Agricultural Machinery

Practical

2nd Stage

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Lecture 3
Part 1

Soil Preparation for Planting (Tillage)

Tillage

1. Definition
2. Function
3. Classification
4. Suitable Time
5. Implementation

1

Definition

Its Mechanical or Physical manipulation of soil to create a favorable condition for seed placement and plant growth.

Tillage operations include ploughing, harrowing and mechanical destruction of weeds and soil crust, etc.

2

Function

Obtain Seedbed

Add to Soil Humus Fertility

Destroy Weeds Insects

Free Circulation Air

Retain moisture From the rain

Prevent Erosion

3 Classification

Due to the different soil types , strength characteristics and nature of the surface topography , soil preparation machines have been designed to suit all of these requirements, so the Soil preparation classification vary depending on the type of crop and soil properties and their types.

The most important methods of soil preparation of the following:

1. **Primary** — **Ploughing by turning, drilling and mixing**

- Tillage that is deeper and more thorough.
- Tends to produce a rough surface finish.

2. **Secondary** — **Harrowing, Rolling**

- Tillage that is shallower and sometimes more selective of location.
- Tends to produce a smoother surface finish.

4 Suitable Time

Depends on availability of soil moisture.

4.1. Low Moisture

Difficult to open the soil, more energy is required and large size and very hard clods are resulted, soil structure is destroyed

4.2. High Moisture

Soil sticks to the plough, the soil below the plough-sole becomes compacted.

4.3. Optimum Moisture

The optimum range of soil moisture for better ploughing is 25 to 50%.

Light soils can be ploughed at wider range of soil moisture conditions, while; the range is narrow for heavy soils.

5 Implementation

5.1. Primary tillage implements

- Ploughs are commonly used for primary tillage.

- Implements used for opening and loosening of the soil are known as ploughs.

Ploughs Types

1 Inversion

A	B
Mould board	Disc plough

A Mould board

Cut through the soil and turn it over. Because this type of plow is meant to turn over the soil, it is shaped like a wing. The idea behind this type of plow is to make sure that no soil is left unturned.

B Disc Plough

Disc plows cuts in terms soil by using discs instead of a wedge-shaped blade. The idea behind using a disk instead of something like a mold board plow is to help reduce friction. Its sufficient in cases where you have sticky or rocky soil. But its don't do a very good job of covering weeds, so if you're trying to turn over the weeds in moldboard plow is a better choice.

This type of plow is heavier because they need to be pushed down into the soil.

2 Sub-soil plough

a subsoiler will break up and loosen soil to twice those depths. Typically its mounted on a compact utility tractor will reach depths of about 30 cm (12 in) and typically have only one thin blade with a sharpened tip. Its help to improve growth in all crops where soil compaction is a problem.. Agricultural subsoilers, can disrupt hardpan ground down to 60 cm (24 in) depths.

3 Rotary plough

The essential feature is a set of knives or tines rotated on a shaft by a power source. The knives chop the soil up and throw it against a hood that covers the knife set. These machines can create good seedbeds, but their high cost and extra power requirement have limited general adoption, except for the small garden tractor.

4 Chisel plough

This type of plow is for breaking up the soil. Typically, we use chisel plows for deep tillage. Chisel plows disturb the soil below the surface, and try to reduce the amount of top layers disturbed.

5 Ridge plough

We use these types of plows to create ridges for particular crops. For example, this type of plow would work well for potatoes. Typically, they are double winged to raise the soil into a furrow.