

# Green Manuring

Reviving Our Time  
Tested Practices



# What Is Green Manuring

- This is a technique where we grow the manure in the field itself and plough it back in.
- Traditionally, we grow a green manure crop between the main crops as part of a crop rotation regime
- This is the best method during a farm conversion
- Traditional Green Manuring uses a single legume crop
- This an ancient method and has withstood the test of time – finds mention in Vriksha-Ayurveda
- Green manuring offers an inexpensive way of improving crop yields
  - esp. important where there is not enough available animal manure

# Benefits

- Because legumes are deep rooted they break up the soil and help bring up/unlock the nutrients and minerals from the vast reserves in deeper layers of the soil and make them available to the main crops.
  - For this reason they are also called pump crops
- The deep rooting also improves movement of water and air in the soil
- The legumes (i.e. their root nodules) fix the nitrogen from the air and hence increase soil fertility
- Helps with weed control
  - Bare soil can quickly be taken over by the weeds which then become difficult and costly to remove
  - The green manure crop competes with the weed for light, space and nutrients and stops the weeds from proliferating

# Benefits (Contd.)

- Green manuring improves water retention (because of the humus it produces)
  - This helps in preventing leaching of nutrients
- It also improves the soil structure i.e. makes clayey soil more porous and sandy soil more cohesive
- Prevents soil erosion
  - Leaving the soil bare is primary reason for erosion
  - The roots penetrate and hold the soil
- Biomass is produced
  - Roots are 3 times what you see on top
  - You are effectively capturing and storing the sun's energy during the inter-crop period
    - Fossil fuels are the sun's ancient energies trapped underneath i.e. former forests that have been covered
  - Will become food for the macro & micro organisms in the soil
    - They are ultimately the true builders of the fertility of the soil

# Choosing The Crop

- 30/35 kg/acre of seed required
  - the crop is grown at a higher density than the normal cropping density
  - so we get thinner stem
    - each plant competes for light and grows thin and long
  - hence we get more green than carbonaceous material overall.
- If we have more cellulose and lignin then it takes the energy of the soil to decompose the organic matter which can become a problem in poor soils
- Sunhemp gives 15 tonnes of biomass per acre
- Cow-Pea, Cluster Beans give about 6 tonnes of biomass per acre

# Choosing A Mixed Crop

- Another method of green manuring is to use a mix of different plants
- This cannot be done if the soil is very poor.
  - Hence may not be practical during the initial farm conversion.
- Different plants have different specific relationships with the micro-organisms and will accumulate different nutrients in the tissue
- A good mix should contain a diverse mix of legumes, non-legumes, oilseeds, weeds, climbers etc.

# Mixed Crop Example

- Per acre following is a typical mix that Dr. Sarvadman Patel uses
  - please change as per your local growing conditions
- Green Manures
  - Sunhemp, Sesbania, Cluster beans (5 Kg. each)
- Legumes
  - Green Beans (Moong), Black Beans (Urad), Pigeon Peas (Toor Dal) (3 Kg. each)
- Oil Seed
  - Sunflower, Mustard, Soya - 1 Kg. each
  - Sesame (200 gms.)
- Climbers
  - Bottle Gourd, Smooth Gourd, Pumpkin (1 Kg. each)
- Cereal/Grasses
  - Sweet Sudan Grass, Bajra, Maize (2 Kg. each)

# Sowing The Green Manure Crop

- For sowing
  - first irrigate i.e. wet the soil
  - cultivate the soil
  - broadcast the seed mixture
  - lightly cultivate again.
- Sprinkle a little compost over this
- Sow the green manure crops on a leaf constellation because we are more interested in the vegetative part of the plant



# Cutting/Ploughing In – Dos and Don'ts

- Green manure should be incorporated in the top few inches of the soil where air, moisture and heat are available.
  - The nutrients contained within the green manure become easily available to the young plants.
  - Inoculate a little compost when ploughing in the green manure - this will enhance the nitrogen fixation

# Cutting/Ploughing In – Dos and Don'ts

- Never plow under too deep.
  - This is because it cuts off the capillary action of the soil and prevents moisture from rising.
  - Besides like a sponge it will absorb the moisture from the top layer of the soil causing it to dry.
  - The young plants will have no immediate access to the nutrients.
  - Also Carbon dioxide released from the decaying organic matter will push out the air from the soil and hence also the free nitrogen.
    - The crops look yellowish because of this
    - paradoxically we are creating a temporary nitrogen deficiency

# Cutting/Ploughing – Method I

- In this method we allow the plants to grow for 2 months and around the flowering time cut and incorporate it into the soil.
- The disk harrow can be very effectively used for this job.
- For the seed sowing of main crop wait for a month
  - because enough nitrogen is not available for germination.
- For transplanted plants this can be done within 15 days

# Cutting/Ploughing – Method II

- In the second method we allow the plants to grow till about 20% flowering, then cut it up to 5 feet (i.e. leave up to 1 foot standing);
- Allow the crop to grow back again for up to 50 % flowering; Now cut up to the base and use it in a separate compost pile (i.e. not in-situ).
- Whatever was cut in the first round is already decomposed. Sprinkle a little compost and we are ready for immediate sowing.
- The benefit here is that the 2nd growth has more nodulation.
- For horticulture
  - same as second method but allow 100% flowering and cut and use the second growth around the tree as mulch