

**A study on marketing cost, marketing margin and price spread for open and protected cultivation of tomatoes**

**ABSTRACT**

The study aims to analyze the marketing cost, marketing margin, price spread, value added in the marketing system and efficiency of different distribution channels in tomatoes marketing which was produced under open and protected environment in Karnataka. The Acharya's method of marketing efficiency was adopted for the study. Primary data pertaining to the study are collected from 15 farmers each under open and protected cultivation practices in both Kolar and Belagavi districts of Karnataka. The data related to market intermediaries are collected from 15 wholesalers, 15 retailers and 5 private companies from each district with the help of structured schedule. Three marketing channels were identified. These are producer-consumer, producer-wholesaler-retailer-consumer and producer-private companies-consumer. Though the channel comprising producer-consumer was more efficient and producer share in consumer rupee was highest its share was very less out of the total volume of tomatoes marketed because of limited support from public bodies. The result shows that the channel involving producer-private companies-consumer was most prominent and had higher marketing efficiency and producer share in consumer rupee under both open and protected cultivation practices.

**Keywords:** Marketing cost, marketing margin, price spread and marketing efficiency

**Abbreviations:** ME = Marketing Efficiency, NP = Net price received by the producer, MC = Marketing cost and MM = Marketing margin.

**1. INTRODUCTION**

Tomato (*Solanum lycopersicum*) is one of the most important vegetable crops in India and world's highly consumed vegetable. It was originated in western South America and domestication is thought to have occurred in Central America. The tomato arrived to India by the way of Portuguese invaders in 16<sup>th</sup> century. It was grown from the 18<sup>th</sup> century onwards under British rule. Tomatoes are also universally treated as "protective food" because it provides vitamins and minerals. It is an annual crop with crop duration of 110 to 140 days and it starts bearing from 50 to 60 days. Tomatoes are consumed directly as raw vegetables in sandwiches, salads, etc... Several processed food materials like paste, sauce, puree, syrup, ketchup, etc. are also prepared on a large scale. It is a good appetizer and its soup is said to good remedy for patients suffering from constipation. India is the world's fifth-largest producer of tomatoes accounting around 6 percent of world production. Tomato is the third most important vegetable in India sharing 8.5 percent of total vegetable production. The total tomato production is 8.6 million tonnes with productivity of 14.0 tonnes per ha. Orissa, Andhra Pradesh and Karnataka are the major tomato producing states in the country. It is considered an important commercial vegetable because of its shorter life duration and gives a high yield. Tomato is a potential vegetable in economic point of view and hence area under its cultivation is increasing day by day. Due to adverse weather conditions in open cultivation, tomatoes cultivation under controlled environment practiced in all over India. The indeterminate types of tomatoes are cultivated under polyhouse structure with irrespective of weather conditions. In addition to meeting the domestic market, the tomato has been identified as a potential export-oriented vegetable crop exported to the countries like Morocco, Canada, France, Belgium, United States, Turkey and China. Around 88.45 thousand metric tonnes of tomatoes had been exported during the year 2021.

**Comment [PP1]:** 1. The whole paragraph has been written without a single citation.  
2. Statistics have been mentioned without citation.

The marketing of tomatoes is a tedious task for the farmers. The farmers in the potential vegetable producing districts of Karnataka are confused in marketing activities. The exploitation of middleman in the regulated market, increased transportation cost and high labour wages for loading and unloading resulted in the lower net price received by the farmers. The tomatoes producers in the study area are well versed in production activities but they are lagging behind in the marketing. To tap the efficient marketing channel and to suggest the better channel for the farmers in the study area and to strengthen the knowledge of farmers regarding marketing of tomatoes which was produced under open and protected

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condition, the present study was taken with the objective to study the price spread and marketing efficiency under open and protected cultivation of tomatoes in Karnataka

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## 2. MATERIALS AND METHODS

The present study concentrated on marketing cost, marketing margin, price spread and marketing efficiency for tomatoes produced under both open and protected conditions. The study was conducted during the period 2021-22 in Karnataka. Kolar and Belagavi districts were selected for the study as they are the highest vegetable producing districts in Karnataka. Tomato crop was selected based on production data from each district from 2017-18 to 2019- 20 (triennium average). The primary data pertaining to the study were collected from 15 farmers for both open and protected conditions and from each district. The data pertaining to market intermediaries were collected from 15 wholesalers, 15 retailers and 5 private companies from each district. The random sampling method had been employed for data collection. The descriptive statistics and Acharya's method of marketing efficiency was adopted for analysis of marketing efficiency.

