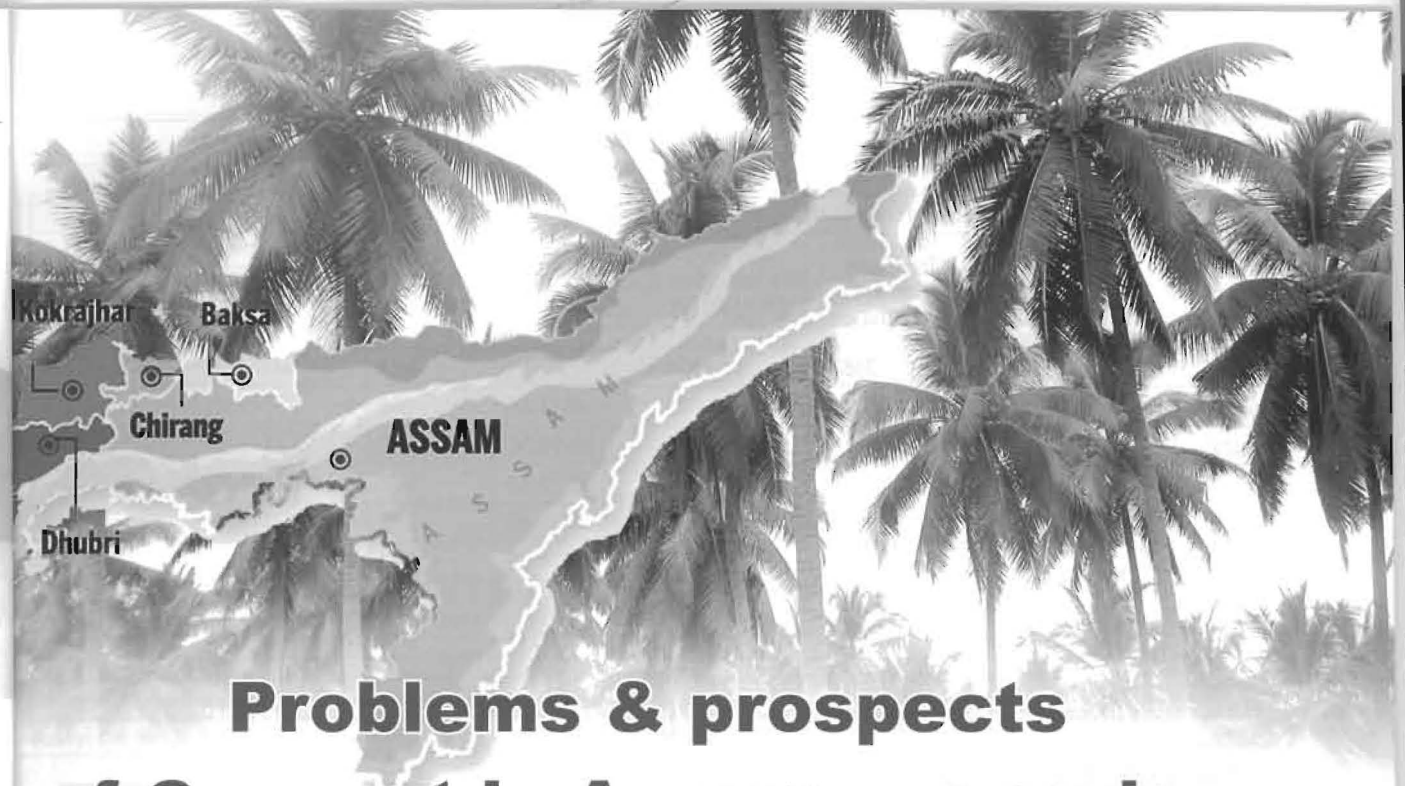

Problems & prospects of Coconut in Assam – a review

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Coconut is produced in 92 countries worldwide in around 12.20 million hectares. World production is estimated about 70,000 million nuts with an average yield of 10,345 nuts per ha. India is the leading coconut producing country, having contribution of about 31 per cent of total production with coverage of almost 17.54 per cent of world coconut area. Coconut production continued to be concentrated in three countries namely, Indonesia, Philippines and India having share of about three-fourth of both global area and production. More importantly, India's share in global coconut production is on the rise and the country earns a lot from this commodity.

