



To cite this article: BITTO PAUL and Dr DEVI. P (2025). SUPPLY CHAIN MANAGEMENT PRACTICES OF COCONUT FARMING IN KERALA, International Journal of Research in Commerce and Management Studies (IJRCMS) 7 (4): 190-201 Article No. 447 Sub Id 817

SUPPLY CHAIN MANAGEMENT PRACTICES OF COCONUT FARMING IN KERALA

BITTO PAUL¹ and Dr DEVI. P²

¹Research Scholar in Commerce, Thanthai Hans Roever College Perambalur (Autonomous), Affiliated to Bharathidasan University Trichy

²Research Advisor, Thanthai Hans Roever College Perambalur (Autonomous), Affiliated to Bharathidasan University Trichy

DOI: <https://doi.org/10.38193/IJRCMS.2025.7412>

ABSTRACT

Coconut farming forms an integral part of the agrarian economy of Kerala, India, contributing significantly to rural livelihoods and the state's overall agricultural output. However, the sector is plagued by inefficiencies in post-harvest handling, value addition, logistics, and market accessibility, which collectively hamper profitability and sustainability. This study aims to investigate the current supply chain management (SCM) practices adopted in coconut farming across major growing regions in Kerala and to assess their effectiveness in addressing these operational challenges. A structured survey was conducted among 150 coconut farmers selected through a convenience sampling method. The research design incorporates both qualitative and quantitative methods, including descriptive statistics, supply chain mapping, and SWOT analysis, to evaluate the performance of existing SCM practices. The findings highlight critical bottlenecks such as inadequate storage facilities, fragmented market linkages, and limited adoption of digital tools. Moreover, the study identifies opportunities for integrating cooperative marketing, value chain collaboration, and ICT-enabled supply chain solutions. The insights derived provide a strategic framework for policymakers, agri-preneurs, and farmer producer organizations (FPOs) to enhance the efficiency, responsiveness, and sustainability of the coconut supply chain. This research contributes to the broader discourse on agricultural supply chain optimization in developing economies and proposes practical interventions aligned with consumer demand and global market trends.

KEYWORDS: Coconut Farming, Supply Chain Management, Kerala Agriculture, Agricultural Marketing, Value Chain, Farmer Producer Organizations, Post-Harvest Management

1. INTRODUCTION

Agriculture and its allied sectors constitute the foundational pillar of most developing economies. In India, agriculture remains a critical livelihood source, engaging approximately 60% of the population

and contributing substantially to rural employment. Despite its socio-economic importance, the agricultural sector has experienced slower growth compared to the industrial and service sectors, leading to a gradual decline in its share of the national Gross Domestic Product (GDP). This disparity underscores the urgent need for transformative strategies to enhance productivity, market access, and profitability within the sector. One such strategy is the application of effective agricultural supply chain management (SCM), which facilitates the seamless movement of agricultural commodities from the farm to the end consumer while optimizing quality, cost, and timeliness.

Agricultural supply chain management involves coordinating various stakeholders—producers, suppliers, processors, distributors, and retailers—to meet consumer demand efficiently and sustainably. It encompasses all the activities required to ensure that agricultural products are cultivated, processed, and delivered in alignment with market requirements regarding quality, quantity, price, and timing. A well-functioning supply chain not only reduces post-harvest losses but also improves farmer income, consumer satisfaction, and the overall competitiveness of the agricultural sector.

Supply Chain Management in Coconut Farming

Coconut is one of India's most economically significant plantation crops, cultivated across approximately 1.98 million hectares and yielding over 21.6 billion nuts annually. India ranks third globally in coconut production, with Kerala, Karnataka, and Tamil Nadu emerging as the primary coconut-producing states. Among these, Kerala accounts for a substantial share of the area under cultivation and total yield, making it a focal region for understanding coconut supply chain dynamics. In the context of coconut farming, supply chain management involves a coordinated network of entities that are engaged—either directly or indirectly—in fulfilling consumer demand. This includes farmers, village-level traders, wholesalers, regulated markets, agents, retailers, logistics providers, and ultimately, consumers. As articulated by Chopra and Meindl (2007), supply chain management is not merely a logistical function but a strategic approach to integrating processes across the value chain to deliver customer value efficiently.

