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ORIGINAL ARTICLE

Value Chain Analysis of Tomato in Kolar District of Karnataka, India

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ABSTRACT
In recent days, the need for analysing value chain for Tomato has gained higher prominence in India. For the study, the Kolar district of Karnataka, one of the top tomato producing districts, was selected and primary data was collected from various stakeholders for the period 2018-19 in Kolar Tomato Market. Besides, the secondary data was collected from the National Horticulture Board database. The analytical tools employed included the Acharya approach of calculating marketing efficiency, the Garret ranking method and Descriptive statistics. The outcome of this study resulted in identifying two fresh tomato and one processed tomato channels. The study focused on fresh tomatoes and identified one Supermarket channel (C-1) and three Traditional APMC channels (C-2, C-3, C-4) in the study area. Among these channels, the quantity handled by the traditional channels was higher than the supermarket channels. However, farmers' income was comparatively more in supermarket channels as compared to other channels. The marketing efficiency of the supermarket channel (C1-1.02) higher than traditional channels (C2-0.8, C3-0.69, and C4-0.85). Among traditional channels, C-4 was efficient owing to fewer intermediaries and operates nearby towns of Kolar.

Key words: Value chain, Marketing efficiency, Price Spread**,** Traditional channel, Supermarket channel.

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INTRODUCTION

Horticulture sector has become one of the major drivers of growth in agriculture sector. It provides employment opportunities across primary, secondary and tertiary sectors. A horticultural crop particularly fruit crops is relatively resilient to changes in weather conditions. This sector also enables the populations at large to enjoy a diverse and balanced diet for healthy living. Vegetables are mostly grown by small and marginal farmers and augment the income of the farmers. The productivity of vegetables in India has been rising from last many years[1].Production of fruits and vegetables has overtaken the production of food grains in the country. The total horticultural production has increased from 211.2 Mt in 2017-18. The percentage share of horticulture crops in value of total agricultural output is approximately 33 percent. Presently, India is the second largest producer of vegetables and fruits in the world [2].Fruits and vegetables are the necessary complements for the human diet. It provides indispensable minerals, fibres, vitamins required for preserving human health. Tomato is one amongst the foremost vital "defensive sustenance" insight of its exceptional nutrient value. It contains higher amounts of lycopene, which is antioxidant with inhibitor properties that is favourable to scale back the incidence of some chronic diseases [3].By accounting for 13% of the global production of fruits and 21% of vegetables, India is the second largest producer, after China, in both the commodity groups. Evidences suggested that the net return in horticultural crops is higher than other crops. The government of India has proposed to double farmer's income by the year 2022. It is increasingly being recognised that horticulture will remain an integral component for the strategy to achieve this goal[4].

Tomatoes are usually marketed by intermediaries such as commission agents and traders who are active in vegetable markets but they are least interested in the well-being of producers-farmers or customers.

Market commission agents work at the stage of the business and pay to the government a fixed percentage of charges. Traders, on the other side, are wholesalers who purchase tomato from one market or directly from farmers and send it to retailers to realize their earnings. These intermediaries are expected to play a crucial role in matching market demand with supply. According to reports of the National Horticulture Board, there was a marginal increase in the area under horticulture crops. The area in 2018-19 was estimated to be 25.87 million hectares (MH) as compared to 25.43 MH in 2017-18. The total horticulture production of the country in the year 2017-18 was around 311.71 MT from an area of 25.43 million hectares, which was 3.55% higher than the previous year and 8.5% higher than the past 5 years average production. It was projected that fruit production was about 97 million tons which was greater than the past year by 4.5 percent. Vegetable production was 178.1 million tons in 2016-17, which has increased to the level of 184.3MT in 2017-18[2].Tomato ranks third in priority after Potato and Onion in India however rank second after potato in the world. India ranks second both in the area as well as in production of tomato[5].The area under tomatoes in the country was about 7.89 lakh hectares and it was about 7.5 percent of the total area under vegetables. Annual tomato production in the country was 197.59 lakh million tons, which was 10.99% of total vegetable production. On the other hand, the production of tomatoes dropped by approximately 1.0 MT in 2018-19 as per 2nd advance estimate of National Horticultural Board[2].Karnataka is one of the advance states with vast horticultural development potential. The state is a progressive state in every aspect in the field of modern agriculture including horticulture in the country. The diverse agro-ecological conditions prevailing in Karnataka has made it possible to grow different types of horticultural crops such as fruits, vegetables, flowers, spices, plantation crops, root and tuber crops, medicinal and aromatic crops. Although it is found that horticulture is the less water consuming cultivation, which can be easily expanded in Karnataka. The state is highly progressive with regard to vegetable production, because of extreme climatic conditions without extreme temperature[6].

