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Profitability, Investment Pattern and Constraints of Major Marketing Intermediaries Involved in Supply Chain of Exotic Carps in Jammu and Kashmir, India

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A B S T R A C T

The study has been conducted in the state of Jammu and Kashmir where the major fish marketing stakeholders like pre-harvesting contractors, wholesalers, retailers, fish vendors and consumers have been interviewed. The paper has examined and evaluated the investment patterns, profitability and constraints of various intermediaries involved in locally produced exotic carps (grass carp, common carp and silver carp) marketing. Among the wholesalers and retailers of the state the major investment was done in purchasing of deep freezers followed by the storage facilities and others. The major contribution in investment for pre harvesting contractor was done for the purchase of nets. The results revealed that the Benefit Cost (B: C) ratio was highest amongst the pre harvesting contractors (3.55) followed by retailers (3.10) and wholesalers (2.25). The study has used the Garrette ranking method to analyze the constraints and the same has revealed that the major constraint for the wholesalers and retailers were the lack of marketing facilities as there was no exclusive market available where the fish could be bought and sold.

Introduction

Marketing of fish in India is neither efficient nor modern but is carried out by many intermediaries which are responsible for bringing fish from the point of production to ultimate consumption (FAO, 2001). A number of intermediaries exist in supply chain between producer and consumer thereby reducing the producers share in consumer's rupee. The large number of wholesalers in market guarantees a high level of competition with prices that immediately reflect changes in demand and supply. The domestic fish market is of high potential but highly unorganized and unregulated (Ganeshkumar *et al.*, 2008). In India, marketing channel of fresh fish involve certain intermediaries with different functions such as auctioneer, commission agent, pre harvest contractor, wholesaler, retailer and fish vendor. The number of intermediaries and channel of distribution vary from region to

region, state to state and district to district within a state. In the state of Jammu & Kashmir the major market intermediaries were pre-harvest contractors, wholesalers, retailers which were bringing the exotic crops from the farmers to ultimate consumers. Unlike conventional marketing systems of agricultural products, fish marketing is characterized by heterogeneous nature of the products with respect to species, size, weight, taste, keeping quality and price, etc. Market price of fish is determined by freshness, species and availability of fish in the market. Marketing involves a lot of problems which often hinder the objectives of producer that is to satisfy consumer wants and to ensure his profitability (Nwabunike, 2015) Some of the problems in fish marketing in India include high perishability and bulkiness of materials, high cost of storage and transportation, no guarantee of quality and quantity of commodity and high price spread (Ravindranath, 2008). In the state of Jammu & Kashmir the major problems hampering the development of fish marketing have been identified to be lack of knowledge on profitability of the enterprise as well as the skills for doing the same. The study was designed to understand the investment pattern and profitability of the major stakeholders involved in supply chain of exotic carp in the state. The study also documented the problems of the stakeholders and analyzed the same to understand the constraints affecting the efficient marketing in the state.

Materials and Methods

Pre-tested specially designed structured interview scheduled were used to collect data using personal interview method from pre-harvesting contractors, wholesalers, retailers and consumers from the state of Jammu & Kashmir. Three pre harvesting contractors, 5 wholesalers, 10 retailers and 20 consumers were selected randomly from Kashmir region and 5 wholesalers, 10retailers and 20 consumers from Jammu region for the study. Information on different costs, quantity of fish dealt, selling prices, constraints etc. were collected and the same was analyzed to estimate the investment pattern, profitability and constraints of different supply chain stakeholders.

Percentage analysis

Percentage analysis was performed to make simple comparison wherever necessary. Variables like different components of cost and constraints were estimated and presented in percentage.

Enterprise business analysis

To estimate the costs and returns for different actors in exotic carp supply chain, enterprise business. analysis was carried out.

Gross income

It was worked out by multiplying the quantity of produce with their respective prices.

$$Grossincome = Q * P$$

Where,

Q= quantity of carp produced (kg)
P = Selling price of carp (Rs. /kg)

Benefit Cost Ratio

B: C ratio was used to ascertain the viability of business. It estimates the ratio of benefit and cost incurred in the business. Mathematically, it can be expressed as

$$\text{B: C Ratio} = \frac{\text{Gross income}}{\text{Total costs}}$$

Garrett's ranking technique was used to rank the constraints faced by sample farmers on

different factors. As per this method, farmers were asked to assign the rank for all the constraints faced by them and the outcomes of such ranking are converted into score value with the help of the following formula:

Percent position = 100 (R_{ij} – 0.5) /N_j

Where,

R_{ij} = Rank given for the i^{th} variable by j^{th} respondents,

N_j = Number of variable ranked by j^{th} respondents

Results and Discussion

Fish supply chains in Jammu and Kashmir

There were 3 major supply chains operating for marketing of exotic carp in the state, in the first chain farmers were selling their produce to the pre- harvest contractors and then it passes through wholesalers and retailers to the consumers. Also, in the third chain farmers themselves take the fish in the nearby market or provide fish at door level to consumer.

