



REPUBLIC OF KENYA



USE GREEN LEGUME MANURES TO INCREASE YIELDS AND REDUCE COMMERCIAL FERTILIZER USE



Introduction

Green legume manures (GLMs) refer to plants that contain nitrogen (N) in their leaves and stems (foliage). Nitrogen and other nutrients are released as the plants decay. Some examples of green leaf manures include annuals like lablab, vetch, and mucuna, as well as perennials like desmodium. These legumes can be intercropped with both pastures and fodder crops. Combining them with fodder and pastures creates a valuable source of animal feed.

Specific examples of GLMs include *mucuna* (velvet bean), *crotalaria* (sun hemp), desmodium, vetch, and lablab, among others.



Mucuna



Crotalaria



Desmodium



Vetch

Advantages of a Green legume manure crop

There are numerous advantages to incorporating a green legume manure crop into rotation, including:

- **Nitrogen Fixation:** Green legume manure crops fix nitrogen, making it available for subsequent crops.
- **Disease Control:** These crops contribute to disease control by providing a break in the cropping cycle, minimizing disease pressure.

- **Erosion Control:** Unlike fallow operations that leave soil exposed to water and wind erosion, legume green manure provides cover. This helps build and maintain soil structure, preventing erosion.
- **Increased Soil Aggregation:** Legume crops enhance soil aeration, water infiltration, and root growth, leading to increased soil aggregation.
- **Carbon dioxide removal and Organic Matter buildup:** Green manure crops play a role in removing carbon dioxide from the atmosphere. Additionally, they contribute to the buildup of organic matter in the soil after termination.

Disadvantages of a Green Legume Manure Crop

Utilizing a green legume manure crop comes with certain disadvantages, including:

- **Moisture Utilization:** In situations where moisture is limited, the green manure crop absorbs and utilizes the available moisture, suppressing the growth of other crops.
- **Establishment Cost:** Unlike marketable crops, green manure crops do not yield direct economic returns. Therefore, the cost of producing a green manure crop should not exceed the potential soil and nitrogen benefits it provides.

Management of GLMs in maize

Step 1

Plant maize seeds at 75 by 50 cm spacing or any other appropriate spacing.

Step 2

Plant one row of the green manure legume (mucuna or crotalaria) in between the maize rows.

- Plant Mucuna 2-3 cm every 30 cm
- Drill crotalaria

Plant the legume on the same day or 2 weeks after planting maize and do not apply nitrogenous fertilizers to the legumes.



Maize crotalaria intercrop

Stage 3

When the maize matures, harvest the cobs and the stover and leave the legume in the field.



Mature maize *Mucuna* intercrop

Stage 4

Uproot or cut the green manure legume left after harvesting maize. Apply the residues either as surface mulch or chop and incorporate them into the soil before planting the following season's maize. Most annual green legume manure crops should be terminated in the mid to late flowering stage. This helps achieve a balance between minimal soil moisture usage and maximum nitrogen fixation. If the legume crop is not terminated, it will produce seeds and a large portion of the fixed nitrogen will be translocated into the seed. This will result in low nitrogen availability for the next cropping season.



Uprooting crotalaria

Remember

- You can reduce commercial fertilizer dependency by growing and using Green legume manures.
- Use of Green legume manures improve soil water retention capacity, add soil organic matter and act as soil conditioners.
- Intercropped Green legume manures produce 800-1600 kg/acre of material which decays to provide 20-36 kg of Nitrogen. This amount is equal to 80-150 kg CAN or 1.5 -3 bags CAN.
- Maize requires 24kg Nitrogen per acre (about two bags of CAN) and so the GLMs in this system supply enough Nitrogen for the maize crop.

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Design and layout by Emma Nyaola

KALRO/NAVCDP/IC Pamphlet No.024/2024