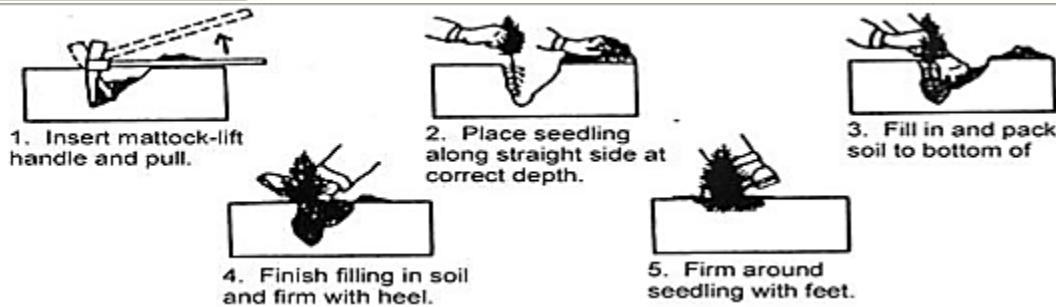


Penang Sangam High School
P.O. Box 44, Rakiraki
Year 12 Agriculture Lesson Notes Week 16

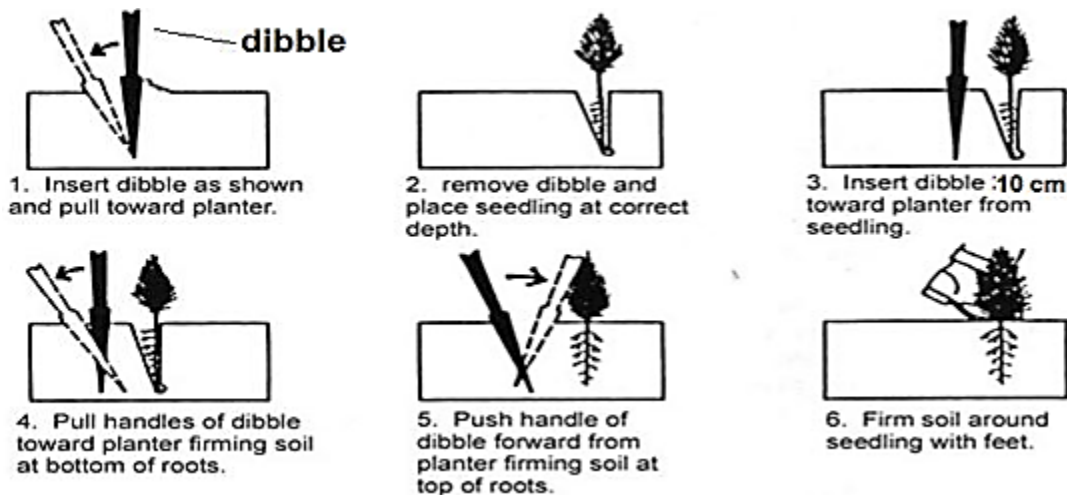
Strand	AS 12.3 Agronomy
Sub-Strand	AS 12.3.2.4: Ornamental Horticulture
Content Learning Outcome	Research and elaborate on the production of tree crops.

2. Mattock or hoe planting - suitable for planting many saplings in clay based soils.

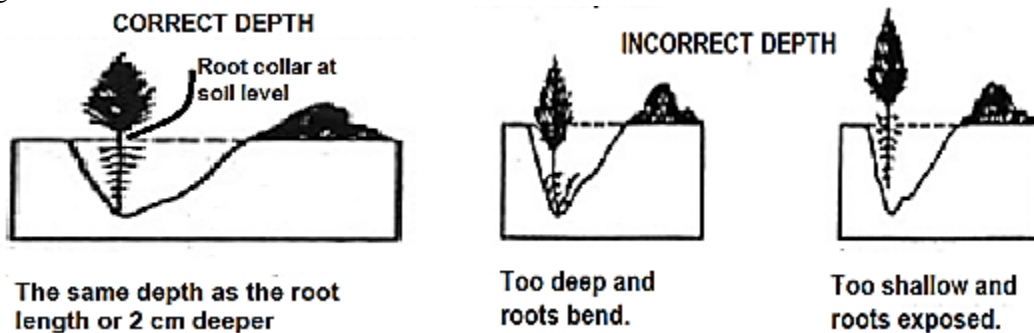


3. Dibble planting- suitable for planting many saplings in sand based soils.

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When transplanting a tree seedlings or sapling, care must be taken with its placement in the planting drill.



