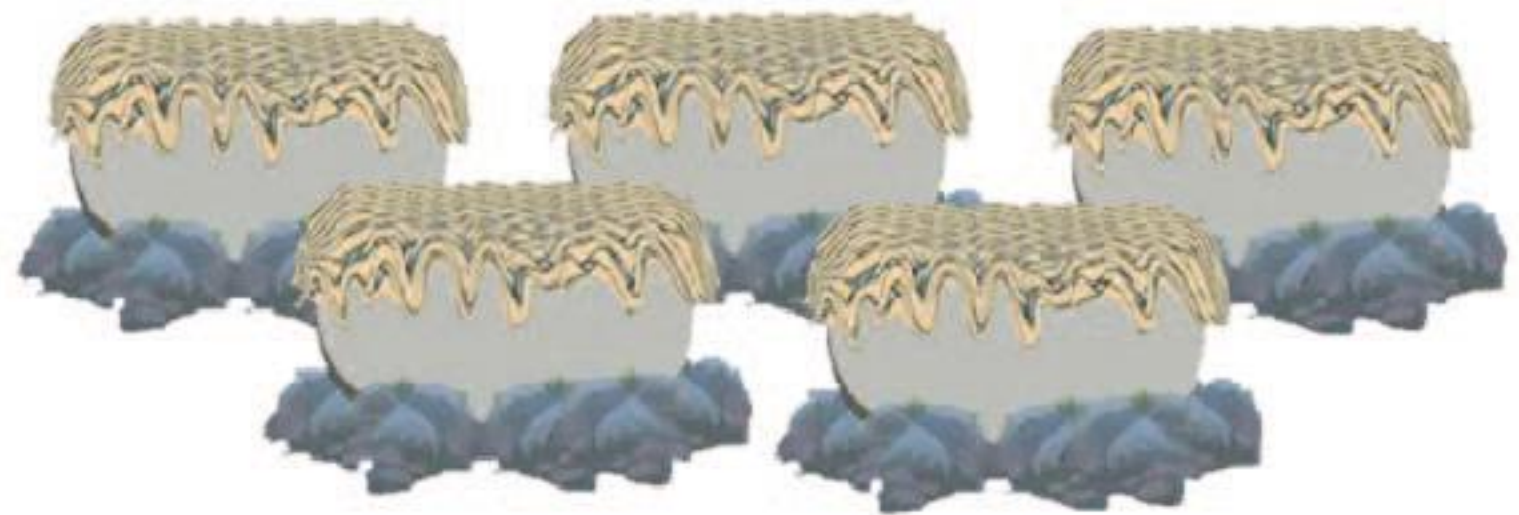
Vermi compost is quite popular nowadays. Many people buy and use this fertilizer. For example-

- Fish traders buy this fertilizer as fish meal.
- Many people use this fertilizer in their roof top garden.
- Rural farmers buy this fertilizer for their crops. Many of them, however, produce their own vermi compost.
- As the usage of this fertilizer is growing day by day, so is its demand.

One kg of vermi compost can be sold at Tk. 10. The market price of earthworms is Tk. 1,500 to Tk. 2,000 per kg.

The process of harvesting good quality fertilizer

Temperature: To obtain the best quality fertilizer, the temperature has to be kept within 20 - 30 degree centigrade. However, the temperature must be kept under 48 degrees centigrade for the survival of the earthworms.



Humidity: Humidity level in the bowls should be maintained at 65 - 70 percent.

The bowls should be covered by gunny bag or thick cloth to retain the humidity and the moisture inside.

Ants or other insects: An earthworm's arch enemy is the ant. You should make sure that ants are kept out of reach of the earthworms.. Apart from that, other insects can also kill or eat up earthworms. So you must take precautions.

Sorting or selecting the earthworm: The selection of the right varieties of earthworms is instrumental to producing this fertilizer.. Organic fertilizer will not be produced if the earthworms are not of the right kind.

Bed: Direct sunlight on the beds can kill the earthworms. Again, earthworms would also die if rain water enters the fertilizer bowls, or if the waste materials contain sand and soil. . Earthworms cannot eat properly if the fertilizer making materials are pushed into the bowls. As a result, the fertilizer will not be produced correctly. On the other hand, excessive water can also hamper the production.



Use of perishable materials

You have to use perishable materials to make fertilizer from earthworms. The list below names the materials that you may not use in the production process.



