Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2320-7051.4037

ISSN: 2320 – 7051

Int. J. Pure App. Biosci. **5 (4):** 290-299 (2017)

Research Article

International Journal of Pure & Applied Bioscience

OPEN ACCESS

A Study on Consumption Pattern of Trout in Kashmir Valley, India

Stanzin Gawa, Nalini Ranjan Kumar*, Navghan Mahida, Hoilenting, Vinay A. and Vinay Maruti Hatte

ICAR-Central Institute of fisheries Education, Mumbai-40016

*Corresponding Author E-mail: drnaliniranjan@gmail.com

Received: 12.06.2017 | Revised: 23.06.2017 | Accepted: 24.06.2017

ABSTRACT

With the purpose to understand consumer's behaviour and constraints faced by trout consumers in Kashmir valley, the present study was conducted during the period 2014-15. Data for the study was collected by conducting personal interview of trout consumers visiting trout farms for the purchase of trouts on the day of survey and willing to participate in the survey with help of specially designed questionnaire for the study. The result revealed that only 8.24 percent of the total household expenditure was for the purchase of fish. Trout was the most preferred fish followed by schizothorax, carp and cat fish on sample households. About 33.33 percent of the consumers bought trout once a month, 28.33 percent once a week,16.67 percent occasionally, 13.33 percent twice a month, 5 percent twice a week, 1.67 percent more than twice a month and 1.67 percent bought once a year. Majority of consumers (91.67%) preferred trout due to its taste, 78.33 percent for its freshness, 58.33 percent due to the presence of less bone, 53.33 percent for health reasons, and so on. Willingness to pay revealed that majority of the consumers (65%) were willing to pay even higher than the prevailing market price (Rs.300-450/kg) if trouts are made available in the nearest local market. At the same time consumers also felt that prevailing price as major constraint followed by long distance to fetch it in the consumption of trout. Encouraging trout production in the state will increase availability in local market that will lead to lower price and higher consumption of trout. This will ultimately lead to better nutrition and health of local people and also create employment and income generating opportunity for poor people in the state.

Key words: *Socio-economics, Consumer preference, Trout, Kashmir.*

INTRODUCTION

Fish plays an important role in the human diet as it provides a number of nutrients, including protein, the long-chain omega-3 polyunsaturated fatty acids (*n*-3 PUFAs), eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) (in particular, in oil-rich fish), and a number of vitamins and minerals. Compared to meat, poultry and eggs, fish is low in saturated fatty acids[2]. Trout is a rich source of vitamin B_1, vitamin B_6 and potassium and a rich or high source of protein, *n*-3 PUFA, vitamin D, vitamin B_3, vitamin B_{12}, phosphorus and selenium.

Cite this article: Gawa, S., Kumar, N.R., Mahida, N., Hoilenting, Vinay, A. and Hatte, V.M., A Study on Consumption Pattern of Trout in Kashmir Valley, India, *Int. J. Pure App. Biosci.* **5(4):** 290-299 (2017). doi: http://dx.doi.org/10.18782/2320-7051.4037

Including trout in the diet can provide many nutrition and health benefits particularly to women around pregnancy, young children and teenagers, and older adults[10]. Farmed rainbow trout are considered one of the safest fish to eat and are noted for high levels of vitamin B and a generally appealing flavour[3]. Seafood Watch ranks farmed rainbow as a "Best Choice" fish for human consumption[12]. Trout has great health benefits as it contains 5 percent fat of which much comes from Omega-3 fatty acids. The Omega-3 fatty acids provide many health benefits, which include reducing the risk of death by heart attack, stroke or heart disease. This fat also helps in preventing fatal arterial clogging, and slows down ageing and help in reduction of bad cholesterol and blood pressure etc[16]. Apart from this, trout is delicacy for many people around the world and has mild fish smell and is ideal fish for all the age group including children which helps in better brain development[16].

