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A study on price spread analysis of Sorghum and Cumbu in Tamil Nadu

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Abstract

Millets are considered ancient grains with high nutritional value and are important food staples in impoverished, semiarid regions of Asia and Africa. The study analyzes the price spread of sorghum and cumbu in Tamil Nadu, focusing on key districts known for millet production. In the 2017-18 season, Tamil Nadu cultivated millets across 560,448 hectares, producing 927,121 tonnes. The study surveyed 90 millet farmers using convenient sampling methods in coordination with Farmers' Producer Organizations and the Department of Agriculture. It included local traders, commission agents, wholesalers, processors, and retailers for a comprehensive perspective. Structured interviews were conducted to gather data on cultivation methods, expenses, and marketing margins. The results showed disparities in the marketing costs and margins for sorghum and cumbu. Price spread analysis revealed the difference between consumer and producer prices, with significant profits for intermediaries. The study highlighted the producer's limited share in consumer spending and the necessity of optimizing supply chain management to improve profitability for farmers and offer fair pricing to consumers. Efforts should focus on enhancing marketing efficiency and reducing costs to benefit both producers and consumers.

Keywords: Price spread, millets, sorghum, cumbu, marketing cost, marketing margin

1. Introduction

Millets are considered ancient grains with high nutritional value and are important food staples in impoverished, semiarid regions of Asia and Africa (Tripathi and Vyas, 2023) ^[1]. They are grown in various agroecological conditions, including plains, coastal hills, and diverse soil types with varying rainfall (Kheya *et al.*, 2023; Balkrishna *et al.*, 2022) ^[5, 15]. Millets are especially prevalent in developing areas like India and Africa, where food and nutritional security pose significant challenges (Satyavathi *et al.*, 2021) ^[6].

India is the world's leading producer of millets, accounting for approximately 41% of global production, followed by Africa (Bhat *et al.*, 2023; Harish *et al.*, 2024) ^[7, 14]. While global millet consumption has declined by about 1%, it is projected to see an upward trend from 2019 to 2024 (Deevi *et al.*, 2024) ^[8]. Over the last 20 years, millet's role as a staple food has diminished in India and globally due to changes in demand and supply influenced by factors such as rising incomes, urbanization, and government policies (Chandra *et al.*, 2021) ^[9]. More than 50% of millets produced today are used for alternative purposes other than staple consumption.

In India, millets are predominantly grown in states like Karnataka, Andhra Pradesh, Tamil Nadu, Maharashtra, Odisha, Madhya Pradesh, Rajasthan, and Uttarakhand. Rajasthan, Maharashtra, and Karnataka have the largest millet cultivation areas, with Rajasthan producing 87% of the country's Cumbu, Maharashtra cultivating 75% of its sorghum, and Karnataka growing 54% of its Ragi and 32% of its Cumbu (Venkatesa Palanichamy *et al.*, 2023) ^[10]. In India, millets are used to make a variety of traditional dishes such as idly, dosa, pappad, porridge, bread, and baby food. Although families often prepare many traditional foods at home, the lack of large-scale commercial uses discourages farmers from cultivating millet crops (Deshpande *et al.*, 2021) ^[11]. As a result, many countries, including India, China, and the USA, have started research projects to explore and develop processing technologies to enhance the nutritional and health benefits of millets and promote their wider use as food (Jindal and Nikhanj, 2023) ^[12]. In the context of millets, pearl millet (cumbu) and sorghum are key crops in the study. The research will focus on analyzing the price spread and the value share of producers within the supply chain of cumbu and sorghum in Tamil Nadu.

2. Materials and Methods

In the 2017-18 agricultural season, Tamil Nadu produced 927,121 tonnes of millets across 560,448 hectares (DACNET, 2018) [13]. The main millets grown in the region were ragi, sorghum, and cumbu. The top five ragi-producing districts - Krishnagiri, Dharmapuri, Sivagangai, Vellore, and Tiruvannamalai - accounted for 88.9% of the cultivated area and 78.09% of total production in the 2017-18 season. For sorghum, Dindigul, Tiruchirappalli, Salem, Namakkal, and Theni were the leading districts, contributing 58.66% of the cultivation area and 62.80% of the production in the same period. Dindigul district led in sorghum cultivation with 50,889 hectares and 71,577 tonnes produced, while Tiruchirappalli followed with 66,003 tonnes (DACNET, 2018) [13].

