GREEN TECHNOLOGY

GREEN FERTILIZERS

- Consist of plant and/or animal-based materials.
- Target both the crop and the soil.
- Serve to better balance the soil nutrient levels.

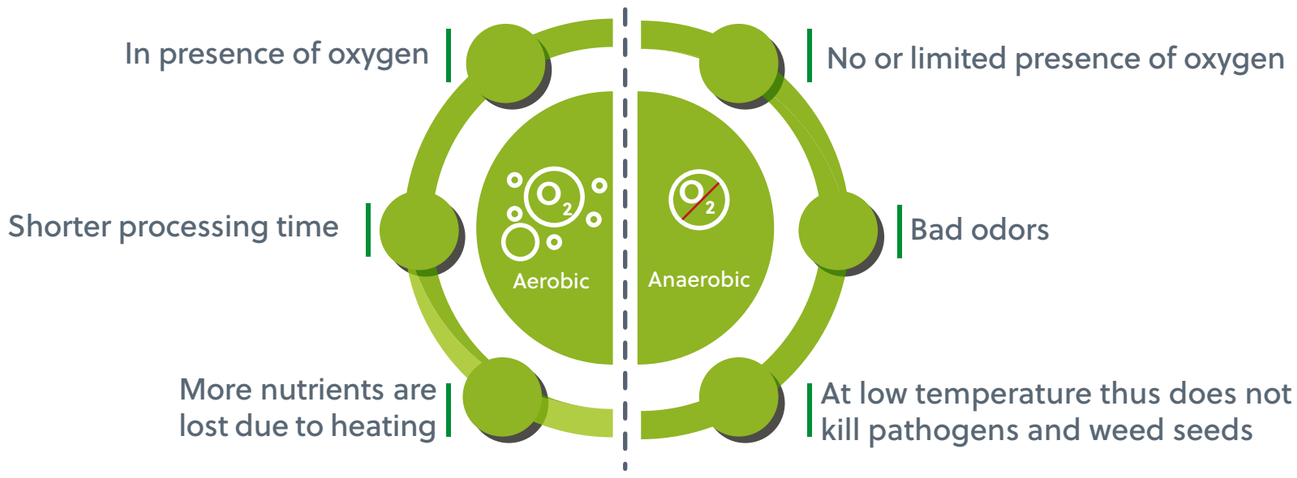
MaterialS to include	MaterialS to avoid
Leftovers from harvest & gardens (branches, leaves,..)	Chemical-synthetic residues (paint, petrol,..)
Manure (cattle, pig, cow...)	Non-degradable materials
Kitchen organic waste	Plywood
Edible oil and fat in small quntities.	Detergents, chlorinated products, antibiotics, drug
Wood shavings, sawdust...	Animal carcasses
Napkins, tissues, paper and cardboard	Cooked food leftovers such as meat.

1. Composting

"Composting is the natural process of decomposition of organic matter by microorganisms under controlled conditions."

WHAT IS COMPOSTING?

A simple method to create a green fertilizer from raw organic matter through Aerobic or Anaerobic conditions:



COMPOSTING METHODS

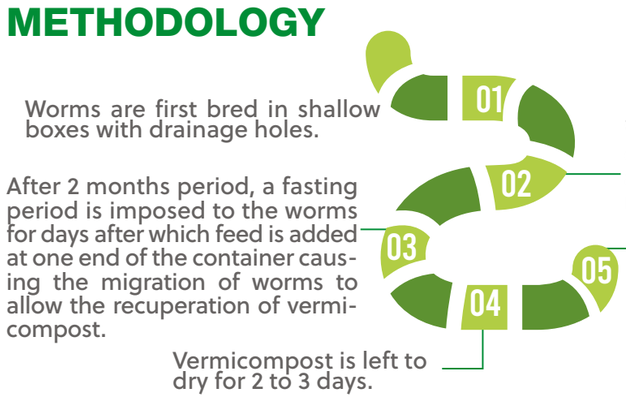
- Composting process takes between 4 months if in aerobic conditions & 8 months if done anaerobically
- It can be produced in piles, pits or in closed holding units
- Height of pile or depth of pit ranges between 1 and 1.5 m with organic matter added in alternated layers
- In aerobic methods, the material is frequently turned with regular water sprinkling

Advantages	Points To Consider
• Reduces soil erosion and helps retaining soil moisture. • Favorizes the multiplication of beneficial microorganisms making nutrients available for plants. • Facilitates working the soil during ploughing and seeding activities.	C:N The type and composition of organic material (C:N ratio) affect the decomposition time Compost temperature and moisture content should be closely monitored. The site of composting should be shaded.

