Manure – teacher information sheet

Basic Soil Management

For soil to maintain its capacity to support plant growth and high crop yields, it must be managed properly. Landslides, flooding and erosion can decrease soil capacity. Soil management is designed to minimise the impact of these processes, and means using soil wisely so that it can continue to support plant growth over the long term. One way to maintain soil fertility is to apply manure.

What is manure?

Manure is waste materials from animals or plants that are added to soil to improve its fertility. Manure is used as an organic fertiliser that contributes to soil fertility by adding organic matter and nutrients.

Advantages and disadvantages of manuring

There are advantages (desirable or 'good' effects) and also disadvantages (undesirable or 'bad' effects) of using manure. Table 1.1 summarises the advantages and disadvantages of manuring.

Table 1.1: Advantages and disadvantages of manuring

Advantages ☺	Disadvantages ☹
• Increases the content of soil organic matter and nutrients • Improves plant nutrition • Improves soil structure • Increases crop yield	• Labour intensive • Longer time to see the result • Has an odour/smell • Heat generated can harm plants

(Seta-Waken, Malie, Utama & Palaniappan, 2016, p. 22).

Types of manure

There are three main types of manure that are commonly used: (1) green or plant manure. (2) farmyard or animal manure and (3) ‘tea‘ or liquid manure.

Example of manure types. (Seta-Waken, Malie, Utama & Palaniappan, 2016, p. 22).

Green or plant manure: what is it?
Green manuring is the process of growing legume plants such as beans and peanut in well-prepared soil until they are leafy. They are ploughed into the soil after sowing because their tissues are very soft when they are very young, and they rot and decay very fast.

Green manure plays a similar role to a cover crop but has a shorter preparation time. Most green manure crops are legumes such as beans, ie, snakebean.

Why is green manuring good?
Green manuring:

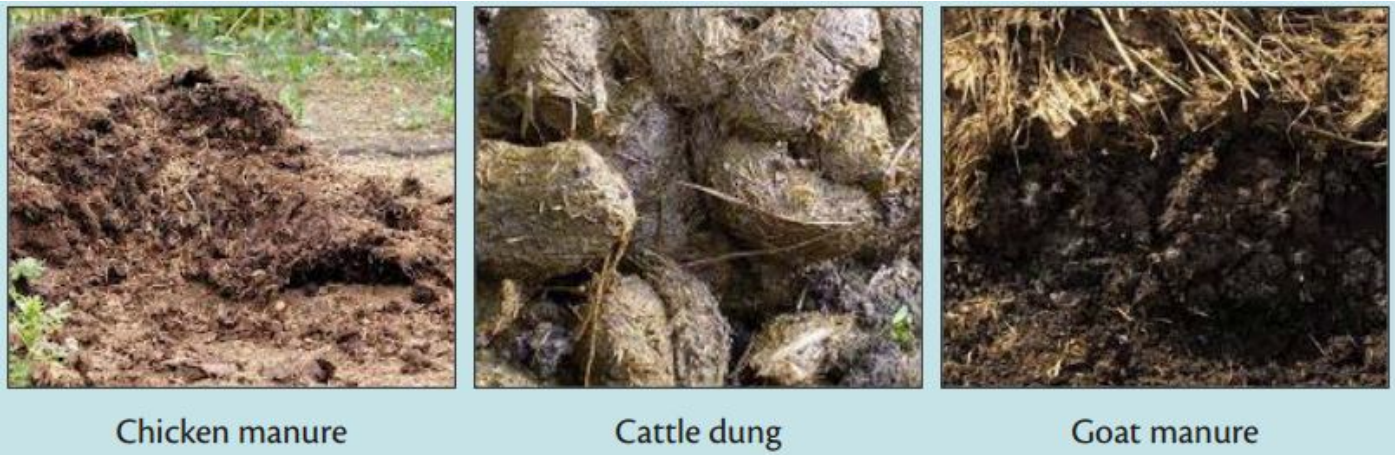
- improves the soil organic matter content, fertility and structure;
- minimises or prevents erosion; and
- conserves soil moisture.

Farmyard or animal manure: what is it?
Animal manure refers to waste such as dung and urine from animals. Most common manures used are from poultry droppings, and pig or cattle dung, and are used in the form of solid manure directly applied to the soil about 2 weeks before planting. *Note that manure must not be applied fresh to the base of your crop because as it decomposes it produces heat that may burn and harm your crop.*

Animal manure is very useful for improving soil fertility. Most animal manures contain nutrients, so they can also be referred to as solid fertiliser. The rate of decomposition of the manure depends entirely on the type of animal waste or dung used.

The effectiveness of the manure depends on the timing and application methods, and of course the type of manure, used. Uniform application of manure must be done 2 weeks prior to planting as it will be in a solid form. However, if planting is delayed for more than 2 weeks after application, the soil is likely to lose nutrients through erosion or leaching. To avoid losing nutrients if planting is delayed, legumes may be planted as a cover crop, as the nutrients will be absorbed by the legumes.

Note that one of the main disadvantages of using animal manure is the contamination of water through leaching or run-off from the soil surface.



Examples of animal manure. (Seta-Waken, Malie, Utama & Palaniappan, 2016, p. 24).

'Tea' or liquid manure: what is it?
'Tea' or liquid manure is derived from the two main manure sources (i.e. plant and animal). Depending on the source used (Table 1.2), 'tea' or liquid manure is labelled differently—if you use animal or farmyard manure it is called animal 'tea' manure; and if you use plant manure it is referred to as plant 'tea' manure.

