

Compost Making

Best Practice in Sustainable Land Management (SLM)

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1 General

Name of the technology: Compost making

2 Detailed description

2.1 Definition

Compost making is a process where waste organic material derived from plants and/or from animals is decomposed by microbial action under aeration and where a friable homogenous humus is produced that can then be used to improve soil fertility and to enhance plant growth and productivity.

2.2 Summary description

2.2.1 Criteria for selection

Compost making was selected as a best practice technology based on the criteria stated in the SLM Best Practices Concept & Manual by the consultant (it needs to be confirmed by the Task Force).

Table 1: Criteria for the assessment of SLM best practices example

Criteria	Points	Comments
Acceptance	3	Fundamental, at least 2 points
Effectiveness	3	Fundamental at least 2 points
Efficiency	3	Fundamental
Relevancy	3	
Sustainability	3	Fundamental
Replicability	3	
Total point	18	
Average rate	3,0	

NB

- the criteria is at high degree (3)
- the criteria is at medium degree (2)
- the criteria is at low degree (1)

The cumulative average rate should be at least 2,0 points to qualify for best practice

Compost making was rated as a best practice technology with the highest average rate, because of its acceptance, its long term existence, its effectiveness for soil fertility improvement and its cost efficiency. It is sustainable and it can be replicated without high investment costs and without any scientific knowledge.

2.2.2 Problem addressed

Soil erosion and degradation are the major challenges contributing to loss of soil fertility and the decline in agricultural production throughout the country. Artificial fertilizers to improve soil fertility require high costs. High infiltration rates reduced run-offs and less soil erosion

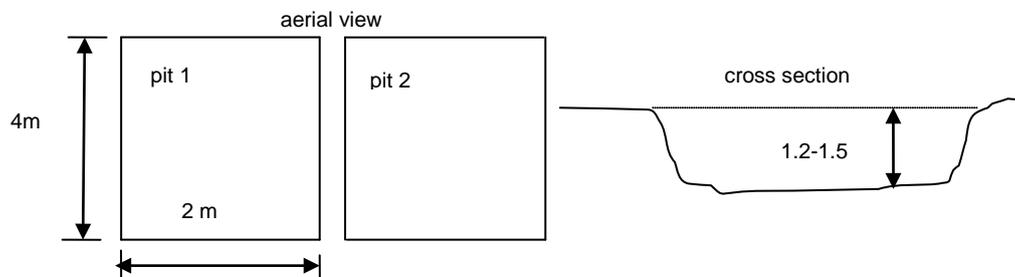
are directly related to the amount of organic matter within the soil. Compost making is a technology to be used not only to sustain agricultural production, but also to enhance soil structure and to improve percolation of water by improving soil porosity. Compost has been used for centuries in agricultural crop production and is an extremely soil and soil microorganism friendly technology.

2.2.3 Purpose and detailed description

Site selection is very important. The compost pit should be placed under the shade of a tree to support retaining of moisture. It also needs to be protected from flooding water.

Depending on the needs and capacities of farmers, compost can be prepared by using one to three pits. The amount of the compost to be produced varies in accordance with the number and size of the pits. Except for its depth, the width and length of a compost pit has no limit. The depth should not be greater than 1.5 meters to have control of the temperature. If the pit is deeper, it may become too hot and it can easily loose moisture, so that the decomposition process comes to a stop. It is recommended that the pit should have the size of 1.5m (w) x 1.5m (l) x 1.0 m (d).

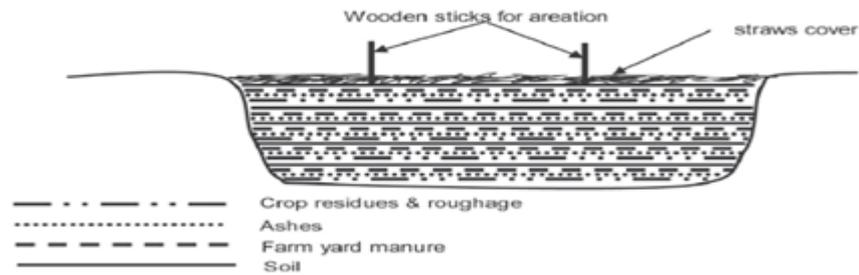
Figure 1: Dimension of pits



If a suitable place is not available, it is also possible to prepare a compost pit with some additional safeguards:

- Prepare the pit where you can find adequate material for compost preparation
- Fill the pit sequentially with different materials as follows:
 - Put maize, sorghum, grasses with thicker stems, or thin branches from trees at the bottom of the pit as 1st layer;
 - Add all kinds of dry biomass such as straw of field crops as 2nd layer;
 - Add all kinds of weeds, grasses (it is preferred to use those material from the leftovers of animal feed) as 3rd layer;
 - Add all kinds of green plant material, such as leaves and soft branches, weeds, grasses as 4th layer;
 - Add a mixture of other naturally decomposable materials such as manure, cow dung, chicken and birds drop, ash and fertile top soil are extremely valuable for compost making as 5th layer;
 - Seal the pit by using cow dung, mud or a mixture of soil and cow dung (chika) and then cover with large wide leaves such as those of Ensete and Banana mainly to test the condition inside the composting materials.

