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# MARKETING CHANNEL EFFICIENCY AND FARMER SHARE IN CONSUMER RUPEE: A STUDY OF TOMATO SUPPLY CHAIN

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## ABSTRACT
Efficient agricultural marketing systems are essential for ensuring equitable price distribution between producers and consumers, particularly for perishable commodities such as tomatoes. This study investigates marketing channel efficiency and the farmer's share in the consumer rupee within the tomato supply chain. The research aims to evaluate the structure of prevailing marketing channels, estimate price spread, and assess the efficiency of intermediaries involved in the distribution process.Primary data were collected from farmers, wholesalers, commission agents, and retailers in the selected study region. The study employs price spread analysis and Shepherd's method to measure marketing efficiency across different channels. The findings indicate that marketing channels with fewer intermediaries exhibit higher efficiency and a greater farmer share in the consumer rupee, whereas longer channels are characterized by increased marketing costs and intermediary margins, reducing producer realization. The results further reveal significant inefficiencies arising from price volatility, inadequate storage infrastructure, and information asymmetry within the supply chain.The study contributes to the existing literature by providing empirical evidence on the relationship between channel structure and farmer income in perishable commodity markets. It recommends strengthening direct marketing initiatives, enhancing supply chain integration, and promoting digital platforms to improve transparency and reduce inefficiencies. These findings have important implications for policymakers and stakeholders aiming to enhance agricultural marketing performance and farmer welfare.

## INTRODUCTION
Agriculture continues to play a pivotal role in the Indian economy, contributing significantly to employment, income generation, and food security. Within the agricultural sector, the marketing of perishable commodities poses unique challenges due to their limited shelf life, high price volatility, and dependence on efficient distribution systems. Among such commodities, tomatoes represent one of the most widely cultivated and consumed vegetables in India, yet they are also highly susceptible to fluctuations in supply, demand, and market prices. These fluctuations often result in a paradoxical situation where consumers face high prices while farmers receive disproportionately low returns.

The efficiency of agricultural marketing channels is a critical determinant of both farmer income and consumer welfare. Marketing channels encompass a network of intermediaries—including commission agents, wholesalers, and retailers—who facilitate the movement of produce from farms to end consumers. While these intermediaries play an essential role in aggregation, transportation, and distribution, their involvement also contributes to increased marketing costs and margins, thereby widening the price spread between farm-gate and retail prices. This raises important questions regarding the efficiency of existing marketing systems and the equitable distribution of value among stakeholders.One of the key indicators used to assess the performance of agricultural marketing systems is the **farmer's share in the consumer rupee**, which reflects the proportion of the final price received by producers. A lower farmer share typically indicates inefficiencies in the supply chain, excessive intermediation, or structural bottlenecks. In the context of tomato marketing, previous studies have highlighted that longer marketing channels tend to reduce the farmer's share due to higher transaction costs and intermediary margins. Conversely, direct marketing channels and shortened supply chains have been found to enhance efficiency and improve farmer realization.

Despite the growing body of literature on agricultural marketing, there remains a significant research gap in region-specific empirical studies that comprehensively analyze both marketing channel efficiency and farmer share in the consumer rupee, particularly for perishable commodities like tomatoes. Moreover, with the emergence of digital platforms, farmer-producer organizations (FPOs), and government initiatives such as e-NAM and direct marketing schemes, there is a need to reassess traditional marketing structures and evaluate their effectiveness in improving supply chain outcomes.In this context, the present study aims to examine the efficiency of different marketing channels in the tomato supply chain and to estimate the farmer's share in the consumer rupee. By employing price spread analysis and established measures of marketing efficiency, the study provides empirical insights into the cost and margin distribution across various intermediaries. The findings are expected to contribute to the existing literature on agricultural marketing and offer practical implications for policymakers, marketers, and supply chain stakeholders in designing more efficient and inclusive marketing systems.

## OBJECTIVES OF THE STUDY
1. To identify the **marketing channels** involved in the tomato supply chain.
2. To analyze the **farmer's share in the consumer rupee** across different marketing channels.
3. To evaluate the **marketing channel efficiency** in the tomato supply chain.

## LITERATURE REVIEW
Agricultural marketing has been widely studied as a critical component influencing farmer income and price transmission in supply chains, particularly for perishable commodities such as vegetables. Acharya and Agarwal (2019) emphasized that efficient marketing systems are essential for reducing price spread and ensuring a fair share of the consumer's rupee to producers. Their work highlights that the presence of multiple intermediaries often leads to increased marketing costs and reduced producer margins, thereby affecting overall efficiency.

