

## Nursery management: A case study of coconut

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### 1. Introduction

Coconut (*Cocos nucifera* L.) palm, venerated as tree of life, bestows multiple benefits to human kind by providing food, medicine, health drink, shelter, fuel, timber, fiber and as array of industrial products. As a crop of small and marginal farmers in India, the income derived from small holding is not sufficient enough to sustain the livelihood of the even the small farm families. It has been demonstrated that a fourfold increase in yield can be achieved by adopting scientific technologies in enhancing the productivity of coconut through adoption of scientific cultivation technologies, which are described hence under.

#### i) Climate and Soil

The Coconut palm is a humid tropical crop, with its distribution confined almost entirely to the tropical zone. It is found to grow under varying climatic and soil conditions. It is essentially a tropical plant, growing mostly between 20°S latitudes. The ideal temperature for coconut growth and yields is 27 + 5 °C and humidity above 60 per cent. The coconut palm grows well upto an elevation of 600 m above MSL. However, near the equator, productive coconut plantations can be established upto an elevations of about 1000 m above MSL. The palms tolerate wide range in intensity and distribution of rainfall. However a well distributed rainfall of about 200 cm per year is the best for proper growth and higher yield. In area of inadequate rainfall with uneven distribution, irrigation is required<sup>[1-2]</sup>.

#### ii) Cultivars and hybrids

Basically coconut cultivars are classified into two group viz. Tall and dwarf. A large no. of varieties has been developed for growing in different. Agroclimatic regions of the country under All India Co-ordinated Research Project Network monitored by Central Plantain Crops Research Institute Kasragod, Kerala, India.

#### Importance of Seed nut selections

Coconut palm is a perennial crops with a life –span of over 70 years. It takes about 6 to 10 years to flower and another 5 years for yield stabilization.

If the quality of the seedling used for planting is poor, the quality of the plantation will also be poor, producing low yield and less returns. This fact can be, however, realized only after long years when the palms start bearing.

- Always use good seedling for planting.
- To produce quality planting material, use good seed nuts for sowing.

#### Location

Locations for collection of seed nuts is important. Agro-Ecological Regions/Agro-Ecological Sub-Regions of the

country delineated by NBSS & LUP and state level agro-climatic zones identified by ICAR and Agricultural Universities (NARP) for each state are followed for ecotype identification. Coconut cultivars or 'eotypes' identified in the respective regions will be propagated in the same agro-ecological sub region from where the seeds are collected.

Disease free resistant varieties are identified from seriously affected areas or disease free areas. Serological tests may be done if necessary.

#### Characteristics of a good 2-F (1<sup>st</sup> F-Food and 2<sup>nd</sup> F-Fibre) coconut mother palm

A healthy coconut palm potent enough to produce nuts of desirable size, shape, high germinability and number pertaining to a particular norms (in India the existing norms is 80-100 nuts/palm/year) is named as a mother palm.

For the purpose of NAIP, to develop bio-industrials applications, a good mother palm may have coconut fruit with husk weighing more than 500 g and nut weighing more than 500 g together with norms for selection already being followed. Selections of mother palm for hybridizations programme in coconut may take into account this criteria of coconut fruit having husk weighing more than 500g.

- Must have regular bearing habit.
- Generally, must be 20 years of age or more but not senile. However it has been reported that seed nuts collected lesser aged palm have produced high quality seedlings with high potentiality for yield. A regular and yielding coconuts palms can be decided precisely by observing its performance at 7-8 years of growth. The steady bearing stage of a good palm of tall the very beginning of its flowering.
- Yields 80 or more nuts per annum.
- 30 or more fully opened leaved in the crown.
- Has strong petioles and wide leaf base.
- Has leaves firmly attached to the stem.
- Bears nuts of medium size and oblong shape.
- Bears at least 12 bunches of nuts in a year.
- Has strong bunch stalks.
- Dehusked nuts should weight not less than 500 g per nut.
- Has nuts producing 150g or more copra per nut.

#### Do not collect seeds nuts from palms

- With long, thin and pendulous inflorescence stalk.
- Which produce long narrow, small sized on barren nuts.
- Which shed immature nuts in large numbers.
- Which grow under highly favourable conditions.
- Which are alternate bears.

#### Characteristics of good seed nut suitable for Nut and Fibre (2-F seedling)

- Coconut (fruit) must be suitable for NUT and HUSK. Selection is by reconnaissance survey among coconuts

farmer, Nut dealers and husk dealers followed by visual observation of the fruit supported by weight of husk, nut etc.

- Coconut must be of medium size and oblong shape.
- Nut should weight more than 500 g.
- The copra content should be 150 g or more
- Nut without water inside should be avoided (A nut containing water produces sound of water while shaking it.)
- Nut with rotten kernel dose not make a good seed nut.
- Husk should weight more than 500 g.
- Seed nut should be stored in such a way that Coconut water (liquid endosperms) remains intact.

### Collection and storage of seed nuts

#### a) Collection of seed nuts

- Collect mature nuts (11 to 12 month-old) form the selected mother palms.
- Selected nuts which are well developed
- Take good care while harvesting the seednuts
- Secure the bunch with rope and lower it down carefully.

