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Consumer's Willingness to Pay (WTP) more for Preferred Fish (*Labeo rohita*) in Manipur

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ABSTRACT

The most preferred fish of Manipur is Labeo rohita (rohu). Study was conducted to find out whether the consumers are willing to pay more for the most preferred fish from 171 households using pre-structure interview scheduled. The objectives of the study were to find out the more amount consumers are willing to pay above the market price and the factors affecting willingness to pay more. The study reveals that consumers are willing to pay more for the preferred fish up to INR 250/kg when the average market price is INR 198/kg. The factors affecting willingness to pay more are taste, nutritive value, family tradition, and proximity. Tastes and preferences were the most preferred factors for buying Labeo rohita (60 %) followed by a nutritive value (16.67%). Out of the four factors taste and the nutritive value was found statistically significant. Therefore regression analysis has been carried out for these two variables using Tobit model.

Key words: *Willingness to Pay (WTP), Tobit model, Labeo rohita, Manipur*

INTRODUCTION

Fish and other aquatic animals have been classified as a good source of easily digestible protein, vitamins, and minerals[2]. Global demand for fish is growing due to a combination of population growth, urbanization, and increasing wealth[11]. In the past four decades, World per capita fish consumption has increased almost double fold from 9.9 kg in the 1960s to 18.6 kg in 2010[7]. Freshwater fish species constitute a major share in total per capita fish consumption in most of the developing countries, and it contributes 15% to 53 % of the total animal protein intake[5]. Fish production and consumption in India is characterised by a large number of species coming from marine and inland sources. Each species varies with its commercial value which is governed by the catch and production pattern, consumers taste and preference[12]. Fish consumption varies widely with economic position of the households, regarding both per capita consumption and type of fish species. Fish, being a heterogeneous product, consumer preferences also differ with species of fish[5]. The domestic market for fish in India is governed not only by the purchasing power of the consumer but also by their tastes and preferences[19]. The per capita fish consumption is 7.02 (rural) and 9.06 (urban) of the consuming population. The consumption of fish in North Eastern states of India ranges from 5 to 14 kg[13].

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Manipur, one of the North Eastern states of India with Imphal as the state capital surrounded by Burma in the east, Assam in the west, Nagaland in the north, and Mizoram in the south and has a fish eating population of more than 90 percent. Fish and rice are the staple food, which forms their basic diet and *Labeo rohita* (rohu) is the most preferred fish species for consumption in Manipur[10].

Thus this study was conducted to find the amount (INR) willingness to pay more for the most preferred fish species (rohu) above the average market price by the sampled households. The specific objectives of the study were to analyze the factors affecting the consumers' willingness to pay more for rohu and to evaluate the consumers' willingness to pay maximum for rohu.

MATERIAL AND METHODS

Multistage random sampling was use in the study. Among the 16 districts of Manipur, four districts viz; Thoubal, Bishnupur, Imphal West and Senapati district was select for the current study. From each of the two districts, Thoubal and Senapati, two villages were randomly selected, and from each of Bishnupur and Imphal West districts, two valley areas were select. The survey was conducted with the help of a specially designed questionnaire. Primary data was collected through personal interview of 180 fish household fish. Price data was collected during the month of September-December 2014 and has a wide range, which differs from frozen fish to locally produce fresh fish. The average price of rohu during the months was INR 198/kg.

The consumer willingness to pay was estimated by using Tobit model, given by James Tobin (1958), in which the value respondent willingness to pay is marked as 1 and the value that the respondents who are not willing to pay is marked as 0. Tobit model given below was fitted for factors such as respondent's age, income, family size, educational level and occupation.

$$Y_i^* = x_i' \beta + \varepsilon i \qquad \{(x_i, y_i) \quad i=1,2....,N\}$$

If

$$Y_i^* = y_i \quad \begin{cases} y_i^* > 0 \\ y_i^* \leq 0 \end{cases}$$

$$y_i = 0$$

Based on the assumption that

Where, $\varepsilon_i \sim$ i.i.d. N $(0, \sigma^2)$

N = is the number of observations

y_i = is the dependent variable

x_i = is a vector of independent variables

β = is a vector of estimable parameters, and

While applying this model, it is assumed that there is an implicit stochastic index (latent variable) equal to y* and was observed only when positive. Maximum likelihood method was used to estimate the parameters.

