A study on price spread analysis and marketing efficiency of Ragi in Krishnagiri and Dharmapuri districts of Tamil Nadu, India

Abstract

Cereals like wheat and rice dominating food sources, millets have been underutilized despite their nutritional value and suitability for semi-arid regions. This research investigates the price spread analysis and marketing efficiency of Ragi, a millet variety, in Tamil Nadu. Focusing on Ragi cultivation in Krishnagiri and Dharmapuri districts, the study employed a convenient sampling technique, surveying 90 farmers and various stakeholders. Structured interviews gathered data on cultivation practices, marketing costs, and value addition. Results reveal significant marketing costs and margins, with Channel II exhibiting the highest total marketing cost and margin. Price spread analysis highlights Channel III as the most cost-efficient, with the highest producer share. Using Acharya's method, Channel III demonstrates superior marketing efficiency compared to Channels I and II. Additionally, value share analysis indicates varying benefits among actors in different marketing channels. Overall, the study underscores the importance of understanding marketing dynamics to enhance efficiency and ensure equitable distribution of benefits within the Ragi value chain in Tamil Nadu.

Keywords: Price spread, marketing cost, marketing margin, marketing efficiency, ragi.

1. Introduction

Nowadays, most people rely on cereals as their main food source. Among cereals like wheat, rice, and corn, wheat, rice, and corn are the most consumed worldwide (Thielecke *et al.*, 2021). However, millets, another type of cereal, have been overlooked as a food source, especially since the green revolution (Tiwari *et al.*, 2023). Millets are small-seeded grasses grown globally and are classified as cereal grains or crops. They are grown mainly in semi-arid regions of Africa and Asia, notably Nigeria and India, where they thrive in dry, hot conditions with minimal water requirements (Bisht *et al.*, 2022). Millets come in various types, each with its own nutritional value, characteristics, and texture (Hassan *et al.*, 2021). Examples include finger millet, pearl millet, foxtail millet, and proso millet. While wheat and rice are crucial for food security, they are more costly to produce compared to millets. Millets play a significant role in ensuring food, fiber, fodder, and agricultural security (Singh *et al.*, 2022).

In Africa and India, various types of millets are important crops, with finger millet being the most widely grown and valued (Meena *et al.,* 2021). However, in developed countries like the United States, proso millets are mainly grown for birdseed (Karthick *et al.,* 2023). Millets are considered native to many regions and have been staple foods in India and Africa for thousands of years (Paschapur*et al.,* 2021). Millets have been cultivated in East Asia for over 10,000 years. The term "millet" comes from the French word "Mille," meaning thousand, as a handful of millet can contain up to 1000 grains. Millets belong to the group of small-seeded cereal crops that are annual plants (Ashoka *et al.,* 2020; Palanichamy *et al.,* 2021).

Finger millets, known for their vibrant red color, are cultivated across the globe, including in countries like Sri Lanka, Nepal, Madagascar, Malaysia, Uganda, Japan, various parts of Africa, and India (Okolo and Adejumo, 2021). They cover a significant portion of millet crop areas in Asia and Africa, accounting for approximately 12%. In India alone, finger millets occupy 1.19 million hectares of land, yielding around 1.98 million tons annually, with an average yield of about 1661 kg per hectare. Despite being a nutritional powerhouse, boasting thirty times more calcium than rice, finger millets are often overlooked and underutilized in semi-arid and tropical regions (Rawat *et al.,* 2023). However, there's substantial potential to process finger millets into a range of value-added food products, especially in developing nations (Bhatt *et al.,* 2023). Their gluten-free nature makes them suitable for individuals with gluten allergies and stomach issues (Asrani*et al.,* 2023). In India, traditional methods like grinding, malting, and fermentation are used to create various products such as beverages, porridges, and staple foods like idli and dosa. This research aims to explore the diverse potential of finger millet as a vital dietary supplement with significant health benefits, particularly in the Indian context. Additionally, the study will investigate the marketing efficiency and price spread analysis of finger millets in Tamil Nadu.

2. Methodology

Ragi, a popular millet known for its ease of use and nutritional benefits, was chosen as the focus of this research. It is predominantly cultivated in the districts of Krishnagiri and Dharmapuri in Tamil Nadu, thus these areas were specifically selected for the study. The research employed a convenient sampling technique, gathering information from millet-growing farmers through Farmers Producer Organizations (FPOs) and the Department of Agriculture. Ninety farmers from the districts were surveyed, alongside a list of local traders,

commission agents, wholesalers, processors, and retailers associated with them. A subset of these stakeholdersfive commission agents, ten wholesalers, ten retailers, five processors, and forty consumerswere selected for in-depth investigation.