In India, coconut is widely produced in four southern coastal states viz., Kerala, Karnataka, Tamil Nadu and Andhra Pradesh. These states together cover about 88 per cent of total area and almost 90 per cent of the coconut production in the country. The north eastern states share only 1.50-1.56 per cent of country's coconut area of which Assam has the lion's (about 63 per cent of area and about 77 per cent of production) share (Table 1).

Assam is traditionally rich in horticultural production due to its diverse and unique agro-climatic condition which is conducive for growing wide range of horticultural crops like fruits, vegetables, flowers, spices, nuts, tuber crops and medicinal and aromatic plants. The world citrus belt encompasses Assam within it. Horticultural crops occupy about 20 percent of the cultivated area of Assam (Table 1) and annually produce more than 67 lakh MT of various horticultural products besides nut crops, flowers and medicinal & aromatic plants thus contributing significantly towards food and nutritional security of the state. According to the Directorate of Horticultural and Food Processing, the growth rate of fruits production, spices and vegetables of Assam was 19.18 percent, 6.40 percent and 72.20 percent respectively during the last ten years.

During the fifth plan period, the necessity of accurate statistics on area and production of plantation crops arecanut and coconut was felt for formulation of various agricultural development programmes. Since then the sample survey for estimation of area and production of arecanut & coconut are being conducted annually by Directorate of Economics and Statistics, Assam. In Assam, major coconut producing districts (Table 2)

Table 1: Status of coconut in land allocation : a comparative look in North-East Year : 2013-14

States	Total Geographical Area (000'ha)	Total Cultivable Area (000'ha)	Total Horticultural Area (000'ha)	Coconut Area ('000 ha)	% share in total horticultural crop area	Production (Million nuts)	Productivity (Nuts/ha)
Assam	7843.8	3387	626.0	21.14 (63.27)	3.38	237.49 (77.13)	11234
Nagaland	1657.9	626	74.5	1.45 (4.34)	1.95	16.32 (5.30)	11255
Tripura	1048.6	310	126.2	6.93 (20.74)	6.68	28.41 (9.23)	4100
Arunachal*	8374.3	293	103.7	0.800 (2.39)	0.77	3.84 (1.25)	2667
Meghalaya*	2242.9	1074	113.6	1.050 (3.15)	0.92	5.21 (1.69)	3065
Mizoram	2108.1	445	120.3	0.04 (0.12)	0.03	0.16 (0.05)	4000
Manipur*	2232.7	164	84.1	2.000 (5.99)	2.38	16.47 (5.35)	5067
Total	25508.3	6299	1248.4	33.41	2.68	307.9	9216

*Source: http://www.icarzcu3.gov.in/land.htm *Estimated data of coconut, http://agricoop.nic.in/, http://www.coconutboard.nic.in*
Figures in parentheses indicate corresponding share in Total of North-East

are Nagoan, Sonitpur, Golaghat (all in central Assam covering about 30 per cent of state area), Barpeta, Kamrup, Nalbari, Baksa, Bongaigaon (Table 2)(all in Western Assam covering about 30 per cent of state area). But it deserves to mention that almost all the districts of Assam have ample potential for coconut cultivation which is to be tapped.

A review of progress of coconut in Assam state since 1985-86 has been undertaken and presented in Table 3. It can be observed that coconut area, production and productivity have increased about 164.25 per cent, 337.37 per cent and 65.52 per cent respectively in 2014-15 since 1985-86. Thus, Simple Annual Growth Rates (SAGR) in these growth parameters happens to be 5.48 per cent, 11.25 per cent and 2.18 for area, production and productivity respectively. The state also experienced negative growth in all these parameters but during different time phases. For example, acreage under coconut slumped since 2000-01 till 2010-11, production slumped since 1995-96 to 2000-01 and again since 2005-06 to 20100-11, productivity slumped since 1990-91 till 2000-01 and again since 2005-06 till 2010-11. Thus, instability in all these growth parameters of coconut is noticed in the state.

