DSP Farms of Coconut Development Board : cynosure for coconut development in India

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Coconut Development Board is implementing various schemes in the country for the integrated development of coconut industry. Production and distribution of quality planting material is one of the thrust areas of Board's activities. One of the major constraints experienced in achieving increased production and productivity of coconut in the country is inadequate availability of suitable quality planting materials. In a perennial crop like coconut, the expected productivity cannot be achieved during the yielding stage without using quality planting materials. Such palms will continue to be a permanent loss to the farmer. Hence adequate infrastructure for production and supply of good quality planting material is most essential. With this objective in view, Coconut Development Board has established nine Demonstration Cum Seed Production farms in different states viz. Kerala, Karnataka, Andhra Pradesh, Maharashtra, Chhattisgarh, Bihar, Assam, Orissa and Tamilnadu. The DSP Farms in Maharashtra and Tamil Nadu are in its nascent stages. The basic details of the DSP Farms are detailed in table 1.

Table 1. DSP Farms of CDB

Location /State	Area(Ha)	Year of establishment	No of yielding palms(Nos)
Mandya (Karnataka)	20	1982	3200
Abhayapuri(Assam)	40	1987	3028
Madhepura (Bihar)	40	1987	3006
Kondagaon (Chattisgarh)	40	1988	3427
Neriyamangalam (Kerala)	20	1991	1385
Vegiwada (Andhra Pradesh)	72	1994	3285
Pitapally (Odisha)	40	1999	2914
Palghar (Maharashtra)	40	2013	0
Dhali (Tamilnadu)	40	2014	0
Total	**352**		**20245**

One of the prime objectives of the establishment of DSP Farm is the production and distribution of quality planting material and supplying it to the farmers at concessional rate. Scientifically maintained coconut nurseries are established in the Farm. Hybridization programme was also started in all the farms where mother palms attain the age suitable for artificial crossing. The details of seed nuts sown in DSP Farms from 2012-13 to 2014-15 and the target fixed for the year 2015-16 is detailed in Table-2

Table -2 Seed nuts Sown and Target for 2015-16(in Nos)

DSP Farm	2012-13	2013-14	2014-15	Target 2015-16
Mandya	341383	225227	172657	300000
Kondagaon	204875	170200	67550	200000
Abhayapuri	150396	470987	35450	100000
Madhepura	90922	231310	1250	55000
Vegiwada	257620	28370	98521	300000
Pitapally	405707	104040	200268	200000
Palghar	0	36070	78050	200000
Neriamangalam	279195	145806	228656	325000
Dhali	0	0	25105	250000
Grand total	1730098	1412019	907507	1930000

The DSP farms of the Board contribute to more than 50% of the quality planting material production in government sector in the country. Out of the 35 lakh seedlings produced and distributed annually for government and private sector, 13 lakh seedlings are produced and distributed from the DSP Farms of CDB. The first DSP farm of the Board established in 1982 in Mandya district in Karnataka is one of the best seed gardens in the country. The seedling produced from this farm is of best quality as experienced by farmers. The demand for coconut seedlings from this Farm is on the increase. Hybridization techniques adopted at DSP Farm Mandya is one of the best standardized protocol for hybridization, yielding maximum recovery percentage of good quality hybrid seedlings. The details of the seedlings produced in the farms from 2012-13 to 2014-15 and the target fixed for the current year 2015-16 is detailed in table -3

Table -3 Seedling Production and target for the year 2015-16(in Nos)

DSP Farm	2012-13	2013-14	2014-15	Target 2015-16
Mandya	258092	228199	128747	130000
Kondagaon	92446	120818	100278	100000
Abhayapuri	122979	63519	290316	225000
Madhepura	103580	162204	0	35000
Vegiwada	81607	316360	14714	100000
Pitapally	93028	299566	65025	150000
Palghar	0	5256	21214	100000
Neriamangalam	98597	130928	239294	250000
Dhali	0	0	0	200000
Grand total	850329	1326850	859588	1290000

Table -4. Income Generated and Target for 2015-16(In Rs)

DSP Farm	2012-13	2013-14	2014-15	2015-16
Mandya	14405800	9862000	11362000	12500000
Kondagaon	4049000	2381000	4311000	5000000
Abhayapuri	1520700	3249000	6133000	7000000
Madhepura	573400	2297000	4927000	6000000
Vegiwada	1861700	4780000	9122000	10500000
Pitapally	1535300	101577000	4098000	5000000
Neriamangalam	3454000	6740000	10780000	11500000
Palghar	0	0	470000	2500000
Dhali	0	0	0	8000000
Grand total	27399900	39886000	51203000	68000000

DSP farms are one of the major income generating units of the Board. The farms are generating income from the sale of seedlings, mature coconut, fish, intercrops like cocoa, cashew, guava, sapota etc. The cost of coconut seedling production at farms are being met from the receipts generated by farms. The details of the receipts realized by the farms for the last three years and the target for the year 2015-16 is detailed in table 4.