P. Deepa (2018) identified four predominant supply chain structures in the Indian coconut market, particularly within Kerala:

SC1: Producer → Village Trader → Wholesaler → Retailer → Consumer

SC2: Producer → Wholesaler → Retailer → Consumer

SC4: Producer → Regulated Market → Wholesaler/Agent → Consumer

SC5: Producer → Village Trader → Retailer → Consumer

Each model presents unique challenges and opportunities in terms of price realization, quality maintenance, and efficiency. These structures highlight the fragmented nature of the coconut supply

chain and underscore the need for systemic improvements, especially in the areas of post-harvest processing, storage infrastructure, price transparency, and market linkages.

This study seeks to explore and critically analyze the existing supply chain management practices adopted by coconut farmers in Kerala. It aims to identify bottlenecks, evaluate the efficiency of current models, and suggest strategic interventions that could lead to improved outcomes for all stakeholders involved. By contributing to the literature on agri-supply chains, particularly within plantation crops, the study offers valuable insights for policymakers, farmer producer organizations (FPOs), agribusiness firms, and researchers focused on enhancing agricultural value chains in emerging economies.

2. REVIEW OF LITERATURE

The role of Supply Chain Management (SCM) in enhancing agricultural efficiency has received considerable academic attention in recent years. As global agricultural markets become increasingly competitive, effective SCM practices have been recognized as critical tools for ensuring timely delivery, maintaining quality, and improving profitability for both producers and consumers. This review synthesizes existing research on supply chain practices in coconut farming, with a particular focus on studies relevant to the Indian context.

Shashikumar and Chandrashekar (2017) investigated the structure of the coconut supply chain in Karnataka and identified the key actors involved, including coconut farmers, wholesalers, commission agents, and end consumers. The study emphasized that a well-functioning supply chain contributes significantly to the operational efficiency and productivity of the coconut sector. By mapping the transactional flow and stakeholder interactions, the study highlighted the pivotal role of intermediaries in price determination and product movement.

Janvier-James (2012) provided a broader perspective on the evolution of supply chain theory, arguing that SCM has become an indispensable component of modern business operations. The author underscored that SCM not only enhances organizational competitiveness but also serves as a strategic instrument for aligning production and market demands, particularly in fast-changing economic environments. Although this study was not specific to agriculture, its theoretical insights are applicable to the complexities of agricultural supply chains.

Kumar et al. (2010) explored the socio-economic importance of coconut farming in India, emphasizing its contribution to food security and rural livelihoods. The authors observed a disproportionately high number of intermediaries relative to producers, leading to reduced profit margins for farmers. The study proposed stronger collaboration between the Coconut Development Board and state-level

industrial departments to promote coconut-based value-added enterprises, thereby shortening the supply chain and increasing farmer incomes.

Anantadjaya et al. (2007) examined the influence of SCM on customer satisfaction and organizational performance in small and medium-sized enterprises (SMEs). The study emphasized that SCM efficiency is closely tied to customer responsiveness, operational coordination, and adaptive behavior in dynamic markets. While this research focused on SMEs in a general context, its conclusions support the need for demand-driven supply chain strategies in agricultural sectors such as coconut farming.

The reviewed literature collectively highlights several recurring themes: the presence of multiple intermediaries, the lack of coordinated efforts among supply chain actors, limited infrastructure for value addition, and the need for institutional support to modernize supply chain practices. However, there remains a notable gap in empirical studies focused on the regional SCM practices in Kerala, particularly in terms of farmer-level decision-making, supply chain transparency, and technology adoption. This study aims to fill that gap by providing a grounded analysis of the supply chain dynamics in Kerala's coconut farming sector and proposing strategic interventions to enhance value chain performance.

