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Status and Strategies for Development of Coconut in Manipur

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Abstract: Plantation crops such as coconut, areca nut, oil- palm, cocoa, spices, cashew, coffee, tea, rubber are high value commercial crops and are playing a significant role in the economic growth of the country. Many of these crops fetch sizeable amount of foreign exchange. The Plantation crops sector has to compete globally with plantation crops in the era of globalization and trade liberation. Coconut, the 'Kalpavriksha' or 'tree of heaven', plays a significant role in the agrarian economy of many states in India. It is also very closely interwoven into the socio-economic and cultural life of substantial number of farm families. India ranks first in terms of production and productivity oof coconut in the world and third in area under cultivation. As per the 2020-21 statistics coconut was cultivated in India in an area of 21.98 lakh ha with the annual production of 20736 million nuts and productivity of 9430 nuts per ha. It is cultivated in 17 states and three union territories. The four southern states viz., Kerala, Karnataka, Tamil Nadu and Andra Pradesh together contribute more than 90% of the area and production of coconut in the country. However, since the last many years coconut cultivation has been spreading to non- traditional areas as well including different states in the North East region of the country. Assam, Tripura and Nagaland are the major North Eastern states having coconut cultivation, together covering about 26,480 ha (as per 2020-21 statistics) and a total annual production of 175.88 million nuts.

The average productivity of coconut in these three states is only 6642 nuts per ha which is much less than the national average of 9430 nuts per ha. Other North East also ern states viz., Arunachal Pradesh, Nagaland, Manipur, Meghalaya and Mizoram are also having small extent of coconut cultivation. There is ample scope for enhancing the area under coconut cultivation in the North Eastern states having congenial agro- ecological situations pertaining to climate and soil. Besides, the productivity and income from the existing coconut holdings can also be considerably increased through better integration of technologies, especially improved varieties, integrated nutrient management, cropping/ farming systems and integrated pest and disease management.

The technical feasibility and economic viability of many of the recommended technologies for higher productivity and income from coconut farming have been demonstrated through the research conducted and front-line extension programmes organized by the ICAR Research Center, Kahikuchi and also by the Horticultural Research Station, Assam Agricultural University, Kahikuchi. However, field level utilization of the technologies recommended for coconut cultivation is not at a satisfactory level due to various factors. The scientific cultivation practices for realizing higher productivity and income from coconut farming in the North East states of India are discussed hereunder.

Keywords: Kalpavriksha, North East, Cropping, Extension, Kahikuchi, Research Station.

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RECOMMENDED VARIETIES OF COCONUT IN NORTH EAST INDIA

The Central Plantation Crops Research Institute (ICAR-CPCRI), under the Indian Council of Agricultural Research and the State Agricultural Universities under the All India Coordinated Research Project on Palms (AICRPP) have developed improved and speciality varieties and for cultivation in different agro- ecological zones of the country. The varieties suitable for cultivation in North East India are describes below.

Dwarf varieties

Kalpa Jyothi: It is a tender nut variety of dwarf habit with potential in landscaping as an ornamental palm. The palms of this variety have a compact spherical canopy and drooping frond tip. Fruits are yellow, medium-sized and oval in shape, with good quality of tender nut water (approx. 380 ml). The quality of tender nut water is good in taste with total soluble solids (TSS) OF 5.9^0 Brix. The nutritive value of tender nut water is excellent with total sugars – 6.2 g/100 ml, free amino acids – 1.7 mg/100 ml, sodium – 36 ppm, potassium – 1998 ppm. Flowering commences early, within 3-4years of planting. Under good management, the palm yields 114 mature nuts/palm/year. When harvested for tender nuts, fruit yield is expected to be at least one and half folds higher. It serves as parental palm for production of hybrids viz., Kalpa Samrudhi (MYD- Malayan Yellow Dwarf × WCT- West Coast Tall) and Kalpa Srestha (MYD × TPT – Tiptur Tall).

Tall varieties

Kampura: It is a high yielding, dual purpose variety, suitable for copra and tender nut production. The palms are tall in habit with spherical canopy and large number of leaves. Fruits are green, medium- sized and oblong with 161g copra/nut and copra yield of 2.86 t/ha with oil content of 65%. The tender nut water content is around 253 ml and is organoleptically graded as "good". The tender nut water has total sugar content of 5.16 g/100 ml, sodium- 39 ppm and potassium- 2294 ppm. Flowering commences about 6-7 years of planting under irrigated condition. The variety yields around 101 nuts/palm/year under good management. This variety is relatively tolerant to low temperature stress during winter.

