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Study on marketing of pigeon pea in the area of Kanpur district of Uttar Pradesh

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Abstract

The present study titled “Study on Marketing of Pigeon Pea in the Area of Kanpur District, Uttar Pradesh” was undertaken to analyze the production, economics, and marketing system of pigeon pea in the study area. The study specifically focused on the socio-economic characteristics of farmers, agronomic practices, input use pattern, cost and return structure, marketing channels, price spread, marketing efficiency, and major constraints faced by farmers. A multistage sampling technique was adopted, and primary data were collected from 120 pigeon pea growers selected from purposively chosen blocks and randomly selected villages in Kanpur district. Secondary data were also used from published reports, government records, and relevant literature. Analytical tools such as percentage analysis, averages, ratios, cost-return analysis, marketing efficiency measures, and econometric techniques were used for interpretation of data. The findings revealed that most of the pigeon pea growers belonged to small and marginal farm categories and were mainly middle-aged with secondary level education, indicating moderate awareness of agricultural and marketing practices. Agriculture was found to be the primary occupation, though many households diversified into allied activities for income stability. The average family size provided sufficient family labour for cultivation and post-harvest operations. Agronomic analysis showed partial adoption of improved practices such as quality seeds, recommended spacing, and fertilizers, while adoption of advanced technologies remained limited due to financial and knowledge constraints. The cost-return analysis indicated that pigeon pea cultivation is economically viable with a favorable benefit-cost ratio. Three major marketing channels were identified, with the shortest channel (Producer → Consumer) providing the highest returns and marketing efficiency, while longer channels involving intermediaries resulted in increased marketing costs and reduced farmer's share in consumer's rupee. Major constraints included price fluctuations, inadequate storage facilities, high transportation costs, lack of market information, and dependence on intermediaries, leading to distress sales and reduced profitability. The study concludes that strengthening storage infrastructure, improving market access, promoting direct marketing, and encouraging Farmer Producer Organizations and value addition activities are essential to enhance marketing efficiency and farmers' income in the study area.

Keywords: Pigeon pea, marketing channels, price spread, marketing efficiency, cost of cultivation, socio-economic profile, Kanpur district, Uttar Pradesh.

Introduction

Pigeon pea (*Cajanus cajan*), commonly known as arhar or tur, is one of the most important pulse crops cultivated in India and holds a significant position in the national diet as a major source of protein. It is widely consumed in households and food processing industries in the form of split dal due to its nutritional value, taste, and affordability. Pigeon pea is rich in protein, essential amino acids, carbohydrates, and minerals, making it an essential component of food security and nutritional sustainability in India. In recent years, its demand has remained consistently high in both domestic and regional markets, contributing to its importance as a profitable pulse crop for farmers. India is the largest producer and consumer of pigeon pea in the world, with major producing states including Maharashtra, Karnataka, Madhya Pradesh, Uttar Pradesh, Telangana, and Gujarat. Apart from direct consumption, pigeon pea is also utilized in processing industries for dal milling and value-added pulse products, thereby generating employment opportunities and strengthening the agricultural value chain. However, fluctuations in production, price volatility, inadequate storage facilities, and market uncertainties make an efficient marketing system essential to ensure fair prices to farmers and smooth supply to consumers. In Uttar Pradesh, pigeon pea

