TKP3501
Agricultural Mechanization & Irrigation

Topic 6a: Crop Production
>> Land Preparation (General)

Ahmad Suhaizi, Mat Su
Email: asuhaizi@upm.edu.my
Objectives

- To increase the productivity with less stress and fatigue,
- To ease the task in farming operation
- To increase in coverage area with the optimum number of worker
What machinery and equipment are used in producing crops?
What task involves in producing crops?
Land Preparation

- A plow is an implement used to cut, lift, and turn over soil. It is commonly used to prepare the soil for planting. There are various types of plows and the one most commonly used in many countries is the moldboard plow.

- A harrow is an implement with spikes or disks that is used to cultivate the soil by pulverizing and smoothing it.

- A cultivator is an implement used to loosen the soil and control weeds between rows of growing crops.
Match "small" tractors with these economy integrals

Convenient 475 Series Plows are available in 2- and 3-shaft sizes for tractors with Category 1 hitch. Maneuverability is outstanding during field turns and transport. Blade in compact and close-coupled design.

Wide range of adjustments. Compares side and double offset drawbacks to progressive point work. Standard kit may be purchased or the name for any of three vertical disk settings (flat, medium, or steep). Lower disk angles may be adjusted for hard and loose ground conditions. The rear wheel has independent 0-3-way setting. Width of cut for all discs may be controlled from 18-1/2 to 8-1/2 inches.

Plow

Harrow

Cultivator
Circuitous pattern

One way pattern

Headland

http://www.knowledgebank.irri.org/ericeproduction/1.3_Land_levelling.htm
Gathering pattern
Seedbed preparation
Type of seedbeds

- There are basically 3 types of seedbeds:
  - Flat beds
  - Raised beds, and
  - Sunken beds.
- The best type to use depends much more on the particular climate and soil conditions than on the crop.
Flat Beds

- Used where water availability is adequate and there are no drainage problems.
- Example of the crops are: maize, sorghum, beans, and potatoes are started out on a flat bed
- As the season progresses, soil is thrown into the crop row to mound up the plants; this is called "hilling-up" and is done to control in-row weeds, provide support, and improve drainage.
Raised Beds or ridges

- Especially advantageous for clayey soils under high rainfall or wherever else drainage is likely to be poor.
- Where crops are furrow irrigated, raised beds or ridges are essential so that the water can flow down the furrows between the beds.

Height of raised beds:
- Raised beds are usually 10-30 cm high. The best height depends mainly on soil texture and moisture considerations.
- For example, raised beds are often 20-30 cm high on clayey soils under high rainfall where poor drainage is likely to be a problem.
- On coarser-textured soil under the same conditions, bed height might be 15-20 cm.
- When raised beds are used in drier conditions, a bed height of 10 cm or leas may be best to avoid excessive moisture loss due to evaporation from the exposed sides.
- Width of raised beds: Typically they are 100-130 cm wide.
Raised beds may have several advantages:
- Much better drainage compared with flat or sunken beds.
- They provide a double layer of topsoil, because they're made by dragging in topsoil from the surrounding alleyways. (Because of this, they're also likely to be looser than flat or sunken beds.)
- In temperate regions, raised beds warm up more quickly in the spring, which may benefit cold-sensitive crops and even permit earlier planting.
- Plants on raised beds are easier to reach when doing hand operations such as weeding and thinning.
- Raised beds usually aren't a good choice during the dry season, because they dry out more quickly than flat or sunken beds; also, water tends to run off them and be lost into the alley-ways.
- These disadvantages can be partly overcome by mulching the bed with straw or rice hulls, making a lip around the bed's edge to reduce run-off, and by reducing bed height to 10 cm or less (see Fig. 4-4).
Sunken Beds

- In dry regions, especially on sandy soils with low water-holding capacity, vegetables can be planted in sunken beds (i.e. shallow basins) about 100-130 cm wide and 2-5 cm below the surrounding soil level.

- Sunken beds conserve water much more effectively than raised beds for 2 reasons:
  - Sunken beds don't have the exposed sides of raised beds from where considerable moisture can be lost by evaporation.
  - None of the applied water is lost by runoff.
Two types of raised beds. Bed A is best suited to high-rainfall areas. Bed B has a lip around all 4 sides which helps prevent water from running off (helpful in drier conditions).

A sunken bed. Depth shouldn’t exceed about 4 cm.
Factors limit the farm mechanization?
Review

- List three method of plowing the land

- Why there is a need to have a headland during the land preparation?
Thank you.