The supply chains I and III were operating for marketing of exotic carp produced by farmers in Kashmir valley where as in Jammu region, supply chains II and III were operating for marketing of exotic carp. In the supply chain-II, the farmers in Jammu were selling their produce to wholesalers at their farms. Wholesalers arrange to harvest of produce on their own and sell it in the local markets to retailers who finally sell to consumers. In the second chain, farmers directly sell their produce to consumers in the local market or at farm depending on the availability of consumer.

There were four major marketing agents involved in exotic carps marketing in Jammu and Kashmir State of India which were

Wholesaler

In Jammu & Kashmir the wholesalers visits the ponds harvests them, collect the fish in bulk and then sell the same to the retailers. They also carry out some value additions in terms of sorting, grading, cleaning, icing and packing before selling the fishes. In India the cost structure of wholesalers is profit intensive (Gupta, 1984). The earnings made by the wholesalers are his commission, usually between 3-6% on the sales of fish paid by fish farmers (Macfadyen *et al.,* 2012). The wholesalers usually know the demand of fish species in the market and harvest according to the preference of customers (Bishnoi, 2005). Among the exotic carps the demand of grass carp was maximum in the state so the wholesalers were harvesting usually the grass carp from the ponds. The wholesalers incur various costs like icing, packing etc. in the marketing of fish so they keep higher margin while selling the same. Deep freezers form largest share of the wholesalers cost

Pre- harvest contractor

This intermediary is involved in the business for 2-3 months only before the onset of winters (Oct.-Dec). The farmers keep contacts with the pre-harvest contractors and as soon as crop is ready they call them for the harvesting. All the harvesting and icing charges are borne by the pre-harvest contractors. Once the harvesting is done the produce is finally transported to the wholesalers and retailers. The pre-harvest contractors / commission agents have fixed establishment and help the traders to sell their produce and charge a fixed commission (Islam, 2008).

Retailers

The retailers in Jammu & Kashmir were doing their business all through the year. They continuously purchase fishes from wholesalers and sell the same to consumers. There were

very few retail outlets of fish especially in the Kashmir valley. The retailers purchase the lot from wholesalers in bulk and then sell it individually species wise to consumers. The retailers also do some value addition in like packing and minor processing, etc. Other fish products like boneless fish kababs and fish fillets are also sold in retail.

Vendors

The vendors selling the fishes in Jammu and Kashmir were giving two type of services either they were selling the locally produced fishes in the nearby markets or providing door to door deliveries. They either purchase the fishes from the local fish producers or the farmer's themselves sell by their own. There were the cases where the fish vendors were purchasing the fishes from the local fish retailers and giving home to home deliveries also. Usually women were involved in door deliveries carrying 8-10 kilograms of fish and selling the same.

Investment patterns of major marketing agents

Fixed capital investment pattern of wholesalers

While studying the investment pattern it was observed that sample wholesalers of Jammu region were harvesting carp from ponds of farmers and transporting them to their shop in wholesale market, selling them to retailers from their respective shops in wholesale markets. All the costs involved like harvesting, icing, transportation etc. were incurred by wholesalers. In case of Kashmir region, wholesalers were involved only in wholesaling activities. The fixed capital investment by sample fish wholesalers in their business was estimated and presented in table 1. Upon analysing fixed capital investment patterns of the wholesalers of Jammu & Kashmir, it was found that total fixed capital investments by an average fish wholesalers in the state of Jammu and Kashmir was Rs.4,23,839.16 which varied from Rs.3,62,051.11 in the Kashmir valley to Rs.485627.20 in Jammu region.