Kalpa Mitra: A high yielding variety, suitable for copra and oil production. It is also suitable for production of ball copra. Fruits are large and oval with 241 g copra/nut. The palms of this variety are tall in habit with stout trunk and spherical canopy with large number of leaves. The palms commence flowering 7-8 years after planting in the field, under rainfed conditions. The variety is relatively tolerant to moisture deficit stress and gives yield of 80 nuts/palm/year, under average management. The average yield of this is around 3.37 t copra/ha, with estimated oil yield of 2.24 t oil/ha. The average quantity of tender nut water is 495 ml. Based on organoleptic evaluation; the tender nut water is classified as "average" in taste. The nutritive value of tender nut water is: total sugars- 5.7 g/100 ml; free amino acids- 1.3 mg/100 ml; potassium – 2150 ppm; sodium – 23.5 ppm.

Kera Chandra: A high yielding, dual purpose variety suitable for copra and tender nut production. Fruits are green, round shaped and weighs 1031g having a copra content of 189 g/nut. The palms of this variety are tall with spherical canopy. The palms commence flowering 5 years after planting. Under rainfed conditions, the variety yields 110 nuts/palm/year, 3.68 t copra/ha/year and 2.43 t oil/ha/year. The average quantity of tender nut water is 450 ml which is characterized with total sugars- 5.86 g/100 ml; TSS-6^0 Brix; sodium- 24 ppm; potassium- 2273 ppm. Organoleptic evaluation of tender nut water graded it as very good. The variety is characterized with relatively high tolerance to moisture- deficit stress.

Kera Keralam: A high yielding variety suitable for copra and oil production. It is also amenable for ball copra production. It is a tall variety with spherical canopy which commences flowering after 6 years of planting under rainfed conditions. Under irrigated and optimum growth conditions, flowering advances to 4-5 years after planting. The fruits are green yellow, and oval- shaped having the copra content of 176 g/nut. Under rainfed conditions, the variety yields 109 nuts/palm/year; 3.36 t copra/ha/year; 2.28 t oil/ha/year, whereas under irrigation the palms yield 147 nuts/palm/year; 4.53 t copra/ha/year and 3.08 t oil/ha/year. Sensory evaluation of tender nut water has graded it as average and the mean tender nut water content is 341 ml; with total sugar content of 5.5 g/100 ml free amino acids 2.41 mg/100 ml; TSS-6.3^0 Brix; sodium-29 ppm; potassium- 2421 ppm. The variety is moderately tolerant to moisture- deficit stress and hence recommended for cultivation under water- limiting conditions.

Hybrid varieties

Kalpa Samrudhi (MYD×WCT): A high yielding, semi tall, dual-purpose D×T hybrid, recommended for copra and tender nut production. The variety is produced by crossing selected Malayan Yellow Dwarf palm (female parent) with pollen from elite West Coast Tall palms (male parent). The palms are regular bearers and commence flowering about 3-4 years after planting, under good management. The variety bears green fruits, with 220 g copra/nut. The quantity of tender nut water is around 346 ml and is of very good quality (TSS-6^0 Brix). The nutritive value of tender nut water is as follows: total sugars-4.17 g/100 ml; free amino acids – 2.08 mg//100 ml; potassium- 2370 ppm; sodium- 35.1 ppm. The average annual nut yield of this variety is 117 nuts/palm/annum, under normal management, with an estimated annual copra yield of 4.5 t/ha and oil yield of 3.04 t/ha. This variety is relatively tolerant to moisture deficit stress and exhibits higher nitrogen use efficiency.

Chandra Sankara (COD×WCT): A high yielding dual purpose D×T hybrid, suitable for copra/oil and tender nut production. It is produced by crossing selected Chowghat Orange Dwarf palms (female parent) with pollen from elite West Coast Tall palms (male parent). The variety is semi tall in habit, bears brown, medium- sized fruits, with 208-225 g of copra/nut. It commences flowering in 3-4 years after planting, much earlier than the WCT parent and produces on an average 110-123 nuts/palm/years, with an estimated copra yield of 4.40-4.82 t copra/ha and 2.99 t oil/ha. The quantity of tender nut water is around 347ml and is of very good quality (TSS-6.58^0 Brix). The nutritive value of tender nut water is as follows: total sugars- 5.99 g/100 ml; free amino acids – 1.73 mg/100 ml; potassium-2193 ppm; sodium- 23.77 ppm. This variety is relatively sensitive to low moisture stress and performs well only under irrigation and good management.