Having identified the prima facie growth scenario in the data series, the trend is analysed here. The entire data series has been divided into two sub-periods : Period I – 1985-86 to 1999-2000, Period II – 2000-01 to 2014-15 and growth behaviors were identified by employing exponential form of trend equation $Qt = aebt$ where, Qt represents output (area / production / productivity), b represents coefficient on time and 'a' represents intercept term. The exponential form of trend equation has been employed for its inherent advantage of obtaining Compound Annual Growth Rate (CAGR) straightway

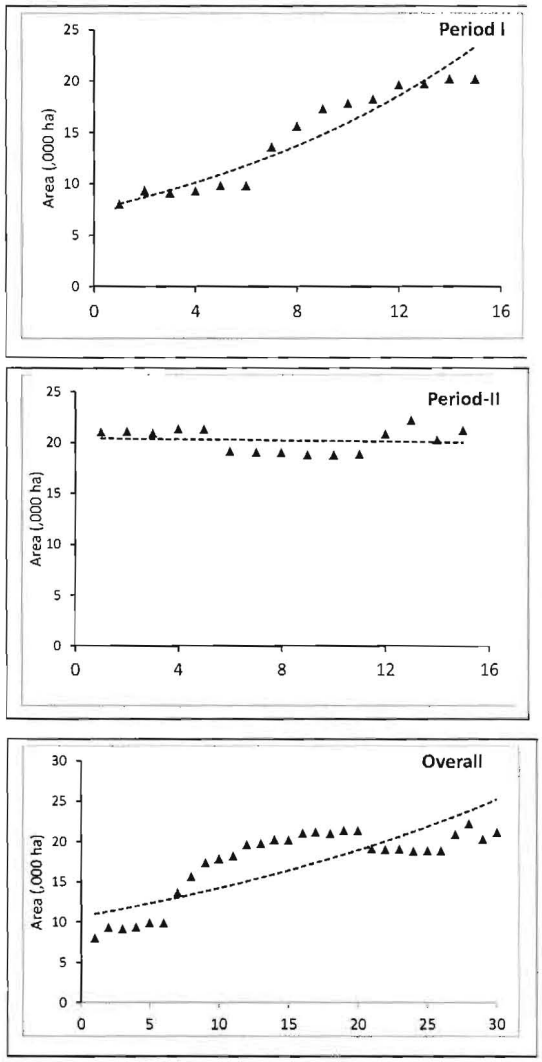

Table 2 : Major coconut producing districts in Assam

District	Total Geo-graphical Area (000'ha)	Total Cultivable Area (000'ha)	Total Horti-cultural Area (000'ha)	Coconut Area ('000 ha)	% share in total horticultural crop area	Production (Million nuts)	Productivity (Nuts/ha)
Nagaon	411.03	291.339	14.259	3.35 (15.82)	23.46	15.117 (10.30)	4520
Barpeta	264.51	263.797	10.001	1.93 (9.13)	19.30	24.996 (17.03)	12952
Sonitpur	532.298	253.46	14.208	1.882 (8.90)	13.24	13.801 (9.40)	7334
Kamrup R	308.684	181.901	14.2	1.253 (5.93)	8.82	12.45 (8.48)	9937
Golaghat	354.07	180.097	12.35	1.053 (4.98)	8.53	11.878 (8.09)	11281
Nalbari	100.483	112.689	6.05	1.38 (6.53)	22.81	9.945 (6.78)	7207
Baksa	196.108	128.119	5.834	1.15 (5.43)	19.71	7.984 (5.44)	6943
Bongaigaon	151.999	108.785	4.909	0.63 (2.98)	12.83	6.444 (4.39)	10229
Udalguri	167.393	159.814	5.436	0.714 (3.38)	13.13	4.957 (3.38)	6943
Goalpara	184.262	128.83	8.206	0.575 (2.72)	7.00	4.758 (3.24)	8275
T o t a l	7850.005	4099.462	209.118	21.141	10.10	146.776	6943

Source: Directorate of Economics and Statistics (http://ecostatassam.nic.in/), www.coconutboard.gov.in

from the equation (Boyce, 1987). Obtained analytical result is presented in Table 4 and Fig. 1-3.