The State is blessed with the 10 agro-climatic areas appropriate for growing fruit and vegetable varieties throughout the year. Horticultural plants big in Karnataka will be categorized into five wide classifications particularly fruits, vegetables, spices, plants and commercial flowers. Additionally, probably valuable plants like aromatic and healthful herbs have conjointly been cultivated in some fields. Within the state, the overall land area under tomato was 64.25 thousand hectares in 2017-18 with a production base of 2081.59 metric tonnes [2]. India's tomatoes are cultivated by a large number of smallholder farmers (i.e. nearly half of India's farming society) with a landholding between 1-3 acres. The southern and central part of the country makes up a large part of India's production including Andhra Pradesh, Telangana, Karnataka, and Maharashtra states. Farmers typically sell in a regional mandi to a local aggregator or a trader. However, the processing sector aims the agglomeration of a big number of farmers in close-knit clusters to allow both a continuous supply of bigger amounts of tomato to the processing unit and the maintenance of the quality of the tomato product. The demand in India for processed tomato products has been growing at an annual rate of about 30% over the past 3 years. Tomato is a major crop for Indian farmers as well as consumers. India produces more tomatoes than any other nation, except China, with a worldwide production share of 11 percent. Despite this, less than one percent of Indian tomato production is processed, well below the 26 percent average for the top 10 tomato producing nations in the world.

Value Chain Analysis

A value chain is a business model describing the full range of activities that are required to bring a product in a particular enterprise from its conception to its end market. It provides a snapshot of an enterprise at a particular time, while value chain mapping indicates the way a product flows from raw material to end markets [7].A value chain for businesses producing products includes the measures that involve bringing a product from development to distribution and everything in between such as procurement of raw materials, production functions and marketing operations. The changing lifestyle and increasing expenditure on health and nutritional foods in both urban and rural areas is the indication of strong demand growth for processed food products in the country. And also due to increasing standards of living in the cities and the rapid urbanization taking place in the rural areas, consumption of tomato based product is expected to go up steadily[8].By assessing the thorough processes engaged in each phase of its business a firm performs a value-chain analysis. It has been argued that linking of farmers to the market through efficient value chains would reduce the use of intermediaries in the chain and strengthen the value adding activities by better technology and input, upgrade infrastructure and processing and exports [7].The aim of analyzing the value chain is to improve the effectiveness of production so that a business can produce maximum value at the least possible cost. Keeping in view the above aspects the study entitled" Value Chain Analysis of Tomato in Kolar District , Karnataka" was performed with the

following objectives: To identify the major stakeholders in the value chain of tomato and mapping the trade link among the various stakeholders in the study area and to analyse the marketing cost, marketing efficiency, and price spread of different channels of the value chain for fresh tomato in the study area.

MATERIAL AND METHODS

Karnataka is thethird largest state in the country in terms of tomato area (64250 ha) and production(2081.59MT) during 2017-18 [2].The study was conducted in the Kolar district of Karnataka during 2019-20. The Kolar district was purposively selected for the present study because the district is the state's major tomato growing district of Karnataka based on their cultivated region (8150 ha) and production (481.45 metric tonnes).The agriculture produce market committee (APMC) of Kolar has been chosen for the collection of primary data about farmers and intermediaries. Farmers, who were selling tomato directly to the organized retailers, were selected randomly in and around Kolar and interviewed systematically. Furthermore, some of the organized retailers like Reliance fresh, HOPCOMS and Big basket were chosen in Kolar and Bangalore for collection of primary data. A significant number of respondents were interviewed at all stages of the tomato value chain to collect the primary data. A total of 30 Farmers, 20 Commission agents, 20 Traders, 20 Wholesalers, 30 Retailers and 20 consumers were interviewed to collect the relevant primary data.