In India, trout was successfully introduced in Jammu and Kashmir during 1990[1]. Now, the state of Jammu and Kashmir especially, Kashmir region is major contributor in trout production with total trout production of 262 tonnes worth Rs.182 lakh during 2014-15[7,8]. In spite of all the benefits of fish and trout consumption and its availability, the prevalence of underweight children in India is among the highest in the world, with dire consequences for mobility, mortality, productivity and economic growth[17]. Therefore, there is need to assess the consumption pattern of the people of Kashmir with reference to trout to understand problem of malnutrition in Kashmir region. Under this background, the study on consumer behaviour and constraints in consumption of trout was undertaken. The finding of the study will help in formulating strategies for improvement in trout consumption which will go a long way in improving nutritional status of children in the Valley.

MATERIAL AND METHOD

The study on consumer behaviour was carried out during the period of 2014-15 with the help of well-structured open ended questionnaire. Since there was no any retail market for trout except the retail unit in Kokarnag Trout Fish Farm, no effort was made to select trout consumers, randomly. All those consumers who visited the farms for purchase of trout and were willing to participate in the survey were interviewed personally with the help of pre-tested specially designed questionnaire for the study. The responses on several aspects were recorded and the results are presented with help of simple statistical tools. RBQ technique was used to know the strength of preference of the consumer towards different attributes of the trout.

Consumer is the most unpredictable component of the value chain and the behaviour of consumer is governed by various factors which have a direct or indirect influence on preference for a particular product. The study was carried out to understand the behaviour of trout consumers. The data for the same was collected from 60 respondents, 30 each from the two selected districts. Trout did not reach market due to high demand and small production volume which were being directly marketed at the farm gate. The trout farms were located at high altitude and it was difficult for the trout farmers to bring the fish in market to sell where they can realize better price in comparison to farm gate. Thus the study was conducted at consumer's level and results so obtained are presented in succeeding sections.

RESULTS AND DISCUSSION

Socio-economic profile of consumers

The consumer's behaviour is influenced by his/ her socio-economic status and so it is imperative to know the socioeconomic profile of consumers before studying their behaviour. The basic socioeconomic profile of consumers was collected and presented in tabular form separately for social and economic characteristics.

Social profile of consumers

The social characteristics of consumers were studied and the results obtained are presented in the table1. It can be observed from the table that majority of consumers lived in joint family which accounts for about 68.33 percent of the total consumer and rest lived in nuclear family.

Table: 1 Social profile of the consumer

Parameter categories	Frequency	percentage
Family type		
Joint	41	68.33
Nuclear	19	31.67
Gender		
Head of Households		
Male	58	96.67
Female	2	3.33
Respondents		
Male	56	93.33
Female	4	6.67
Age group		
Head of Households		
<25	0	0.00
25-35	12	20.00
36-45	13	21.67
>45	35	58.33
Respondents		
<25	8	13.33
25-35	27	45.00
36-45	14	23.33
>45	11	18.33
Family size		
2 to 4	9	15.00
5 to 7	32	53.33
>7	19	31.67
Average Family structure		
Male	2.8	40.76
Female	2.68	39.06
Children (<14 yr.)	1.38	20.14
Education level		
Head of Households		
Illiterate	9	15.00
Primary	14	23.33
Secondary	15	25.00
High secondary	12	20.00
Graduate	8	13.33
PG	2	3.33
Respondents		
Illiterate	5	8.33
Primary	9	15.00
Secondary	14	23.33
High secondary	15	25.00
Graduate	12	20.00
PG	6	10.00

The majority of family head were male (96.67 %) and only two (3.33 %) were female. This clearly indicates the dominance of male in the family. Same was the case with respondents; about 93.33 percent of them were male and only 6.67 percent female. Das *et al*[4]., also found that purchasing of fish was done mainly by male members of the family which is about 86.87 percent of total respondents in Tripura.