2. Vermicomposting

"Vermicomposting is the use of earthworms in composting organic matter."

METHODOLOGY



Earthworms cast enrich the compost with nutrients and favorize the growth of beneficial bacteria that enhance soil quality and health.

Frequently used worm species:

Lumbricus rubellus

Eisenia Foetida

Advantages	Points To Consider
• Increases soil porosity and microbial activity • Improves water retention • Presents an additional source of income for rural communities	pH of bedding material should be close to neutral and optimal temperature should be between 19 and 25 °C Earthworms prefer dark environment Earthworms are sensitive to temperature & contamination

3. Green Manure

"Green manure are cover crops turned into the soil as a whole plant or as remaining parts to provide it with additional nitrogen and organic matter"

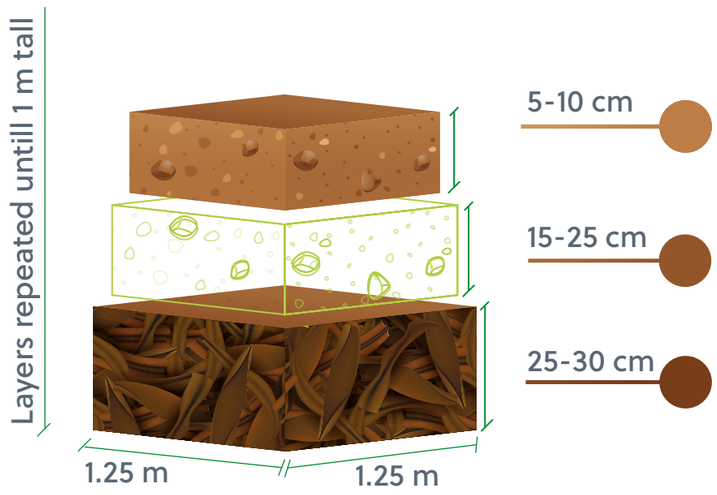
Cover crops are planted a season before the actual crop and then turned in the soil (manually or mechanically) to improve its quality.

PLANTS USED AS GREEN MANURE

Alfalfa · White mustard · Vetch · Annual grasses

Faba bean · Lablab · Forage Raddish · Buckwheat

Advantages	Points To Consider
• Maintain soil organic matter and increase nitrogen availability. • Reduce the growth of weeds. • Helps improve soil structure & reduces moisture evaporation.	Type of cover crop depends on soil type, climate and water availability. Good rotation of crops is important to avoid pest infestation transferred from cover crop to cash crop. Some cover crop can become a weed for following crop if left to set seeds



Layer 3:
Soil mixed with animal manure (optional)

Layer 2 is not a foundation layer:
A layer of wet or green material with high nitrogen content

Layer 1:
A layer of dry material with high content of carbon sprinkled with water to make it moist

4. Biochar

"A specially produced charcoal used to enhance soil quality."

Biochar is the outcome of thermal decomposition where organic material is combusted under no or limited supply of oxygen through pyrolysis. Biocar can be produced at small scale in batch stoves, retort or kilns. The heating source can be external through a separate source or internal where the biomass itself is ignited.

Advantages	Points To Consider
• Encourage the growth of crop roots. • Immobilize heavy metals in the soil. • Help plants resist disease, enhance seed germination, optimize soil microbial population structure and richness.	The choice of biomass reactor depends on the type and amount of biomass. Particle size of biomass affects the time of pyrolysis. High doses of biochar can increase soil salinity.

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