Restructuring the Coconut gardens with Quality planting materials

R.Jnanadevan*

Productivity of any crop depends on the quality of planting material. Hence systematic replanting and restructuring of senile unproductive as well as disease advanced plantations with high yielding varieties so as to maintain optimum sustainable planting density is essential in this changing environment.

The coconut gardens in the traditional coconut growing area are characterized with the existence of high rate of old and senile palms which warrants rejuvenation and replanting with high yielding strains. Prevalence of old and senile palms, poor genetic base of the planting material under cultivation, over populated stand of both coconut and other trees in the homestead, poor management and severe incidence of pest and diseases are the major reasons for the low productivity. Hence to improve the productivity of such gardens timely removal of senile unproductive disease advanced palms and to restore them with suitable varieties is essential to maintain higher level of production.

Kerala is the land of coconut with coconut trees seen everywhere. The State occupies 47% of total coconut area in the country and 44% of production. Coconut is generally considered as a small holder's crop with an average holding size of less than 0.2ha size. But now the situation has been changing dramatically. The area under coconut has been shrinking continuously since 2000 due to various factors. Area under coconut has declined from 8.978 lakh ha to 7.877 lakh ha in Kerala during the period from 2005-06 to 2008-09.Shift of cultivation to other more remunerative crops like rubber, high cost of cultivation and low return in coconut, high price of rubber, prevalence of pest and disease like root wilt, leaf rot , but rot, etc., rapid urbanization under going in the state which causes conversion of coconut area for housing and construction of commercial buildings, roads etc. are the reasons for decline in area.

One of the strategies to be adopted to prevent the shrinkage of area, arresting the productivity decline and bringing about increase in productivity is to promote large scale under planting /replanting or restructuring of the coconut gardens with high yielding varieties to maintain optimum and sustainable planting density. Regulation of shade and maintaining optimum plant population is one of the areas emphasized in the massive program for Replanting and Rejuvenation of coconut gardens which is being implemented on pilot basis in three districts of Kerala.

Adopt right Spacing.

Coconut is a sun-loving tree and does not tolerate excessive shade. It requires 100% sunlight to fall on the crown for proper growth and timely yielding. Hence optimum plant density must be maintained in the field for realizing better yield from coconut. Normal plant density of

*Dy.Director (Marketing), Directorate of Cashewnut and Cocoa Development (DCCD), Kochi.)

coconut recommended is 175 plants per ha @ 7m X 7m emplacement. In Kerala the average palm density is above 229 palms per hectare and proportion of bearing palms is that of 2/3rd of the total population. As the planting density is more than the optimum level the productivity decreases. Systematic under replanting of senile and unproductive as well as disease advanced palms by maintaining optimum sustainable planting density will only bring increase in the total farm productivity. Spacing depends upon the planting system, soil type, variety etc. A spacing of 7.5 x 7.5 m is generally recommended for coconut. This will accommodate 175 palms per ha under the square system of planting. If the triangular system is adopted, an additional 20 to 25 palms can be planted. Also a hedge system can be adopted giving a spacing of 5.0 to 5.5m along the rows and 9 to 10 m between rows. Wider spacing of 10m x 10 m provides ample opportunity to accommodate a number of perennial and annual crops in the interspaces. For dwarf varieties closer spacing of 6mx6m is sufficient since the canopy size is small compared to tall palms. Diagrammatic representation of different methods of planting is shown in figure-1

