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Economic analysis of marketing and constraints of rajma in Visakhapatnam district of Andhra Pradesh, India

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ABSTRACT

Rajma (*Phaseolus vulgaris* L.) is an important grain legume cultivated in the tribal and hilly areas of Visakhapatnam district of Andhra Pradesh. The present study analysed the marketing channels, marketing costs and margins, price spread, producer's share, marketing efficiency and marketing constraints of rajma in the district. Primary data were collected from 40 rajma farmers and market intermediaries during 2021–22 using a pre-structured schedule. Three major marketing channels were identified. The total marketing cost was ₹188.50, ₹189.25 and ₹188.75 per quintal in Channels I, II and III, respectively. Channel I recorded the highest producer's share in the consumer's rupee (82.26%), followed by Channel III (77.81%) and Channel II (76.45%). The price spread was highest in Channel II (₹1,930.50/q), while marketing efficiency estimated using the Acharya method was highest in Channel I (4.64), followed by Channel III (3.51) and Channel II (3.25). The lower efficiency in Channel II was associated with its higher price spread and involvement of two wholesalers. Among the marketing constraints, inadequate transportation facility ranked first, followed by inadequate awareness about market news and intelligence, inadequate storage facility and low price for beans, with mean Garrett scores of 60.75, 58.00, 49.50 and 25.00, respectively. The findings suggest the need to strengthen direct procurement and collective marketing through co-operatives and Farmer Producer Organisations, along with improved transportation, storage and market information facilities, to enhance farmers' price realization and marketing efficiency.

Keywords: Rajma, marketing channels, price spread, marketing margin, Producer's share, Garrett's ranking, Andhra Pradesh

Introduction

Rajma (*Phaseolus vulgaris* L.), commonly known as kidney bean or common bean, is an important grain legume valued for its high protein, dietary fibre, vitamins and mineral content. It is widely consumed across India and has gained increasing popularity owing to changing dietary preferences and growing awareness of its nutritional benefits. The area under rajma cultivation in India increased from 0.23 million hectares in 2020–21 to 0.36 million hectares in 2022–23, while production increased from 0.21 million tonnes to 0.36 million tonnes during the same period (DES, DA&FW, 2024) [1]. Although rajma is traditionally cultivated in the Himalayan and north-western regions of India, its cultivation has expanded to several non-traditional regions, including Andhra Pradesh. In the state, rajma is particularly cultivated in the tribal and hilly areas of Visakhapatnam district, where it has emerged as an important cash crop owing to its high market value and increasing consumer demand, thereby contributing to the income and livelihood of farming households. During 2024–25, the area under rajma in Andhra Pradesh was reported as 0.10 lakh hectares (DES, Government of Andhra Pradesh, 2024-25) [2].

Efficient agricultural marketing is essential for ensuring remunerative prices to farmers and facilitating the movement of produce from producers to consumers. Marketing channels, transportation, communication facilities and market information influence farmers' market access and the prices they receive. In India, inadequate transport and communication networks and limited market information can increase farmers' dependence on informal buyers (Negi *et al.*, 2018) [3]. Rajma in Andhra Pradesh is marketed through channels involving producers, village traders, wholesalers, retailers and consumers, with the involvement of intermediaries affecting marketing costs, margins, price spread and producer's share in the consumer's rupee. The number of intermediaries can also influence marketing costs and marketing efficiency (Kumar *et al.*, 2017; Thakur *et al.*, 2023) [4, 5]. Farmers, particularly those in remote and tribal areas, may face constraints related to transportation, market information, storage and market access.

Despite the growing importance of rajma in Andhra Pradesh, limited empirical evidence is available on its marketing system, particularly in the tribal areas of Visakhapatnam district. Therefore, the present study analysed the marketing channels of rajma, estimated marketing costs and margins, assessed price spread and producer's share in the consumer's rupee, evaluated marketing efficiency and identified the major constraints faced by rajma farmers in Visakhapatnam district of Andhra Pradesh.