The head of households and respondents were categorized in four groups based on their age. These groups are (i) Age less than 25 yrs; (ii) Age more than 25 years and less than 35 years (iii) Age more than 36 years and less than 45 years and (iv) Age more than 45 years. Majority of the head of Households were in the age group of greater than 45 years accounting for 58.33 percent of the total. About 21.67 percent of the head of family were in the age group 36-45 years and remaining were in the age group of 25-35 age which was about 20 percent of the total. In the

case of respondents, the major age group was 25-35 years representing about 45 percent of the total. About 23.33 percent were in the age group of 36-45 years, 18.33 percent in the age group of greater than 45 years and 13.33 percent in the age group of less than 25 years, respectively. From the above discussion it is clear that most of head of households were in older age group of more than 45 years as older members usually head the family in Indian culture, while majority of the respondent were of middle age group of 25-35 years. Mugaokar *et al*., observed that majority of fish consumers in Mumbai (70%) were in young age group of 25-30 years. In Kashmir about 45 percent of consumer fall in the age group of 25-35 years and 23.33 percent fall in the age group of 36-45 years.

The family size of respondents was categorized into four groups such as 2 to 4, 5 to 7 and greater than 7 in number. The study revealed that majority of family (53.33%) had 5 to 7 members followed by 31.67 percent of family had more than 7 members and only 15 percent of family had 2 to 4 members in their family. This indicates that majority of families in Kashmir had large family size. This fact can be supported from fact that majority of family were living in joint family system indicating towards large family size.

Information regarding education status of head of family and respondent were analysed by categorizing the education level into six categories (illiterate, primary, secondary, higher secondary, graduate and post graduate and above). In the case of head of households, it was found that 25 percent of head of households were educated up to secondary level which was followed by education up to primary, higher secondary, illiterate, graduate and post graduate and above level with share of 23.33, 20, 15, 13.33 and 3.33 percent, respectively in the total family. In the case of respondents, 25 percent were educated up to higher secondary followed by 23.33 percent up to secondary level, 20 percent up to graduate and 10 percent were post graduate degree holder showing high educational status of respondents. The results revealed that respondents were better educated as compared to the head of family.

Economics profile of trout consumers

The economic profile of sample households was analysed and results so obtained are presented in table 2.

Table 2: Economic profiles of the sample households

Parameter	category	Frequency	Percentage
Occupation Family Members			
	Agriculture	9	15
	Fishery	1	1.67
	Govt. Job	15	25
	Business	19	31.67
	Private Job	4	6.67
	Student	7	11.67
	Other	5	8.33
Family Monthly Expenditure (Rs.)			
	Total Food	9308.33	56.79
	Non-Veg	3705	39.8
	Fish	1350	36.4
	Total Household	16391.67	100
Monthly Per Capita Expenditure (Rs.)			
	Total Food	1352.96	56.79
	Non-Veg	538.52	22.60
	Fish	196.22	8.24
	Total Household	2382.51	14.53
Monthly Household Expenditure category (Rs.)			
	Low(>10000)	8	13.33
	Medium(10000-20000)	41	68.33
	High(<20000)	11	18.33

The occupational profile of family members of the respondents was studied by categorizing them into different groups such as agriculture, fishery, government job, business, private job, students and others. The study revealed that majority of family members were involved in business activities accounting for 31.67 percent of the total. Government job was second largest group with 25 percent share followed by agriculture with 15 percent, student with 11.67 percent and others with 8.33 percent share. Business and the government job formed the major occupational group indicating the inclination of family members towards business and government job. Only 1.67 percent family members of the respondents were involved in fisheries.

The monthly family expenditure pattern revealed that 56.79 percent of total household expenditure was on food items. About 22.60 percent of the total household expenditure was for non-veg and only 8.24 percent of the total household expenditure was on the purchase of fish per month. The per capita expenditure was also worked out and it was found that Rs. 1,350, Rs.538.52 and Rs.196.22 was spent on total food, non-veg and on fish, respectively. The results are similar with Prasad and Madhavi[14] who found that monthly per capita expenditure on fish was Rs.192.20.

The sample households were categorized on the basis of their monthly expenditure as low spender (less than Rs. 10,000) medium spender (between Rs. 10,000 to 20,000) and high spender (greater than 20000). The results revealed that majority of households (68%) were in medium category followed by high (18.33%) and low (13.33%).

