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A study on Coconut Cultivation practices and satisfaction among the farmers in Theni district

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Abstract
The coconut, in its natural state, adorned with gold or silver, was part of many religious and social celebrations' offerings. Coconut (Cocous nucifera) is a tropical edible, oilseed, and cultivated perennial plant known as the tree of life; that contributes greatly to India';s economy. The coconut palm has been around since the prehistoric times. There is enough evidence that it happened around 3000 years ago in India. The coconut was once known as Nux idica; or Indian nut; in the Middle Ages. It was also known as the Nargil tree, or tree of life; during the time. The coconut palm is known in Western literature by the Malayalam word Tenga; which is related to Tamil Tennai The coconut is known as; Kalpavriksha; because of its diverse cultivation and numerous uses of its products (Tree of Heaven). The coconut palm's fruit, sometimes known as the nut; is its most essential and economically valuable product. It has an outer exocarp, which is a thick covering of fibrous fruit known as the husk, and a hard protective endocarp, or shell, underneath it. The white albuminous endosperm or coconut meat; covers the shell, while the inner cavity is filled with a clear, sweet refreshing liquid known as coconut water.

Keywords: Coconut, Kalpavriksha, Cultivation, Satisfaction

Introduction
Agriculture has dominated the economic development of both developed and developing countries. India is an agricultural country, with agriculture employing a third of the people directly or indirectly. Since the time immemorial, agriculture has been the backbone of the Indian economy. The production of oilseeds occupies a significant position. Coconut is one of the most important and abundant sources of vegetable oil, which is used for both edible and non-edible purposes. A vast number of small and marginal farmers in peninsular India rely on the coconut for their livelihood. Coconut farming is extremely important in India's rural economy. In terms of coconut output, India is the world's leading country. India is the world's third-largest producer of coconuts, with 1.78 million hectares under cultivation. The coconut palm and its products are a major source of income for a big portion of the tropical rural population, and they also contribute significantly to the total export profits of various Asian and Pacific countries. It can be found in the Malay Archipelago, Southeast Asia, India, Sri Lanka, the Pacific Territories, and the West Indies, among other humid tropics.Due to its adaptability, coconut is the most widely cultivated and used nut in the planet. One of the most useful plants is the coconut palm. It is grown in more than 80 countries throughout the world. The Philippines and Indonesia are the world's number one and second largest coconut producers, respectively. The coconut palm has been the foundation of an essential life system for millennia, not only for island and coastal people in the humid tropics, but also for inland parts of India, the Philippines, Indonesia, and Thailand. India is currently ranked third in the world for coconut output, having produced 16.9 billion nuts from a planted area of approximately 1.89 million hectares. India is also the most productive coconut-producing country in the world in terms of productivity.

Objectives of the Study
Considering the cultivation issues of coconut and satisfaction among the farmers in Theni district, the study was carried out with the following objectives:

- To study the cultivation practices of coconut farmers in the Theni district
- To determine the level of satisfaction among farmers in Theni district with regard to institutional support for coconut production and marketing

Scope of the Study

The purpose of this study is to look into the production and marketing of coconut in the Theni district. Farmers in the five taluks of Theni district, namely Theni, Periyakulam, Andipatti, Bodinayakkanur, and Uthamapalayam, are included in the study. Coconut manufacturing and marketing entails a variety of operations. As a result, only the most common practices in coconut production and marketing are examined in this study.Furthermore, the study primarily focuses on the reasons why farmers select coconut farming, farmers' satisfaction with coconut cultivation, coconut growers' production problems, farmers' satisfaction with coconut marketing, and farmers' problems with coconut marketing.

Review of Literature

Ofwona Edith (1994) aimed to examine existing coconut-based farming systems in the research area, identify farm-level challenges that coconut producers experience, and provide solutions to these problems in order to enhance productivity and determine the relative profitability of coconut intercrops. Coconut farmers employed minimum amounts of combinations indicated for intercropping coconut and associated agronomic practices, according to the study with acceptable information dissemination to farmers. According to 90% of the farmers, access to financing was a barrier to purchasing coconut inputs. A weak price structure for nuts and copra was also a hindrance. According to 70% of respondents, the lack of an organised marketing system and timely market knowledge exacerbated the situation. Seventy per cent of responders reported seeing rhinoceros beetle-caused insect damage.