**Comment [PP3]:** Why these 2 districts were chosen instead of the others is not mentioned here.

**Comment [PP4]:** Why specifically 15 wholesalers, 15 retailers and 5 private companies? Please justify the calculation rationale.

**Comment [PP5]:** The sampling method is inaccurate. This is more towards stratified and systematic sampling.

### Descriptive Statistics

Descriptive statistics provide simple summaries about the sample and about the observations that have been made. It deals with the presentation of numerical facts or data in either tables or graph form and with the methodology of analyzing the data. The percentages were calculated in the present study.

**Acharya's method (Acharya and Agarwal, 2007):** Acharya's marketing efficiency measures include the total marketing cost, net marketing margins of intermediaries, price received by farmer and price paid by the consumers. The Acharya's method of marketing efficiency formulae has been presented as follows

Where,

ME = Marketing Efficiency

NP = Net price received by the producer (₹/q)

MC = Marketing cost (₹/q)

MM = Marketing margin (₹/q)

### 3. RESULTS AND DISCUSSION

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#### Pattern of distribution of tomatoes produced under open and protected environment

Majority of the farmers practiced channel-II (53.33%), followed by channel-III (40%) and channel-I (33.33%) for marketing of tomatoes produced under open condition. Whereas, under protected cultivation, the maximum number of farmers preferred to sell the tomatoes through channel-III (around 53%), followed by channel-II (around 47%). While, around 33 per

cent of the farmers followed channel-I. The probable reason might be due to there were no exploitation of middleman in channel-III. The collection centres are located nearby the farm and transportation cost could be reduced. (Table-1).

**Table 1: Pattern of distribution of tomatoes produced under open and protected environment**

n=30 for each cultivation practices

Sl. No.	Particulars	Numbers*	Percentage
<b>1.</b>	<b>Open cultivation</b>		
a.	Channel-I	10	33.33
b.	Channel-II	16	53.33
c.	Channel-III	12	40.00
<b>2.</b>	<b>Protected cultivation</b>		
a.	Channel-I	4	13.33
b.	Channel-II	14	46.67
c.	Channel-III	16	53.33

Channel I - Producer-Consumer, Channel II - Producer-Wholesaler-Retailer-Consumer and Channel III - Producer-Private Companies  
 \* denotes the multiple responses.

**Marketing cost incurred for open versus protected cultivation of tomatoes under different marketing channels**

The tomato producer practicing open and protected cultivation, sold the produce in all three channels. The total marketing cost incurred by producer, wholesaler, retailer and private companies under different marketing channels are presented in Table-2.

**Marketing cost incurred for open cultivation of tomatoes under different marketing channels**

The marketing cost incurred by market intermediaries in different channels under open cultivation of tomatoes are reported in Table-2. The result reveals that the total marketing cost incurred in channel-I was nil and in channel-II it was ₹ 71.39 and in channel III was ₹ 52.29 for handling of 100 kg of tomatoes under each channel.

In the channel-II, around 43 per cent of the total marketing cost was borne by producer, about 35 per cent of the total marketing cost was expended by retailers and the remaining marketing cost in the channel (22%) was incurred by wholesaler. The producer (₹ 18.77 per quintal) and wholesaler (₹ 7.30 per quintal) spent maximum amount on transportation of the produce. This might be due to shortage of vehicles in the study area and the rental charges for vehicle fetched higher transportation cost. While, at retailer stage, loading and unloading charges was higher (₹ 9.33 per quintal). Because, in the study area it was found that lack of availability of hamali service which resulted in high cost investment on loading and unloading. The second most component observed was loading and unloading charges in both producer (₹ 4.61 per quintal) and at the wholesaler level (₹ 4.40 per quintal). Whereas, at retailer level the second most important component was transportation (₹ 6.06 per quintal). The remaining marketing cost in the channel was shared by commission charges at producer level, packaging charges at wholesaler and retailer level and miscellaneous charges at each stage.

In the case of channel-III, with respect to producers marketing cost, the maximum cost incurred was spent on transportation (₹ 9.13 per quintal). The private companies also expended around 20 per cent of the total marketing cost for transportation (₹ 10.47 per quintal). The next foremost component at producer level was loading and unloading charges (₹ 5.08 per quintal), while at private companies' level also, it was loading and unloading charges (₹ 8.21 per quintal). The above mentioned costs altogether constituted around 63 per cent of the total marketing cost in the channel. The rest of the marketing cost was shared by remaining components at each stage.

