

Technical Bulletin 2
Organic Farming



Green Manuring

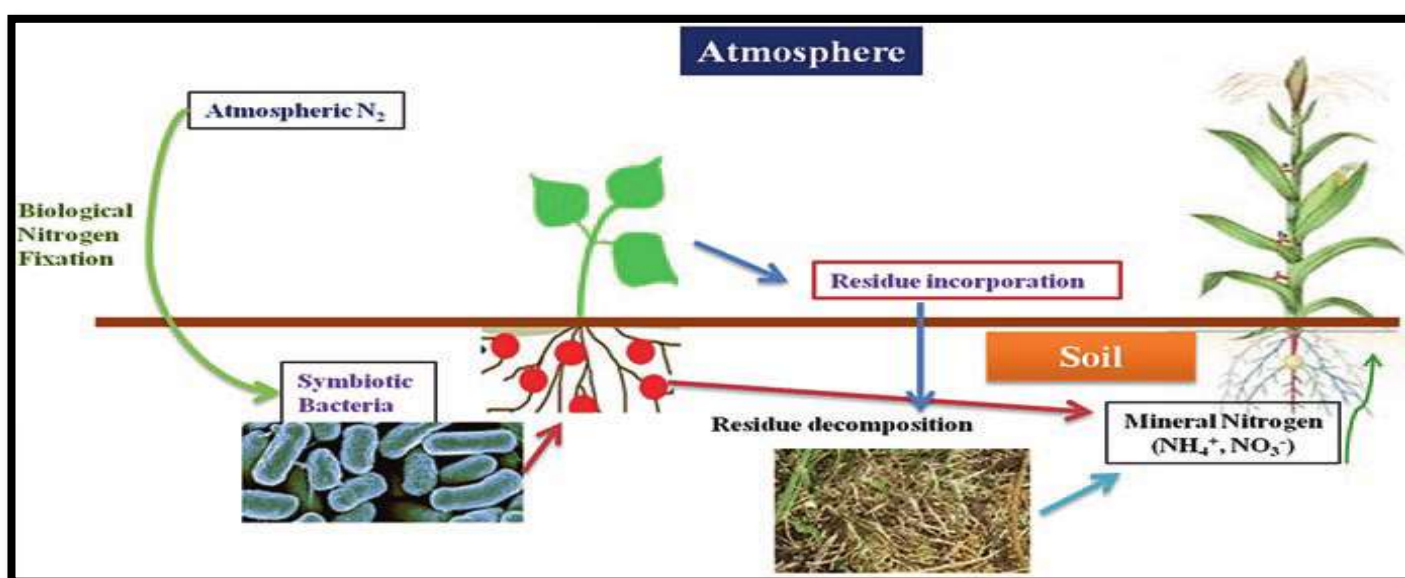


DAY – National Rural Livelihood Mission

Green Manure:

Organic matter from green plants

Some plants such as **leguminous plants** have some specific bacteria in their roots. For example, **Rhizobium**, which lives in a **symbiotic relationship** with the plants and **fixes atmospheric nitrogen** into organic compounds. This enhances the nitrogen availability in the soil and hence it is very good alternative for chemical fertilizers like urea.



Advantages:

- Improves soil structure.
- Provides Nutrition like NPK.
- Increase Fertility of the Soil.
- Increases water holding capacity and aeration in soil
- Reduces soil loss due to erosion.

The topsoil has the maximum humus (organic matter) and is often washed by rain, drifted by wind, and burnt by sun. Sowing green manure or cover crops in between two crop seasons will protect the soil organic matter from the above incidences apart from improving Nitrogen availability.



Green manure can be grown in main field or on the borders of the field and the biomass can be incorporated in the compost bed.

In many states of the country, there is a practice of sowing green gram or black gram after main paddy crop. It grows well with the residual moisture in the paddy land and provide 3 or 4 quintals of pulses per acre and enriches the soil by adding Nitrogen and biomass to the land. Similarly, in the dry lands, cowpea is grown as catch crop using the residual moisture of the previous crop to get an additional crop and to improve soil fertility.

Green manures are important in improving acidic and sodic soils, to maintain the pH level, to enhance microbial activity and to sustain the life of the soil.