Upon component wise analysis, it was found that, the deep freezer was the costliest item of investment that accounted for about 79.45 percent on overall basis in the state and varied from 75.88 percent in the Jammu region to 83.01 percent. The second most important item of investment was creation of storage facilities that accounted for 9.91 percent at state level and varied from 9.37 percent in Jammu region to 10.44 percent in Kashmir Valley. The other important components of fixed cost are investment on plastic crates, steel tubs, nets, weighing balance, boneless machine, furniture and bucket that accounted for about 6.35 percent, 2.83 percent, 2.69 percent, 1.16 percent, 0.89 percent,0.68 percent, and 0.38 percent, respectively at state level. The similar type of pattern was visible in both the regions except invested on the purchase of nets for harvesting fishes from farmer's fields in case of Jammu region.

Fixed capital investment on sample pre-harvest contractors

Total investments in fixed assets at pre-harvest contractors were studied and presented in table 2. Total investments on fixed capital by the pre-harvest contractor were Rs.25630 per contractor. The major component of fixed capital was the cost for nets (53.45%), which includes a big drag net and a cast nets. The second major component was the cost of tubs which accounted for 12.68 percent. The share of other fixed assets like buckets, weighing balance and sintex tank in the total fixed capital was 11.04 percent, 11.71 percent and 11.12 percent, respectively.

Fixed capital investment pattern by retailers

Total investment on fixed assets by retailers of Jammu and Kashmir was estimated and presented in table 3. Perusal of the table indicates that on an average retailer of the state had invested about Rs.2.37 lakh which varied from Rs.1.96 lakh in Kashmir valley to Rs.2.78 lakh in Jammu region. It was also observed that the deep freezer was the most costly items accounting for about 75.73 percent of total investment at retail unit in the state followed by storage facilities (17.22%), plastic crates (2.25%), steel tubs (2.21%), weighing balance (1.86%) and furniture (0.75%). The similar pattern was observed in both the regions. However, due to costly deep freezer requirement in Jammu total investment was more for retailers in Jammu

Costs and return analysis

Costs and return in wholesaling of carp

Costs and return in wholesaling of carp in both the regions of Jammu and Kashmir as well as the state as whole was estimated and presented in table 4. It can be viewed from the table that the total cost of wholesaling for a year in the state was Rs.9.70 lakh which varied from Rs.9.06 lakh in Kashmir to Rs.10.34 lakh in Jammu region. The higher cost of wholesaling in Jammu region was mainly due to vertical integration of harvesting activity by wholesalers who bear all the expenses of harvesting, icing, packing and transporting from farm up to wholesale markets. Due to increase in activities both the fixed and variable costs were more in case of Jammu region in comparison to the Kashmir valley. Upon component wise analysis, it was found that the share of fixed cost in total cost on overall basis for the state was 30.38 percent which varied from 27.06 percent in Kashmir Valley to 33.28 percent in Jammu region. The variable cost accounted for about 69.62 percent which varied from 66.72 percent in Jammu region to 72.94 percent in Kashmir valley. The higher fixed cost in Jammu region in comparison to Kashmir valley was mainly due to higher wage bills to permanent human labour.

It was also revealed that transportation cost was the major item of cost of marketing at wholesale level accounting for about 23.87 percent of total cost on overall basis followed by casual labour charges (19.98%), wage bill of permanent staff (13.55), cost of icing the fish (6.65%), payment for shop rent (6.57%), loading and unloading charges (6.19%), grading and packing charges (5.95%) and others.

In the Kashmir valley the wholesaler deals with locally produced fish during the months of November to January and in other month's supply of fish comes from outside states. During the winter seasons when the roads get blocked due to snow fall the outside supply of fishes to the valley get halted. Also, at the same time local produce of carp get ready for harvest, so the same wholesalers start dealing in locally produced fish during the winter period.

In Jammu region, it was observed that the wholesalers were also involved in carrying out harvesting of produce from fish ponds. The wholesalers harvest the produce from the ponds of the farmers and sell them through their respective shops in the wholesale market along with fish produced outside state. The costs involved in local harvesting, marketing, transportation, icing etc. were borne by the wholesalers only. It was also estimated that the average net income earned by each wholesaler was Rs.12.09 lakh per year with the benefit cost ratio (B: C ratio) of 2.21 indicating the financial viability of the business.