Structured interview schedules, tailored to the physical, cultural, and socio-economic context of millet production, processing, and marketing, were used to collect primary data. These schedules underwent rigorous pre-testing and refinement. Farmer interviews covered topics such as farm and household characteristics, cultivation practices and technologies, cultivation costs, and marketing margins. For other stakeholders, details on marketing costs, margins, and value addition were gathered. The study identified various marketing channels for ragi, calculated price spreads, and analyzed the value shares of stakeholders within these channels.

2.1. Marketing Costs

Marketing cost means the entire expenditure met by the supply chain players to move the product from different levels and ultimately to respective consumers. The marketing cost items generally will be packing, storage, transport, and commissions to be charged and incurred by the intermediaries (Malaisamy, 2021).

2.2. Marketing Margin

Marketing margins measure the gap between the net price received by the producer and the price paid by the consumer (Rahayu *et al*., 2021). The margin incurred by the intermediaries upon the product towards the consumer.

2.3. Price spread Analysis

Information was collected from the individual farmers and traders. The costs would include the transport, weighing, loading, and unloading, packing, storage, and other expenses incurred for marketing the produce. In the process of marketing, the difference between the price paid by the consumer and that received by the millets producer for an equivalent quantity of millets was defined as “Price Spread”. Profit of the various market intermediaries involved in moving the product from the initial point of production till it reached the ultimate consumer was recorded (Jagadesh *et al*., 2021)

a. Farmer’s share in Consumer Rupee

Further, the farmer's share in the consumer rupee was calculated with the help of thefollowingformula.

$$Fs = Fp/Cpx100$$

Where,

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

Fp=Farmer'sprice

Cp=consumer'sprice

2.4. EstimationofMarketingEfficiency

For calculating marketing margins, both Shepherd's formula and the concurrent margin approach are used, though it did not consider the time that elapses between the purchase and sale of the produce (Mugenzi, 2023). However, it becomes difficult to follow the track of the commodity as it loses its identity in the movement. Marketing efficiency is the degree of market performance. The movement of millets from producers to the ultimate consumers at the lowest possible cost consistent with the provision of services desired by the consumer is termed efficient marketing.

a. Acharya's Approach

According to Acharya, an ideal measure of marketing efficiency, particularly for comparing the efficiency of alternate market channels should consider all of the following (Mgale and Yunxian, 2020):

a) Total marketing cost (MC)

b) Net marketing margin (MM)

c) Prices received by the farmer (FP)

d) Prices paid by the consumer (RP)

Further, the measure should be accepted the following relationship between each of these variables and the marketing efficiency.

i) Higher the (MC), the lower the efficiency

ii) Higher the (MM), the lower the efficiency

iii) Higher the (FP), the higher the efficiency

iv) Higher the (RP), the lower the efficiency

As there is an exact association among the four variables, i.e. a+b+c = d, any three of these could be used to arrive at a measure for comparing the marketing efficiency. The following measure is suggested by Acharya,

$$MME = FP \div (MC + MM)$$

2.5. Value shares

According to Kaplinsky and Morris (2000), in determining the distribution of values among actors in the chain, one can identify who befitted in its participation in the chain and which actors will benefit more when support is provided (Tuoi and Son, 2023). The value shares among actors in the chain are different between market-driven and producer-driven chains. Value share is the amount of value that each actor in the chain adds.

It is the difference between the price the actor pays for the product and the price he sells it for. It can be calculated by the formula:

Added value = Price received by actor –Price paid by actor

Value share = Added values x 100 ÷ Final retail price

3. Results and discussions

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

The marketing cost and marketing margin of ragi for three different channels are given in the below table 1. The different channels are

Channel - I Farmer – Commission Agent - Wholesaler – Consumer

Channel – II Farmer - Wholesaler– Market Retailer – Consumer

Channel – III Farmer -FPO – Consumer

Table1.Marketingcostand Marketingmargin of Ragi(Rs./q)

