# An Economic Analysis of Marketing Efficiency of Maize in Tamil Nadu, India

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***Authors' contributions***

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## ABSTRACT

Maize plays a significant role in the agricultural economy. Since, growers of maize have numerous marketing-related issues. The present study is made with an objective to identify the major maize marketing channels and analyze its cost incurred, price spread and efficiency. A well-structured interview schedule was used to collect primary data. Price spread analysis and marketing efficiency of maize marketing channels is estimated using Acharya and Shepard approach**.** The lowest marketing spread were observed in Channel III which was about 13.56 percent (Rs. 200 per quintal) of the consumer price, due to less intervention of intermediaries. Therefore, Channel III is the most efficient one among the identified marketing channels. Besides, Channel III has the highest marketing efficiency and the farmers should choose their marketing channel with the less number of intermediaries where it helps them attain better income.

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## 1. INTRODUCTION

Maize is mainly cultivated during *Kharif* season with the cultivated area around 85 per cent during the *Kharif* season. Southern Mexico and Mesoamerica are the first places where maize (Zea mays L., often known as corn) was domesticated more than 9,000 years ago [1]. After wheat and rice, it is the third-most significant cereal crop in India. It makes up 9 per cent of the nation's overall production of food grains. The leading producers of maize are Andhra Pradesh, Karnataka, Rajasthan, Maharashtra, Bihar, Uttar Pradesh, Madhya Pradesh and Himachal Pradesh which totally accounted for more than 80 per cent of the nation's total production. It has become a significant crop in unconventional areas of India like north eastern states and Jammu and Kashmir [2].

Due to its importance both domestically and internationally, research on its marketing features is required. It is evident from literature that maize plays a significant role in the agricultural economy. It is noted that growers of maize have numerous marketing-related issues. The marketing of maize is a hazardous and complicated endeavor [3]. Low prices, price fluctuations, and lengthy marketing channels are the main problems in marketing [4]. The primary reasons for its price fluctuations are ineffective marketing channels, changes in the demand for maize in the export and poultry industries, inadequate storage facilities, and a lack of markets that are suited. The income of maize producers is impacted by the inefficiencies in the marketing system [5]. Farmers must carefully consider their marketing channels since the channel they choose to dispose of their produce through will determine how much real benefit they receive. The selected channel needs to guarantee a larger percentage of consumer rupee while accounting for the least amount of marketing expenses. The amount of marketable excess that the farmer has available ability to withhold, the cost, and the accessibility of infrastructure facilities all play a role in the choice of the marketing channel [6].

Hence, the study is made with an objective to identify the major maize marketing channels and analyze its cost incurred, price spread and efficiency. The price spread analysis findings would shed light on effective maize marketing system. The findings will assist decision-makers in creating plans and appropriate policy measures to advance maize production and marketing in Tamil Nadu.

## 2. REVIEW OF LITERATURE

Singh [5] reported that the farmers share in consumer's rupee is observed at 61.01 per cent per quintal and the price received by him was Rs.198. Since the majority of produce was sold through commission markets. Balaji et al. [7] suggested that more focus be placed on lowering the marketing cost and margin to intermediary by implementing source measures when selling through regulated markets. According to research by Rajput et al. [8], the producer's comparatively low share was mostly caused by greater marketing and shipping costs as well as a larger middlemen's profit. The highest level of marketing efficiency using a cooperative society was achieved closely followed by private commission agents [9]. According to Ganga et al. [10], the price spread represents the percentage share of the producer and various functionaries in addition to the cost of services rendered in the price that the customer pays for each 100 rupees worth of a good. Channel IV was the most effective from the perspectives of both producers and consumers because it gave the producer 46% of consumer rupees while also having the most part of the total marketing margin in the Mango [11]. An investigation on orange production and marketing in the Jammu region was carried out by Kachroo et al. [12] and found that marketing intermediates benefited the most from the marketing channels. A study by Inbatamizhan [13], identified three channels, where channel I has a marketing efficiency of 10.15; channel II has a marketing efficiency of 6.72; and channel III has a marketing efficiency of 3.84.