Lesson 3: Tree Care

Lesson Outcome: Discuss the care of a tree crop.

1. Weather phenomena

- ✓ grow trees and shrubs that are resistant to local weather
- ✓ locate stands of trees or shrubs in sheltered areas
- ✓ choose trees which are salt spray tolerant

2018 – State one way in which farmers can ensure that tree crops are not affected by salt spray.

2. Fire

- ✓ minimize risk of fire through public education
- ✓ ensure there is insufficient combustible material

2019 – One precaution which farmers take to stop fires from spreading in a plantation forest

3. Insects and fungi

-plant tree and shrub species or varieties known to be resistant to the pests

(i) Silvicultural measures - well timed, careful thinning after establishment of the forest plantation

2018 - Explain one silvicultural method used to control pest attacks on established trees

(ii) Insecticides and fungicides – are used for controlling insects and fungus. Mechanical control, either by removing and destroying pests or eliminating alternative hosts

4. **Wild animals** - animals such as pig, goats, horses and rats cause damage. It can be controlled using fences, bait, etc.

2018 – One way in which goats damage trees?

5. **Domestic animals** - domestic animals such as goats, sheep may browse on young plants. Hedges and fences can be used to control domestic animals.

Cultural control - promotes the growth and yield of trees and shrubs by providing a favourable environment.

(i) **Weed control** - eliminates or suppresses undesirable vegetation. Weed control methods either suppress or eliminate the competing vegetation.

Weed suppression - physically beating down, crushing, or cutting the weeds back at or above ground level. Animals can graze on the weeds too.

Weed elimination – killing weeds, destroying whole plant either by cultivation or by use of chemicals. Weed elimination may be total or partial.

6. **Thinning** - to obtain desired spacing and to reduce competition.

2018 – Why farmers practice thinning of healthy saplings in a plantation forest?

7. **Irrigation** - before each watering, area around tree should be cleared of weeds, and a shallow basin should be made around stem of each sapling to collect as much water as possible.

AS 12.3.2.4: Trees Crops in Fiji

Content Learning Outcome: Discuss the harvesting, post-harvest treatment and uses of products and by-products of fruit trees.

Lesson 1: Harvest and Post-Harvest Treatment of Tree Fruits

Lesson Outcome: At the end of this lesson, the student will discuss:

- (i) signs that fruit is ready for harvesting from trees
- (ii) harvesting methods used
- (iii) post-harvest treatment of fruits

* Insects lay eggs and their larvae damage the fruit

* Bats, birds, rodents and insects detect fruits and eat them

Fruit trees in Fiji fall into two categories; trees which bear fruit:

- (i) all year round - like the jackfruit tree and coconut palm
- (ii) in season - like the breadfruit and mango trees

To minimise loss, farmers pick the fruit when signs of maturity appear.

2017 – Why farmers harvest fruits as soon as they are mature?

Signs that indicate fruits are ready for harvest

- (i) change in colour - from green to yellow, orange or red eg. pawpaw, citrus and betel nut
- (ii) appearance of small drops of latex on the surface eg. breadfruit
- (iii) fruit fall off the tree - coconuts and Tahitian chestnut
- (iv) smell of ripe fruit - jackfruit
- (v) bats visiting trees at night - most sweet fruit
- (vi) appearance of swarms of fruit flies - mangoes and sour sop

The picker may harvest fruits by:

- ✓ Hand
- ✓ Twister fruit picker
- ✓ Telescoping pole pruner
- ✓ Fruit-picker basket

2017 & 2019 – How farmers can minimize bruising of fruits like pawpaw during harvesting?

Lesson 2: Use of the Products and By-Products of Fruit Trees

Lesson Outcome: At the end of this lesson, the student will discuss the use of the products and by-products and fruit preservation methods.

The products and by-products of trees are used for various purposes. Since there are so many tree species, the breadfruit tree will be used as an example.