Marketing Cost

The total costs incurred by the producer-seller and the various intermediaries involved in the sale and purchase of the commodity until the commodity reaches the ultimate consumer under this head [9]:

$$C = Cf + Cm_1 + Cm_2 + Cm_3 + \ldots\ldots\ldots\ldots + Cm_i$$

Where, *C* is total cost of marketing of the commodity; *Cf* is cost incurred by the producer from the time the product leaves the particular stakeholder, and *Cmi* is cost incurred by the i^{th} middleman in the process of buying and selling the product.

Marketing Margin

The marketing margin is the difference between the i^{th} middleman's receipts (sale price) and total payments (cost + purchase price) [9]. The absolute margin of the i^{th} middleman as per the equation below was worked out:

$$Ami = PRi - (PPi + Cmi)$$

Where, *Ami* is absolute margin of the i^{th} middle man; *PRi* is total value of receipts per unit (sale price); *PPi* is purchase value of goods per unit (purchase price); and *Cmi* is cost incurred in marketing per unit.

Price Spread

The price spread for the marketing channels listed in the study area was worked out separately. In general, price spread is defined as the difference between the consumer's price and the producer's price for an equivalent quantity of farm produce. Price spread using formula is determined:

Price spread = Consumer price - Producer's price

Producer's share in Consumer's rupee

It is the price the farmer pays as a percentage of the retail price (the price the buyer paid). If *Pr* is the retail price and *Pf* is the Farmer received a price, the consumer rupee (*Ps*) share of the producer may be reported as follows [9]:

$$P_s = (P_f/P_r) \times 100$$

Marketing Efficiency

The effectiveness of the marketing system with which it works is marketing efficiency. The updated approach as suggested by Acharya and Agarwal [9] was used to measure marketing efficiency:

$$ME = FP/(MC+MM)$$

Where, *ME* is marketing efficiency; *MC* is marketing cost; and *MM* is marketing margin

Value Addition

This represented the difference between the price a firm sold its goods for and the cost this spent on the materials it bought. That disparity reflected the value added by the firm's productive activities.

Value addition = Selling price of the product – Cost of the total inputs

RESULTS AND DISCUSSION

Marketing channels followed in the study area

It was found that three marketing channels were operating in the study area in the marketing of tomato. In that, traditional channels and modern retail channels were busy in marketing fresh tomatoes and the processing channel was busy procuring most of the processed tomato directly from the farmers for its

value addition activities. In the study, we have studied the value chain of market-oriented fresh tomato. Given that, the following channels were identified in the study area. Following marketing channel was observed under modern retailers channel/organised retailers channel:

Channel – 1 (C1):Farmers/Growers ⟶ Retailers ⟶ Consumers

In recent years, Indian retail stores across different categories have seen the rapid transformation and robust profits. This can be taken into account because Indian consumers are changing their attitudes and accepting modern retail formats overwhelmingly. India has entered a phase of positive economic development that calls for a significant improvement in the liberalization of the retail markets. The modern retail stores not only fetch a better price to the growers but also provide good quality tomatoes to the consumers. Organized retailers contact medium and large farmers directly and purchase tomatoes in bulk to prevent middlemen and to get the good quality of fresh tomatoes. Farmers could sell their whole lot to organized retailers, where the farmer gets slightly higher than market prices. However, it is difficult for farmers to rely on large retailers because they procure farm tomatoes only when they require the produce. A long distant collection centre makes an increase in transportation costs and a slight damages and low-quality tomatoes fetch a lower price for the organised retailers. In the study area, following marketing channels were observed under traditional marketing channels:

Channel – 2 (C2): Farmers⟶Wholesalers⟶Retailers ⟶ Consumers
Channel – 3 (C3): Farmers ⟶ Commission agents⟶ Traders⟶ Wholesalers⟶ Retailers ⟶ Consumers
Channel – 4 (C4): Farmers⟶ Commission agents⟶ Traders⟶ Retailers⟶ Consumers

The platform for the Traditional channel is the Agricultural Production Market Committee (APMC) yard, and the operations are controlled by the related APMC authorities. This chain includes producers (including all categories of farmer-landholders), commissioning agents, traders, wholesalers, and retailers. Marketing through these traditional channels is marked by very little attention to grading, storage, and poor handling during loading, unloading, and transportation. Supply chains for fruit and vegetables tend to be multi-layered which has serious implications on the producer's share in consumers' rupee and quality of the commodity.