Plastic



Soap



Oil



Insecticides



Color



Excreta of cat or dog



Onion and garlic

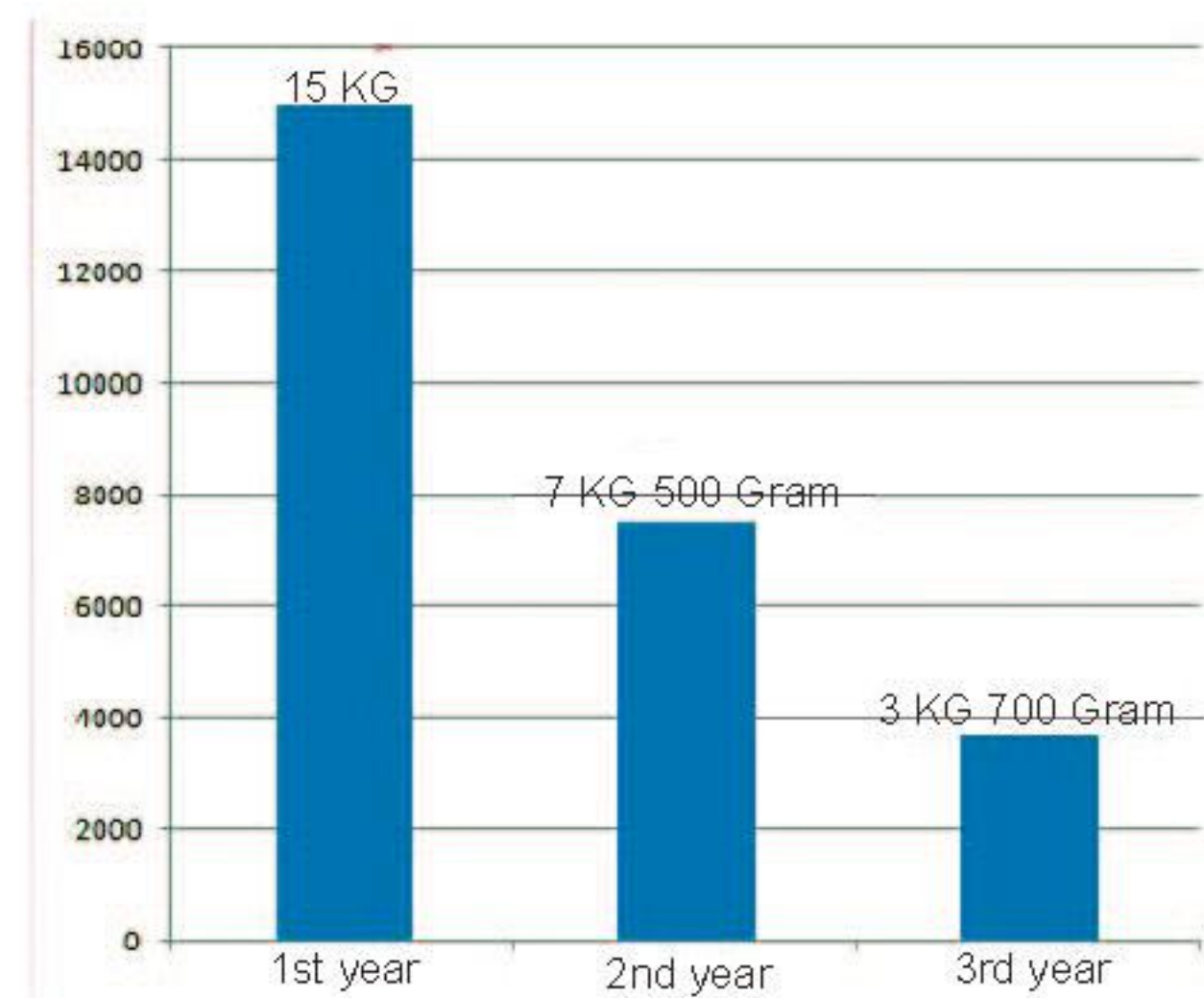


Fragrant spices
(cardamo, cloves,
cinnamon etc)

Apart from these, any metal or lead substances, such as chemicals, lemons, or citrus fruits cannot be used.