The farms of the Board also serve as demonstration centers for scientific coconut cultivation in the country. Different systems of planting, variety wise blocks of plantation, performance of different varieties and adaptability to local conditions, intercropping with perennials and annuals to augment income from unit area etc are demonstrated in the DSP Farms. It is not an exaggeration to add that the DSP farms of Coconut Development Board act as learning center for coconut farmers which provide information about all aspects of coconut cultivation. During the current financial year, Board targets

to sow 19.30 lakh seed nuts and is planning to raise 12.90 seedlings from the nuts already sown. Board also targets to generate an income of Rs.6.8 crores from DSP farms during the year 2015-16.

Even though the DSP Farms are catering to the need of coconut farmers

in the country to some extend, DSP Farms have a lead role to play improving the coconut production and productivity of our country. The Demonstration cum Seed production Farms could take up more multi tasking operations like increased production of hybrid seedlings by giving more thrust on hybridization programme, implementing productivity improvement mission at farm level undertake field research programmes to address the problems faced by the farmers in their field and augment dwarf seedling production to establish more dwarf mother palms for enhancing hybrid seedling production. DSP Farms can definetly take a lead role in quality seedling production and demonstration of scientific coconut cultivation to benefit the farmers of our country. A concrete effort from the DSP Farms is the need of the hour.

The Government of India has approved a new scheme for co

centre on coconut during 2014-15. The DSP farm of the Board has initiated action to conduct field research at various centers for standardizing the age of planting material for sale, method of sowing seed nuts in the nursery, weed control using plastic mulches, identifying suitable intercrops in different agro climatic conditions etc. It is hoped that the Farms of the Board would act as field research centre for conducting applied research on coconut in future and develop new technologies for the benefit of the farming community.

DSP Farm Neriamangalam

Jayashree.A,
Farm Manager, DSP Farm,
Neriamangalam

High quality planting materials provide a good head start to sustain coconut palms productive and economic during its life span of 60 or more long years in the field under extremely variable conditions. Selecting the best planting materials before field planting assures higher productivity per unit area and per unit time. Selection of planting materials being a prime factor in coconut cultivation, Coconut Development Board has established nine farms in major coconut belts all over the country for producing quality coconut seedlings of all cultivars and hybrids of different parental combinations suited for different agro climatic conditions.Success of a coconut plantation starts with the

production of good quality planting materials.

The only demonstration cum seed production farm of the Board in Kerala is situated in Neriamangalam which was established during 1991. During the initial years the emphasis was given on development of the farm and demonstration of technologies which later turned to a major source of production and supply of quality coconut seedlings in Kerala. The farm is having 2017 palms of different cultivars of which 1385 are in yielding stage. Cocoa, pepper, nutmeg, cashew, arecanut, turmeric, banana, rambutan and mangosteen are taken up as intercrops along with coconut. Three vermi compost units with a capacity to produce 40MT are maintained for regular production by utilizing farm waste.

Due to the climatic variation and debilitating diseases there was deviation in yield during the last few years. Seedlings were stacked due to low demand since production cost for coconut was high compared to the produce cost and hence

The production of seedlings in DSP Farm, Neriamangalam has raised eight folds during last five years from 16,202 seedlings in 2010-11 to 1,45,688 seedlings in 2014-15. The sale of seedlings has raised twenty folds during last five years, that is from 8,254 seedlings in 2010-11 to 1,69,756 seedlings in 2014-15. The total revenue generated from farm during the current year is Rs. 1.07 crores. Revenue from seedlings has increased sixteen times during last five years from Rs. 4.63 lakhs to Rs. 75.094 lakhs being the all time highest.

Coconut varieties available in the farm

Tall	West Coast Tall, East Coast Tall, Tiptur Tall, Arsikere Tall, Lakshadweep Ordinary, Lakshadweep Micro
Exotic	Philippines Ordinary, Java, Fiji, Jamaica, Benaulin Ordinary, Guam, BSI, Kenya, Spikelets, Cochin China, New Guinea
Dwarf	Malayan Green, Malayan Yellow, Malayan Orange, Choughat Green, Choughat Orange
Hybrids	Chandra Sankara, KalpaSankara, KalpaSamrudhi, MOD X WCT, MGD X WCT

farmers start diverting to other crops. Land scarcity due to piled up seedlings was another issue. By overcoming the various tribulations, now the farm has emerged as one of the major reliable source of quality coconut cultivars as well as hybridized seedlings.Good price for coconut has made the farmers to rethink and turn back to coconut farming resulting in high demand for coconut seedlings. A drastic change among the farmers preferring dwarf and D X T varieties is also found during recent years. Considering the demand for tender nut and neera tapping, more emphasis is being given now for producing dwarf variety seedlings in the farm. For meeting the demand apart from farm, the seed nuts of dwarf variety are presently collected from identified and marked palms from farmers field also.

For hybridization, around 350 consistently yielding palms with good vegetative growth and disease tolerant mother palms are selected in the farm. Following recommended procedures by trained workers of hybridization unit of the farm and stringent criteria in the nursery technique result in production of high yielding D X T seedlings which have high demand all over Kerala as well as in Tamil nadu. Around twenty thousand hybrids of various combinations were produced and sold during 2014-15.

