

## Value Chain Analysis of Turmeric in Southern Karnataka

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### ABSTRACT

The present study is an attempt to assess the economics of production, farm level processing and to identify and evaluate the different marketing channels which are involved in the marketing of turmeric in Southern Karnataka. For the study, 96 farmers practicing the cultivation of turmeric in both Chamarajanagar and Mysuru district were selected randomly. The data collected from the respondents was analysed using budgeting technique. The estimated per acre cost of cultivation was more in the case of Chamarajanagar district than that of Mysuru district. The gross returns and total marketing costs were also found higher in the case of Chamarajanagar district. The B : C ratio was found to be profitable in both the districts. With respect of marketing cost incurred by the market intermediaries, it was more in the case of retailers. Results of the marketing efficiency showed that, channel-III was the most efficient marketing channel among all other channels, thus selling of turmeric to the processors through commission agents / traders was said to be an efficient marketing channel.

*Keywords* : Economics, Farm level processing, Marketing channels, Market efficiency, Value chain in turmeric

INDIA is popularly known as the 'Spice Bowl of the World' as a wide variety of spices with premium quality are grown in the country since ancient times. In Vedas, as early as 6000 BC, scruples evidences are available regarding various spices, their properties and utility. Among the commodities that were traded during that period, spices occupied a major portion due to their superior quality and diversity which attracted foreigners to India (Angles *et al.*, 2011). Turmeric is also called as Golden Spice - is widely cultivated in different countries such as India, China, Myanmar, Nigeria, Bangladesh, Pakistan, Sri Lanka, Taiwan, Burma, Indonesia, etc., Among these countries, India occupies first position in both area (295 thousand hectares) and production (1102 thousand tonnes) of turmeric during 2020-21 (Anonymous, 2021). In India, turmeric is grown in 18 states and Telangana, Maharashtra, Tamil Nadu, Karnataka, Orissa and West Bengal are the major turmeric-producing states. Karnataka is the third largest producer of turmeric in India after Telangana and Maharashtra with an area of 21496 ha and with production of 130928 tonnes in 2020-21. In Karnataka, the major districts which are producing turmeric are Belagavi, Chamarajanagar, Bagalkote, Mysuru and Bidar. Belagavi is the leading

district with an area of about 8888 ha with a production of 57461 tonnes followed by Chamarajanagar (9587 ha and 56122 tonnes), Bagalkote (4549 ha and 26816 tonnes) and Mysuru (2345 ha and 8794 tonnes) (Anonymous, 2018-19). It is widely grown and consumed spice in the world and has got good international market. Over the years prices of turmeric show considerable volatility that could pose profit risk to different stakeholders. Since large group of market participants are engaged in different activity in the entire value chain of turmeric right from production to its consumption and due to high marketing cost involved in the marketing, it reinforces the need for risk management tool. Keeping in view the above points, present study is a modest attempt to analyse the production, farm level processing and marketing of turmeric in Southern Karnataka. The study will help the planners and policy makers to frame appropriate policies related to the turmeric production and marketing.

### METHODOLOGY

Multi-stage sampling technique was employed for selection of districts, taluks and villages. For the present study, Southern Karnataka was selected purposively

and Chamarajanagar and Mysuru districts were selected for the study since both the districts are having highest area under turmeric in Southern Karnataka. In the second stage two taluks from each district were selected based on the highest area under turmeric. Thus Chamarajanagar and Gundlupet taluks in Chamarajanagar district and H. D. Kote and Hunsur in Mysuru district were topped the list and were selected for the study. In the third stage two villages from each taluk were selected again based on the area under turmeric. For the selection of sample farmers, random sampling method was adopted and from each village twelve farmers practicing the cultivation of turmeric were selected randomly, thus the total sample size of the respondents was 96. For the selection of market intermediaries purposive sampling technique was adopted *i.e.*, Chamarajanagar, Gundlupet and Kollegal markets were selected as the majority of the turmeric growers of the region were used to sell their produce in these markets. For studying the marketing aspects of turmeric five retailers, five wholesalers and five commission agents / traders were selected randomly from each market and thus the total sample size of the market intermediaries was 45.