Table.1 Supply chains for exotic carp in the state

Supply chain (SC)-I	**Farmer → Pre-harvest contractor → Wholesaler → Retailer → Consumer**
Supply chain (SC)-II	Farmer → Wholesaler → Retailer → Consumer
Supply chain (SC)-III	Farmer → Consumer

Table.2 Fixed capital investment by sample fish wholesalers in Jammu & Kashmir

(Investment in Rs./sample wholesaler)

Particulars	Jammu		Kashmir		Jammu & Kashmir	
	Investment	Share (%)	Investment	Share (%)	Investment	Share (%)
Storage Facilities	45500.65	9.37	37800.86	10.44	41650.76	9.91
Furniture	4470.00	0.92	1567.00	0.43	3018.50	0.68
Plastic Crates	10960.04	2.26	37800.86	10.44	24380.45	6.35
Steel tubs	11355.28	2.34	12033.00	3.32	11694.14	2.83
Weighing balance	6400.00	1.32	3600.00	1.00	5000.00	1.16
Deep freezer	368500.00	75.88	300550.00	83.01	334525.00	79.45
Nets	26100.00	5.37	0.00	0.00	13050.00	2.69
Boneless making machine	8640.23	1.78	0.00	0.00	4320.12	0.89
Buckets	3700.00	0.76	0.00	0.00	1850.00	0.38
Total	485627.20	100.00	362051.11	100.00	423839.16	100.00

Table.3 Fixed capital investment on sample pre-harvest carp contractors

Particulars	Investments (Rs.)	Share in total investment (%)
Cost of steel Tubs	3250	12.68
Weighing balance	3000	11.71
Cost of Buckets	2830	11.04
Cost of Nets	13700	53.45
Cost of Sintex Tank	2850	11.12
Total	25630	100.00

Table.4 Fixed capital investment patterns of sample retailers in Jammu & Kashmir

(Investment in Rs. /retailers)

Particulars	Kashmir		Jammu		Jammu & Kashmir	
	Investment	Share (%)	Investment	Share (%)	Investment	Share (%)
Storage Facilities	37466.67	19.11	42564.02	15.32	40015.35	17.22
Plastic Crates	3966.67	2.02	6851.21	2.47	5408.94	2.25
Furniture	1831.67	0.93	1550.00	0.56	1690.84	0.75
Steel tubs	4006.67	2.04	6582.22	2.37	5294.45	2.21
Weighing balance	3153.33	1.61	5870.00	2.11	4511.67	1.86
Deep freezer	145600.00	74.28	214500.0	77.18	180050.00	75.73
Total	196025.00	100.00	277917.45	100.00	236971.23	100.00

Table.5 Economics of wholesaling of exotic carp in Jammu and Kashmir

(Value in Rs./year)

Particulars	Kashmir		Jammu		Jammu & Kashmir	
	Value	Share (%)	Value	Share (%)	Value	Share (%)
Variable costs:						
Electricity	6600.68	0.73	8520.00	0.82	7560.34	0.78
Miscellaneous	16382.36	1.81	16500.03	1.60	16441.20	1.70
Icing charges	76121.00	8.40	52800.23	5.11	64460.62	6.65
Loading/ unloading	56520.56	6.24	63520.00	6.15	60020.28	6.19
Grading/ packing	59211.08	6.53	56135.62	5.43	57673.35	5.95
Casual labour charges	243594.66	26.88	144000.00	13.93	193797.33	19.98
Thermocol boxes	36246.56	4.00	46153.97	4.47	41200.27	4.25
Water charges	2402.68	0.27	2833.30	0.27	2617.99	0.27
Transportation cost	163800.00	18.08	299200.00	28.95	231500.00	23.87
A. Total Variable cost	660879.58	72.94	689663.15	66.72	675271.37	69.62
Fixed costs:						
Depreciation	36874.90	4.07	40946.00	3.96	38910.45	4.01
Interest on fixed cost	43446.13	4.79	58275.26	5.64	50860.70	5.24
Repair and maintenance	2282.35	0.25	2850.00	0.28	2566.18	0.26
Mandi fees	6600.00	0.73	7500.00	0.73	7050.00	0.73
Shop rent	61521.15	6.79	66000.00	6.39	63760.58	6.57
Permanent staff	94500.00	10.43	168400.00	16.29	131450.00	13.55
B. Total Fixed cost	245224.53	27.06	343971.26	33.28	294597.90	30.38
Total Cost (A+B)	906104.11	100.00	1033634.41	100.00	969869.26	100.00
Fish handled (q)	1818.00		2682.00		2250.00	
Cost of wholesaling (Rs./kg)	4.98		3.85		4.31	
Gross Income (Rs.)	2072520.00		2285064.00		2178792.00	
Net Income (Rs.)	1166415.89		1251429.59		1208922.74	
B-C ratio	2.29		2.21		2.25	

