

Challenges and Prospects of Coconut Cultivation in North East India

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Coconut, the 'Kalpavriksh' 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 a substantial number of farm families. India ranks first in terms of production and productivity of 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 Andhra Pradesh together contributes 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 Eastern states viz., Arunachal Pradesh, Nagaland, Manipur, Meghalaya and Mizoram are also having small extent of coconut cultivation.

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

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

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

The coconut sector in the northeast region has been witnessing substantial growth over the past two decades (Table 1). During the period from 2000-2021 to 2020-2021, 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 increase 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). Coconut is grown in most of the districts of Assam covering the Upper (Charaideo, Dhemaji, Dibrugarh, Golaghat, Jorhat, Lakhimpur, Majuli, Sivasagar and Tinsukia), Central (Dima Hasao, Hojai, East Karbi Anglong, West Karbi Anglong, Morigaon and Nagaon), Lower (Baksa, Barpeta, Bongaigaon, Chirang, Dhubri, Goalpara, Nalbari, Kamrup (M), Kamrup (R), Kokrajhar and South Salmara-Mankachar), Hills

and Barak Valley (Cachar, Hailakandi and Karimganj) and North Assam (Biswanath, Darrang, Sonitpur and Udalguri).

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 to 2,745.9 mm prevailing in these areas. The land utilization pattern in the state indicate the huge potential for area expansion of plantation crops including coconut. In Tripura, coconut is cultivated in small and marginal 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. PH of soil ranges from 4.8 to 6.8. Dimapur, Peren, Wokha, and Chumoukedima are 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.

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

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, 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.

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, seednut 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 more 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. The coconut varieties found suitable for cultivation in North East India include Kalpa Jyothi (dwarf variety), Kamrupa, Kalpa Mithra, Kerachandra and Kera Keralam (tall varieties) and Kalpa samrudhi, Chandra sankara and Kera sankara (hybrid varieties). Besides, scientific recommendations suitable for coconut cultivation in North East India pertaining to agro-techniques for nursery management, planting and after care, management of juvenile palms, integrated nutrient management, water management and irrigation have also been evolved. Non-adoption or low level of adoption of these technologies results in low productivity of coconut in the region. Hence, 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 more 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.

A variety of intercrops like tubers and *rhizomatous* spices (tapioca, elephant foot yam, sweet potato, greater yam, lesser yam, chinese potato, colocasia, Ginger (*Var. Nadia*) and turmeric), pulses and oilseeds (cowpea, green gram, black gram, ground nut), vegetable crops (pumpkin, ash gourd, chillies, potato, french bean, snake gourd, amaranthus, brinjal, bottle gourd, ridge gourd, *Coccinia* sp., *Dolichos* bean, Cauliflower, curry leaf and tomato), fruit crops (Banana (*Var. Chenichampa*, Robusta, grand nine) pineapple, assam lemon and papaya), flowering crops (*Heliconia* sp., *Anthurium* sp., *Jasminum* sp., gerbera, tuberose, gladiolus and marigold) and fodder grass and legumes can be raised in coconut gardens up to 5 to 7 years.

During the second growth phase of palms, i.e., 5-20 years of age, growing of other crops in the interspace may be difficult due to poor sunlight availability. However, crops like colocasia, some varieties of banana like Robusta, Grand Naine etc., fodder grass, shade loving medicinal plants etc. which can tolerate shade can be cultivated in this phase.

After the palms attain a height of 5 to 6 m (above 20 years) *i.e.*, in older plantations, the crops mentioned in the initial stage and perennials like cocoa, vanilla, black pepper, cinnamon, clove and nutmeg, sapota and medicinal and aromatic crops Patchouli, Indian long pepper (*Piper longum*) can be grown as mixed crops along with the intercrops.

From the experimental plot on high density multispecies cropping system (HDMSCS) maintained at HRS Kahikuchi, which involves coconut and other crops like black pepper, ginger, assam lemon, banana and pineapple, it is observed that an average annual net income of 3 to 4.5 lakh rupees can be obtained per ha. Besides, 25 tonnes of organic wastes are also made available per ha which can be recycled and applied to the crops as vermicompost. In HDMSCS if organic recycling is effectively carried out, we can reduce the chemical fertilizer input for coconut to two third of the recommended dose.

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.

Community action for integrated pest and disease management

Coconut growers of the region face difficulties due to the crop loss caused by incidence of pests like



rhinoceros beetle, red palm weevil, eriophyid mite and white fly, disease like stem bleeding etc. Though technologies for the integrated management of these pests and diseases are made available, their field level adoption is very low. Community approaches on a contiguous area basis is to be encouraged among the coconut growers to effectively adopt IPM/IDM practices to avoid crop loss.

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.