The collected data is presented in tabular form to facilitate easy comparisons. The budgeting technique was employed for estimating the cost and return structure and tabular presentation technique was employed to analyse the marketing cost and margins under different channels of turmeric marketing, the data were summarized with the aid of statistical tools like averages and percentages to obtain the meaningful results. To analyse the producer's share in the consumer's rupee and marketing efficiency following formulas were used, Producer's net price (PNP) expressed as a percentage of the retail price (RP) is defined as producer's share in the consumer's rupee.

$$PSCR = (PNP / RP) \times 100$$

The marketing efficiency was estimated by using Shephard's formula (Shepherd, 1965),  $ME = (V/I) - 1$  Where, ME is index of marketing efficiency, V is consumer price and I is total marketing cost.

## RESULTS AND DISCUSSION

The details of per acre cost of cultivation of turmeric in both the districts is presented in the Table 1. Perusal of the table indicated that, in both the districts variable costs accounted for a major share in the total cost of cultivation. The variable costs mainly comprised of cost of human labour, bullock labour, planting material, FYM, fertilizers and plant protection chemicals. The main focus of the study was to know, whether there is any difference between the cultivation of turmeric in both the sample districts that too with respect to cost.

It is evident from the table that, per acre average cost of cultivation of turmeric was high in the case of Chamarajanagar district (Rs.77263) than Mysuru district (Rs.76985) and the difference was very meagre. In that, the total variable cost was Rs.72956, Rs.72564, respectively, among the variable costs, cost of planting material, cost of human labour and cost of FYM were the major items in both the districts. The expenditure on the planting material found to be an important item in the total cost of cultivation of turmeric since seed material had to be properly processed by way of seed treatment (Mane *et al.*, 2011). The cost on seed material can be reduced if the farmers would have known the technique of preserving their own seed material in better way. As turmeric is vegetatively propagated crop, the healthy mother rhizomes can be used for planting in the next season by proper treatment and preservation. The growers expressed their fear about decreasing crop stand and gradual decreased in yield, year after year. The turmeric is more labour intensive crop which requires semi-skilled labour from planting to till harvesting and also the farmers used more quantity of FYM to improve the soil fertility and to get more yield since there is a better spread of younger rhizomes in the fertile soils, which the farmers aware of (Kerutagi *et al.*, 2000). The cost involved in the usage of human labour was high in the case of Mysuru district (Rs.18065) than that of Chamarajanagar district (Rs.16017) due to more wage rate prevailing in the Mysuru district. The results of the study are in line with the study conducted by Patil (2000) and Dodke (2002).

TABLE 1  
Cost of cultivation of turmeric in Chamarajanagar and Mysuru (Rs./acre)

Particulars	Districts			
	Chamarajanagar	Per cent	Mysuru	Per cent
<i>I. Variable cost</i>				
Human labour	16017	20.73	18065	23.47
Bullock labour	1389	1.80	1848	2.40
Machine labour	5354	6.93	5758	7.48
Planting material	29439	38.10	29123	37.83
Farm yard manure	10165	13.16	7720	10.03
Fertilizers	1980	2.56	1961	2.55
PPC	3209	4.15	2715	3.53
Interest on working capital	5404	6.99	5375	6.98
Sub-total (I)	72956	94.43	72564	94.26
<i>II. Fixed cost</i>				
Rental value of land	3000	3.88	3060	3.97
Land revenue	14	0.02	15	0.02
Depreciation	866	1.12	907	1.18
Interest on fixed capital	427	0.55	438	0.57
Sub-total (II)	4307	5.57	4420	5.74
Total cost of cultivation (I)+ (II)	77263	100.00	76985	100.00

Among the items of fixed costs, the rental value of land had a maximum share in the total cost of cultivation followed by depreciation charges, interest on fixed capital and land revenue in case of both the districts. The findings of the study are in line with Gupta and Sharma (2009) in the cultivation of ginger in Himachal Pradesh.