By scrutinizing the figures (Fig. 1-3) and the Table 4, it can be construed that both area and production of coconut in the state progressed remarkably well during the first period i.e., 1985-86 to 1999-2000. During this period the concerned area progressed significantly at CAGR 7.6 per cent and production progressed significantly at 6.9 per cent and correspondingly the trend line progressed successively upward (Fig 1,2). In the second period (i.e., 2000-01 to 2014-15) the coconut area shows a discernible negative CAGR (-0.2 per cent) though production and productivity grows non significantly positive. Overall (over thirty years), CAGR, though significantly positive (for area 2.9 per

Table 3 : Coconut in Assam : a journey over the years

Year	Area (,000 ha)	% change	Pro-duction (million nuts)	% change	Pro-duc-tivity (Nuts/ ha)	% change
1985-86	8.0	-	54.3	-	6787	-
1990-91	9.8	22.50	78.9	45.30	8051	18.62
1995-96	18.2	85.71	140.3	77.82	7709	-4.25
2000-01	21.0	15.38	136.0	-3.06	6476	-15.99
2005-06	19.1	-9.05	204.9	50.66	10728	65.66
2010-11	18.8	-1.57	147.1	-22.96	7824	-21.73
2014-15	21.1	12.45	237.5	50.44	11238	33.79

Source : www.coconutboard.nic.in

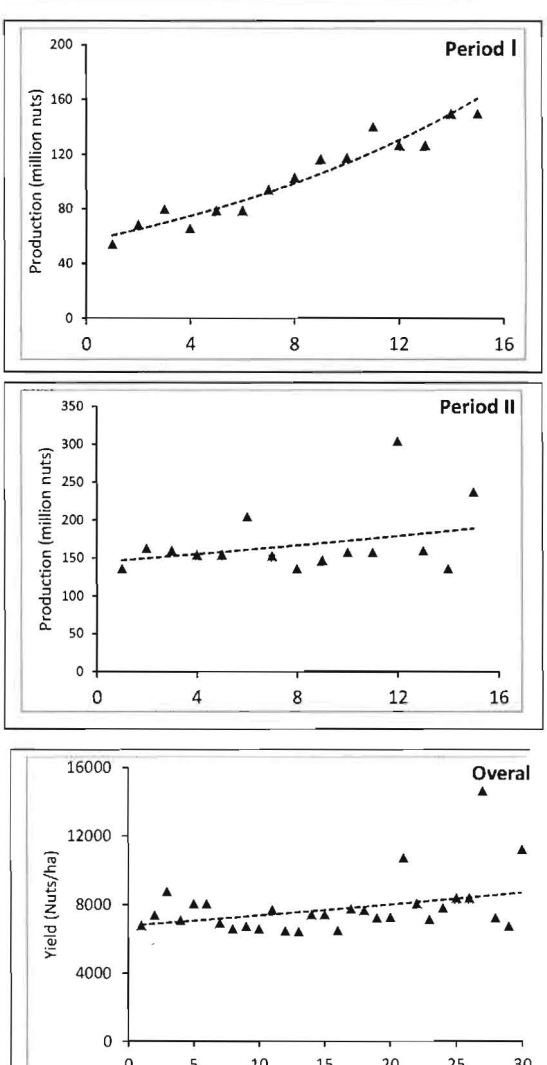

Figure 2 : Trend in coconut Production in Assam over the years

Table 4 : Time series analysis (period I, period II, overall : area, production, productivity)

Growth parameters	Period I (1985-86 to 1999-2000)			Period II (2000-01 to 2014-15)			Overall (1985-86 to 2014-15)		
	Trend Equation	R2	CAGR	Trend Equation	R2	CAGR	Trend Equation	R2	CAGR
Area	$Y = 7.46e^{0.076\,t}$	0.92	7.60**	$Y = 20.44e^{-0.002t}$	0.014	-0.20^{NS}	$Y = 10.67e^{0.029t}$	0.63	2.90**
Production	$Y = 56.63e^{0.069t}$	0.93	6.90**	$Y = 144.16^{e0.018t}$	0.13	1.80^{NS}	$Y = 72.20^{e0.037t}$	0.73	3.71**
Yield	$Y = 7586e^{-0.006t}$	0.10	-0.60NS	$Y = 7051e^{0.0196t}$	0.16	1.96^{NS}	$Y = 6767e^{0.008t}$	0.17	0.84^{NS}

*Significant at 5% level; ** Significant at 1% level; NS : Non Significant

cent, for production 3.71 per cent, for productivity 0.84 per cent) are rather sluggish in nature.

