1. What is Green Manuring?

Green manuring is the practice of growing lush plants on the site into which you want to incorporate organic matter, then turning into the soil while it is still fresh. The plant material used in this way is called a green manure (GM).

Green Manuring is an easy method of improving soil structure and fertility. Since the crop is grown right where it is utilized the costs are also minimal.

Generally the practice of green manuring is adopted in two ways:

a) In-situ green manuring
b) Green leaf manuring.

a. In-situ green manuring

In this system the short duration legume crops are grown either before or along with the main crop. Traditionally, green manure crops are sown and allowed to grow for 60-80 days after sowing or cut down just before they begin to flower and buried in to the soil and are left to decompose, releasing vital plant nutrients back into the soil which are then used by the next crop.

In-situ Green Manuring can be done in the following ways:

- ***Cover Crop:***

A cover crop is any crop grown to provide soil cover, regardless of whether it is later incorporated.Cover crops are grown primarily to prevent soil erosion by wind and water. Cover crops and green manures can be annual, biennial, or perennial herbaceous plants grown in a pure or mixed stand during all or part of the year. In addition to providing ground cover and, in the case of a legume, fixing nitrogen, they also help suppress weeds and reduce insect pests and diseases.

- ***Catch Crop***

When cover crops are planted to reduce nutrient leaching following a main crop, they are often termed "catch crops."
A catch crop is normally established after harvesting the main crop and is used primarily to reduce nutrient leaching from the soil profile. For example, planting cereal rye following corn harvest helps to scavenge residual nitrogen, thus reducing the possibility of groundwater contamination. In this instance, the rye catch crop also functions as a winter cover crop. Short-term cover crops that fill a niche within a crop rotation are also commonly known as catch crops.

- ***Winter Cover Crop:***

A winter cover crop is planted in late summer or fall to provide soil cover during the winter. Often a legume is chosen for the added benefit of nitrogen fixation. In temperate regions the plant selected needs to possess enough cold tolerance to survive hard winters.
Hairy vetch and rye are among the few selections that meet this need.

- ***Summer Green Manure Crop***

A summer green manure crop occupies the land for a portion of the summer growing season. These warm-season cover crops can be used to fill a niche in crop rotations, to improve the conditions of poor soils, or to prepare land for a perennial crop. Legumes such as cowpeas, soybeans, annual sweetclover, sesbania, guar, crotalaria, or velvet beans may be grown as summer green manure crops to add nitrogen along with organic matter. Non-legumes such as sorghum-sudangrass, millet, forage sorghum, or buckwheat are grown to provide biomass, smother weeds, and improve soil tilth.

- ***Living Mulch***

A living mulch is a cover crop that is interplanted with an annual or perennial cash crop. Living mulches suppress weeds, reduce soil erosion, enhance soil fertility, and improve water infiltration.
Examples of living mulches in annual cropping systems include overseeding hairy vetch into corn at the last cultivation, no-till planting of vegetables into subclover, sweetclover drilled into small grains, and annual ryegrass broadcast into vegetables.
Living mulches in perennial cropping systems are simply the grasses or legumes planted in the alleyways between rows in orchards, vineyards, windbreaks, and field nursery trees to control erosion and provide traction.

- ***Forage Crop***

Short-rotation forage crops function both as cover crops when they occupy land for pasturage or haying, and as green manures when they are eventually incorporated or killed for a no-till mulch. Examples include legume sods of alfalfa, sweet clover, trefoil, red clover, and white clover, as well as grass-legume sods like fescue-clover pastures.

For maximum soil-improving benefits, the forage should not be grazed or cut for hay during its last growth period, to allow time for biomass to accumulate prior to killing.

3. How does it enrich the soil?

Green manures usually perform multiple functions that include soil improvement and soil protection:

- Leguminous green manures such as clover and vetch contain nitrogen-fixing symbiotic bacteria in root nodules that fix atmospheric nitrogen in a form that plants can use.
- Increases percentage of organic matter (biomass) in the soil, thereby improving water retention, aeration, increasing biological activity and helps in pest control in crops.
- The root systems of some varieties of green manure grow deep in the soil and **bring up** nutrient resources unavailable to shallower-rooted crops.
- Suppresses weeds, prevents soil erosion and compaction.
- Some green manure crops, when allowed to flower, provide forage for pollinating insects.
- A rapid increase in soil microorganisms occurs after a young, relatively lush green manure crop is incorporated into the soil. The soil microbes multiply to attack the freshly incorporated plant material. During microbial breakdown, nutrients held within the plant tissues are released and made available to the following crop.

Some common green legume crops:

Pea plant
Pisum sativum

White Clover
Trifolium repens

Upright Vetch
Vicia orobus

For further information, contact:

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