DoI: https://doi.org/10.58537/jorangrau.2025.53.1.12

J. Res. ANGRAU 53 (1) 114-122, 2025

EVALUATING MANGO VALUE CHAINS: PRICE SPREAD, MARKETING EFFICIENCY AND CONSTRAINTS IN CHITTOOR DISTRICT, ANDHRA PRADESH

M. SAI KRISHNA, Y. PRABHAVATHI, M. RAVI KISHORE and S.K. NAFEEZ UMAR

Master of Business administration (MBA),
Institute of Agribusiness Management, Tirupati-517502

Date of Receipt : 13-12-2024 Date of Acceptance : 05-02-2025

ABSTRACT

The study conducted during 2024-25 in Chittoor district, Andhra Pradesh aimed at identification of various actors and activities involved in mango value chain for processing varieties along with assessment of price spread, efficiency in marketing and constraints of the actors involved. The sample size included 150 farmers and 30 intermediaries. The analysis employed value chain mapping, price spread analysis and Garrett techniques. The study identified three distinct value chains that included direct selling to processors, selling through ramp traders and selling to pre-harvest contractors. Among these, value chain 1reflecting farmers selling directly to processors was found most efficient and advantageous, offering the highest marketing efficiency (0.56) and yielding a greater sharefor producers to an extent of 55.88. Additionally, the Garrett ranking revealed that key challenges encountered by pre-harvest contractors, ramp traders, and processors across these value chains were high market price fluctuation, lack of timely payments and high requirements for working capital respectively.

Keywords: Mango value Chain, Value chain mapping, efficiency, price spread, constraints

INTRODUCTION

After China, India is the world's largest producer of fruits and vegetable production.The country holds the top global rank in the production of bananas, mangoes (including mangosteens and guavas), and papayas, contributing 25.56%, 44.46% and 38.64%, respectivelyto the world's total production. Mango (*Mangiferaindica* L.), widely cultivated tropical fruit, is a member of the cashew family, *Anacardiaceae*. States such as Karnataka, Uttar Pradesh, Andhra, Telangana Bihar,and West Bengal states are principal mango-growing regions in India. Andhra Pradesh and Uttar Pradesh states leadin mango cultivation area, accounting for 16.56 per cent and 13.42 per cent respectively. Uttar Pradesh and Andhra Pradesh occupies the largest production with a share of 25.76 per centand 22.10 per cent respectively (Department of Agriculture and Farmers Welfare, 2024).

Mango processing is a vital segment of the fruit's value chain, with significant processing activity concentrated in the Krishnagiri district of Tamil Nadu and erst while

Corresponding author mail Id:prabhayanduri@gmail.com; Part of MBA (AB) thesis submitted to Acharya N.G. Ranga Agricultural University, Guntur, Andhra Pradesh is included in first page

Chittoor district in Andhra Pradesh. These regions house around 65 processing units, with Alphonso and Totapuri mangoes being the primary varieties used in processing (Agricultural and Processed Food Products Export Development Authority, Ministry of Commerce and Industry, 2024). The erstwhile Chittoor district alone accounts for 1.12 lakh hectares of mango cultivation, producing approximately 15.50 lakh tonnes annually. The Totapuri (Banglora) variety is predominantly used by the pulp industry (Sowmya *et al.,* 2022). Processed mango products such as juices, purees and dried slices have witnessed increased demand in domestic and international markets. However, processors operate at only about 40% capacity due to several challenges, including raw material shortages, the lack of suitable varieties for processing, poor quality of raw materials, high working capital requirements and competition from fresh produce buyers.

Despite India's leadership in mango production, farmers and processors face multiple challenges. Price fluctuations, driven by the seasonal nature of mango production, pose a major risk, while limited access to credit, markets and timely market information limiting timely investment in better practices. Labour shortages and high pest and disease infestation further escalate production costs. Moreover, middlemen exploitation, trader cartels, and policy-related inefficiencies contribute to low price realization, widening the price spread and creating marketing inefficiencies (Kumaresh and Sekar, 2013; Saripalle, 2019; Badar and Ahmad, 2021). These challenges necessitate for a well-structured and integrated value chain that enhances market efficiency, reduces post-harvest losses while also ensuring higher prices for mango growers and processors. Alternative marketing channels have also emerged to strengthen farmers' bargaining power, ensure better prices, and enhance supply chain transparency.