There may be several technical, institutional and social problems for this slow growth. However, following major factors can be cited for the slow growth of coconut cultivation in Assam :

- Non-availability of standard planting material : CDB DSP farm Abhayapuri serve as the only source for quality planting material in the State as well as entire north eastern states. CPCRI and KVKs produces few coconut seedlings. Though the performance of West Coast tall, Hybrid D X T and Kamrupa released by Assam Agricultural University are excellent, but are not available in large scale for planting.
- Non-adoption of scientific management practices by the farmers : The farmers are not following the scientific method for cultivation. Mostly, they are not in the habit of using fertilizer for coconut trees. Neither they are aware about crop improvement, crop protection, production and cropping system resulting in immature nut fall in the region. Boron deficiency is one of the major problems reported in Assam but the farmers are not much aware about that.
- Difficulty in mechanized farming : Fragmented land holding pattern, scattered plantation, and the small size of plots make it really difficult for mechanized farming which is highly essential for cost as well as time effectively.
- Absence of Coconut-based industry : Lack of coconut based industrial units reduces the farmers intrest to adopt large scale cultivation.
- Incidence of Diseases-Pest and non adoption of management practices: Assam indicated that the incidence of stem bleeding ranged between 1-16% in different areas under districts of Kamrup, Nagaon, Morigaon and Darrang. The incidence of crown choke was estimated to be maximum 20% in some areas of Kamrup. Similarly, preliminary survey carried out in different areas of Kamrup, Nagaon, Morigaon, Goalpara and Udalguri districts of Assam revealed that districts like Morigaon and Nagaon had maximum incidence of Eriophyid mite attack while Morigaon district has the highest mite incidence (35.75%) and intensity (76.96%) followed by Nagaon (Acharya et al,) .
- **Sociological impediments :** There is a common belief amongst people that fat content is high in mature coconut flesh, so though tasty, it increases fat in the body. Therefore, this nut is to be avoided in every day cooking. Hence coconut is not a preffered cooking medium for daily cooking. So, this notion of people regarding coconut is definitely an impediment for coconut development in North East. Mature nut is used for some special purposes in Assam, like preparation of sweet dishes like laddu & pitha during Bihu festival and Durga puja. Also, it is used while offering prayer to gods and goddesses. Tender coconut water is generally consumed by the people when they feel sick or think that consuming this water will give them vigour.

In order to overcome these bottlenecks the following steps can be undertaken.

- **Cluster District Approach :** Cluster of districts are to be formed with potential or focused districts where implementation of all relevant schemes, specially, area expansion and coconut nurseries has to be concentrated during the coming four or five years. Depending on the performance of schemes, popularity of coconut cultivation, adoption of technologies and the number of districts under the cluster may be planned.
- **Promotion of Private Coconut Nursery Units:** Private coconut nurseries, regional nurseries and nucleus seed gardens are to be promoted on large scale through advertisement, publicity etc. so that in the near future