- (1) fruit - eaten either raw, fermented or cooked and is rich in energy, Vitamin C and fibres
- (2) seeds - eaten raw, fermented or cooked and are rich in protein and Vitamin B
- (3) leaves - young leaves are a source of Vitamin C, iron, and calcium. Mature leaves are used as platters for food, wrapping food for cooking and as fans.
- (4) dried male flowers - are lit to repel insects like mosquitoes.
- (5) sticky white latex – for glue, caulk and even chewing gum.
- (6) latex droplets from the surface of fruit - are harvested by honey bees.

Caulk - waterproof filler and sealant, used in building work and repairs.

Latex - milky fluid that exudes when plant is cut and coagulates on exposure to air.

(7) inner bark (bast) - made into bark cloth [tapa] and cordage [cords and rope].

(8) leaves, bark, latex, sap and roots - used for traditional cures and medicine.

(9) wood - trunk resists termites and marine worms so is used to construct houses and canoes, surfboards, eating utensils and carvings.

Lesson 3: Preservation

Lesson Outcome: At the end of this lesson, the student will discuss the preservation of breadfruit

The following are methods used for the preservation of breadfruit:

1. Short term storage

- ✓ keep in a cool and dark place until needed
- ✓ if stored overnight, submerge the whole breadfruit in water

2019 – One traditional method used by Pacific Islanders to preserve breadfruit.

2. Long term storage - breadfruit is preserved by drying, burying, or freezing.

(a) Drying can done by the sun or in a very slow oven (50°C).

Pre-drying

(i) wash mature breadfruit and cut into pieces.

(ii) peel and core it.

Drying

(iii) Slice very thinly, place on racks, and put in the sun to dry. When well dried, wrap in plastic bags or leaves so as to keep out moisture.

(iv) Cook breadfruit first and then mash it into a paste. Dry paste in the sun and store in airtight containers

(b) Breadfruit flour - made from dried breadfruit, by pounding or by grinding.

- ✓ sift and repeat the process until all the flour is sifted
- ✓ store the flour in airtight jar
- ✓ can be used instead of wheat flour in many recipes

(c) Freezing - boiled, baked, or roasted breadfruit can be frozen.

- ✓ cut the fruit into thin slices
- ✓ wrap in grease-proof paper
- ✓ package in plastic bags

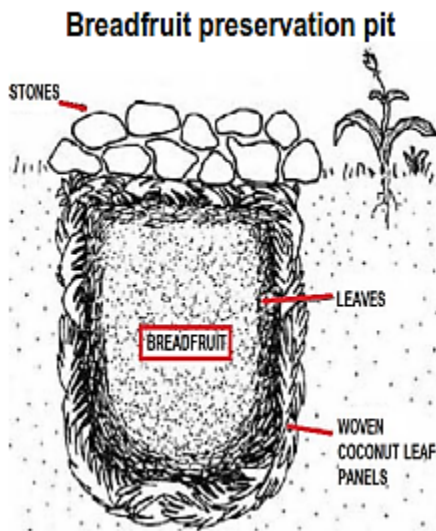
It is more convenient for use if frozen in small amounts. Reheat over steam or use in stews or soups. Once thawed, it can be fried.

(d) Burying - used in some parts of the Pacific.

- ✓ fruits are peeled, cored, and cut into small pieces
- ✓ pit is lined with banana leaves or breadfruit leaves
- ✓ breadfruit is put inside and covered with leaves, old bags, earth and a layer of stones
- ✓ after two months, breadfruit is fermented and ready to eat

When breadfruit is dug, it is put into bags and rinsed with water until sour-smelling liquid is removed.

Then it is mixed with coconut cream and baked. Mashed bananas may also be added to the mixture before baking.



AS 12.3.2.4: Tree Crops In Fiji

Content Learning Outcome: Discuss the harvesting, post-harvest treatment and uses of products and by-products of wood producing trees.

Lesson 1: Harvest and Post-Harvest Treatment of Timber Trees

Lesson Outcome: At the end of this lesson, the student will discuss:

- 1. logging**
- 2. post-harvest treatment of wood**

Foresters choose trees to be harvested based on the age of the tree, the diameter of the trunk and the use that the tree will be put to.

Logging - the cutting, skidding, on-site processing and loading of logs onto trucks for transport to further processing.

Slash - coarse and fine woody debris generated during logging operations.

Timber - trees that are grown in order to produce wood.

Lumber - timber sawed or split into planks, boards, etc.