#### b) When the collect seednuts

- Collect the seednut between December and May

#### c) How to store Seed nuts

Store the seed nuts in shade for minimum period of 30 days before sowing in the nursery

- If the soil is sandy and the ground is sufficiently shaded, nut can be stored in small lots.
- Heap the seednuts harvested in May in partial shade till the husk is well dried before sowing.
- Store the seednut with the stalk-end up over an 8-cm layer of sand in a shed pit. Cover with sand to prevent drying of nut water. Up to 5 layers of nuts can be arranged one over the other)

### Nursery

#### a) Selection and preparation of site for nursery

- Nursery sites should be well drained with light textured soil and with adequate but not too much shade.
- Water requirement may be ensured.
- In open areas, provide shade during summer.
- Prepare beds of 1.5 m width and of convenient (4-5m) length with 75cm space between beds.
- In areas where drainage is poor, prepare raised beds.
- Before planting, examine seed nuts and discards those without nut water and with rotten kernels.
- To prevent termite attack, the beds are treated with chlordane, Aldrin or Lindane 10 % dust. Sandy soils do not require this treatment.

#### b) Time of sowing

Sow the nuts in the nursery with commencement of south-west monsoon during May-June.

#### c) Spacing of Nuts

Plant the seed nut at a spacing of 30cm (between rows) x 30cm (between nuts) with four or five rows per bed.

#### d) Method of planning seed nuts

- Plant the seed nuts in the beds in tranches 25-30 cm deep and cover with soil so that top protion of husk alone is visible.
- Vertical planting is preferable on account of lesser risk of seedling injury during removal form nursery and convenience in transporting.

#### e) Care and management of nursery

- Give adequate shade to the nursery during summer months.
- If the soil is sandy, provide mulching immediately after monsson.
- Irrigate the nursery in 1-3 days interval depending upon the agro-climatic situation.
- Keep the nursery beds free of weeds by periodic weeding.
- If termite attack is noticed, removed soil in the affected area up to a depth of about 15 cm and dust soil and nuts with Carbaryl or chlorophyrifos. Repeat if attack persist.
- Periodically spray the plants with 1% Bordeaux mixture or any other copper fungicide to prevent fungal infection.

### Field planting

#### a) Selection of seedlings

Under favourable environmental or geographical conditions, seed nuts of tall varieties commence to germinate 11-12 weeks after planting. The percentage of germination reaches the maximum between 17<sup>th</sup> and 18<sup>th</sup> week and then commences to decline. [Remove seed nuts, which do not germinate within 6 months after sowing as well as those with dead sprouts. Right age of seedling for transplantation to the main field is 9-10 months. A good quality seedling will have the following characteristics.

1. Early germination, rapid growth and seedling vigour.
2. Six to eight leaves for 10-12 months old seedling and at least four leaves for 9 months old seedlings.
3. Collar girth of 10-12 cm
4. Early splitting of leaves.

The Recovery of quality seedlings will be about 60-65%. Since early germination is one of the criteria for the selection of seedlings, the storing and sowing of seeds nuts should be in lots rather than in a staggered manner.

#### b) Removal of seedlings

Remove seedlings from the nursery by lifting with spade and cutting the roots. Keep the seedlings in shade and do not expose the sun. Plant seedling as early as possible after removal form nursery. Never lift the seedling form the soli by pulling the leaves or stem.

#### c) Land Preparation

Land preparation before planting depends upon topography of land, soil type and other environmental as well as geographical factors. Clayey soils are likely to experience impeded drainage which would cause damage to seedling due to water logging. On slopes and in areas of undulating terrain prepare the land by contour terracing or bunding. In low-lying areas and rice fields, prepare mounds to a height of at least 1

m above water level. In reclaimed areas, planting can be done on the field bunds.

#### **d) Time of planting.**

Plant the seedling during May with the onset of pre-monsoon showers. Under assured irrigation, planting can be done during April also. In low-laying areas, plant the seedlings in September after the cessation of heavy rains.

#### **e) Planting**

The size of pits for planting depends on soil type and water table. In sandy soils, the size of pits may be 0.75 x 0.75 x 0.75 m. In loamy soil type, pit size of 1 x 1 x 1 m is recommended. In laterite soils with underlying rock, take larger pits of size 1.2 x 1.2 x 1.2 m. The pits may be filled up with topsoil and manure to a height to 50-60 cm below the ground level. In lateritic areas, common salt at the rate of 2 kg per pit may be applied six months prior to planting on the floor of the pit to improve soil condition. In low lying lands, take shallow pits and as the plant grows, raise the ground level by adding silt and sand so as to cover the entire bole of the palm. The same procedure can be adapted when planting is done on mounds or bunds.

#### **f) Important of spacing**

Spacing depends upon the planting system, soil type etc. In general, square system of planting can be adopted with a spacing of 7.6 to 9.0 m which will accommodate 170 to 120 palm/ hectare. Wider spacing, that is 9.0 m may be used to facilitate intercropping system to increase the income of the farmers through food crops and spices.

#### **g) Care of transplanted seedlings**

For the first two years of planting, irrigate 45 liters of water per seedling, once in 4 days during summer months. Do not allow water to stagnate in the pit. Remove the soil accumulating at the collar region of the seedlings during rains. Provide adequate shade to the transplanted seedlings. Coconut leaves can be used as good shade material. Provide fencing for protecting the seedlings from attack by animals.

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