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An inquest on strategic fit of market dynamics among value chains - Case of capsicum in Champawat district of Uttarakhand

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ABSTRACT

Value chain analysis for the strategic precision in market research has gained momentum during the last decades in all sectors like health, industry, education, agriculture etc. In agriculture it is very important to analyse the value chains to get substantial benefits to the farmers and esteemed satisfaction to the consumers as a single commodity value chain may show temporal and territorial variations in actors and activities involved in it. An exploratory value chain analysis of capsicum was undertaken in this study by considering the paucity of such work in this off season vegetable. Value chain mapping revealed the existence of two distinct value chains (C1: Producer-Consumer; C2: Producer-Wholesaler-Retailer- consumer) with different market functionalities for the capsicum. Marketing efficiency was found as 1.33 in C1 and 1.24 in C2 indicating the reduced efficiency of C2. Producer share in consumer price in terms of net margin was found 68.5 and 27.3%, respectively in C1 and C2. Value chain analysis revealed that maximum margin was obtained for the retailers (779Rs/q) among the different marketing agents.

Key words: *Capsicum annuum*, incremental B:C ratio, marketing efficiency, mapping, value chain.

INTRODUCTION

The notion of value chain development has gained more and more admiration in the economic development activities prevailing in all sectors including agriculture (FAO, 6). This is mainly because of that it has the invisible ladder to reduce the economic inequality by improvement, through perfection by adjustment in the market access and income of all actors along the chain. In the current context of sluggish progress in farmers income enhancement, domain of agriculture has need to make revelation from the concept of mere cultivation and production of crops to its marketing after the value creation and its enhancement (Anjani Kumar *et al*., 2). Degree of success and failure of the farmers are now gauged on the ground of their ability to take right decision at right time on where to sell, how to sell, what logistics to utilize for selling and the issues related to value creation. Thus, the entire value chain represents specific type of actions from farm to fork becomes pertinent in current agricultural situation (Kristen Lowitt *et al.,* 8). This argument hold more validity to the horticultural crops like fruits, commercial vegetables and off-seasons vegetables in which no formal system of marketing network prevails in many of the state. Rapid and urbanised population growth and increased amount of liquid cash especially in vicinity of cities created an increased market demand for horticultural products especially vegetables, as consumers seek to diversify their diets (Pepijn *et al*., 13). The increased demand coupled with the relatively greater degree of perishability of horticultural produce as compared to cereals give ample reason to evolve the effective value chain for maximizing farmers' profitability in this area.

Capsicum, one exotic vegetable among the nightshade family *Solanaceae* earned a promising position in the vegetable market, among the different vegetables demanded in an increased quantum by the people. It is a well known spicy vegetable in food and feed industries for its colour and flavours (Mekdes *et al*., 10) and is commonly known as Red Pepper, Sweet pepper or Hot Pepper (Narayana Swamy *et al.,* 12). It is identified as the most vital vegetable in the world after tomatoes, due to its high nutritional values and rich content of different vitamins like A, E and C (Mekdes *et al.,* 11). Along with the medicinal properties and its unique blending capacity of taste in culinary food preparations has created entice from the researchers for different breeding programmes, farmers for cultivation, vegetable sellers for getting better markets and the food industry to make flavoursome products. Even though it has identified with huge potential in making impacts on national economy through

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its export, from the production to the final stage of its logistic so many imperfections are associated with it like low price, poor market information and infrastructural problems (storage, transport and processing) at the producer level and seasonal skyrocketing price for vegetable capsicum and its confectionery products at the consumer level etc. (Reshma *et al.,* 15; Sharangi and Acharya, 16). Nevertheless the production of capsicum is constrained by various situational and climatic factors; a growing trend has been seen in area under capsicum cultivation and number of people who have engaged in its production to consumption levels. The scenario, therefore, emanates to analyse several issues like what invention and value chain dynamics are prevail in the production, marketing and consumption pockets of capsicum, what types of values (quality, time and place values) have been created by different actors and with what economic efficiency, which channels are operating at what efficiency level, what are the facilitating and hindering factors for the effective value chain etc.. This study, therefore, was conducted with the purpose of investigating the market dynamics, the value chains and its performance and factors affecting the supply of products to the market and final consumers in the case of capsicum to reduce the information gap, to work better understanding on strategies to upscale it or develop some alternative forms to reap maximum monitory benefits to the farmers and product satisfaction to the consumers.