Figure 2: Cross section of pit showing layers



- Create artificial shade with plastic, grasses, old sacks, similar to the shade used in a seedling nursery;
- Make structures to divert possible flood water from entering into the pit.

Figure 3: Heap of compost prepared under shade

Matured compost should be stored either in its original compost pit or taken out and put under shade. It needs also to be covered it with grasses or leaves until it is taken to the field for further utilization. A sunny and windy place is not recommendable for storing compost to avoid loss in nutrients.

2.3. Adaptation to different agro-ecological and socio-economic conditions

Compost can be prepared within all agro-ecology zones by using different methods such as **pit method** and **heap method**. Pit method is commonly done within moisture stressed areas while heap method is suitable in moist 'dega' (highland) and 'weyna dega' (intermediate) areas, in 'kolla' (dry) areas it is less suitable, but can be done, when for example animal material is widely available.

1. **Pit method:** the compost making process is best used in moisture stressed and cold areas. In moisture stressed areas, it keeps the available moisture for a longer time while in cold areas, it keeps the inside temperature high enough for de-composition process.
2. **Heap (piling) method** is a surface-based compost preparation process. It is an appropriate method in areas with high moisture through high rainfall and irrigation. If compost preparation is to be carried out in a pit, moisture may enter into the pit and change the decomposition of the compost from a good smelling aerated process into a sour or ammonia smelling process.

3 Benefits and costs

3.1 Benefits

Compost is important because, it

- contains the main nutrients useful for the growth of plants – nitrogen (N), phosphorous (P) and potassium (K), often written as ‘NPK’;
- improves the organic matter in the soil by providing humus and leads to a higher agricultural production and productivity;
- helps the soil hold both water and air for better plant growth;
- contains trace elements and micronutrients that are available to plants;
- can provide 1-2 tons of compost per homestead when prepared through pit method in dry and in moisture areas;
- allows to reduce temporary water logging along bunds and creates “fertile infiltration zones” within the first 2-3 meters above bunds, to be planted with high demanding crops, and
- offers income opportunities for members of very poor households to serve as compost makers for others.

3.2 Costs

Compost preparation involves pit excavation and collection of compost materials such as roughage, ashes and animal dung around farms, foot paths, etc. It also requires the preparation of the different layers, step by step, and turning material from one pit to another pit. After that it needs to be transported to the farm land for utilization. In most cases, all these activities are done by the farmer and his family members. Whenever there is labor shortage, farmers may use additional external labor to carry out some of the (hard) work, such as excavating the compost pit, turning the decomposed material and the transportation to the field. No accurate data is available to estimate the overall cost of compost preparation.

4 Success and challenges

4.1 Success

Practices such as recycling of organic matter and securing favorable soil conditions for plant growth are considered as an integral component of soil fertility management. For food security and livelihood improvement most of Ethiopian farmers depend on compost making and utilization. Especially rotational livestock ban or in Amharic called ‘beret’ is a common method in Ethiopia for the soil fertility management.

4.2 Challenges

Compost making needs great care. Preparation of compost for commercial use is also very tedious and requires high labor inputs and requires transportation facilities. Compost application should be done during the planting period. When compost is applied at the same time, the releasing process will be inside the soil. If compost is applied before planting, it should not stay on the surface of the soil. It has to be ploughed and mixed with the soil. If farmers use row planting, the compost should be put in the row with the seeds and then covered with soil. Approximately 6 tones of compost are required to be applied per ha, which requires high amounts of compost materials and transportation facilities.

5 Sustainability and chances for scaling up

Compost making can be scaled up to any agro-ecological zone and can be done by any farmer. Material for compost preparation is available everywhere and compost can be prepared by family labor inputs and / or with additional hired labor.

6 Conclusion and recommendation

Compost is an essential component for plant growth and for soil fertility. It is used to provide organic matter, it enhances the soil structure and increases the percolation of water by improving soil porosity. Compost is known and has been used in agricultural crop production for a long time and it is an extremely soil and soil microorganism friendly technology. It is made from locally available material and it is rather cheap in comparison with commercial fertilizers.

7 Reference

MoA; Community based participatory watershed development – a guideline, 2005, Addis Ababa, Ethiopia.