Table.6 Costs and return analysis of pre-harvest contractor in Kashmir valley

Cost components	Value (Rs)	Share (%)
Variable Costs:		
Cost of Labour/ harvesting charges	18850.00	49.47
Transportation Cost	4560.25	11.97
Icing Charges	3352.65	8.80
Communication Expenses	2050.00	5.38
A. Total Variable Cost	28812.90	75.61
Fixed costs :		
Interest on Fixed Capital	3069.60	8.06
Depreciation	5573.40	14.63
Repairs & Maintenance	650.00	6.99
B. Total fixed cost	9293.00	24.39
C. Total cost (TC) (A+B)	38105.90	100
Total quantity of fish handled (kg/annum)	8895.75	
Purchase price of fish from farmers (PP)	179.76	
Sale price of fish to WS (SP)	194.96	
Amount received from wholesalers (Q* SP)	1734315.42	
Amount paid to farmers (ATF)= (Q*PP)	1599100.02	
Gross income earned (GI)	135215.40	
Cost of operation of pre-harvest contractor (Rs/ kg)	4.28	
Net Income (GI-TC)	97109.50	
B:C ratio	3.55	

Table.7 Costs and return in fish retailing by sample retailers

(Cost in Rupees)

Cost and returns	Kashmir		Jammu		Jammu & Kashmir	
Variable costs	**Value (Rs)**	**Share (%)**	**Value (Rs)**	**Share (%)**	**Value (Rs)**	**Share (%)**
Electricity	4336.25	1.81	6000.00	1.92	5168.13	1.87
Miscellaneous	6000.02	2.51	6500.17	2.08	6250.10	2.30
Icing charges	60160.68	25.12	82000.46	26.24	71080.57	25.68
Loading/ unloading charges	14080.00	5.88	25850.00	8.27	19965.00	7.08
Human Labour charges	112000.00	46.76	135600.24	43.39	123800.1	45.08
Thermocol boxes	42144.00	17.60	55300.59	17.69	48722.30	17.65
Water charges	800.07	0.33	1300.00	0.42	1050.04	0.38
A. Total Variable cost	239521.0 (77.93)	100.00	312551.46 (77.50)	100.00	276036.2 (77.68)	100.00
Fixed Costs						
Depreciation	22202.60	32.73	29500.06	32.51	25851.33	32.62
Interest on fixed cost	23523.04	34.67	33350.01	36.75	28436.53	35.71
Annual repair	2612.00	3.83	2902.02	3.20	2751.01	3.52
Shop rent	19520.00	28.77	25000.00	27.55	22260.00	28.16
B. Total Fixed Costs	67845.64 (22.07)	100.00	90752.09 (22.50)	100.00	79298.87 (22.32)	100.00
Total cost (A+B)	307366.7		403302.1		355334.4	
Exotic Fish handled (Kg)	104220.0		182520.0		143370.0	
Fish kababs (Packets)	528.0		1128.0		828.0	
Price of fish kababs/ packet	200		140		170	
Cost of retail marketing (Rs./kg)	2.92		2.21		2.48	
Income from fish selling (Rs)	965324.0		1235486.		1100405.	
Income from value added product(Rs)	105600		157920		140760	
Gross Income	1070924		1393406		1241165	
Net income	763557.3		990103.9		885830.6	
B-C ratio	3.48		3.45		3.49	

Note: Figures in Parenthesis indicates their percentage to total cost

Table.8 Constraints faced by wholesalers in Jammu and Kashmir

	Jammu		Kashmir		State	
Constraints	**Average Score**	**Rank**	**Average Score**	**Rank**	**Average Score**	**Rank**
High transportation cost of fish	65.53	3	48.80	5	57.17	4
Lack of cold storage facility for fish	67.58	2	61.50	4	64.54	2
Uncertainty & high fluctuation in prices	45.98	8	42.40	9	44.19	9
Lack of grading	47.88	7	45.90	7	46.89	8
Lack of processing	39.13	11	31.40	10	35.27	10
Spoiled fish	48.73	6	45.80	8	47.27	7
Power supply	41.33	9	23.50	11	32.42	11
Poor availability of ice	51.68	5	64.00	3	57.84	3
Lack of marketing facilities	72.60	1	77.80	1	75.20	1
Low availability of local species	56.68	4	46.60	6	51.64	6
Low labour availability	38.53	12	22.10	12	30.32	12
Low demand of fish in the market	39.48	10	68.00	2	53.74	5