MATERIALS AND METHODS

Greenhouse farming technologies made a production boost for the capsicum in northern part of India. Among the capsicum cultivating states in India, Uttarakhand is the one with 13.77 metric tonne of capsicum production and contributing about 4.77 per cent of total production (APEDA, 3). Though it is a leading state in the capsicum cultivation, the value chain analysis in the capsicum is a virgin area for the state. Based on the need of the hour and priority the Uttarakhand state was selected purposively for the comparative analysis of different value chain of the capsicum under this epistemological research work. Since this work amid for extruding factors to reveal possible relationships by observing existing conditions, a descriptive and diagnostic analysis endorsed with *ex-post facto* research design (Kerlinger and Rint, 7) was followed for this study. Champawat district was sampled purposively for making the sample frame. A total of 80 farmers, 10 whole sellers and 20 retailers from the sampling frame were selected from 8 different villages for the research investigation. Primary data on the different variables considered for the measurement purpose were collected from farmer producers, traders, middlemen and development department personnel by devising a well structured interview schedule and focused group discussions. For data triangulation and validity checking selected PRA tools were also employed. Overall and in particular analysis with standard procedures was carried out to enumerate various factors of marketing dynamics and value chain performance like price spread, benefit cost ratio etc. among different identified value chains prevailing in the study area. Marketing efficiency of the different value chains of capsicum has been estimated with Acharya's marketing efficiency index (MEI) (Acharya and Agarwal, 1).

$$MEI = \frac{\text{Net price received by farmer}}{TMM + TMC}$$

Where, MEI = Marketing Efficiency Index; TMM = Total Marketing Margin; TMC = Total Marketing Cost.

Incremental B:C ratio (Kuo-Lung *et al*., 9) was employed for analysing the profitability of the additional actors along the identified value chains. For this approach, the benefits and costs considered for each value chains are not the totals, but rather the additional benefits achieved and costs incurred over the next stage of action were considered to get valid conclusion. This analysis considers, in effect, whether an investment necessary to achieve the next incremental step in the value chain can be justified in terms of the incremental benefits that would be achieved through the value creation. Formula used for finding the incremental BC Ratio as follows;

Incremental BCR = $(\Sigma B1 - \Sigma B2) / (\Sigma C1 - \Sigma C2)$

Where: $\Sigma B1$ = total benefits for agent 1; $\Sigma C1$ = total costs for agent 1; $\Sigma B2$ = total benefits for agent 2; $\Sigma C2$ = total cost for agent 2

Value chain mapping (FAO, 5), constituting a visual illustration of the connection between different agents in the particular marketing channel as well as the other channels of selection has been carried out to get a clear picture of the effect of interconnections in marketing decision making. For all the analysis the price prevailed in the project area and marketing locations during period of investigation was obtained and compared. Suitable descriptive statistical tools and techniques using MS excel software were carried out to draw meaningful conclusions from the collected data.

RESULTS AND DISCUSSION

Estimation of the market dynamic of the capsicum was started with analysis of the cost and benefits at the farm level. The average cost of production of capsicum in the study area was computed as Rs. 76,770/ha (Table 1). The maximum cost incurred

Table 1. Average Cost of production (Rs/ha) Capsicum (N = 80).

Cost component	Amount (Rs/ha)	% share
Labour incurred	9870	12.85
Machinery charges	10500	13.68
Seed for cultivation	21500	28.01
Fertilizer applied	18550	24.16
Pesticide applied	4235	5.51
Irrigation cost	4800	6.25
Harvesting cost	7315	9.53
Total cost (Rs./ha)	76770	100

towards seeds (28%) because mostly the hybrid seeds are being used by the farmers for the capsicum cultivation. This was followed by expenses on nutrients application (Rs. 18,550/ha). Cost incurred on use of production machinery and labours were to the extent of 13.68% and 12.85% respectively of the total cost of production computed. About one tenth of the total cost incurred was proportioned towards the cost of harvesting. Irrigation and plant protection also shred the significant proportion of 6.25 and 5.51%, respectively of the total cost of production (Table 1).