When it came to cumbu, the top five districts were Villupuram, Cuddalore, Tuticorin, Tiruvannamalai, and Madurai, which together accounted for 81.25% of the cultivation area and 82.62% of the total production. Villupuram ranked first in cumbu cultivation with 29,066 hectares and 62,643 tonnes produced, while Cuddalore ranked second with 19,882 tonnes (DACNET, 2018) [13].

The study surveyed 90 millet-growing farmers using a convenient sampling method, in coordination with Farmers Producer Organizations (FPOs) and the Department of Agriculture. Additionally, the research included a diverse group of local traders, commission agents, wholesalers, processors, and retailers. A subset of five commission agents, ten wholesalers, ten retailers, five processors, and forty consumers were selected for detailed investigation.

Structured interview schedules, designed to fit the specific cultural and socio-economic contexts of millet production and marketing, were used to collect data. These schedules were pre-tested and refined for accuracy. Farmer interviews focused on farm and household profiles, cultivation methods and technologies, cultivation expenses, and marketing margins. Other stakeholders provided data on marketing costs, margins, and value addition. The study mapped out the various marketing channels for ragi, calculated price spreads, and examined the value shares of different stakeholders in these channels.

2.1 Marketing costs

Marketing costs encompass all expenses incurred by supply chain participants as products move through various stages to reach consumers. These costs typically include packaging, storage, transportation, and intermediary commissions (Malaisamy, 2021) [3].

2.2 Marketing margin

Marketing margin refers to the difference between the net price the producer receives and the price paid by the consumer (Rahayu *et al.*, 2021) [4]. This margin represents the cost added by intermediaries in the process of delivering the product to the consumer.

2.3 Price spread analysis

Primary data was collected from individual farmers and traders regarding their marketing-related expenses, including transportation, weighing, loading, unloading, packing, storage, and other related costs. The price spread, defined as the difference between the consumer's price and the producer's price for the same quantity of millets, was analyzed. This included tracking the profits of various market intermediaries involved in transporting the product from its source to the final consumer (Jagadesh *et al.*, 2021) [2].

a. Farmer's share in consumer rupee

The farmer's share of the consumer rupee was calculated using the following formula.

$$Fs = Fp / Cp \times 100$$

Where,

Fs = Farmer's share in consumer rupee (percentage),

Fp = Farmer's price

Cp = consumer's price

3. Results and Discussion

3.1 Marketing cost and marketing margin of sorghum (Rs. /q)

Farmer – Wholesaler – Consumer

Table 1: Marketing cost and Marketing margin of Sorghum (Rs. /q)

| Particulars | Cost | % Consumer Price |
|--|-------------|------------------|
| Farm gate price at village | 2346 | 92.5 |
| Primary Sorting | 2 | 0.1 |
| Packing – Gunny Bags | 30 | 1.2 |
| Weighing | 2 | 0.1 |
| Transport | 20 | 0.8 |
| Losses | - | |
| Marketing Cost | 54 | 2.1 |
| Farmers' selling price to Wholesaler (Mandy) | 2400 | 94.7 |
| Sorting | 2 | 0.1 |
| Packing – Gunny bags | - | |
| Loading/ Unloading | 10 | 0.4 |
| Transport | - | |
| Storage | 3 | 0.1 |
| Marketing Cost | 15 | 0.6 |
| Marketing Margin | 120(5%) | 4.8 |
| Total Marketing cost | 69 | 2.7 |
| Total marketing margin | 120 | 4.8 |
| Wholesaler price to Consumer | 2535 | 100 |

It states that from table 1, the total marketing costs of this channel was Rs. 69/q (54 – producer + 15 – wholesaler) and it costs 2.70 percent in the consumer price (2.10 – producer + 0.6 – wholesaler). The marketing margin for the produce was kept by the wholesaler were Rs. 120/q and it costs 4.8 percent in the consumer's price.

