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GUIDELINES FOR ESTABLISHING COCONUT SEED GARDENS IN INDIA



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Guidelines for establishing coconut seed gardens in India

1. Introduction

The arrangements available for the production of quality planting materials are meagre in plantation crops sector and more so in coconut which has thus adversely affected the development programmes of this crop. While the major coconut producing states in India are Kerala, Karnataka and Tamil Nadu, the crop is also grown in Andhra Pradesh, Orissa, Maharashtra, Gujarat, Andaman and Nicobar Islands, Lakshadweep Islands, Goa, Daman and Diu and also to limited extent in Assam and Tripura. Potential also exists for its cultivation in the states of Madhya Pradesh, Bihar and Manipur (Table 1). The most popular and common cultivar available is the local tall of the respective states. A few dwarf types are also seen mainly in the house compounds grown for tender nuts and for ornamental purposes. Though the number of coconut seedlings required annually for fresh planting, replanting and underplanting runs to several millions, no systematic planning to produce them out of superior materials on a country wide basis has so far been made.

Table 1. Area and production of coconut in different states (1983-84)

State	Existing area (000 ha)	Production in million nuts	Potential area* (000 ha)
Kerala	676.4	2694.7	5.0
Karnataka	186.2	966.5	78.0
Tamil Nadu	140.6	1402.2	75.0
Andhra Pradesh	46.5	192.4	50.0
Orissa	23.3	97.9	100.0
Andaman & Nicobar Islands	20.8	96.6	10.0
Goa, Daman & Diu	21.6	106.0	1.0
Maharashtra	11.2	61.1	20.0
Assam	7.5	47.9	5.0
West Bengal	14.9	167.7	5.0
Lakshadweep	2.8	22.2	-
Pondicherry	1.6	14.1	1.0
Tripura	1.4	1.7	1.0
Bihar	-	-	25.0
Gujarat	-	-	5.0
Madhya Pradesh	-	-	10.0
East Uttar Pradesh	-	-	2.0
Total	1154.8	5871.0	393.0

* Source : P K Thampan, Indian Coconut Journal Vol. XIII No. 7

2. Performance of varieties and hybrids

The superiority of the Dwarf×Tall hybrids over the local tall has been proved and in a number of coconut growing countries large scale production of these hybrids has been undertaken. Evaluation trials in progress indicated the superiority in performance of CDO × WCT, LO × CDO and LO × GB over WCT in terms of nut yield and copra out turn (Table 2), under West Coast conditions. ECT × CDG released as VHC-1 in Tamil Nadu has yielded better than ECT under East Coast conditions (Table 3). Trials with Laccadive Ordinary undertaken in different states showed that this variety is superior to local tall (Table 4). In view of these facts there is urgent need for the large scale production of these hybrids and varieties.

Table 2. Performance of hybrids and WCT under rainfed condition (Kasaragod)

Cultivar/Hybrid	Age	Time taken for flowering	Mean No. of nuts/palm/year	Copra/nut in gm	Outturn of copra/year/palm (kg)
CDO × WCT	19	6	78.4	208	16.3
WCT × CDO	19	5	74.8	198	14.8
LO × GB	19	6	75.1	195	14.6
LO × CDO	19	6	77.9	195	15.2
WCT	19	7	59.5	186	11.1
CDO	19	4	52.0	152	7.9

CDO - Chowghat Dwarf Orange, WCT - West Coast Tall, LO - Laccadive Ordinary
GB - Gangabondam

Table 3. Performance of ECT × CDG (VHC-1) and parent hybrid at Veppankulam (Tamil Nadu)

Cultivar/Hybrid	Age of palm	No. of nuts	Copra/nut in gm	Outturn/tree/year (kg)
VHC-1	10 years	115	163	18.5
ECT	22 ,,	88	128	11.2
Dwarf Green	22 ,,	35	62	1.9

VHC - Veppankulam Hybrid Coconut, ECT - East Coast Tall, CDG - Chowghat Dwarf Green

Table 4. Performance of Laccadive Ordinary in different states

Centre and state	Age	Laccadive Ordinary No. of nuts/palm/year	Local Tall No. of nuts/palm/year
Ambajipeta (Andhra Pradesh)	21	135.5	85.2
Ratnagiri (Maharashtra)	20	134.0	88.0
Veppankulam (Tamil Nadu)	23	58.7	55.15
Kasaragod (Kerala)	20	83.34	59.52