Harvesting of turmeric is carried out during January to March since the temperature during summer season helps in curing the crop. The curing percentage of turmeric was 20 to 22 per cent in the study area. The turmeric crop is harvested in the form of wet rhizomes which are not used for the direct consumption. It needs certain kind of farm level processing. Farm level processing starts from separation of fingers from rhizomes. It consists of curing, drying and polishing of cooked fingers. The detailed per acre cost of farm level processing of turmeric is presented in Table 2.

It is evident from the table that, the total cost of farm level processing of turmeric in Chamarajanagar district

was Rs.11003 per acre. For curing of turmeric the cost of human labour was Rs.1383 and cost of machine labour was Rs.3264, drying operation required Rs.1181

TABLE 2  
Cost of farm level processing of turmeric in selected districts (Rs./acre)

Particulars	Districts	
	Chamarajanagar	Mysuru
<i>Curing</i>		
Human labour	1383	1607
Machine labour	3264	3277
Wood	-	1073
<i>Drying</i>		
Human labour	1181	1367
Utensils	524	417
<i>Polishing</i>		
Human labour	1726	1777
Machine labour	2925	2221
Total	11003	11739

for human labour and Rs.524 for the purchase of utensils *i.e.*, sarees and nets and for the polishing of turmeric Rs.1726 for human labour and Rs.2925 for machine labour were required. In the case of Mysuru district, the total cost of farm level processing of turmeric was Rs.11739 per acre. In that the cost of curing operation was Rs.1607 for human labour, Rs.3277 for machine labour and Rs.1073 for the purchase of wood for fuel purpose. About Rs.1367 of human labour and Rs.417 for the purchase of utensils was required while drying of cooked rhizomes and in case of polishing Rs.1777 of human labour and Rs.2221 of machine labour was used.

The total cost of farm level processing of turmeric was found to be high in the case of Mysuru district (Rs.11739) than Chamarajanagar district, this marginal difference was mainly due to the difference cost of fuel wood utilised in the curing of turmeric. For fuel to cook the rhizomes farmers used vegetative waste from mulberry sticks, dried coconut leaves, sugarcane thrash, cotton sticks available on the farm and some of the sample farmers purchased the fuel wood for boiling purpose from other sources that is about 2.5 to 3 quintal of fuel wood was required to cook one acre rhizomes. It was noticed that the cost incurred by the sample farmers on fuel wood was more in the case of Mysuru district (Rs.1073) this was mainly because majority of the farmers in the district purchased the wood from outside and in the case of Chamarajanagar district none of the sample farmers purchased the wood from outside market, they utilized dried vegetative parts available in their farms. In the study area, for curing operation the sample farmers incurred more cost on machine labour which was more in the case of Mysuru district. It was noticed that in the study area, majority of the farmers were practicing the scientific method and TNAU (Tamil Nadu Agricultural University) method for curing of turmeric as these methods required considerably less time as compared to the traditional method and moreover, these improved techniques also helped in perfect boiling of turmeric which turn influenced the colour and aroma of the final product.

The cooked fingers are dried in the sun by spreading them in five to seven cm thick layers on low quality sarees or drying floor. A thinner layer is not desirable, as the colour of the dried product may be adversely affected. During night time, the rhizomes were heaped or covered with material which provides aeration. It may take 10-15 days for the rhizomes to become completely dry. In drying operation farmers incurred more cost on human labour as it is 10-15 days process and to some extent on purchase of sarees and drying nets which are required for drying mainly low quality sarees and drying nets, these sarees costs around 8 to 10 each and around 100 to 120 sarees were required to dry one acre of cooked rhizomes.

Dried turmeric has a poor appearance and a rough dull outer surface with scales and root bits. The appearance is improved by smoothening and polishing the outer surface by mechanical rubbing. In the study area the dried turmeric are polished on the farm by hiring a power/manual operated rotary drum. The cost of hiring of machine for polishing of turmeric was high in the case of Chamarajanagar district; this was mainly due to difference in the hiring charges of the machines. Similar results were obtained by Lokesh and Chandrakanth (2004) in their study which was conducted in Karnataka.