#### **Marketing cost incurred for protected cultivation of tomatoes under different marketing channels**

Table-2 also represents the marketing cost incurred by the producer, wholesaler, private companies and retailers in protected cultivation of tomatoes. In channel-I, cent per cent of the total marketing cost was incurred by the producer (₹ 17.00 per quintal) in which

the maximum amount was spent on transportation of tomatoes (₹ 7.50 per quintal, 44%) and the remaining cost was incurred on packaging and miscellaneous charges.

The marketing cost incurred by producer, wholesaler and retailer was ₹ 34.91 per

quintal (around 45%), ₹ 24.02 per quintal (around 31%) and ₹ 19.17 per quintal (around 24%) respectively in channel-II. Wherein, the majority of cost was spent on transportation at each stage in this channel.

In the case of channel-III, the total marketing cost incurred by producer was ₹ 29.26 per quintal (around 41%) and by private companies was ₹ 42 per quintal (around 59%). Among the different operations, transportation cost was the major one with maximum share of the marketing cost incurred by the producer (around 27%) and private companies (around 21%). The remaining total marketing cost incurred by the producer was on loading and unloading charges, packaging charges, commission and miscellaneous charges. But, the commission charge was not paid by other market intermediaries in the channel.

The top most components in which the majority of the cost was incurred are transportation, loading and unloading charges under both the cultivation practices. This might be due various factors influencing the increase of transportation cost and loading and unloading charges. In the study are the farmers are lagging in adoption of own logistics and due to Indian worst road facility the rental charges for the vehicle had been raised. The labour scarcity for loading and unloading was noticed in the study area. This resulted in hiring of skilled labours from neighbouring villages at higher wage rates lead to increased loading and unloading charges under both the cultivation practices.

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**Table 2: Marketing costs incurred for open versus protected cultivation of tomatoes in different marketing channels**

(₹/q)

Sl. No.	Particulars	Open cultivation				Protected cultivation					
		C-II	%	C-III	%	C-I	%	C-II	%	C-III	%
<i>Marketing costs incurred by producer</i>											
a.	Transportation	18.77	26.29	9.13	17.46	7.50	44.12	21.27	27.23	19.57	27.47
b.	Loading and unloading charges	4.61	6.46	5.08	9.72	4.75	27.94	4.86	6.22	4.81	6.75
c.	Packaging	2.11	2.96	1.75	3.35	3.00	17.65	2.14	2.74	1.69	2.37
d.	Commission charges	3.00	4.20	0.00	0.00	0.00	0.00	3.00	3.84	0.00	0.00
e.	Miscellaneous charges	2.11	2.96	2.58	4.93	1.75	10.29	3.64	4.66	3.19	4.47
<b>Total marketing cost by producer</b>		<b>30.60</b>	<b>42.86</b>	<b>18.54</b>	<b>35.46</b>	<b>17.00</b>	<b>100.00</b>	<b>34.91</b>	<b>44.70</b>	<b>29.26</b>	<b>41.06</b>

<i>Marketing costs incurred by wholesaler</i>											
a.	Loading and unloading charges	4.40	6.16	-	-	-	-	6.32	8.09	-	-
b.	Transportation	7.30	10.23	-	-	-	-	8.76	11.22	-	-
c.	Packaging	2.13	2.99	-	-	-	-	5.76	7.38	-	-
d.	Miscellaneous charges	1.93	2.71	-	-	-	-	3.18	4.07	-	-
<b>Total marketing cost by wholesaler</b>		<b>15.77</b>	<b>22.09</b>	-	-	-	-	<b>24.02</b>	<b>30.76</b>	-	-
<i>Marketing cost incurred by private companies</i>											
a.	Cleaning	-	-	2.50	4.78	-	-	-	-	3.70	5.19
b.	Loading and unloading charges	-	-	8.21	15.70	-	-	-	-	9.00	12.63
c.	Transportation	-	-	10.47	20.02	-	-	-	-	14.70	20.63
d.	Packaging	-	-	7.50	14.34	-	-	-	-	8.10	11.36
e.	Miscellaneous charges	-	-	5.07	9.70	-	-	-	-	6.50	9.12
<b>Total marketing cost by private companies</b>		-	-	<b>33.75</b>	<b>64.54</b>	-	-	-	-	<b>42.00</b>	<b>58.94</b>
<i>Marketing cost incurred by retailer</i>											
a.	Cleaning	3.96	5.54	-	-	-	-	5.23	6.70	-	-
b.	Loading and unloading charges	9.33	13.07	-	-	-	-	2.88	3.69	-	-
c.	Transportation	6.06	8.49	-	-	-	-	7.13	9.13	-	-
d.	Packaging	2.58	3.62	-	-	-	-	2.35	3.01	-	-
e.	Miscellaneous charges	3.08	4.32	-	-	-	-	1.58	2.02	-	-
<b>Total marketing cost by retailers</b>		<b>25.02</b>	<b>35.05</b>	-	-	-	-	<b>19.17</b>	<b>24.55</b>	-	-
<b>Total marketing cost</b>		<b>71.39</b>	<b>100</b>	<b>52.29</b>	<b>100</b>	<b>17.00</b>	<b>100</b>	<b>78.10</b>	<b>100</b>	<b>71.26</b>	<b>100</b>