The consumers were asked about the factors for which they would be willing to pay more for rohu. From the survey, it was recorded that the determinants of demand were taste, nutritive value, family tradition, and proximity. Each respondent was asked to rank the determinant of demand in order of preference. Then they were asked about how much they are willing to pay for one kg of rohu for their most preferred determinant of demand.

RESULTS AND DISCUSSION

From the sample respondent (n=171) it is shown in fig. 1 and 2 that maximum of the respondent are in the age group of 36 to 45 (43.27%) belonging to middle age group and has a family size of 5- 7 members (58.48 %).

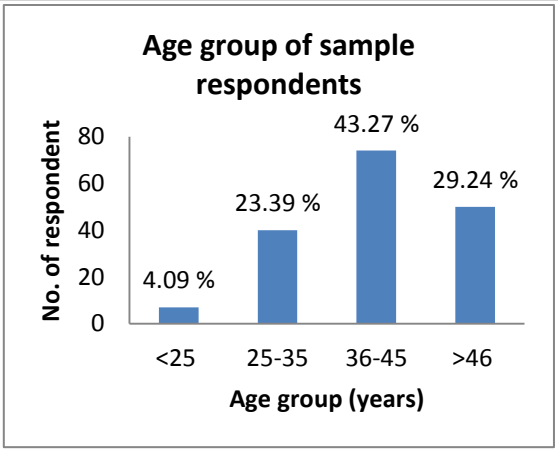

Fig. 1: Age group of sample respondent

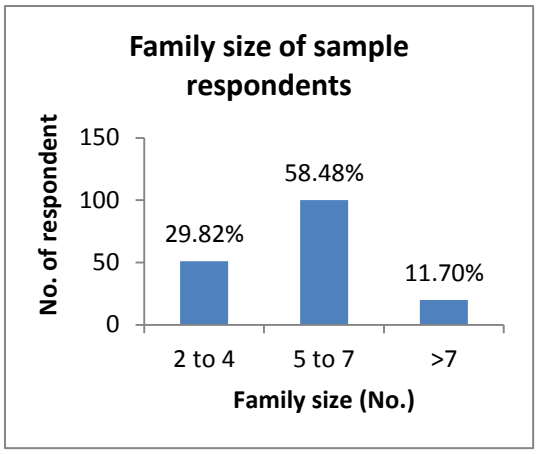

Fig. 2: Family size of sample respondent

Maximum of the respondent (48.54 %) were in the medium income group (Rs. 6000 to 25000), 27.49% and 23.98 % of the respondent were in the low and high-income group respective. Considering the educational qualification, maximum (46.2%) of the respondent are having the educational level up to high school and 5.85% of the respondents are illiterate given in table 1.

Table 1: Income and Educational level of sample respondents. (n=171)

Parameters	Number of respondents	Percentage
Annual Household income		
Low (<6000)	47	27.49
Medium (6000-25000)	83	48.54
High (>25000)	41	23.98
Education		
Illiterate	10	5.85
High school	89	46.20
Higher secondary	56	29.82
Graduate and above	31	18.13

Willingness to pay (WTP) for preferred fish species

The willingness to pay more for the most preferred fish rohu is studied based on the factors such as taste, nutritive value, family tradition and proximity (easy access). The ranking of sample respondents for the four identified determinants is recorded in table 2. A perusal of table 2 reveals that maximum of the household (60.23%) are willing to pay more for taste, followed by a nutritive value (16.96%), family tradition (12.87%) and proximity (9.94%). The willingness to pay more for rohu ranges from INR 180/kg to 250/kg. The average willingness to pay more was INR 198/kg and maximum willingness to pay is INR 250/kg.

Table 2: Rank for *Labeo rohita* (rohu) for selected factors

Factors	Frequency as the first choice	Percent of sample household opting the first choice
Taste	103	60.23
Nutritive value	29	16.96
Family tradition	22	12.87
Proximity	17	9.94
No. of respondents	171	100.00

Tobit model

As WTP price depends upon the households' demographic variables such as age, family income, family size and education level in addition to the above-mentioned four factors such as taste, nutritive value, family tradition and proximity, multivariate Tobit analysis was performed by using STATA 11.0 version software. Results revealed that likelihood ratio of chi-square equals to 31.83 with (df= 20) with a p-value of 0.0451 fits significantly better at 0.05 level of significance. Resultant table 4 also shows the coefficients, their SE, the t-statistics, associated p-value and the 95 percent confidence interval of the coefficients. Among the independent variables, coefficients of age and education are not showing any significant impact on willingness to pay a higher price for *Labeo rohita.* Whereas, coefficients for household family income and family size are found to have significant value (0.0217 and 0.012), hereby positively influencing WTP higher price for *Labeo rohita* at 0.05 level of significance. Among the four factors, coefficients for taste and nutritive value was found significant (0.041 and 0.023) and indicates for willingness to pay a higher price than the average market price by the respondent households and the same is also found during the survey.