The APMC Channels recorded a higher volume of transactions even though it fetches a lesser price to the farmers. It's mainly due to the drawbacks of modern retail channels, where the collection centre offers a limited quantity, which makes the farmer search other channels to sell the remaining produce. Besides, collection centres purchase directly from the APMCs when the market glut was created, which promote the farmer to choose the APMC channel. Furthermore, farmers prefer more of APMC channels due to speculation of higher prices in auction. Along with it, in APMC channels, there are no issues like grading, sorting, and packing which also prompt farmers to choose APMC channels. Also, the majority of farmers avail loans from the commission agents with the agreement of selling his produce. Hence, they choose traditional channels. Along with the above advantages, APMC channels have some disadvantages like delayed payment from commission agents, lower prices than the expected price, etc.

Tomato Value Chain Map

The three prevailing channels were identified in the study area - Traditional channel, Modern retail channel, and Processing channel. Traditional channel was a complex channel, it consists of intermediaries like Farmers/growers, Commission Agents, Traders, Wholesalers, retailers, and consumers. However, in the modern retail channel and processing channel, the tomato was procured directly from the growers which avoid intermediaries. However, the modern retail channel has the CCs- collection centres which helps in procuring the fresh tomato from the growers in rural areas and pass it to the retail outlets, which are mainly situated in urban areas. While the processing channel has no intermediary, it mainly operates through contract farming, few of processing industries purchase tomato from traders. Figure-1 shows that tomatoes in the study area reached through the Supermarket channel (Channel-1), Traditional channels (Channel-2, Channel-3 and Channel-4), and processing channel. In the value chain map, the value chain of tomatoes and tomato products have been organized and systematically shown. Input suppliers, producers, trader commission agents, wholesalers, retailers, traders, processors and consumers are the main components of the tomato value chain. The processed tomato products are mainly sold as a paste to manufacturers for ketchup and sauce, though some of them are also globally exported.

Ketchup and sauce were sold in smaller packages to individual and bulk customers, such as hotels and institutions.

Structure of marketing cost incurred by Tomato Growers/Farmers in different Channels(Rs/ Quintal)

Marketing cost is one of the major factor which influence the farmer's income,As higher the marketing cost lower will be the growers/farmer's net income. While selling farmers would choose the convenient channel among the identified channels based on marketing cost and price. As per Table-1, modern retail outlets prefer better quality and well-graded tomatoes, which incurs a higher value-added cost (42.4 Rs/quintal). Besides, a distant collection centre added more cost to the farmer while transporting and loading and unloading the produce compared to traditional channels and incurred the total marketing cost of 129.6 Rs/quintal. Moreover, in traditional channels, even though the farmer incurred less transit cost, high commission charges led to high marketing costs (178.6 Rs/quintal). However, in channel 2, the farmers sold directly to the wholesalers in the absence of a commission agent thus marketing cost was lower (115 Rs/quintal) than the rest of the identified traditional channels.

Farmers have got a slightly better price in the modern retail channel (970.4 Rs/quintal) than the traditional channels. However, among traditional channels, APMC channels (C-3 and C-4) fetched comparatively better prices than the C-2 (Non – APMC) channel, where farmers directly sell to the trader in the absence of a commission agent. Even though farmers sold at a higher price (920 Rs/quintal) in case of C-3 and C-4 channels. Thus higher marketing cost pulled down the net received price of the farmer to (741.4 Rs/quintal). But in case of C-2 channel, farmers sold tomato @ 880 Rs/quintal and managed to get 764.4 Rs/quintal with low marketing cost.

Structure of marketing costs incurred by the Commission Agents (Rs/quintal)

Table2 reveals that among the different costs, labour charges (24.26 Rs/quintal)) was the major cost involved in facilitating trade between trader and farmer. Besides, shop rent, electricity bill and other personal costs were 2.58 Rs/quintal, 0.45Rs/quintal, 5.15Rs/quintal, respectively. The total expenses borne by commission agent were 32.44 Rs/quintal.