Table.9 Constraints faced by sample fish retailers in Jammu and Kashmir

	Jammu Retailers		Kashmir Retailers		State	
Constraints	**Average Score**	**Rank**	**Average Score**	**Rank**	**Average Score**	**Rank**
Low demand in local market	72.62	1	73.04	2	72.83	2
Cold storage facilities	54.58	3	70.37	3	62.475	3
High transportation cost	47.34	5	30.17	5	38.755	5
Sanitation & hygiene	32.42	6	28.43	6	30.425	6
Lack of marketing facilities	69.10	2	80.04	1	74.57	1
Poor availability of ice	48.82	4	47.43	4	48.25	4

Table.10 Constraints faced by sample fish consumers in Jammu and Kashmir

Constraints	**Jammu**		**Kashmir**		**State**	
	Garret Score	**Rank**	**Garret Score**	**Rank**	**Garret Score**	**Rank**
Low availability of local carps in the market	44.70	6	40.50	7	42.60	7
Low supply of carps	30.50	8	64.33	2	47.42	5
Lack of retail units	51.90	3	48.83	4	50.37	3
Wide price fluctuations	51.45	4	46.33	6	48.89	4
Highly perishable	44.95	5	46.67	5	45.81	6
High price	67.30	2	77.33	1	72.32	1
Lack of quality/hygiene	43.00	7	24.33	8	33.67	8
Long distance to fetch	67.80	1	52.17	3	59.99	2

The net income earned by wholesalers varied from Rs.11.66 lakh per annum to Rs.12.51 lakh per annum in Jammu region. This indicates more profitability of wholesaling in Jammu as compared to that in Kashmir. This may be due to low total volume of transaction in Kashmir valley than that in Jammu region. The cost of marketing at wholesale level was estimated to be Rs.4.31 per kg which varied from Rs.3.85 in Jammu region to Rs.4.98 per kg in Kashmir valley.

Costs and return of pre- harvest contractor

The pre-harvest contractor have a very crucial role in disposing off carps from farmer's fields to the wholesalers which is further forwarded to retailers and finally to the consumers. The job of this actor seems to be easy but practically it's not. The contractor needs to maintain a good rapport with both the farmers and wholesalers for carrying out his business. Usually the contractor deals in this business for a period of 3 months starting from November to January when fishes are harvested in Kashmir valley. So this job is a source of supplementary income which is earned for a period of 3 months only. Taking into considerations the above mentioned points the costs and return of the contractor was calculated for three months and presented in the table 6**.** Perusal of the table revealed that total cost in the business was Rs.38, 105.90, out of which share of fixed cost was 24.39 percent while that of variable cost was 75.61 percent. This indicates that most of the cost in this business was of variable in nature. The cost of operation for pre-harvest contractor was estimated to be Rs.4.28 per kilogramme of fish. The average gross income and net income of the business was Rs. 1,35,215.40 and Rs. 97,109.50,

respectively. The benefit cost ratio (B: C) was 3.55, showing the profitability of the business. This clearly depicts the viability and high profitability for the business of pre-harvest contractors.

Costs and return in fish retailing in Jammu and Kashmir

Retailer is one of the crucial market players who sell the fishes to consumers. The main role of the retailers is to generate value by providing the produce which has greater demand nearer to consumer place in the market. It was observed that retailers sell the good quality fishes to consumers. Also, some value added products like fish kababs were also been sold by the retailers. The retailers were selling the fish kababs and in each packet a dozen kababs were packed. As per the retailers in Jammu region, averages of 22-25 packets and in Kashmir 10-12 packets were sold in a week. The high cost of thermocol boxes were mainly due to the supply of fish to the army camps. The retailers used to pack the fishes with proper icing in these thermocol boxes and deliver to the camps. There was a frequent demand from these army camps contributing to high cost of these thermocol boxes The costs and return in fish retailing was estimated for the state as well as for both the regions of the state and are presented in table 5. It is evident from the table that total cost of retailing for an average retailer was Rs.3.55 lakh per annum which varied from Rs.3.07 lakh per annum in Kashmir region to Rs.4.03 lakh per annum in Jammu region.

