

Role of Small Farmers in Tomato Value Chain - A Case of Karnataka

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Abstract: Agricultural Census data overtime shows that there has been an increasing trend in small and marginal farmers India due to mainly sub-division and fragmentation. The average size of land holding has been declined from 1.37 ha in 2001 to 1.15 ha in 2011. Whereas, the contribution towards production and productivity is relatively higher in the case of marginal and small farmers as compared to the medium and large farmers as evident from the existing literature. Although, there are several issues and challenges for their growth, the recent developments in the field of agricultural marketing, post harvest management, integration of forward and backward linkages, and institutional developments along with the government support have created opportunities for them to compete in the globalized world. With this background, an attempt has been made in this paper to understand the role of small and marginal farmers in the tomato value chain analysis in Karnataka. Results demonstrate that a majority of marginal and small farmers have adopted modern technologies in the tomato cultivation, thereby they could able to achieve higher productivity and returns as compared to medium and large farmers in the study area. The per acre costs seems to be moderate among marginal and small farmers, whereas, the productivity (15.60 tonnes) and net returns (Rs. 42,041/-) found to be highest. Besides, they found to be more efficient in terms of input usage in contrast to medium and large farmers. About five to ten per cent of the marginal and small, and semi-medium and medium categories of farmers opted for other channels such as super market and processor channels, where, the prices are relatively higher. However, none of the large farmers preferred other channels than the traditional, in which the producer's share in consumers' rupee is comparatively lower. Across value added products, marketing efficiency of ketchup is high (1.88) followed by sauce (0.67) and paste (0.25). The results provides useful insights for the policy makers for improving the efficiency of the tomato value chain in India.

Key Words: Role of small farmers, marketing costs and efficiencies, tomato value chain

INTRODUCTION

The role of small farms in development and poverty reduction is well recognized as pointed out by several scholars (Lipton, 2006; Amartya Sen, 1964; Singh *et al.*, 2002, Mahendra Dev, 2014). Agricultural Census data also shows that the share of small and marginal farmers has been increasing in one hand, and the average size of land holding declining on other when compared over time. The population of small and marginal farmers has been increased from 121 million in 2001 to 138 million in 2011. In contrast, average size of land holding has declined from 1.37ha in 2001

to 1.15ha in 2011 (Agricultural Census, 2001 & 2011). But their share in operated area is relatively same (around 44%). As rightly revealed from the study conducted by FAO (Singh *et al.*, 2002), the productivity of small and marginal farmers is relatively higher than that of medium and large-size farms and their marketable surpluses are increasing. These results are on par with the inverse relationship between farm size and productivity (Amartya Sen, 1964). It is also true that small holdings play an important role in raising agricultural development and poverty reduction (Lipton, 2006).

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The common issues and challenges faced by the small and marginal farmers include market volatility; risks and vulnerability; absence of access to credit and other extension services; poor access to public goods such as canal irrigation, command area development, electricity; poor technical know-how; adaptation to climate change and so on. The recent developments such as commercialization of increasing proportions of input and output, institutional developments such as supermarkets, privatization, integration of value chains etc., also focussing more on large farm-size (Lipton, 2006; Thapa and Gaiha, 2011). Therefore, to overcome from these challenges, these small and marginal categories of farmers need to be empowered through policy interventions and increasing public investment on agriculture and rural infrastructure development.

Within Agriculture sector, horticulture has emerged as the priority area for agricultural development in India. It is one of the most important “protective foods” both because of its special nutritive value and its widespread production. The country ranks second in the world in terms of production of fruits and vegetables accounting for 13 and 14 per cent, respectively, of total global production during 2012-13 (MoA, 2014). Recently, Food processing Industry (FPI) in India is booming due to increased investment and policy support from the government. The FPI is playing a vital role in diversifying the agricultural sector, improving value addition opportunities and creating surplus food for agro-food products. The share of food processing sector in Gross Domestic Product (GDP) of manufacturing sector has been 9.8 per cent and the contribution of this sector to the GDP amounts to INR 845.22 Billion in 2012-13. Manufacturing sector was generally growing at a higher rate than food processing industry till 2009-10 but the performance of FPI improved substantially in 2011-12 registering a record growth of 21.6 per cent. However, the sector has grown at an average rate of 8.4 per cent during last five years ending 2012-13 (CSO, 2014), which is higher than that of the agriculture sector.