## 3. DATA AND METHODOLOGY

Perambalur, Ariyalur, and Cuddalore districts were selected based on convenience sampling for the present study. Based on the area under maize crop, proportionate sampling procedure was followed to select sample respondents. Simple random sampling procedure was followed to select the sample blocks, villages and farmers. A well-structured interview schedule was used to collect primary data.

## 3.1 Descriptive Statistics

The democratic and socioeconomic characteristics of the sample farmers, such as age, education, family size, farming experience, experience growing maize, income, land holding pattern, etc., were assessed using percentages and averages.

## 3.2 Compound Growth Rate

Compound Growth Rate (CGR) is used to measure the annual rate of growth in area, production, and productivity and it is expressed in percentage.

Yt = abt e
Logarithmic form of the above equation is

Ln Y = ln a + t ln b
The per cent CGR is derived using the formula

CGR ® = [Antilog b-1]* 100 Where,
Yt = Area/Production/Yielda = Interceptb = Regression coefficient of t
t = Time variabler = Compound Growth Rate

## 3.3 Price Spread Analysis

Individual farmers, merchants, and wholesalers provided the information needed for the price spread analysis. While marketing the produce various costs involved in it, such costs are transportation, weighing, loading and unloading, packing, and other expenses. In the process of marketing of maize, the difference between price paid by the consumer and price received by the maize producer for an equivalent quantity of produce was defined as "Price Spread".

Records were kept of the profits made by the several market workers who moved the products from the site of production to the final consumer. Price spread analysis in the current study involved calculating profit margin and marketing costs, and the results were expressed as a percentage to the rupee of the customer. In this study, farmer's share in consumer rupee was worked out in the estimation of price spread.

## 3.4 Farmer's Share in Consumer Rupee

Further, the Farmer's share in consumer rupee was calculated with the help of the following formula.

$$F_s = \frac{F_p}{C_p} x100$$

Where,

Fs= Farmer's share in consumer rupee (percentage) Fp = Farmer's priceCp= Consumer's price

## 3.5 Estimation of Marketing Efficiency

The level of market performance is indicated by marketing efficiency. The movement of goods from the producer to the ultimate consumer at the lowest possible cost consistent with the provision of service desired by the consumers is termed as efficient marketing. The marketing effectiveness of the various channels used to market maize was calculated using the following formulas.

## 3.6 Shepherd's Formula

Shepherd (1965) suggested that the ratio of total value of goods marketed to the marketing cost could be used as a measure of marketing efficiency. The higher the ratio, higher would be the efficiency and vice versa. This can be expressed in the following form,

ME = [(V/I)-1] Where,
ME = Index of marketing efficiencyV = Value of goods sold (consumers price)
I = Total marketing cost

## 3.7 Acharya's Approach

According to Acharya (2003), an ideal measure of marketing efficiency, particularly for comparing the efficiency of alternate market channels should take into account all of the following:

1. Total marketing costs (MC)
2. Net marketing margins (MM)
3. Prices received by the farmer (FP)
4. Prices paid by the consumer (RP)

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

1. Higher the (MC), the lower the efficiency
2. Higher the (MM), the lower the efficiency
3. Higher the (FP), the higher the efficiency
4. Higher the (RP), the lower the efficiency

As there is an exact relationship 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,

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

## 4. RESULTS AND DISCUSSION

Since higher marketing costs make the marketing system inefficient against the interests of both producers and consumers, marketing costs associated with the marketing channels have always been a topic of significant concern. Three marketing channels were identified in the study area and the marketing efficiency is analyzed for the identified channels. Channel I includes Producer-Commission agent- Local traders- Wholesalers-Processors, Channel II includes Producers, Local traders, Wholesalers, Processors and Channel III includes Producer, Commission agent, Local traders, Processors. The primary marketing channel for maize was Channel I, which included Commission Agents as an additional middlemen through which the farmers sell their produce. Among the sample farmers, Channel I was used by 50.4 per cent of the farmers, Channel II used by 30.8 per cent of the farmers and Channel III used by 18.8 per cent of the farmers.