Value chain refers to set of actors and activities involved in bringing a product from production stage to the final consumer and its final disposal. The actors in the mango value chain for processing varieties in India include nursery producers, fresh mango producers, harvesters, assemblers, processors, traders and exporters. These actors engage in a series of inter connected activities to bring the farm produce to final consumers. In the process, each actor relies on others in the value chain to ensure an efficient flow of produce. Understanding these interdependencies play a vital role in improving responsiveness and competitiveness within the mango value chain.Value chain analysis enables the assessment of the actors, their relationships, factors influencing the industry performance, identifying and addressing the constraints to enhance efficiency, productivity and competitiveness of an industry. In this context, the study focuses on evaluating mango value chains for processing varieties in erstwhile Chittoor district in state of Andhra Pradesh with the following objectives.

i. To map value chains of mangoes associated with processing varieties

ii. To evaluate the efficiency of different marketing channels for processed mango processing.

iii. Identifying the constraints encountered by various actors in mango value chains.

Till date, studies on mango have primarily focused on economic analysis, price spread, and marketing efficiency for table varieties. Although some research has explored farmer challenegs, a comprehensive examination of all actors involved in the mango value chain, from production to end-use, remains lacking. Existing studies predominantly

concentrate on fresh mangoes and do not provide an in-depth assessment of value chain efficiency, price spread, and market linkages in the processing segment. Moreover, previous studies lack integrated approach regarding perspectives of key stakeholders across the value chain. This study seeks to fill this gap by offering a holistic analysis of the mango value chain, specifically for processing varieties, evaluating marketing channels, and identifying the challenges faced by stakeholders to enhance efficiency and market outcomes.

MATERIAL AND METHODS

Chittoor district was selected for this study purposively due to its prominent position in mango production within Andhra Pradesh. The district's top five mango-producing mandals were purposively selected. Within these mandals, three villages with largest area from each mandal were selected, leading to a total of 15 villages. A random sample of 10 mango-growing farmers were selected from each selected village, totaling 150 farmers as the sample. Additionally, 30 intermediaries including 8 pre-harvest contractors, 10 ramp traders, and 12 processors were selected using the snowball sampling technique. Thus, the study constituted a sample of 150 farmers and 30 intermediaries. Both the farmers and intermediaries were interviewed to gather data on mango value chains, value addition activities, marketing costs, and constraints within these chains. The information obtained was analyzed using value chain mapping, price spread analysis, Acharya's marketing efficiency approach, and Garrett ranking technique. The collected data pertains to the period of June and July months of 2024.

Price Spread

It is the difference between the price paid by the consumer and the price received by the producer for an equivalent quantity of produce. It is calculated by using below formula.

Price Spread=Consumer Price-Producer Price

Producer's share in consumer rupee

It represents the percentage of the final retail price that goes to the producer. It is evaluated by using the below formula. It is calculated usig the following formula.

Producer's Share (%)=(Consumer Price/ Producer Price)×100

Marketing Efficiency

Marketing efficiency of value chains was calculated by using Acharya's formula (2003).

Marketing Efficiency (ME)= Producer Price/(Marketing Costs+ Marketing Margin)

Garrette ranking

It is a statistical technique used to rank constraints faced by various actors in value chains based on their significance as perceived by respondents in the survey.Garrett's formula is given by,

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

Where,

R_{ij} : Rank given for i^{th} factor by j^{th} individual

N_j : Number of factors ranked by j^{th} individual

RESULTS AND DISCUSSION

Mapping of value chains and the value chain analysis of mango processing varieties:

In Chittoor district, the mango value chain for processing varieties includes mango growers, pre-harvest contractors, input suppliers, financial institutions, horticulture departments and processing units. Post-

cultivation, the value chain includes aggregation and marketing managed by ramp traders and processors, who enhance the value of mangoes for both domestic and international markets. Farmers primarily sell processing varieties, such as Totapuri, to processors, pre-harvest contractors and traders. The marketing efficiency of three major value chains used by these farmers has been evaluated and the results aredetailed below.