Consumer preference towards different species

Preferences of consumers were recorded and based on their responses are presented in table 3. It was found that mainly 4 species of fishes were prevalent in the market during the period of study and hence preferences of respondents were sought from respondents only towards these particular species. The responses were recorded on 5-point score and the result showed that majority of consumers (90%) gave most liked preference to trout fish and 10 percent of them only liked it. Schizothorax species commonly known as snow trout, which is the local fish of Kashmir, was the second most preferred fish with 18.33 percent of the respondent giving it most liked preference and 70 percent liked it. Third most preferred fish was carp that got liked preference from 11.67 percent of respondents and moderately liked from 13.33 percent of respondents while, 33.33 percent gave least liked and 25 percent as not liked. Cat fish was least preferred fish since it was not available in fresh condition. Only 10 percent consumers considered it least liked and 90 percent as not liked. The results reflect that trout was most preferred fish species followed by Schizothorax, carp and cat fish.

Table 3: Consumer preferences towards different species

Species	Frequency					RBQ score	Rank
	1	2	3	4	5		
Trout	54	6	0	0	0	78.00	1
	(90)	(10)	(0)	(0)	(0)		
Carp	0	7	8	20	25	19.00	3
	(0)	(11.67)	(13.33)	(33.33)	(41.67)		
Schizothorax	11	42	7	0	0	61.33	2
	(18.33)	(70)	(11.67)	(0)	(0)		
Cat Fish(pangus)	0	0	0	6	54	2.00	4
	(0)	(0)	(0)	(10)	(90)		

Note: 1= Most liked 2=liked 3=moderately liked 4=Least liked 5=Not liked

- *figures given in the parenthesis indicate percentage of the frequency*

With the help of responses received from consumers RBQ was estimated to rank preferences. It was found that trout was most preferred fish with RBQ score of 78 followed by Schizothorax with RBQ score of 61.33 and Carp was given RBQ score of 19 and the last was catfish with RBQ score of 2. It was found that there were vast differences (about 76%) between the most preferred and not preferred fish and difference between the most liked and liked fish was 16.71 percent. Hence, the result clearly showed that trout was most preferred fish in Kashmir. Schizothorax a local fish captured from wild was also found in fresh condition was the second most preferred fish.

Das *et al*[4]., in their study in Tripura found that 87.5 percent of the consumers preferred locally produced fresh fish and remaining 12.5 percent expressed preference for the fish coming from other states like Andhra Pradesh, West Bengal and Bangladesh which includes marine and brackish water fishes. Davidson *et al*[5]., found that Hawaii consumers were willing to pay more for wild-caught fish than farm raised and more for fresh than previously frozen fish with the degree of preference varying across species.

Consumption pattern

The consumption pattern of trout was estimated and results are presented in the table 4. It was found that all the respondents were aware about trout and none of them has any knowledge about processed trout product. It was found that Kashmiris were fond of non-vegetarian food and they love to relish trout in fresh condition.

Purchasing pattern of the trout were estimated by categorizing the quantity into different groups that is 0.5-1 Kg, 1-2Kg, and greater than 2 Kg for both trout and other available fish in the market. The study revealed that majority of consumers (56.67%) purchased 1-2 Kg of trout fish during each visit and only 50 percent of the consumers purchase 1-2 kg in the case of other fishes. Consumers buying more than 2 kg during each visit were 25 percent and 45 percent in case of trout and other fishes, respectively. Only 18.33 percent and 5 percent of the consumers were buying 0.5-1 kg of trout and other fishes, respectively. The study showed that higher quantity of other available fishes was purchased (more 2 kg) and majority of the consumers bought medium quantity (1-2 kg) in case of trout during each visit. More than 81.67 percent of consumers bought more than 1Kg of trout and 95 percent bought more than 1 kg fish during each visit. The trend of buying higher quantity of fish can be explained by the higher number of family members in joint family.

