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CROP PRODUCTION TECHNOLOGY

UNIT 3

CROP MANAGEMENT

declining in crop yield

- The decline in productivity can be attributed to the appearance of deficiency in secondary and micronutrients
- The physical condition of the soil is deteriorated due to long term use of chemical fertilizers, especially the nitrogenous fertilizers

Strategies for INM

- Organic nutrients
- Inorganic nutrients

INTEGRATED PEST MANAGEMENT

Integrated Pest Management (IPM) is an ecosystem approach to crop production and protection that combines different management strategies and practices to grow healthy crops and minimize the use of pesticides **Integrated Pest Management (IPM)** means the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment. IPM emphasizes the growth of a healthy crop with agro-ecosystems and encourages natural pest control mechanisms. As per FAO

Goal of IPM:

- To control pests and not to eradicate entire population
- Treatments are **not** made according to a predetermined schedule
  - Based on results of monitoring
- Treatments are chosen & timed
  - Most effective & least disruptive to natural pest controls

Strategies for IPM

- Physical and mechanical
- Cultural
- Biological
- Chemical

TYPES AND METHODS OF HARVESTING

Harvest

It is an operation done either by cutting, plucking, picking, digging or a combination of more than one of these methods, for removing the economic part from the matured plant.

Pulses,cotton–Picking
Maize,Bhendi,vegetables–Plucking Flower (all) – Plucking Tuber crops–Digging
Sugarcane – Cutting

Harvesting can be done only after assessing maturity. In general maturity means there is no more addition of source of sink (economic portion).

Physiological maturity:

It no more addition of source to sink; physiologically maturity is attained – ascertained by appearance of yellowing, initiation of drying, etc. We harvest the produce at once it attains physiological maturity. After physiological maturity there is a loss either in the weight or by some means.

Harvestable maturity:

It is generally occurs seven days after physiological maturity. The important processes during this period is loss of moisture from the economic parts

Assessment of Maturity

In case of cereals, the grain colour changes to yellow or brown from green leaves may turn golden yellow or brown.

- Rice–hard and yellow coloured grains
- Wheat–yellowing of spikelets
- Maize–The sheath covering the cob turns brown
- Sorghum, cumbu, tenai-yellow coloured ears with hard grains
- Ragi –Turns brown
- Pulses–Pods become dark or brown
- Cowpea–Pods appear golden yellow
- Sugarcane–when brix reading is more than 18^0

Time of harvesting depends on

- Economic use
- Labour availability
- Marketing-demand

Harvesting

It is the operation of cutting, picking, plucking digging or a combination of these operations for removing the crop from under the ground or above the ground or removing the useful part or fruits from plants.

Harvesting action can be done by four ways:

1) Slicing action with a sharp tool.
2) Tearing action with a rough serrated edge
3) High velocity single element impact with sharp or dull edge.
4) Two elements scissors type action.

Manual harvesting involves slicing and tearing action. Harvesting can be done by : (1) Manually operated tool (ii) Animal drawn machine (iii) Mechanically operated machine.

There are a few related terms in connection with harvesting, which are as below:

- **Mower**: It is a machine to cut herbage crops and leave them in swath.
- **Reaper** :It is a machine to cut grain crops.

- **Reaper binder** It is area per which cuts the crops and ties them into neat and uniform sheaves.
- **Swath**: It is the material as left by the harvesting machine.
- **Sickle**: It is a curved steel blade having a hand grip used for harvesting by manual power.
- **Windrower**: It is a machine to cut crops and deliver them in a uniform manner in a row.

Sickle

Sickle is a simple harvesting tool. It is used for harvesting crops and cutting other vegetations (fig.1). It essentially consists of a metallic blade and a wooden handle. Sickles are classified in to two classes: (i)Plain and(ii) Serrated. Blade is the main metallic part of the sickle.