Value chain 1:

Farmers ⟶ Processors ⟶ Domestic/ international buyers

Mango-growing farmers focused primarily on cultivating and harvesting mangoes. After harvest, produce is sold directly without middlemen to nearby processing units, received a net price of Rs.24596 per tonne (Table 1). The processing units then added value by converting the raw mangoes into pulp, concentrates and mango drinks, which were sold to domestic beverage companies or exported to international buyers. In this value chain, processors received a margin of 18.98 per cent from domestic sales, while the producer's share accounted for 55.88 per cent of the final consumer price. (Sowmya *et al*., 2022)

Value chain 2:

Farmers ⟶ Ramp Traders ⟶ Processors ⟶ Domestic/international buyer

In this value chain, farmers sell their output to ramp traders, received a net price of Rs.22,222 per tonne (Table 1). After purchasing the produce, ramp traders promptly loaded it onto large vehicles, such as lorries, using ramps which is then transported to processing units, while also bearing the costs associated with loading and transportation. These traders typically sold the produce to domestic or out-of-state processors, earned a margin of 2.18 per cent of final consumer's price. Once the mangoes purchased from the traders, the processing units added value by converting them into pulp, concentrates and mango drinks, which were then sold to domestic beverage companies or exported to international buyers. In this value chain, processors achieved a margin of 19.83 per cent from domestic sales, while the producer's share accounted for 50.49 per cent of consumer price.(Sowmya *et al*., 2022)

Value chain 3:

Farmers ⟶ Pre-harvest ⟶ contractors ⟶ Processors Domestic/ international buyer

In this case, farmers sold mango orchards to pre-harvest contractors (PHCs) for an agreed-upon price of Rs.12611(Table 1) per cent which represents approximately 28.65 per cent of price paid by consumers, thereby stepped away from any further involvement in the marketing process. Once the PHCs take over the orchards, they take complete responsibility of maintenance and covered all related costs. After harvesting, the PHCs sold the produce directly to nearby processing units, resulting in earning a margin of 8.01 per cent of consumer purchase price. The processing units then added value by converting the mangoes into pulp, concentrates and mango drinks, which were sold to domestic beverage companies or exported to international buyers. In this value chain, processors achieved a margin of 21.02 per cent from domestic sales, while the producer's share accounted for 28.65 per cent of the final consumer price. (Ravi *et al.,* 2023)

The results revealed that the price spread across three value chains were Rs.19417,Rs.21791 and Rs.31402 respectively. Higher efficiency in the value chain is reflected through smaller gap between the consumer purchase price and producer

Table 1. Marketing costs, margins, price spread, producer's share and marketing efficiency of mango processing variety

		Processing variety					
		Value chain 1		Value chain 2		Value chain 3	
S.No	Actor	Cost per tonne (Rs.)	% in CP	Cost per tonne (Rs.)	% in	Cost per tonne (Rs.)	% in CP
1	**Farmer**						
	Producer's Sale price	26526	60.27	23750	53.96	12611	28.65
	Total MC	1930	4.39	1528	3.47	0	0.00
	Producer's net price	24596	55.88	22222	50.49	12611	28.65
2	**Pre-harvest contractor**						
	Purchasing price					12611	28.65
	Total MC					9490	21.56
	Margin					3524	8.01
	Sale price					25625	58.22
3	**Ramp trader**						
	Purchasing price			23750	53.96		
	Total MC			1440	3.27		
	Margin			960	2.18		
	Sale price			26150	59.41		
4	**Processor**						
	Purchasing price	26526	60.27	26150	59.41	25625	58.22
	Total MC	9135	20.76	9135	20.76	9135	20.76
	Margin	8352	18.98	8728	19.83	9253	21.02
	Domestic sale price	44013	100	44013	100	44013	100
	International price	57216		57216		57216	
	PS (Price Spread)	**19417**		**21791**		**31402**	
	P's S (Producer's Share) (%)	**55.88**		50.49		28.65	
	ME (Marketing Efficiency)	**0.56**		0.50		0.29	

·MC – marketing costs (maintenance costs, harvesting costs, loading costs, unloading costs, transportation costs and processing costs)