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Materials and Methods

The sampling plan adopted for selection of district, blocks and respondents was multistage purposive and random sampling procedure. Out of 26 districts of Andhra Pradesh, Visakhapatnam was selected purposively as it ranked first in terms of both area and production of rajma in the state. Two blocks with highest area under rajma was purposively selected. Two villages were selected from each block, and 10

producers were picked from each village making it to 40 producers in total are randomly selected. Primary data were collected from farmers and market intermediaries during 2021–22 using a pre-structured schedule through personal interviews. The study identified three marketing channels to move the produce from the place of production to ultimate consumer with help of different intermediaries consisting of 9 village traders, 5 wholesalers, co-operative society and 12 retailers.

Channel I	:	Producer-Village trader-Wholesaler-Retailer
Channel II	:	Producer-Village trader-Wholesaler I -Wholesaler II-Retailer
Channel III	:	Producer-Co-operative society-Wholesaler-Retailer

Marketing cost

Cost incurred by the producer and intermediaries, including village traders, wholesalers, co-operative society and retailers involved in the buying and selling of rajma seeds.

Marketing cost (M_C) is expressed as follows:

$$MC = CF + CT + CW + Cc + CR$$

Where,

M_C is total marketing cost,

C_F = Cost incurred by farmer/producer in marketing

C_T = Cost incurred by village trader in marketing

C_W = Cost incurred by wholesaler in marketing

C_c = Cost incurred by co-operative society in marketing

C_R = Cost incurred by retailer in marketing

Marketing margin

It denotes to the difference in prices prevailing at successive stages of marketing at given period of time. Market margin (M_M) is expressed as follows,

$$MM = SP - (PP + MC)$$

Where,

M_M = Marketing margin

S_P = Selling price

P_P = Purchasing price

M_C = Marketing cost

Price spread

Price spread represents the proportion of costs and margins attributed among the intermediaries in the marketing chain. Price spread (P_S) is expressed as follows,

$$PS = PC - PP$$

Where,

P_S = Price spread

P_C = Price paid by consumer

P_P = Net price received by producer

Producer's share in consumer's rupee (P_S)

It shows the proportion of the price paid by the consumer that the producer actually receives. Producer's share in the consumer's rupee (P_S) is expressed as follow:

$$PS = P_F / P_C \times 100$$

Where,

P_S = Producer's share in consumer's rupee

P_F = Net price received by farmer

P_C = Price paid by consumer

Marketing efficiency (M_E)

Marketing efficiency of different rajma marketing channels was estimated using the modified approach suggested by Acharya *et al.* (1999) [6]. The marketing efficiency index was expressed as the ratio of the net price received by the producer to the total marketing cost and total marketing margin.

$$ME = \frac{NP_P}{MC + MM}$$

Where,

M_E = Marketing efficiency

NP_P = Net price of producers

M_C = Marketing cost

M_M = Marketing margin

Garrett's ranking analysis

Garrett's ranking technique was utilized to prioritize or rank the constraints identified while marketing of rajma. Garratt's Formulae for converting ranks into percentages is as follows:

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

Where,

R_{ij} = Rank given for i^{th} factor (constraint) by j^{th} individual,

N_j = Number of factor (constraints) ranked by j^{th} individual

Results and Discussion

Marketing costs incurred across different marketing channels

The marketing costs incurred by various market intermediaries in the three identified marketing channels of rajma are presented in Table 1. The magnitude and composition of marketing costs varied across channels depending on the number of intermediaries involved and the marketing functions performed.