Note: C - I: Channel I (Producer → Consumer);

C - II: Channel II (Producer → Wholesaler → Retailer → Consumer)

C - III: Channel III (Producer → Private Companies → Consumer)

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### **Price spread and marketing margins for open versus protected cultivation of tomatoes under different marketing channels**

Price spread, marketing margin, price received by the producer in the consumer's rupee and marketing efficiency were calculated for one quintal of tomatoes handled and are presented in Table-3.

#### **Price spread and marketing margins for open cultivation of tomatoes under different marketing channels**

The tomatoes are marketed in all three channels. With respect to channel-I, the farmer involved in farm gate sales such that marketing cost was nil in this channel. The producer sold tomatoes directly to ultimate consumer at the rate of ₹ 1,460 per quintal. The price received by the producer in the consumer's rupee was around ₹ 1,460 per quintal, which means producer share in consumer's rupee is 100 per cent.

It is observed under channel-II that, the producer sold the tomatoes to wholesaler for about ₹ 1,442 per quintal which includes marketing cost incurred by producer, ₹ 30.60 per quintal. Hence, the price received by the producer was found to be ₹ 1,411 per quintal. The wholesalers marketing cost was ₹ 15.77 per quintal and attained the profit margin of around ₹ 371 per quintal by selling the tomatoes at a rate of ₹ 1,828 per quintal to retailers in the market. The retailer's marketing cost was ₹ 25 per quintal and profit margin was found to be ₹ 650 per quintal. The retailer sold the tomatoes to consumer for ₹ 2,504 per quintal. Producer share in consumer rupee was around 56 per cent. The value added in the marketing system was under the channel was ₹ 1,092 per quintal. The marketing efficiency worked out was 1.29.

In the case of channel-III, the sampled respondents sold tomatoes to private companies for ₹ 1,970 per quintal which included the marketing cost of ₹ 18.55 per quintal and the farmers received the price of ₹ 1,952 per quintal of tomatoes. The marketing cost incurred by private companies was around ₹ 34 per quintal, which includes both assembling and distribution costs. The private companies sold to ultimate consumer for ₹ 2,853 per quintal through their retail outlets. Producer share in consumer's rupee was around 68 per cent in this channel. The value added to the marketing system was around ₹ 901 per quintal in this channel and the marketing efficiency was 2.12.

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#### **Price spread and marketing margins for protected cultivation of tomatoes under different marketing channels**

Table-3 also reveals the results of protected cultivation of tomatoes. In channel-I the

producer sold tomatoes directly to the consumer for ₹ 2,000 per quintal. The marketing cost incurred by the producer was around ₹ 17.00 per quintal. The price received by the farmer was ₹ 1,983 per quintal which was around 99.15 per cent share in consumers' rupee. The marketing efficiency was 116.65 under this channel.

In the case of channel-II, the producer sold the produce in APMC market to wholesalers for ₹ 1,929 per quintal of tomatoes. The marketing cost and price received by the producer were around ₹ 35 and ₹ 1,894 respectively. The wholesalers marketing cost was ₹ 24 per quintal for handling of tomatoes and received the profit margin of ₹ 423 per quintal by selling tomatoes to retailers for ₹ 2,376 per quintal. The retailers marketing cost recorded was ₹ 19.15 per quintal of tomatoes. The retailers received the profit margin of ₹ 643 per quintal by selling tomatoes for ₹ 3,038 per quintal to ultimate consumers. The farmers received around 62.33 per cent, for each rupee paid by the consumer. The marketing efficiency evaluated was 1.65 under this channel.

With regard to channel-III, the producer sold tomatoes to private companies at ₹ 2,100 per quintal. The marketing cost incurred by producer was ₹ 29.26 per quintal. The marketing cost incurred by the private companies was ₹ 42.00 per quintal and sold to ultimate consumer through their own retail outlets for ₹ 2,950 per quintal. The private companies gained the profit margin of ₹ 829 per quintal. The producers share in consumers' rupee was around 70 per cent and the marketing efficiency calculated was 2.30 under this channel for marketing of tomatoes grown under protected cultivation.

