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FACULTY OF AGRICULTURAL SCIENCES AND ALLIED INDUSTRIES

Lecture 4: Green manures –Classification with examples - Advantages and limitations of green manuring in situ and green leaf manuring

Green manuring: Green manuring can be defined as the growth of a crop for the specific purpose of incorporating it into soil while green, or soon after maturity with a view to mproving the soil and benefiting subsequent crops or Practice of ploughing or turning in to the soil un decomposed green plant tissues for the purpose of improving physical condition as well as fertility of the soil

Objectives of green manuring:

Increasing organic matter content of soil

Maintain and improve soil structure

Reduce the loss of nutrients ,perticularly nitrogen

Provide a source of nitrogen for the following crop

Reduce the soil loss by erosion

Types of green manuring:

The practice of green manuring is adopted in various ways in different states of India to suit soil and climatic conditions. Broadly speaking, the following two types of green manuringcan be differentiated.

Classification of Green manuring:

I. Green manuring *in situ*:

In this system, green manure crops are grown and buried in the same field which is to be green-manured, either as a pure crop or as intercrop with the main crop. This is most common green manure crops grown under this system are sunnhemp(***Crotalaria juncea***) ,daincha (***Sesabania aculeata***) , Pillipesera (***Phaseolus trilobus***).

Green manure crops:

Sunnhemp (*Crotalaria juncea*) :

It is a unique crop possessing ,fiber ,fodder and green manurial value with nutrient composition of 2.3 % N, 0.2 % P and 1.4 %K

It can be raised beneficially for irrigated dry conditions

Under high rain fall conditions it is grown in dry lands

Grown in medium fertile soils

Seed rate is 45 kg ha^{-1}

Green matter yield 9-17 tonnes ha^{-1}

Daincha (*Sesbania aculeata*) and (*Sesbania speicosa*)

They are erect growing deep rooted crops and useful to open soil and improve drainage in heavy soils.

Nutrient composition(%) [3.5N,0.3P and 1.0K]

These crops are grown on heavy soils

They are non fodder crops and non palatable

They correct sodic soils specially *S. spaciosa* as it is less woody and less fibrous ,which gives heavy foliage and easily decomposable

Seed rate 30 kg ha $^{-1}$

Yield 5 tonnes ha $^{-1}$

Seeds require scarification for easy germination (Scarification means lightly pounding with sand).

Indigo (*Indigofera tinctoria*):

Slow growing, deep rooted drought resistant crop

It is not relished by cattle

Can be grown in fruit gardens and plantations during non –monsoon

Seed rate is 20 kg ha $^{-1}$

Yield is 5 tonnes ha $^{-1}$

Pillipesara (*Phaseolus trilobus*)

Regular green manure , minor pulse crop and fodder crop (triple purpose crop)

Popular green manure crop for black and alluvial soils

It has good ratooning capacity

The crop could be incorporated in to the soil after two cuttings for fodder

Yield : 3-5 tonnes ha^{-1}

Seed rate : 35 kg ha^{-1}
Chemical composition (%): 3 N,0.1 P and 0.3 K

Horse gram (*Dolichus biflorus*)

It is suitable as green manure crop for poor and hard soils . It can also withstands drought . Seed rate is 35 kg ha^{-1} and yield a green matter of 3.5 tonnes ha^{-1}

II. Green leaf manuring:

Green leaf manuring refers to turning into the soil green leaves and tender twigs collected from shrubs and trees grown on bunds ,waste lands and near by forest areas. The common shrubs and trees used are Glyricidia , Sesbania speciosa , Karanj (Pongamia pinnata) etc.,

Plants used as a source of green leaf manure are as follows

Azolla pinnata

Calotropis gigantea

Cassia auriculata

Ipomea carnea

Glyricidia maculate

Leucaena leucocephala

Pongamia glabra

Sesbania rostrata

Advantages of green manuring (*in situ*):

Green manure crops can be chosen to suit the soil, season, water facility and cropping pattern

Reduces expenditure on collection and transportation of green leaf

It is easy to incorporate the green manure crop in right time

It reduces the loss of nitrogen from the soil

Limitations of green manure crops (*in situ*)

There must be sufficient time available for growing the green manure crop, nearly 2-3 months

Extra expenditure has to be incurred for growing green manure crop

Some of the green manure crops are of fodder value, they are liable for cattle tress pass

They are susceptible for pests and diseases as such they may harbour them as alternate hosts.

Need timely rainfall or irrigation etc., for growing

Seeds may not be available in time

Advantages of green leaf manuring

All the quantity of green leaf applied is entirely an addition to soil –neither the moisture nor nutrients are utilized from the soil

There is no fear of spread of pests and diseases

It can be adopted at any time irrespective of the season

Limitations of green leaf manuring:

The green leaf is not available everywhere except in forest regions and waste lands

Green leaf whichever is available has to be used without choice

Green leaf may not be available sufficient quantity in all seasons

Extra expenditure on collection and transport has to be incurred

Criteria for green manure crop

Capacity to fix atmospheric N in good amounts in symbiosis with micro organisms

Heavy foliage, Succulent vegetation with limited fibrous material

Deep root system to open the soil-for recycling of nutrients

Short duration with maximum and faster vegetative growth.