Items	ChannelI		ChannelII		ChannelIII	
	Cost	% Consumer Price	Cost	% Consumer Price	Cost	% Consumer Price
Farmgateprice	**2866**	**88.1**	**2846**	**86.09**	**2746**	**93**
MarketingCost						
Producer	34	1	54	1.62	54	1.82
CommissionAgent	-	-	-	-	–	–
Wholesaler	25	0.8	15	0.45	15	0.5
Processor	-	-	-	-	-	-
Retailer	-	-	45	1.4	-	-
TotalMarketing Cost	**59**	**1.8**	**114**	**3.47**	**69**	**2.32**
Marketingmargin						
Producer	-	-	-	-	-	-
CommissionAgent	174.04	5.4	-	-	-	-
Wholesaler	153.7	4.7	140	4.23	140	4.71
Processor	-	-	-	-	-	-
Retailer	-	-	205.8	6.2	-	-
TotalMarketing Margin	**327.74**	**10.1**	**345.8**	**10.43**	**140**	**4.71**
ConsumerPrice	**3252.74**	**100**	**3305.8**	**100**	**2955**	**100**

From the above table, it shows the marketing cost and marketing margin of ragi. The channel II had the high total marketing cost of Rs. 114 per q, and it costs about 3.47 per cent in the consumer price, followed by channel III (Rs. 69/q), channel I (Rs. 59/q) The marketing margin is the difference between the cost to the seller and the cost to the consumer. The channel II had the high marketing margin of Rs. 345.8 per q, and it costs about 10.43 per centin the consumer price, followed by the channel I (Rs. 327.74/q) and channel III (Rs. 140/q). The local trader/commission agent had the commission charges as their marketing

margin of about Rs. 174.04/q in the channel I, and it costs about 5.4 per cent in the consumer price. The wholesaler had the maximum margin in the channel I of about Rs. 153.7/q and it costs 4.7 per cent in the consumer price, followed by the channel III (Rs. 140/q) percent costs in the consumer price was 4.71.

3.2. Cost involved in the Value addition process of Ragi by Dharmapuri FPO (Rs/q)

The value addition of ragi by the Dharmapuri district minor millet farmers producers company ltd were depicted in the below table.

Table2.Costinvolved inthe Valueadditionprocessof Ragiby FPO(Rs/q)

S.No	Particulars	Ragi	
		Cookies	**Flour**
		Value(Rs)	**Value(Rs)**
1.	**Farmer**		
	GrossPrice	**2946**	**2946**
	PrimarySorting	2	2
	Packing– GunnyBags	30	30
	Weighing	2	2
	Transport	20	20
	MarketingCost	54	54
	NetPrice	**3000**	**3000**
2.	**DharmapuriFPO**		
	PurchasePrice	**3000**	**3000**
	Grading	12	12
	LabourCost	1500	400
	Electricity	50	20
	ValueaddingIngredients	3000	-
	Wastage	50	50
	Labelling&Packaging	2500	1800
	Transport	30	30
	TotalCost	10142	5312
	Margin	4000	900

	SalePrice	**14142**	**6212**
3.	**Retailer**		
	PurchasePrice	**14142**	**6212**
	MarketingCost	50	50
	TotalCost	14192	6262
	Margin	2500	960
	SalePrice	**16692**	**7222**
4.	**ConsumerPrice**	**16692**	**7222**

From the above table 2, it could be inferred that the farmers sold the ragi grains to the Dharmapuri district minor millet farmer's producer company ltd. The processors added the value to the ragi grains and converted it into cookies and flour. The farmers farm gate price to the processors were 3000 per quintal with incurred the marketing costs of Rs. 54/q. The Dharmapuri FPO process the ragi grains and make the ragi flour and cookies. The FPO bought it for 3000/quintal and the total costs incurred were Rs. 10142/q (grading, labour costs, electricity, value adding ingredients, transport, etc. The margin for making the cookies were Rs. 4000/q and their sale price were Rs. 14142/q. The retailer purchase the product for Rs. 14142/q and incurred the marketing cost of Rs.50/q and added the margin of Rs. 2500/q and sold out to the final consumer at the price of Rs. 16692/q. The flour were processed by the FPO, added the marketing costs of Rs.5312/q and added the margin of Rs. 900/q sold out the flour to the retailer at the price of Rs. 6212/q. The retailer bought the flour and incurred the marketing costs of Rs. 50/q and added the margin of Rs. 960/q and sold out at the rate of Rs. 7222/q.

Thus, the consumers bought the value added product of ragi – cookies and flour with the price of Rs. 16692/q and Rs. 7222/q respectively.