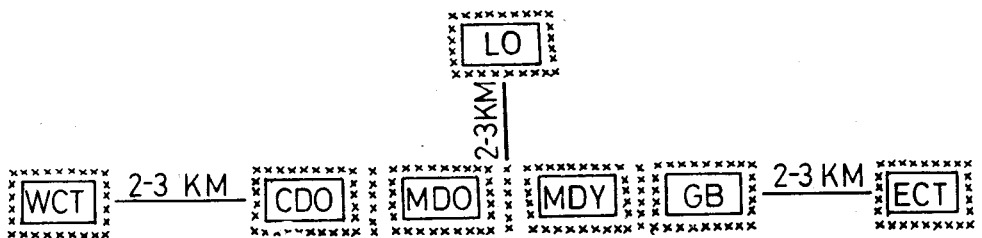
3. Method of establishing seed gardens

3.1 Hybrid seed gardens

For establishing seed gardens for hybrid seed production, the earlier method adopted was to plant tall and dwarfs in alternate rows so that by simple emasculation of the female parent both D×T hybrid and T×T (tall) could be produced either through natural crossing if pollinating agents are available or through assisted pollination. The seed gardens established at Konark (Orissa) and Navalok (Tamil Nadu) and Dharmaveera and Kidu (Karnataka) have adopted this method.

However, in view of the easiness of operation, the present approach is to plant dwarfs and tall in separate compact blocks. A simplified crossing technique developed by the Central Plantation Crops Research Institute for the production of hybrid coconut seeds now being used at various seed gardens in the country can be conveniently be adopted. Since the availability of pollen garden in the vicinity is always preferable it is suggested to plant the tall pollen parent in compact areas two to three km away from the dwarf seed garden. This will help in avoiding the storage and long distance transport of pollen (Fig. 1). In such a lay out, the desired D×T, T×D and T×T combinations can be produced depending upon the requirements and operational easiness.

FIG.1 LAYOUT OF SEED GARDEN BLOCKS



x — BORDER ROW

LO	_____	LACCADIVE ORDINARY
CDO	_____	CHOWGHAT DWARF ORANGE
MDO	_____	MALAYAN DWARF ORANGE
MDY	_____	MALAYAN DWARF YELLOW
GB	_____	GANGABONDAM
WCT	_____	WEST COAST TALL
ECT	_____	EAST COAST TALL

3.2 Seed garden for tall

Since the tall pollen parent is also invariably the recommended tall, larger blocks of the same if established simultaneously will meet the needs of both pollen as well as that of the seed nuts of the tall.

3.3 Purity of parents

Periodic inspection of the tall and dwarf varieties planted in seed blocks should be undertaken and the off types and low yielders removed to ensure varietal purity and better progeny performance.

4. Parental material availability

Due to the limited availability of the parental materials especially that of dwarfs in the country every effort has to be made to conserve them and channelise them to these seed gardens in order to achieve the estimated targets for the establishment of seed gardens in different states. The sources available presently are given in Table 5.

5. Estimated seed garden requirements of different states

The requirements of seed garden to produce superior tall planting material as well as hybrids for the different states has been worked out keeping in view the requirements of underplanting, replanting and new plantings. The varieties have been chosen either on the basis of performance of the cultivars and hybrids or on their expected potential (Table 6). For Kerala State the requirement includes the requirement of Dwarf \times Tall hybrids for the replacement of root(wilt) affected palms over a period of time. The details of the area that could be planted in each state with the available Tall and Dwarf parental sources during the Seventh Plan are given in Table 7. From Tables 6 and 7 it will be observed that against the projected requirements of 2055 ha of hybrid seed gardens only about half the area can be covered during the Seventh Plan while almost the entire tall seed garden can be raised.