The production of sawn timber or lumber is discussed below:





Step 1: Logging

- (i) Felling - trees are cut.
- (ii) Cleaning logs of branches and leaves
 - a) Limbing - larger branches are removed
 - b) Snedding - small shoots and side limbs are cut off

2018

2017 - Differentiate

- c) Topping - top of the tree is cut off
- d) Bucking - bottom of the log is cut off

Limbing	Snedding	Topping	Bucking
			

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2018 – Use of slash

Slash is spread on ground to facilitate movement of logging machines and vehicles

It is then collected into heaps to minimize burning hazards

It can also be used to produce wood chips or burnt as firewood

(iii) Skidding - moving logs from where they are felled to the landing where they will be loaded for transport.

(iv) Loading - logs are loaded onto trucks using lifting equipment.

(v) Transporting - logs are transported to sawmill for production of sawn timber wood chips, plywood or particle board.

Slash	Skidding	Loading	Transporting
			

Step 2: Sawn timber

(i) Log sorting - according to species, diameter, length and end-use.

(ii) Debarking - bark is removed to reduce wear on blades and to allow evaluation of logs.

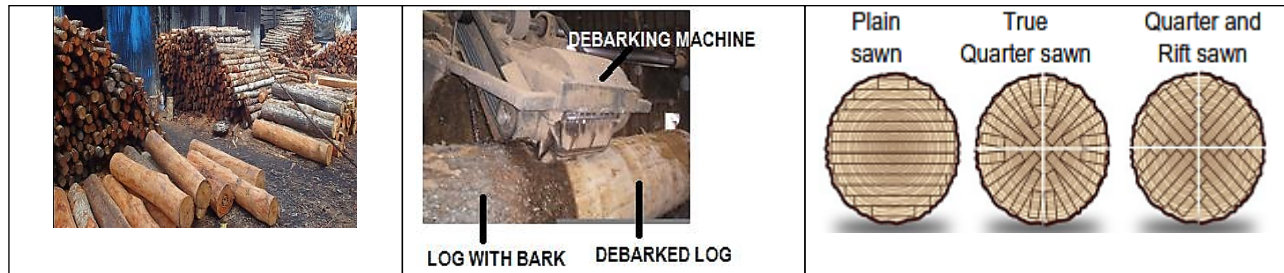
2019 – Why bark is removed before a log is washed and sawn into timber?

(iii) Washing – logs are washed to remove dirt and debris

(iv) Log sawing or breakdown

- ✓ plain sawn
- ✓ true quarter sawn
- ✓ quarter and rift sawn

Log sorting	Debarking	Sawing patterns
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(v) Lumber sorting - according to thickness, width, length, quality, grade and species

(vi) Grading - according to overall quality, direction of grain, presence of knots and defects

2017 - Why lumber is seasoned?

(vii) Seasoning - lumber is dried to moisture content of between 25 and 30% to reduce shrinkage and warping, improve strength and color, reduce weight and deter pests.
- to remove moisture/water vapor

There are two types of drying used:

(a) Natural seasoning - called air drying

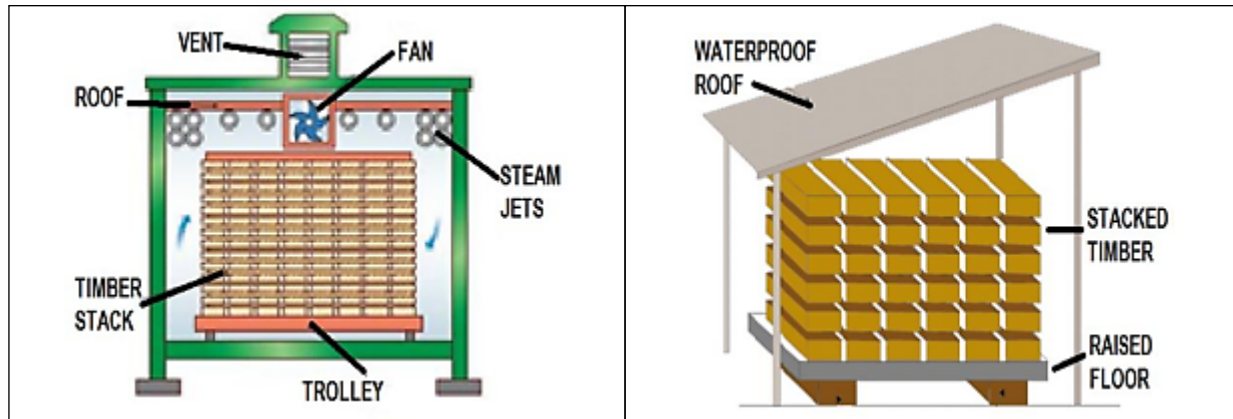
- ✓ storing lumber in a clean, dry, warm and shady area by stacking it on raised foundations and separating each level
- ✓ this allows air to blow through the lumber gradually, the wood's moisture content will become level with that of the surrounding area.

