TOPIC 3: AGRONOMIC PRACTICES LIMITING CROP PRODUCTIVITY

3.0 Introduction

This topic looks at routine farm practices which, if not properly followed or observed by farmers, can easily lead to lower crop yields. This topic is very important and will never miss in any of your tests or UNEB examinations.

3.1 Timely seedbed preparation

Timely opening up and preparation of land is the first step to good crop yields. Failure by some farmers to observe this is one of the causes of low yields.

Importance of early seedbed preparation

- ✓ To allow time for the decomposition (rotting) of organic matter before crops are planted.
  Note: At least give 6 weeks between seedbed preparation and planting to give time for weeds and other vegetation to rot. If planting is done immediately after ploughing, seedlings suffer from shortage of Nitrogen because the microorganisms in soil have used it up in the process of decomposing organic matter. (Refer to seedbed preparation notes for other advantages)

3.2 Proper seed selection

Seed selection involves separation of good seed from bad seed before planting.

Importance of seed selection

- ✓ Leads to uniform germination
- ✓ A farmer can achieve optimum plant population

Qualities of a good seed

- ✓ Should be free from pests and diseases
- ✓ Should be normal size for that variety (not too big or too small)
- ✓ Should be normal shape for the crop spp. Not deformed
- ✓ Should show normal color for the variety of interest
- ✓ Should be wholesome, i.e. not cracked or damaged
- ✓ Should be from a high yielding variety
- ✓ Should be from a plant with good characteristics, e.g. drought resistant, fast maturing, etc.
- ✓ Should preferably be treated

Qualities of a bad seed

- ✓ Affected by pests and diseases (having holes, discoloration, etc.)
- ✓ Abnormal size (too big or too small)
- ✓ Shriveled seeds
- ✓ Cracked or deformed (abnormal shape)

3.3 Seed treatment

Seed treatment is the coating of seeds with chemicals (pesticides). This is done in order to control pests both in store and the field. It also helps preserve seed viability. Common pesticides used include:-

- ✓ Insecticides. To control insect pest damage
- ✓ Fungicides. To control fungal diseases
- ✓ Bactericides. Protect bacterial diseases

3.4 Early planting (Timely planting)

This refers to planting crops at the onset of the rainy season.

Importance of early planting.

- ✓ Leads to timeliness of farming calendar.
- ✓ Plants get adequate moisture during critical stages of crop growth
- ✓ Early planted crops escape some pest and disease outbreaks
- ✓ Early planted crops establish faster than weeds and smother them
- ✓ Crops benefit from the Nitrogen flush (Nitrate-nitrogen), which accumulates in the soil during hot and dry weather and is released soon after first rains
- ✓ It is possible for a farmer to reap high yields
- ✓ It is possible for a farmer to get higher price for his crop since there would be few competitors, leading to higher profits.

3.5 Method of planting

There are two methods that can be used to plant seeds or crops:-

- ✓ Broadcasting
- ✓ Row planting

3.5.1 Broadcasting (Sowing)

This is where seeds are scattered randomly over a field and then covered.

Advantages

- ✓ Suitable for sowing tiny seeds, e.g. finger millet, simsim, legume pasture seeds
- ✓ Faster than row planting
- ✓ Does not require much skill
- ✓ It is not labour demanding
- ✓ Simple

Disadvantages

- ✓ A lot of seed is used (wastes seeds)
- ✓ Difficult to achieve correct (optimum) plant population
- ✓ Difficult to achieve correct and even crop species
- ✓ Difficult to weed crops that have been broadcast
- ✓ High competition among crops for space, moisture, nutrients, water, etc.
- ✓ Impossible to use farm machinery for weeding, spraying and harvesting
- ✓ May lead to low quality produce

3.5.2 Row planting

This is the planting of seeds/crops in rows or lines

Advantages

- ✓ Lower seed rate is used, i.e. economical in terms of seed
- ✓ Easier to achieve optimum plant population per unit area
- ✓ Easy to establish correct spacing
- ✓ Can be done mechanically
- ✓ Other farm practices such as weeding, fertilizer application, etc. can be done mechanically
- ✓ The use of "close spacing" is possible which helps control certain diseases in some crops, e.g. Groundnut rosette in Groundnuts.

Disadvantages

- ✓ Not suitable for small seeded crops
- ✓ Requires more labor, if done manually
- ✓ Slower than broadcasting if done manually
- ✓ Requires skill to carry out
- ✓ May require gap filling to achieve optimum plant population

3.6 Depth of planting

This refers to how deep down the soil the seeds are planted. Seeds should be planted at right depth. On average, seeds are planted at a depth of about 5 times their diameter or width. Small seeds are planted shallowly at 1.5-2.5 cm. deep, while big seeds like Beans and Maize should be planted 2.5-3.5 cm. deep. This is because bigger seeds have more food reserves than small seeds.

Advantages of correct planting depth

- ✓ Seeds get enough oxygen, water and warmth for their germination
- ✓ Seeds germinate quickly
- ✓ Seeds do not use up too much food reserve in trying to push the plumule out of the ground
- ✓ Crops germinate uniformly, are of the same size and mature at the same time

3.7 Spacing

This is the recommended distance between crops and between rows when planting. Every crop has a recommended spacing, e.g. Maize 60cm x 45cm (i.e. 60cm between rows and 45cm between crops in a row). Recommendations are guided by researchers (scientists).