Structure of marketing cost incurred by the traders (Rs/quintal)

In the study, there were two channels where traders were actively involved in dealing with tomato. Table3 shows that in C-3 channel traders have purchased tomato directly through commission agents @ 920 Rs/quintal and sold to wholesalers for a profit. In the C-4 channel, they have purchased tomato through commission agent (920 Rs/quintal) and sold directly to the retailers. This C-4 channel mainly operates in and around areas of Kolar. The Value-added cost of C-3 and C4 accounted same (16.33Rs/quintal) since traders of both channels purchase in APMC through a commission agent. Both incurs the same value-added costs. Total marketing cost accounted same in the C-3 channel (192.43 Rs/quintal) and C-4 channel (192.43 Rs/quintal).Even though, the traders of C-3 and C-4 channels purchased tomato at the same price from farmers through the commission agent, the trader of C-4 sold at a higher price and kept its margin high (197.56Rs/quintal) than the C-3 trader's margin (102.56 Rs/quintal). Finally, traders of C-3 sold tomato @ 1215 Rs/quintal to respective wholesalers, and C-4 traders sold @1310 Rs/quintal to their respective retailers.

Structure of marketing cost incurred by the Wholesalers (Rs/Quintal)

It is evident from the Table4 that secondary wholesalers (C-3) had a lower marketing cost (113.1 Rs/quintal) than the primary wholesalers (170.8 Rs/quintal) of C-2. In the C-2 channel, owing to direct contact with the farmers, wholesalers incurred a transportation cost of 70.6 Rs/quintal. However, in case of secondary wholesalers, transportation cost was borne by the respective trader. Besides, due to more wastages while handling large quantity, the value-added cost was more for primary wholesalers (24.8 Rs/quintal) then the secondary wholesalers (21.6 Rs/quintal).Even though wholesalers of channel C-2 purchased tomato @ 880 Rs/quintal. Due to high marketing cost, they had sold crop produce to retailers @ 130 Rs/quintal with a higher margin of 269.2 Rs/quintal. However, wholesalers of C-3 channels purchased tomato at a comparatively high price of 1215 Rs/quintal, with considerable margins (151.9 Rs/quintal) and they sold it to retailers @1480 Rs/quintal.

Structure of marketing cost incurred by the retailers (Rs/quintal)

In the modern retail channel, transportation cost was quite high (176.66 Rs/quintal) since retail outlets were far away from the collection centres. However, the transportation cost of traditional channels was comparatively low since retailers found nearby wholesalers, which reduces transportation costs (Table5).Modern supermarkets had a better infrastructure like a big shop and a handful of employees. For modern retail stores shop rent accounted for 71.33 Rs/quintal and labour cost accounted for 6.33 Rs/quintal, which added more to the marketing cost. However, in traditional channels, retailers operated solely with fewer infrastructure facilities, which made shop rent and labour cost accounted for relatively

cheaper. Besides, in the modern retail channel, due to higher rejection in grading, cleaning and good packaging made value-added costs higher (178.66 Rs/quintal) than the traditional channel, where they made little rejection and less packaging cost. Finally, modern retailers sold produce at 1920 Rs/quintal and incurred marketing cost of 597.33 Rs/quintal with a massive margin of 222.06 Rs/quintal. However, in traditional channels(C-2) sold at 1700 Rs/quintal and incurred 177.2 Rs/quintal of marketing cost with a considerable amount of margin (202.8 Rs/quintal). While retailers of C-3 and C-4 channels sold tomato at 1810 Rs/quintal and 1610 Rs/quintal with the marketing costs of 178.8 Rs/quintal and 165.2 Rs/quintal respectively. Both the retailers of C-3 and C-4 channels had a margin of 151.2 Rs/quintal and 197.56 Rs/quintal respectively. The study revealed that modern retailers were busy in marketing fresh tomatoes in cities and towns with higher prices and margin. Even though modern channels had no intermediary, they were incurred higher marketing costs and value-added costs. Besides, a higher marketing margin, made the price of tomato higher than on any other channel.

Among traditional channels, the C-3 channel, mainly operated in the cities and towns, the price of tomato was higher (1810 Rs/quintal) due to high marketing cost and high marketing margin of intermediaries. However, the C-4 channel operated in and around the district of Kolar, hence the marketing cost and marketing margin was relatively lower which made the retailers to sell at a quite lower price of 1610 Rs/quintal.