Kera Sankara (WCT×COD): A high yielding dual purpose T×D hybrid, recommended for copra and oil production and produced by crossing elite West Coast Tall palms (female parent) with pollen from selected Chowghat Orange Dwarf palms (male parent). The variety bears brown, medium-sized, oblong fruits with 187 g copra/nut. It commences flowering within four years of planting, much earlier than the WCT parent under good management. The average yield is 108 nuts/palm/year, with an estimated copra yield of 3.78 t copra/ha and 2.40 t oil/ha. The quantity of tender nut water is around 351ml and good to taste (TSS- 7.00^0 Brix). The nutritive value of tender nut water is as follows: total sugars- 6.61g/100 ml; free amino acids- 1.47 mg/100 ml; potassium- 2274 ppm; sodium- 33.30 ppm. This hybrid variety exhibits low moisture- stress tolerance and

produces reasonably good yield under water limiting condition.

CHALLENGES AND PROSPECTS OF COCONUT CULTIVATION IN THE NORTH EAST INDIA

The coconut sector in the northeast region has been witnessing substantial growth over the past two decades (Table 1). During the period from 2000-2001 to 2020-2001, area under coconut in Assam, the major producer of coconut in the North East region, got reduced by 0.95% while production of coconut increased by 9.2% and productivity increased by 10.25%. In Tripura, area under coconut cultivation increased by 48.71%, production increased by 163.43% and productivity increased by 76.97% during the same period. In Nagaland the increased in area, production and productivity of coconut during the period from 2000-2001 to 2020-2001 was 18.89%, 75.10% and 47.75% respectively. However, as per the 2020-21 statistics, the above three North Eastern states together contributed only 1.2% of the total area and 0.85% of the total production of coconut in the country.

Assam: Among the North Eastern states Assam has the largest area under coconut cultivation. It is cultivated in 20,800 ha with a production of 148.51 million nuts and productivity of 7,140 nuts per ha. Coconut plays an important role in the socio- cultural life of the people of Assam. It is mostly raised in small and marginal holdings as homestead crop. Though coconut is grown in most of the districts of Assam, its cultivation is mainly confined to Central and Lower Brahmaputra Valley Zone of Assam. Nagaon district has the maximum area under coconut (2,490 ha) followed by Barpeta (1,636 ha) and Nalbari (1,390). The agro-ecological situation of these districts is congenial for coconut cultivation. Coconut can perform well under the soil types such as red sandy loam, alluvial red loam and laterite soils and sub-tropical weather condition receiving an annual rainfall of 1,840 mm to 3,200 mm prevailing in these areas. The low productivity of coconut in Assam, which is less than the national average, is mainly attributed to the lack of adoption of scientific cultivation practices including improved varieties, multiple cropping and integrated farming systems, integrated nutrient management and integrated pest and disease management. If nurtured properly, coconut can be a good source of income for the farmers, even in the small holdings under homestead system.

Tripura: Tripura ranks second among the North Eastern states after Assam in the area under cultivation of coconut. Coconut is cultivated in 4,610 ha with a production of

18.44 million nuts and productivity of 3,996 nuts per ha. The agro-ecological situation prevailing in Gomati, West Tripura and South Tripura districts is congenial for coconut cultivation. Coconut can perform well under the soil types such as reddish yellow brown sandy soils, red loam and sandy loam soils, older alluvial soils and sub- tropical weather condition receiving an annual rainfall of 1,979.6 to2,745.9 mm prevailing in these areas. The land utilization pattern in the state indicates the huge potential for area expansion of plantation crops including coconut. In Tripura, coconut is cultivated in small and marginal

Table 1: Trend in coconut cultivation in the North East India

State/region	*Area ('000 ha)*		*Production (million nuts)*		*Productivity (nuts/ha)*	
	2000-01	*2020-01*	*2000-01*	*2020-01*	*2000-01*	*2020-01*
Assam	21	20.8	136	148.51	6476	7140
Tripura	3.1	4.61	7	18.44	2258	3996
Nagaland	0.9	1.07	5.1	8.93	5667	8373
Total	25	26.48	148.1	175.88	5924	6642
All India	1823.9	2198.98	12678.4	20736.12	6951	9430

Source: Horticulture Division, Dept. of Agriculture & Cooperation, Ministry of Agriculture & Farmers Welfare, Government of India.

holdings without much care and hence the productivity realized is very low. If farmers are empowered to take up scientific crop management practices coconut productivity in the state can be enhanced substantially.

Nagaland: In Nagaland, coconut is cultivated in a small extent only. It is cultivated in 1,070 ha with a production of 8.93 million nuts and productivity of 8,373 nuts per ha. The soil is acidic, very rich in organic carbon but poor in available phosphate and potash content. P^H of soil ranges from 4.8 to 6.8. Dimapur, Peren, Wokha, and Chumoukedimaare the districts in Nagaland having good potential for coconut cultivation.