With this backdrop, an attempt is made in this paper to understand the role of small and marginal

farmers in the tomato value chain analysis in Karnataka. The tomato is selected for the study due to its importance in production and consumption patterns. In Karnataka tomato is produced throughout the year. It is the second largest state in terms of tomato area (5780 ha) and production (1916.60 MT) with the productivity of 33.16 tons/ha during 2012-13 (NHB, 2012-13). The productivity is much higher compared to the largest tomato area and production state Andhra Pradesh. The major tomato growing areas in Karnataka are Bangalore, Tumkur, Kolar, Hassan, Haveri, Davangere. Kolar, Chikkaballapur and Belgaum districts were the top tomato producing districts in the state based on their area under cultivation.

This paper mainly focuses on the Tomato Value chains in Karnataka with the following specific objectives:

- To study the profitability of tomato production.
- To map the actors involved in the tomato value chains.
- To study the level of participation of small and medium farmers in the tomato value chains.
- To estimate the marketing efficiency in tomato value chains.

METHODOLOGY

Based on the area under cultivation, the top three districts were selected for the study. Similar criterion was adopted to select taluks among these selected districts. Within these taluks, few contiguous villages were selected randomly for understanding the cost and returns of tomato production and marketing patterns from the growers/ producers. Random sampling technique has been adopted to select villages, markets, market functionaries, processors and farmers. Within each selected district, 50 farmers; 20 each commission agents, retailers and consumers; and 15 wholesalers were selected for the study. Since, the exporters and processors were not found in all the districts, only 3 processors in and around Bangalore and Kolar were selected for this purpose. Hence, overall sample size included 150 farmers; 60 each commission agents,

retailers and consumers; 45 wholesalers and 3 processors. Thus, the total sample size was 378 for the present study.

The study considered both primary and secondary data. The qualitative and quantitative data collected for tomato value chain actors in three selected districts during August-September 2015 period. The data pertains to the reference period 2014-15. A semi-structured, pre-tested survey with both open and closed ended questionnaire was used to collect relevant information from the growers of tomato based on recall method. The primary data collected were analyzed using suitable statistical tools. The details of the analytical methods applied were illustrated as follows;

Marketing Cost

The total cost incurred on marketing by producer seller and by the various intermediaries involved in the sale and purchase of the commodity till the commodity reaches the ultimate consumer was taken under this head (Acharya and Agarwal, 2006).

$$C = C_f + C_{m1} + C_{m2} + C_{m3} + \dots + C_{mi} \tag{1}$$

Where,

- C = Total cost of marketing of the commodity,
- C_f = Cost incurred by the producer from the time the product leaves the particular stakeholder, and
- C_{mi} = Cost incurred by the ith middleman in the process of buying and selling the product.

Marketing Margin

Marketing margin is the difference between the receipts (sale price) of the ith middleman and total payment (costs + purchase price). Absolute margin of the ith middleman was worked out as per below equation (Acharya and Agarwal, 2006):

$$A_{mi} = P R_i - (P P_i + C m_i) \tag{2}$$

Where,

- A_{mi} = Absolute margin of the ith middleman,
- PR_i = Total value of receipts per unit (sale price),

PP_i = Purchase value of goods per unit (purchase price), and

C_{mi} = Cost incurred on marketing per unit.

Price Spread

Price spread is the difference between the price paid by the consumer and price received by the producer for an equivalent quantity of farm produce and has been estimated using the formula:

$$\text{Price spread} = \text{Price paid by consumer} - \text{Price received by Producers'}$$

Producer's Share in Consumer's Rupee

It is the price received by the farmer expressed as a percentage of the retail price (the price paid by the consumer). If Pr is the retail price, the producer's share in consumer's rupee (Ps) may be expressed as follows.

$$P_s = (P_f / P_r) * 100 \tag{3}$$

Marketing Efficiency

Marketing efficiency is the effectiveness of the marketing system with which it operates. For calculating the marketing efficiency modified method as suggested by Acharya and Agarwal (2004) has been used.

$$ME = \frac{FP}{MC + MM}$$

Where,

- ME = Marketing efficiency
- FP = Net price received by the farmer
- MC = Total Marketing cost
- MM = Total marketing margin

Marketing efficiency for the processed products of tomato was calculated using the equation as given (Shepherd, 1965):

$$ME = \frac{V - 1}{I} \tag{4}$$

Where,

V = Value added for the tomato.

I = Total marketing cost incurred.

ME = Index of marketing efficiency.