6. Operational strategy

It is advantageous to spread out the seed gardens if suitable land is available so that cost of transportation of seeds is minimised. Seeds from the source indicated in Table 5 may be procured and seedlings of a given parent raised at the site of planting. If sufficient seeds are not available it is better to phase out the planting of the seed garden so that only quality materials are planted in these seed gardens. In the case of dwarfs double border may be provided to avoid contamination when different pollen parents are used. (Fig. 1)

Table 5. Parental sources available in the country

State and Farm	Name of cultivar	Approximate No. of palms		Area of seed garden (ha)	Estimated no. of nuts						Total during VII Plan
		Non bearing	Bearing		85-86	86-87	87-88	88-89	89-90		
1	2	3	4	5	6	7	8	9	10	11	
<i>Kerala</i>											
<i>C S F,</i>											
<i>Aralam</i>											
	CDO	700	434	105	4,500	5,000	5,000	6,000	7,000	27,500	
	MDY	900	-	40	-	-	-	-	2,000	2,000	
	MDO	127	-	10	-	-	-	-	1,000	1,000	
	MDG	248	-	10	-	-	-	-	2,480	2,480	
	LO	5,000	700	36	10,000	15,000	20,000	25,000	30,000	1,00,000	
	WCT	4,000	2,800	30	56,000	70,000	84,000	84,000	98,000	3,92,000	
<i>S G C,</i>											
<i>Nilambur</i>											
	CDO	1,000	-	100	-	-	-	-	-	-	
	LO	540	-	10	-	-	-	-	-	-	
	MDY	1,150	-	50	-	-	-	-	10,000	10,000	
	WCT	9,050	-	140	-	-	-	-	-	-	
<i>CPCRI,</i>											
<i>Kasaragod</i>											
	CDO	25	75	-	2,500	2,000	3,000	3,000	4,000	15,000	
	MDY	-	35	-	1,750	1,750	1,750	1,750	1,750	8,750	
	MDO	-	27	-	1,000	1,000	1,000	1,000	1,000	5,000	
	MDG	-	30	-	1,500	1,500	1,500	1,500	1,500	7,500	
	CDG	-	24	-	1,000	1,000	1,000	1,000	1,000	5,000	
	LO	-	67	-	2,000	2,700	2,700	2,700	2,700	12,800	
	WCT	-	800	-	32,000	32,000	32,000	32,000	32,000	1,60,000	
<i>Chowghat</i>											
<i>area culti-</i>											
<i>var garden</i>											
	CDO	-	10,000	-	20,000	20,000	20,000	20,000	20,000	1,00,000	

	1	2	3	4	5	6	7	8	9	10	11
<i>Karnataka</i>											
<i>Dharma-veera</i>											
<i>Hort-farm</i>											
Bellara	-		-	3,000	496	1,000	1,500	2,000	2,500	3,000	10,000
WCT	-		-	2,300		1,000	3,000	3,500	4,000	4,500	16,000
<i>Kanna-mangala</i>											
WCT	-		-	1,000	50	500	1,000	1,000	1,000	1,000	4,500
<i>C.P.C.R.I.</i>											
<i>Kidu</i>											
WCT	3,000		3,000	1,500	26	69,000	74,000	79,000	89,000	1,04,000	4,15,000
CDO	1,600		400	400	10	16,000	16,000	20,000	25,000	30,000	1,07,000
CDG	-		-	100	-	4,400	4,400	4,000	4,000	4,000	20,800
<i>Ganga-bondam</i>											
LO	400		400	200	4	6,800	7,000	7,000	8,000	9,000	37,000
<i>C.P.C.R.I.</i>											
<i>Shanti-godu</i>											
CDO	150		150	58	-	2,150	2,150	2,150	3,000	4,000	13,300
CDG	-		-	15	-	750	750	750	750	750	3,750
AO	-		-	36	-	1,000	1,000	1,000	1,000	1,000	5,000
<i>Tamil Nadu</i>											
<i>Navlok</i>											
Ranipet*	-		-	720	-	8,600	8,600	8,600	8,600	8,600	43,200
ECT	-		-	800	-	30,000	30,000	30,000	30,000	30,000	1,50,000
<i>Balaji Garden</i>											
CDO	-		-	100	-	3,000	3,000	3,000	3,000	3,000	15,000
<i>Ettankulam</i>											
CDO	3,779		-	-	-	-	-	-	-	-	-

	1	2	3	4	5	6	7	8	9	10	11
Tirunel- veli		MDY	3,639	-	100	-	-	-	-	-	-
		MDO	400	-	-	-	-	-	-	-	-
Neyveli		ECT	8,800	-	50	-	-	-	-	-	-
Orissa											
Bishwana- hakani*		CDO	3,223	250		750	1,140	1,200	1,500	3,000	7,590
		MDY	1,255	381	50	1,140	1,200	1,500	3,000	6,000	12,840
		MDG	1,223	612	-	1,800	2,400	3,000	4,500	6,000	17,700
		WCT	816	56	-	170	300	600	900	1,800	3,770
Konark*		CDO	1,000	120	-	1,000	1,000	1,000	1,000	1,000	5,000
<i>Andhra Pradesh</i>											
East											
Godavari		Ganga- bondam	-	200	-	4,000	4,000	4,000	4,000	4,000	20,000
East Coast											
Hybrid											
Ittikala- gunta,											
Tadepalli- gundam*		Ganga- bondam	-	150	6.5	1,500	1,500	1,500	1,500	1,500	7,500
		ECT	-	780		10,000	10,000	10,000	10,000	10,000	50,000