Returns and benefits of the capsicum farming was also analysed in the study area with the standard procedure. On an average 97.50 qt/ha yield was recorded for the capsicum by the farmers in every growing season. Average market price for the farmers was estimated as Rs. 21 per kilogram of the capsicum. The B:C ratio of the capsicum was found 2.66:1 (Table 2) indicating the profitability of the venture. A similar study by Daundkar and Bairagi (4) showed a B:C ratio of 3.11 for capsicum cultivation at Akola.

Value chain analysis of capsicum in the Uttarakhand revealed the existence of two prominent marketing channels with the remarkable difference in efficiency due to the difference in market margin and marketing cost. The value chains identified were C1: Producer-Consumer and C2: Producer-Whole sellers-Retailers-Consumers. Different processes involved in the value chain of the capsicum were depicted in Fig.1. It can be seen that starting from the input acquisition to final stage of reaching to the consumers, different process were involved in the capsicum value chain like deal of inputs, cultivation, harvesting, farm gate consumption, farm gate selling, wholesaling, retailing, primary processing different levels, secondary processing and consuming. Before the final consumption at each stage of processing, values in different forms of utility like product, time

Table 2. Yield and returns from capsicum cultivation in the project areas (N = 80).

Capsicum	Yield (q/ha)	Price (Rs./q)	Gross income (Rs/ha)	B:C ratio
	97.50	2100	204750	2.66:1

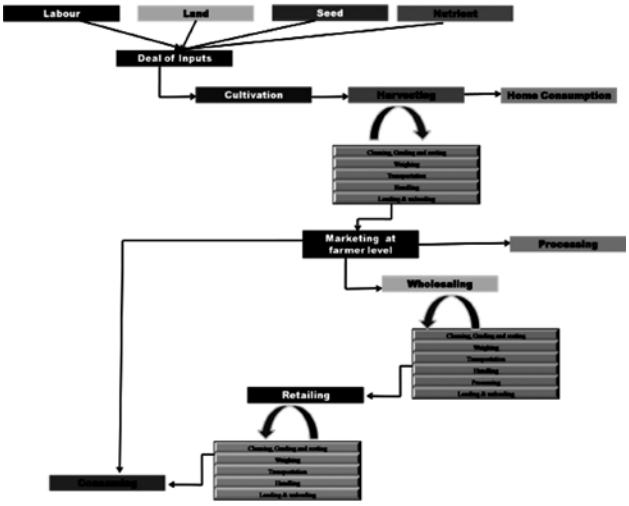

Fig. 1. Process mapping in capsicum value chains.

space etc. were added. According to Prabhavathi *et al.* (14), two different value chains were identified in the capsicum market like Chain 1; Producer-traders- wholesaler- retailer –consumer and Chain 2; Producer- processor-consumers in a similar study at Warangal. Besides these quantitative terms of market dynamics analysis some other secondary elements or players also played substantially high role in the value chain of capsicum in Uttarakhand like knowledge provides, financial supporting institutions, technology development research institutions etc. It was observed that farmers were getting seasonal and suitable information regarding all the activities in the value chains from the public institutions, successful farmers, KVK scientists and even the input suppliers to some extent.The technology in terms of promising hybrids, planting techniques, nutrient management, storage techniques etc were being acquired by growers from formal sources of public funded institutions like universities centres, KVKs, state, horticulture department, etc. However, the disposal of the produce along the identified value chains was by and largely dependent on private players for the activities like procurement, assemblage, grading, transportation, etc.

Step wise identification of the different actions and responsible actors for each and every activity identified in the value chains was prepared as a base for the

analysis of the marketing cost incurred by various actors (Fig. 2).