Value Addition

It reflected the difference between price for which a firm sold its products and the cost incurred on the value added inputs. This difference represented the value addition by the productive activities of the firm (Kohls and Uhl, 1967).

$$\begin{aligned} \text{Value addition} &= (\text{Selling price of the product}) \\ &\quad - (\text{Cost of the total inputs}) \end{aligned} \quad (5)$$

RESULTS AND DISCUSSION

Profitability of tomato cultivation under different categories of farmers

Tomato is a short duration crop (three to four and half months), cultivated mainly as a cash crop and the profit can be earned immediately. The tomato cultivation is being commercial activity undertaken by farmers. Per acre costs and returns of tomato cultivation for different categories of farmers is presented in Table 1 for the agricultural year 2014-2015. It is revealed from the table that the overall cost of tomato cultivation in the study area worked out to Rs. 82,169/- per acre. However, per acre costs found higher among medium farmers (Rs. 85,959/-) followed by marginal and small farmers (Rs. 80,419/-) and large farmers (Rs. 55,043/-). It was interesting to note that although, per acre costs were moderate among marginal and small farmers, the productivity (15.60 tonnes) and net returns (Rs. 42,041/-) has been found to be highest followed by medium farmers with a productivity of 14.90 tonnes and net returns of Rs. 30,708/-, and large farmers with a productivity and net returns of 10.70 tonnes and Rs. 11,297/-.

It is obvious that out of the total costs, variable costs alone accounted for about 78 per cent of the costs and the rest accounted in fixed costs. At the aggregate, farm yard manure and rental value of land are the major costs (11 per cent each) followed by the interest on variable costs and the depreciation costs (nine per cent each), cost on mulching sheets,

plant protection chemicals and human labour (eight per cent) under tomato cultivation. The other important costs include cost on seedlings, threads, chemical fertilizers and irrigation accrued to six per cent each, and rest of the costs amounted for less than five per cent to the total costs.

Across categories of farmers, it is noteworthy to say that excepting large farmers, both marginal and small, and medium farmers cultivated tomato crop organically by applying more of farm yard manure (around five tonnes per acre) than using chemical fertilizers, and hence, the cost on chemical fertilizers appears less than that of large farmers. Similarly, these farmers also adopted modern technologies like use of bio-fertilizers, staking method of tomato cultivation (using sticks and threads), sprinkler or drip irrigation, and use of mulching sheets in the production of tomato. Therefore, though the cost of cultivation has increased in the case of marginal and small, and medium farmers, they could able to achieve higher productivity and returns as compared to large farmers, who have been cultivating tomatoes under traditional method. However, between marginal and small, and medium farmers, marginal and medium farmers found to be more efficient in terms of input usage in terms of their costs such as farm yard manure, plant protection chemicals, irrigation, threads and mulching sheets, which could resulted in getting better yield (15.60 tons/ acre) with the least cost (Rs. 80,419/- per acre) by the small and marginal farmers in contrast to medium farmers (14.90 tons/ acre with the total cost of Rs. 85,959/- per acre). It shows that from efficiency point of view, small holdings are better than medium and large farmers. In the case of fixed assets, excepting depreciation on sticks in respect of large farmers, all other costs found relatively same across all categories of farmers.

Mapping Tomato Value Chain

The value chain analysis is the process of breaking a chain into various components to better understand its structure and functioning. It is understood from the survey that tomatoes and tomato products reach the final consumers through three channels, viz. traditional channel, super

Table 1
Cost of cultivation and returns structure of tomato (2014-15)
(Rs. Per acre)

Sl. No.	Particulars	Marginal & Small Farmers		Medium farmers		Large Farmers		Overall		% to Total Costs
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	
A) Variable Costs										
1	Seedlings (Nos)	6387	5237	6494	5549	6000	5000	6421	5344	6.06
2	Farmyard Manure (Tonnes)	4.71	9620	5.12	10494	0	0	4.83	9859	11.18
3	Chemical Fertilizers (Kg)	225.31	5502	212.26	5208	340	9220	222	5425	6.15
4	Bio-fertilizers (Rs)	-	1059	-	1011	-	-	-	1035	1.17
5	PPC (Rs)	-	6526	-	7844	-	12350	-	7021	7.96
6	Human Labour (Mandays)	37.50	7060	37.65	6941	38.00	7600	38.00	7022	7.96
7	Machine Labour (Hrs)	2.90	1574	2.88	1538	2.00	1500	4.30	1561	1.77
8	Irrigation (Acre Inches, Cost in Rs.)	11.79	5036	10.19	6633	19.50	2465	11.24	5572	6.32
9	Threads (kg)	67.47	4958	72.37	5248	0	0	69	5026	5.7
10	Mulching sheet (Kg)	67.60	5758	99.63	8379	0	0	78	6628	7.52
11	Interest on Variable Cost (15 per cent) (for six months)	8870		9867		6680		8174		9.27
	Sub total		61200		68712		44815		63694	77.51
B) Fixed cost										
1	Depreciation on sticks @ 25%	1633	8028	1482	6267	0	0	1570	7364	8.96
2	Rental Value of Land (Rs/Acre)	-	9097	-	9097	-	9097	-	9097	11.07
3	Land Revenue	-	35	-	35	-	35	-	35	0.04
4	Interest on Fixed Cost (12% for six months)	-	2059	-	1848	-	1096	-	1980	2.40
	SUB TOTAL		19219		17247		10228		18475	22.48
C) Total cost of cultivation (Rs.)										
		80419		85959		55043		82169		100
D) Returns										
1	Yield in ton	15.60		14.90		10.7			15.33	
2	Rate Rs./ton	7850		7830		6200			7800	
	Gross Returns (Rs.)	122460		116667		66340			119574	
	Net Returns (Rs.)	42041		30708		11297			37404	