Materials needed for animal and plant 'tea' manure

Table 1.2: Materials for animal and plant 'tea'

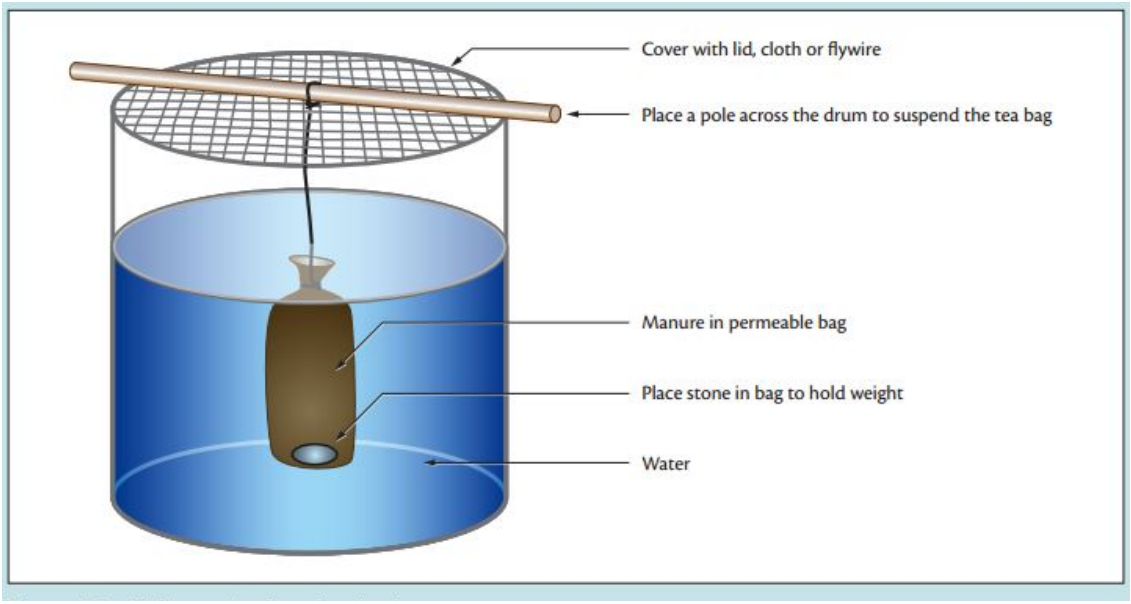
Animal manure	Plant manure
1. Pig, chicken, goat, sheep, cow dung etc.	1. Green leaves–soft, hairy and leguminous
2. Sack or stock feed bag (50 kg)	2. Wood ash
3. Clean water	3. Sack or empty stock feed bag (50 kg)
4. 200-L (44-gallon) drum, plastic containers or buckets (10-L/15-L)	4. Clean water
5. A stick or wooden timber	5. 200-L (44-gallon) drum, plastic containers or buckets (10-L/15-L)
6. Large stone for weight	6. A stick or wooden timber
	7. Large stone for weight

Steps needed for animal and plant 'tea' manure

Table 1.3: Steps in making animal and plant 'tea'

Animal manure	Plant manure
1. Collect or gather dried animal manure. 2. Fill the sack or stock feed bag with the manure. 3. Place the large stone into the bag filled with manure to prevent the bag from floating. 4. Make a hole at the top of the bag and insert a stick or timber to hold the bag upright when placed into the drum. 5. Fill the drum or plastic container halfway with water. 6. Lift the bag filled with manure and place into the drum filled with water and cover with a lid, cloth or flywire. 7. Using a stick, stir the 'tea' daily. 8. The 'tea' should be ready for application after 7 days.	1. Gather three types of green leaves: – soft, e.g. cassava – hairy, e.g. pumpkin – leguminous, e.g. gliricidia shade tree, leucaena. 2. Chop the leaves into fine pieces. 3. Fill the bag with the chopped leaves. 4. Add wood ash for minerals and also as a pest repellent, and shake thoroughly. 5. Add the stone as a weight to prevent the bag from floating. 6. Make a hole at the top of the bag and insert a stick or timber to hold the bag upright when placed into the drum. 7. Fill the drum/container halfway with clean water. 8. Place the bag of manure into the drum filled with water and cover the drum/container with a lid, cloth or flywire. 9. Stir every morning using a stick. 10. The 'tea' should be ready for application after 7 days.

(Seta-Waken, Malie, Utama & Palaniappan, 2016, p. 25).



Application of liquid manure

Application is done by diluting the manure with an equal amount of water and applying it using a watering can or small tins at the side of the plant. Avoiding application during the rainy season minimises or prevents losses by leachin

Advantages and disadvantages of plant manure.

Advantages ☺	Disadvantages ☹
1. Supplies major and minor nutrients	1. Labour intensive
2. Is taken up quickly as it is a liquid	2. Not to be applied during rainy season
3. Can be stored for a longer period	3. Can burn plants if applied directly on the surface of the leaves
4. Cheap	4. Can only be stored for a shorter period
5. Takes a shorter time to be ready	

(Seta-Waken, Malie, Utama & Palaniappan, 2016, p. 27).

Information taken from

Seta-Waken P., Malie R., Utama P. and Palaniappan G. 2016. Introduction to basic crop production, post-harvest and financial management practices: a training manual for smallholder vegetable farmers in western Pacific island nations (ed. by C.J. Birch and B.E. Chambers). Monograph Number 176 Australian Centre for International Agricultural Research: Canberra, ACT. http://aciar.gov.au/node/25047

This resource has been developed as part of the ACIAR-funded projectImproving opportunities for economic development for women smallholders in rural Papua New Guinea (ASEM/2014/095).

ACIAR
Research that works for developing countries and Australia
aciar.gov.au

UNIVERSITY OF CANBERRA