From the map (Fig. 2.) the detailed activities with the cost at each agent level were analysed (Table 3). For channel 1, marketing cost incurred by the producers was Rs. 221/q. Out of this; the highest share (45.25%) was for transportations (Rs 100/q). This was followed by grading and sorting (40.72%) which amounted Rs 90/q followed by loading and unloading charges of Rs 20.0/q. Other costs involved were relatively less as Rs 6.0/q for weighing cost and Rs 5.0/q for handling charges (Table 3). The total marketing expenditure was 21.92 % of the total cost incurred by the producer in the C1. From the same table, it is further evident that for second channel i.e. Producer-whole sellers – Retailers-consumers, whole sellers incurred the total cost of Rs 451.00/q and retailers had this amount of Rs 221.00/q towards marketing cost. The cost spread for different marketing components was worked out. In case of whole seller, the highest share (37.69%) was found for *Mandi* charges for the services of commission agents (Rs 170.0/q). This was followed by the transportation charges (Rs 100.0/q) with its share of 22.17%. Whole sellers also required to pay and amount of Rs 60.00/q as the processing charge for marketing of capsicum (13.30%). Other nominal charges levied were towards loading and unloading (4.43%), weighing (1.33%) and handling (1.11%) of the produce. On the other hand, in the same channel, retailers had the total amount of Rs 221.00/q as the expenses towards various cost components of marketing. Among those, the highest share (45.24%) was towards transportation (Rs 100.0/q) followed by cost share (40.72%) on grading and sorting (Rs 90.0/q). Loading and unloading charges were amounted Rs 20.0/q (9.05%). Other miner costs were Rs 6.0/q and Rs 5.0/q towards weighing (2.71%) and handling (2.26%) costs respectively (Table 3).

Thus, in channel C1, differential share of producer cost to the total marketing cost was computed very less (21.92%) (Table3). Whereas in channel C2 it was

Table 3. Marketing cost incurred by the different marketing function in the value chain of capsicum.

No.	Marketing cost incurred	C1:Producer-consumer	Amount (Rs/q)	C2: Producer-whole sellers-retailers-consumers	Amount (Rs/q)
1	Expenditure incurred by producer/ cost of production	787.00	78.08	787.00	-
2	Marketing Expenditure incurred by Producer	221.00	21.92	221.00	-
A	Cleaning, grading and sorting	90.00	40.72	90.00	40.72
B	Weighing cost	6.00	02.71	6.00	02.71
C	Transportation charges	100.00	45.25	100.00	45.25
D	Handling charges	5.00	02.26	5.00	02.26
E	Loading & unloading charges	20.00	09.05	20.00	09.05
	Expenditure incurred by producer including marketing cost	1008.00	-	1008.00	60.00
3	Expenditure incurred by wholeseller	-	-	451.00	26.84
A	Cleaning, grading and sorting	-	-	90.00	19.96
B	Weighing cost	-	-	6.00	01.33
C	Transportation charges	-	-	100.00	22.17
D	Handling charges	-	-	5.00	01.12
E	Loading & unloading charges	-	-	20.00	04.40
F	Commission/Mandi charges	-	-	170.00	37.69
G	Processing charge	-	-	60.00	13.30
4	Expenditure incurred by retailers	-	-	221.00	13.15
A	Cleaning, grading and sorting	-	-	90.00	40.72
B	Weighing cost	-	-	6.00	02.71
C	Transportation charges	-	-	100.00	45.25
D	Handling charges	-	-	5.00	02.26
E	Loading & unloading charges	-	-	20.00	09.05
5	Total cost	-	-	1680.00	-