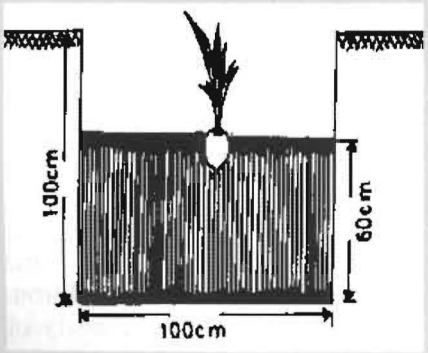

Figure 2 - Planting of the seedling

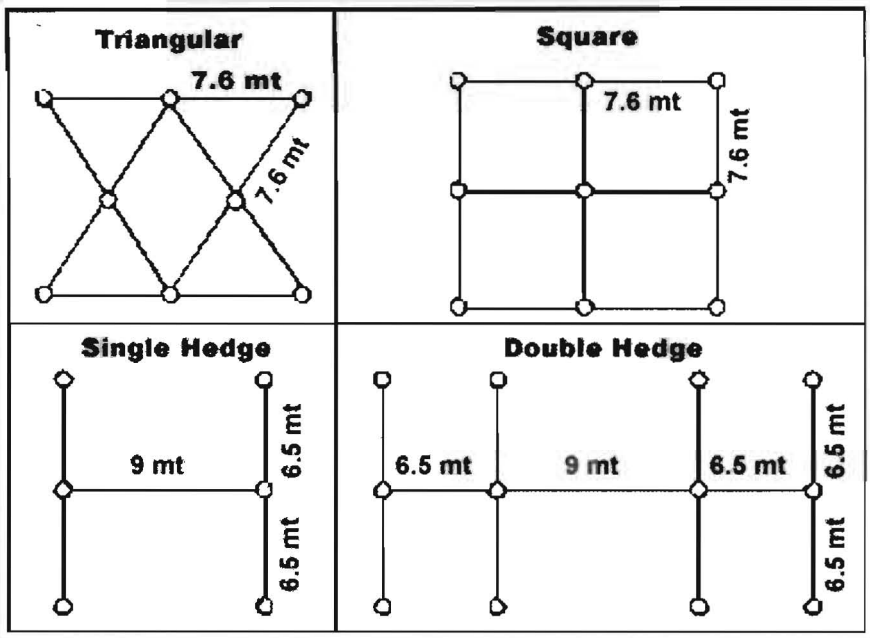

Figure 1 - Different methods of planting

Plant coconut at right depth.

Normally coconut seedlings are planted in pits of size 1mx 1m x 1 m. The depth of pits will depend upon the type of the soil. In laterite soil with rocky substratum, deeper and wider pits, 1.2x1.2x1.2m, are to be dug and filled up with loose soil, powdered cow dung and ash up to a depth of 60 cm before planting. In loamy soils with low water table, planting in pit size of 1mx 1m x 1 m filled with top soil to height of 50 cm is generally recommended. However, when the water table is high, planting at the surface or even on mounds may be necessary. Even while planting at the surface or mounds, digging pits and filling has to be done. While filling the pits with soil, it is advisable to use the top soil, compost/ farmyard manure. Two layers of coconut husk can be arranged at the bottom of the pit before filling up the soil with concave surface facing up .This will help in conserving the moisture. In laterite soil, addition of 2 Kg of common salt will help in loosening the soil.

In well drained soils where water stagnation is not a problem, seedlings can be transplanted with the beginning of southwest monsoon. If irrigation facilities are available, it is advisable to take up planting at least a month before the monsoon sets in so that the seedlings get well established before the onset of heavy rains. Planting can also be taken up before the north- east monsoon. In low lying areas subject to inundation during the monsoon periods, it is preferable to plant the seedlings after the cessation of the monsoon. In low-lying areas mounds are to be formed at planting site to a height of at least 1m above water level. In reclaimed 'kayal' areas, seedlings are planted on field bunds

Under planting

Under planting is generally done in plantations where the palms become unproductive and uneconomic to the farmer. Old palms are removed in stages over a period of 3 to 4 years. First peg mark the area to be under planted.

Remove the very poor yielder (less than 10 nuts per year) and those close to the planting pits and plant the seedlings in the usual way. The other trees are removed at the rate of one third each year during 2nd,3rd and 4th year after planting. If the existing garden is irregularly spaced remove old palms within 1m radial distance from the newly planted seedlings in the first year, 2m distance in second year, 3m distance in third year and the rest in 4th year. For large scale replanting it is advisable to plant seedlings after complete removal of old stand to obtain uniformity in plantation.

Select good quality Seedlings

Coconut is propagated through seedlings raised from selected seed nuts. Generally 9 to 12 month old seedlings are used for planting. Select seedlings, which have 6-8 leaves and 10-12 cm collar girth when they are 9-12 month old. Early splitting of leaves is another criterion in the selection of coconut seedling.

Since coconut is highly cross pollinated, vegetative propagation of palms with all desirable genotypic characters is not possible. Studies conducted at CPCRI, Kasaragod on production of tissue culture seedlings also did not obtained encouraging results. The average yield of WCT cultivars under irrigated conditions is 80 nuts/palm per year while that of released hybrids COD x WCT, LO x COD, WCT x COD is 116, 109 and 108 nuts per hectare respectively. Generally, the yield stabilization of local tall cultivars starts between 12-15 years after planting and that of hybrid is between 8-10 years. This reduction in pre-bearing period of hybrids has a positive impact on cost of production of nuts. There is a gap of about 5-8 years for the trees to come to bearing stage depending on the use of hybrid / dwarf / tall planting materials. Use high yielding coconut varieties recommended for different states for planting. The high yielding coconut varieties recommended for cultivation under different agro climatic condition coconut growing states are given in the Table - 1

New varieties released

Kalpa Pratibha : Tall, relatively tolerant to drought, Contains 448 ml of tender nut water, gives constant good yield over 15,874 coconuts per hectare, 23.3 kg copra/palm or 4.07 t/ha(under rain fed condition), 2.72 t/ha oil. It can withstand normal droughts. Due to its features it is named by the scientists as a variety specially made for the coastal belt. Released by CPCRI recently and recommended for cultivation in Kerala and Tamil Nadu.