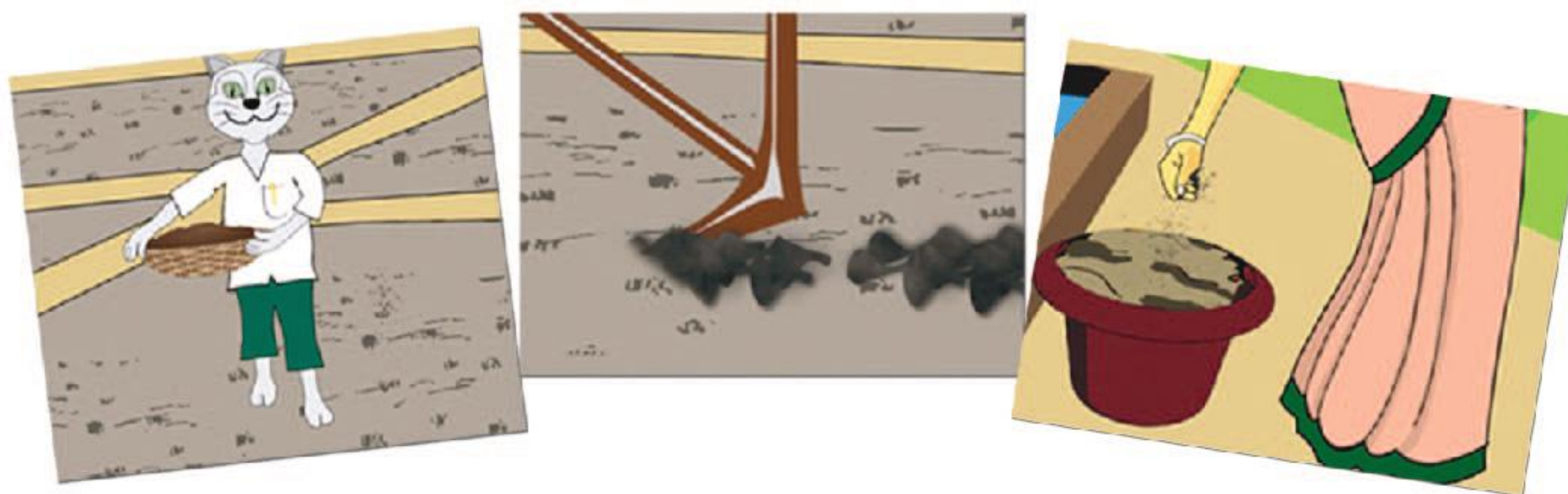
Application of vermi compost in crop land

In the first stage, 7 kg - 10 kg of vermi compost is needed for every decimal of land. But the need may vary depending on the quality of land and the types of crop sown. During the second and third stage, less fertilizer is needed. In the table below, the quantity of fertilizer to be used per decimal of land is shown.



Year	Amount of land	Quantity of fertilizer
1 st year	1 decimal	15 kg
2 nd year	1 decimal	7.5 kg
3 rd year	1 decimal	3.7kg

If the quality of the soil is normal, fertilizer can be use as per the table above. You can expect a bigger harvest if you use fertilizer as per the table. If you use vermi compost in a land for three consecutive years, you can go on without applying any fertilizer for the next two following years.. As a result, your production cost will decrease. If the soil fertility of the land is too low, then 70 percent chemical fertilizer can be used along with the vermi compost.



Fertilizer should be spread evenly throughout the land during land preparation. Vermi compost should be properly mixed with the soil using a plough and ladder. This fertilizer can also be used in the tub after mixing it properly with the soil. Seeds or seedlings should be sowed after 3 - 5 days of fertilizer application.

Other uses of vermi compost

- No other fertilizers are required in a pond, if vermi compost is used. Fishes consume vermi compost directly as feed.
- Natural fish feed grows in the pond if vermi compost is applied.
- Higher Oxygen level can be obtained in the pond if vermi compost is used.