### 4.1. Price Spread Analysis of Maize

An attempt was made to determine the marketing functions carried out by various intermediaries and the costs associated with each marketing function, such as packaging, loading and unloading, weighing, transportation, marketing, and other miscellaneous activities, after determining the marketing channel for maize in the study area and the quantity transacted in each channel. In addition to the intermediaries' profit margin, the price spread also accounts for marketing expenses paid by different farmers and intermediaries. A percentage of the customer's rupee was stated as the net price that the farmer received. Marketing expenses and profit margins of the various middlemen engaged in the marketing of maize were collected and tabulated in the Table 1.

In the marketing channel I, the net price received were 78.02 per cent (Rs. 1,200 per quintal) of the consumer price which was minimum compared to other channels (Channel II-79.85 per cent, Channel III- 86.44 per cent) due to high marketing cost incurred by the intermediaries. In the channel I, local trader has the highest the

marketing cost of 8.15 per cent (Rs. 125.30 per quintal), followed by wholesaler about 2.64 percent (Rs. 40.60 per quintal). The total marketing margin for wholesaler was highest i.e., 6.85 per cent (Rs. 95.40 per quintal), local trader 4.34 per cent (Rs. 66.70 per quintal). Price spread in the channel I was about 21.47 percent (Rs. 328 per quintal).

In the channel II, the marketing cost of local trader is about 7.10 per cent (Rs. 110.30 per quintal), followed by wholesaler about 2.61 percent (Rs. 40.60 per quintal). The total marketing margin for wholesaler was highest i.e., 6.15 per cent (Rs. 95.40 per quintal), local trader 4.29 per cent (Rs. 66.70 per quintal). Price spread in the channel I was about 20.15 percent (Rs. 313 per quintal).

In the channel III, the marketing cost incurred by the local trader is about 9.04 per cent (Rs. 133.30 per quintal), and the marketing incurred was about 4.52 per cent (Rs. 66.70 per quintal). In this situation, the local trader directly sells his produce to the processor.

In nutshell, the longest and maximum price spread were observed in the marketing channel I (Producer, Commission agent, Local traders, Wholesalers, Processors) among the identified marketing channels. Local trader acts himself as a commission agent in the channel II. The lowest marketing spread were observed in Channel III which was about 13.56 percent (Rs. 200 per quintal) of the consumer price, due to less intervention of intermediaries.

### 4.2. Marketing Efficiency of Maize by Acharya and Shepard Approach

Marketing efficiency of maize in different channels was estimated using Acharya and Shepard approach and the results were presented in the Table 2.

Channel III has the highest marketing efficiency compared to the other two marketing channels in the both approaches. In Acharya's approach the marketing efficiency of channel III was about 6.38 and in Shepard approach it was about 8.56. Therefore, it could be concluded that the farmers should choose their marketing channel with the less number of intermediaries where it helps them attain better income by providing a major share to the producer from the consumer's rupee. Hence, the efficiency of the channel is better when the intermediaries are less in the channels [14,15].