3.2 Price spread of Sorghum Marketing (Rs/q)

Table 2: Marketing cost and Marketing margin of Sorghum (Rs. /q)

| Sl. No | Particulars | Sorghum |
|--------|---------------------------|---------------|
| 1 | Producer | |
| | Gross Price received | 2346 (92.54) |
| | Marketing Cost | 54 (2.13) |
| | Net Price received | 2400 (94.67) |
| 2 | Wholesaler (Mandy) | |
| | Price paid | 2400 (94.67) |
| | Marketing Cost | 15 (0.6) |
| | Marketing margin | 120 (4.73) |
| | Price received | 2535 (100.00) |
| 3 | Consumer | |
| | Price paid | 2535 (100.00) |
| | Total Marketing cost | 69 (2.72) |
| | Total Marketing margin | 120 (4.73) |
| | Price Spread | 189 (7.46) |

It states that from table 2, this sorghum channel had a price spread of about Rs. 189/q (7.07% of net price paid by the consumer). Where the total marketing cost was Rs. 69/q and total marketing margin was Rs. 120/q and producer's share in consumer price was 92.54 percent.

3.3 Value Shares incurred by the Actors in the Sorghum Value Chain: The details on the value shares incurred by the actors in the value chain of sorghum is collected and presented in table 3. The value shares of each of the actors in the chain are worked out and presented.

Table 3: Value Shares incurred by the Actors in the Sorghum Value Chain

| Details Actors | Marketing Cost (Rs/q) | Marketing Margin | Marketing Cost (Rs/q) | Marketing Margin | Marketing Cost (Rs/q) | Marketing Margin |
|----------------|-----------------------|------------------|-----------------------|------------------|-----------------------|------------------|
| Producer | 54 | - | 2346 | 2400 | 54 | 2.25 |
| Wholesaler | 15 | 120 | 2400 | 2535 | 135 | 5.30 |
| Total value | 69 | 120 | | | 189 | 7.55 |

From the table 3, it could be inferred that the value share for the producer in the chain was 2.25 percent and the wholesaler share was 5.30 percent. The wholesaler kept Rs. 120/q as the margin for his produce to the next actor.

3.4 Marketing cost and Marketing margin of Cumbu (Rs. /q)
Farmer - Wholesaler (Mandy) – Consumer

Table 4: Marketing cost and Marketing margin of Cumbu (Rs. /q)

| Particulars | Cost | % Consumer Price |
|--|---------|------------------|
| Farm gate price at village | 2115 | 92.16 |
| Primary Sorting | 3 | 0.13 |
| Packing – Gunny Bags | 30 | 1.31 |
| Weighing | 2 | 0.09 |
| Transport | - | |
| Losses | - | |
| Marketing Cost | 35 | 1.53 |
| Farmers' selling price to Wholesaler (Mandy) | 2150 | 93.68 |
| Sorting | 2 | 0.09 |
| Packing – Gunny bags | - | |
| Loading/ Unloading | 10 | 0.44 |
| Transport | - | |
| Storage | 3 | 0.13 |
| Marketing Cost | 15 | 0.65 |
| Marketing Margin | 130(6%) | 5.66 |
| Total Marketing cost | 50 | 2.18 |
| Total marketing margin | 130 | 5.66 |
| Wholesaler price to Consumer | 2295 | 100 |

It states that in table 4, the total marketing costs of this channel was Rs. 50/q (35 – producer + 15 – wholesaler) and it costs 2.18 percent in the consumer price (1.53 – producer + 0.65 – wholesaler). The marketing margin for the wholesaler

kept the produce was Rs. 130/q and it costs 5.66 percent in the consumer's price.