Table 2. Constraints faced by the pre-harvest contractors in mango value chain

S.No.	Constraints	Garrett score	Rank
1	High market price fluctuations	79	I
2	Weather uncertainty	71.25	II
3	Lack of negotiation power	61.75	III
4	Labor shortage	61	IV
5	Unsupportive government policies	48.5	V
6	Less support from financial institutions	46.5	VI
7	Lack of processing units support	41	VII
8	Lack of storage facilities	34.875	VIII
9	Insufficient transport facilities	33.375	IX
10	Lack of timely payments	20.75	X

received price. Among the three, Value Chain 1 proved to be higher efficient, given its lower price spread. The producer's share of the consumer's rupee was 55.88 per cent, 50.49 per cent and 28.65 per cent for the three value chains, respectively. Value Chain 1 had higher producer share, making it the most efficient (Kalidas and Ravikumar. 2024). In general, a value chain with lower value-added costs and margins is considered more efficient in marketing. Therefore, Value Chain 1, indicating farmers selling their produce directly to processors, demonstrated the highest marketing efficiency, resulting in a greater share for producers and making this chain the most advantageous for farmers.

Constraints of pre-harvest contractorsin mango value chain

Results in Table 2. indicates the first major constraint faced by pre-harvest contractors in the study area was higher market price fluctuations (79) as the prices changes day to day and price was fixed by the union of processors. The second constraint encountered was weather uncertainties leading to lesser yields(71.25). Other notable constraints included lack of negotiation power with the farmers (61.75) as large farmers

Table 3. Constraints of ramp traders in mango value chain

S.No.	Constraints	Garrett score	Rank
1	Highmarket price fluctuations	77.6	I
2	Lack of timely payments	65.8	II
3	Competition from other players in the market	59.2	III
4	Lack of adherence to promised agreements due to better prices offered by other players in market	50.2	IV
5	Lack of processing units support	46.8	V
6	Less support from financial institutions	39.8	VI
7	Inadequate transport	38.2	VII
8	Inadequate storage	22.4	VIII

Table 4. Constraints faced by the processors in mango value chain

S.No.	Constraints	Garrett score	Rank
1	High requirements for working capital	80	I
2	Shortage of labor for processing activities	66.67	II
3	Unavailability of high-quality raw materials	63	III
4	High interest rates on loans	56.08	IV
5	Unsupportive government policies	52.58	V
6	Shortage of skilled labor	48.67	VI
7	Less support from financial institutions	42.33	VII
8	Non upgradation to advanced technologies	36	VIII
9	Market competition from other processing firms	34.67	IX
10	Frequent electricity supply disruptions	18	X

demand high prices and shortage of labor for harvesting and marketing activities (61).

Constraints of Ramp traders in mango value chain:

Table 3. also indicates thathigher market price fluctuations (77.6) identified as major challenge by ramp traders driven by daily price changes and the influence of processor unions in setting prices. This is followed with payments delays from buyers (65.8), as processing units often make payments late. Additional challenges included competition from other players in market (59.2) and a lack of adherence from suppliers to agreed-upon terms (50.2) often due to higher prices offered by competitors.

Constraints of processors in mango value chain:

Table 4. indicates that, the primary challenge encountered by processors was the high requirement for working capital (80), driven by increasing raw material costs and higher labor costs. The next constraint was a shortage of labor for processing activities (66.67), attributed to the presence of multiple processing units in the area. Other notable constraints included the unavailability of high-quality raw materials (56.08) and high interest rates onloans (52.58). (Sowmya *et al*., 2022 and Wie and Aido, 2017)

CONCLUSIONS

The study conducted in Chittoor district of Andhra Pradesh with regard to mango processing varietiesrevealed that among the three identified mango value chains, direct selling to processors (Value Chain 1) is identified as the most efficient cannel, offering the highest marketing efficiency (0.56) and the greatest share for farmers to an extent of 55.88.The major constraints faced by pre-harvest contractors include high market price fluctuations and weather uncertainty, while that of ramp traders were high market price fluctuations and lack of timely payments from processors and processors have been facing major significant constraints related to high requirements for working capital and shortage of labour for processing activities. These challenges hinder the overall efficiency and profitability of the mango value chains, indicating a need for targeted interventions to

address these issues and improve the value chain's performance.