In Channel I (Producer → Village Trader → Wholesaler → Retailer → Consumer), the wholesaler incurred the highest marketing cost (₹84.00/q), followed by the retailer (₹44.50/q), while both the producer and village trader incurred ₹30.00/q each. The producer's marketing cost comprised bag cost (₹20.00/q), transportation (₹5.00/q) and weighing charges (₹5.00/q). The village trader mainly incurred loading and unloading charges (₹20.00) and transportation cost (₹10.00/q). For the wholesaler, storage charges (₹30.50/q) constituted the largest cost component, followed by transportation (₹25.50/q), labour (₹20.00/q) and handling losses (₹8.00/q). The retailer incurred marketing expenses on labour (₹12.00/q), transportation (₹10.00/q), loading and unloading (₹10.00/q), weighing (₹6.50/q) and handling losses (₹6.00/q).

In Channel II (Producer → Wholesaler I → Wholesaler II → Retailer → Consumer), Wholesaler I incurred the highest marketing cost (₹59.25/q), followed by the retailer (₹50.25/q), Wholesaler II (₹49.25/q) and the producer (₹30.50/q). The producer incurred marketing expenses primarily on packaging and transportation. Storage charges (₹20.50/q) accounted for the largest share of the marketing cost incurred by Wholesaler I, followed by loading and unloading, transportation, weighing and shop rent. Wholesaler II incurred major

expenses on transportation (₹25.00/q), storage (₹10.75), labour (₹10.00/q) and shop rent (₹3.50/q). The retailer's marketing cost consisted mainly of labour (₹12.00/q), transportation (₹10.00/q), loading and unloading (₹10.00/q), handling losses (₹8.25/q), shop rent (₹5.00/q) and weighing charges (₹5.00/q).

In Channel III (Producer → Girijan Co-operative Corporation → Wholesaler → Retailer → Consumer), the wholesaler incurred the highest marketing cost (₹71.75/q), followed by the retailer (₹46.25/q), the co-operative society (₹45.75/q), and the producer (₹25.00/q). The producer's marketing cost comprised bag and weighing charges. The co-operative society's major marketing expense was storage (₹25.25/q), followed by loading and unloading (₹10.00/q) and transportation (₹10.50/q). The wholesaler incurred substantial expenditure

on transportation (₹20.00/q), loading and unloading (₹15.25/q), labour (₹10.00/q), storage (₹10.50/q), shop rent (₹10.50/q) and handling losses (₹5.50/q). Retailer costs included labour (₹15.00/q), transportation (₹8.75/q), shop rent (₹8.00/q), weighing (₹8.00/q) and handling losses (₹6.50/q).

Overall, wholesalers incurred the highest marketing costs across all channels due to their involvement in multiple marketing functions such as transportation, storage, handling, and distribution. Storage and transportation emerged as the major components of marketing costs, while producers incurred comparatively lower costs as they performed only limited marketing activities before the sale of produce.

Table 1. Marketing cost of rajma in channels (₹/q)

S. No.	Particulars	Channel-I	Channel-II	Channel-III
1.	Producer			
	Bag cost	20.00	22.00	20.00
	Transportation cost	5.00	8.50	-
	Weighing cost	5.00	-	5.00
	Sub total	30.00	30.50	25.00
2.	Village trader			
	Loading and unloading	20.00	-	-
	Transportation	10.00	-	-
	Sub total	30.00	-	-
	Co-operative society			
	Loading and unloading	-	-	10.00
	Storage charges	-	-	25.25
	Transportation	-	-	10.50
	Sub total	-	-	45.75
3.	Wholesaler-I			
	Loading and unloading	-	18.25	15.25
	Labor charge	20.00	-	10.00
	Shop rent	-	4.50	10.50
	Storage charges	30.50	20.50	10.50
	Transportation charges	25.50	10.50	20.00
	Weighing cost	-	5.50	-
	Losses	8.00	-	5.50
	Sub total	84.00	59.25	71.75
	Wholesaler-II			
	Labor charge	-	10.00	-
	Storage charges	-	10.75	-
	Transportation charges	-	25.00	-
	Shop rent	-	3.50	-
	Sub total	-	49.25	-
4.	Retailer			
	Loading and unloading charges	10.00	10.00	-
	Weighing	6.50	5.00	8.00
	Transport charges	10.00	10.00	8.75
	Labor charge	12.00	12.00	15.00
	Shop rent	-	5.00	8.00
	Losses	6.00	8.25	6.50
	Sub total	44.50	50.25	46.25
	Total	188.50	189.25	188.75

Price spread in rajma marketing

Price spread reflects the distribution of the consumer's price among producers and various market intermediaries through marketing costs and margins, thereby providing an indication of the efficiency of the

marketing system. The price spread for different marketing channels of rajma is presented in Table 2.