3. SIGNIFICANCE OF THE STUDY

Coconut cultivation is a vital source of livelihood for a substantial portion of Kerala's rural population. Despite its economic and cultural significance, the coconut farming sector in the state faces persistent structural and market-related challenges. A large number of farmers remain financially constrained, often relying on informal credit from local moneylenders and traders. In many cases, this financial dependence compels them to enter into pre-harvest sale agreements or to dispose of their produce at unfavorably low prices, thereby eroding their bargaining power and limiting profitability. The absence of reliable transport infrastructure further compounds these challenges. Many smallholder farmers are forced to sell their produce within their localities, often at distress prices, to meet immediate financial and social obligations. A notable lack of awareness about prevailing market prices and trading mechanisms in wholesale markets leaves them vulnerable to exploitation by commission agents and intermediaries. This lack of transparency in price discovery and value realization leads to inefficiencies and perpetuates cycles of poverty among farming communities.

In this context, the adoption of an effective and inclusive supply chain management (SCM) framework becomes imperative. SCM, when properly implemented, can provide farmers with greater access to market information, reduce dependency on intermediaries, and enable better price realization. It can also facilitate investments in infrastructure, logistics, and digital platforms that enhance post-harvest handling, storage, and distribution. This study is significant as it seeks to identify the existing gaps in

coconut supply chain practices in Kerala and provide actionable insights to address them. By highlighting the role of SCM in improving price efficiency, product quality, and farmer profitability, the study aims to inform policy interventions and capacity-building initiatives that can elevate the sector's performance. Furthermore, the research offers a strategic perspective on empowering coconut farmers through improved market linkages, value addition, and institutional support, thereby contributing to rural development and economic sustainability.

4. STATEMENT OF THE PROBLEM

Kerala, historically referred to as the "land of coconuts," has long held a dominant position in India's coconut production landscape, contributing approximately 15% to the state's total agricultural Gross Domestic Product (GDP). However, in recent years, the state has witnessed a gradual decline in its national ranking in terms of coconut productivity and market competitiveness. This downturn is attributed to a range of challenges, including stagnant yields, rising input costs, market inefficiencies, and inadequate post-harvest infrastructure. A critical factor underlying these inefficiencies is the underdeveloped nature of the coconut supply chain. In the absence of well-structured supply chain mechanisms, most smallholder coconut farmers continue to rely on local village-level sales, often at prices that do not reflect the true value of their produce. This situation is exacerbated by poor access to market information, weak bargaining power, and an overreliance on intermediaries. Consequently, farmers face limited income generation opportunities despite substantial labor and resource investments. Effective supply chain management (SCM) presents a viable solution to address these systemic issues. By facilitating streamlined production, storage, distribution, and market linkages, SCM can enhance the economic viability of coconut farming and restore Kerala's competitiveness in the national coconut sector. In light of these concerns, this study seeks to explore and answer the following research questions:

What is the role of supply chain management in enhancing the efficiency and profitability of coconut farming in Kerala?

What are the key factors that influence farmers' selection of specific supply chain models in the coconut sector?

What are the major operational and market-related challenges faced by coconut farmers in managing their supply chains?

By addressing these questions, the study aims to identify strategic interventions that can optimize the coconut supply chain and improve the socio-economic outcomes for farming communities in Kerala.

5. OBJECTIVES OF THE STUDY

The study "Supply Chain Management Practices of Coconut Farming with Special Reference to Kerala" is carried out based on the following specific objectives:

1. To identify the Selling Pattern of Coconut through Different Supply Chain

2. To identify the significant factors influencing supply chain selection.
3. To unearth the problems faced by the coconut farmers

6. HYPOTHESIS OF THE STUDY

Ho1: No Association between the age of the farmers and the mode of the sale of coconut

Ho2: No Association between the occupation of the farmers and the mode of sale of coconut

Ho3: No Association between the income of the farmers and the mode of the sales of Coconut

7. SCOPE OF THE STUDY

The present study is titled “Supply Chain Management Practices of Coconut Farming in Kerala” and aims to evaluate the role and effectiveness of supply chain mechanisms in the coconut farming sector of the state. The primary focus is on identifying how supply chain strategies influence production efficiency, market access, and profitability for coconut farmers. The study covers farmers engaged in coconut cultivation irrespective of the size of their holdings, ensuring a comprehensive representation of both small and medium-scale producers. The geographic scope is limited to Ernakulam District in Kerala, with data collected from a sample of 150 coconut farmers. The insights derived from this study are expected to assist in designing appropriate interventions to strengthen supply chain practices in the sector.