The details of per acre costs and returns structure in turmeric production in the selected districts are presented in Table 3. Perusal of the table revealed that, the total cost of cultivation was found high in the case of Chamarajanagar district (Rs.77263) than that of Mysuru district, cost of processing was found high in the case of Mysuru district (Rs.11739) than Chamarajanagar district whereas, the total cost of marketing was found in the case of Chamarajanagar district (Rs.8273). The gross returns obtained from both main produce (fingers) and By-produce (mother rhizomes which are usually kept as seed materials) were high in the case of Chamarajanagar district (Rs.195049) than that of Mysuru district (Rs.191909). The B : C ratio was found to be profitable in both the districts. In spite of huge variable costs involved in turmeric cultivation, returns were quite good which can further be increased by efficient management of

TABLE 3  
Cost and returns profile of turmeric production in selected districts

Particulars	Unit	Districts	
		Chamarajanagar	Mysuru
Total Cost of cultivation	(Rs./acre)	77263	76985
Total cost of processing	(Rs./acre)	11003	11739
Total cost of marketing	(Rs./acre)	8273	8011
Price	(Rs./qtl)	5300	5262
Returns from main produce	(Rs./acre)	141383	141790
Returns from the by-produce	(Rs./acre)	53666	51384
Gross returns	(Rs./acre)	195049	191909
Net return	(Rs./acre)	98511	95174
B:C ratio	(Rs./acre)	2.02	1.98

the farm. The findings of the above analysis are in line with the results of Singh *et al.* (2012), Patil *et al.* (2009), Sagar and Gaddi (2021) and Patil *et al.* (2004).

In the marketing of turmeric three main marketing channels were identified in the study area and they were,

- i) Producer → Commission agents/traders → Wholesalers → Retailers → Consumer
- ii) Producer → Distant market commission agents / traders and
- iii) Producer → Commission agents/traders → Processors (Powder making units)

In the first channel the producers himself bring the produce to the market place and sells through commission agents. 79.17 per cent farmers in Chamarajanagar and 78.87 per cent farmers in Mysore district. Whereas, in second channel, the producers sold the produce in the distant market that is, Erode market of Tamil Nadu in both the districts. In these districts, 6 (12.50 %) farmers in Chamarajanagar and 13 farmers (27.08 %) in Mysore district sold their produce through this channel as they felt that in Erode market they could able to get better price and also opined that, the commission agents will provide supply of planting material and other inputs on credit basis. Similar to first channel, in third channel the producers brought the produce to the commission agents, through

which it reached the processors (powder making units). In the case of Chamarajanagar district, 4 farmers (8.33 %) and 6 farmers (12.50 %) in Mysore district sold their produce through this channel.

Per quintal cost incurred by sample farmers in marketing of the turmeric through channel-I, II and III has been narrated in Table 4. The marketing cost incurred varied from market to market and channel to channel. Similar kind of marketing channels were identified by Agarwal and Singh (2003), Tripathi *et al.* (2006) and Basavaraj (2007) in case of Cumin, Ginger and Chilli, respectively in their studies.

The table revealed that, per quintal marketing cost incurred by the sample farmers in channel-I was same in case of both the districts ( Rs.343). The only major differentiating cost item between the two districts was transportation cost and it was more in the case of Mysuru district (Rs.56) than Chamarajanagar district (Rs.41). Since the turmeric growers of Mysuru district used to sell their produce in Chamarajanagar district markets *viz.*, Chamarajanagar and Kollegal markets due to absence of large number of turmeric traders in Mysuru market. Suman *et al.* (2019) found the similar results in the marketing of crossandra.

The total marketing cost incurred by the sample farmers in channel-II was Rs.479 per quintal and Rs.448 per quintal in case of Chamarajanagar and

TABLE 4  
Marketing cost incurred by the farmers in different channels (Rs./qtl.)

