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Fishers' perception on co-operative services and willingness-to-pay (WTP) for improved fish marketing services at Njarakkal, Ernakulam District, Kerala

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ABSTRACT

Fishermen co-operatives play a vital role in providing services which are uniform in nature. But, the perception of fishermen regarding co-operative services is generally subjective. This study assessed the fishermen's perception at Njarakkal, Ernakulam District, Kerala, regarding the services of co-operatives. It was found from the results that 90% of respondents strongly agreed that they were earning profit by selling fish through co-operatives. More than 80% accepted that co-operatives were the best credit source, binding the fishermen and improving standard of living. About 50% felt that co-operatives had no role in fisheries management. Besides provision of credit, fish auctioning is an important service rendered by fishermen co-operatives. It has been felt that there is lack of proper infrastructure facilities, especially cold storage facility in the domestic fish marketing system. The willingness-to-pay for improved marketing services at Njarakkal was also evaluated during this study. The willingness-to-pay for setting up cold storage facility was assessed using logistic model. Results revealed that 65% of respondents are willing-to-pay for the cold storage facility. The results of logistic regression analysis showed that member's satisfaction regarding co-operative activities is the most significant factor which decides their willingness-to-pay for the improved marketing services.

Keywords: Co-operatives, Fishermen, Logistic regression model, Marketing, Perception, Willingness-to-pay

Fish is a highly perishable commodity that needs much attention during transportation and handling till it reaches the consumer (Bensam, 1999). In India, around 85% of fish is traded in domestic markets and around 70% is traded as fresh fish. Hence, there is lot of chance for spoilage during handling and transportation. Fish spoilage is mainly attributed to the absence of proper cold storage facilities to preserve the off-season and off-time fish catch. Fish spoilage accounted for 10-15% of the fish quantity traded (Chea and Mckenny, 2003). There is difficulty in transporting fish to the non-coastal and interior areas due to lack of cold storage facilities. In India, there are initiatives by National Fisheries Development Board (NFDB) towards improving the cold chain of hygienic retail outlets at varying levels which includes installation of cold storage facility also.

In Kerala, the first initiative to form fishermen co-operatives was taken during 1917, with three-tier structure coming into force *i.e.*, primary co-operatives at village level, secondary co-operatives at district level and apex co-operatives at state level with definite roles and responsibilities. Later, the primary activities of credit were diversified into various business and welfare aspects. Fish selling through fishermen co-operatives is one such activity which earns considerable amount of profit to both fishermen and co-operative societies.

Gibson (1978) highlighted the role of fishing co-operatives in providing platform for processing and export facilities to fisher members. He found that members of co-operatives were enjoying more benefits such as loan facilities for purchase of craft and gear accessories for fishing. The co-operatives frequently face financial, mechanical, social and cultural issues which affect effective functioning. Some of the important drawbacks are lack of adequate cold storage facilities, processing equipment and ice-making machines. The study has been carried out to determine the fishers' willingness-to-pay for improved marketing services at Njarakkal in Ernakulam District of Kerala.

Matsyafed (Kerala State Co-operative Federation for Fisheries Development Ltd.) is instrumental in facilitating fish auctioning through Fishermen Development Welfare Co-Operative Societies. There were 232 fishermen co-operative societies involved in fish auctioning with 43,330 fishermen, which sold 52,049 t of fish and earned about ₹142.15 crores during 2010 (Matsyafed, 2015). In Ernakulam District, there were 55 functional fishermen co-operatives which are mainly under the supervision and control of Matsyafed. The aim of Matsyafed is to liberate fishermen from the middlemen exploitation through providing cheaper credit and common platform towards decision making.

For the present study, the Njarakkal Nayarambalam Fishermen Development Welfare Co-operative Society in Narakkal Panchayat, Vypeen Island, Ernakulam, Kerala (Fig. 1) was purposively selected. In Ernakulam District, around 50% of fishers were members of fisheries co-operatives (CMFRI, 2012). Among the respondents, 75 members were randomly contacted for the study to assess the perceived willingness-to-pay for the improved marketing services.

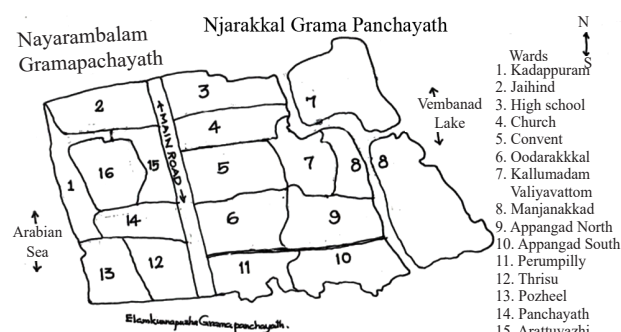


Fig. 1. Location map of Njarakkal Panchayat, Ernakulam District

During 2011-12, eighteen groups comprising of 671 member fishers availed fish auctioning services through Njarakkal co-operatives (Table 1). The quantity of sale was 32,909 t with auction value of ₹873 lakhs and the society earned a commission of ₹13.09 lakhs. Usually, the society charges 6% as commission for fish auctioning services which comprises of 1% commission to Matsyafed, 1.5% to fish auctioneer, 1.5% to the owner of the fishing boat and 1% to the society. The 1% commission to society will be paid in return as a bonus during festive season.