MDY - Malayan Dwarf Yellow
MDO - Malayan Dwarf Orange
MDG - Malayan Dwarf Green
AO - Andaman Ordinary

* 30% dwarf segregants in the D x T production programme alone considered for estimating planting material availability

Table 6. Projected seed garden requirements and area proposed to be planted during Seventh Plan with parents

State and seed garden	Name of dwarf parent	Area to be brought under (ha)	Name of tall parent	Area to be brought under (ha)
1	2	3	4	5
<i>Kerala</i>				
SGC Nilambur	CDO	800	WCT	290
CSF Aralam	MDY	75	LO	200
	MDO	25	AO	10
Additional Seed Garden	Gangabondam	100		
<i>Karnataka</i>				
D.H.Farm	CDO	140	WCT	60
Bellara	MDY	35	TT	60
New Seed Garden in Mysore	Gangabondam	25	LO	60
<i>Tamil Nadu</i>				
Navalok	CDO	80	ECT	20
Vellalaviduthi	MDY	50	WCT	20
Thirumurthy	MDO	7	LO	30
Dam	Gangabondam	5	AO	10
Neyveli	CDG	18	TT	20
<i>Orissa</i>				
Biswanahakani	CDO	120	ECT	30
New Seed Garden	MDY	20	WCT	10
	MLG	25	LO	10
	Gangabondam	25		
<i>Andhra Pradesh</i>				
	MDY	25	ECT	25
	Gangabondam	25	LO	25
<i>Bihar</i>				
	CDO	30	ECT	25
	MDY	20	WCT	25
<i>Maharashtra</i>				
	CDO	30	WCT	25
	MDY	20	Benaulim	25

1	2	3	4	5
<i>Gujarat</i>	Goodajali Dwarf	25		
			Gujarat Tall	25
	CDO	20		
	MDY	5	WCT	25
<i>West Bengal</i>				
Talliya farm &	MDY	30	WCT	10
New Garden	CDO	20	ECT	15
	Gangabondam	50		
<i>Madhya Pradesh</i>				
	MDY	30	WCT	15
	CDO	20	ECT	25
			LO	10
<i>Goa</i>				
	CDO	15	WCT	10
	MDY	5	Benaulim	10
<i>Assam</i>				
	CDO	7	WCT	10
	MDY	7	ECT	10
	Gangabondam	6		
<i>Tripura</i>				
	CDO	15	ECT	7
	MDY	5	WCT	7
			LO	6
<i>Manipur</i>				
Tiri Farm	CDO	7	ECT	7
	MDY	7	WCT	7
	Gangabondam	6	LO	6
<i>Pondicherry</i>				
	CDO	5	ECT	5
	MDY	5	WCT	5
<i>Andamans</i>				
	MDY	10	LO	5
	CDO	30	AO	40
			King Coconut	15
Total		2055		1255

Table 7. Seventh Plan target production of planting materials and coverage anticipated

Name of cultivar	No. of nuts	Seedling numbers	Area which can be covered/ha
Chowghat Dwarf Orange	3,63,590	@ 30% 1,09,077	623.2
Malayan Dwarf Yellow	37,950	@ 60% 22,770	130.1
Malayan Dwarf Orange	6,000	@ 60% 3,600	20.5
Malayan Dwarf Green	25,800	@ 50% 12,900	73.7
Gangabondam	38,900	@ 40% 15,560	88.9
Chowghat Dwarf Green	25,800	@ 60% 15,480	88.4
Laccadive Ordinary	1,49,800	@ 60% 89,880	513.6
East Coast Tall	2,00,000	@ 60% 1,20,000	685.7
Andaman Ordinary	5,000	@ 60% 3,000	17.1
West Coast Tall	9,91,270	@ 60% 5,94,762	3398.6

All the dwarfs together = 1,024.8 ha

All the tall together = 4,615.0 ha