market channel and processor channel (Figure 1). The processed tomato products are mostly sold as paste to manufacturers of ketchup and sauce. The ketchup and sauce are sold to individuals and bulk consumers (hotels and institutions) in smaller packets. A part of it is also exported. The value chains of tomatoes and tomato products are presented in a systematic way in the value chain map (Figure 1). We have differentiated between the processes in the chain (left side of figure, denoted by black arrows), actors associated with different processes in each channels are denoted separately (rectangle for traditional channel, and oval shape for organised retailers and hexagons for processors. If the processes include more than one function, it is depicted by a larger block arrow. The tomato value chain comprises input suppliers, producers, commission agents, wholesalers, collection centres, central warehouses, vendors, processors, retailers, distributors, exporters and consumers as depicted in Figure 1.

Channel I: Traditional Market Channel: This traditional channel dominates over other channels for fresh tomatoes. The Agricultural Produce Market Committee (APMC) is the platform for this channel and the activities are administered by the concerned authorities of APMC. The chain comprises input suppliers, producers all landholding (size categories of farmers), commission agents, wholesalers, exporters (domestic) and retailers.

Since the volume of produce is more, the competition is high and sale prices are low in this channel, compared to other channels. There is no quality specification, as the whole lot of the farmers put for bidding facilitated by the commission agents. The competition among wholesalers was purely based on the best value proposition to the overall quality of the lot. Usually, prices in this channel are very low during peak season. The post harvest losses are also found to be higher in this channel, as compared to other channels due to wastages at different levels. The transactions takesplace in this channel between producers, commission agent and wholesalers are of informal without invoices or receipts. The minimum quantity for sale in this channel should be a lot. Commission agents usually exercises physical control and negotiates the sale of

goods, and charges eight percent commission on gross returns of growers instead of wholesalers, mainly to favour wholesalers. At times, they also charge commission from wholesalers at varying rates. The majority of the marginal and small farmers sell their produce to these commission agents, against their pre-commitments through availing credit in advance for different purposes.

Usually, wholesalers buy tomatoes from the commission agents, and rarely processors and super marketers also participate in the bidding, as they have good network with other secondary traders (at local and distant market)/ exporters for sale. Majority consumers prefer to purchase tomatoes from this channel due to better quality of the produce as compared to supermarkets and grocery stores where produce stays on the shelf for longer time.

Channel II: Organised Retailers/ Supermarket Channel: The growth of organised retailing in fresh fruits and vegetables initiated in the country since the beginning of the 20th century. Majority of the corporate players have based their offices in Bangaluru as the neighbouring districts such as Bangalore Rural, Kolar, Chikkaballapur and Ramanagar are the hub for sourcing of vegetables from southern part of the country. These organised retail chains have attempted many changes in the supply chain management and established an institutional mechanism for linking farmers with modern markets. This channel is also a main sales channel for tomato-based processed products. The supermarket channel (Channel II) involve minimum actors such as input suppliers, tomato producers, collection centers, central warehouses, wholesalers, tomato processors, retail outlets/ supermarkets and consumers (Figure 1).

During the study, we have come across few of the collection centres in Chikkaballapur and Kolar APMCs. These organised retailers usually source fresh tomatoes directly from registered growers. They also purchase from wholesalers in the market whenever short supply arises for any particular vegetables. These supermarketers also provide technical advice on production and quality aspects of vegetables in general and tomatoes in particular.