Upon analysing the component-wise cost of retail marketing, it was revealed that variable cost was major cost accounting for about 77.68 percent of total cost and the rest about 22.32 percent was accounted by fixed cost. The similar pattern was observed in both the regions where variable cost accounted for about 77 percent of the total cost. Among variable costs, the cost of human labour was highest accounting for about 45 percent followed by cost of Icing of fish (25.68%), cost of thermocol boxes (17.65%), loading and unloading charges (7.08%), electricity (1.87%) water charges(0.38%) and miscellaneous (2.30%). The similar trend was observed in both the regions. The overall cost of retail marketing was Rs.2.48 per kg in the state which varied from Rs.2.21 per kg in Jammu region to Rs.2.92 per kg in Kashmir valley. The low cost of retail marketing in Jammu was mainly due to more volume of sell by retailers in Jammu region than that in Kashmir valley.

The net income earned per annum by retailers in the state was Rs.8.85 lakh which varied from Rs.7.63 lakh by Kashmiri retailers to Rs.9.90 lakh by retailers of Jammu region. The benefit cost ratio (B:C ratio) of 3.48, 3.45 and 3.49 for retailers of Kashmir, Jammu and state, respectively indicate the financial viability of the business in the state as well as in both the regions.

Constraint analysis

Constraints faced by fish wholesalers

Wholesalers play a key role in fish marketing in the state of Jammu and Kashmir. They purchase fish in bulk from the pre-harvest contractors in Kashmir valley or from farmers at their pond site in Jammu region and sell to retailers in small quantity. Some sort of value addition in terms of icing, packing, packaging, etc. are done by wholesalers. While carrying out the business, wholesalers were facing some constraints in the state. During the study a total of 12 constraints were identified and wholesalers were asked to rank them, the same were analysed and the results obtained are presented in table 7. The major problems faced by wholesalers in marketing

of fish in the state were lack of specific market, followed by lack of cold storage facility for fish, availability of ice, high transportation cost, low demand of fish in the market, low availability of local species, spoiled fish, lack of grading and so on. Similar work was carried out by (Shakti and Vahoniya, 2016) in inland fish marketing in Gujarat where they found the major constraint for the wholesaler was perishability of fish followed by the huge competition in the market.

It was found that wholesalers in the Jammu and Kashmir ranked poor marketing facilities as the first major constraint with the average garret score of 75.2 percent at state level and 72.60 percent and 77.80% in Jammu and Kashmir region, respectively. There was no specific fish market in the state of Jammu and Kashmir where fish could be sold exclusively. The wholesalers were selling the fishes in the general markets without proper hygiene and marketing facilities. The vendors use to sell the fishes on the road sides and on bridges for reaching the customers. The state government has taken the initiative to construct fish markets one in Jammu and one in Kashmir but the work is still pending. The second most important constraints faced by the wholesalers in the state was lack of storage problem which got 2nd rank in Jammu region and 4th rank in Kashmir region on the basis of Garret score. The storage problem was in the sense that they used to The wholesalers were not having cold storage facilities and were forced to store fishes in deep freezers which is very costly affair.

The third most important constraint for wholesalers in the state was poor availability of ice in the marketing area. The constraint was ranked 3rd by wholesalers in Kashmir region and 5th by wholesalers of Jammu region with an overall 3rd rank at the state level. Wholesalers particularly have to transport ice from a distant place and have to incur high cost for the same. It was observed that the wholesalers in the chazzabal area of Srinagar get ice from a distance of around 4-6 kilometres from their shops making this a constraint for them.

The 4th important constraint faced by fish wholesalers in the state was high transportation cost which was ranked 3rd in Jammu region and 5th in Kashmir valley. In Jammu region, the wholesalers were involved in harvesting the produce, icing it and then transporting it to their respective shops. So the transportation cost involved in the process was high. Low demand of fish in the local market was the fifth most important constraints at state level which got 2nd rank in Kashmir valley and 10th in Jammu region. It was observed that people in Kashmir region were less fish eaters than the population of Jammu region and major portion of fish supply was going to defence personals through wholesalers. Low availability of fish of local species was 6th most important constraint faced by fish wholesalers in the state which was ranked 4th by wholesalers in Jammu region and 6th in Kashmir region. The local production in Jammu region was not sufficient so most of the time they were engaged in selling of fishes which comes from the other states. The other constraints faced by the wholesalers of the Jammu and Kashmir state are lack of grading, spoiled fish, uncertainty and high fluctuation in prices, power supply and others.

