

BROCHURE

5 SUSTAINABLE PRODUCTION PRACTICES

RECYCLE ORGANIC WASTE



This brochure is made available by the COLEAD to fruit and vegetable producers and exporters in the ACP (Africa, Caribbean, Pacific) countries. The illustrated procedures on the following pages are intended for producers who want to manage their by-products and organic waste more efficiently.

This brochure brings together the key messages and procedures to be followed to exploit the benefits for production of organic waste available.

Brochures on other subject areas are also available from (www.colead.link).

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INTRODUCTION

Organic waste is produced by the death and decomposition of living organisms, vegetable matter, animals or micro-organisms. It is present in the upper layer of ground and is formed primarily through the action of micro-organisms (bacteria and fungus), nematodes, earthworms and insects. The presence of organic matter is essential for the ecology of the environment. Organic matter is an essential element for the structure of the soil. Without a certain amount of organic matter, the soil structure collapses, run-off and erosion accelerate, rooting is less effective and nutrients are less accessible to plants. Soil fertility is therefore directly linked to the content and nature of organic matter.

“Residues” from production (e.g. straw, withered leaves), processing or use (e.g. discards, leaves, crowns, stones, peel, etc.) are organic products; while they cannot be exploited directly, they should never be seen as “waste”. Agriculture does not generate “waste” since organic matter is always valuable and exploitable. These “residues” constitute a cheap and virtually inexhaustible source of organic matter.

Working land in inter-tropical regions as farmland and pasture means that plant products are exported and the organic matter content of the soil, which is generally low due to the climate and poor farming practices, is reduced. To conserve soil fertility, sufficient organic matter must be added regularly to avoid gradual exhaustion that is difficult to reverse. “Organic waste” can be used to good effect by returning it to the land.

However, some organic waste, such as mud or excrements, must be used with care (presence of heavy metals, chemical products or micro-organisms that are a health hazard), with moderation (risk of aquatic environments being contaminated as a result of excess nitrogen and/or phosphorous) and should ideally be treated in advance by being composted before they are used, both to eliminate weed seeds and dangerous organisms, but also to decompose part of the organic matter so that it can be returned to the soil in the form that is most easy to incorporate into soil particles.

These waste recovery activities therefore involve:

1. **Recycling organic matter by exploiting the biological activity of the soil**
2. **Examining the various ways of exploiting organic matter based on its nature and the needs of the farmer**
3. **Being able to assess and manage the risks linked to organic matter usage and its sustainable use in the environment**

LIST OF KEY MESSAGES AND PROCEDURES FOR EXPLOITING ORGANIC WASTE

EXPLOIT ALL ORGANIC MATTER BY RECYCLING IT IN THE SOIL

1. Exploit all organic matter available that derives from crop residue and animal or vegetable by-products, which have different compositions.
2. Maintain a good ecological soil balance to foster the break-down of organic matter by worms and insects, and mineralization by bacteria. The speed of decomposition depends on the nature of the organic matter, the soil ecology and the environmental conditions.
3. Offset part of the organic matter exported during harvesting by adding sufficient organic matter to conserve the properties and fertility of the soil.

USE ORGANIC WASTE AS NEEDED

1. Use crop residues (straw, withered leaves) and organic waste (manure, slurry, liquid manure, mud) that contain nutrients as fertiliser and soil conditioner.
2. Transform organic matter into high-value substrate for farming thanks to techniques that are often rustic and low cost, such as composting.
3. Use organic matter to generate energy directly through incineration or the production of biogas that can be used for cooking or to generate electricity.

ASSESS AND MANAGE THE RISKS OF USING ORGANIC MATTER

1. To protect aquatic environments, avoid over-application of organic fertilisers (no more than 170 kg/ha for nitrogen inputs and 80 kg/ha for phosphorous inputs).
2. Sort and process organic waste before their use (composting) since it may contain chemical substances (pesticide or medicine residues), heavy metals or bacteria that are hazardous to human health.
3. Prohibit the use of animal-origin waste and sewage or septic tank sludge as fertiliser for pastures.

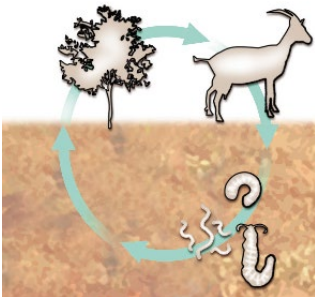
EXPLOIT ORGANIC MATTER BY RECYCLING



ALL CROP RESIDUES AND BY-PRODUCTS CAN BE EXPLOITED

- The forms of organic matter used in agriculture vary widely (in terms of nature and composition).
- Organic matter, whether of vegetable (waste from fruits and vegetables, pulp, straw) or animal (fish flour, bone or horn powder, blood) origin can be used.
- Manure, compost, slurry or liquid fertiliser, poultry droppings, guano and green manure are those most commonly used.

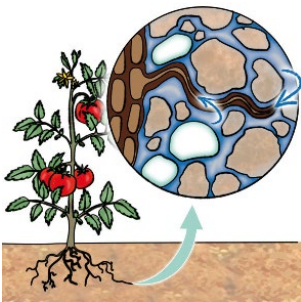
This diversity makes it possible to vary the input in line with crop requirements.



THE RECYCLING OF ORGANIC MATTER DEPENDS ON SOIL LIFE

- It is first broken down by worms and insects present in the soil.
- It is then transformed (mineralised) by soil bacteria.