Out of the 1.918 lakh seedlings produced during the year from Neriamangalam farm, 1.43 lakh seedlings were distributed to the members of Coconut Producers Society and Federation from nine districts in Kerala. Under Rejuvenation and Replanting scheme only dwarf varieties are promoted for replanting. It is proposed to produce and distribute three lakh dwarf seedlings during the year 2015-16 from this farm. In order to meet the demand for DXT hybrids the availability of dwarf palms for hybridization has to be enhanced by and large in private sector also since the availability of the same in Government sector is limited. To satisfy the requirement, the farmer collectives should take initiatives for setting up decentralized nurseries adhering recommended quality standards. Training for hybridization and nursery management is also provided from the farm to equip the farmers and farmer collectives to start their own nurseries with financial aid from the Board.

Achievements during last five years

Details	2010-11	2011-12	2012-13	2013-14	2014-15
Production of seedlings (nos)	16,202	16,088	98,597	1,30,926	1,47,825
Sale of seedlings (nos)	8,254	24,630	50,755	99,953	1,91,863
Revenue generated from sale of seedlings (Rs)	4,63,030	11,61,155	23,57,840	56,58,465	94,85,625

Practices undertaken for seedling production

The major steps of agricultural practices for nursery management includes selection of seed gardens, mother palm selection, selection of seed nuts, storage of seed nuts and nursery management.Rearing coconut seedlings in a well-maintained nursery facilitates efficient selection of normal uniform seedlings. The need for collecting seed materials from high yielding coconut palms is highly essential in a perennial crop like coconut.

Mother palm selection is a key factor in planting material production of coconut. The selected gardens should have palms with a high proportion of heavy bearers but it must not be from very favourable conditions like trees growing closer to households, cattle shed, compost pits and other favorable conditions. Garden should be free from the incidence of diseases and not prone to severe attacks of pests. The centres well known for good quality local varieties of seed nuts and seedlings in Kerala are Kuttiadi in Kozhikode and Chavakkad in Thrissur districts.

For production of quality planting materials it is essential to have good quality mother palms of the desired varieties. Since commercially viable vegetative propagation techniques are not available only seed propagation is possible in coconut. Regular bearing palm producing on an average one leaf and an inflorescence in its axil every month is selected as mother palm. Trees producing habitually barren nuts are avoided. Straight stout trunk with even growth and closely spaced leaf scars with spherical or semi spherical crown and more than 30 fully opened leaves and spathe production are considered. The middle aged palms from 25 to 40 years are preferred even though trees with 15 years age are also selected, if it is high yielding and has stabilized yield and free from pest and diseases. High yielding mother palms giving not less than 100 nuts per palm per year under irrigated condition and 70-80 nuts per year under rain fed conditions are chosen for collecting seed nuts.

Palms having long, thin and pendulous inflorescence stalks produce long, narrow, small sized or barren nuts, showing alternate bearing tendency, shedding of immature nuts in large numbers and grown under favourable environmental conditions are avoided. In Kerala in the root wilt disease prevalent tracts, in the midst of heavily diseased palms, high yielding disease free West Coast Tall (WCT), Chowghat green dwarf (CGD) and Chowghat Orange Dwarf (COD) palms are found. Such palms can be selected as mother palms and open pollinated nuts of these palms can be used for large scale planting material production. Seedlings produced from these palms are expected to be high yielding and disease free.

Seed nuts are harvested during the months of December to May in Kerala to get maximum germination and good quality seedlings. Damaged nuts and nuts with irregular shape and size are discarded. The mature nuts are harvested when one nut in the oldest bunch starts drying. In Tall varieties, it takes 11-12 months to become a matured seed nut whereas in dwarfs, nuts will mature in 10-11 months after emergence of the inflorescence. Mature nuts producing a resonant and ringing sound when hit with the harvesting knife or tapped by finger indicates that the husk is dry. The seed nuts should be medium sized, round or oblong in shape. The bunches are harvested by lowering them to the ground using a rope to avoid injury to seed nuts.

To get more quality seedlings, the seed nuts are air cured for one month followed by sand curing. In general seed nuts of tall variety are stored up to two months after harvest and dwarfs are sown within 15 days. For storing, seed nuts are arranged with the stalk-end up over an eight cm layer of sand in a shed and covered with sand to prevent drying of nut water. Up to five layers of nuts can be arranged one over the other. The nuts are stored in heaps in plots under shade and covered by coconut leaves. Nursery area are selected in a well drained plot with friable, sandy loam/loam soils which are best suited for coconut nursery due to the relative ease in removing the seedlings from the nursery.

Due to space constraints the nursery is raised in the interspaces of the coconut plantation in the farm. About 120 m^2 area is required to sow 1000 nuts in flat or raised beds whereas larger area of 200 m^2 would be required to maintain 1000 poly bag coconut seedlings.Sowing of seed nuts with commencement of the rainy season will reduce the frequency of

irrigation required for getting good germination. Generally seed nuts are harvested during February-May and planted in June in the west coast region, whereas sowing is done in October-November in East Coast region. In the farm seed nuts are sown throughout the year under favourable climatic conditions and availability of good irrigation facilities. Nursery beds are prepared of 1- 1.5 m width and of convenient length with 75 cm space in between the beds. In areas where drainage is poor, raised beds of 10-20 cm height are prepared. The seed beds are drenched with Chlorpyriphos @0.05% before sowing of seed nuts, in areas having termite problem. To prevent bud rot in seedlings, the nursery can be drenched with 1% Bordeaux mixture, in bud rot endemic areas.