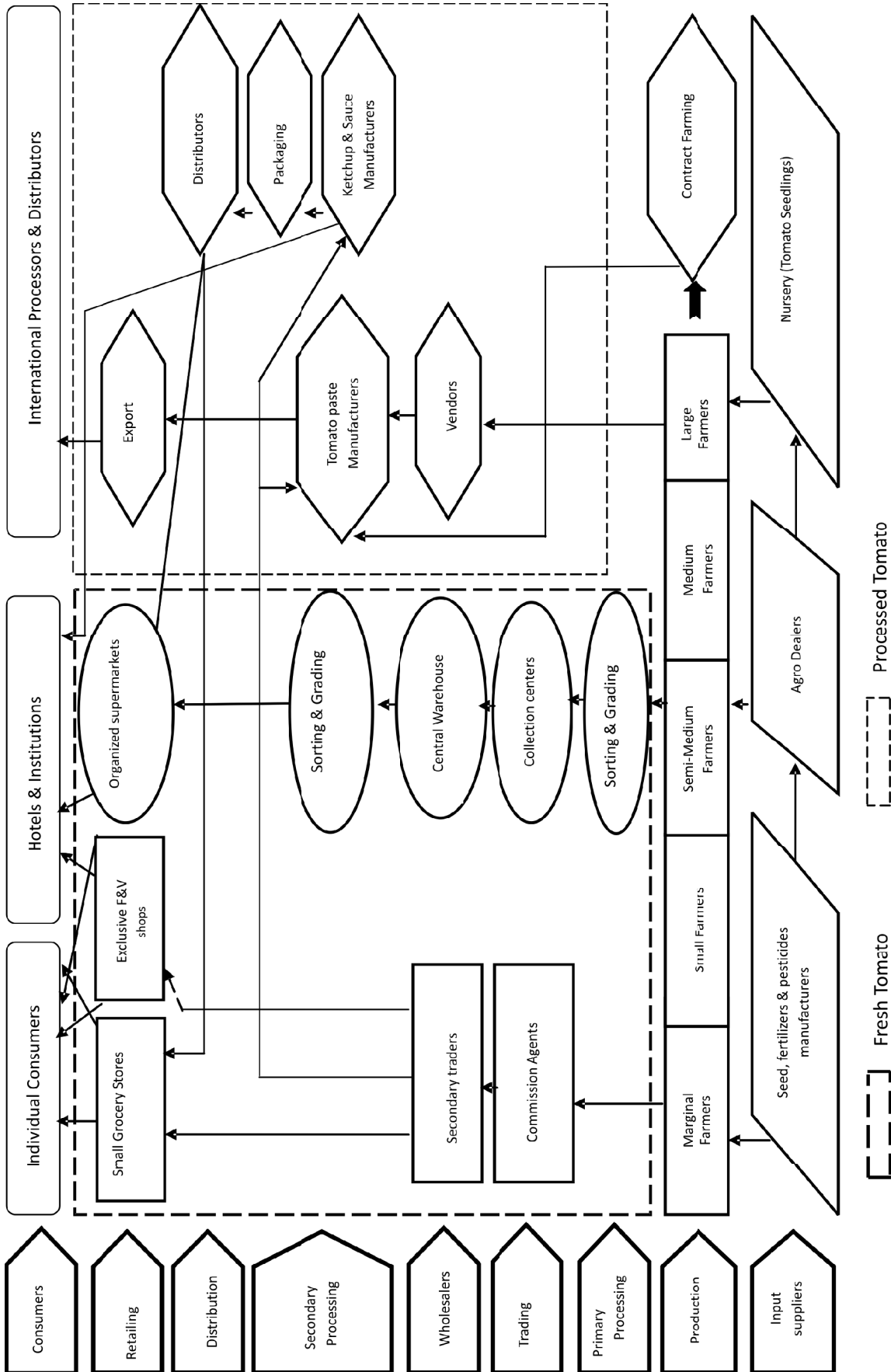


Figure 1: Overall tomato value chain mapping in Karnataka

These retailers looking for consistent supply from these limited number of trusted growers/suppliers. This channel is very meticulous about the quality aspects, and hence, generally, farmers bring sorted and graded produce to these collection centres, but the produce again subjected for sorting and grading in the collection centres under the supervision of quality assessment in-charge. Accordingly, farmers obtain better prices in this channel as compared to other channels.

The produce received from different collection centres was pooled in the central warehouse, graded again and distributed to each outlets (super markets) according to their indents. They also create value on front-end by promising quality, freshness and lower prices of fruits and vegetables besides more conducive shopping environment in their supermarkets. Apart from fruits and vegetables, they also sell processed food products and fast moving consumer goods (FMCGs) in their outlets.

Channel III: Processors Channel: The processors purchase raw tomatoes from three ways namely APMCs/Wholesalers, vendors, and directly from farmers through contract farming. The value chain mapping of the processors channel is shown in Figure 1. The chain comprised of various actors such as input suppliers, farmers, vendors, wholesalers, manufacturers, distributors, retailers, exporters/international market and consumers.