Price spread in different channels of the Tomato value chain (Rs/quintal)

The study revealed that price spread was maximum in Channel-3 (1068.6 Rs/quintal) followed by Channel-2 (935.6 Rs/quintal) due to various factors such as the number of intermediaries, marketing cost and marketing margin. However, the channel-4, which was prevalent in and around Kolar district had the low price spread (868.6 Rs/quintal) owing to less in intermediaries, absence of wholesalers, retailers took part directly in purchasing tomato in the market and sold to consumers around them which made marketing cost and marketing margin comparatively lower (Table6).Whereas in the case of the modern retail channel, the price spread was 949.6 Rs/quintal. Even though these retailers sold at a higher price (1920 Rs/quintal) but the comparatively higher price being paid to the farmer made the price spread relatively low than the traditional channel C-3. Retailers were the only intermediaries in the supermarket channel and owing to higher marketing cost and higher marketing margin, it summed up to the higher price. From the study, it has been revealed that the C-2 channel was efficient in case of the outer district among traditional channels. However, in and around Kolar district, the C-4 channel was efficient. These results are supported by the report of the Ramappa and Manjunatha [5].

Marketing efficiency and producer's share in consumer's rupee for per quintal of tomato under different channels

In the study it was found that for channel-1(modern retail channel), the marketing efficiency was higher (1.02) than any other traditional channels. Owing to the absence of intermediaries, marketing cost was lower which made the channel more efficient in view of the farmer (Table7).Among the traditional channels, channel-4 with the marketing efficiency (0.85) was more efficient where commodities had bought by wholesalers from farmers through commission agents and sold it to nearby retailers with some margins. However, among the traditional channels – Channel-2 and Channel 3, due to the existence of more intermediaries in the chain, marketing efficiency accounted for 0.81 and 0.69 respectively, which is quite lower than the other channels. This indicated that their margins can be improved by reducing the commodity from marketing loss during transit. The study of Tuteja and Chandra [10] also shows that the marketing efficiency of emerging marketing channels (0.96) was quite higher than the traditional channel (0.66) for fresh tomato in Haryana. For channel-1 (supermarket channel), the marketing efficiency was comparatively higher due to the absence of market intermediaries and the relatively higher consumer price, which made a higher share (50.54 percent) of the producer's in consumer's rupee. Among the traditional channels, since the price spread in channel-3 was higher, the producer's share in consumer rupee for channel-3 was very low (40.96 percent) and made this channel inefficient with the least marketing efficiency compare to any other channel. In addition to this, channel-2 accounted for less of the producer's share in consumer's rupee (44.96 percent), due to the reasons of higher price spread and marketing cost. However, channel-4, which operated in and around the Kolar district, had a comparatively good producer's share in consumer's rupees (46.04 percent) since the consumer's buying price was lower than any also there was less number of intermediaries.

These results were supported by the results reported by Tuteja and Chandra in their study at Haryana [10]. They found that the producer's share in consumer's rupee in the emerging marketing channel (48.93 percent) was higher than the traditional channel (39.63 percent).