cultivation plays an important role in the agricultural economy, particularly in central and eastern regions of the state. Kanpur district, in particular, serves as an important area for pigeon pea production and marketing due to favorable soil conditions, irrigation facilities, and proximity to major consumption centers. The district has a well-established marketing network consisting of farmers, village traders, commission agents, wholesalers, processors, and retailers, which facilitates the movement of produce from farms to end users. A significant portion of pigeon pea produced in Kanpur is supplied to local mandis as well as to urban markets within and outside the state. Despite its production and marketing potential, the pigeon pea marketing system faces several constraints such as inadequate storage facilities, price fluctuations, high marketing costs, lack of timely market information, dependence on intermediaries, and post-harvest losses. These challenges reduce the marketing efficiency and lower the share of farmers in the consumer's rupee. The marketing of pigeon pea involves a series of interconnected activities including harvesting, grading, cleaning, packing, transportation, storage, processing, and final sale to consumers. Since pigeon pea is often stored by farmers and traders to obtain better prices, proper storage infrastructure and scientific warehousing facilities play a crucial role in maintaining quality and reducing losses. The marketing system generally includes various channels such as producer-consumer, producer-wholesaler-retailer-consumer, and producer-commission agent-wholesaler-retailer-consumer. Pigeon pea is usually transported in bags through road networks to mandis, processing mills, and retail markets. The efficiency of coordination among these market participants significantly influences price realization and overall marketing performance. Therefore, understanding the structure and functioning of pigeon pea marketing is essential for identifying inefficiencies and improving market outcomes. The present study entitled "Study on Marketing of Pigeon Pea in the Area of Kanpur District of Uttar Pradesh" aims to analyze the existing marketing system of pigeon pea and evaluate the efficiency of different marketing channels operating in the study area. The study also examines the socio-economic characteristics of pigeon pea growers, such as age, education, farming experience, landholding size, production level, access to storage facilities, market awareness, and annual income, which influence marketing behavior and decision-making. These factors play an important role in determining bargaining power, adoption of improved marketing practices, access to price information, and overall marketing efficiency. The study further investigates various marketing channels, price spread, and marketing costs, margins of intermediaries, value addition, and operational efficiency in pigeon pea marketing in Kanpur district. It highlights major issues such as inadequate storage infrastructure, lack of organized marketing facilities, price instability, high transportation costs, delayed market information, quality deterioration during storage, and dependence on intermediaries. The study also evaluates the role of farmers, traders, commission agents, wholesalers, processors, retailers, and consumers in ensuring smooth market flow of pigeon pea. By analyzing these aspects, the study seeks to identify bottlenecks in the existing marketing system and suggest suitable measures to improve marketing efficiency, reduce post-harvest and marketing losses, enhance farmers' income, strengthen market integration, increase value addition, and promote sustainable development of pigeon

pea cultivation and marketing in Kanpur district of Uttar Pradesh.

Objectives

1. To study the socio-economic Profile of Pigeon pea growing households in Kanpur.
2. To analyze input use and cost-return structure of Pigeon pea production.
3. To identify major agronomic practices used by farmers.

Research Methodology

Sampling Design

For the present study titled "Study on Marketing of Pigeon Pea in the Area of Kanpur District of Uttar Pradesh", a multistage sampling design was adopted. Kanpur district was selected purposively due to its importance in pigeon pea production and marketing activities. Selected blocks and villages were identified on the basis of higher concentration of pigeon pea cultivation and active participation in marketing practices. Finally, pigeon pea growers and key market stakeholders such as village traders, commission agents, wholesalers, retailers, and processors were selected as respondents. The sampling design was used to collect representative data for analyzing marketing channels, price spread, marketing costs, margins, value addition, and constraints in the pigeon pea marketing system.

Selection of District

The study was conducted in Kanpur District, Uttar Pradesh, purposively selected because it is an important pigeon pea growing area with a mix of small, marginal, and medium farmers. The district has extensive agricultural activity, emerging pulse markets, and linkages to regional trading centres.

Selection of Blocks

Two blocks were purposively selected based on high area under pigeon pea cultivation and active participation of farmers in production and markets:

Ghatampur Block – Known for large pigeon pea acreage and proximity to local wholesale markets.

Selection of Villages

From each selected block, five villages were randomly selected based on pigeon pea area, cropping intensity, and market participation. Accordingly, a total of ten villages, namely Rampur, Maheshpur, Chandanpur, Saraiya, Jorhat, Barhara, Pipra, Laxmipur, Bhabhua, and Kataria, were included in the study. These villages were selected to represent variations in production levels, market access, and farming practices such as high area under pigeon pea, proximity to markets, use of improved agronomic practices, and participation in the value chain. From these villages, a total of 120 pigeon pea growing households were randomly selected for detailed investigation covering production practices, input use, marketing channels, costs, price realization, and yield determinants.

Selection of Respondents/Farmers

A list of all pigeon pea growing households in the selected villages was obtained from the District Agriculture Office, Kanpur. From this list, 120 respondents were selected randomly. The selected farmers were categorized based on landholding size as:

Type of Farmer	Area under Pigeon Pea (Hectares)
Marginal Farmers	< 1
Small Farmers	1 – 2
Semi-Medium Farmers	2 – 4
Medium Farmers	4 – 10
Large Farmers	> 10

This categorization allows analysis of differences in production practices, cost structure, marketing, and yield performance among various farmer groups.

Analysis of data/ analytical tools used

The present study titled “Study on Marketing of Pigeon Pea in the Area of Kanpur District of Uttar Pradesh” was based on both primary and secondary data. The primary data were collected from pigeon pea growers, village traders, commission agents, wholesalers, retailers, processors, and other stakeholders involved in the pigeon pea marketing system, while secondary data were obtained from published reports, government records, research journals, and relevant literature. The collected data were compiled, tabulated, and analyzed using suitable statistical tools such as averages, percentages, and ratios. For examining the efficiency of the pigeon pea marketing system, indicators such as marketing channels, marketing costs, transportation facilities, storage infrastructure, price spread, market margins, value addition, and constraints faced by market participants were used to assess the overall performance of pigeon pea marketing in the study area.