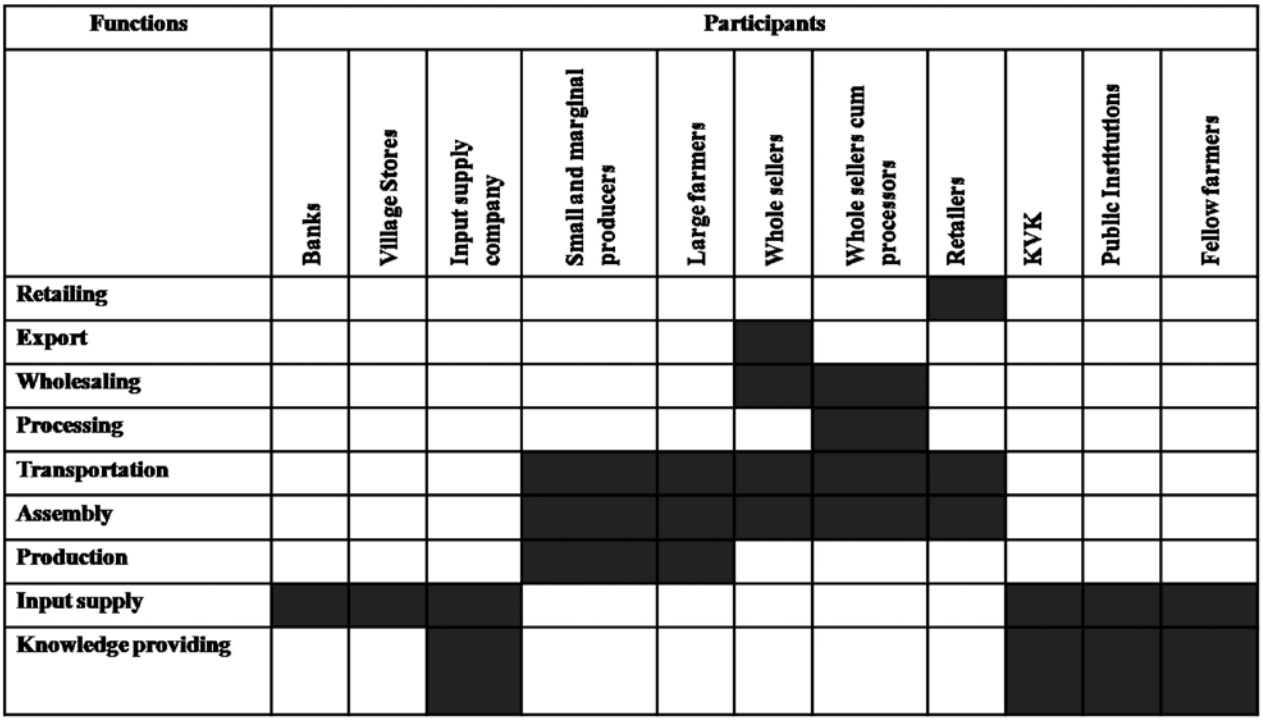

Fig. 2. Functional engagement of participants in value chain.

revealed that, producers' differential share was highest (60.00%) followed by whole sellers (26.84%) and retailers (13.15%) with respect to the total marketing cost as indicated in the Table 3. The market margin for different market functionaries were also worked out along the different channels identified. As indicated in Table 4, in the case of channel 1, producer got the maximum margin of Rs. 1,092/q as against the consumer purchase price of Rs 2100/q. However in another channel, the return amount was also found shared considerably by the other two functionaries' namely whole sellers and retailers. In this channel, producers' margin was found to be reduced to the amount of Rs 1,092/q. However, whole seller and retailers enjoyed the net margin of Rs 449.00 and Rs 779.0/q, respectively as indicated from the Table 4. The results revealed that the length of the channel increases financial burden over the consumers also increases. Consumers are getting the capsicum with a higher price with a difference of Rs.8/ kg after the involvement of the wholesalers and retailers in the value chain (Table 4).

Thus, proportionately, producer had about 100% and 52% share in consumer price on absolute terms basis and net margin basis respectively in case if producer sales capsicum directly to the consumers (Table 5). However, if producer sales the produce through whole seller and retailers, his share reduced to about 27.3 % in consumers' price in terms of net margin. Retailers and whole sellers, on the other hand, enjoyed 19.48 % and 11.22 % share in consumers' price on net margin basis

Table 4. Price Spread among the different market functionaries in case of Capsicum.