Haridas and Chandran (1995) studied the marketing system in Tamil Nadu in terms of commercial practices such as harvesting, grading, packaging, and marketing channels, as well as marketing costs, margins, price spread, and the effects of changes in consumer prices on farmer and retailer shares and marketing efficiency. The study's key findings include: the producer's share of the net retail price of Rs.3015.18 per 1000 coconuts; the wholesalers' mark-up per 1000 coconuts is Rs. 170; and the retailers' share is Rs. 265.28; and among these coconut marketing problems, lack of funding is the most pressing, followed by transportation and storage problems.

Coconut producers' production patterns and selling behaviour were researched by Yasotha and Padmanaban (1996). The field survey was conducted in three villages in Pollachi, Tamil Nadu: Nelligoundanpalayam, Pollachi North, and Ramapattinam. Thirty coconut growers were chosen at random, with ten farmers from each village. In the research region, the average number of coconut palms per acre was 83. The average monthly nut production is 570. Three key functionaries, namely local dealers, commission agents, and wholesalers, were involved in large nut disposals. The farmer from Nelligoundanpalayam sold 98.13 per cent of his coconuts to local traders, 1.87 per cent to commission agents, and none to wholesalers. Coconut farmers in Pollachi North sold 73.10 per cent of their crop to local dealers, 25.66 per cent to wholesalers, and 1.24 per cent to commission agents. Farmers in Ramapattinam sold 78.94 per cent of their coconuts to local dealers, with sales of 19.53 per cent to wholesalers and 1.53 per cent to commission agents.

Nagarajan (1998) found that 75 west coast tall variety palms per acre were regularly given organic and inorganic fertilizers at the rate of 30 kg of farmyard manure, 1 kg of urea, 2 kg each of super phosphate and muriate of potash, 1 kg of micronutrient mixture, and 2 kg of powdered neem cake per palm tree per year in a study of coconut productivity in Rangasamudram village in Coimbatore district. The nuts are sold locally for Rs. 4 per nut on average. Cultivation costs per acre are Rs.12000 per year. The total income is approximately Rs. 30000, whereas the net income is approximately Rs.18000.

Nair and Rajesh (2001) present a clear picture of the country's coconut area, output, and productivity, citing factors such as high yield types and hybrids, manures and fertilizers, irrigation, intercropping, and pests and diseases as contributors to increased production and productivity. To improve production and productivity, the study suggests the following strategies: establish a seed garden to produce seedlings of already proven high-yielding varieties / hybrids, identify varieties adapted to different agro-climatic conditions, evolve hybrids and tolerant varieties to important diseases, develop site-specific fertilizers and irrigation taking soil characteristics into account, and efforts should also be made to improve the pest management technologies that have previously been created in order to prevent crop losses.

The costs and margins of coconut marketing were investigated by Ramakumar (2001). This study's data was gathered by a field survey in four districts of Kerala: Thiruvananthapuram, Alappuzha, Thrissur, and Kozhikode. Farmers were hesitant to enter the processing sector, such as copra production and oil milling. The majority of the farmers sold their coconuts to copra manufacturers on the farm, who collected the coconuts, processed them into copra, and sold it to oil mills. Intermediaries have gained huge profit margins in this processing chain. When they sold coconuts through cooperative societies, they received a greater price as well as benefits from their participation in cooperatives, such as access to financing, medical care, and other services.

Despite the fact that India produces 25.57 per cent of the world's coconuts, Maheswari, et al. (2003), argue that the current marketing system for coconut and related products is unscientific, unstructured, and almost devoid of vertical integration. The lack of an effective marketing structure, on the other hand, creates many chances for intermediaries to profit from the market. They usually set pricing in practically all primary markets. In the coconut market, there are numerous wrongdoingsThe research recommends that coconut committees be formed in each block, with members from the Department of Agriculture, the Coconut Board, and producers meeting to discuss issues related to coconut production and marketing. Extension programs should be carried out by holding trade fairs and exhibitions to ensure market promotion and customer awareness.

