**AGRICULTURAL SCIENCE JSS 2**

**CROP PROPAGATION**

Crop propagation is the process by which new plants are produced from existing stocks. It is an important aspect of cop reproduction. It involves formation of new plants or multiplication of individual plant. Different propagation processes make it possible for large number of new crops or individual plants to be raised by the farmer within a short period of time. New plants can be raised mostly by seeds, others by bulbs as in onions, suckers as in banana and plantain, corms as in cocoyam, tubers as in yam e.t.c. Farmers use other methods like grafting, budding, cutting and layering to raise new plants.

**METHODS OF CROP PROPAGATION**

Propagation of crops occurs by two main methods namely;

1. Sexual propagation
2. Asexual propagation or vegetative propagation

**SEXUAL PROPAGATION:** Sexual method of crop propagation is production of new individual plants from the seed i.e development of new plants from seeds which are planted in the soil. It is the commonest method of propagation. When a seed is sown in a suitable soil, it germinates and grows into a new plant which resembles the parent plant.

**ASEXUAL OR VEGETATIVE PROPAGATION**: This is the production of new plant by the means of vegetative parts such as stems, roots and leaves. Detached parts of the plants like leaves, roots, flowers or stems are capable of regenerating new roots and shoot systems. They may also be able to unite with another plant parts and give rise to new individual plant stands.

**METHODS OF VEGETATIVE PROPAGATION**

1. **CUTTING:** This is a vegetative method where parts of a plant are cut into portions and planted to produce new plants. The cut part may be from stem, leaves or root of the plant depending on the type of plant being propagated. Cutting methods are used for plants that do not produce seeds or may not do well when raised directly from the seeds. The growth of a cut plant is induced by plant hormone called auxins. To achieve success in stem cutting, a mature stem with sufficient buds (at least three buds) is selected. Cut pieces of stem should not be planted upside down in order not to delay its development. Examples of plants developed by cutting include; cassava stem, sugar cane, coffee etc.
2. **BUDDING:** This is the union of bud with a stock. It involves carefully slicing an active bud out of the plant and inserting it into a cut made in another rooted plant. The bud sliced out of one plant is referred to as scion while the rooted plant into which the sliced bud is inserted is called the stock. A plant with desirable characteristics such as high yield, resistance to diseases, good fruit e.t.c is selected as the scion while the stock be a variety with vigorous growth pattern. Budding is easily achieved with citrus plants that are free from infection. A T-shaped mark is cut into the stem of the stock. The bud removed as the scion with a piece of bark is attached to it as the bud shield. The layers of both the scion and stock are in close contact with the bud shield firmly bound into position with polythene tape to prevent harmful bacteria and other micro organism from attacking it. A new shoot develops from the inserted bud within three weeks. Examples of plants developed by budding include rubber, cocoa, oranges etc.
3. **LAYERING**: This a process by which the branch of a plant enclosed or buried in a moist medium is induced to produce roots directly from stem. A branch of a parent plant is lowered in the soil. By means of the peg it is held resting on the soil.

The steps involved in layering include:

1. Bend a branch of a plant and allow the nodes to touch the ground.
2. Peg down the branch.
3. Cut the shoot half way along a node where it touches the ground.
4. Cover the place with soil and allow it to produce roots.
5. Leave the end of the shoot to remain above the ground level.
6. After the layers have developed strong roots, then cut the stem from the parent plant. This method is used to propagate tree crops like mango and a few ornamental plants. However, it is not a widely used technique.
7. **GRAFTING**: This involves the process of joining a whole shoot or stem into another plant. The parts joined in this way unite and grow together. It is a faster way of raising plants than layering, budding and cutting. The stem to be grafted on a root stock is the scion. For instance, sweet orange can be grafted into a sour orange and the new tree will show the characteristics of the sweet orange together with the healthiness of the sour orange. The shoot of the root stock and the scion are cut off in slanting cut to fit into each other. The two cut surfaces are laid together and bound with tape or wax so that their growing tissues are in contact and are shielded from evaporation and bacterial invasion.

 **ADVANTAGES OF PROPAGATION**

**ADVANTAGES OF SEXUAL PROPAGATION OR SEED PROPAGATION INCLUDE:-**

1. Seeds are easy to carry from place to place, easy to store and easy to sow without reduction in viability.
2. Improved crop seed varieties are easily available through the activities of those who specialize in seed multiplication.
3. Raising seeds through cross-pollination leads to crop improvement quality-wise.
4. Seedlings are easier and cheaper to raise from seeds.
5. In some crops, this is the only economic and practicable method.
6. This method is the surer method of raising disease-free plants.
7. It leads to greater increase in crop population.

 **ADVANTAGES OF VEGETATIVE PROPAGATION:-**

1. It is the only way of propagating seedless plant.
2. Through budding or grafting e.g. sweet orange can be grafted on sour orange.
3. The new plants produced from vegetative propagation mature faster and early than those from seeds.
4. Plants propagated under this method can withstand adverse soil and weather conditions.
5. Offspring that are similar to their parent plant in all characteristics can be produced.