RECOMMENDATION

Improving the mango value chain for processing varieties requires a multi-faceted approach. This includes establishment of efficient price dissemination mechanism and expanding alternate market access through eNAM along with facilitating logistic services for institutional and large buyers located at distant markets. Furthermore, enhancing access to value chain finance for farmers, middlemen and processors, promoting mango FPOs and addressing infrastructural bottlenecks through them followed with enhancing technology adoption at farmer level to increase yields and mitigate climate risk will significantly enhance the efficiency of mango value chain in the study area.

POLICY IMPLICATIONS

As price fluctuations is identified a major challenge in the mango value chain, the government should establish an efficient market intelligence system to disseminate real-time price information. This can be achieved by setting up kiosks near marketplaces and at the village level. Strengthening the integration of logistics service providers and institutional buyers through the eNAM "Platform of Platforms" will not only improve price discovery but also enhance access to other markers for mango farmers. The government should promote formation of mango FPOs in high-production clusters to enhance farmers' bargaining power. Additionally, facilitating infrastructure development such as cold storage and ripening chambers, through these FPOs will help mitigate price fluctuations and reduce post-harvest losses. Expanding institutional credit through relaxations of norms along side with state support to mango processing units in identified clusters will address their working capital needs, ensuring timely payments to farmers and supporting the growth of the processing industry. Through a Public-Private Partnership (PPP) model involving state agricultural departments and agri-startups, the government should encourage farmers to adopt technologies such as IoT, helping farmers for informed decision making while also effectively mitigating risk associated climate variability. To protect mango farmers from price volatility, the government should introduce alternative price guarantee mechanisms for crops not covered under MSP. A price assurance system similar to the sugarcane model can help shield farmers from trader cartels and unpredictable market fluctuations

REFERENCES

Agricultural and Processed Food Products Export Development Authority, Ministry of Commerce and Industry. 2024. Data about processing units of mango and mango pulp from India. Retrieved from website (https://apeda.gov.in/) on 08.08.2024.

Badar, H and Ahmad, B. 2021. Smallholders' constraints and options for participation in mango value chains in Punjab, Pakistan. Journal of Agricultural Research.59(2): 187-195.

Department of Agriculture and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India. 2024. Area and production of mango in India. Retrieved from website (https://agriwelfare.gov.in/en/StatHortEst) on 10.08.2024.

Kalidas, K and Ravikumar, R. 2024. Assessing Marketing Efficiency in the Coconut Value Chain: A Case Study of Western Tamil Nadu's Coconut Landscape. Journal of Scientific Research and Reports. 30(5): 625-632.

Kumaresh, K and C. Sekar. 2013. Price spread, marketing efficiency and constraints in supply chain of mango in Krishnagiri district of Tamil Nadu. Agriculture Update. 8 (3): 446-451.

Ravi, S. C., Beer, K., Gupta, A. K., Amrutha, T., Mishra, M., Jaiswal, R and Damodaran, T. 2023. A comprehensive analysis of the value chain dynamics of Dashehari mango in Uttar Pradesh, India. Journal of Applied Horticulture. 25(3): 297-302.

Saripalle, M. 2019. Market awareness and profitability: case study of Mango production in Karnataka India. Economic and Political Weekly. 54(4): 52-59.

Sowmya, R. B., Kishore, N. K., Lakshmi, T and Umar, S. N. 2022. A study on export growth of Chittoor mango and constraints faced by different actors in mango value chain. Andhra Pradesh Journal Agricultural sciences. 8(4): 223-228.

Sowmya, R. B., Kishore, N. K., Lakshmi, T and Umar, S. N. 2022. Critical analysis of value chain: a case of mango processing varieties in Chittoor district of Andhra Pradesh. The Journal of Research ANGRAU. 50(3): 139-143.

Wie, P and Aidoo, R. 2017. Analysis of the Sweet Potato Value Chain in Ghana; Linkages, Pathways, Governance and Constraints. Journal of Agriculture and Food Technology. 7(1): 1-13.

Sai Krishna, M., Prabhavathi, Y., Ravi Kishore, m and Nafeez Umar, S.K. 2025. Evaluating Mango Value Chains : Price Spread, Marketing Efficiency and Constraints in Chittoor District, Andhra Pradesh. The Journal of Research ANGRAU. 53 (1) : 114- 122