Before planting, the seed nuts are examined and nuts without nut water and rotten kernels are discarded. Seed nuts are planted in beds, at a spacing of 30 x 30 cm, either horizontally or vertically in deep trenches with 20-25 cm depth. The nuts may be planted either horizontally with the widest of the segments at the top or vertically with stalk-end up. The seedlings raised by following vertical planting suffer more from drought and are less robust than those from flat or horizontal method. The seedlings obtained by this method are less likely to be damaged at transplanting because the attachment between shoot and nut is much better protected by the husk. With horizontal planting rate of germination and subsequent growth of seedlings are found faster compared to vertical planting. Nuts are covered with soil so that top portion of husk alone is visible as it helps to prevent possible infection of the collar region of the emerging seedlings. Five rows of nuts are planted in each bed accommodating 50 nuts per row or based on the width of the seed bed being undulating land condition of the farm.

Sprinkler irrigation is undertaken at farm conditions. Micro jet sprinkler or small hose irrigation systems are also well suited for irrigating coconut nurseries. After sowing, the seed nuts are irrigated thoroughly to saturation levels. The seed beds are irrigated regularly to ensure that the soil is moist. During summer months, the beds are irrigated on alternate days. The seed beds are covered with suitable mulch after the cessation of monsoon rain with coconut leaves or straw. This is done to conserve moisture and to check weed growth. Nursery beds are kept weed free by periodic weeding. Shades are provided to the nursery by raising shade plants like Glyceridia, Sesbania or Leucaena on the sides of beds.

Seedlings are removed from the nursery by lifting with spade and cutting the roots. Lifting the seedlings from the soil by pulling the leaves or stem are not practiced.Seedlings are compactly packed and transported. For very long distance transportation, special care is taken to pack the seedlings in coir pith or other moisture retaining material by covering with coconut leaves. Poly bag seedlings can be transported as such and planted directly in the field after cutting and removing the base of the poly bag to facilitate growth of roots. Seedlings should be planted as early as possible after removal from nursery. The seedlings can be kept for about four weeks under careful storage in shade and irrigated to keep them moist after removal from the nursery.

DSP Farm, Abayapuri

G. Ragothuman,
Technical Officer & In-charge, DSP Farm, Abhayapuri

CDB, DSP Farm, Abhayapuri was established during the financial year 1986-87 for the integrated development of coconut cultivation and industry and for meeting the planting material requirement of coconut farming community in North Eastern Region. The extent of area of the farm is 40 ha. It is situated at Batabari Village of Bongaigaon District about 3.5 km away from Abhayapuri Town, 27 km away from Bongaigaon and 200 km away from Guwahati. The farm has a palm population of 4268 coconut palms of different cultivars and around 2581 palms are in yielding stage.

Quality coconut seedlings of different cultivars are produced from the commercial nursery attached to the farm. The Board has allotted a target of producing three lakh coconut seedlings to this farm during the financial year 2014-15. About 2,90,316 coconut seedlings comprising of 2,88,900 Tall, 1382 dwarf and 34 D x T quality seedlings were produced in the farm during 2014-15 which was an all time record.

Under the commercial nursery programme, the farm has sold about 1,68,668 coconut seedlings which includes 1,63,887 Tall, 4706 dwarf and 75 D x T seedlings respectively to the seven sisters of North Eastern Region such as Assam, Tripura, Manipur, Meghalaya, Mizoram, Nagaland, Arunachal Pradesh and also West Bengal during 2014-15 which was also a record.

The hybridized nuts of D x T (GB x WCT, MOD x TT, MYD x TT, COD x TT and CGD x TT) and T x D (Kamrup x MOD) are produced under the hybridization programme in the farm itself. The total receipt realized from the farm during 2014-15 was 6.61.33 lakh, of which 6.50.63 lakh from the commercial nursery. Presently the farm is having the stock of around 1.60 lakh coconut seedlings which is ready for disposal to meet the demand of the financial year 2015-16.

DSP Farm Kondagaon

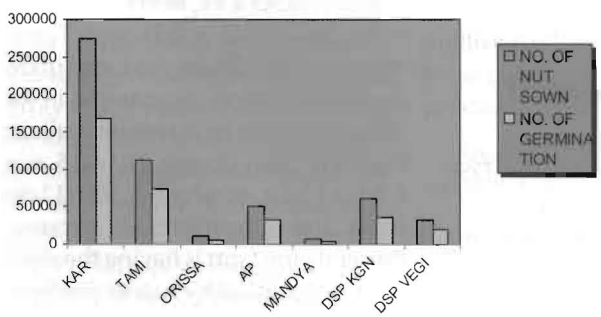
R.S.Sengar,
Assistant Director and
Samiksha Awasthi, Horticulture Assistant
DSP Farm Kondagaon

The Coconut Development Board has established a 100 acre Demonstration -Cum-Seed Production Farm for producing quality planting material for the farmers of Chhattisgarh state. The production of quality planting material determines the ultimate return from arable crops, particularly from plantation crops like coconut. The seedling vigor is highly correlated with adult palm characters such as early flowering, nut yield and copra production. In the absence of a viable technology for vegetative method of propagation, coconut is propagated through seeds. If the seed nuts happen to be of poor quality, the new plantation will prove to be uneconomic causing considerable loss of time and money to the growers.