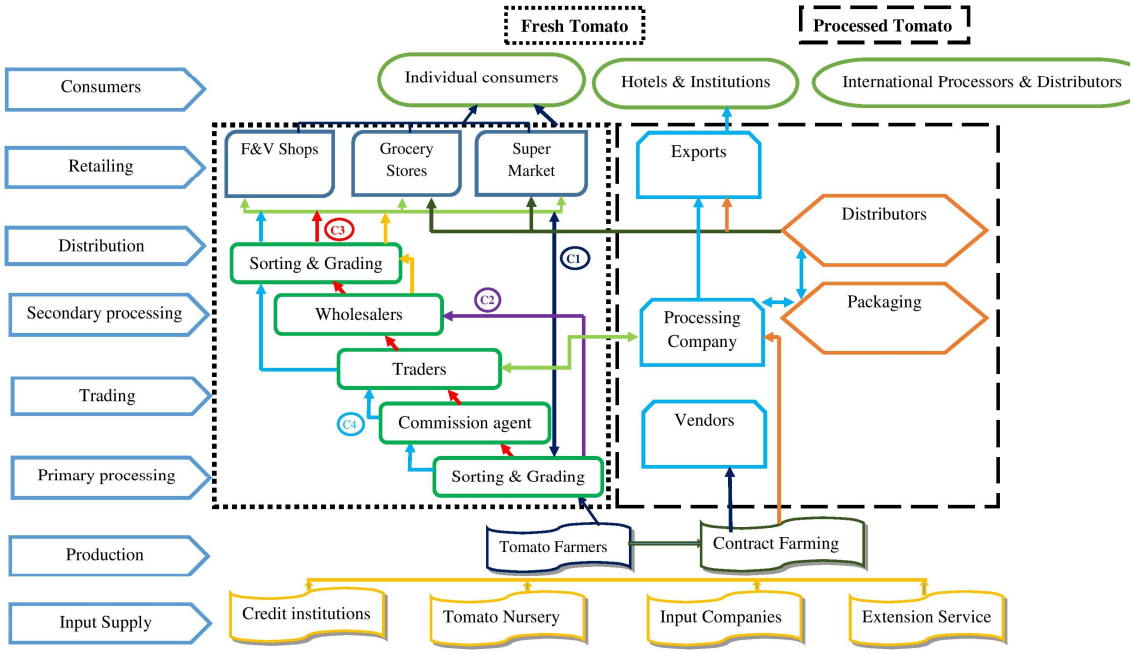

Figure-1: Tomato Value Chain Map

Table1: Structure of marketing cost incurred by Tomato Farmers/Growers in different Channels (Rs/quintal)

Particulars	Modern retail channel	Traditional channels		
	C-1	**C-2**	**C-3**	**C-4**
Loading & Unloading	18.8	13.8	13.8	13.8
Transportation	47.2	39.2	35.2	35.2
Commission (8%)	0.0	0.0	73.6	73.6
Miscellaneous cost	21.2	21.2	18.6	18.6
Value added cost	42.4	41.4	37.4	37.4
Total Marketing cost	129.6	115.6	178.6	178.6
Producer's sale price	1100.0	880.0	920.0	920.0
Net Price received	970.4	764.4	741.4	741.4

Table 2: Structure of marketing cost incurred by the Commission agents (Rs/quintal)

Particulars	**Cost (Rs/quintal)**
Shop rent	2.58
Electricity and Telephone charges	0.45
Labour charges	24.26
Personal cost	5.15
Total Expenses borne by Commission agent	32.44

Table 3: Structure of marketing cost incurred by the Traders (Rs/quintal)

Particulars	**Modern retail channel**	**Traditional channels**		
	C-1	**C-2**	**C-3**	**C-4**
Transportation	-	-	140.3	140.3
Loading and unloading	-	-	15.4	15.4
Value added costs	-	-	16.33	16.33
Miscellaneous costs*	-	-	20.4	20.4
Total Marketing cost	-	-	192.43	192.43
Purchased price of tomato	-	-	920	920
Marketing margin	-	-	102.56	197.56
Trader's sale price	-	-	1215	1310

*includes market fees and other personal expenses.

Table 4: Structure of marketing cost incurred by the Wholesalers (Rs/quintal)

Particulars	Modern retail channel	Traditional channels		
	C-1	C-2	C-3	C-4
Transportation	-	70.6	46.6	-
Loading and unloading	-	36.8	20.8	-
Value added costs	-	24.8	21.6	-
Miscellaneous costs		38.6	24.1	-
Total Marketing cost	-	170.8	113.1	-
Purchased price of tomato	-	880	1215	-
Marketing margin	-	269.2	151.9	-
Wholesaler's sale price	-	1320	1480	-

Table 5: Structure of marketing cost incurred by the Retailers (Rs/quintal)

Particulars	Modern retail channel	Traditional channels		
	C-1	C-2	C-3	C-4
Transportation cost	176.66	54.8	54.2	47.8
Labour cost	62.33	12.8	13.6	13.2
Shop rent	71.33	26.8	30.8	26
Value added costs	178.66	63.4	61.2	59.8
Miscellaneous costs	108.33	19.4	19	18.4
Total Marketing cost	597.33	177.2	178.8	165.2
Purchased price of tomato	1100	1320	1480	1310
Marketing margin	222.66	202.8	151.2	197.56
Retailer's sale price	**1920**	**1700**	**1810**	**1610**

