

Small-Scale Success: How Palm-Based Products are Thriving in Cottage Industries in Thoothukudi district

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ABSTRACT

Palmyra (*Borassus flabellifer*), is highly revered in Tamil culture and known as "Karpaka Viruksham". The palmyra tree produces Neera, a perishable product, and contributes to rural community and development. In this study, 25 palm-based industries were surveyed and convenient sampling method was used. The results of the study revealed, majority of respondents were above 50 years old, with 88% of processing units owned by males. The majority of unit owners had over 30 years of experience, with 72% operating as sole proprietorships. The majority preferred complete control over their businesses for effective decision-making. 96% of processing units established their industries on their own land, while only 4% leased land. The labour force was 96% of units with up to five people, compared to only 4% with 5-10 individuals. Palm processing unit owners sell their palm-based products through channel I, with the majority selling to retailers via wholesalers. Palm jaggery is a natural, healthy product made by extracting sap from palm saplings, treating it with lime, filtering and boiling it, and pouring it into coconut shell molds. The palmyra industry faces challenges like adulteration, labour shortages, price variations, and production difficulties. To ensure sustainability, efforts should focus on planting more trees, protecting existing ones, supporting self-help groups, promoting a Farmer Producer Organization (FPO)-based approach, and modern methods for extending product storage life.

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INTRODUCTION

Palmyra Palm (*Borassus flabellifer*), the State tree of Tamil Nadu (Krishnaveni, 2020) and known as "Karpaka Viruksham" (Aravindan, 2023), is grown in 8,790 lakh ha of land, with a production of 3,71,738 lakh tones and a productivity of 42.2 t/ha in 2022-2023 (Season and Crop report- 2022-2023, Tamil Nadu). Thoothukudi, with 73.14% of production, accounts for 90% of state production. The highest productivity is in Thoothukudi, followed by Tenkasi and Tirunelveli. Palmyra contributes 36.59% of Thoothukudi district's total agricultural produce. Neera, a

perishable product, is available during the palm blossoming season and takes 90-130 days to produce. Female palms offer 33-50% more Neera than male palms, with tapping starting in December-February and ending in March (Asha, 2019).

In the Thoothukudi district, palm jaggery and palm candy manufacturing units are typically operated as household or cottage industries (Krishnaveni, 2020). The processing and production centers for different value-added products of Palmyra namely, Neera sap, Palm jaggery, Palm sugar, Palm candy, *Nungu*, Palm fruit jam, Palm chocolate, Palm rock candy,

Palm sprouts, Palm wine, Palm pickle, Palm halvah, etc. are located at extensively in Thoothukudi district. So, improved cultivation is necessary following good agricultural practice in order to meet the quality raw material in Palmyra value chain for the production and processing of Palmyra agro based products. Hence, to tap the export potential, high yielding Palmyra crop varieties should be promoted among the farmers.

Palmyra trees are grown in Tiruchendur, Srivaikundam, Sattankulam, and Vilathikulam Taluks, producing a popular alcoholic beverage, jiga. This income generates jobs in agriculture and agro processing industries. Despite being considered poor man palm fruit; it offers nutritional value and nutraceutical properties. Proper government support and Geographical Indication (GI) could attract an international nutraceutical market for Thoothukudi palm products, benefiting entrepreneurs through increased income generation and participation in national and international expos.

The palmyra has numerous value-added products that contribute to rural community development and conservation of elite germplasm (Srivastava, 2017). These products include Neera, jaggery, palm sugar, candy, tuber-based bakery products, pulp-based beverages, and spongy endosperm. The palmyra palm tree has a strong home and export market, earning foreign money. Its woods are used for various handmade products, wood-based products, leave-based products, and coir-based products (Barfod, 2015). The palmyra palm tree plays a crucial role in human life, providing numerous health benefits. However, awareness of the palmyra palm's importance is low (Allwin, 2023). Proper awareness and market demand for these products could increase health consciousness, especially during the pandemic. Promotion, marketing, and financial assistance to small and medium-sized enterprises (SHGs), foundations of commerce (FPOs), and micro entrepreneurs is needed (Ambasta, 2023). Increased availability of palm products through fair price shops would provide quality palm products at affordable rates while supporting palm processors. Investing in modern methods to extend the storage life of value-added products is also necessary for better distribution.

Cultivation of Palmyra is crucial for economic, cultural, social, religious, and environmental benefits. With over 800 uses, it requires less water, has a lifespan of nearly 100 years, and can recharge the water table. The plant also provides natural shelter for birds, bats, and wild animals. Tamil Nadu is a pioneer in the palm products industry in India, making palm-based processing industries a viable alternative for sustainable livelihoods in the Thoothukudi district (Rao, 2023). To ensure the long-term viability of the micro-food processing businesses situated in Palmyra, Palmyra processing units might be created by centralizing these districts.