In Bastar region, the production of coconut quality planting materials need more care and management practice during the establishment of orchard or even for homestead garden. Generally coconut growers have misconceptions in choosing planting materials for their garden. They select the inappropriate planting material and follow wrong position during plantation.

Nursery attached to DSP Farm Kondagaon

Considering the local demand of quality coconut seedlings, the DSP farm Kondagaon has started large scale production of quality planting material to facilitate farmers of Chhattisgarh. The seed nuts harvested from the available mother palm in DSP Farm Kondagaon was insufficient to meet the local demand hence seed nuts were procured from outside source (Andhra Pradesh, Karnataka, Tamilnadu, Orissa) from selected mother palms and seedlings were raised in DSP Farm to meet the local demand.



Nuts sown from different sources and germination

Nursery attached to DSP Farm Kondagon

In non-traditional belt many factors are responsible for producing quality planting material such as selection of seed nut, storing period, time of sowing, sowing method, irrigation system, site selection, weeding etc. In non-traditional belts in states like Chhattisgarh where temperature in summer and winter session makes terrible change in the production of quality planting material. The DSP Farm Kondagaon sows coconut seed nut as and when it is received from different sources. Various studies have shown that nut sown in between June to September makes good result.

From the available data at DSP Farm Kondagaon and based on the experience, it is clear that nut collected from Karnataka, Tamilnadu and from own source and sown in the nursery in between September to November gives higher germination compared to any other months. Hence nut selected from other sources such as Orissa and Andhra Pradesh need to be avoided for non-traditional areas.

Coconut seedling produced at DSP Farm Kondagaon since inception

Year	No. of Seedlings Produced
2000--07	40925
2007-08	9465
2008-09	15023
2009-10	14268
2010-11	13988
2011-12	92446
2012-13	120818
2013-14	100278
Total	**407211**

Selection of site, preparation of bed & sowing of seed nut

The nursery should be located in places where water for irrigation on regular basis round the year is available. The surface sowing of seed nut is also possible depending upon the soil condition, availability of water source, flexibility of temperature etc. The site should be free from disease and insect attack.

Seed bed preparation is to be done with due care. Well-drained, coarse - texture soil in the vicinity of assured water source is desirable. The beds are to be prepared with a height of 10-15 cm from ground level to avoid water stagnation if the nuts are sown in raised bed system.

Usually the beds are made of two meter length and one meter width of convenient interspacing with 60-75 cm space in between two beds forbetter supervision, irrigation, intercultural and drainage purposes. As a precaution against white grub and termite the soil is to be treated with chlorophyriphos with 5% dust@120kg/ha. The seed nuts are sown at a spacing of 40-cmX30 cm in 20-25 cm deep trenches during May-June.

The position of seed nuts during planting is another important consideration. The nuts may be placed horizontally or vertically with stalk end up and in such a manner that the husk appears just above the surface of the soil. The advantage of vertical planting is on account of its convenience in transport. On the other hand, horizontal planting has been critically found advantageous as this type of planting ensures feeding the developing seedling by the endosperm. Moreover, coconut water under this horizontal planting will be in close proximity with the developing embryo thereby providing more favorable conditionfor germination.

During planting the widest of the three segments is to be placed uppermost in horizontal planting to ensure early and higher germination percentage as well as vigorous seedlings with thicker collar girth. The seed nuts should be buried with soil and covered with thick layer of sand to prevent termite attack.

Conservation of soil moisture by using mulching

Proper irrigation system like using sprinkler is a good option for obtaining better germination percentage and good quality seedling. In heavy summer session mulching and shading shall be done in nursery beds especially when the nursery is located in an open and sandy soil for moisture conservation. We can use coconut leaves for mulching.

Selection and certification of seedling

In nontraditional belts, in states like Chhattisgarh the germination of seed nuts generally start after three months of the sowing. The seednut germinated after six months should be discarded. The seedling in nursery having good quality and sound seedling is good for plantation. At the time of uprooting , seedlings should be removed gently without damaging the nut. It's better

Malyalayan yellow & Orange Dwarf DSP Farm Kondagaon

to irrigate the nursery bed before uprooting the seedling. After uprooting the seedling, it should be transported and planted as early as possible in the field.

The next vital step is care and management of nursery. Irrigation, fertilization, weeding and plant protection are the major considerations at this step. Irrigation should be done at regular intervals during dry season to ensure soil moisture as per the requirement of the seedling. Weeds are readily removed from the seedbeds as they competewith the seedlings for nutrients, water as well as space, sunlight etc.