A major problem with these processors is that they source depending on their requirement and thus for this reason farmers do not depend upon them for selling their produce. Generally, they start procuring from markets during peak season during glut situation as they purchase in bulk quantity at a cheaper rate than other two channels. The large scale industries like Mother Dairy had tie-up with farmers for contract farming of tomatoes wherein all categories of farmers have been involved and major portion of raw tomatoes comes from this source. They also procure tomatoes from APMCs whenever need arises. Other tomato processing industries, usually source their raw tomatoes from wholesalers in APMCs especially during glut situation. Sometimes, tomato paste producing industries also depend upon vendors for procurement of tomatoes

from a major production areas. Vendors generally pool tomatoes from various farmers in cluster of villages and supply whenever they receive indents from these processing industries. In the case of ketchup and sauce manufacturers, usually procure paste from tomato paste manufacturers. Only at the time of peak seasons and glut situation in APMCs, they also procure raw tomatoes and processes to tomato paste on their own. Tomato paste manufacturers supply major portion of their product to the secondary processing industries such as ketchup, puree and the rest was exported to international markets.

Level of Integration/Participation by the group of farmers with the value chains

An attempt has been made to understand the farmers integration with the existing value chains in the study area, and their level of profit making through the production and marketing of tomato. The details of the analysis are shown in Table 2. It is revealed from the table that a majority (about 65%) of marginal and small farmers cultivated tomato in the study area as compared to semi-medium and medium (about 35%) and medium farmers (approximately about one percent). The large farmers have not shown much interest in tomato cultivation, as it is a costly and labour intensive affair.

The share of marketed quantity is relatively same (about 48%) with respect of both marginal and small, and semi-medium and medium farmers. This is also true for the reasons that higher operational holdings of the semi-medium and medium farmers and the area under tomato cultivation (2.27 acres/farm household in the case of semi-medium and medium farmers and 1.16 acres/ farm household with respect of marginal and small farmers). Whereas, it is interesting to note that the average productivity found to be higher (150 quintals/acre) in the case of marginal and small farmers as compared to semi-medium and medium farmers (142 quintals/acre). This might be due to the fact that as the marginal and small farmers give much concentration on the activities they do with the limited land, and adopt modern technologies such as staking, mulching, and irrigation systems (drip/

sprinkler) in their production activities in contrast to large farmers (107 quintal/acre). They are efficient than that of semi-medium and medium farmers by means of reducing costs in respect of adopting similar technologies. Consequently, the cost of cultivation is less in the case of marginal and small farmers (Rs. 60,340/- per acre) than semi-medium and medium farmers (Rs. 66,155/- per acre) and large farmers (Rs. 38,135/- per acre).

The results are in-line with the remarks made by Singh *et al.*, (2002) and Amartya Sen (1964). As indicated by Singh *et.al.*, (2002) 'the productivity of

small and marginal farmers is somewhat higher than that of medium and large-size farms and their marketable surpluses are increasing' and Amartya Sen (1964) stated that 'there is a inverse relationship between farm size and productivity. Both the statements found true in the case of tomato farmers in Karnataka.

With regard to channel preference by the farmers, a majority (> 90%) of farmers across categories, preferred traditional channel as a major channel for selling tomatoes as there is no binding or restriction in the channel both in terms of quality

Table 2
Level of integration/participation by the group of farmers with the existing value chains

Group of Farmers	Marginal and Small Farmers	Semi-medium and Medium Farmers	Large Farmers
Share of Farmers (Per cent)	64.67	34.67	0.67
Share of Marketed Quantity (Per cent)	48.69	48.22	3.09
Average Area of Tomato Cultivation (Acres)	1.16	2.27	10
Average Productivity (Quintals/acre)	149.62	142.85	107
Channel Preference (Per cent of farmers)	Channel I	90.38	100
	Channel II	5.77	-
	Channel III	3.84	-
COC (Rs/acre)	60340	66155	38135
Average Income (Rs/Acre)	56905	45443	28205
Average PHL (Rs/Acre)	6327	4829	560

Note: PHL refers to Post Harvest Losses

and quantity. But prices of the produce are comparatively lower in this channel. Therefore, only about five to ten per cent of the marginal and small, and semi-medium and medium categories of farmers opted for other channels, where the prices are relatively better.