 **DISADVANTAGES OF PROPAGATION**

 **DISADVANTAGES OF SEXUAL PROPAGATION OR SEED PROPAGATION INCLUDE:-**

1. Seeds with longer period of dormancy do not germinate easily.
2. A plant grown from seeds takes longer time to start fruiting.
3. Some plants produce few seeds.
4. Plants grown from seeds are not always uniform in its characteristics such as growth, maturity and yields.
5. Seeds reduce the amount of food (crops) for consumption i.e it reduces food as those that could be used as food are planted.

**DISADVANTAGES OF ASEXUAL PROPAGATION OR VEGETATIVE PROPAGATION INCLUDE:-**

1. These methods are generally more expensive since the parts are bulky and difficult to transport and store.
2. Improvement in genetic characteristics of plant is not easily allowed.
3. They require special skills.
4. Some viral diseases of special plants can be transferred to the new plant.

 **CULTURAL PRACTICES**

Cultural practices are all the activities engaged in by the farmer in the course of crop production. The aim of these practices is mainly to maximize yield or output of crops at the cheapest cost. The farmer also uses specific activities to improve the quality of his produce and reduce wastage due to pests and diseases and preserve products in season for use out of season.

The cultural practices can be divided into five groups. These are:-

1. Pre-planting activities
2. Planting
3. Post planting activities
4. Harvesting
5. Post-harvesting activities.

**PRE-PLANTING ACTIVITIES**

These include all the farming activities carried out before actual planting is done. Examples are:- choice of farm site, clearing, burning, stumping, plotting, tilling, ploughing, harrowing, ridging, seed selection, nursery and nursery practices.

1. **Choice of farm site:** In selecting a new farm site, certain factors should be considered such as the size of the land, soil fertility, topography, and nearness to the farm or school in the case of farm school farm, accessibility to good road for transportation of farm produce to the market. A loamy flat land is preferable, or a gentle slope. This is to reduce the effect of run-off water.
2. **Clearing:** The natural vegetation covering the soil can be cleared using machetes and axes, tractors or bulldozers in large scale farming. However few trees may be left to provide shade in the farm.
3. **Burning:** In some areas, farmers dispose the cleared vegetation by burning. The ash produced helps to increase the alkalinity of the soil, although most of the ash is easily washed away by rain and lost. It is advisable to gather the cleared vegetation at a place before burning. This is because burning has an adverse effect on the soil organism that aid in the decomposition of organic matters.
4. **Stumping:** This involves the uprooting of the cut trees bases together with their roots. It can be done with machetes and axes, or by bulldozer.
5. **Plotting:** The new farm should be marked out to determine its breadth and length. This is done with ranging poles and a measuring tape. The farmer can divide the land into smaller plots as he wished before the soil is prepared.
6. **Tilling:** This is usually done to break and loosen the soil which will enable plant roots to move easily into the soil and absorb the required nutrients and water. Tilling can be done with digger, hoe or mechanically with plough, harrows and ridgers driven mould board etc.
7. **Ploughing:** This is done to break up the soil into large clods. By ploughing, the weeds are buried and the soil is loosening making it easy for plant roots to penetrate into the soil. It is the first tillage operation that prepares the land for planting. Ploughing can be done with disc plough, digger and hoe.
8. **Harrowing:** This involves loosening the soil and crushing the clods in preparation for ridging. Planting may be done after harrowing for crops that are planted on flat seedbeds. But for other crops, ridges are necessary, and follows after harrowing.
9. **Ridging:** Ridges, heaps or mounds are made in readiness for planting. It helps in bringing together the top soil and its nutrients for the use of crop plants. Ridges are made at right angles to the slope on the farm. This will help to reduce or stop the run off waters and hence reduce erosion. Ridges are made with disc ridger or with hoe in small farm land. By ridging, manure is buried more easily and weeds are easily controlled.
10. **Seed selection:** Before planting, the seeds to be planted should be selected. Only good and viable seeds should be planted. This will help to cut the cost of buying seeds and eventually help to increase crop yield and profit.
11. **Nursery and nursery practices:**
* Nursery: Nursery is a place where seedlings are raised in preparation for transplanting in the main garden-Nursery beds are generally slightly raised ,square or rectangular or flat beds. Crops that can be raised in nursery include tomatoes, citrus, coca, kola etc.
* Nursery practices: These are the essential operations carried out on the nursery beds like providing sheds to the young seedlings, dialing watering of the seedlings, weeding etc.

 **REASONS FOR NURSERY PRACTICES**

1. Seeds which are too small to the planted at stake may be developed in the nursery before transplanting.
2. The plants can easily be watered; shaded or other cultural operations can easily be carried out.
3. When seeds are raised in the nursery, only the healthy seedlings are selected for transplanting.
4. Nursery practice is labour time and space saving.