**Table 1. Price spread analysis of marketing channels**

| Particulars | Channel - I | | Channel -II | | Channel - III | |
|---|---|---|---|---|---|---|
| | Price (Rs/qtl) | Per cent to the consumer Price | Price (Rs/qtl) | Per cent to the consumer Price | Price (Rs/qtl) | Per cent to the consumer Price |
| **Farmer (Producer)** | | | | | | |
| Net price received by producer | 1200 | 78.02 | 1240 | 79.85 | 1275 | 86.44 |
| **Local trader** | | | | | | |
| Purchase Price | 1200 | 78.02 | 1240 | 79.85 | 1275 | 86.44 |
| Packaging cost | 12.50 | 0.81 | 12.50 | 0.80 | 13.50 | 0.92 |
| Weighing cost | 13.50 | 0.88 | 13.50 | 0.87 | 13.50 | 0.92 |
| Loading/Unloading cost | 13.50 | 0.88 | 13.50 | 0.87 | 12.50 | 0.85 |
| Transport cost | 44.60 | 2.90 | 44.60 | 2.87 | 50.60 | 3.43 |
| Marketing fee | 11.50 | 0.75 | 11.50 | 0.74 | 11.50 | 0.78 |
| Wastage during transit | 04.00 | 0.26 | 04.00 | 0.26 | 04.00 | 0.27 |
| Miscellaneous cost | 10.70 | 0.70 | 10.70 | 0.69 | 10.70 | 0.73 |
| Commission charges | 15.00 | 0.98 | - | - | 17.00 | 1.15 |
| Total Marketing cost | 125.3 | 8.15 | 110.30 | 7.10 | 133.30 | 9.04 |
| Marketing margin | 66.70 | 4.34 | 66.70 | 4.29 | 66.70 | 4.52 |
| Sale price of local trader | 1392 | 90.51 | 1417 | 91.24 | 1475 | 100.00 |
| **Wholesaler** | | | | | | |
| Purchase price | 1392 | 90.51 | 1417 | 91.24 | - | - |
| Loading/Unloading cost | 11.50 | 0.75 | 05.50 | 0.35 | - | - |
| Weighing cost | 05.50 | 0.36 | 11.50 | 0.74 | - | - |
| Transport cost | 16.50 | 1.07 | 16.50 | 1.06 | - | - |
| Wastage during transit | 04.00 | 0.26 | 04.00 | 0.26 | - | - |
| Miscellaneous cost | 03.10 | 0.20 | 03.10 | 0.20 | - | - |
| Total Marketing cost | 40.60 | 2.64 | 40.60 | 2.61 | - | - |
| Marketing margin | 95.40 | 6.85 | 95.40 | 6.15 | - | - |
| Sale price of the wholesaler | 1528 | 100.00 | 1553 | 100.00 | - | - |
| **Processor** | | | | | | |
| Purchase price | 1528 | 100.00 | 1553 | 100.00 | 1475 | 100.00 |
| **Price spread** | **328** | **21.47** | **313** | **20.15** | **200** | **13.56** |

**Table 2. Marketing efficiency of maize**

| S.No | Particulars | Channel - I | Channel - II | Channel – III |
|------|-------------|-------------|--------------|---------------|
| I | Total marketing cost (Rs) | 165.9 | 150.9 | 133.3 |
| II | Net Marketing margin (Rs) | 162.1 | 162.1 | 66.7 |
| **A** | **Acharya's Marketing Efficiency [IV/(I + II)]** | 3.66 | 3.96 | 6.38 |
| III | Value of goods Sold (Rs) | 1528 | 1553 | 1475 |
| IV | Net price received by the farmer (Rs) | 1200 | 1240 | 1275 |
| **B** | **Shepherd's Marketing Efficiency [ (IV/ I) -1]** | 6.23 | 7.22 | 8.56 |

## 5. CONCLUSION AND POLICY IMPLICATIONS

In the marketing channel I, the net price received were 78.02 per cent (Rs. 1,200 per quintal) of the consumer price which was minimum compared to other channels (Channel II-79.85 per cent, Channel III- 86.44 per cent) due to high marketing cost incurred by the intermediaries. the longest and maximum price spread were observed in the marketing channel I (Producer, Commission agent, Local traders, Wholesalers, Processors) among the identified marketing channels. Local trader acts himself as a commission agent in the channel II. The lowest marketing spread were observed in Channel III which was about 13.56 percent (Rs. 200 per quintal) of the consumer price, due to less intervention of intermediaries. Therefore, Channel III is the most efficient one and has the highest marketing efficiency among the identified marketing channels in the study area. The establishment of a regulated auction center by the agricultural marketing department will stabilize prices, lower transportation costs, and boost farm revenue. The problem of fluctuating maize prices can be resolved by formation of Farmer Producer Companies or Farmer Co-operatives by the maize farmers at the village or block level in the study area that can strengthen their bargaining power and help them escape the clutches of intermediaries.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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