Coconut Scenario in Tamil Nadu

Coconut cultivation plays a significant role in Tamil Nadu's agrarian economy. Tamil Nadu is the country's major coconut grower, followed by Kerala. Coconut is a perennial

crop that is grown on 4.40 lakh hectares in Tamil Nadu, with an annual production of 52140 lakh nuts and a productivity of 11560 nuts per hectare. The Coconut Development Board was founded by the Indian government with the goal of increasing the area and production of coconuts. Coconut is widely cultivated in Tamil Nadu, with the exception of the Nilgiris. The primary coconut-producing districts are Coimbatore, Thanjavur, Kanyakumari, and Erode. In Tamil Nadu, there are nine major coconut clusters. Table 3.5 lists the major clusters and sub-clusters in detail.

Table 1.1: Details of Sub-clusters in Nine Major Coconut Clusters of Tamil Nadu.

S. No.	Cluster	Sub-cluster
1	Coimbatore	Coimbatore, Mettupalayam, Pollachi, Sulur and Valparai.
2	Theni	Andipatti, Bodinayakkanur, Periyakulam, Theni and Uthamapalayam.
3	Dindigul	Attur, Dindigul, Kodaikanal, Natham, Nilakottai, Oddanchatram, Palani and Vedasandur.
4	Thanjavur	Kumbakonam, Orathanadu, Papanasam, Pudukottai, Paravurani, Thanjavur, Thiruvaiaru and Thiruvidaimarudur.
5	Erode	Bhavani, Erode, Perundurai Gobichettipalayam and Sathyamangalam.
6	Tiruppur	Avinashi, Dharapuram, Kangayam, Madathukulam, Palladam, Tiruppur and Udumalpet.
7	Dharmapuri	Dharmapuri, Harur, Palacode, Pappireddipatti and Pennagaram.
8	Krishnagiri	Denkanikottai, Hosur, Krishnagiri, Pochampalli and Uthangarai.
9	Salem	Attur, Edapadi, Gangavalli, Mettur, Omalur, Salem, Sankari, Valapadi and Yercaud.

Source: tn.nic.in/district.

Despite the fact that coconuts are grown in all 38 districts of Tamilnadu, coconut processing is concentrated in the districts of Coimbatore, Theni, Dindigul, Thanjavur, Erode, Tiruppur, Dharmapuri, Krishnagiri, and Salem, which account for the majority of coconut production, copra, and coconut oil in the state. The following are the main coconut-growing districts, together with their area and production:

Table 1.2: Major Coconut Growing Districts with Area and Production in 2028-19.

S. No.	Area Under Production		Production	
	District	Area (Ha)	District	Lakh Nuts
1	Coimbatore	87,702	Coimbatore	12,506
2	Tiruppur	61,249	Thanjavur	6,147
3	Thanjavur	38,116	Tiruppur	5,018
4	Dindigul	28,829	Vellore	2,769
5	Kanyakumari	24,574	Kanyakumari	2,759
6	Theni	21,444	Theni	2,126
7	Vellore	20,652	Krishnagiri	1,955
8	Tirunelveli	16,534	Dindigul	1,916
9	Krishnagiri	15,167	Dharmapuri	1,690
10	Erode	14,315	Virudhunagar	1,595

Source: Department of Economics and Statistics, Government of Tamil Nadu.

Table shows the area and coconut production of Tamil Nadu's ten major districts. Coimbatore, Tiruppur, and Thanjavur were the top three districts in terms of coconut palm cultivation in 2018-19. In terms of coconut producing area in 2019, Coimbatore leads with 87702 hectares, followed by Tiruppur (61249 hectares) and Thanjavur (38116 hectares). On an area of 16534, 15167, and 14315 hectares, the districts of Tirunelveli, Krishnagiri, and Erode are ranked 4th, 5th, and 6th, respectively. Coimbatore, Thanjavur, and Tiruppur are the top three districts for coconut production. Coimbatore leads the way in coconut production, with 12506 lakh nuts, followed by Thanjavur (6147 lakh nuts), and Tiruppur (5018 lakh nuts). Dindigul, Dharmapuri, and Virudhunagar are ranked 4th, 5th, and 6th, respectively, with 1916, 1690, and 1595 lakh nuts produced.