Methodology

Result and Discussion

Demographic Profile of the Palm products manufacturing units in Thoothukudi district

Table 1. Demographic Profile of the palm products manufacturing units in Thoothukudi district

Particulars	No. of units Responded
Age (Year)	
Below 35	5 (20.00)
36-50	3 (12.00)
Above 50	17 (68.00)
Total	25 (100.00)
Gender	
Male	22 (88.00)
Female	3 (12.00)
Total	25 (100.00)
Experience (Year)	
Below 10	4

A comprehensive study approach was utilized to address the needs of cottage industries manufacturing palm-based products in the Thoothukudi district. Primary data was collected from 25 palm manufacturing cottage industries were selected randomly through convenient sampling. The Udankudi and Manapadu blocks were chosen due to its significant presence of cottage industries producing palm-based products in the Thoothukudi district. The data collected was tabulated, processed, and analyzed using statistical methods. This study employed simple percentage analysis, SWOT analysis, and Garrett's ranking technique to evaluate the palm product manufacturing units in the Thoothukudi district.

SWOT analysis of palm products manufacturing industries, effectively finds the strengths and Weaknesses also signify adverse effects that may have an impact on the service quality or added value of the product, Opportunities are resources that an industry can make use of to its benefit (Bennis B, 2023). Furthermore, all unsuitable outside occurrences that have the potential to damage the ecosystem are threats.

Simple Percentage Analysis: A percentage is a number or ratio that can be expressed as a fraction of 100. If we have to calculate percent of a number, divide the number by the whole and multiply by 100 (Heiman 1992). Hence, the percentage means, a part per hundred. The word per cent means per 100. It is represented by the symbol "%". To determine the percentage, we have to divide the value by the total value and then multiply the resultant by 100. This study utilizes percentage analysis to evaluate the basic industrial profile of micro food processing units in the Thoothukudi district.

Percentage formula = (Value/Total value) × 100

Garrett's Ranking Technique

The processors were asked to rank their firm level issues in marketing of palm products. In Garrett's ranking technique, these ranks were converted into per cent position by using the formula (V. Shanjeevika, 2022)

$$\text{Percent position} = \frac{100 \times (R_{ij} - 0.5)}{N_j}$$

Where,

R_{ij} = Ranking given to the i^{th} attribute by the j^{th} individual

N_j = Number of attributes ranked by the j^{th} individual.

By referring to the Garrett's table, the per cent positions estimated were converted into scores. Thus, for each factor the scores of various respondents were added and the mean values were estimated. The mean values thus obtained for each of the attributes were arranged in descending order. The attributes with the highest mean value were considered as the most important one and the others followed in that order (Sathya, 2022).

	(16.00)
11-20	3 (12.00)
21-30	5 (20.00)
Above 30	13 (52.00)
Total	25 (100.00)
Family Structure	
Nuclear	18 (72.00)
Joint	7 (28.00)
Total	25 (100.00)

Figures in parentheses indicate percentage to total

The data presented in the table 1 indicates that a significant majority of respondents, 68%, were above the age of 50. Additionally, 20% fell below the age of 35, while only 12% were between the ages of 36 and 50. This suggests that the majority of respondents were in the above 50 age group. The findings reveal that 88% of processing units were owned by males, with only 12% owned by females. Analysis of the table 1 shows that unit owners with over 30 years of experience accounted for the

highest percentage at 52%, followed by those with 21-30 years of experience at 20%. Furthermore, 28% of unit owners had less than 20 years of experience. The results demonstrate that among the respondents, the nuclear family structure was predominant at 72%, while only 28% of units were under a joint family structure (Singh, 2008).

Ownership Pattern and Workforce of the Palm processing units in Thoothukudi district

Table 2. Ownership Pattern and Workforce of the Palm processing units in Thoothukudi district

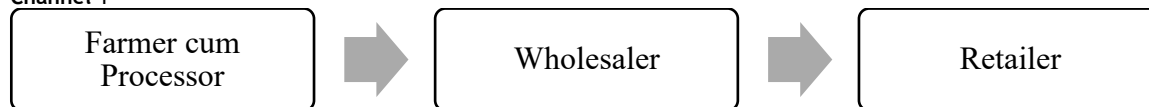
Particulars	No. of units Responded
Ownership Pattern	
Proprietorship	25 (100.00)
Total	25
Land Ownership	
Own Land	24 (96.00)
Rental	0
Lease	1 (4.00)
Total	25 (100.00)
Work Force: Total No. of Labours	
Up to 5	24 (96.00)
5-10	1 (4.00)
Total	25 (100.00)

