

PLANTATION?

- ❑ Plantation is a piece of land not less than but more than 5ha dedicated to production of permanent tree crops with industrial value. It is profit oriented industry comprising of different aspects that can stand alone as a venture.
- ❑ Plantation is usually monospecific in nature.
- ❑ Economic importance of studying Plantation crops are :
 1. Job opportunities e.g. plantation manger, consultancy, research/ teaching, input supplier importer/exporter, inspectors
 2. Demand for industrial Raw materials e.g. rubber, palm oil, palm kernel oil,, Cashew nut oil, cocoa butter, e.t.c
 3. Foreign Exchange earning
 4. Environmental control in terms of creation of microclimate- canopy of trees provide shade, litters increase organic matter in the soil.

SOME PLANTATION CROPS

- Rubber- *Hevea brasillensis*
- Oil palm- *Elaeis gueneensis*
- Tea- *Camellia sinensis*
- Coffee – *Coffea arabica*
- Cocoa- *Theobroma cacao*
- Cashew- *Anarcadium occidentale*
- Citrus- *Citrus spp.*
- Coconut – *Cocos nucifera*
- Ogbono – *Irvingia gabonensis*
- Sugarcane- *Saccharum officinarum*

Plantation establishment

Some Terminologies in Plantation crops Husbandry

- **Pre- nursery** – It is a stage in propagation of tree crops where an environment that ensure uniform germination of seeds before being transferred to the nursery.
- **Nursery** – It is a piece of land dedicated to intensive care of propagules that meet salable size within the shortest time. It is an integral part of a larger plantation industry and it is responsible for required propagules for the plantation establishment.

- Holing – Creation or digging of appropriate size of transplanting holes at predetermined coordinates
- Fire tracing – Creation of a weed free corridor about 6m wide round the plantation as a preventive measure against fire out-break.
- Pruning – It is the systematic removal of excessive or unwanted vegetative part of the crop either to shape, prevent pests and diseases spread or ensure good fruit yield.
- Mulching - Mulching is an important practice of using natural or artificial plant residues or other plant materials on soil surface e.g. grasses, legumes or plant parts such as maize, cereal straw, grass thatch e.t.c.
- Rub out- Act of removing or rubbing off tender sprouts or shoots from rootstock to enhance scion growth.
- Ring-weed- Weeding round the individual plant stand.
- Beating up – replacement of missing or dead seedling stands in the plantation after transplanting
- Blocking- Partitioning or dividing the plantation land into manageable units so as to ease operations and record keeping/decisions.
- Transplanting- It is the act of transferring seedlings that are mature to the field for permanent establishment

Rationale for establishing a nursery:

- Demand for healthy propagules for plantation establishment at short notice
- Specialization i.e. an integral part of plantation that ensures cost effectiveness
- Production of seedlings of right and high quality for successful plantation i.e. true - to – type,
- To supply back up for the plantation

Principles Nursery and Plantation Establishment

- Justification- WHY?
- Budget- HOW MUCH IS NEEDED?
- Acquisition- WHAT ARE THE NEEDED MATERIALS? E.g land, labour, agrochemicals- Herbicides, Pesticides, Fertilizers, Topsoil, Tools e.t.c.
- Layout- HOW? What arrangement/Spacing?
- Nursery/Field preparation- Land clearing, Layout, mapping-out, holing, transplanting e.t.c
- Demand- WHO WANTS WHAT IS PRODUCED?

Factors to consider in Nursery/Plantation establishment

- Closeness to perennial source of good quality water
- Accessibility by good road network
- Visibility –good advertisement i.e. can be easily located
- Location- a nursery must be located on a prime land
- Routine monitoring
- Weed control
- Mulching
- Watering
- Creation of alleys between seedlings to ease movement

CITRUS SPECIES

• Citrus - family Rutaceae which contain about 150 genera and nearly 2000 species of which very few species are of economic importance.

- They are evergreen trees, small statured with thorny stems and branches.
- The fruits are small to large with leathery rind, yellow to orange in colour when ripe.
- The pulp and juice may vary in taste from sweet to acid. Examples:

BOTANICAL NAME	COMMON NAME
<i>Citrus sinensis</i>	Sweet orange
<i>Citrus paradisi</i>	Grapefruit
<i>Citrus limon</i>	Lemon
<i>Citrus reticulata</i>	Tangerine/Cleopatra mandarin(wild citrus)
<i>Citrus aurantifolia</i>	Lime
<i>Citrus aurantium</i>	Sour orange
<i>Citrus grandis</i> (Pomelo)	Shaddock
<i>Citrus sinensis</i> x <i>Citrus reticulata</i>	King orange
<i>Citrus paradisi</i> x <i>Citrus reticulata</i>	Tangelo
<i>Citrus jambhiri</i>	Rough lemon

- **Varieties of *Citrus sinensis***

- Pineapple, Parson brown, Umudike, Washington navel, Valencia, Agege 1.