(b) Kiln seasoning - called kiln drying

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-lumber is passed through a specialized oven created within a thermally insulated chamber that extracts the water vapor from the wood.

Kiln Seasoning	Natural Seasoning
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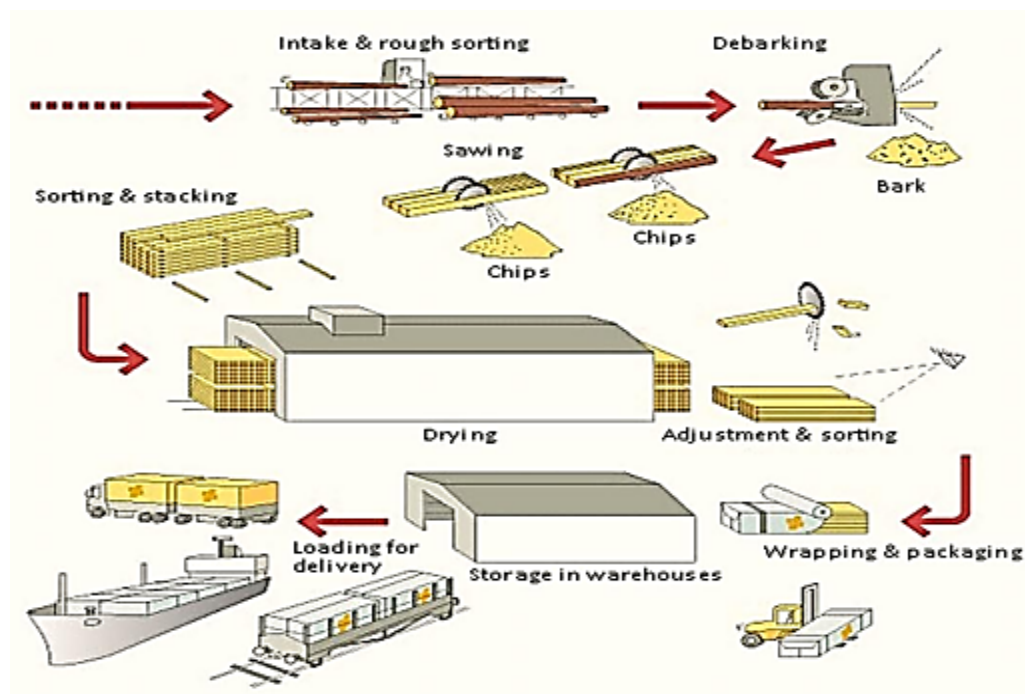
(viii) Preservative treatment

-lumber is impregnated with chemicals to reduce attack from insects, fungi and marine borers

(ix) Regrading and surfacing

2018 – Defects which may occur in lumber during drying process

-inspect lumber for any defects from drying process, such as split-ends and loose knots. These may be removed by trimming and planing and so upgrading the value of lumber.



Activity Questions

1. Discuss the advantages and disadvantages of preserving fruit.

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2. Research a totem tree of the locality and discuss its many uses.

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3. Differentiate between an endemic and an exotic tree.

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'Sandalwood, *Santalum yasi*, which was found on Bua and Lekutu coasts in 1802, brought trading ships from America, Australia and India to the 'Sandalwood Island", the name given to Vanua Levu by traders.

Trees have played a significant part in the life of Fijians, supplying wood and materials for:

- ✓ traditional dwellings
- ✓ domestic items
- ✓ tools
- ✓ large canoes which were the only means of communication and travel between the islands

The lumber was fashioned with adzes, hardwood hammers and spitting wedges.

Shells were used as scrapers, shark and ray skins as well as coral as rasps and pumice for final sanding.'

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