Advantages of using recommended spacing

- ✓ You achieve optimum plant population per unit area.
- ✓ Helps in smothering weeds, i.e. suppressing weed growth
- ✓ Leads to high yields as each crop gets enough growth requirements
- ✓ Economises seed
- ✓ Leads to efficient use of available land
- ✓ Avoids overcrowding of plants which may lead to stunted growth or etiolation of plants
- ✓ In some crops close spacing is used to control some diseases, e.g. in Groundnuts it is used to control Groundnut rosette disease transmitted by Aphids.

Factors that determine spacing of a crop

- ✓ Soil fertility. Fertile soils can support more plants per unit area than infertile soils
- ✓ Rainfall intensity. Areas that receive more rainfall can support more plants than those that receive less.
- ✓ Type and growth habit of crop. Spreading crops have require a larger spacing than non-spreading crops.
- ✓ The purpose for which the crop is grown/Economic importance of crop. For example, Maize for sale should be spaced more widely than that for silage making.
- ✓ Accessibility to the crop. The ease of movement within the garden during operations such as weeding, spraying, fertilizer application and harvesting by machines.

3.8 Seed rate

The amount or number of seeds planted per hectare/land. It affects the plant population, i.e. the number of plants per unit area of land (Ha/acre).

Importance of correct seed rate

- ✓ Gives the right plant population, i.e. number of plants per unit area.
- ✓ Leads to high yields
- ✓ Economises seed, i.e. avoids wastage of seed and money

3.9 Thinning

The removal or pulling out of excess plants from a field.

Importance of thinning

- ✓ To establish correct plant population
- ✓ Reduces competition for light, water, space and plant nutrients
- ✓ Improves quality of produce
- ✓ Helps achieve correct spacing
- ✓ Encourages lateral growth which leads to bigger plants

3.10 Rogueing

This is the uprooting of diseased plants from the nursery or garden. Its main aim is control spread of diseases between crops leading to high yields.

3.11 Weeding

Removal of unwanted plants from the field or garden. Its main aim is to reduce competition for air, sunlight, soil moisture and nutrients with crops leading to high yields. Young crops are more sensitive to weed competition, so early weeding is essential. Delayed weeding reduces growth and yields of crops. There many other reasons for weeding (Refer to notes on weeds later this year).

3.12 Fertilizer/manure application

Fertilizers/manures are substances added to the soil to increase the level of plant nutrients in the soil. The types of fertilizers used vary from crop to crop. However, Phosphorus and Potassium fertilizers should always be incorporated in the seedbed, while Nitrogen fertilizers are applied later in the growing season. (Refer to your S>1 notes on fertilizers for the "Importance of fertilizers").

3.13 Gap filling

Gap filling is re-sowing or replanting seeds in areas where they did not germinate. Lack of germination could be due to poor seed or unfavorable conditions. Gap filling should be done 1-2 weeks after first planting.

Importance of gap filling

- ✓ The main aim is to attain optimum plant population
- ✓ Leads to high yields
- ✓ Efficient use of available land

3.14 Pruning

This is the removal of unproductive, diseased or unwanted parts of a plant. It is commonly done in perennial crops like Tea, Coffee, Cocoa, Bananas and in vegetables and ornamental plants, e.g. hedges. Pruning saws/knives and secateurs are some of the tools used.

Importance of pruning

- ✓ To remove unproductive parts to reduce competition for growth requirements
- ✓ Remove diseased parts thus avoid spread throughout the crop
- ✓ Controls some pests and diseases, e.g. Antestia bugs and Coffee berry disease (CBD) in Coffee.
- ✓ To prevent overbearing, i.e. regulate fruiting

- ✓ Opens up the plant making spraying easier
- ✓ Opens up the plant to more sunlight
- ✓ Opens up the plant making spraying more effective
- ✓ Eases harvesting of fruits
- ✓ Improves air circulation around plants
- ✓ Improves quality of yields as plant parts get enough air and nutrients
- ✓ Facilitates mechanization
- ✓ In some crops, it helps encourage lateral growth of branches
- ✓ To form a plucking table in Tea
- ✓ To train a plant to produce a desirable shape

3.14 Staking

The practice of using poles or sticks to support weak plants.

Importance of staking

- ✓ Gives support to weak/trailing plants
- ✓ Controls soil-borne diseases
- ✓ Reduces contamination of fruits by soil
- ✓ Keeps plants upright enabling them to receive enough light
- ✓ Keeps plants upright increasing air circulation
- ✓ Eases harvesting of fruits
- ✓ Eases weeding of plants
- ✓ Eases spraying and economises chemicals
- ✓ Leads to production of quality fruits
- ✓ Helps plants to support the weight of its fruits, e.g. Bananas

CHECK YOURSELF

1. What do you understand by agronomic practices?
2. Name any ten agronomic practices that you have learnt.
3. Give five reasons why should farmers prepare their fields early.
4. Give four characteristics of good seed and four qualities of bad seeds.
5. Why should farmers select seeds
6. Give different methods of planting and give advantages and disadvantages of each
7. What is the difference between pricking out, thinning and roguing?
8. Why is it important to prune Coffee or Tea?
9. Explain how staking leads to high crop yields. Give an example of a crop which is normally staked.

Note: The next topic (Topic 4) is "Crop propagation"