Among the three channels, Channel I recorded the highest producer's share in the consumer's rupee (82.26%), with the consumer paying ₹7,500 per quintal. The producer incurred a marketing cost of ₹30.00

per quintal (0.40% of the consumer's price), while the village trader, wholesaler and retailer incurred marketing costs of ₹30.00, ₹84.00 and ₹44.50 per quintal, respectively. In Channel II, the consumer paid ₹8,200 per quintal, of which the producer received 76.45%. The producer's marketing cost was ₹30.50 per quintal (0.37% of the consumer's price), whereas Wholesaler I, Wholesaler II and the retailer incurred marketing costs of ₹59.25, ₹49.25 and ₹50.25 per quintal, respectively. In Channel III, the consumer price was ₹8,000 per quintal, with the producer receiving 77.81% of the consumer's rupee. The producer incurred a marketing cost of ₹25.00 per quintal (0.31%), while the co-operative society, wholesaler and retailer incurred marketing costs of ₹45.75, ₹71.75 and ₹46.25 per quintal, respectively.

The marketing margins also varied across channels. In Channel I, the retailer realized the highest net margin (₹455.50/q; 6.07% of the

consumer's price), followed by the wholesaler (₹416.00/q; 5.54%) and the village trader (₹270.00/q; 3.60%). In Channel II, the retailer again obtained the highest net margin (₹649.75/q; 7.92%), followed closely by Wholesaler I (₹640.75/q; 7.81%) and Wholesaler II (₹450.75/q; 5.49%). In Channel III, the co-operative society earned the highest net margin (₹904.25/q; 11.30%), followed by the retailer (₹453.75/q; 5.67%) and the wholesaler (₹228.25/q; 2.85%).

The results indicate that the producer's share in the consumer's rupee declined with an increase in the number of intermediaries involved in the marketing channel. Consequently, Channel I, with fewer intermediaries, was relatively more efficient and ensured the highest share of the consumer's price to producers, whereas Channel II recorded the lowest producer's share due to the presence of two wholesalers. Similar findings have been reported by Swami *et al.* (2019) [7], Prasad *et al.* (2013) [8] and Thombre *et al.* (2013) [9].

Table 2. Price spread in rajma marketing (₹/q)

S.No.	Particulars	Channel-I	Channel-II	Channel-III
1.	a) Net price received by producer (Producer's share in consumer's rupee)	6,170 (82.26)	6,269.50 (76.45)	6,225 (77.81)
	b) Expenses incurred by producer	30 (0.40)	30.50 (0.37)	25 (0.31)
2.	a) Price paid by village trader and received by producer	6,200 (82.66)	-	-
	b) Expenses incurred by village trader	30 (0.40)	-	-
	c) Margin of village trader	270 (3.60)	-	-
3.	a) Price paid by Co-operatives and received by producer.	-	-	6,250 (78.12)
	b) Expenses incurred by Co-operatives	-	-	45.75 (0.57)
	c) Margin of Co-operatives	-	-	904.25 (11.30)
4.	a) Price paid by wholesaler and received by producer/village trader	6,500 (86.66)	6,300 (76.82)	7,200 (90.00)
	b) Expenses incurred by wholesaler	84 (1.12)	59.25 (0.72)	71.75 (0.89)
	c) Margin of Wholesaler	416.00 (5.54)	640.75 (7.81)	228.25 (2.85)
5.	a) Price paid by wholesaler-II and received by Wholesaler	-	7000 (85.36)	-
	b) Expenses incurred by wholesaler-II	-	49.25 (0.60)	-
	c) Margin of wholesaler-II	-	450.75 (5.49)	-
6.	a) Price paid by retailer	7,000 (93.33)	7,500 (91.46)	7,500 (93.75)
	b) Expenses incurred by Retailer	44.50 (0.59)	50.25 (0.61)	46.25 (0.57)
	c) Margin of Retailer	455.50 (6.07)	649.75 (7.92)	453.75 (5.67)
7.	Price paid by consumer	7,500	8,200	8,000