The organic matter is fully recyclable in a form that can be assimilated by plants thanks to the soil life.



ORGANIC MATTER IS AN ESSENTIAL ELEMENT FOR THE SOIL

- Crop residues and by-products provide nutrients to plants (nitrogen, phosphorous, potassium and others).
- The presence of micro-organisms improves soil structure, making it possible to circulate the air and water needed for soil life.
- It increases the water retention capacity of the soil (sponge effect).

Since soil fertility depends on recycling organic matter, the equivalent of that part exported as a result of harvesting must be returned to the soil.

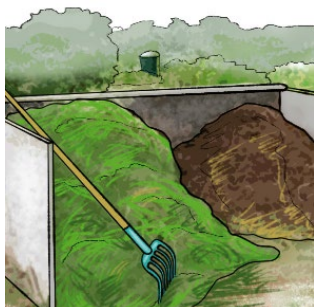
USE ORGANIC WASTE AS NEEDED



SUBSTITUTE ORGANIC RESIDUES AND WASTE FOR FERTILISERS

- They free nutrients (primarily nitrogen and phosphorous) that can be assimilated by plants.
- Certain organic forms reduce the leach of nutrients.
- Spread over farmland, they also serve as soil conditioners.

Adding organic matter makes it possible to maintain good soil structure and fertility.



TURN ORGANIC MATTER INTO ORGANIC SUBSTRATES

- Cheap homespun methods (such as composting) can be used to generate high-value substrates.
- Since the organic substrates requirements for a farm are high ($1\text{m}^3/\text{day}/\text{ha}$), their sale can provide a valuable source of income.

This makes it possible to give added value to products generally seen as waste.



USE ORGANIC MATTER TO PRODUCE A VALUABLE SOURCE OF POWER

- Burning organic waste (for heating or cooking).
- Producing biogas for cooking or generating electricity.

Fermenting organic matter produces heat and gas. Under certain conditions (maintaining the temperature in the heap) this method also obtains compost.

ASSESS AND MANAGE THE RISKS OF USING ORGANIC MATTER



AVOID OVER-APPLICATION OF ORGANIC FERTILISERS

- Over-application of certain organic materials (slurry and liquid fertilisers) rich in nitrogen and phosphate can result in water pollution (nitrate content).
- Do not apply more than 170 kg/ha for nitrogen and 80 kg/ha for phosphorous.

Quantities that are not assimilated easily leach out and cause algae to develop in ponds and water courses.



SORT AND PROCESS CERTAIN ORGANIC WASTES BEFORE THEY ARE USED

- Certain organic wastes (muds) may contain chemical product residues, heavy metals or dangerous bacteria.
- Take precautions before spreading products based on faecal matter (fresh manure, slurries and liquid fertilisers that contain bacteria dangerous to man).

Treat organic waste by composting it to eliminate numerous organisms that are hazardous to health.



PROHIBIT THE USE OF WASTE OF ANIMAL ORIGIN ON PASTURES

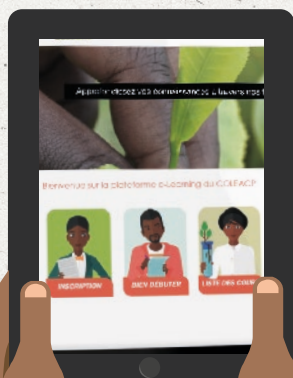
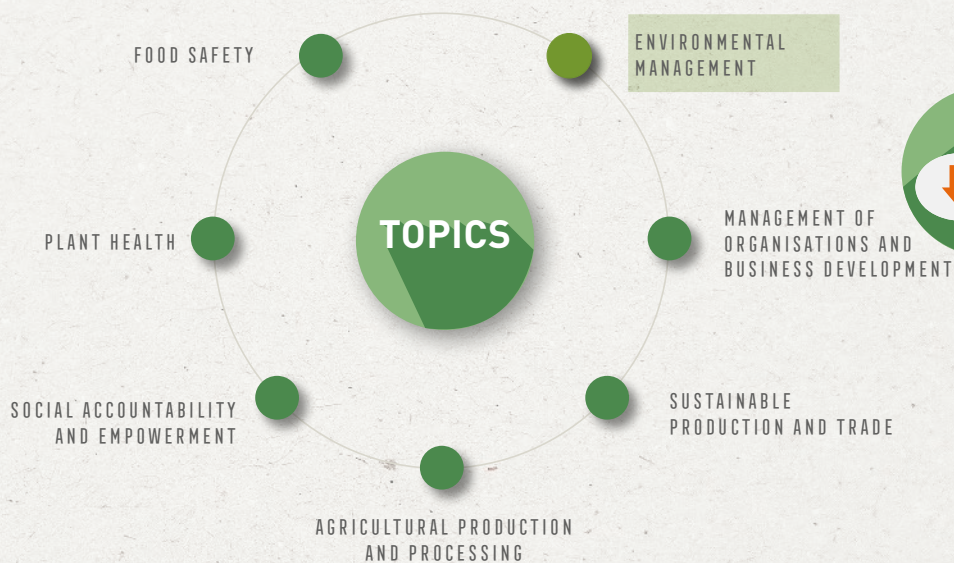
- It is prohibited to use sewerage slurry as a fertiliser on pastures.
- Avoid spreading products of animal origin (flours) and septic tank sludge.

This reduces the risk of spreading diseases such as mad cow disease (or bovine spongiform encephalopathy - BSE).

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