

## Green Manuring

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### INTRODUCTION

The physical structure and fertility of the soil are improved by ploughing the green plant tissues that have developed in the field or by introducing green plants with delicate twigs or leaves from the outside. It is the process of turning or ploughing disintegrating green plant tissues into the soil in order to increase the fertility of the soil. It is an environmentally friendly way to provide nutrients to plants and improve soil fertility. Along with inorganic fertiliser and bio-fertilizer, it is one of the key tenets of an integrated nutrient delivery system. Leguminous or non-leguminous trees and bushes can be cultivated on wastelands or bunds to use the vegetative sections for green manuring soils. The goal of green manuring is to supply the soil with N, the most crucial and lacking nutrient, by adding organic matter.

### Types of green manuring:

There are two types of green manuring:

1. **Green manuring in-situ:** Green manuring in-situ is the practise of growing green manure crops directly in the field, either as a standalone crop or as an intercrop with the primary crop and burying them there. E.g.: Sannhemp, Dhaicha, Pillipesara, Shervi, Urd, Mung, Cowpea, Berseem, Senji etc.

### These crops are sown as:

- Main crop
- Inter row sown crop
- On bare fallow, depending upon the soil and climatic conditions of the region

**Green leaf manuring:** It means incorporating fragile green branches and green leaves from shrubs and trees grown on bunds, wastelands, and neighboring forests into the soil. E.g.: Glycicidia, wild dhaicha, karanj.



Table no. 1 Green manures suitable for some field crops

Field crop	Suitable green manures
Rice	Sunnhemp, Sesbania, Wild Indigo
Sugarcane	Sunnhemp
Finger millets	Sunnhemp
Wheat	Sunnhemp
Sorghum	Sunnhemp, Subabul, Cowpea
Banana	Lupin, Sunnhemp, Cowpea, Guar, Horsegram.

**An ideal green manure crop must have the following qualities**

1. Produce a significant amount of green material within a short period,
2. It should be resistant to heat, shade, and drought.
3. Grow quickly, particularly at first, to choke off weeds.
4. Have a quick breakdown by being succulent and growing more leaves than wood, so that its decomposition will be rapid,
5. Preferably is a legume, so that atm. 'N' will be fixed,

6. Have a deep and fibrous root system to better the soil's structure and to collect nutrients from the lower zone and add them to the surface sod.
7. Have the ability to thrive in subpar soils.

**Stage of green manuring:** A crop for green manuring can be harvested during or shortly before blooming. The majority at the G.M. crops require 6 to 8 weeks after sowing at which there is maximum green matter production and most succulent.

Table no. 2 Biomass production and N accumulation of green manure crops

Crop	Age (Days)	Dry matter (t/ha)	N accumulated
<i>Sesbania aculeata</i>	60	23.2	133
Sunnhemp	60	30.6	134
Cow pea	60	23.2	74
<i>Pillipesara</i>	60	25.0	102
Cluster bean	50	3.2	91
<i>Sesbania rostrata</i>	50	5.0	96

**Table no. 3 Nutrient content of green manure crops**

Plant	Scientific name	Nutrient content (%) on air dry basis		
		N	P <sub>2</sub> O <sub>5</sub>	K
Sunhemp	<i>Crotalaria juncea</i>	2.30	0.50	1.80
Dhaincha	<i>Sesbania aculeata</i>	3.50	0.60	1.20
Sesbania	<i>Sesbania speciosa</i>	2.71	0.53	2.21

#### Advantages of green manuring:

1. It enriches the soil with organic matter and mimics the activities of soil microorganisms.
2. It enhances soil structure, increasing the soil's capacity to retain water and reducing runoff and rain-related erosion.
3. The GM incorporates nutrients into the top layer of the soil by removing them from the soil's lower layers.
4. It is a leguminous crop that contributes to the soil and fixes 'N' from the atmosphere for use by following crops. Typically, the atmosphere provides approximately 2/3 of the nitrogen, while the remaining 1/3 comes from the soil.
5. It makes several plant nutrients, such as P<sub>2</sub>O<sub>5</sub>, Ca, Mg, and Fe, more readily available.
6. In the off-season, green manure crops are grown to control weed development and proliferation.
7. Alkaline soils can be recovered with the use of green manuring.
8. Green manuring can be used to control root knot nematodes.

#### Constraints in green manuring:

Although the advantages of green manure in terms of their impact on soil fertility and crop

yield are well established, farmers do not frequently utilise this method due to the following limitations:

1. In a high-intensity cropping system, the farmers might not be compelled to set aside 6 to 7 weeks exclusively for the cultivation of green manure in the absence of financial reward. Only the fallow season (summer) will be left without any crops, therefore farmers were unable to consider cultivating any green manures during this time.
2. Because organic and inorganic sources are complimentary or synergistic in the farmer's eyes, the advantages of adding green manure were not as obvious as those of mineral fertiliser N.
3. Due to differences in soil types, types of green manure, environmental factors, etc., the advantages of green manuring may not necessarily be consistent across all crops.
4. In rain-fed conditions, the subsequent crop's germination and growth may be hampered by a lack of moisture for G.M. growth and decomposition.
5. G.M. crop inclusive of decomposition period occupies the field least 75-80 days which means a loss of one crop.