There are a few problems associated with the other channels. In the case of super marketers, there are both quantity restrictions and prescribed quality standards, as they can't buy the entire quantity produced by the farmers, and they prefer only A-grade produce. Moreover, quality prescriptions are much higher among super marketers than processors, and accordingly, the prices are superior in the supermarket channel. As a result, only four

per cent of the marginal and small, and about six per cent of the semi-medium and medium farmers sold their produce to supermarkets. Whereas, in respect of processors, they get into purchase only when there is a need and a glut in the market or sudden collapse in prices, hence, farmers cannot depended on them. Nevertheless, about four per cent of the semi-medium and medium, and six per cent of the marginal and small farmers sold tomatoes to processors during the reference period. Fortunately, they got better prices as compared to traditional channel. The advantage with the processors is that there won't be any other costs to the farmers as they go to farmer's field for bulk purchase.

Post harvest costs varies according to the preferred channels. In the case of supermarkets, quality checks were done at each stages of movement of produce from collection centres to till it reaches outlets. Similarly, in the case of processors, they purchase on the spot looking into the quality of the produce. Only in respect of traditional markets, the entire lot is auctioned for a particular price. Accordingly, post harvest losses were found to be least (Rs. 560/- per acre) followed by processors channel (Rs. 4,829/- per acre) and super marketers (Rs. 6,327/- per acre). As a result, marginal and small farmers have achieved higher income (Rs. 56,905/- per acre) than that of semi-medium and medium (Rs. 45,443/- per acre), and large farmers (Rs. 28,205/- per acre).

Marketing costs and efficiencies in tomato value chain

Various intermediaries involved in the transactions of tomato at different stages of value chain marketing system. To understand the different facets of marketing and the price structure as well as efficiency of the system, marketing margins and costs were worked out for actors between producer and consumer in respect of the services rendered and the remuneration received by them.

Few farmers sold their entire produce to the processors during the reference year on directly visiting farmers field, and hence, they have not incurred any cost on marketing. However, they were able to sell their entire lot at a slightly better rate (Rs.789/- per quintal) than the price at Channel I (Rs.778/- per quintal) i.e. traditional market, but which is slightly less than Channel II (super market) (Rs. 883/- per quintal). Nevertheless, it is difficult for the farmers to depend upon processors, as they procure tomatoes only when there is a need. A majority processors, mostly procure tomatoes from markets when there is a glut or price slash in the market, especially during the peak arrival season. Hence, the details of costs per quintal incurred by the sample farmers marketed in Channel I and Channel II are discussed in this paper. The price spread in different tomato value chains are presented in Table 3. The producer's share in

consumers' rupee is comparatively lower in the traditional APMC channel (Channel I) (42.18%) due to various factors such as more number of intermediaries, cost of various market functions rendered by different actors and wastages at each stage.

The producer's share in organized retailers/supermarkets (Channel II) is higher (59.50%) largely due to the absence of some intermediaries, viz. commission agents and wholesalers. However, value addition costs are higher in Channel II due to higher rejections during sorting and grading at various stages (i.e., from the collection centre till it reaches retail outlet). Thus, margin of retailer is low (7.03%) in the organized retailer channel vis-a-vis traditional marketing channel (11.32%), but the consumer's price is less in Channel II. The reasons for lower price at the organized retailers (supermarkets) are due to economies of scale, use of modern technology and efficient business management as compared to small traditional retailers. Overall, producer's share in consumer rupee being highest in Channel II (59.5%) than in Channel I (42.2%). However, Channel II is more farmer-friendly.

The marketing efficiency of fresh tomato under two different value chains have been worked out using Acharya's Modified Method and for the value added products are shown in Table 4, respectively. A perusal of the Table 4 reveals that supermarket channel (Channel II) found to be the efficient channel because of higher (1.46) marketing efficiency as compared to traditional marketing channel (0.72) (Channel I). The low marketing efficiency was observed in traditional marketing channel due to the prevalence of more intermediaries in the chain, indicating the possibility of improving their margins by saving the produce from marketing loss during transit and eliminating market intermediaries. Each stage, they incurred costs as well as margin and hence, both marketing costs and margins suppress the efficiency in traditional channel (Channel I). Moreover, the price of the produce also low in the case of traditional channel because of selling entire lot for the auctioned price.

Table 3
Price spread of tomato value chain in Karnataka (Rs/quintal)