In the channel-I the consumers took an advantage to harvest the preferred superior quality of the produce in both the cultivation practices. Hence, farmers marketed the produce at higher selling price compared to APMC market price. The quantity of tomatoes handled in channel-I are negligible out of the total quantity harvested. The farmers sold tomatoes which were produced under open and protected condition at lower market price compared to other two channels. The probable reason might be due to average level quality of tomatoes are marketed in regulated market which fetched lower price. The farmers sorted and graded the tomatoes in the farm itself. The superior quality of the produce was sold to private companies. The private companies paid higher prices compared to regulated market.

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Therefore few farmers in the study area marketed in collection centres nearest to the farm and received higher returns. The producer share in consumer rupee was found higher in channel-I in both open and protected cultivation of tomatoes. But, the quantity distributed in channel-I are negligible. Hence, farmers in the study area failed to sell the produce in this channel. Next best channel was channel-III in both the cultivation practices where the farmers received higher share in consumers each rupee with higher marketing efficiency compared to channel

II. The value added higher in channel-II because, the market intermediaries are found more in this market system against other channels under both the cultivation practices.

**Table 3: Price spread and marketing margins for open versus protected cultivation of tomatoes in different marketing channels**

(₹/q)							
Sl. No.	Particulars	Open cultivation			Protected cultivation		
		C-I	C-II	C-III	C-I	C-II	C-III
1.	Price received by farmers	1460.05	1411.16	1951.93	1982.98	1893.68	2070.74
2.	Marketing cost incurred by farmers	0.00	30.60	18.55	17.00	34.92	29.26
3.	Selling price of producers	1460.05	1441.76	1970.48	1999.98	1928.60	2100.00
4.	Wholesalers purchase price	-	1441.76	-	-	1928.60	-
5.	Marketing cost incurred by wholesalers	-	15.77	-	-	24.03	-
6.	Net profit margin by wholesaler	-	370.90	-	-	422.90	-
7.	Private companies purchase price	-	-	1970.48	-	-	2100.00
8.	Marketing cost incurred by private companies	-	-	33.75	-	-	42.00
9.	Net profit margin by private companies	-	-	866.33	-	-	828.70
10.	Retailers purchase price	-	1828.43	-	-	2375.53	-
11.	Marketing cost incurred by retailers	-	25.02	-	-	19.15	-
12.	Net profit margin by retailers	-	650.07	-	-	643.35	-
13.	Retailers selling price	-	2503.52	2853.06	-	3038.00	2950.00
<b>Price Spread</b>							
I	Price paid by consumer	1460.05	2503.52	2853.06	1999.98	3038.00	2950.00
II	Total marketing cost	0.00	71.39	52.30	17.00	78.10	71.26
III	Total profit margins of intermediaries	0.00	1020.97	866.33	0.00	1066.25	828.70
IV	Price received by farmer	1460.05	1411.16	1951.93	1982.98	1893.68	2070.74
V	Value added by the marketing system	0.00	1092.3	901.13	17.00	1144.3	879.26

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<b>VI</b>	<b>Producer share in consumer rupee (%)</b>	<b>100.00</b>	<b>56.37</b>	<b>68.42</b>	<b>99.15</b>	<b>62.33</b>	<b>70.19</b>
<b>VIII</b>	<b>Marketing efficiency</b>	<b>-</b>	<b>1.29</b>	<b>2.12</b>	<b>116.65</b>	<b>1.65</b>	<b>2.30</b>

Note: C- I: Channel I (Producer → Consumer);

C- II: Channel II (Producer → Wholesaler → Retailer → Consumer)

C- III: Channel III (Producer → Private Companies → Consumer)

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#### 4. CONCLUSION

The study revealed that three channels existed in the study area for open and protected cultivation of tomatoes. The marketing efficiency which was computed by Acharya's method revealed that channel-I comprising of Producer→Consumer had higher efficiency which in indeterminate in open cultivation and higher in protected cultivation. But as its presence in the market was limited and the buyers in this channel are nearby the farm which are also limited. Among the other channels, channel-II and channel-III were coming out to be relatively better in terms of marketing efficiency. Channel-III comprising of Producer→Private Companies→Consumer was the most prominent and efficient channel where producer share in consumer rupee was also higher compared to other channels under both cultivation practices in existing marketing situation. The tomato producers should add value at their level, which could be on individual basis or in group or cooperative and try to minimize the intermediaries which will reduce the price spread and increase the marketing efficiency. The farmers should promote direct selling of tomatoes.

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