3.5 Price spread of Cumbu Marketing (Rs/q)

Table 5: Price spread of Cumbu Marketing (Rs/q)

| Sl. No | Particulars | Cumbu |
|--------|----------------------------------|---------------|
| 1 | Producer | |
| | Gross Price received | 2115 (92.2) |
| | Marketing Cost | 35 (1.53) |
| | Net Price received | 2150 (93.7) |
| 2 | Trader (Commission agent) | |
| | Price paid | - |
| | Commission Charges | - |
| | Price received | - |
| 3 | Wholesaler (Mandy) | |
| | Price paid | 2150 (93.7) |
| | Marketing Cost | 15 (0.65) |
| | Marketing margin | 130 (5.65) |
| 4 | Consumer | |
| | Price paid | 2295 (100.0.) |
| | Total Marketing cost | 50 (2.18) |
| | Total Marketing margin | 130 (5.65) |
| | Price Spread | 180 (7.84) |

It states that from table 6, this channel had the price spread of about Rs. 180/q (7.84% of net price paid by the consumer). Where the total marketing cost was Rs. 50/q and total marketing margin was Rs. 130/q and producers share in consumer price was 92.2 percent.

3.6 Value shares incurred by the actors in the millet value chain: The details on the value shares incurred by the actors in the value chain of cumbu is collected and presented in table 6. The value shares of each of the actors in the chain is worked out and presented.

Table 6: Value Shares incurred by the Actors in the Millet Value Chain

| Details Actors | Marketing Cost (Rs/q) | Marketing Margin (Rs/q) | Price received (Rs/q) | Price sold (Rs/q) | Value added (Rs/q) | Value share (%) |
|-------------------|-----------------------|-------------------------|-----------------------|-------------------|--------------------|-----------------|
| Producer | 35 | 0 | 2115 | 2150 | 35 | 1.6 |
| Wholesaler | 15 | 130 | 2150 | 2295 | 145 | 6.3 |
| Total value added | 50 | 130 | | | | 7.9 |

From the table it could be inferred that the value share for the producer in the chain was 1.6 percent and the wholesaler share was 6.30 percent. The wholesaler kept Rs. 130/q as the margin for his produce to the next actor.

It was observed from the above details, the value chain channels were identified for all the major millet crops (Ragi, Sorghum & Cumbu). Cost of cultivation showed the difference between the value of yield per hectare and value of inputs. The role of actors and their activities were culled out. Using the marketing cost and marketing margin, the price spread calculated for the different channels for all major millet crops. Marketing efficiency also calculated to understand the market performance, to provide the lowest possible cost services. The preference of the major millet products by the consumers, source of awareness about the millets, frequency of consumption, form of consumption and place of purchase by the consumers were collected and given below.

4. Conclusion

In conclusion, the research effectively mapped the intricate marketing channels and value shares in the supply chains of millets in Tamil Nadu. The study highlighted the top-producing districts for ragi, sorghum, and cumbu, revealing significant disparities in cultivation areas and production volumes across the region. Detailed investigations into marketing costs and margins exposed the economic dynamics within each channel, providing insights into the roles and activities of various stakeholders. For both sorghum and cumbu, price spreads and value shares of producers and

wholesalers were calculated, indicating the producer's limited share in the consumer rupee compared to intermediaries. This research underscores the importance of efficient supply chain management to optimize profitability for farmers and offer fair pricing for consumers. Ultimately, these findings contribute valuable knowledge for developing strategies to enhance millet marketing systems and promote sustainable agricultural practices in Tamil Nadu.

The study suggests that efforts should focus on improving marketing efficiency in the millet supply chain by reducing marketing costs and ensuring a fair distribution of value shares among different actors. Strengthening the capacity of farmers and wholesalers, particularly through better negotiation and marketing strategies, can enhance producer margins. Promoting direct farmer-to-consumer sales or reducing intermediaries may increase farmers' shares in consumer spending. Additionally, encouraging transparency in price setting and facilitating access to market information can benefit both producers and consumers.

5. Limitations of the study

However, the research has limitations. The use of convenient sampling for surveying may introduce bias, limiting the generalizability of the findings. Data collected from specific regions might not represent broader trends in other millet-producing areas of Tamil Nadu. Future studies could benefit from a larger and more diverse sample to provide a more comprehensive understanding of the marketing dynamics of millets. Additionally, the study's focus on certain marketing channels may overlook other emerging or niche channels,

impacting the overall analysis. Further research could explore these aspects for a more holistic view of the millet market.

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