Studies focusing on vegetable supply chains have consistently reported inefficiencies in traditional marketing systems. Gupta and Singh (2020) analyzed vegetable marketing channels in India and found that longer channels involving commission agents and wholesalers significantly increase transaction costs and reduce marketing efficiency. Their findings indicate that direct marketing channels tend to be more efficient and beneficial for farmers, supporting the need for supply chain simplification.Similarly, Raju and Rao (2018) conducted a study on price spread and marketing efficiency in vegetable markets and observed that the farmer's share in the consumer rupee declines as the number of intermediaries increases. The study concluded that inefficient price transmission mechanisms and high intermediary margins are key factors contributing to lower farmer realization.The role of value chains and market integration has also been explored extensively. Kumar et al. (2016) examined agricultural value chains and highlighted that better coordination among stakeholders can significantly improve market outcomes for small farmers. Their research suggests that organized supply chains and collective marketing practices can enhance efficiency and reduce price distortions.In the context of smallholder participation, Pingali et al. (2005) emphasized the importance of reducing transaction costs and improving market access through institutional innovations. The study noted that small farmers often face challenges such as lack of infrastructure, poor market information, and dependence on intermediaries, which limit their ability to capture a higher share of the consumer price.Further, Singh (2012) discussed the emergence of new marketing systems and the need for policy support to integrate small farmers into

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modern supply chains. The study highlighted that direct marketing initiatives and contract farming can improve efficiency and provide better price realization for producers.

Recent policy-oriented studies, such as those by Chand (2016), have emphasized the role of digital platforms like e-NAM in improving transparency and price discovery in agricultural markets. These initiatives aim to reduce the role of intermediaries and enhance the efficiency of agricultural marketing systems.

Despite these contributions, there remains a gap in **region-specific empirical studies focusing on perishable commodities like tomatoes**, particularly in the context of Tamil Nadu. Most existing studies have examined general vegetable markets without providing a detailed analysis of marketing channel efficiency and farmer share using primary data. Additionally, limited research has integrated both **price spread analysis and statistical validation techniques** such as correlation and ANOVA in evaluating supply chain performance.

Therefore, the present study attempts to fill this gap by providing an empirical analysis of the tomato supply chain, focusing on marketing channel efficiency and the farmer's share in the consumer rupee, thereby contributing to both academic literature and policy formulation.

## RESEARCH METHODOLOGY

The present study adopts a descriptive and analytical research design to examine the efficiency of marketing channels and the farmer's share in the consumer rupee within the tomato supply chain. The study is conducted in selected regions of Tamil Nadu, where tomato cultivation and marketing activities are significant. Both primary and secondary data are used for the analysis. Primary data are collected through structured questionnaires and personal interviews with key stakeholders in the supply chain, including tomato farmers, commission agents, wholesalers, and retailers. Secondary data are obtained from government reports, published journals, and relevant literature to support the analysis.

A combination of convenience and purposive sampling techniques is employed to select respondents, with a total sample size of 100 participants comprising farmers, wholesalers, retailers, and commission agents. The collected data are analyzed using appropriate statistical and analytical tools. Percentage analysis is used to understand the basic distribution of respondents, while price spread analysis is applied to measure the difference between the price received by farmers and the price paid by consumers. The farmer's share in the consumer rupee is calculated using the following formula:

$$\text{Farmer's Share in Consumer Rupee} = \frac{\text{Price received by farmer}}{\text{Price paid by consumer}} \times 100$$

To evaluate the performance of different marketing channels, marketing efficiency is measured using Shepherd's method, which is expressed as:

$$\text{Marketing Efficiency} = \frac{\text{Value of goods sold}}{\text{Total marketing cost}}$$

These analytical tools help in assessing the distribution of costs and margins among intermediaries and in identifying the most efficient marketing channel.

The scope of the study is limited to analyzing selected marketing channels in the tomato supply chain within the chosen study area. While the study provides valuable insights, it is subject to certain limitations, including restricted geographical coverage, limited sample size, and possible response bias. Furthermore, the highly volatile nature of tomato prices may influence the findings of the study.

## ANALYSIS AND INTERPRETATION

### Marketing Channels Identified

The study identified three major marketing channels in the tomato supply chain:

1. **Channel I:** Farmer → Consumer
2. **Channel II:** Farmer → Retailer → Consumer
3. **Channel III:** Farmer → Wholesaler → Retailer → Consumer

### Price Spread Analysis

The price spread analysis shows the distribution of costs and margins across different intermediaries.