Pest & disease Management

In areas where there is a risk of fungal attack like leaf spot and bud rot diseases, preventive treatments should be given twice in a month. Spraying both sides of the leaves with one per cent Bordeaux mixture or 0.3 per cent Indofil M-45 will be effective. Severely infected leaves must be removed and burnt to avoid dissemination of leaves.

Seedling selection

The essential points to be noted during selection of seedlings are early germination, early splitting of leaves into leaflets, short and thick leaf stalks, healthy and robust appearance, having minimum of six leaves and collar girth of 10 cm at one year age etc. Proper selection of seedlings in the nursery alone ensures 10 per cent improvement in yield. Mere planting of good seedling does not always ensure better production. This is mainly due to ill management with regard to irrigation and fertilization.

The crude reality is that coconut plants in homestead garden are rarely watered or supplied with fertilizers in time. The disease and pest incidence including the malady caused by rats is often neglected and is not properly taken care of. Moreover, lured by advertisements ignorant farmers always prefer high yielding varieties without considering their adaptability in local conditions and disregarding many local varieties with good adaptation are available in same agro climatic condition. For further detail Farmers/ Visitors can contact the Assistant Director, Coconut Development Board, Demonstration-Cum-Seed Production Farm, District-Kondagaon, Phone No. 07786-242443, E-mail cdbkgn1987@gmail.com.

DSP Farm, Mandya

M K Singh,
Farm Manager, DSP Farm, Mandya

Quality planting material is a most important tool to get better production and productivity of coconut due to long gestation period, since the evaluation of new progeny is possible only after a few years. The age old apprehension that coconut has a pre-bearing period of 6-7 years has proved to be a fallacy. Coconut starts bearing much earlier than the above period. Under good management practices, tall coconut yields well within four years, hybrids within 3-5 and dwarf within three years. It is however beyond doubt that selection of seed nuts is more important since it is a crop with a long pre-bearing period. If coconut seed nuts happen to be of poor quality, the new plantation will prove to be irregular in bearing and uneconomic, causing considerable loss of time and money to the grower. Coconut is a highly cross pollinated palm and it does not breed true. This makes the selection of seednuts and seedlings highly difficult. However, it is possible to eliminate poor quality seednuts and seedlings through a series of selections at field level.

In the recent years, DSP Farm, Mandya has emerged as a major reliable centre for quality coconut planting material not only for Karnataka but also for Tamil Nadu , Kerala, Goa, Maharashtra, Andhra Pradesh and Gujarat. The seed nuts of different varieties are supplied to North and North eastern states from this centre.

The Demonstration Cum Seed Production Farm Mandya is situated 110 kms from Bangalore, 55 kms from Mysore and 10 kms from Mandya town. This farm has got a good collection of Tall and Dwarf varitey mother palms with a well established hybridization unit for production of D X T hybrid seed nuts/seedlings. The major cultivars in Tall are West Cost Tall, Tiptur Tall, Tamil Nadu Tall, Benaulim Tall, Lakshadweep Ordinary, Lakshadweep Micro besides a good collection of different Exotic varieties like FMS, Newguniya, Andaman Gaint, Sahraman, Callen guate, Philiphins, Psychellus, Laccadive Micro, Laccadive ordinary small, Ganga

Hybridization Process

Bondam , S.S.G , Fiji and Siam. In Dwarf, Chowghat Orange Dwarf (COD), Malayan Orange Dwarf (MOD), Malayan Yellow Dwarf (MYD), Chowghat Green Dwarf (CGD) are the major varieties planted in this farm. Two combinations of D X T like COD x TT, CGD x TT hybrids are also produced in this farm.

Seed Nuts Sown (2007-08 to 2014-15)

Variety	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Tall	30330	42070	49090	75718	195630	194317	114306	146583
Dwarf	46166	64697	90864	42970	85579	92606	74876	40090
Hybrid	38676	40318	82964	50400	79871	54460	36015	31609
Total	**115172**	**147085**	**222918**	**169088**	**361080**	**341383**	**225227**	**218282**

Seedling Production (2007-08 to 2014-15)

Variety	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Tall	33123	24862	29775	40138	60708	154171	150390	84882
Dwarf	45484	45864	53135	76925	64613	92706	68508	51952
Hybrid	8973	7443	8147	14938	10172	11215	9301	8755
Total	**87580**	**80059**	**91057**	**132001**	**135493**	**258092**	**228199**	**145589**

DSP Farm , Odisha

E Aravazhy,
Deputy Director, CDB, State Centre, Pitapally, Odisha

"He who plants a coconut tree plants, food and drink, vessels and clothing, a home for himself and a heritage for his children"- South Seas saying

Seedling quality is defined as "fitness for purpose".Being a perennial crop, performance of coconut can be judged only after several years, so the quality of coconut seedling is much important. The quality seedlings are essential for the good growth and performance of coconut.

The total requirement of coconut seedlings in the country is around 10 million a year. However, the country produces only around 3.5 million seedlings. There is a huge gap of around 6.5 million seedlings.