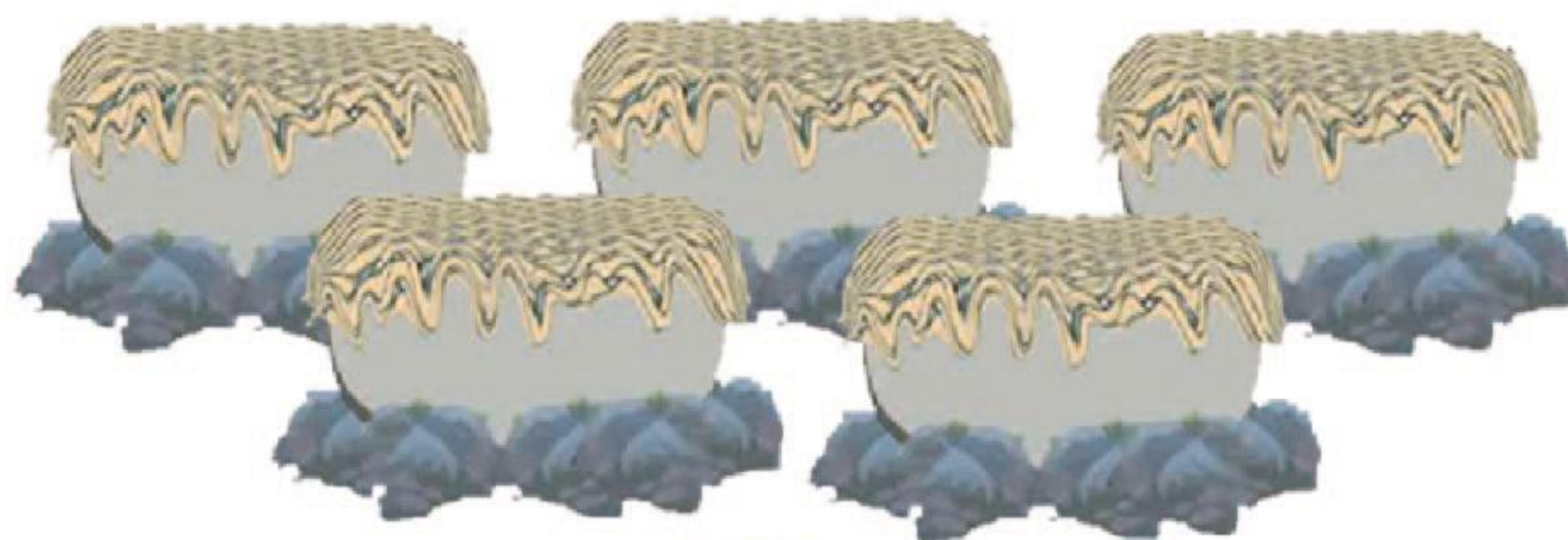


Comparison of nutrient values between vermi compost and other organic fertilizers (shown in percentage points)

Organic fertilizer	Nitrogen	Phosphorus	Potash
Vermi compost	2.5 - 3.0	1.0 - 1.5	1.5 - 2.0
Cow dung	0.5 - 1.5	0.4 - 0.8	0.5 - 1.9
Poultry excreta	1.6	1.5	0.85
Farm fertilizer	0.5 - 1.5	0.4 - 0.8	0.5 - 1.9
Common compost	0.4 - 0.8	0.3 - 0.6	0.7 - 1.0
Water hyacinth compost	3.0	2.0	3.0

Profit from producing vermi compost

Profit can be found after deducting all relevant costs, incurred in the process of production, from the revenue achieved from selling the produced goods. The surplus amount is the profit. Let us now look at how much profit we can make in two years by producing vermi compost.



Fixed cost

We already know that the approximate price of the necessary fixed materials is Tk. 24,000. Calculating 20 percent depreciation of the fixed materials per year, the cost of those for two years is (Tk. 4,800 x 2 years)	Tk. 9,600
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Current or variable cost

Purchase of cow dung – 10 Van	Tk. 1,750
Purchase of new earthen bowl – 4 No.	Tk. 2,200
Purchase of polythene bag – 500 No.	Tk. 1,500
Total current or variable cost	Tk. 5,450

Total cost

Current or variable cost	Tk. 5,450
Fixed cost	Tk. 9,600
Total cost	Tk. 15,050

Total sales

Sales of earthworm – 11 kg @ Tk. 2,000 per kg	Tk. 22,000
Fertilizer sales – 1,454 kg @ Tk. 10 per kg	Tk. 14,540
Total sales	Tk. 36,540

Profit

Total sales	Tk. 36,540
Total cost	Tk. 15,050
Profit gained in two year producing vermi compost	Tk. 21,490

Conclusion

Now we have learned the techniques of vermi compost production. Anybody can start this business at home alongside one's regular activities. This task needs less effort. Female members of the family can also do this job. The demand for vermi composts is increasing day by day. Many people are now interested to get involved in vermi compost production because of its promises. You can also consider producing vermi compost. You can begin the production of vermi compost with only 8 earthen bowls as start up capital. If you add more earthen bowls, the amount of profit you make would multiply. We can increase our income through this activity and also improve our environment by using this fertilizer instead of toxic chemical fertilizers.



Achievable competence

After reading this book, the readers:

1. Would be able to explain the environment friendly qualities of vermi compost;
2. Would be able to articulate the benefits of the production of vermi compost as a small business;
3. Would be able to name the materials necessary to produce vermi compost, the amount needed, places of availability and the possible prices of these materials. .
4. Would be able to explain the qualities of vermi compost as to how it help increase production upon it usage, and can compare it with other organic fertilizers.
5. Would be able to describe the process of bed making and can name the materials that are used to make beds.
6. Would be able to explain the consideration points in selecting the needed rooms to produce vermi compost.
7. Would be able to narrate the techniques of collecting and carrying earthworms and can name the correct species of earthworms to produce vermi compost.
8. Would be able to say the methods of the vermi compost production.
9. Would be able to say about the process of obtaining and preserving vermi compost.
10. Would be able to narrate the other usage of vermi compost except using in crop production.
11. Would be able to narrate the techniques of earthworm and vermi compost marketing.
12. Would be able to narrate the possible income and expenditure accounts of vermi compost production and sales.

Readers would be able to grasp the above mentioned competence more skillfully after watching the vermi compost related animated video.



Learning material for the enhancement of livelihood skills for people with limited reading skills