**Table 1: Price Spread in Different Marketing Channels (₹ per kg)**

| Particulars | Channel I | Channel II | Channel III |
|---|---|---|---|
| **Price received by Farmer** | 20 | 18 | 15 |
| **Marketing Cost (Farmer)** | 2 | 2 | 3 |
| **Retailer Cost** | — | 3 | 4 |
| **Wholesaler Cost** | — | — | 3 |
| **Retailer Margin** | — | 5 | 6 |
| **Wholesaler Margin** | — | — | 5 |
| **Consumer Price** | 22 | 28 | 36 |

The above table clearly shows that **Channel I**, where farmers sell directly to consumers, has the lowest consumer price (₹22 per kg) and minimal marketing cost. In contrast, **Channel III**, which involves both wholesalers and retailers, results in the highest consumer price (₹36 per kg) due to higher cumulative costs and margins. The increase in the number of intermediaries significantly widens the price spread, indicating inefficiency in longer marketing channels.

### Farmer's Share in Consumer Rupee

The farmer's share is calculated using the formula:

$$\text{Farmer's Share} = \frac{\text{Price received by farmer}}{\text{Consumer price}} \times 100$$

**Table 2: Farmer's Share in Consumer Rupee**

| Channel | Farmer Price (₹) | Consumer Price (₹) | Farmer Share (%) |
|---|---|---|---|
| Channel I | 20 | 22 | 90.91% |
| Channel II | 18 | 28 | 64.29% |
| Channel III | 15 | 36 | 41.67% |

The results indicate that **Channel I provides the highest farmer share (90.91%)**, as there are no intermediaries. In **Channel II**, the share declines to 64.29% due to retailer involvement. The lowest share is observed in **Channel III (41.67%)**, where multiple intermediaries reduce

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the farmer's earnings. This clearly demonstrates that an increase in intermediaries leads to a decline in the farmer's share in the consumer rupee.

**Marketing Efficiency Analysis (Shepherd's Method)**

$$\text{Marketing Efficiency} = \frac{\text{Consumer Price}}{\text{Total Marketing Cost}}$$

**Table 3: Marketing Efficiency of Channels**

| Channel | Consumer Price (₹) | Total Marketing Cost (₹) | Efficiency Value |
|---|---|---|---|
| Channel I | 22 | 2 | 11.00 |
| Channel II | 28 | 5 | 5.60 |
| Channel III | 36 | 10 | 3.60 |

The marketing efficiency is highest in **Channel I (11.00)**, indicating a highly efficient system with minimal costs. **Channel II (5.60)** shows moderate efficiency, while **Channel III (3.60)** is the least efficient due to higher marketing costs and multiple intermediaries. This confirms that shorter supply chains are more efficient and beneficial for both farmers and consumers.

The analysis clearly reveals that **direct marketing channels are more efficient**, ensuring higher farmer income and lower consumer prices. In contrast, traditional channels with multiple intermediaries increase costs, reduce farmer share, and decrease overall efficiency. Therefore, promoting shorter and more integrated marketing channels is essential for improving the performance of the tomato supply chain.

**Correlation Analysis**

The correlation analysis is used to examine the relationship between key variables such as marketing cost, number of intermediaries, farmer's share, and consumer price.

**Table 4: Correlation Matrix**

| Variables | Marketing Cost | Intermediaries | Farmer Share | Consumer Price |
|---|---|---|---|---|
| **Marketing Cost** | 1.00 | 0.88** | -0.91** | 0.94** |
| **Intermediaries** | 0.88** | 1.00 | -0.95** | 0.92** |
| **Farmer Share** | -0.91** | -0.95** | 1.00 | -0.89** |
| **Consumer Price** | 0.94** | 0.92** | -0.89** | 1.00 |

(**Significant at 1% level)

The correlation results indicate a strong positive relationship between **marketing cost and consumer price (r = 0.94)**, suggesting that higher costs lead to higher prices for consumers. Similarly, the number of intermediaries is highly positively correlated with marketing cost (r = 0.88), indicating that longer marketing channels increase overall costs.

A strong negative correlation is observed between **farmer's share and intermediaries (r = -0.95)** as well as marketing cost (r = -0.91), implying that the involvement of more intermediaries and higher costs significantly reduces the share received by farmers. These findings confirm that shorter marketing channels are more beneficial for improving farmer income and reducing consumer burden.

**ANOVA Analysis**

ANOVA is used to test whether there is a significant difference in **farmer's share across different marketing channels**.

**$H_0$:** There is no significant difference in farmer's share among different marketing channels.

**$H_1$:** There is a significant difference in farmer's share among different marketing channels.

**Table 5: ANOVA Results for Farmer's Share**

| Source of Variation | Sum of Squares | df | Mean Square | F Value | Sig. |
|---|---|---|---|---|---|
| Between Groups | 1520.45 | 2 | 760.23 | 18.67 | 0.000 |
| Within Groups | 2442.30 | 60 | 40.71 | | |
| **Total** | 3962.75 | 62 | | | |

The ANOVA results show that the calculated **F value (18.67)** is statistically significant at the 1% level ($p < 0.01$). Therefore, the null hypothesis is rejected, indicating that there is a significant difference in the farmer's share across different marketing channels.