8. RESEARCH METHODOLOGY

Research methodology refers to the systematic procedures adopted to collect, analyze, and interpret data relevant to the research objectives. This study employs both descriptive and analytical approaches to examine the supply chain dynamics in coconut farming. The methodology includes sample selection, data collection methods, and statistical tools used for analysis.

8.1. Sample

A sample represents a subset of a population selected for the purpose of conducting empirical research. In this study, the sample comprises coconut farmers from Ernakulam District, Kerala. These respondents were selected to reflect diverse farming practices, levels of market engagement, and exposure to supply chain systems.

8.2. Sampling Design

The sampling design defines the framework and procedure used to select units from the population. For this research, convenience sampling was adopted due to ease of access to respondents and the exploratory nature of the study. A total of 150 coconut farmers were surveyed, representing a cross-section of the farming community in the region. The sampling frame included registered and non-registered farmers actively engaged in coconut cultivation. The method facilitates an initial

understanding of supply chain practices and highlights practical issues at the grassroots level.

9. TOOLS FOR ANALYSIS

The primary data collected through structured questionnaires were coded, classified, and tabulated using standard data processing techniques. Descriptive statistics, including percentages, were employed to summarize the demographic and categorical data. To examine associations between variables and test the significance of observed relationships, the Chi-square test was used as an inferential statistical tool. These analytical methods enabled a meaningful interpretation of the supply chain structures, challenges, and behavioral patterns of coconut farmers in the study area.

Table 9.1 Selling pattern of farmers through the different supply chain Location of sales

Particulars	Frequency	Percentage
Farm	71	47
Local Market	45	30
mill/processing unit	34	23
Total	150	100

In the case of coconut growers, more (47 per cent) of the farmers sell the nuts in the farm itself. 30 per cent of the farmers sell the nuts in the local market. Out of the total farmers, 23 per cent of them sell the nuts in the mill/processing unit.

Table 9.2 Sales immediately after harvest

Particulars	Frequency	Percentage
Yes	88	59.0
No	62	41.0
Total	150	100

In the trading of coconuts, the majority, 59per cent of respondents, sell their produce immediately. The rest 41per cent of respondents hold their produce and secure it for the right time

Table 9.3 Reasons for retaining the crops

Particulars	No. of Respondents	Percentage
High demand	23	15
Value addition	21	14
Get expected price	106	71
Total	150	100

The majority, 71 per cent, respondents possess to meet their expected produce price. Then 15. per cent of respondents keep their nuts till the demand reaches high. The rest, 14 per cent of respondents, retain the nuts for value addition.

10. TESTING OF HYPOTHESIS

H0: No Association between the age of the farmers and the mode of sale of coconut

Result of the Test

Test	Level of Significance	Degree of freedom	Computed Value	Table Value	Ho Accepted /Rejected
Chi-Square	5%	6	30.06	12.592	Ho Rejected

As per this investigation, the calculated value (30.06) is greater than the table value (12.592) at a five per cent level of significance, and the null hypothesis is rejected. Hence the age of the farmers is associated with the mode of selling coconut. The null hypothesis has been framed and tested with the help of the chi-square test.