Cost/ Return	C1 (Rs. / q)	C2 (Rs. / q)
1. Cost of production	787	787
2. Marketing cost of producer	221.00	221.00
3. Gross returns to producer	3200	2100
4. Net returns of Producer (MM) (3-(1+2))	2192	1092
5. MC of wholesaler	-	451
6. MM of wholesaler (7-3+5)	-	449
7. Gross price to wholesaler	-	3000
8. MC of retailer	-	221.00
9. MM of retailer (10-7+8)	-	779
10. Consumer price	3200	4000
11. Producers share in consumers price (3/10)*100	100.00%	52.50%
12. Marketing efficiency (Acharya's method)	1.33	1.24

Table 5. Differential proportion of net return for various marketing elements in Consumer price paid in case of capsicum.

No.	Particulars	Value in terms of net margin (%)	Value in absolute terms basis
1	C1 : Producer- Consumer		
a	Producer share in consumer price	68.5%	100.00%
2	C2 :Producer-Whole Seller- Retailers-Consumer		
a	Retailer share in consumer price	19.48 %	100.00 %
b	Wholesaler cost in consumer price	11.22 %	75.0%
c	Producer share in consumer price	27.3 %	52.50%

respectively. In absolute terms of margin, retailers, whole sellers and producers had 100, 75 and 52.50% share of the consumers' price as indicated in Table 5. Marketing efficiency of the both the channels were analysed and it was found as 1.33 in C1 and 1.24 in C2. This indicates the profitability of the C1 over the C2 in the case of product movement along the value chains (Fig. 3).

For further detailed analysis of the profitability among agents and actions of value addition along the different value chain, a step wise incremental analysis of BCR (B:C ratio) has been done and presented in Table 6. In both the channels of marketing of capsicum, cleaning, grading sorting and processing (CGSP); and transportation (TRP) were the important value addition components which were added by the producer (PRD), whole sellers (WS) and retailers (RT) at their level. Therefore, channel wise, the magnitude and share of the cost incurred and return accrued for each value added activities (Fig. 3) and the incremental BC ratio were worked out for each actors in the value chain.

The findings in Table 6 showed that, in case of channel C1 (Producer-Consumer), CGSP and TRP the magnitude of cost incurred were Rs 90.0/q and Rs 100.0/q with their relative share of 40.72% and 45.25% respectively. The proportionate benefits accrued were Rs. 892.58/q and Rs 991.88/q because of CGSP and TRP, respectively. Though the proportionate benefits were different for the value added components in the value chain, the incremental BC ratio for the both the activities were computed same i.e. 9.91. Contrary to it this, in other channel C2 (Producer-Whole Seller-Retailers-Consumer), two partners i.e. producers, and retailers incurred Rs 90.0/q and Rs 100.0/q towards CGSP and TRP with their relative shares of 40.72%, 45.25%, respectively for CGSP and TRP. Whereas in the case of WS expenditure incurred were Rs. 150/q and Rs 100/q towards CGSP and TRP respectively with relative share of 33.25% and 22.17%. The incremental benefit accrued for doing value addition by all the three actors (PRD, WS and RT) were Rs. 444.66/q, Rs. 100.00/q and Rs 317.21/q with respect to CGSP;

Table 6. Incremental Benefit-Cost ratio analysis for the capsicum chain.

No.	Particulars	C1		C2	
		CGSP (Rs/q)	TRP (Rs/q)	CGSP (Rs/q)	TRP (Rs/q)
1	Expenditure incurred by producer	90.00 (40.72%)	100.00 (45.25%)	90.00 (40.72%)	100.00 (45.25%)
2	Expenditure incurred by whole seller	-	-	150.00 (33.25%)	100.00 (22.17%)
3	Expenditure incurred by Retailer	-	-	90.00 (40.72%)	100.00 (45.25%)
4	Proportionate Benefit accrued for producer (Rs/q)	892.58 (out of Rs 2192/q)	991.88 (out of Rs 2192/q)	444.66 (out of Rs 1092/q)	494.13 (out of Rs 1092/q)
5	Proportionate Benefit accrued for whole Seller (Rs/q)	-	-	100.00 (out of Rs 449 /q)	99.54 (out of Rs 449 /q)
6	Proportionate Benefit accrued (Rs/q) for Retailer	-	-	317.21 (out of Rs 779/q)	352.5 (out of Rs 779/q)
7	Incremental B:C ratio for the producer	9.91	9.91	4.94	4.94
8	Incremental B:C ratio for whole seller	-	-	.66	.99
9	Incremental B:C ratio for retailer	-	-	4.12	3.52