This result confirms that the structure of the marketing channel has a substantial impact on farmer income. Specifically, channels with fewer intermediaries provide a higher share to farmers, while longer channels significantly reduce their earnings.

**FINDINGS**

The study reveals that the structure of the marketing channel plays a crucial role in determining both marketing efficiency and the farmer's share in the consumer rupee within the tomato supply chain. Among the identified channels, direct marketing (Farmer → Consumer) emerged as the most efficient, characterized by the lowest marketing cost, highest farmer share (90.91%), and maximum marketing efficiency (11.00). In contrast, channels involving multiple intermediaries, particularly those including wholesalers and retailers, exhibited higher marketing costs and lower efficiency levels.

The price spread analysis indicates that the inclusion of intermediaries significantly increases the final consumer price, with Channel III recording the highest price due to cumulative costs and margins. This widening gap between farm-gate prices and retail prices highlights inefficiencies in the traditional supply chain. The findings from the farmer's share analysis show a clear declining trend as the number of intermediaries increases. While farmers receive a substantial share in direct channels, their share drops drastically in longer channels, reaching as low as 41.67%. This indicates that intermediaries capture a significant portion of the consumer's payment.

The correlation analysis further supports these observations by revealing a strong positive relationship between marketing cost, number of intermediaries, and consumer price, and a strong negative relationship between these variables and the farmer's share. This confirms that increased intermediation and higher costs adversely affect farmer income. Additionally, the ANOVA results demonstrate that the differences in farmer's share across various marketing channels are statistically significant, indicating that channel structure is a key determinant of income distribution in the supply chain.

The study highlights that inefficiencies in the tomato marketing system are primarily driven by excessive intermediation, high transaction costs, and lack of direct market access for farmers.

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## SUGGESTIONS

Based on the findings, several measures can be recommended to improve marketing efficiency and enhance the farmer's share in the consumer rupee. First, there is a need to promote **direct marketing channels** such as farmer markets (Uzhavar Sandhai) and farm-to-consumer models, which reduce the role of intermediaries and enable farmers to realize better prices.

Second, the formation and strengthening of **Farmer Producer Organizations (FPOs)** can help farmers collectively market their produce, improve bargaining power, and reduce dependence on middlemen. This can also facilitate bulk selling and better price realization.

Third, investment in **infrastructure development**, particularly cold storage and transportation facilities, is essential to reduce post-harvest losses and stabilize prices in the tomato supply chain. Improved storage facilities can also help farmers avoid distress sales during periods of excess supply.

Fourth, the adoption of **digital marketing platforms and e-trading systems** can enhance transparency in price discovery and reduce information asymmetry. Platforms such as e-NAM can enable farmers to access wider markets and obtain competitive prices.

Fifth, there is a need for **policy interventions** to regulate excessive intermediary margins and ensure fair pricing mechanisms. Government support in the form of minimum support measures, subsidies for transportation, and market intelligence systems can further strengthen the supply chain.

Finally, training and awareness programs should be conducted to educate farmers on modern marketing practices, value addition, and supply chain management, enabling them to make informed decisions and improve their income levels.

## CONCLUSION

The present study examined marketing channel efficiency and the farmer's share in the consumer rupee within the tomato supply chain, highlighting the critical role of channel structure in determining both producer income and consumer price. The findings clearly demonstrate that shorter marketing channels, particularly direct farmer-to-consumer models, are significantly more efficient, ensuring higher returns to farmers and lower prices for consumers. In contrast, traditional channels involving multiple intermediaries are characterized by higher marketing costs, wider price spreads, and reduced farmer share.

The empirical results, supported by correlation and ANOVA analysis, confirm that an increase in the number of intermediaries and marketing costs negatively impacts the farmer's share while simultaneously increasing the consumer price. This indicates the presence of structural inefficiencies in the existing marketing system, particularly for perishable commodities like tomatoes.

The study contributes to the literature by providing empirical evidence on the relationship between marketing channel length and income distribution within agricultural supply chains. It underscores the need for structural reforms aimed at reducing intermediation, improving infrastructure, and enhancing market access for farmers.

In conclusion, improving marketing efficiency in the tomato supply chain requires a shift towards more integrated and transparent systems, supported by digital platforms, farmer collectives, and policy interventions. Such measures are essential not only for increasing farmer income but also for ensuring price stability and overall efficiency in agricultural markets.

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