For meeting the requirement of quality coconut seedlings, Coconut Development Board is producing quality seedlings in nine Demonstration and Seed Producion(DSP) Farms. Of the nine DSP farms, one of the farm is located in Khurda District of Odisha with 100 acres having 3898 coconut palms of seven tall varieties, six Dwarf varieties, TxD hybrid and DxT hybrid. In addition to demonstrating coconut scientific cultivation technology, DSP farm is also producing good quality coconut seedlings in a scientific manner.

In the DSP farm, quality seed nuts and seedlings are obtained through a series of selections made at various stages as follows

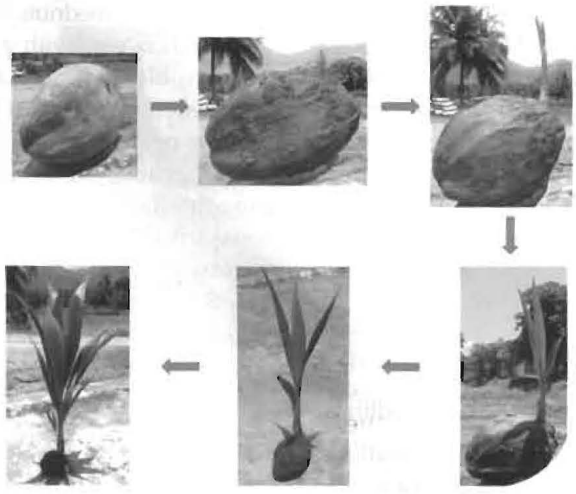
Steps followed in producing good quality coconut seedlings at the farm

I.Selection of good mother palms

In DSP Farm, Odisha, mother palms are selected from the major coconut belt of Odisha, Puri district or from DSP farms of Coconut Development Board. The mother palms of following criteria are selected by proper identification from different farmers field of Puri district and CDB DSP farms. The selected palms are marked as mother palms.

The selection criteria for good mother palms is as follows:

1. Regular bearing habit and yielding not less than 80 nuts / annum.
2. Age 20 years or more (5 years after reaching full bearing capacity).



Stages of seedling growth

3. More than 30 fully opened leaves with short strong petioles and wide leaf base firmly attached to the stem.
4. Bearing at least 12 bunches of nuts with strong bunch stalks.
5. Bearing nuts of medium size and oblong shape.
6. Husked nuts should weigh not less than 600 g.
7. Mean copra content of 150 g per nut or more.

Palms which (i) have long, thin and pendulous inflorescence stalks (ii) producing long, narrow, small sized or barren nuts, showing shedding of immature nuts in large numbers and which are grown under favourable environmental conditions are avoided.

II.Collection and storage of seed nuts

From the selected mother palms, mature nuts of above 11 month old are collected during the period from December to May. Seednuts are collected by lowering of bunches by means of ropes when the palms are tall and ground is hard. After collection of mature nut, nuts which show improper development or other undesirable features are discarded. Then the selected seednuts will be stored in shade for a minimum period of 60 days prior to sowing in nursery by arranging the seed nuts with the stalk-end up over an eight cm layer of sand in a shed and is covered with sand to prevent drying of nut water. Up to five layers of nuts are arranged one over the other. The nuts are also stored in plots, provided the soil is sandy and the ground is sufficiently shaded. The sowing of seednuts in nursery will be done after the husk is well dried.

III.Preparation of coconut nursery and sowing of seednuts

Nursery is maintained in the interspace of coconut garden in the farm. Nursery is prepared by raising seedbeds of 1.25m and 4 m length. The seednuts are sown in the nursery after commencement of southwest monsoon

during May-June. In the prepared seedbeds, seednuts are planted in trenches 25-30 cm deep and covered with soil so that top portion of husk alone is visible. Seednuts are planted at a spacing of 30 cm (between rows) x 30 cm (between nuts) with four or five rows per bed. Seednuts are planted in horizontal method because the rate of germination and subsequent growth is faster compared to vertical planting. Seedbeds are drenched with Chlorpyriphos @ 0.05% before sowing of seednuts. In the case of budrot disease 1% Bordeaux mixture is drenched in seedbeds. After sowing the seednuts mulching is done and irrigation is given at an interval of two days.

IV.Selection of seedlings

Selection of seedlings in the nursery is as important as the selection of mother palms and seednuts. Being a perennial tree, selection of good seedlings is an important criterion for obtaining high yield. Proper selection of seedlings in the nursery alone ensures 10 per cent improvement in yield. The sown seed nuts start germination within six to eight weeks and germination continues up to six months. Seed nuts, which do not germinate within six months after sowing as well as those with dead sprouts are removed and only good quality seedlings (9-12 months old) having the following characteristics are selected by the selection committee.

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

The recovery of quality seedlings in the farm is about 50-65%. The one month old seedlings are lifted with spade and and after lifting roots will be removed. Lifted seedlings will be kept in shade and is not exposed to sun. Seedlings are planted as early as possible after removing from nursery.

Selection committee will certify the seedling produced and the certified seedlings will be sold to the farmers at govt. approved rate.

Certified seedlings produced in DSP Farm, Odisha

More than five lakhs quality coconut seedlings were sold to farmers in Odisha during this period.