Marketing efficiency of rajma marketing channels

Marketing efficiency of the identified rajma marketing channels was estimated using the modified approach of Acharya and Agarwal, which relates the net price received by the producer to the total marketing cost and marketing margin. The results are presented in Table 4. Channel I recorded the highest marketing efficiency (4.64), fol-

lowed by Channel III (3.51), while Channel II recorded the lowest efficiency (3.25). The higher efficiency of Channel I indicates a relatively more efficient marketing arrangement from the producer's perspective, whereas the lower efficiency of Channel II suggests comparatively greater resource use within the marketing system. Overall, Channel I was the most efficient among the identified channels.

Table 4. Marketing efficiency of different rajma marketing channels

Particulars	Channel I	Channel II	Channel III
Net price received by producer (₹/q)	6,170.00	6,269.50	6,225.00
Total marketing cost (₹/q)	188.50	189.25	188.75
Total marketing margin (₹/q)	1,141.50	1,741.25	1,586.25
Total marketing cost + margin (₹/q)	1,330.00	1,930.50	1,775.00
Marketing efficiency (M_E)	4.64	3.25	3.51

Constraints in marketing of rajma

The major marketing constraints faced by rajma farmers are presented in Table 4. Inadequate transportation facility emerged as the most important marketing constraint, with the highest mean Garrett score of 60.75, and was ranked first. This was followed by inadequate awareness about market news and intelligence, which recorded a mean score of 58.00 and was ranked second. Inadequate storage facility ranked third with a mean score of 49.50, while low price for beans was ranked fourth with a mean score of 25.00.

The predominance of transportation constraints indicates that inadequate transport facilities may limit farmers' access to markets and increase the difficulty and cost of moving rajma produce from production areas to markets. Limited awareness of market news and intelligence may further restrict farmers' ability to identify remunerative markets and negotiate better prices. Inadequate storage facilities may compel farmers to sell their produce soon after harvest, whereas low market prices directly affect their returns from rajma cultivation. The findings highlight the need for improved transportation and storage infrastructure and better dissemination of timely market information to enhance the marketing efficiency and price realization of rajma farmers. Similar evidence regarding the role of transportation and market information in farmers' market access has been reported by Shashikant *et al.* (2011) [10].

Table 4. Constraints in marketing of rajma

S.No.	Constraints	Score	Rank
1.	Inadequate transportation facility	60.75	1
2.	Inadequate awareness about market news and intelligence	58.00	2
3.	Inadequate storage facility	49.50	3
4.	Low price for beans	25.00	4

Conclusion

The study revealed that rajma marketing in Visakhapatnam district involved three major channels, with variation in marketing costs, margins and price spread. Channel I recorded the highest producer's share in the consumer's rupee (82.26%), whereas Channel II recorded the lowest share (76.45%) and the highest price spread (₹1,930.50/q). The higher price spread in Channel II was associated with the involvement of two wholesalers, suggesting scope for reducing intermediary stages in rajma marketing. Promoting direct procurement from farmers or farmer groups by bulk buyers and strengthening co-operative/FPO-based marketing can help reduce the additional intermediary margin and improve farmers' share in the consumer price. Improving trans-

portation, storage and market information facilities would further support farmers in accessing such marketing arrangements.

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