<i>Particulars</i>	<i>Channel I</i>	<i>Channel II</i>	<i>% Difference between Channel I & II</i>
Producer			
Net price received	587.62	743.76	-26.57
Marketing cost	153.19	99.20	35.24
Value added cost	36.91	40.37	-9.37
Total marketing cost	190.11 (13.65)	139.57 (11.17)	26.58
Gross price received	777.73	883.33	-13.58
Wholesaler			
Price paid	777.73	-	-
Traditional marketing cost	174.95	-	-
Value added cost	14.48	-	-
Total marketing cost	189.43 (13.60)	-	-
Marketing margin	104.17 (7.48)	-	-
Price received	1071.33	-	-
Retailer			
Price paid	1071.33	883.33	17.55
Traditional marketing cost	101.39	196.85	-94.15
Value added cost	62.67	82.00	-30.84
Total marketing cost	164.06 (11.78)	278.85 (22.31)	-69.97
Marketing margin	157.71 (11.32)	87.82 (7.03)	44.32
Price received	1393.10	1250.00	10.27
Price paid by the consumer	1393.10 (100.00)	1250.00 (100.00)	10.27
Overall marketing cost	543.60	418.42	23.03
Overall marketing margin	261.88	87.82	66.47
Price spread	805.48 (57.81)	506.24 (40.50)	0.37
Producer share in consumer's rupee (per cent)	42.18	59.50	-41.06

Note: Figures in parentheses are percentages to consumer price

Table 4
Marketing efficiency for per quintal of tomato under different channels
(Rs/quintal)

<i>Sl. No.</i>	<i>Particulars</i>	<i>Traditional channel</i>	<i>Super market channel</i>
i.	Consumers' purchase price	1393.1	1250
ii.	Producers' sale price	777.73	883.33
iii.	Total marketing costs(MC)	543.60	418.42
iv.	Total margins of intermediaries(MM)	261.88	87.82
v.	Net price received by farmer	587.62	743.76
vi.	Marketing efficiency (5/(3+4))	0.72	1.46

It is noticed during the survey that tomato paste is the source for ketchup and sauce industries. A majority of these industries purchase tomato paste from paste manufacturing industries and rarely procure fresh tomatoes and process into paste. In general, tomato paste industries of bigger size (in terms of volume), manufacture paste alone in bulk and sell, they hardly process into other subsidiary products.

The marketing efficiency of value added products of tomato are estimated and presented in Table 4. The table reveals that per quintal raw tomato processing into other products. Hence,

procurement cost included loading, unloading and transportation cost of raw material and it is worked out to Rs.125 per quintal of tomato. Few cases, the processors of ketchup and sauce also purchase paste as a raw material from paste manufacturers and it is directly deliver to their door steps. In such cases, the question of marketing costs may not arise. The analysis revealed that the total marketing cost of tomato sauce was found to be higher compared to other products ketchup and paste. Marketing efficiency of ketchup was high (1.88) followed by the sauce (0.67) and paste (0.25). Thus it was concluded that the production of ketchup and sauce are profitable than manufacturing of tomato paste alone.

Table 5
Marketing efficiency of value added products in tomato value chain

		(Rs/Quintal)		
Sl. No	Particulars	Tomato Paste	Ketchup	Sauce
1	Procurement Cost	125	125	125
2	Value added or Processing cost	176	575	644
3	Total marketing cost	301	700	769
4	Profit margin	74	1316	518
5	Value addition cost	375	2016	1287
6	Marketing efficiency	0.25	1.88	0.67

CONCLUSIONS AND POLICY SUGGESTIONS

In recent years, the value chain of perishables has gained more prominence due to increased demand for processed food, rising disposable income, urbanization, changing lifestyle, increasing expenditure on health and nutritional foods in India. The growth in value chain has also spurred with the supply side advantages such as diverse agro-climatic conditions, abundant resources and cost competitiveness. The improvement in the value chain activities of tomatoes resulted in promoting efficiency in the tomatoes marketing systems, thereby benefited actors involved in the emerging value chains. This study focused on mainly the role of small farmers in the tomato value chains in Karnataka. The study revealed that marginal and small farmers are more advanced and efficient in terms of input usages under tomato production, and

hence, they could able to incur less costs and make higher profits than the other categories of farmers.

Their involvement in the value chain is better than that of large farmers. Although, they have not involved in the secondary processing activities, they started following primary processing activities such as washing, grading and standardisation. They have been associated with the modern retailers (super markets) for selling their high quality produces at slightly better prices by shunning middlemen in the traditional marketing. The study also observed that there is a higher marketing efficiency in the case of value added products. The production of ketchup and sauce are profitable than manufacturing of tomato paste alone.

Since, a majority farmers are marginal and small in the study region, there is a need for creating awareness to the farming community about the advantages of growing tomatoes in greenhouses, adoption of other modern technologies, methods to increase yield, and prolong season. There is an opportunity/scope for higher value added activities in the study region. Hence, government need to create a favourable environment for the investors by encouraging small scale enterprises. As the organised retailers/ super marketers are not able to handle higher quantities with the limited capacity, there is a need to provide better support and encourage them to source higher quantities from farmers directly including contract farming. Provisions should be made to take up secondary processing activities.

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