As two factors, taste and nutritive value were found to have significant, tobit analysis was again performed to check that which of the demographic variables were responsible for giving preference by respondent households, and the results is given in table 3.

The result of multivariate Tobit model for taste is presented in table 4. Based on taste it was found that with the increase in household family income and family size of one percent the WTP above the market price increases by 0.03% and 0.04% respectively shown in table 4. The fish which are caught from natural and large water body like Loktak lake are assumed to be tastier than farm fish by the consumer and so are willing to pay more for fish from Loktak lake.

Table 3: Regression estimates of multivariate Tobit model

Variables	Coefficient	Standard Error	T	P>l t l	[95% Confidence-Interval]	
Nutritive	0.1317	0.1022	2.10	0.041*	-0.0514	0.4350
Taste	0.2607	0.1132	2.30	0.023*	0.0370	0.4844
Tradition	0.0607	0.2186	0.28	0.781	-0.3709	0.4925
Proximity	-0.1352	0.3678	-0.37	0.714	-0.8616	0.5912
Age	0.0012	0.0019	0.66	0.512	-0.0025	0.0050
Family Income	0.0632	0.0150	2.13	0.027*	0.0089	0.0688
Family Size	0.0432	0.0170	2.54	0.012*	0.0096	0.0768
Education Level	0.0542	0.0290	1.97	0.157	0.0075	0.0794
Constant	0.2627	0.4083	0.64	0.521	-0.5437	1.0692

(Note: * represents value significant at 5% LOS)

Table 4: Regression estimates of multivariate Tobit model for taste

Taste	Coefficient	Standard Error	T	P >l t l	[95% Confidence Interval]	
Age	0.0036	0.0024	1.49	0.139	-0.0085	0.0012
Family Income	0.0382	0.0276	3.00	0.031*	0.0006	0.0728
Family Size	0.0432	0.0216	2.00	0.047*	0.0005	0.0859
Education Level	0.0093	0.0101	0.92	0.361	-0.0107	0.0293
Constant	0.6332	0.1544	4.1	0	0.3284	0.9381

(Note: * represents value significant at 5% LOS)

Similarly, for the nutritive value, the regression estimates at 5 percent level of significance age and family income is found significant. From the table 5 given below shows that one percent increase in age and family income the WTP more above the market price increase by 0.0105% and 0.0471% respectively. Surprisingly, educational level has no significant value on the attributes of nutritive value, where fish is mainly known for its high nutritive value, which may be due to the educational level of the respondent having only up to high school level. Thus households with comparatively more adult members and having higher family income were found to be mainly concerned with nutritive value.

Table 5: Regression estimates of multivariate Tobit model and nutritive value

Nutritive	Coefficient	Standard Error	t	P>l t l	[95% Confidence Interval]	
Age	0.0105	0.0023	4.44	0.0058*	0.0058	0.0151
Family Income	0.0471	0.0263	2.10	0.0291*	0.0003	0.0012
Family Size	-0.3272	0.0207	-1.58	-0.0737	-0.0737	0.0082
Education Level	0.0135	0.0096	1.41	-0.0054	-0.0054	0.0324
Constant	0.3699	0.1475	2.51	0.0788	0.0788	0.6610

(Note: * represents value significant at 5% LOS)

CONCLUSION

The study on the consumers' willingness to pay more for preferred fish, rohu has revealed that the consumers are willing to pay the price higher than the market price. The rank and WTP price for selected determinants offered by the respondents have indicated that 'taste' is the choicest determining factor for consumer's willingness to pay more. The results of multivariate Tobit analysis for taste for *Labeo rohita* have indicated that family size and income of respondents were positively related to WTP a higher price. The results for multivariate Tobit model for nutrition of *Labeo rohita* have shown that age and income of respondents were positively related to the WTP more price for *rohu*. The study has concluded that there exists a considerable demand for rohu which has a good consumer surplus.

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