Item of Cost	Districts			
	Chamarajanagar		Mysuru	
	Amount (Rs.)	Per cent	Amount (Rs.)	Per cent
<i>Producer – Commission agents/traders (Channel-I and Channel-III)</i>				
Cleaning/sorting	49	14.30	47	13.83
Packing	43	12.39	38	11.17
Transportation	41	12.00	56	16.36
Weighment	7	2.04	7	2.06
Commission charges	164	47.80	162	47.31
Storage	8	2.38	-	-
Loading and unloading	22	6.37	22	6.39
Miscellaneous	9	2.65	10	2.94
Total	343	100	343	100
<i>Producer – Distant market commission agents/traders (Channel-II)</i>				
Cleaning/sorting	43	8.98	41	9.15
Packing	40	8.35	37	8.26
Transportation	110	22.96	128	28.57
Weighment	5	1.04	5	1.12
Commission charges	148	30.90	158	35.27
Storage	91	19.00	42	9.38
Loading and unloading	27	5.64	24	5.36
Miscellaneous	15	3.13	13	2.90
Total	479	100	448	100

Mysuru districts, respectively. This channel was seen mainly because some segment of the sample farmers sold their produce in Erode market of Tamil Nadu state. They felt that in Erode market they could able to get better price for their produce and also opined that, the commission agents/traders of Erode market supplied planting material and other inputs to the farmers on credit basis. It could be seen from the table that, the total marketing cost incurred by the sample farmers was high in the case of Chamarajanagar district (Rs. 479/quintal). This marginal difference was due to difference in the storage charges, as the Chamarajanagar district farmers kept their produce with commission agents/traders for longer time than that of Mysuru district farmers due to lower price for their produce in the local markets. The other major

cost items included in the total marketing cost were, commission charges and transportation charges.

The total marketing costs incurred by the commission agents / traders were more in the case of Chamarajanagar district (Rs.304/quintal) than Mysuru district (Table 5). The major cost items were storage loss, tax and packing charges. The storage loss accounts more in the total cost as the commission agents / traders will lose 2 - 3 per cent of the produce while handling the produce as opined by the commission agents / traders.

The total marketing cost of both wholesalers (Rs.342) and retailers (Rs.352) was more in the case of Mysuru district than Chamarajanagaar district (Tables 7 and 8). In general the marketing costs incurred by market

TABLE 5  
Marketing cost incurred by the commission agents/traders in the selected districts (Rs./qtl.)

Item of Cost	Districts			
	Chamarajanagar		Mysuru	
	Amount (Rs.)	Per cent	Amount (Rs.)	Per cent
Packing	42	13.82	46	15.59
Market fee	14	4.61	14	4.75
Tax	68	22.37	68	23.05
Storage loss	123	40.46	108	36.61
Labour cost	15	4.93	17	5.76
Shop rent	13	4.28	12	4.07
Miscellaneous cost	29	9.54	30	10.17
Total cost	304	100	295	100

functionaries varied between the different selected markets among different types of market functionaries. As per the regulated market rules, the purchaser had to pay 1 - 2 per cent of the value of produce as tax and market fee in the case of all the selected markets. The minor differences observed between the markets were mainly due to variation in arrivals and prices. The other cost components were loading and unloading, shop rent, miscellaneous expenses and these were also fixed by the respective market committees. In case of all the intermediaries, cost of storage loss was accounted for major share in the total marketing cost since there was the problem of non-availability of

scientific storage facility in the Chamarajanagar district markets.

Marketing margins and their components under different channels of marketing have been presented in Table 8. Marketing margins measured the gap between the net price received by the producer and the ultimate price paid by the consumer. From the view point of marketing efficiency, this gap has to be reduced to the minimum. In order to protect the actual producer, a simultaneous effort has to be made to cut the costs incurred by farmers and reduce the profit margins of the market intermediaries which actually broaden the

TABLE 6  
Marketing cost incurred by the wholesalers in the selected districts (Rs./qtl.)

Item of Cost	Districts			
	Chamarajanagar		Mysuru	
	Amount (Rs.)	Per cent	Amount (Rs.)	Per cent
Packing	41	12.54	40	11.70
Market fee	17	5.20	17	4.97
Tax	74	22.63	76	22.22
Storage loss	135	41.28	144	42.11
Labour cost	16	4.89	20	5.85
Shop rent	18	5.50	16	4.68
Miscellaneous cost	26	7.95	29	8.48
Total cost	327	100	342	100

TABLE 7  
Marketing cost incurred by the retailers in the selected districts (Rs./qtl.)