- **Varieties of *Citrus limon***- Eureka, Lisbon,

- **Varieties of *Citrus paradisi***- Red blush, Duncan

- **Varieties of *Citrus reticulata*** Clementine; Dancy

- Major Producing States in Nigeria Oyo; Ogun Plateau Benue Nassarawa Imo
- Internationally Argentina Algeria Brazil California Chile Europe Florida Spain Portugal Morocco:

Economic Importance/Uses of Citrus

- The main commercial product of citrus is the juice which can then be consumed in various forms e.g. juice and wine, confectioneries (jam, marmalade).
- Other by-products that are of use may include supply of nutrients, vitamins e.g. Vitamin C, Health/Medicine, Essential Rind oils used pharmaceutical industries,
- Fruit pulp as fodder for livestock or fuel for combustion and wood from citrus can serve as source of fire wood.

PROPAGATION OF CITRUS

Can be done by Seed or Vegetatively

- Propagation by seed - collect seeds from plants with high yield /good growth, pests and disease free and of good quality
- Select seeds on the basis of size fullness and conformation
- Select from ripe and well filled fruits
- Sow immediately either at stake or in the nursery for transplanting or store for a short duration in a closed jar in a cool place
- Vegetative propagation most common is T- budding: Root stocks which is plant used for underlying or supporting scion and are not usually consumable but are vigorous drought and disease tolerant:
 - Get bud wood on the day of budding early in the morning from branches 8 to 10 months for budding: OR keep in moist cotton wool wrapped in moist cloth for transportation
 - Budding of bud wood to the rootstock is done at a height of 20 to 25cm from ground level on prepared rootstock keep in the nursery for at least 8months before transplanting to the field

Field establishment

- Site selection - loamy soil well drained, pH 5 to 6
- Land preparation - total clearing, plough and harrow or double plough
- Block - Line and map out at recommended spacing 10m x 10m for shaddock, 7m x 7m for sweet orange, 6m x 6m or 5m x 5m for lime
- Hole and transplant
- Employ Weed control measures
- Apply fertilizer

- Pests and Disease control
- Special treatment pruning
- Harvest when fruits mature and ripen. There two seasons -April/May fruits are acidic and November this is the best harvest, fruits are sweet.

Oil Palm

- Palms belong to Family Palmae with about 225genera 2600species. Oil palm belongs to the sub-family Cocoideae and it is the most important of the subfamily.
- Botanical name: *Elaeis guineensis* common oil palm
- *Coroza oleifera* swampy palm
- Description Monocotyledonous, monoecious plant grows up to 9m or more with stout stem with persistent leaf bases, stem may be 30 to 38 cm in diameter
- Produces fibrous root system within 25 to 50cm depth of soil
- Fronds about 20m long and 25 to 30 in number and each frond bears between 20 to 150 pair of leaflets
- Economic life span 25 to 30 years and life expectancy 60 years

VARIETIES OF OIL PALM

- The Dura type has thin esocarp thick endocarp and large kernel denoted DD genotypically
- The Pisifera type has thick mesocarp with thin endocarp and reasonable sized kernel denoted Dd genotypically
- The Tenera type has thick mesocarp with little oil content no endocarp and small kernel denoted dd genotypically It is a dual type recommended for commercial oil production

USES OF OIL PALM

- Source of fresh palm wine and alcohol production
- Domestic oil
- Industrial oil or Palm kernel oil
- Palm kernel Cake
- Local brisquettes oguso Broom Basket Roof thatch log for construction shell for smithing etc

PROPAGATION / ESTABLISHMENT

This could be by

- Tissue culture which is the most important modern method
- Seeds germination in the pre nursery and then transferred to nursery 10 to12 months

- **Establishment and post planting operations**

- Site selection - loamy soil well drained neutral pH preferred but can tolerate a wide range of pH.
 - Land preparation total clearing plough and harrow or double plough
 - Employ Weed control measures
 - Apply fertilizer
 - Control Pests e.g Mites, Red spiders, Grasshoppers, Locusts, Termites, Rodents etc
 - Control Diseases e.g Brown germ disease, Anthracnose, *Glomerella ingulata*
 - Special treatment e.g rehabilitation of the plantation
 - Harvest when fruits mature and ripen using:
 - (i) Chisel method (ii) Pole on Knife method (iii) Climbing rope method
 - Processing – Sterilize, strip, mill, separate, press, clarify to get (1)Hard oil (2)Soft oil (3)Special oil and by product as Palm kernel oil
 - Marketing- Store or decant and sell.
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- Block, Line and map out at recommended spacing 8.75m x 8.75m x 8.75m 9m x 9m x 9m triangular
 - Hole and transplant seedlings with ball of earth
 - Provide protection for young seedlings in form of colar netting about 15cm away from plant