The Purchasing frequency of the consumers were studied by collecting responses with the help of open ended question and the responses obtained were summarized and results showed wide variability in the purchasing frequency. About 33.33 percent of the consumers bought trout once a month, 28.33 percent once a week,16.67 percent occasionally, 13.33 percent bought twice a month, 5 percent bought twice a week, 1.67 percent bought more than twice a month and 1.67 percent bought once a year. The wide variability in purchasing frequency of trout among the consumers may be due to the different constraints faced by consumers in purchasing trout.

Perception of consumers about trout was studied and found that majority of them (91.67%) preferred trout due to its taste, 78.33 percent for its freshness, 58.33 percent due to the presence of less bone, 53.33 percent for health reasons, 50 percent for being it nutritious, 21.67 percent due to its odour, 15 percent due to ease in cooking, 13.33 percent due to its flavour and 5 percent due to its appearance. Mugaonkar *et al*[11]., in their consumer level study of retail market in Mumbai found that about 60 percent of the consumers gave more preference to the freshness of the fish rather than price of the fish.

Table 4: Behaviour of trout Consumers

Sl.no	Parameters	Category	Frequency	Percentage
1	Awareness about trout Fish			
		Yes	60	100
		NO	0	0
2	Knowledge about Trout Product			
		Yes	0	0
		No	60	100
3	Quantity of trout(kg) purchased per visit			
		0.5-1	11	18.33
		1 to 2	34	56.67
		>2	15	25
4	Quantity of other fish(kg) purchased per visit			
		0.5-1	3	5
		1 to 2	30	50
		>2	27	45
5	Purchasing frequency of trout			
		Once a week	17	28.33
		Twice a week	3	5
		More than twice	1	1.67
		Once a month	20	33.33
		Twice a month	8	13.33
		Once a year	1	1.67
		Occasionally	10	16.67
6	Reason for preferring Trout			
		Taste	55	91.67
		Health	32	53.33
		Nutritious	30	50
		Freshness	47	78.33
		Less bone	35	58.33
		Easy to cook	9	15
		Appearance	3	5
		Odour	13	21.67
		Flavour	8	13.33
7	Willing to purchase trout product			
		Fresh	60	100
		Processed product	0	0
8	Willingness to pay for trout (Rs/kg)			
		350-400	12	20
		401-450	9	15
		451-500	15	25
		>500	24	40

Prasad and Maddhavi[14] found that consumers perceived freshness as significant factor in purchasing fish which also hold true in this study. Hence the results revealed that trout was more or less preferred for its taste, freshness, less bone, health and nutritional quality. It was found that almost all consumers liked to consume trout in fresh condition than in processed form. Mugaonkar *et al*[11]., found that 57.9 percent of consumers were aware about different products of fish in their study in Mumbai. While in case of Kashmir, trout was available only in fresh and was not available in retail market in fresh except canned tuna and

sardine which were produced commercially for export. The findings is in line with Palash and Sabur[13] who conducted study in Dhaka and concluded that taste and freshness were most important factor in selecting the fish.

Willingness to pay was examined by categorizing the price of trout into different range that is Rs.350-400, Rs.401-450, Rs.451-500 and more than Rs.500. The results revealed that majority of respondents (40%) were willing to pay more than Rs.500 per Kg, 25 percent of them were willing to pay between Rs.451-500, 20 percent of them were willing to pay between Rs.350-400 and 15 percent of them were willing to pay between Rs.401-450. This gives us indication that majority of the consumers (65%) were willing to pay higher prices than the prevailing price (Rs.300-450). This indicate the high demand of trout and existence of market potential in the state. Kumar *et al*[9]., studied the willingness to pay for *pahari* potato and CIPC treated potato concluded that about 57 percent of respondent were willing pay more for CIPC treated than prevailing price but only 3 percent were willing to pay more than *pahari* potato which was much costly than CIPC treated. This behaviour of consumer was due to superior attributes of the *pahari* potato over the CIPC treated. Similar behaviour was seen for trout in Kashmir over the other fishes mainly imported from other states in market.