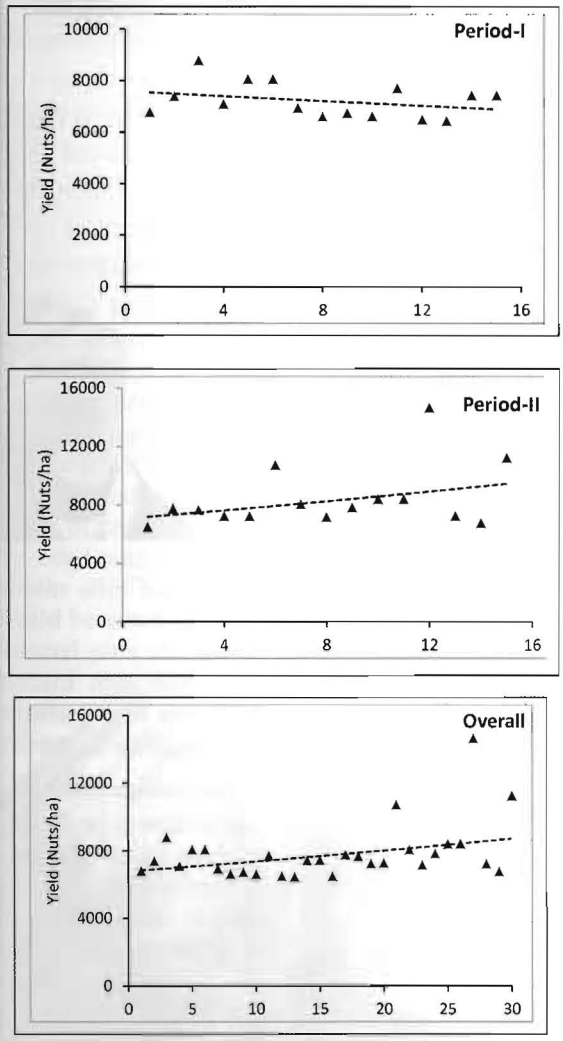

Figure 3 : Trend in coconut yield in Assam over the years

there will be no dearth of quality planting materials of the tall & dwarf varieties.

● **Encouragement & Promotion of FPO :** Due priority is to be given to the formation of Farmer Producer Organisation so that CDB schemes can be implemented through them successfully. But awareness and capacity building is very much needed to strengthen the societies so that they can take up schemes like AEP (Area Expansion Programme), LODP (Laying of Demonstration Plot), OMU (Organic Manure Unit), Nurseries etc. & skill development training programmes like FOCT (Friends of Coconut Tree), Handicraft, convenience food etc.

Facilitating Market Linkage : Market backward and forward linkages should be established very strongly. Direct marketing by the farmers in the wholesale/retail markets is to be facilitated. FPOs can play a major role in this sector like the FPOs formed under SFAC in the NVUIC project of Government of India.

Coconut-based Multi cropping System : Successful models of coconut based multiple cropping system are to be developed for NE India so that steady income generation from coconut orchards are to be ensured. Trials can be done in farmers field as well as in the farm with the crops like cocoa, nutmeg, banana, spices, pineapple, lemon etc. Best model of intercropping, based on income generation and healthy plant nutrition is to be developed.

Incubation Centre : One incubation centre may be developed in collaboration with Indian Institute of Crop Processing Technology, Government of India. Entrepreneurs may hire machineries for production of coconut products like cookies, biscuits, dessicated coconut powder, milk cream, virgin coconut oil etc.

● **Wide scale mass communication :** Publicity of CDB schemes, benefits of cultivation, value addition etc. are to be done through TV, Radio, Newspapers, Magazines etc. Printing and distribution of leaflets/ booklets in all NE languages like Assamese, Mizo, Nagamese, Bengali, Khasi etc may also be undertaken.

Abstract

Coconut, a plantation crop, plays an important role in the agricultural economy of Assam, a North-Eastern state in India. North-eastern states share about 1.56 per cent of country's coconut area in which Assam supplied the major bulk (about 77 per cent). But the state lags substantially behind in all the growth parameters viz. coconut area, production and productivity. Time series analysis for thirty years (1985-86 to 2014-15) in Assam shows a distinctly reverse picture in growth in two sub-periods (Period I : 1985-86 to 1999-2000 & Period II : 2000-01 to 2014-15). Spectacular growth has been noticed in sub-period I (CAGR for area & production were 7.6 & 6.9 per cent per annum respectively) which slumped drastically in period-II (CAGR for area & production was -0.20 per cent per annum and 2.80 per cent per annum respectively). Lack of coconut-based industrial units, rather subsistence nature of farming, lack of awareness etc. are thought to be responsible for this tardy growth especially in the 21st century. The cluster district approach, promotion of coconut nurseries for quality planting material, private seed producing entrepreneurs, encouraging coconut-based multi-cropping system and especially in non-traditional areas are some of the measures for rather faster growth of coconut economy in the state.

References : *Gobinda Ch Acharya*, Ranjana Chakrabarty and Himadri Rabha, Central Plantation Crops Research Institute, Kahikuchi, Assam*

Boyce, J.K (1987). Agrarian Impasse in Bengal. Oxford University Press. http://www.icarzcu3.gov.in/land.htm, http://agricoop.nic.in/, http://www.coconutboard.nic.in, http://ecostatassam.nic.in/ ■