Arunachal Pradesh: Out of the 26 districts in Arunachal Pradesh, eight districts have coconut cultivation in a very limited scale; total area under coconut being 220 ha. Highest production of coconut is in Changlang district (45.53 million nuts) and highest area under coconut cultivation is in Namsai district (96 ha).

Manipur: Potential area for coconut cultivation in Manipur includes Pherzawl, Jiribam and Tamenglong districts. In Jiribam district Coconut Development Board (CDB) started 20 hectares of area under coconut.

Meghalaya: Meghalaya is known for the highest amount of rainfall it receives. The annual average rainfall received is 11,000 mm, highest in the world. The potential areas for coconut cultivation in Meghalaya include West Garo Hills, East Garo Hills, South Garo Hills, South- West Garo Hills, North Garo Hills and Ri-Bhoi districts.

Mizoram: The potential area for coconut cultivation in Mizoram includes Mamit, Kolasiband Lawgtlai districts.

CHALLENGES AND PROSPECTS OF COCONUT CULTIVATION IN THE NORTH EASTERN REGION

Major challenges and prospects of coconut cultivation in the North Eastern states are briefly discussed below.

QUALITY PLANTING MATERIAL

Though North Eastern states have great potential for expanding area under coconut cultivation, lack of quality planting material is a major constraint for implementing appropriate interventions on area expansion of coconut. Besides, cutting and removal of unproductive senile palms and replanting also requires seedlings of improved varieties. Public sector agencies including the State Agriculture/Horticulture Departments, ICAR institutions, SAUs, CDB etc do not have the necessary infrastructure facilities for producing sufficient quantity of coconut seedlings of improved varieties to meet the demand for seedlings. Nurseries in the private sector often do not follow scientific nursery management practices and supply inferior quality seedlings. Farmers who produce coconut seedlings also do not possess adequate knowledge about mother palm selection, seed nut collection and nursery management practices. The nurseries and farms under various public sector agencies need to take up interventions for raising mother palm orchards of improved coconut varieties to produce a greater number of quality coconut seedlings. Similarly, efforts are required to identify ideal mother palms of coconut in farmers' gardens and utilize them for seedling production. Decentralized community coconut nurseries can also be promoted with active involvement of Farmer Producer Organizations (FPOs) to enhance the availability of coconut seedlings.

ADOPTION OF SCIENTIFIC CULTIVATION PRACTICES

Low productivity of coconut in the existing coconut gardens in the North Eastern states can be mainly attributed to the low level of adoption of recommended cultivation practices. Non-adoption or low level of adoption of improved varieties, technologies for irrigation and soil and water conservation, integrated nutrient management, integrated pest and disease

management etc results in low productivity of coconut. Appropriate interventions are to be formulated and implemented to empower the farmers of the region for the better integration of available technologies for the management of their coconut gardens to realise higher productivity and income.

FRAGMENTED HOLDINGS

Coconut cultivation in the North Eastern states is mostly confined to fragmented small and marginal holdings. These holdings suffer due to the resource limitations, both bio- physical as well as socio-economic resources. Hence, individual farmers are unable to adopt latest technologies for enhancing productivity and income from their coconut holdings. Group approaches are to be facilitated among the small and marginal coconut growers to overcome the resource limitations in the fragmented holdings and to better utilize technologies to achieve higher productivity and income. Three–tier FPO set up consisting of Coconut Producer Societies (CPSs), Coconut Producer Federations (CPFs) and Coconut Producer Companies (CPCs) is being facilitated in coconut sector by the Coconut Development board (CDB). These are formed with the main objective of socio-economic development of farmers through productivity improvement, cost reduction, efficient aggregation, processing for value addition, better by-product utilization and efficient marketing of the produce. So far 29 CPSs have been registered in Assam under the CDB. These FPOs are to be empowered to take up group initiatives to strengthen the coconut sector. There is a need to facilitate formation of a greater number of FPOs in coconut sector by development and extension agencies in other north eastern states also.

EXTENSION SUPPORT FOR SCIENTIFIC COCONUT CULTIVATION

Low level of awareness and knowledge of farmers is one of the reasons for the low level of adoption of recommended scientific practices of coconut cultivation resulting in poor productivity of coconut in the region. Participatory extension interventions ensuring the active involvement of farmers by the concerned agencies including Coconut Development Board and State Agriculture/ Horticulture Departments for the capacity development of farmers to enhance their knowledge about scientific coconut cultivation thus assume much significance. Since coconut is not a major crop in the region, only few schemes are implemented by the State Agriculture/Horticulture Departments to provide extension support and to provide incentives to coconut growers and other stakeholders. Considering the vast scope for expanding area under coconut in the region and the fact that there are many farmers already taken up coconut farming providing extension support to the growers is highly relevant to motivate the farming community.