5. Constraints faced by trout consumers

While purchasing trout, consumers were facing some constraints which vary in the magnitude. In order to know the severity of constraints faced by the consumers in purchasing trout, constraints were first identified and the responses were recorded on 5-point scale where, 1 = Most important 2 = important 3 = moderately important 4 = Least important 5 = Not important.

Frequency and percentage analysis were performed and on basis of these responses RBQ value was estimated to rank them. The result obtained is presented in the table 5.

Table 5: Constraints faced by trout consumers

Sl. No	Constraints	Frequency					RBQ	Rank
		1	**2**	**3**	**4**	**5**		
1	Scarcity	23 (28.33)	30 (50)	7 (11.67)	0 (0)	0 (0)	85.33	3
2	Lack of retail units in neighbourhood	36 (60)	21 (35)	3 (5)	0 (0)	0 (0)	84.33	4
3	Wide price fluctuations	0 (0)	0 (0)	0 (0)	3 (5)	57 (95)	21.00	7
4	Highly perishable	0 (0)	3 (5)	5 (8.33)	26 (43.33)	26 (43.33)	35.00	5
5	High price	52 (86.67)	5 (8.33)	1 (1.67)	2 (3.33)	0 (0)	95.67	1
6	Lack of quality/hygiene	2 (3.33)	1 (1.67)	1 (1.67)	7 (11.67)	49 (81.67)	26.67	6
7	Long distance travel to fetch	41 (68.33)	9 (15)	1 (1.67)	5 (8.33)	4 (6.67)	86.00	2

Note: Where 1= Most important 2= important 3 = moderately important 4= Least important 5=Not important

**figures given in the parenthesis is percentage of the frequency*

Majority of consumers considered prevailing trout price as high about 86.67% gave it most important, 8.33 percent important, 1.67 percent moderately important and 2.33 percent least important and based on the RBQ score it was ranked 1. The result was in line with the findings of Upadhyay *et al*[15]., and Debnath *et al*[6]., for the fish consumers of Tripura where high price of fish was most important constraints. This finding seems to contradict the willingness to pay where it was found that they were willing pay more than existing price but for trout if made available in their neighbourhood retail market. They also felt its worth paying due to its taste and freshness and they purchase trout only on some special occasion in the family. The 2nd ranking constraint was long distance travel to fetch trout as 68.33 percent of the consumers considered it most important, 15 percent important, 1.67 percent moderately important, 8.33 percent least important and 6.67 percent not important and RBQ score was 86 percent. The third most severe constraint faced by consumers was scarcity of trout in market as 28.33 percent of the consumers considered it most important, 50 as important, 11.67 percent moderately important and the RBQ score was 85.33 percent. The fourth most severe constraint was lack of retail unit for trout in the neighbourhood 60 percent considered it as most important, 35 percent important and 5 percent as moderately important. The fifth constraints was high perishability of trout but it was not severe as its RBQ score was 35 percent with 8.33 percent of consumers considered moderately important, and equal percent (43.33%) of consumers considered least important and not important. Sixth constraint was lack of hygiene and quality with RBQ score of 26.67 percent and the last constraints was wide price fluctuation of trout with RBQ score of 21 percent. The 5th, 6th and the 7th constraint were not seems to be severe as their RBQ score was low compared to other high ranked constraints. As, trout was available in fresh condition on farm the perishability was not a concern among the majority of consumer. Since trout was available in fresh condition hygiene and quality was not an issue among the consumers and the price was fixed in case of government farms and in private farms also there was not much variation during the period of study so these were not perceived severe constraint by consumers

CONCLUSION

Study showed that trout fish was most preferred fish among the respondents and willingness to pay was also for higher prices than prevailing. The majority of the respondents preferred trout due to its taste and freshness while 50 percent preferred due to its nutritional quality. It is scientific fact that consumption of trout fish is very beneficial and has health benefit for human being. Its production should be encouraged to improve its availability in the market which can fill the gap of nutritional deficiency mainly in the hilly areas. Trout culture has well accepted in Kashmir valley and it can play important food item in other Himalayan region where trout culture can be carried out.