3.3. Price spread of Ragi marketing (/q)

Table 3. Price spread of Ragi marketing (/q)

Sl.No	Particulars	ChannelI	ChannelII	ChannelIII
1	**Producer**			
	GrossPricereceived	2866 (88.11)	2846 (86.09)	2746 (92.93)

	MarketingCost	34 (1.04)	54 (1.63)	54 (1.82)
	NetPricereceived	2900 (89.15)	2900 (87.72)	2800 (94.75)
2	**Trader (Commission agent)**			
	Pricepaid	2900	-	-
	CommissionCharges	174.04 (5.35)	-	-
	Pricereceived	3074.04 (94.50)	-	-
3	**Wholesaler(Mandy)**			
	Pricepaid	3074.04	2900 (87.72)	2800 (94.75)
	MarketingCost	25 (0.76)	15 (0.45)	15 (0.51)
	Marketingmargin	153.7 (4.72)	140 (4.23)	140 (4.74)
	Pricereceived	3252.7 (100.00)	3055 (92.41)	2955 (100.00)
4	**Retailer**			
	Pricepaid	-	3055 (92.41)	-
	MarketingCost	-	45 (1.37)	-
	Marketingmargin	-	205.8 (6.22)	-
	Pricereceived	-	3305.8 (100.00)	-
5	**Consumer**			
	Pricepaid	3252.7 (100.00)	3305.8 (100.00)	2955 (100.00)
	TotalMarketingcost	59 (1.81)	114 (3.45)	69 (2.33)
	TotalMarketing margin	327.74 (10.07)	345.8 (10.46)	140 (4.74)
	PriceSpread	386.74 (11.88)	459.8 (13.91)	209 (7.07)

It is seen from the table 3, the channel III had the less price spread of Rs. 209/q and it costs 7.07 per cent of net price paid by the consumer. Therefore, the producers share in consumer price (92.93%) was high in this channel. Next best channel where the price spread less was channel I. The price spread in this channel was Rs. 386.74/q, and it costs 11.88 per cent of net price paid by the consumer. Where the total marketing cost was Rs. 59/q and total

marketing margin was Rs. 327.74/q and the producers share in consumer price was 89.15 per cent and it was supported by the results of Reddy *et al.*, (2015). Subsequently, channel II had less price spread, where the marketing cost was Rs. 114/q and the total marketing margin was Rs. 345.8/q. The price spread in this channel was Rs. 459.8/q (13.91% of the net price paid by the consumers) and the producers share in consumer price was 86.02 per cent. The next channel II that had the marketing cost and the total marketing margin was Rs. 114/q and Rs. 345.8/q respectively. The price spread was Rs. 459.8/q (13.91 % of the price paid by the consumer), where the producer share in consumer price was 88.11 per cent. In comparative of all the three channels, the price spread was seen less in channel III, I, and II. The marketing margin was higher than the marketing costs in the channel II,I, and III. It clearly states that number of intermediaries' increases and the price spread also gets increased and it decreases the producers share in consumer price.

3.4. Measurement of marketing efficiency of Ragi (Rs/q)

Table4.MeasurementofmarketingefficiencyofRagi(Rs/q)

Sl.No	Particulars	ChannelI	ChannelII	ChannelIII
1	Retailer'ssaleprice(RP)	3252.7	3305.8	2955
2	Totalmarketingcost (MC)	59	114	140
3	Totalmarginsofintermediaries(MM)	327.74	345.8	140
4	Pricereceived byfarmers (FP)	2866	2846	2746
5	Value added bythe marketingsystem (1-4)	386.74	459.8	209

3.5. Index of Marketing Efficiency of Ragi (Rs/q)

Marketing efficiency has been worked out using Acharya modified marketing efficiency method.

Table 5. Index of Marketing Efficiency of Ragi (Rs/q)

S. No	Methods	EfficiencyPercentage(%)		
		ChannelI	ChannelII	ChannelIII
1	Acharya'smethod(MME)[4/(2+3)]	7.4	6.2	9.8

From table 5, the marketing efficiency of all the three channels of ragi brought out that channel III was the most efficient one. The marketing efficiency of this chain was 9.8 as against 6.2 in channel II, 7.4 in channel I. The marketing efficiency of the channel III was high because less market intermediaries was involved.

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 ragi is collected and are presented in the Table 6. The value shares of each of the actors in the chain is worked out and presented.