Figures in parentheses indicate percentage to total

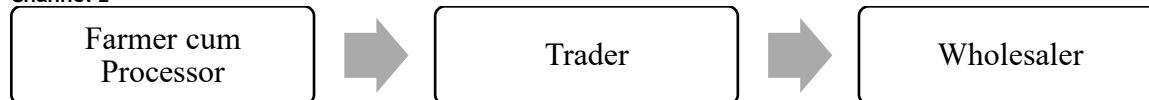
The results of table 2 revealed that all palm processing units were operated as sole proprietorships. The majority of unit owners preferred to maintain complete control over their businesses, as it allows for more effective decision-making processes. 96% of processing units had established their industries on their own land. Only four percent of units had leased land for their operations. The workforce defined by the number of laborers involved in the production of goods. The results showed that 96% of processing units had a labor force of up to five people, while only four percent had a labor force of 5-10 individuals.

Marketing of palm-based products in Thoothukudi district

Channel 1



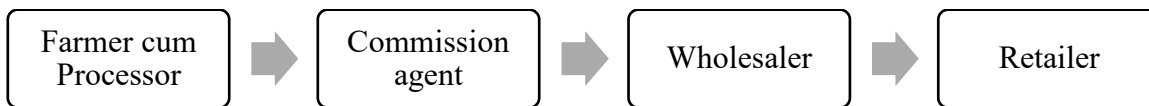
Channel 2



Channel 3



Channel 4



The result found that about 52% of the processing unit owners marketed through channel I followed by 20% of the unit owners marketed through channel IV and 16% of unit marketed through channel III only 12% of units marketed through channel II. This revealed that majority of the processing unit owners sold their product to the retailer via wholesaler.

Manufacturing process and technology involved palm jaggery producing cottage industries

Essential machinery/ Equipment used for the production of the Palm based products

i). Weighing machine, ii). Sealing machine, iii). *Thatchi (Vessel)*, iv). Coconut shell, v). Grading cot., These are the primary equipment utilized in the manufacturing process of Palm based products in cottage industries in Thoothukudi district.

The process of producing palm jaggery is completely natural as it showed in figure 1, as no chemical agents are used, allowing all the natural minerals to be retained without the need for preservatives. Palm jaggery is known to offer numerous health benefits (Asghar, 2021). The sap is carefully extracted from palm saplings, collected in earthen pots, and treated with slaked lime to prevent fermentation (Sarma, 2022). The unfermented juice is then filtered and boiled in iron vats until it bubbles. After cooling, the liquid is poured into molds, often made from coconut shells, to set into palm jaggery ready for consumption. This traditional method ensures the purity and quality of the final product, making it a healthy and delicious choice for consumers.

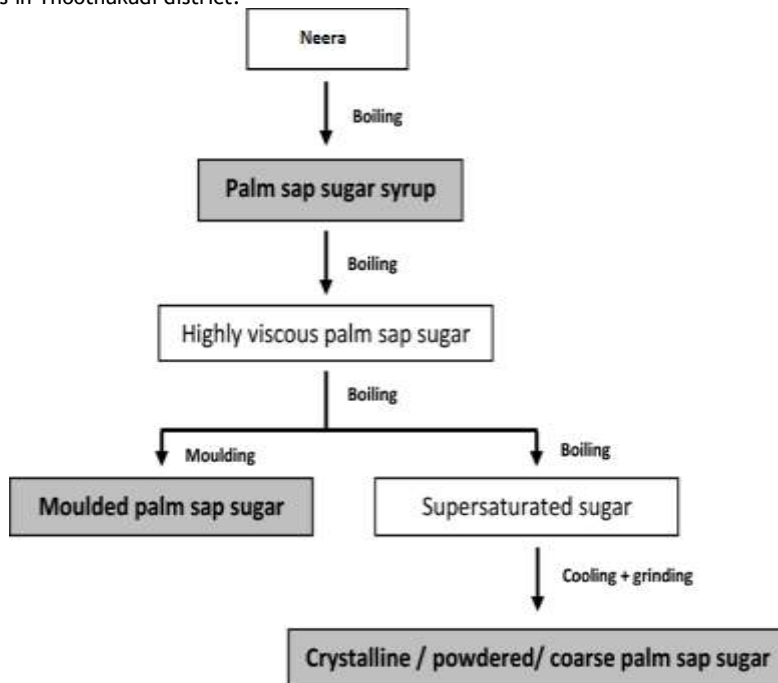


Figure 1. Manufacturing process of Palm Sugar and Palm Candy in cottage industries in Thoothukudi district

Constraints faced by Palm Processing units in Thoothukudi district
Table 3. Constraints of Palm Processing units in Thoothukudi district

S. No.	Constraints in Production and Marketing	No. of units Responded	Rank
1.	Adulteration in palm products	48.12	I
2.	Labour Scarcity	35.42	II
3.	Lack of short duration varieties	33.31	III
4.	Price Fluctuation	22.52	IV
5.	Absence of insurance for tree climbers	20.63	V
6.	Lack of Storage facilities	16.45	VI
7.	Neera production is affected in rainy days	15.18	VII

Table 3 lists the challenges faced by the palm product business, which include adulteration, a lack of labor, a shortage of short-duration types, price variations, inadequate storage facilities, insurance for tree climbers, and production difficulties during wet days when Neera is produced. A systematic approach is necessary to properly handle these challenges, which impede the industry's growth and sustainability (Kamble, 2018).