Item of Cost	Districts			
	Chamarajanagar		Mysuru	
	Amount (Rs.)	Per cent	Amount (Rs.)	Per cent
Packing	40	11.83	42	11.81
Transportation	30	8.88	32	9.11
Loading and unloading	20	5.92	20	5.68
Storage loss	222	65.68	227	64.45
Municipality charges	8	2.37	9	2.65
Miscellaneous cost	18	5.33	22	6.20
Total cost	338	100	352	100

gap between the net price received by farmer and ultimate price paid by the consumer. The marketing margins differed from market to market and from channel to channel.

A clear perusal of the table revealed that the producer's share in consumer / processor rupee was more in channel-III than channel-I due to presence of more number of additional market intermediaries in the channel-I. Producer's share in processors purchase price was fairly better in both the districts under channel-III *i.e.*, highest was observed in Chamarajanagar district (75.89 %) than Mysuru district (74.34 %) and similarly in the case of channel-I also. The producer's share in consumer rupee was estimated only with respect to first and third channels, since in case of second channel the farmers sold their produce to the distant market commission agents (Erode, Tamil Nadu) and it was not possible to trace the channel further.

The marketing efficiency of different channels of turmeric has been worked out by Shephard's formula and it is shown in the same table. A perusal of the table revealed that channel III was the most efficient marketing channel as efficiency index was high in both the districts than that of channel-I. The index was found high in the case of Mysuru district in both the channels. Thus selling of turmeric to the processors through commission agents / traders is said to be efficient

marketing channel. Prabhavathi *et al.* (2013) also concluded in their study that, Producer → Processors channel was more efficient in the marketing of Red Chillies in Andhra Pradesh as in this channel more value goods were delivered to consumer from producer at low marketing costs. The results of the study on far with the findings of Tripathi *et al.* (2006) where Producers → Small traders → Commission agents → Retailers → Consumers was found to be the efficient channel in the marketing of ginger in Meghalaya since in that channel the producers bring the produce to local market and sold to small traders who come from the secondary markets and also due to trading of small quantity they incurred less marketing cost and Singh *et al.* (2012) identified the marketing channels for turmeric in Punjab, they found that Producer–Processor–Consumer has been found to be the major marketing channel by which nearly 72 per cent of the turmeric is sold. In that channel, the relative share of net price received by producer in the consumer rupee has been found as 15.46 per cent, while net margin of processor has been noted as 34.10 per cent. Similar results were obtained by Ganapathy *et al.* (2014) in their study.

In spite of huge variable costs involved in turmeric cultivation, returns were quite good and hence, the farmers need to be encouraged to take up the cultivation of this crop in large areas with a provision of financial assistance by the institutional agencies at

TABLE 8

Costs and margins in different channels of turmeric marketing in Southern Karnataka (Rs./qtl.)

Particulars	Districts	
	Chamarajanagar	Mysuru
<i>Channel –I</i>		
Gross Price received by the producer	5466	5409
Marketing cost of producer	343	343
Net price received by producer	5123	5066
Cost incurred by the commission agent	304	295
Profit of the commission agent	982	1111
Price paid by the wholesaler	6750	6815
Cost incurred by the wholesaler	327	342
Profit of the wholesaler	308	405
Price paid by the retailer	7385	7562
Cost of the retailer	338	352
Profit of the retailer	601	594
Consumer purchase price	8325	8508
Marketing Margin/price spread	2860	3098
Producer's share in consumer rupee (%)	61.53	59.55
Marketing efficiency	5.35	5.39
<i>Channel –III</i>		
Net price received by producer	5123	5066
Marketing cost of producer	343	343
Price paid by the commission agent	5466	5409
Cost incurred by the commission agent	304	295
Price paid by the processor	6750	6815
Producer's share in processors rupee (%)	75.89	74.34
Marketing efficiency	9.44	9.68

subsidized rate of interest. Producer's share in consumer / processor rupee was more in channel-III and thus there is a need to develop processing industry in the production area to enable the farmers to get remunerative price for their produce in the local vicinity. The government may also take up the serious steps to encourage both farmers and traders for trading of the commodity in the local regulated markets by providing the infrastructural facility such as scientific storage

and transport facilities besides disseminating information on international markets, price behavior and other trade matters.

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