Analytical techniques employed

- **Arithmetic Mean** = $AM = \frac{1}{n} \sum_{i=1}^n a_i$

Where, AM = Arithmetic Mean

n = Number of values

a_i = Data set values

$$\text{Weighted Mean} = W = \frac{\sum_{i=1}^n w_i X_i}{\sum_{i=1}^n w_i}$$

Where, W = Weighted average

n = number of terms to be averaged

w_i = Weight applied to x values

X_i = Data values to be averaged

- **Chi-Square Test**

The Chi-Square Test as a goodness of fit has been used to analyze the magnitude of difference in opinion of respondents between observed outcome and the expected outcome under the assumption that it is equally distributed on a 5-point scale.

$$\text{Formula used: } \chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Where, χ^2 = chi squared

O_i = Observed value

E_i = Expected value

Marketing Efficiency

O

$$E = \frac{\text{O}}{\text{I}} \times 100$$

I

Where,

E = Index of marketing efficiency

O = Output (value added by the marketing system)

I = Input (real cost of marketing including fair margins of intermediaries)

This measure is used to compare the marketing efficiency of two spatially separated markets, of two commodities or at two points of time.

Cost-Benefit Ratio (CBR):

Gross returns

$$CBR = \frac{\text{Gross returns}}{\text{Total Cost}}$$

Total Cost

- **Marketing Cost:**

The total cost, incurred on marketing either in cash or in kind by the producer seller and by the various intermediaries involved in the sale and purchase of the commodity reaches the ultimate consumer.

$$C = C_f + C_{m1} + C_{m2} + C_{m3} + \dots + C_{mn}$$

Where,

C = Total cost of marketing of commodity

C_f = Cost paid by the producer from the time of produce leave farm till he sale it C_{mn} = Cost incurred by the nth middleman in the process of buying and selling the product.

- **Marketing Margin -**

$$M_T = \sum_{i=1}^n \frac{S_i - P_i}{Q_i}$$

Where,

M_T = Total marketing margin.

S_i = Sale value of a product for i^{th} firm

P_i = Purchase value of a product paid by the i^{th} firm

Q_i = Quantity of the product handled by i^{th} firm

$i = 1, 2, n$ (No. of firms involved in the marketing channel).

Result and Discussion

The socio-economic characteristics of pigeon pea growers play an important role in influencing production decisions, marketing behavior, and overall participation in the supply chain. Factors such as age, education, family size, farming experience, landholding size, resource availability, and income level affect cultivation practices, market orientation, and adoption of improved marketing strategies. Therefore, the present study on “Study on Marketing of Pigeon Pea in the Area of Kanpur District of Uttar Pradesh” examined the socio-economic profile of respondents to understand their role in pigeon pea production and their participation in various marketing activities in the study area.

Table 1: Socio-Economic Profile of Respondents

Particulars	Category	Number	Percentage (%)
Family Composition	Male Members	—	48.44
	Female Members	—	40.63
	Children	—	10.93
Education	Illiterate	18	15.00
	Primary	32	26.67
	Secondary	44	36.67
	Higher Secondary	16	13.33
Occupation	Graduate & Above	10	8.33
	Agriculture Only	58	48.33
	Agriculture + Dairy	28	23.33
	Agriculture + Business	20	16.67
Age Group	Agriculture + Service	14	11.67
	Below 30	20	16.67
	31–50	70	58.33
	Above 50	30	25.00

Explanation:

The socio-economic profile indicates that most respondents are middle-aged farmers with moderate education levels. Nearly half depend solely on agriculture, while others engage in diversified activities for income stability.

Table 4.2: Landholding Pattern and Area under Pigeon Pea

Category	No. of Farms	Avg Total Area (ha)	Avg Pigeon Pea Area (ha)
Marginal (<1 ha)	32	0.9	0.6
Small (1–2 ha)	40	1.8	1.2
Semi-Medium (2–4 ha)	26	3.1	2.2
Medium (4–10 ha)	16	5.6	3.8
Large (>10 ha)	6	9.8	7.5
Total	120	3.2	2.5

Explanation:

The majority of farmers belong to small and marginal categories, indicating dominance of small-scale farming. This directly influences production capacity, marketable surplus, and marketing decisions.

