

Agronomical Practices for fodder production (Part -2)

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General cultivation concept for fodder production

1. Tillage- Tillage is defined as the mechanical manipulation of the soil for the purpose of crop production.

It is the turning the soil to control for weeds and pests and to prepare for seeding.

The fundamental purposes of tillage are-

- (i) to prepare a suitable seedbed,
- (ii) to eliminate competition from weed growth, and
- (iii) to improve the physical condition of the soil.

Annual fodder crops require minimum tillage of 2 or 3 ploughings.

Types of tillage

- Tillage is of 2 types-

- 1. Primary tillage

It is further of 3 types-

a. Deep tillage

b. Sub-soiling

c. Year round tillage

- 2. Secondary tillage

Types of Primary Tillage

- They are deep ploughing, subsoiling and year-round tillage.

- **Deep Tillage**

- Deep ploughing turns out large sized clods, which are baked by the hot sun when it is done in summer. These clods crumble due to alternate heating and cooling and due to occasional summer showers.

• A deep tillage of 25-30 cm depth is necessary for deep rooted crop like pigeon pea while moderate deep tillage of 15-20 cm is required for maize.

• Deep tillage also improves soil moisture content.

- However the advantage of deep tillage in dry farming condition depends on rainfall pattern and crop.

• It is advisable to go for deep ploughing only for long duration, deep rooted crops.

Subsoiling

- Hard pans may be present in the soil which restrict root growth of crops. These may be silt pans, iron or aluminium pans, clay pans or - man-made pans. Man-made pans are tillage pans induced by repeated tillage at the same depth.
- Subsoiling is breaking the hard pan without inversion and with less disturbance of top soil.
- A narrow cut is made in the top soil while share of the subsoiler shatters hard pans.
- Chisel ploughs are also used to break hard pans present even at 60-70 cm.
- The effect of subsoiling does not last long.

Year-round Tillage

- Tillage operations carried out throughout the year are known as year-round tillage.
- Repeated tillage operations are carried out until sowing of the crop.
- Even after harvest of the crop, the field is repeatedly ploughed or harrowed to avoid weed growth in the off season.

Secondary Tillage

- Lighter or finer operations performed on the soil after primary tillage are known as secondary tillage.
- After ploughing, the fields are left with large clods with some weeds and stubbles partially uprooted.
- Harrowing is done to a shallow depth to crush the clods and to uproot the remaining weeds and stubbles.
- Disc harrows, cultivators, blade harrows etc., are used for this purpose.

TILLAGE



TILLAGE



Primary tillage preparing the lands.

- **Manures and fertilizers** – Generally forage crops take nutrient from residual effect of manuring done to the previous crop. So, extra manure is not required, but sometime for good yield additional manure application may be applied.
- Manures are obtained from natural sources, whereas fertilizers are synthetically manufactured in the factories.
- Manures are organic in nature and eco-friendly, whereas fertilizers are inorganic in nature and may harm the useful microbes present in the soil and also decrease the soil fertility if used for a longer time.

Manures and Fertilizers

Manure vs Fertilizer



Seed Rate

Seed rate is the quantity of **seed** of a crop that is required to sow a unit area of land for optimum crop production.

- Heavy seed rate is adopted for annual fodder. It will give thick stand of crop with good yield.

Importance of determining **seed rate**

- To maintain optimum plant population in the field for higher yield harvest.
- To prevent **seed** wastage from excess sowing such reduces the initial **cost** of production.
- To know the quantity of **seed** needed for sowing in advance.

Seed inoculation-

- **Seed inoculation** is the practice of covering the **seed** surface with a nitrogen-fixing bacteria (Rhizobium or Brady rhizobium) prior to planting.
- The bacteria penetrates the root, resulting in the formation of root nodules that fix nitrogen from the air and make it readily available to the plant.
- It protects the nitrogen fixing bacteria, needed, due to the fact that most **seeds** carry natural toxins against soil decay which destroy Rhizobia as well.
- Typically, **inoculation** is performed via mechanical wounding or grafting. Mechanical **inoculation** includes cutting, slashing, and rubbing

Stage of harvesting-

Different crops have different harvesting stage.

- The **milk stage** is when the grain head releases a white liquid substance when opened. The **dough stage** is when the grain head begins to turn to a doughy consistency. As the plant matures from the **boot stage** to the **dough stage**, **forage** quality decreases while yield increases.
- In annual grain crops, harvesting should be done at milk stage, while in leguminous crop, harvesting should be done at pod formation stage.

Fodder Conservation

Fodder Conservation methods-

- Excess or surplus fodder are conserved by hay or silage making methods depending upon the weather conditions.
- Ensiling is a process which involves the **conservation** of green **fodder** crops, grasses and the storage over long period.
- Feeding strategies based on conserved **fodder** include feeding of dry **fodder** (hay, dried crop residues or grazing of dried grasses), silage (preserved green **fodder** or grasses) and standing hay/stover (standing mature **fodder** crop or crop residue

Crop rotation

- **Crop rotation** is the practice of planting different **crops** sequentially on the same plot of land to improve soil health, optimize nutrients in the soil, and combat pest and weed pressure.
- Some crops are cultivated as catch crops before or after main crop production or in between two important crops.
- It will improve the palatability or nutritive value of forage material. eg- production of legume crop after rice crop.
- The sequence of **four crops** (wheat, turnips, barley and clover), included a fodder **crop** and a grazing **crop**, allowing livestock to be bred year-round.

Rice-fallow crops

- In the **rice-fallow** system, rainfed **rice** is grown in the wet season (kharif) and the land lies **fallow** during the subsequent dry winter (Rabi) and summer periods, except for weeds that are grazed.
- **Rice-fallow** cropland areas are those areas where **rice** is grown during the kharif growing season (June–October), followed by a **fallow** during the rabi season (November–February).
- In eastern India, vast areas are lying **fallow** after the **rice** (*Oryza sativa* L.) crop is harvested. **Rice-fallow** areas can be better utilized in establishing **pulse** crop utilizing the residual soil moisture through conservation agricultural practices, after the harvest of **rice** crop by utilizing the residual soil moisture.

Moisture availability- For good yield of fodder, the soil moisture range from field capacity to about 75% of availability

• Thanks