

ICAR-Central Plantation Crops Research Institute, Research Centre, Kahikuchi intervention in doubling farmers income of Assam – A farmer success story

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Preamble : The Central Plantation Crops Research Institute, Research Centre, Kahikuchi came into existence in 1959 as Regional Arecanut Research Station under Central Arecanut Research Station (CARS). Later, the Centre was amalgamated with the Central Plantation Crops Research Institute in 1970 (Indian Council of Agricultural Research) as one of the Research Centre with its headquarters at Kasaragod, Kerala. Since inception, the Research Centre, Kahikuchi is conducting purpose-specific research on plantation crops specifically to cater to the needs of the farming community of North East region of India. The Centre has developed various farmer-friendly viable technologies like arecanut based high density multispecies cropping system models, standardization of irrigation requirement of arecanut, *In situ* water conservation measures suitable for water-shed area of North East region, intercropping of seasonal horticultural crops in arecanut plantation, vermicomposting of biowaste from arecanut and arecanut based cropping system, development of disease management practices against major diseases of arecanut, standardization of media for production of quality planting materials of arecanut seedlings in secondary nursery, development of integrated nutrient management practices for high yielding varieties of arecanut. Apart from that, *In vitro* studies on the efficacy of locally available botanical and chemicals against the causal organism of major diseases and pests of arecanut were carried out for further scientific study. The research is also carried out to identify suitable varieties/ germplasms of other spices and plantation crops; like black pepper, coconut, cocoa etc for the North East region of the country. Amongst the achievements, development and release of arecanut variety “Kahikuchi” for commercial cultivation in Assam and other North Eastern Region of the country is creditable.

However, lack of awareness is one of the most important factors for non-adoption of these viable technologies among the farming community. One of the

mandates of ICAR-Central Plantation Crops Research Institute, Research Centre, Kahikuchi is the transfer of improved technologies to the farming community of North East region. The Centre has been disseminating the improved technologies to the farmers through various training and demonstration programme. Sri Bhabani Kalita, is such a farmer who has been keenly involved in the adoption of CPCRI-led technologies in his field in form of demonstration gardens and on-farm trial.

Documentation of the success story of Sri Bhabani Kalita is highlighted in brief in this article.

Brief information of farmer – Sri Bhabani Kalita: Sri Bhabani Kalita is a farmer from Nahira village, Rampur block of Kamrup (Rural) district, Assam. He has been involved in farming since 1990 in an area of 1.6 ha that was inherited from his forefather. Later he has purchased 2.40 ha of land during 2002. Out of 4.0 hectare, 1.28 ha was used for cultivating rice. The remaining area of 2.27 ha was kept fallow land. He was engaged most of the time for growing both the *Boro* and *Sali* rice cultivation. He could meet only his family demand for food but no extra income was earned by growing rice only. So, he decided to take up high value horticultural crops to increase his farm income. He visited ICAR-CPCRI, Research Centre, Kahikuchi to take training and was suggested to take up arecanut based cropping system in his fallow land. Later in the fallow land, the cropping system model consisting of arecanut, banana and Assam lemon was started in an area of 0.40 ha during 2015.

ICAR-Central Plantation Crops Research Institute intervention in doubling farmer’s income: Sri Bhabani Kalita was given training during 2015 on arecanut based cropping system model developed at the Research Centre, Kahikuchi. Later, an arecanut based cropping system model consisting of banana and lemon was established in an area of 0.40 ha. Quality planting materials of arecanut var. Kahikuchi, banana var. Malbhog and Assam lemon was supplied to him during 2016.



Sri Bhabani Kalita



Sri Bhabani Kalita plot before intervention



Sri Bhabani Kalita plot after intervention

Technologies adopted: Sri Bhabani Kalita has planted arecanut as a main crop at a spacing of 3.0 m x 3.0 m. Component crops like banana, lemon, drumstick and ber were planted in single line of four arecanut palms and pineapple was planted at the boundary of the field. The arecanut palms were planted during 2016 and a total of 400 arecanut palms (*var.* Kahikuchi), 30 ber, 50 Assam lemon, 400 pineapple and 400 banana (*var.* Malbhog) were planted in the cropping system model. Fertilizer and FYM are applied twice; first application during onset of monsoon and second application during November-December without basin opening and normally broadcasted in the field. He also does intercultural operation like weeding twice in a year. Irrigation during dry period is a regular practice. Flood system of irrigation is adopted using bore well. He has adopted plant protection measures in consultation with ICAR-CPCRI, Research Centre, Kahikuchi for different diseases and pests. Most of the farm operational work was done by him. Drumstick and ber were used for domestic purposes.

Income generation: Through the cropping system model till now he could generate Rs.2, 33,162.00 through sale of banana and lemon for the last four years (2016-2019) from 0.40 ha of land. Banana was found to be a profitable intercrop in arecanut plantation. During the first year, he could generate a net income of Rs. 33,321.00 and subsequently in the second, third and fourth year, the annual net income was increased to Rs. 57,091.00, 63,935.00 and 78,815.00, respectively, through sale of banana and lemon. Banana and lemon are sold in local market available nearby. The cost of banana and lemon was about Rs. 40/- per hand and Rs. 2/- per fruit, respectively.