H0: No Association between the income of the farmers and the selection of mode of sales of coconut

Result of the Test

Test	Level of Significance	Degree of freedom	Computed Value	Table Value	Ho Accepted /Rejected
Chi-Square	5%	6	18.52	12.592	Ho Rejected

As per this study, the calculated value (18.5) is greater than the table value (12.592) at a five per cent level of significance, and the null hypothesis is rejected. Thus the income of the farmers is associated with the selection of the location of sales. The null hypothesis has been framed and tested with the help of the chi-square test

H0: No Association between the occupation of the farmers and the mode of sale of coconut

Result of the Test

Test	Level of Significance	Degree of freedom	Computed Value	Table Value	Ho Accepted /Rejected
Chi-Square	5%	6	22.5	12.592	Ho Rejected

An effort was made to identify whether there is an association between the occupation of farmers and the mode of selling coconut. For this reason, the null hypothesis was framed and tested with a chi-square test. It shows the calculated value (22.5) is greater than the table value (12.592) at 5per cent level of significance null hypothesis is rejected. Thus, it results that there is a significant association between the occupation and mode of sales.

11. FINDINGS

The study's findings are based on the responses of 150 coconut farmers from Ernakulam district, Kerala, and offer insights into their demographic profiles, marketing practices, challenges faced, and the determinants influencing their supply chain decisions.

Demographic Profile of Farmers

The demographic analysis reveals that the majority of the coconut farmers (51.1%) fall within the age

group of 45 to 60 years, suggesting that middle-aged individuals are predominantly engaged in coconut cultivation. The participation of younger individuals in agriculture is notably minimal, indicating a generational shift away from traditional farming occupations. Educationally, most respondents hold graduate-level qualifications; however, only 5.4% have received formal education in agriculture, underscoring a gap in domain-specific knowledge. Furthermore, 40.7% of the farmers identify agriculture as their primary occupation, while the remainder pursue it alongside other income-generating activities. Income-wise, majority report earnings above ₹40,000 per month. Regarding farming experience, only 19.3% of the respondents have been engaged in coconut farming for over 30 years, suggesting a relatively low proportion of long-term practitioners in the sector.

Selling Patterns in the Coconut Supply Chain

With respect to marketing practices, a significant proportion of the respondents (47%) prefer to sell their produce directly from the farm, thereby bypassing formal market channels and minimizing logistical challenges. Additionally, 59% of farmers sell their coconuts immediately after harvesting, primarily to meet immediate financial needs or due to a lack of storage facilities. The remaining 41% store their produce temporarily with the expectation of securing better prices in the market at a later stage.

Challenges in Marketing Coconuts

Farmers face multiple obstacles in marketing their produce effectively. The most commonly reported challenges include inadequate storage infrastructure, inefficient transportation systems, lack of access to fair market prices, and intense competition from intermediaries. These constraints often lead to suboptimal price realization and hinder the overall profitability of coconut farming. The findings indicate a pressing need for training programs and institutional support to improve farmers' knowledge and decision-making capabilities in marketing their products.

Factors Influencing Supply Chain Selection

The study identifies three primary factors that influence the selection of supply chain models among coconut farmers: assurance of safe and secure sales, price realization, and risk mitigation. Farmers tend to opt for supply chain arrangements that offer reliable transaction security and stable returns, particularly in the context of volatile agricultural markets.

Statistical Association Between Farmer Profiles and Mode of Sale

The results of chi-square tests reveal statistically significant associations between certain demographic variables and the mode of coconut sale. Firstly, there is a significant relationship between the age of farmers and their preferred mode of sale, with older farmers tending to rely on traditional or informal sales channels. Secondly, the occupation of the farmer is significantly associated with the mode of

sale, where full-time agriculturalists are more likely to engage in organized supply chain models compared to part-time farmers. Lastly, income levels are also significantly related to the selection of the sales method; farmers with higher incomes are more inclined toward supply chain models that offer better market access and pricing strategies. In all three cases, the null hypotheses were rejected at the 5% level of significance, confirming the existence of meaningful associations.

12. RECOMMENDATIONS

Based on the findings and analysis, the following recommendations are proposed to enhance the efficiency and sustainability of supply chain management in coconut farming in Kerala:

1. Capacity Building and Training Programs

Comprehensive training should be provided to coconut farmers on modern agricultural practices, market trends, pricing mechanisms, and supply chain dynamics. Special emphasis should be placed on developing skills in post-harvest handling, storage, grading, and quality control.