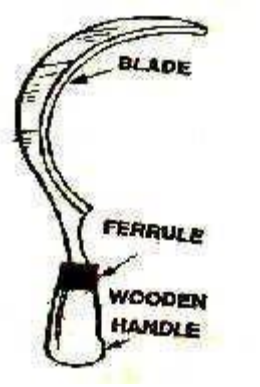


Fig.1.Sickle

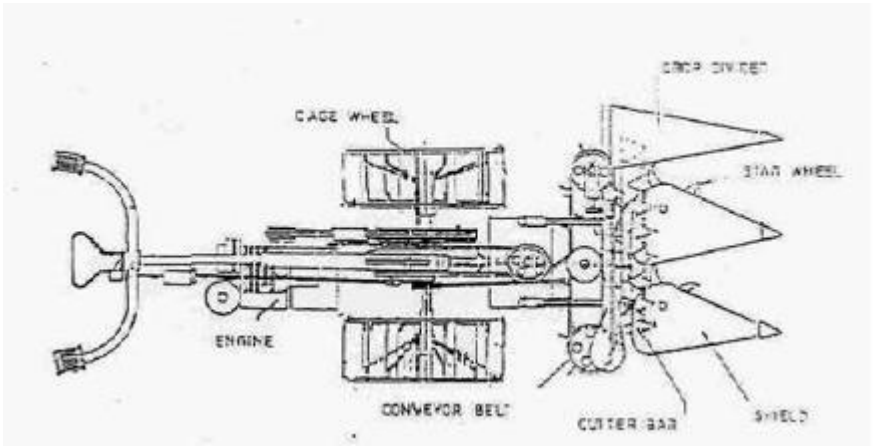
Mower

Mower is a machine to cut herbage crops and leave them in swath. There are different types of mower used in different ways such as: (i)Cylinder mower (ii)Reciprocating mower (iii) Horizontal rotary mower (iv) Gang mower and
(v) Flail mower.

Paddy harvester

The harvester is a front mounted unit and consists of a cutter bar, five numbers of gathering header assemblies with star wheels, two numbers of vertical conveyors with G.I. pegs on the periphery, a gear box and a pair of cage wheels.

Fig.4.Paddyharvester



Combine Harvester

It is a machine, which Performs the functions of a reaper, thresher and winnower.

Functions:

- Cutting the standing crops
- Feeding the cut crops with the threshing unit
- Threshing the crops
- Cleaning the grains free in git from straw
- Collecting the grains a container

The functional components are header, reel, cutter bar, elevator, feeder, concave, feeding drum, threshing drum, feeder concave, fan, chaffer sieve, grain sieve, and return conveyor, tailing auger, grain elevator and grain container.

THRESHING

Threshing is the removal of the grains or economic part from the matured crop. Methods of threshing are manual, mechanical and also by using animals.

Threshing is carried out only after drying and when there is minimum moisture. Moisture is the critical factor to decide threshing.

It is the process of detaching grains from the ear-heads or from the plants.

Threshing methods

The common methods of threshing are:(i) by manual labour (ii)by animals and (iii)by machines.

Threshing by manual labour

- Threshing by manual labour is slow and labour consuming device.
- Process of beating the harvests on a floor or beating by stick is the method followed for small quantity of harvests.

Threshing by animals

- Threshing by animals is very common method used in villages.
- The harvest is spread on a clean threshing space, the animals are tied in Line one after the other with the help of a strong pole, fixed in the centre of the threshing space.
- Animals move round and round on the harvest and trample them continuously till the

grains are completely separated from straw.

- One man drives the animals from the back.

Threshing by machines

- With the increase of mechanization in farms, threshing machines are getting popular day by day.
- Different type of threshers is used for threshing.

CLEANING

Cleaning – The process of removal of foreign or dissimilar materials by washing, screening and picking or by any other mechanical means.

Those threshers which are not fitted with aspirator unit have got only one blower, which blows air in horizontal direction. This type of thresher is commonly called *drummy* thresher

- **Aspirator -** It is a component of the cleaning unit used for cleaning grain by drawing air through the grain mass.

- **Blower-**It is a device to produce air blast.

- **Winnower**-It is a machine with one or two sieves and fan using air stream across falling grain

- **Winnowing fan**- It is a machine used for creating air blast mainly for the purpose of winnowing of grains.

STORING

Before storing drying is an important process of post harvest processing. The grain should be brought to storable moisture. It is the amount of moisture sufficient to keep the biochemical activities at the bearable minimum level. When the moisture is above the storable moisture, enhanced microbial activity takes place which affects the viability of the grain, loss of quality, etc., e.g., oil seeds develop rancidity.