Percentages in parentheses indicate the relative share to total value

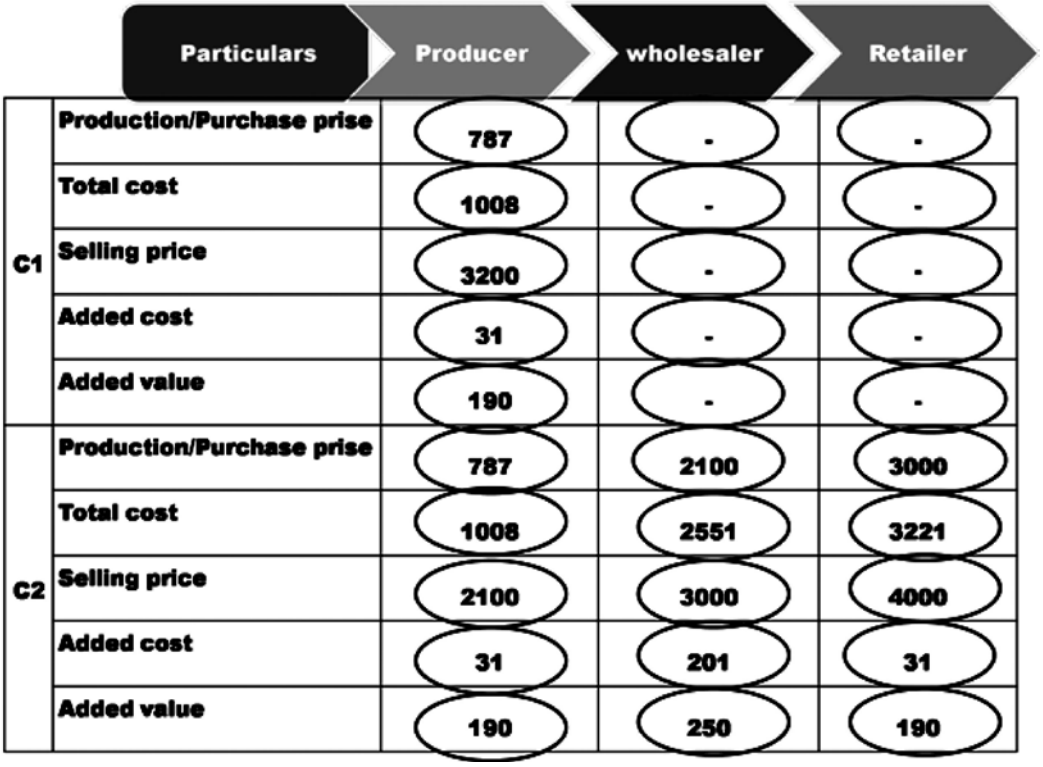

Fig. 3. Map showing value addition along the identified Value chains in Capsicum (Rs/q).

and Rs. 494.13 /q, Rs 99.54/q and Rs 352.5/q for TRP. The incremental BC ratio for producers was observed same for CSGP and TRP with a magnitude of 4.94. At the same time for wholesalers it was observed with the enormity of 0.66 and 0.99 respectively for CSGP and TRP. Retailers showed Incremental BC ratio as 4.12 for CSGP and 3.52 for TRP. As indicated from the study results the efficiency of the value chains are largely depends on the number of players and the market margins they incurred. Strategies need to be devised to reduce the channel length in the capsicum value chain and knowledge impartment among the farmers through KVKs, ATMA and other public extension organizations need to be done for creating more bargaining power among the farmers to capture the high proportion in the consumers' payment.

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