Coconut Cultivation Practices

Climate and Soil: Coconut palms grow in a wide range of climatic and soil conditions. It is mostly a tropical plant that grows between the latitudes of 20° N and 20° S. Coconut palms grow and yield best when the temperature is 27°C and the humidity is above 60%. The coconut palm can be found up to 600 m above the MSL. However, profitable coconut farms can be built near the equator up to a height of roughly 1000 m above MSL. Palm trees can withstand a wide range of rainfall intensity and distributions. However, for optimal development and yield, a well-distributed rainfall of roughly 200cm per year is ideal. Irrigation is required in areas when rainfall is limited and distribution is uneven.

Cultivars and Hybrids

Coconut cultivars are generally divided into two categories: tall and dwarf. West Coast Tall and East Coast Tall are two tall varieties that are frequently grown. In comparison to the tall type, the dwarf type is smaller and has a shorter lifespan. The two types of hybrids are Tall x Dwarf and Dwarf x Tall. There are ten distinct hybrid combinations available for commercial production, produced by Kerala Agriculture University and Tamil Nadu Agriculture University.

Planting Material

Seedlings from selected seeds are used to propagate the coconut. Seedlings that are 9-12 months old are often used for planting. Choose seedlings with 6-8 leaves and a 10-12 cm neck circumference at 9-12 months of age. The early splitting of leaves is another consideration for selecting coconut plants.

Site Selection and Preparation

Clayey soils, shallow soils with underlying hard rocks, and low areas prone to water stagnation should all be avoided. Before planting, make sure there is enough moisture, either by well-distributed rainfall or irrigation. Seedlings are planted on field bunds in reclaimed "kayal" areas. A pit size of 1mx1mx1m is recommended on loamy soils with a low water table. Take larger pits 1.2 m x 1.2 m x 1.2 m in lateritic soils with underlying rocks. The size should not exceed 0.75m x 0.75m x 0.75m in sandy soils.

Timing of Planting

At the commencement of the southwest monsoon, seedlings can be transplanted. If irrigation facilities are available, it is best to begin planting at least a month before the monsoon

so that seedlings have time to develop before the rains arrive. Planting can also be done before the northeast monsoon arrives.

Planting

The pits are filled to a depth of 50-60 cm with topsoil and cow dung / powdered compost before planting. Then, inside, cut a small hole to accommodate the nut linked to the seedling. To improve the physical state of the soil in lateritic zones, apply 2 kg of common salt per pit. It's a good idea to bury 25 to 30 coconut shells each stacked kernel to keep the moisture in.

Manuring

To obtain increased productivity, regular manuring is required from the first year of planting. With the commencement of the southwest monsoon, when the soil water content is high, 20-50 kg of organic manure should be applied per palm per year. Compost, farmyard manure, bone meal, fish meal, blood meal, neem meal, groundnut cake, and other organic fertilizers could be utilized for this purpose.

Irrigation

Coconut production is often limited by soil moisture in locations where there are lengthy periods of dry weather or where rainfall is scarce and unevenly distributed. During the summer, water the palm trees in ponds around the palm tree. Irrigation requirements differ depending on soil type and meteorological circumstances. An adult palm tree typically requires 600 to 800 litres of water every four to seven days. Irrigate ponds with a radius of 1.8 metres and a depth of 10 to 20 cm. Seawater can be used to irrigate adult palms in sandy coastal soils. Seawater should not be used to irrigate seedlings or very young palms for up to two years. Interrupting irrigation in irrigated gardens will severely affect the productivity and overall condition of the palms.

Mixed / Inter / Multi-Cropping

The mixed cropping schedule can be adjusted based on the canopy size and palm orientation. The coconut garden can be used to raise a number of intercrops such as pineapple, banana, elephant's foot yam, groundnut, chilli peppers, sweet potato, tapioca, and various vegetables. Cocoa, cinnamon, pepper, cloves, nutmeg, and other spices can be grown as mixed crops on ancient plantations.