Table 6: Price spread in different channels of the Tomato Value Chain (Rs/quintal)

S.N.	Particulars	Modern Retail Channel	Traditional channels		
		C-1	C-2	C-3	C-4
I	**Growers/Farmers**				
	Gross price received	1100	880	920	920
	Value added costs	42.4	41.4	37.4	37.4
	Total Marketing cost	129.6	115.6	178.6	178.6
	Net Price received	970.4	764.4	741.4	741.4
II	**Traders**				
	Price paid	-	-	920	920
	Value-added costs		-	16.33	20.4
	Total Marketing cost	-	-	192.43	192.43
	Marketing Margin	-	-	102.56	197.56
	Net Price received		-	1215	1310
III	**Wholesaler**				
	Price paid	-	880	1215	-
	Value added costs	-	24.8	21.6	-
	Total Marketing cost	-	170.8	113.1	-
	Marketing Margin	-	269.2	151.9	-
	Net Price received	-	1320	1480	-
IV	**Retailer**				
	Price paid	1100	1440	1480	1310
	Value added costs	178.66	63.4	61.2	59.8
	Marketing Margin	222.66	202.8	151.2	134.8
	Total Marketing cost	597.33	177.2	178.8	165.2
	Net Price received	1920	1700	1810	1610
V	**Consumer**				
	Price paid	1920	1700	1810	1610
	Price spread	946.9	935.6	1068.6	868.6

Table7: Marketing efficiency and producer's share in consumer's rupee for per quintal of tomato under different channels

Particulars	C-1	C-2	C-3	C-4
Consumer's purchase price	1920	1740	1790	1610
Net price received by the farmer	970.4	724.4	741.4	741.4
Total marketing cost*	726.93	463.6	646.93	536.23
Total marketing margin*	222.66	472.6	401.66	332.36
Marketing efficiency	1.02	0.81	0.69	0.85
Producer's share in consumer's rupee	50.54	44.96	40.96	46.04

**:Total marketing cost and margin includes all intermediaries marketing cost and margins*

CONCLUSION

The study has identified four different channels in the marketing of fresh tomato in the study area. They include 1-Super market channels and 3-Traditional APMC channels. Among the channels, the quantities handled by the traditional channels were relatively higher than the supermarket channel. But it was not shocking that farmer's profit in the supermarket channels was relatively higher than the traditional channels. The study clearly showed that marketing efficiency in the supermarket channel (1.02) was higher than any traditional channel. In traditional channels, Channel-4 (Farmer-Commission agent-Trader-Retailer-Consumer) has been the most effective channel with a marketing efficiency of 0.85. Since it was being operated in and around Kolar district which makes the marketing cost lower. Channel-3(Farmer-Commission Agent-Trader-Wholesaler-Retailer-Consumer) was least efficient with a marketing efficiency of 0.69. In this channel tomato will be sold by the trader in different states, thus it incurs more marketing costs and makes the least efficient. Along with it, Channel-2(Farmer-Wholesaler-Retailer-Consumer) has the marketing efficiency of 0.81. This channel operates in and around the district of Bangalore urban hence it was quite better than channel-3. However, in Channel-1 (supermarket channel), the producer's share in consumer's rupee was comparatively higher (50.04%) than in traditional channels owing to the lack of intermediaries. However, among traditional channels, channel-3 provides the lesser producer's share in consumer's rupee. While value-added cost was greater in the supermarket channel due to comparably higher rejections in the sorting and evaluation of central warehouses at collection and distribution points. Besides, the price spread of the supermarket channel was low (946.9 Rs/quintal) due to the absence of intermediaries. Whereas among traditional channels, channel-3 has more price spread of 1068.06 Rs/quintal which makes a lesser return to the farmer. However, it should be noted that the total marketing cost through supermarket channel (726.93 Rs/quintal) was found to be lower than traditional channels and the total marketing margin of the supermarket channel (222.66 Rs/quintal) was lesser than any other traditional channel. The Supermarket channels are better performing by providing good returns to farmers and satisfying the consumers with good quality tomatoes.

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