Table6. ValueSharesincurredby theActorsin theMilletValueChain

S.No	Particulars	ChannelI	ChannelII	ChannelIII
1	**Producer/ Farmer**			
	Pricereceived	2866	2846	2746
	MarketingCost	34	54	54
	PriceSold	2900	2900	2800
	AddedValue	34	54	54
	ValueShare(%)	**1.05**	**1.6**	**1.83**
2	**LocalTrader (Commissionagent)**			
	Pricereceived	2900	-	-
	MarketingMargin	174.04	-	-
	PriceSold	3074.04	-	-
	AddedValue	174.04	-	-

	ValueShare(%)	**5.35**	-	-
3	**Wholesaler(Mandy)**			
	Pricereceived	3074.04	2900	2800
	MarketingCost	25	15	15
	MarketingMargin	153.7	140	140
	PriceSold	3252.74	3055	2955
	AddedValue	178.7	155	155
	ValueShare(%)	**5.49**	**4.7**	**5.25**
4	**Retailer**			
	Pricereceived	-	3055	-
	MarketingCost	-	45	-
	MarketingMargin	-	205.8	-
	PriceSold	-	3305.8	-
	AddedValue	-	250.8	-
	ValueShare(%)	-	**7.6**	-
5	**Consumerpaid**	**3252.74**	**3305.8**	**2955**
6	**Totalvalueshares (%)**	**11.89**	**13.9**	**7.08**

From table 6, it could be inferred that the channel I had the value share of 1.05 percentfortheproducer,commissionagentsharewas5.35percentandthewholesalersharewas 5.49 per cent. The overall value share of the channel I was 11.89 per cent. The channel IIhad the value share of 1.6 per cent for the producer, wholesaler share was 4.7 per cent and theretailer share was 7.6 per cent. The overall value shares incurred by the actors in the channelII was 13.90 per cent. The channel III had the value share of 1.83 per cent for the producer,wholesaler share value of 5.25 per cent.The overallvalue sharesincurred by theactorsinthechannelIIIwas 7.08per cent.

4. Conclusion

This research sheds light on the often overlooked yet crucial role of millets, specifically finger millet (ragi), in ensuring food security, especially in regions like Tamil Nadu, India. Through a comprehensive analysis of the marketing efficiency and price spread of ragi, valuable insights have been gained into the dynamics of its production, distribution, and consumption. The findings highlight the significant potential for value addition in millet processing, as demonstrated by the case study of Dharmapuri FPO, which not only adds value but also increases farmer income. Moreover, the study reveals variations in marketing costs,

margins, and efficiency across different channels, emphasizing the importance of understanding the entire supply chain for effective policy interventions and market interventions. Channel III emerges as the most efficient in terms of marketing efficiency, attributed to fewer intermediaries involved. Additionally, the assessment of value shares among actors in the millet value chain underscores the need for equitable distribution of benefits to farmers, traders, wholesalers, and retailers. Overall, this research underscores the importance of promoting millets like ragi as a sustainable and nutritious food option while optimizing marketing strategies to enhance the livelihoods of smallholder farmers and ensure food security in semi-arid regions like Tamil Nadu.

There's a need for targeted interventions to streamline marketing channels and reduce intermediary layers, particularly evident in channels where excessive intermediation leads to inflated price spreads and reduced farmer's share in consumer price. This can be achieved through the promotion of direct farmer-to-consumer sales models or the establishment of farmer cooperatives to bypass unnecessary intermediaries. Secondly, efforts should focus on improving value addition processes, especially at the farmer-producer organization (FPO) level, to capture a larger share of the consumer price. Enhancing processing capabilities, product diversification, and branding strategies can help increase the value share retained by farmers and producer groups. There's a crucial need for further research and innovation in marketing strategies, including digital platforms, market linkages, and value chain coordination mechanisms, to foster greater market efficiency and equitable distribution of value among stakeholders. By implementing these recommendations, stakeholders can contribute to the sustainable growth of the ragi sector while ensuring fair returns to farmers and enhanced access to nutritious millet-based products for consumers.

5. Limitations of the study

While this research provides valuable insights into the marketing efficiency and price spread analysis of Ragi in Tamil Nadu, several limitations should be acknowledged to contextualize the findings. The study's focus on a specific region and crop may limit the generalizability of the results to other geographical areas or millet varieties. Additionally, the research employed a convenient sampling technique, which may introduce selection bias and compromise the representativeness of the sample. The reliance on self-reported data from stakeholders, including farmers and traders, raises concerns about response bias and data accuracy. Furthermore, the study primarily focuses on economic aspects and lacks a comprehensive analysis of socio-cultural factors influencing millet production and consumption patterns. The exclusion of qualitative data and perspectives from key stakeholders

such as consumers and policymakers may limit the depth of understanding. Addressing these limitations in future research endeavors would enhance the robustness and applicability of findings in informing policy and practice related to millet marketing and food security.

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