2. Promotion of Farmer Producer Organizations (FPOs)

Encouraging the formation and strengthening of FPOs can help small and marginal farmers gain collective bargaining power, reduce dependency on intermediaries, and access better markets. FPOs can also play a critical role in value addition and product standardization.

3. Investment in Infrastructure and Technology

Government and private stakeholders must invest in developing rural infrastructure, including cold storage facilities, efficient transportation networks, and digital platforms for market access. The integration of ICT tools can facilitate real-time price discovery and logistics coordination.

4. Market Linkages and Contract Farming Models

Establishing direct market linkages through partnerships with retailers, processors, and exporters can help farmers secure assured prices. Additionally, well-regulated contract farming models can reduce price risks and provide access to better inputs and technology.

13. CONCLUSION

Coconut farming continues to play a vital role in sustaining Kerala's rural economy, contributing significantly to livelihoods, local food systems, and agricultural GDP. However, the sector is currently confronted with numerous operational and structural challenges that hinder its growth and profitability. The findings of this study emphasize that ineffective market access, inadequate infrastructure, and the absence of organized supply chain frameworks are key obstacles limiting farmers' ability to realize the full value of their produce. In this context, supply chain management (SCM) emerges as a critical strategic tool for improving the performance of the coconut farming sector. Efficient and well-integrated SCM practices can address existing inefficiencies by optimizing resource allocation, minimizing transaction costs, improving price realization, and enhancing market responsiveness. By establishing a well-coordinated system that aligns production with market demand,

SCM enables farmers to deliver value-added products, reduce post-harvest losses, and increase overall profitability to remain competitive in the increasingly dynamic and globalized agricultural market, coconut farmers in Kerala must adopt modern supply chain strategies supported by institutional frameworks, market intelligence, and capacity-building initiatives. A robust SCM system not only empowers farmers to make informed decisions but also serves as a catalyst for rural development and economic resilience in the plantation sector.

REFERENCES

- Beamon, B. M. (1998). Supply chain design and analysis: Models and methods. *International Journal of Production Economics*, 55, 281–294.
- Das, P. K. (1984). Estimating production costs and returns for coconut in Kerala. *Journal of Plantation Crops*, 12(2).
- Dileep, B. K., Grover, R. K., & Rai, K. N. (2002). Contract farming in tomato: An economic analysis. *Indian Journal of Agricultural Economics*, 57(2), 197–210.
- Elias, G. (2014). Economics of coconut products: An analytical study. *Commerce Spectrum*, 5(2), 39–44.
- Janvier-James, A. (2012). A new introduction to supply chains and supply chain management: Definitions and theories perspective. *International Business Research*, 5(1), 1–13.
- Kumar, S. (2010). Value chain analysis of coconut in Orissa. *Conference Proceedings*, 23, 1–10.
- Shashikumar, S., & Chandrashekar, H. M. (2017). Supply chain management of the coconut industry in Karnataka. Ph.D. Thesis, University of Mysore.
- Samuel, B., Philip, C. J., & Timothy, J. L. (2008). Coordinating the supply chain in the agricultural seed industry. *European Journal of Operational Research*, 185(1), 354–377.
- Vanamadevi, R. (2016). Cultivation and marketing problems of coconut growers in Thali Panchayat, Udumalpet. *International Conference on Research Avenues in Social Science, IJARIE-ISSN(O)-2395-4396*, 1(3), 2016.
- Veerakumar, K. (2019). Challenges of agriculturists in coconut cultivation of Meenakshipuram village, Chittur Taluk, Kerala. *International Journal of Innovative Technology and Exploring Engineering (IJITEE)*, 8(11S), 467–470.
- Yamuna, S. M., & Ramya, R. (2016). Coconut cultivation and marketing in Pollachi Taluk. *International Journal of Innovative Research in Management Studies (IJIRMS)*, 1(2), 51–57.