Harvesting

Harvesting coconuts varies from region to region, based on the tree's yield, variety and the crop's intended use. Nuts are harvested once a month in extremely prolific gardens, which means that on the west coast, harvesting nuts, may be possible 6 to 12 times a year. Coconuts are typically harvested six times each year, or once every two months in low-productivity gardens. In the areas where nut shells are prioritized for retting, around 10 to 12 harvests are collected. Individual nuts can sometimes be gathered by chopping an entire bunch of nuts and lowering them using a coconut string connected to the bunch.

Demographic Profile of Coconut Farmers

Individual demographic profiles serve as unique identifiers. It contains basic information such as gender, age, education, occupation, and income, among other things. Table 4.1 shows the demographic profiles of the farmers in the sample.

Table 1.3:.1Demographic Profile of Coconut Farmers.

Farmer Demographics		No. of Respondents	Percentage
Gender	Male	427	76.25
	Female	133	23.75
Age (years)	Upto 30	31	5.54
	31-40	100	17.86
	41-50	311	55.54
	Above 50	118	21.07
Education	Upto SSLC	53	9.46
	H.Sc	211	37.68
	Degree	240	42.86
	PG and above	56	10.00
Annual income (Rs.)	Upto 250000	63	11.25
	250001-500000	178	31.79
	500000 - 750000	255	45.54
	Above 750000	64	11.43
Farmer's category	Marginal and small farmer	231	41.25
	Medium farmer	188	33.57
	Big farmer	141	25.19
Marital status	Married	488	87.14
	Unmarried	72	12.86
Family type	Joint family	108	19.23
	Nuclear family	452	80.71
No. of family members	Upto 5	357	63.75
	6 and 7	117	20.89
	7 and above	86	15.36
Taluk	Theni	60	10.71
	Periyakulam	100	17.86
	Andipatti	120	21.43
	Bodinayakkanur	80	14.29
	Uthamapalayam	200	35.71

Source: Primary Data.

76.25 per cent of the 560 farmers in the sample are male, while 23.75 per cent are female. 5.54 per cent of the respondents are under the age of 30, 17.86 per cent are between the ages of 31 and 40, 55.54 per cent are between the ages of 41 and 50, and 21.07 per cent are over the age of 50. SSLC education is held by 9.46 per cent of respondents, H.Sc is held by 37.68 per cent, graduates are 42.86 per cent and PG and above qualifications are held by 10% of respondents. The group with the highest annual income, Rs. 500000-750000, is followed by the group with the annual income, Rs. 250001-500000, with 31.79 per cent of respondents. 11.25 per cent of respondents have an annual income of less than Rs. 250000 and 11.43 per cent have an annual income of more than Rs. 750000. A total of 41.25 per cent of the 560 farmers in the sample are marginal and small farmers, 33.57 per cent are medium farmers, and 25.19 per cent are big farmers. Of the total, 87.14 per cent of farmers are married and 12.86 per cent of farmers are unmarried. A joint family accounts for 19.23% of farmers, whereas a nuclear family accounts for 80.71 per cent. 63.75 per cent of the 560 farmers in the sample had up to five family members, 20.89 per cent have six to seven family members, and 15.36 per cent have seven or more family members. The taluks of Theni, Periyakulam, and Andipatti are home to 10.71 per cent, 17.86 per cent, and 21.43 per cent of the respondents, respectively. Bodinayakkanur taluk has 14.29 per cent of the responders, while Uthamapalayam taluk has 35.71 per cent.

Cultivation Pattern of Coconut Farmers

Table 1.4: Cultivation Pattern of Coconut Farmers.

Particulars		No. of Respondents	Percentage
Cultivated area	Below 2.5 acres	231	41.25
	2.5 to 5 acres	188	33.57
	Above 5 acres	141	25.19
Type of coconut palm planted	Dwarf coconut	354	63.21
	Tall coconut	206	36.79
Reasons to prefer coconut cultivation	Water source	117	20.89
	Profitability	207	36.96
	Less labour	229	40.89
	Lower cultivation costs	258	46.07
	Intercropping	273	48.75
	Climate suitability	289	51.61
	Less maintenance	297	53.04
	Permanent income	301	53.75
	Cash crop	327	58.39
	Less workload	336	60.00
Production period	3 years	138	24.64
	4 years	281	50.18
	5 years	141	25.18
Type of irrigation system used	Trip irrigation	202	36.07
	Basin irrigation	227	40.54
	Sprinkler	97	17.32
	Others	34	06.07
Coconut harvest rotation period	Between 25 to 40 days	228	40.71
	Between 41 to 60 days	276	49.29
	Above 60 days	56	10.00

Source: Primary Data.