Kalpa Mitra : Tall, variety relatively tolerant to drought. 19.3 kg copra/palm (3.37t/ha) 66.50% oil in copra yielding 2.24 t/h. Tender nut quality also good. Released by CPCRI as a dual purpose national variety recommended for cultivation in Kerala, WB, AP

Kalpa Dhenu : Tall, relatively tolerant to drought; 20.8 kg copra/ palm (3.64t/ha), 65.50% oil in copra yielding 2.38t/ha oil. Tender nut quality is good. The oil extracted from copra of this variety has higher lauric acid content.

Kalparaksha: This is a semi tall variety even though the name indicate dwarf released by CPCRI, as a selection from Malayan Dwarf Green variety. Shows field resistance to root (wilt) disease. Average yield is 120 nuts per palm per year and with maximum yield potential of 280 nuts, 2.44 t of copra/ ha. Also suitable for tender nut purpose, gives good quality (290 ml) of sweet tender nut water per nut.

Kalpa Samrudhi. A semi tall Dwarf x Tall coconut hybrid released by CPCRI for cultivation in Kerala and Assam. Nut yield of 117 nuts /palm/ year under rained conditions ,good tender nut quality and quantity (346 ml/nut) It is drought tolerant, copra yield of 25.71 kg /palm /year (4.5t/ha) – 3.06t/ha of oil yield.

Kalyani Coconut 1: A tall variety with higher quantity of nut water (360ml) and suits for dual purpose as a tender variety as well as a commercial variety for oil. Released by BCKV and recommended for cultivation in West Bengal.

Gauthami Ganga: A high yielding dwarf variety (12813 nuts per ha. per annum) with a high quantity of nut water (446 ml).Recommended for cultivation for tender nut purpose in Andhra Pradesh.

Konkan Bhatye Coconut Hybrid-1 High yielding variety recorded 20,300 nuts/ha. annum. The copra yield is 3.43 tonnes/ha. Released by Regional Coconut Research Station, Bhatye, Maharashtra. and recommended for cultivation in Konkan coastal region of Maharashtra.

Kera Bastar: Tall variety with average yield of 110 nuts/ palm / per/ year with a copra yield of 2.97 tonnes/ ha and oil yield of 2.04 tonnes/ha. Released by AICRP Palms and recommended for cultivation in Chattisgarh. Farmers could select appropriate coconut varieties/ hybrids based on its suitability in their holdings. It is advisable to plant hybrids and dwarf varieties to the maximum possible extent while undertaking replanting in coconut gardens.

Name	Agency released	Area recommended
I. Tall		
1. Chandrakalpa (Lakshadweep Ordinary)	CPCRI	Lakshadweep, Kerala, Tamil Nadu
2. Kerachandra (Phlippine Ordinary))	CPCRI	All regions
3. Kalpa Pratibha	CPCRI	Kerala, Tamil Nadu
4. Kalpa Mitra	CPCRI	Kerala, WB, AP
5. Kalpa Dhenu	CPCRI	Andaman, Kerala, TN
6. Pratap (Benaulium Green Round Tall)	KKV, Dapoli	Konkan region, Kerala
7. VPM-3(Andaman Ordinary)	TNAU	TN
8. ALR1(Arasampatti)	TNAU	TN
9. Kamrupa (Assam Green Tall)	AAU	NE region- Assam
10. Kera Sagara	KAU	Kerala
11. Kera Bastar	AICRP Palms	Chattisgarh
12. Kera Keralam	AICRP Palms	TN, Kerala
13. Kalyani Coconut	BCKV	WB
14. Kalpatharu	AICRP Palms	Kerala, Karnataka, TN
II.Dwarf		
1. Chowghat Orange Dwarf	CPCRI	All states for tender nut purpose.
2. Goutami Ganga	APHU	Andhra Predesh.
3. Kalparaksha (Semi- Tall, Malayan Green Dwarf)	CPCRI	Kerala
4. Kalpasree	CPCRI	Kerala
III.Hybrid		
1. Chandra Sankara (COD x WCT)	CPCRI,	Kerala, Karnataka, TN
2. Kera Sankara(WCT x COD)	CPCRI	Kerala, Maharastra, Andhra Pradesh
3. Laksha Ganga (LOXGB)	KAU	Kerala
4. Kera Ganga (WCT x GB)	KAU	Kerala
5. Kera Sree (WCTXMYD)	KAU	Kerala
6.Kera Sowbhagya (WCT x SSAT)	KAU	Kerala
7.Ananda Ganga (AOXGB)	KAU	Kerala
8. Godavari Ganga (ECT x GB)	APAU	AP
9. VHC-1 (ECT x GD)	TNAU	TN
10. VHC-2 (ECT x MYD)	TNAU	TN
11. VHC-3(ECT x COD)	TNAU	TN
12. Konkan Bhatye CH-1) (GBGD x ECT)	RCRS, Bhatye	Konkan regions of Maharashtra
13. Kalpa Sankara(CGD x WCT)	CPCRI	Root (wilt) affected areas of Kerala
14. Kalpa Samrudhi (MYD x WCT)	CPCRI	Kerala, Assam

Table -1 Coconut varieties recommended for cultivation