Constraints faced by retailers in Jammu and Kashmir

The fish retailers purchase fishes from wholesalers in small quantity and sell them to consumers in nearby area. A total of 6 constraints faced by fish retailers in the state were identified and the results so obtained are presented in table 8. The major problems

faced by fish retailers in the state was the lack of marketing facilities which was followed by low demand in local market, lack of cold storage facilities, Unavailability of ice, high transportation cost and so on. (Vinay *et al.*, 2015) also reported the similar constraints faced by retailers like poor facilities of retail, storage facilities, transportation and others in Nanded district of Maharashtra.

The lack of marketing facility was the most important constraints faced by retailers in the state, which was ranked 1st in Kashmir region and 3rd in Jammu region. The second most important constraints faced by retailers was low demand which was ranked 1st in Jammu region and 2nd in Kashmir region. This was mainly due to people of the state are not very fond of fish eating. However, most of the demand of fish comes from defence personnel and tourist in the state. The low demand may also be due to that fact that mutton and poultry meat are cheaper than fish in the state.

The third major constraint for retailers of the state was lack of cold storage facility. In absence of cold storage, every retailer either have to keep deep freezers which is very costly or sell the entire fish on same day even at price lower than the purchase price to avoid spoilage of fish. The poor availability of ice was the 4th major constraints faced by retailers which was ranked 4th in both the Jammu and Kashmir region. The retailers need to travel long distance to fetch ice for their business. The fifth major constraint was high transportation cost which ranked same in both regions. The last major constraints experienced by the retailers was absence of sanitary and hygiene in the local market.

Constraints faced by consumers in Jammu and Kashmir

The sample fish consumers in the state were asked about the constraints faced in fish consumption and responses received by them was analysed and presented in table 9. A total of 8 major constraints were listed by them out of which the major problem was high price of fish followed by long distance to fetch, lack of retail units, wide price fluctuation, low supply of carps and so on.

The first major constraints experienced by the consumers in the state were high price of fish which was ranked 1st in Kashmir and 2nd in Jammu region. The 2nd major constraints for fish consumer in the state were travel of long distance to fetch fish. Since fish market and retail units are very few and hence most of the consumers had to travel long distance to buy fish. The second major constraint for the consumers of Kashmir valley was low supply of local carps (64.33%) in the market. The third major constraint for the consumers in Jammu region was lack of retail units (51.90%) and for Kashmiri consumers it was long distance to fetch the fishes (52.17%). The fourth major constraint for the consumers of Jammu region was the wide price fluctuations (51.45%) and same was lack of retail units (48.83%) for Kashmiri consumers. It was observed that the high perishability of the fishes was the fifth major constraint for both Jammu and Kashmir valley consumers. The other constraints were lack of hygiene/ quality and others. Debnath *et al.*, (2014) studied the major constraints in fish consumption for different fish group in Tripura. RBQ analysis revealed that high price and price fluctuation were the two major constraints for different fish groups and in general followed by irregular supply and freshness of fish which mainly referred to interstate fish. Lack of hygiene and nearness to source were two least important constraints

Though domestic fish marketing holds a very good potential but the fish selling areas of Jammu and Kashmir were lacking in basic infrastructure facilities. The marketing agents

were earning good profit in their respective fish business but it could have been better in the presence of fish markets where exclusively fish could be bought and sold. There were three major supply chains in the state responsible for bringing the locally produced exotic carps (grass carp, common carp and silver carp) from the farmer to ultimate consumer. In Kashmir region the fishes were going through the pre-harvesting contractors, wholesalers, retailers, vendors and finally reaching the consumers. In Jammu region the same was carried through wholesalers, retailers and finally to consumers. The highest B: C ratio was found to be in pre-harvest contractors involved in the marketing followed by the retailers and wholesalers in the state.

Fish is a cheap source of protein and also provide livelihood and income generation opportunity to rural youth. Therefore, there is need to popularise fish farming and marketing as profitable enterprise among the rural youth which can generate livelihood and employment opportunity with considerably low investments.

At present, there is no proper fish market in the state where exclusively fish can be sold and purchased. The fish is sold either in local market or on AmiraKadal Bridge in Srinagar which is not only unhygienic but illegal also. The department of fisheries is planning to construct a fish market one in Srinagar district and another in Jammu district which will help the sellers in selling their produce/ products.

Another thing to be noticed was that there was no ice factory nearby the fish selling area and the wholesalers/ retailers have to go a long distance to fetch the ice. So, there is a need to produce cooperatives and self-help groups which would not help the marketing agents in providing the necessary inputs but also will assist them in selling the fishes in the nearby markets.

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