Acknowledgement

Authors are thankful to the Director, ICAR-CIFE, Mumbai for the facility provided for the conduct of the study.

REFERENCES

1. Ayyappan, S., Jena, J.K., Gopalakrishnan, A. and Pandey, A.K., *Handbook of fisheries and aquaculture*. Indian Council of Agricultural Research (2011).
2. Bates B, Lennox A, Prentice A. *et al.*, National Diet and Nutrition Survey, Headline Results from Years 1, 2, and 3 (combined) of the Rolling Programme (2008/09-2010/11). Department of Health, and Food Standards Agency, London (2012).
3. Cancila Katherine The 5 Safest Fish to Eat – Salmon, Tilapia, Rainbow Trout and More, *Babble*. Disney. Retrieved from website - https://www.babble.com/best-recipes/safe-to-eat-fish-recipes-facts-5/ on 7th July, 2016 (2010).

4. Das, A., Kumar, N.R., Debnath, B., Barman, D., and Datta, M., Fish Consumers' Behaviour at Selected Fish Markets of Tripura, India. *Fish. Technol.*, **50:** 185–190 (2013).
5. Davidson, K, Pan, M., Hu, W. and Devie Poerwanto, D., Consumers' Willingness to Pay for Aquaculture Fish Products Vs. Wild-Caught Seafood – A Case Study in Hawaii. *Aqua. Eco. & Manag.*, **16(2):** 136-154 (2012).
6. Debnath, B., Biradar, R.S., Pandey, S.K., Ananthan, P.S., Krishnan, M., Das, A., and Muagaokar, K.,Constraints Analysis on Fish Consumption in Tripura. *Ind. J. of Agri. Mark.* **28(1):** 36–45 (2014).
7. DoF (Department of Fisheries) Official website of Department of Fisheries, Jammu and Kashmir. http://jkfisheries.in/achievements.htm. Accessed on 2 June 2016 (2016).
8. Govt. of Jammu and Kashmir, Economic Survey, 2014-15, Directorate of Economic & Statistics, Government of Jammu and Kashmir (2015).
9. Kumar, N.R., Ezekiel, R., Singh, B., Dahiya. S.P., Kuma, S., Consumer Perception On CIPC Treated Potato In India. *Ind. J. Of Assoc.*, **3(3-4):** 183-190 (2004).
10. McKenzie, J.M. and L. Wyness. Review of Nutritional & Health Benefits for the British Trout Association, British Trout Association Client Report, Queen Margaret University, Edinburgh pp-30 (2013).
11. Mugaonkar, P.H., Ananthan, P.S. and Samal, S.S., A Study on Consumer Behaviour at Organized Fish Retail Outlet. *Agri. Eco. Res. Rev.*, **24:** 133–140 (2011).
12. *O'Neill, Brendan, Seafood Watch Report: Farmed Rainbow Trout (PDF). Monterey Bay Aquarium. pp. 2–6 (2006).* Retrieved from website http://www.seafoodwatch.org/-/m/sfw/pdf/reports/f/mba_seafoodwatch_farmedtroutreport.pdf on 6th July, (2016).
13. Palash, M.S. and Sabur, S.A., Consumption pattern and consumer behaviour of fish in Dhaka city. *J. of Bangl. Agri. Uni.*, **2(2):** 361–370 (2004).
14. Prasad, D. and Madhavi, S., Fish Consumption Behavior in West Godavari District, AP, India. *Res. J. of Manag. Sci.*, **3(5):** 1–5 (2014).
15. Upadhyay, A.D. and Pandey, D.K., Analysis of urban consumer behavior for fish in Tripura. *Fish. Technol.*, **46(2):** (2009).
16. Waweru, P.T., *Trout Fish Value Chain Analysis*, Jitunze Environment Self Help Group, pp.4-33 (2012).
17. Wikipedia *Malnutrition in India*, Wikipedia, the free encyclopedia**,** retrieved from the website https://en.wikipedia.org/wiki/Malnutrition_in_India (2016).