SWOT Analysis of Palm products processing units in Thoothukudi district

Strengths	Weakness
<ul style="list-style-type: none"> ▪ Palm products possess medicinal value ▪ Palmyra provides food and non-food products ▪ Palmyra is suitable for the typical climate prevalent in Tamil Nadu (Krishnaveni, 2020). ▪ There is a potential for production of more and more value-added palm products linking with the technical institutions. 	<ul style="list-style-type: none"> ▪ No market information system ▪ Actual market demand not known ▪ Unhygienic processing practices (Obire, 2015). ▪ Non-availability of adequate and timely credit. ▪ Lack of innovative capability of the entrepreneurs (Martin, 2015). ▪ Non availability of cost-effective modern processing methods to adopt. ▪ Lack of knowledge of markets and consumption pattern. ▪ Adulteration is a big problem (Basri, 2017)
Opportunities	Threats
<ul style="list-style-type: none"> ▪ Expanding national and international markets ▪ Provides an opportunity for the employment and welfare of society. ▪ Value addition potential is high ▪ Branding will fetch good price for the products of the cluster. ▪ Chance to involve more FPO and SHG groups in this venture (Prasad, 2022). ▪ Scope for advanced varieties, production and processing technologies 	<ul style="list-style-type: none"> ▪ Marketing and price risk ▪ High expectation of customers in the matter of quality and price. ▪ No focus on the living and health conditions of the tappers and their families (Loughnan, 2015). ▪ Palm tappers are fully unemployed in the offseason (Srivastava, 2017).

Palmyra providing a wide range of food and non-food products that are well-suited for the typical climate found in Tamil Nadu. These trees not only offer economic opportunities for employment but also contribute to the overall welfare of society. Unfortunately, the indiscriminate cutting of younger trees and excessive tapping of leaves have led to stunted growth and weakened health of the Palmyra trees. It is imperative that efforts are directed towards planting a greater number of trees, protecting existing ones, and supporting self-help groups for Palmyra farmers and tappers. Additionally, promoting a Farmer Producer Organization (FPO) based approach, conducting research on advanced varieties, production and processing technologies, and cultivating more plants around water bodies to enhance the underground water table are essential steps to ensure the sustainability of Palmyra trees. The government must prioritize the living and health conditions of the tappers and their families. Initiatives aimed at raising awareness among the public about the health benefits of Palmyra products are crucial for the long-term preservation and utilization of these valuable resources.

CONCLUSION

Farmers-processors face challenges in jaggery production, including adulteration and labor scarcity. To combat these issues, proper testing and standardization are needed to obtain AGMARK certification. Enhancing the efficiency of low-cost Palmyra climbing devices, tapping methods, and collection processes is crucial (Vengaiiah, 2013). Increasing mechanization, improving tapping methods, and reducing contamination risk are also essential. Cost-effective strategies can benefit those involved in Palmyra palm production and processing. Modern techniques can extend storage life for value-added products, ensuring year-round availability and preservation. Food products like Jaggery and liquid Jaggery (locally it called as *Thangaram*) from Palmyra are not commercialized due to traditional practices, unhygienic preparation, and limited storage life. Despite being economically important, Palmyra has not received proper research due to its slow growth and wild state. Mechanization is needed for value addition techniques and popularization. Jaggery's high cost due to medicinal properties necessitates standardization and mechanization for jaggery preparation (Upadhyaya, 2023, Safdar *et al.*, 2023). Government should

2.4. SWOT Analysis of Palm products manufacturing units in Thoothukudi district

The strategic planning method was utilized to assess the strengths, weaknesses, opportunities, and threats associated with Palmyra processing. This approach allowed for a comprehensive analysis of the factors impacting the operation, enabling informed decision-making and strategic direction.

encourage young people to pursue palm tapping, providing training and reasonable wages through cooperative societies (Li, 2015). Banks should adopt a liberal lending policy to help palm workers overcome financial difficulties, offering lower interest rates. Providing suitable wages and training to palm workers can help improve their status as a respectable occupation. Palm tapping is a seasonal activity that leaves palm tappers unemployed in the offseason. They need alternative employment and adequate compensation for injuries. To address this, the government should establish a palm workers welfare hospital in Thoothukudi, organize cooperative societies for their welfare, and establish cluster-based Neera processing centers.

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