Year	No. of Nuts sown	No. of certified seedling	Germination percentage	No. of quality seedling sold to farmers	Varieties	Source of seednuts
2008-09	22190	8894	49.72	Tall- 797 Dwarf- 4807 Hybrid – 3290 Total - 8894	COD, MYD, MOD, MGD, CGD, GB, WCT, Exoties and Hybrid	CPCRI,Kidu, DSP farm, Mandya, DSP farm, Assam
2009-10	35580	14235	45.54	Tall – 282 Dwarf – 13953 Total - 14235	COD, GB, CGD, MYD, MOD, MGD & TT	DSP farm, Mandya, CPCRI, Kidu, MunderyGovt farm, Kerala
2010-11	32448	17083	61.63	Tall 4346 Dwarf – 11885 Hybrid – 852 Total - 17083	COD, MYD, MOD, CGD, GB, AG, WCT, TT, HYBRID, EXOTICS	DSP farm, Mandya
2011-12	370235	209174	56.49	Tall – 188067 Total - 188067	SKL Tall, TT	Farmers Garden, Puri District, Odisha and Karnataka
2012-13	405707	237681	58.58	Tall – 234172 Dwarf – 3509 Hybrid- 237681	ECT, WCT, TT, SKL TALL, MYD, COD, CGD, GB	DSP Farm, Vegiwada, Farmers garden Odisha and Andhra Pradesh
2013-14	104040	68765	66.09	Tall – 65025 Total - 65025	SKL Tall	Farmers Garden of Puri District, Odisha
Total	**970200**	**555832**		**530985**		

Quality is more important than quantity. It is better to produce a few good coconut palms, than many poor ones. It is not worth a farmer's effort to transport plants to the field, prepare an area, plant and maintain trees unless they are of good quality. A poor quality seedling will always be a poor quality coconut palm even if planted on a well-prepared, good site. In the field, each poor quality coconut palms wastes space and resources leading to low site productivity. High quality coconut palms have a higher survival rate and faster growth in the field than poor quality palms. Hence using quality coconut seedling is important in increasing the production and productivity of coconut.

DSP Farm Vegiwada

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The Coconut Development Board established a Demonstration cum seed production Farm in an area of 71.80 ha at Vegiwada village of Pedavegi Mandal in West Godavari district of Andhra Pradesh. The main objective of this farm is to produce quality planting materials. Farm also disseminates information through demonstration on the latest technology of coconut cultivation and processing for the benefit of coconut community.

In DSP Farm Vegiwada about 25 ha land is cultivated with coconut and other intercrops. There are seven bore wells for irrigation in the field. The farm is having 2359 tall variety palms of which 2048 are yielding. There are 1632 dwarf palms of which 1237 palms are in the yielding stage. Amla, Black Pepper, Cocoa, Drumsticks, Sitaphal, Cashew and Guava are the intercrops grown in the farm.

Variety	Present Plant Population	Yielding palms	Nuts Harvested 14-15
ECT	255	254	26950
ECT	148	148	14214
G.B	139	138	11791
G.B	340	235	15165
COD	290	240	30652
GB	75	29	4334
CGD	140	93	10513
MYD	353	296	18585
CGD	118	84	8488
WCT	646	642	75959
T.T	379	368	34657
WCT	212	186	18027
B.Tall	233	181	17869
ECT	118	95	12265
ECT	93	62	6864
A.O./ Exotic	263	214	6945
MYD	21	20	1775
Hybridized nuts			1921

The coconut seedlings are not only sold to the farmers of Andhra Pradesh, but also to the farmers of Odisha, West Bengal, Tamil Nadu, Maharashra and other states of India directly or through State government. During the year 2014-15, total of 3,16,974 coconuts were harvested from 3285 yielding palms from the DSP Farm Vegiwada. After keeping the required seednuts the rest were sold by tender cum auction.

In spite of the presence of Horticulture Research Station Ambajipeta in East Godavari, AP and Aswarao Peta in Khammam district, Telangana, the main source of coconut planting material in this area is the DSP Farm Vegiwada. Coconut Development Board pays special attention for the selection of mother palms and selection of seednuts for sowing in the farm. Only fully matured medium size coconuts having water inside are selected for seednut purpose to ensure good germination percentage. The farm also maintains a coconut nursery in the interspaces of coconut palms. This is another source of income to the farm.

During 2014-15 total of 3,16,974 coconuts were harvested which includes 2,13,750 nuts from the tall palms,1,01,303 nuts from the dwarf and 1,921 nuts from the DxT variety. 1,75,406 coconut seedlings were distributed to the farmers & under AEP in 517.57 ha area of East Godavari and West Godavari districts. 35 .50 tones compost was also produced by five organic manure units.

The farm is planning to emphasis on the production and distribution of dwarf coconut plants both. Emphasis will be given on hybridization works like emasculation, pollination, bagging etc during the year 2015-16.The farm is targeting to produce 2.5 lakh dwarf seedlings during this financial year. The possibility of procurement of quality dwarf seed nuts from the approved seed gardens in the states of Tamil Nadu and Karnataka will be explored. In addition to the production of quality seedlings, special emphasis will be given to increase the production and productivity of the farm.