

# FARMING-SYSTEM SPECIFIC EXTENSION CONTENT FOR ENHANCING CLIMATE CHANGE ADAPTATION AND RESILIENT FOOD SYSTEMS IN SORGHUM-BASED DRYLAND FARMING SYSTEMS OF TANZANIA AND BURKINA FASO

## MANURE COMPOSTING AND USE

### CLIMATE CHANGE ADAPTATION AND RESILIENT FOOD SYSTEMS ISSUE

Chemical fertilizers are costly for the majority of farmers in the sorghum-based farming systems. Their use may be unsustainable. In addition they can lower the fertility of the soil if used regularly and, if not used properly, they can also damage the crops and make them unhealthy for consumption.

### ESSENTIAL TECHNICAL INFORMATION

Manure adds nutrients to the soil without affecting its fertility. It does not damage crops and produces healthy plants. The beneficial effects of manure on the soil are; as the soil absorbs manure, nutrients are released which in turn helps the plants as fertilizer, conditions the soil and improves soil's ability to retain moisture and reduces runoff and leaching of nitrates in the soil.

#### *What is manure?*

Manure is the decomposed form of dead plants and animals, which is applied to the soil to increase production. It is a natural form of fertilizer and is cost-effective. The human and animal excreta is also used as manure.

#### *What is composting? Compost?*

Composting is a controlled, aerobic (oxygen-required) process that converts manure and other organic materials into a nutrient-rich soil amendment or mulch through natural decomposition.

Hence compost is organic residues, mostly manures (animal manure) that has been piled, mixed and moistened to undergo decomposition.

#### *What are the benefits of manure compost?*

Composting manure is a great way of improving soil structure, fertility and water holding capacity. Compost is rich in organic matter and improves soil health. As the soil absorbs manure, nutrients are released. This enriches the soil, which in turn helps the plants.

The most important benefit of using manure in the garden is its ability to condition the soil. For instance, mixing manure with sandy soils helps to retain moisture levels. Adding manure to compacted soil helps loosen the soil. Manure produces increased soil carbon, which is an important source of energy that makes nutrients available to plants. Other benefits of manure include reduced runoff and leaching of nitrates in the soil.

In order to maximize the benefits of manure compost in the garden, proper application is vital. One of the best ways to use manure as plant fertilizer is by mixing it in with compost. Composting manure eliminates the possibility of burning the plants. So plenty of time has to

be allowed for the manure to break down, eliminating the threat of burning plants in the garden. Well-aged manure on its own also makes a great fertilizer for garden plants.

Nearly any kind of manure can be used. Generally, cow and chicken manure are the most commonly used for manure fertilizer. Some people also use sheep and rabbit manure. However, it is not recommended that anyone use cat or dog manure. These types of manures are unsuitable for the garden or the compost pile, as these are likely to carry parasites

Composted manure can also be used as mulch. Because manure is considered a slow-release plant fertilizer, it provides small amounts of nutrients over an extended period. This makes it an acceptable form of mulch for plants. However, the farmer should make certain it is not fresh manure. Fresh manure is too strong for plants, as it contains excessive amounts of nitrogen, which can burn the plants. In addition, some manure fertilizer consists of urine as well, which is also high in nitrogen. Too much nitrogen on plants can be detrimental for them.

*Can compost completely remove the need for chemical fertilisers?*

While manure compost improves soil physical and chemical condition, and is a source of fertilizer for crop production, much of the nitrogen is tied up in complex organic compounds and is not ready for uptake by plants. Use of compost should therefore go hand-in-hand with use of commercial fertilisers. The compost should be applied using a spreader or in holes during micro-dosing which will ensure that proper amount is applied in the required area.

ADVICE TO FARMERS ON HOW TO MAKE MANURE COMPOST

- a. Manure should be piled (be in a mound), and the mound should have 50% of the pore space filled with water and the pile should be aerobic/ aerated;
- b. The pile at the bottom is generally about 3.0 to 3.7 m wide at the bottom and 1.2 to 1.8 m high.
- c. Microorganisms have a C/N ratio of 5 to 1 to 10 to 1.
- d. Water management is critical in manure compost management because 40 to 65% of the pore space in composting materials should be water. To feel moisture content, squeeze the compost. If water drips out, then it is too wet and if the compost feels like wrung out wet rug, then the compost has sufficient moisture content.
- e. To compost manure well, turn the pile when temperature drops below 43°C. After turning compost 3-5 times, the manure must be composted (plant material within has broken down).

The extension agents may need training on how to train farmers on manure composting. The guide published by the World Vegetable Center on: *“How to conduct a compost-making workshop: A course for trainers”* (Suzanne Neave, 2011) may be a useful resource. It can be downloaded from here: <https://avrdc.org/download/publications/manuals/eb0161.pdf>