Sustainability and scope of cropping system: Monocropping of arecanut and coconut is normally adopted by the farmers of Assam. Due to fluctuation in market price, unexpected crop loss due to pests and diseases, natural calamities and variation in demand and supply of a particular agricultural commodity, the farmers income goes down drastically. Cropping system model consisting of arecanut, lemon and banana is a viable commercial option that reduces the risk of price fluctuation in market. Research conducted at ICAR-Central Plantation Crops Research Institute, Research Centre, Kahikuchi have shown that intercropping of arecanut with black pepper, Assam lemon and banana are highly profitable intercrops than monocropping. A data of last 11 years revealed that a net return of Rs. 1,14,250 to 2,06,442 was obtained from one hectare of land (Acharya and Singh, 2014). Since



Established farm of Sri Bhabani Kalita, Nahira village, Kamrup (Rural)

arecanut can be sold in different forms as raw, *Bura tamul* and chali, there is no problem for selling arecanut in the market of Assam. Moreover, there is a continuous recycling of nutrient due to fall of arecanut leaves, banana pseudostems and leaves in the system which makes the soil more productive. The greater advantage of cropping system in arecanut is the ability to provide substantial increase in yield per unit area through better utilization of three limited natural resources like land, water and light. Bhat and Leela (1968) found that more than 80 per cent of the roots of arecanut are within a radius of 75 cm from the base of the palm spaced at 2.7 m x 2.7 m. The normal cultural operations were also confined within about 75 cm to 85 cm radius from the base. Thus arecanut palm

exploits only 2.27 square meter of land area out of 7.29 square meter area available for each palm. This estimate indicates that 68.9 per cent of land is not effectively utilized by the root system of arecanut palm. Multiple cropping in arecanut garden can more effectively utilized this unused land volume. Muralidharan (1980) reported that 32.7 to 47.8 per cent incident light rays pass down the canopy of a 14 years old arecanut garden depending upon the time of day. This light energy reaches the ground and gets wasted. Multiple cropping can advantageously utilize this waste energy in arecanut garden. This tremendous potentiality of multiple cropping in arecanut plantation to generate employment opportunity for getting sustained income from small size farm holdings has been adequately

Table 1: Income generated from arecanut based horticultural crops

Year	Crops	Expenditure cost (Rs.)				Total expenditure (Rs.) (A+B+C+D)	Yield of the crops	Gross income (Rs.)	Net income (Rs.)
		Planting material (A)	Fertilizer (B)	Labour (C)	Miscellaneous cost (D)				
2016	Arecanut	8,000.00	1,268.00	10,000.00	5,000.00	36,679.00	Nil	Nil	33,321.00
	Banana	4,000.00	6,960.00				250 bunches	70,000.00	
	Lemon	1,250.00	2,01.00				Nil	Nil	
2017	Arecanut	Nil	2,546.00	10,000.00	7,000.00	26,909.00	Nil	Nil	57,091.00
	Banana	Nil	6,960.00				300 bunches	84,000.00	
	Lemon	Nil	403.00				Nil	Nil	
2018	Arecanut	Nil	3,820.00	10,000.00	7,000.00	28,385.00	Nil	Nil	63,935.00
	Banana	Nil	6,960.00				320 bunches	89,600.00	
	Lemon	Nil	605.00				1,360 no. of fruits	2,720.00	
2019	Arecanut	Nil	3,820.00	10,000.00	7,000.00	28,385.00	Nil	Nil	78,815.00
	Banana	Nil	6,960.00				360 bunches	1,00,800.00	
	Lemon	Nil	605.00				3,200 no. of fruits	6,400.00	

demonstrated.

Profitability of intercropping in arecanut garden:

Since arecanut take almost five to six years to start commercial bearing. Intercropping of horticultural crops like banana and lemon helps to generate income in the initial year of planting. It is evident from Table 1 that during the initial year, banana plantation alone in the system could generate net revenue of Rs. 33,321.00 with subsequent increase in the 2nd, 3rd and 4th year. In addition, intercropping of lemon was found to generate additional revenue from the 3rd years of planting. Beside, the system helps to recycle nutrients through fall of arecanut leaves, banana pseudo stem and leaves. This type of cropping system is highly profitable in state like Assam where the agro climatic condition is suitable for the growth of main and intercrops. The main crop will start bearing during six year and will help to generate additional revenue from the system. Thus, from a single piece of land, farmers will be

able to generate income from the main as well as intercrops. Mono-cropping of arecanut is now-a-days is not advisable in a garden where cropping system can be followed scientifically. The farmer has chosen this cropping system due to high income and easy management.

References:

Acharya, G.C. and Singh, L.S. (2014). Arecanut based cropping system: Alternative pathway to achieve sustainability in North Eastern India. *Indian J. Arecanut, Spices & Medicinal Plants*, **16**(1): 23-26.

Bhat, K.S. and Leela, M. (1968). Cultural requirement of arecanut. *Indian Farming*, **18** (4): 8-9.

Muralidharan, A. (1980). Biomass production, plant interaction and economics of intercropping in Arecanut. Ph.D. Thesis, UAS, Bangalore, 271 pp.

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