PROMOTING COCONUT-BASED CROPPING/FARMING SYSTEMS

In the north eastern states, coconut is mostly cultivated as a monocrop in the small and marginal holdings. Compared to coconut monocropping, adoption of multiple cropping and integrated farming system in coconut gardens fetches higher income and employment opportunities. Different models of coconut-based cropping/farming systems suitable for the north east region have been developed by CPCRI and SAUs. However, adoption of such cropping/farming systems is very low due to various reasons. Hence, farmers are to be made aware about the advantages of adopting coconut-based cropping/farming systems and suitable interventions to promote the same are to be implemented.

REMOVAL OF SENILE AND UNPRODUCTIVE COCONUT PALMS AND REPLANTING

Large number of coconut palms in the existing coconut gardens are old, senile and with

very low productivity which adversely affect coconut production in the region. Hence, it is suggested to remove such old and senile palms and replant with quality seedlings of improved varieties suitable for the region to enhance coconut productivity.

PROMOTING VALUE ADDITION

Value addition through product diversification is a viable strategy suggested to enhance income from coconut farming. Large number of value-added products can be produced and marketed using coconut kernel, tender coconut, coconut water, shell, leaves and timber. However, due to various factors the level of value addition in coconut is abysmally low in the north eastern states. Hence, appropriate interventions are to be formulated and implemented to promote coconut-based enterprises on production and marketing of value-added coconut products. FPOs in coconut sector can also be encouraged to take up such enterprises.

Improvement in the general infrastructure for the development of farm sector and specific interventions in coconut sector as discussed above surely will usher in a bright future for coconut in the North East India.

CONCLUSIONS

Assam, Tripura and Nagaland are the major North Eastern states having coconut cultivation, together covering about 26,480 ha (as per 2020-21 statistics) and a total annual production of 175.88 million nuts. The average productivity of coconut is much less than the national average of 9430 nuts per ha. There is ample scope for enhancing the area under coconut cultivation in the North Eastern states having congenial agro- ecological situations pertaining to climate and soil. Besides, the productivity and income from the existing coconut holdings can also be considerably increased through better integration of technologies, especially improved varieties, integrated nutrient management, cropping/ farming systems and integrated pest and disease management.

The technical feasibility and economic viability of many of the recommended technologies for higher productivity and income from coconut farming have been demonstrated through the research conducted and front-line extension programmes organized by ICAR Research Centre,

Plate 1: Kalpa Jyothi

Plate 2: Kamrupa

Plate 3: Kalpa Mitra

Plate 4: Kera Chandra

Plate 5: Kera Karalam

Plate 6: Kalpa Samrudhi (MYD x WCT)

Plate 7: Chandra Sankara (COD x WCT)

Plate 8: Kera Sankara (WCT x COD)

Kahikuchi, however, field level utilization of the technologies recommended for coconut cultivation is not at a satisfactory level due to various factors.

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REFERENCES

R.C. Srivastava, D.R. Singh, R.Sudha, I.Jaisankar, Shrawan Singh, V.Damodaran, V.B. Pandey, L.B. Singh: Proceedings of National Workshop cum Seminar on "Status and Future Strategies for Horticulture Development in A&N Islands" 23-25 Jan 2009.

ICAR-Central Plantation Crops Research Institute, Kasargod 671 124, Kerala, India: "Challenges and Prospects of Coconut Cultivation in the North East India".

Palaniappan, S.P. 1985. Cropping systems in the tropics-Principles and Management. Wiley Eastern Ltd. and Tamil Nadu Agricultural University, Coimbatore.

Chatterjee, B.N. and P.K. Das. 1989. Morphology, growth physiology and seed production in forage crops. In forage crop production- Principles and Practices. Oxford and IBH publication co., New Delhi. pp 95-175.

Dasthagir, M.G. 1986. Agroforestry at Tamil Nadu Agricultural University. A review of trials and experiments. Dissertation submitted to the University of Wales, Magister in Scientia in Environmental Forestry, UCNW. P 76

Vinaya Rai, R.S., C. Swaminathan and C. Surendran. 1990. Studies on intercropping with coppice shoots of *Eucalyptus tereticornis* sm. J. Trop. For. Sci. 3: 97-100.