In-situ green manuring



In this technique, green manure crops are grown on the field and after they achieve a sufficient height and flowering stage, they are ploughed into the same field. After plowing, fields are left for a few weeks until they are completely decomposed. The residue act as organic matter after decomposition and improve fertility and structure of soil. Next crops are grown on the same field.

Green Manure Crops

The green manure crops when ploughed into the soil will add the following quantity of dry crop residue (in Ton/Hectare) and Nitrogen (in Kg/Hectare).

Biomass production and Nitrogen accumulation in soil:

Crop	Age (Days)	Dry matter (t/ha)	N accumulated (kg/Ha)
Sesbania Cannabina	60	23.2	133
Sun hemp	60	30.6	134
Cowpea	60	23.2	74
Pillipesara	60	25.0	102
Cluster bean	50	3.2	91
Sesbania rostrata	50	5.0	96

Nutrient content of green manure crops:

Plant	Nutrient content % on air dry basis		
	N	P205	K
Sunhemp	2.3	0.5	1.8
Dhaincha	3.5	0.6	1.2
Sesbania	2.71	0.53	2.21



COWPEA



Seed rate:
 Cowpea - 25-35 kg/Ha
 All other green manure crops – 30-35 Kg/ha.



Cluster beans

Sowing Time:

About 2 – 2.5 months before the main crop sowing. They are ploughed back into the soil by 40 to 45 days after sowing preferably before flowering. Again, after the main crop is harvested, wherever residual moisture is available, the green manure crop can be grown & ploughed back.

Enriches Soil

Green biomass:

The green biomass yield of cowpea is 8 to 10 MT/ ha. For other green manure crops, the green biomass yield is around 25 to 30 MT/ha. The dry air weight is about 25% of green weight.

Special mentions

Daincha:

It is adapted to varying soils and climate conditions. This can be grown even under adverse conditions of drought, water logging and salinity



Sesbania aculeata



Croton retusus



Sesbania rostrata

Green Leaf Manure


Enhances Organic matter content & improves soil structure & fertility

In this type of manuring, green manure crops are not grown on the fields, instead, green leaves and dried leaves are brought from nearby sources. It can be forest, lawns, farms or any other source. These leaves and plant residues are left in one side of the field for some days to decompose. Decomposed material is spread in the field. In wetlands, the green leaves brought from outside are applied in the puddle straight away. Allowed to decompose for a few days and are ploughed into the soil.



Nutrient content of Green Leaf manure:

Plant	Scientific name	Nutrient content (%) on air dry basis		
		N	P	K
Gliricidia	Gliricidia sepium	2.76	0.28	4.6
Pongamia	Pongamia glabra	3.31	0.44	2.39
Neem	Azadiracta indica	2.83	0.28	0.35
Gulmohur	Delonix regia	2.76	0.46	0.50
Peltophorum	Peltophorum ferugenum	2.63	0.37	0.50
Weeds				
Parthenium	Parthenium hysterophorus	2.68	0.68	1.45
Water hyacinth	Eichornia crassipes	3.01	0.90	0.15
Trianthema	Trianthema portulacastrum	2.64	0.43	1.30
Ipomoea	Ipomoea	2.01	0.33	0.40
Calotropis	Calotropis gigantea	2.06	0.54	0.31
Cassia	Cassia fistula	1.60	0.24	1.20



These trees and plants can be grown on bunds of the fields and the vacant places in the field.

The green biomass of the above plants and trees can be used at the rate of 20 to 25 MT per ha under the following methods:

- a. For wetland rice and other crops, the biomass of green manure and green leaf manure can be applied to the puddle 10 to 15 days before transplanting or sowing. This period will allow the biomass to decompose to an extent and be in readiness to release the nutrient to the crop.
- b. For dry land crops, the biomass of the green leaf manure may be applied to the compost for further decomposition. This mixture can be applied prior to last ploughing in the field.
- c. For perennial crops and row crops, the green leaf manure can be applied in between the rows of the crop as mulch. This mulch will help in soil conservation, and then as nutrient after sufficient decomposition.

Precautions:

Make sure there is sufficient moisture in the field while applying green leaf manure for proper decomposition.