According to the data above, 41.25 per cent, 33.57 per cent, and 25.19 per cent of the 560 coconut farmers cultivate coconuts on less than 2.5 acres, 2.6 to 5 acres, and more than 5 acres, respectively. Farmers planted a dwarf coconut variety 63.21 per cent of the time and a tall coconut variety 36.79 per cent of the time. Water source, profitability, less labour, lower cultivation costs, and intercropping are among the reasons given by 20.89 per cent to 48.75 per cent of respondents for choosing coconut production. Climate suitability, low maintenance, permanent revenue, a cash crop, and less workload are among the reasons respondents prefer coconut production, which ranges from 51.61 per cent to 60 per cent. 3 years, 4 years, and 5 years are the opinions of 24.64 per cent, 50.18 per cent, and 25.18 per cent of respondents, respectively, on the production time of coconut palm. Trip irrigation, basin irrigation, sprinkler irrigation, and other methods of irrigation are used by 36.07 per cent, 40.54 per cent, 17.32 per cent, and 6.07 per cent of respondents, respectively. According to 40.71 per cent, 49.29 per cent, and 10 per cent of respondents, the rotation time of the coconut harvest are between 25 and 40 days, between 41 and 60 days, and above 60 days, respectively.

Institutional Support for Coconut Production and Marketing

It is a fact that the performance of supporting institutions and programmes is crucial to the expansion of agriculture. Institutional support in the form of agricultural research, extension, credit, and marketing is critical for the well-being of the farming community's production and marketing system. In this context, the respondents were asked to state their satisfaction with the institutional support for the production and marketing of coconuts in the Theni district.

Table 1.5: Gender and Satisfaction of Institutional Support for Coconut Production and Marketing.

Gender	No. of Respondents	Mean	Standard Deviation	Coefficient of Variation
Male	427	28.05	4.22	15.04
Female	133	27.41	3.80	13.86
Total	560	27.90	4.13	14.80

Source: Primary Data.

Comparison of Satisfaction by Male and Female Farmers of Institutional Support for Coconut Production and Marketing.

Calculated Chi-square Value	DF	Table Value at 5% Level	Result
1.558	558	1.964	Not significant

At the 5% significance level, the calculated t-value for 558 degrees of freedom is (1.558) smaller than the table value (1.964). As a result, there is no significant difference in satisfaction with institutional support for coconut production and marketing between male and female farmers. As a result, the null hypothesis (H_{01}) is accepted. This reveals that the gender of coconut producers has no significant influence on the institutional support for the production and marketing of coconuts. Male farmers had the highest average satisfaction score (28.05), followed by female farmers. The variation in satisfaction is high (15.04%) among male farmers and it is low (13.86%) among female farmers. Therefore, female farmers have a consistent level of satisfaction with institutional support for coconut production and marketing.

Conclusion

The researcher endeavored to investigate value-added coconut products, coconut origins, coconuts at the global, national, and state levels, coconut cultivation practices, and coconut marketing in this chapter. The coconut palm zone in India spans 18 states and three Union territories, each with its own set of agro-climatic characteristics. Indonesia, the Philippines, and India account for over nine million hectares of the world's 12.50 million hectares of cultivated land. India is currently ranked third among the world's top coconut-producing countries. Kerala, Tamil Nadu, Karnataka, Andhra Pradesh, West Bengal, Maharashtra, Odisha, Assam, Goa, Daman and Diu, Lakshadweep, Gujarat are the primary coconut producing states in India. Kerala leads the way in terms of production, accounting for 39% of the country's total. Tamil Nadu is the country's major coconut grower, followed by Kerala. Coconut is a perennial crop that is grown on 4.40 lakh hectares in Tamil Nadu, with an annual production of 52140 lakh nuts and a productivity of 11560 nuts per hectare.

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