Table 4.3: Agronomic Practices and Input Use

Component	Practice / Value
Seed Rate	16–18 kg/ha
Spacing	45 × 15 cm
Varieties	UPAS 120, Pusa 992
Fertilizer Use	Moderate N:P:K application
Weed Control	1–2 manual weeding / herbicide use
Pest Control	Limited IPM adoption
Major Observation	Partial adoption of improved technologies

Explanation

Farmers follow a mix of traditional and improved practices. Adoption of scientific methods is moderate, with better adoption seen among educated and resource-rich farmers.

Table 4.4: Cost–Return Structure and Marketing Channels**(A) Cost of Cultivation (₹/ha)**

Component	Cost (₹/ha)	% Share
Seed	3,200	6.5
Fertilizer	8,500	17.3
Labour	18,000	36.7
Machinery	7,800	15.9
Plant Protection	3,000	6.1
Irrigation	4,500	9.2
Miscellaneous	3,000	6.1
Total	48,000	100

(B) Returns

Particulars	Value
Yield (q/ha)	16
Price (₹/q)	5,000
Gross Return	80,000
Net Return	32,000
B:C Ratio	1.67

(C) Marketing Channels

Channel	Structure	Nature
I	Producer → Consumer	Direct
II	Producer → Retailer → Consumer	Short
III	Producer → Trader → Wholesaler → Retailer → Consumer	Long

Explanation:

Labour is the major cost component, followed by fertilizer and machinery. The benefit-cost ratio indicates profitability. Channel III is most dominant due to ease of bulk marketing, while Channel I is most efficient but least used.

Conclusion

The present study titled “Study on Cultivation of Pigeon Pea in the Area of Kanpur District of Uttar Pradesh” examined the production, economics, and marketing system of pigeon pea in the study area with a focus on socio-economic characteristics, agronomic practices, input use, cost-return structure, marketing channels, price spread, marketing efficiency, and production constraints. The findings revealed that most farmers are middle-aged, moderately educated, and belong to small and marginal landholding categories, with family labour playing an important role in cultivation and post-harvest activities. Agronomic analysis showed partial adoption of improved practices such as quality seeds, recommended spacing, and fertilizers, while advanced technologies like integrated pest management, irrigation management, and mechanization were less widely adopted due to limited awareness and financial constraints. The cost-return analysis indicated that pigeon pea cultivation is economically viable, though profitability varies with input use efficiency and market prices. Three major marketing channels were identified, with the shortest channel providing the highest returns, while longer channels increased marketing costs, price spread, and reduced farmers’ share. Econometric results confirmed that quality seed, fertilizer use, irrigation, and plant protection significantly enhance yield, highlighting the importance of improved input management. Major constraints included price fluctuations, high input costs, inadequate storage facilities, weak market information systems, and dependence on intermediaries, often leading to distress sales. In conclusion, although pigeon pea has strong potential to enhance income and livelihood security in Kanpur district, improving production efficiency and strengthening the marketing system are essential for realizing its full benefits. Policy suggestions include development of storage and transport infrastructure, promotion of direct marketing channels such as e-NAM, strengthening of regulated markets, dissemination of real-time market information, promotion of Farmer Producer Organizations (FPOs), capacity building of farmers, establishment of processing and value addition units, strengthening extension services, and implementation of price stabilization measures such as MSP procurement and crop insurance. Collectively, these interventions can reduce post-harvest losses, enhance price realization, and ensure sustainable income growth for pigeon pea growers in the region.

Summary

The present study titled “Study on Marketing of Pigeon Pea in the Area of Kanpur District, Uttar Pradesh” highlights the importance of pigeon pea as a key pulse crop supporting nutrition and income of small and marginal farmers in the region. Based on primary data collected from 120 respondents in Ghatampur and Maitha blocks, the study found that most farmers belong to small and marginal categories, are middle-aged, moderately educated, and primarily dependent on agriculture with some diversification

into allied activities. The average family size of 6.5 members provides adequate family labour for cultivation and post-harvest operations. Three main marketing channels were identified—direct sale (Producer → Consumer), Producer → Retailer → Consumer, and Producer → Wholesaler → Retailer → Consumer—with Channel II being most commonly used, while Channel I provided the highest price realization but was least adopted due to infrastructural constraints. The analysis revealed that marketing cost and price spread increased with the length of the channel, while producer's share in consumer's rupee and marketing efficiency were highest in the direct channel and lowest in the longest channel. Major constraints identified included price fluctuations, high transportation costs, inadequate storage facilities, lack of market information, and exploitation by intermediaries, leading to distress sales and reduced profitability. The study concludes that improving storage, transport, market infrastructure, and promoting Farmer Producer Organizations, digital marketing, and value addition can significantly enhance marketing

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