Table 1. Performance of co-operatives in fish auctioning (2003- 2011)

Year	Group	Members	Auction value (₹ lakhs)	Quantity (t)
2003	16	505	350	1752
2004	16	505	398	1992
2005	16	505	594	2970
2006	18	513	529	2645
2007	16	505	620	3100
2008	17	574	702	3514
2009	17	574	1133	5669
2010	18	671	1380	6901
2011	18	671	873	4366
Total	134	4581	6579	32909

The fishermen perception on co-operative services was estimated using Likert scale with a five point scale (Zarafshani *et al.*, 2010). The qualitative scale of agree, strongly agree, disagree, strongly disagree and neutral was used to categorise the perception and characteristics of

co-operatives. The Logistic model was fitted to assess the fishermen co-operative members' willingness-to-pay (WTP) for improved marketing services.

Improved marketing services include establishment of cold storage facilities by the co-operatives for facilitating fish marketing activities of respondents towards reducing loss due to post-harvest handling. The model was run using the variables *viz.*, age, education, membership, satisfaction and fish marketing activities of respondents. The bivariate analysis explained the factors influencing the willingness-to-pay among the variables selected. The perceived willingness to pay of the member fishers towards the improved marketing services was analysed using binary logistic regression analysis (Uva and Cheng, 2005; Tinashe *et al.*, 2013). The mathematical derivation of model is as follows:

$$Z_i = \log \left[\frac{P_i}{1-P_i} \right] = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \alpha_5 X_5 + \epsilon$$

where, X_1 = Age of the respondent (indicates age of the fishermen who are members of the fishermen co-operatives)

X_2 = Education level of the respondent (indicates education level of the fishermen)

X_3 = Membership status (indicates duration as members in the fishermen co-operatives and mentioned in years)

X_4 = Members' satisfaction (indicates the opinion of the fishermen on co-operative services, '1' indicates satisfaction and '0' indicates not satisfied)

X_5 = Fish marketing through co-operatives (indicates the fishermen members who are selling fish through co-operatives, '1' indicates yes and '0' indicates 'No')

ϵ = error term (Zhao *et al.*, 2010)

Narakkal-Nayarambalam Fishermen Development Welfare Co-Operative Society at Narakkal, Ernakulam District came into existence in 1988 and the membership strength was 3123 fishers during 2011. The general activities of co-operatives are credit, fish auctioning, provisional stores, technical assistance, insurance, input sales and welfare activities. Unal *et al.* (2009) identified that the responsibilities of fishermen co-operatives in Turkey were organisation of credits, production, marketing and construction of cold storage.

From the results of the study, it was found that 94% of respondents agreed or strongly agreed that they were earning profit by fish selling through co-operatives similar to earlier report (Zarafshani *et al.*, 2010). More than 80% accepted that co-operatives were the best credit source, ensured unity among fishermen and improved standard of living (Table 2). Two aspects *viz.*, stakeholders' perception and satisfaction on co-operative services determined

Table 2. Fishermen perception on Fisheries co-operative services (%)

Particulars	SA*	A*	N*	D*	SD*
Potential and attractive credit source	2	86	4	8	0
Ensure fishermen unity	4	78	6	12	0
Provide training on fishing activities	0	18	24	54	4
Satisfying the needs of fishermen	2	52	20	26	0
Fish selling is profitable	4	90	4	2	0
Improves standard of living of fishermen	2	86	2	6	0

*SA-Strongly agree, A-Agree, N-Neither agree nor disagree, SD-Strongly disagree, D-Disagree

the co-operatives' performance as reported previously (Unal *et al.*, 2009).

More than 50% felt that co-operatives had no role in fisheries management. The major determinants of the fishermen perception were the role of co-operatives in input supply (94%), client friendliness (92%) and hassle free procedures for approval and repayment of loans (89%) (Table 3).

The co-operatives were preferred least due to the lack of timely loans (33%) and non-provision of technical assistance (29%). Unal and Yercan (2006) also stated that co-operatives were not professionally managed and generally performed below the standard level of efficacy. On the other hand, Baticados *et al.* (1998) reported that co-operatives were helpful in co-managing fisheries resources and members were also willing to assume responsibilities.

The average age of the member fishers was 36 years and majority of them completed middle school (66%). It was understood from the previous studies that there were significant contribution of education and income towards perceived willingness-to-pay for conservation activities (Scott and Willits, 1994; Chen *et al.*, 2011). Family size of the respondents varied between 2 to 6 and the average family

Table 3. Determinants of fishers' perception on co-operative services (%)

Particulars	SA*	A*	N*	D*	SD*
Client-friendliness	6.25	85.42	4.17	4.17	0.00
Timely loan availability	4.17	29.17	16.67	50.00	0.00
Profitability	4.17	83.33	4.17	6.25	2.08
Technical assistance	0.00	22.92	25.00	52.08	0.00
Input supply	2.08	43.75	31.25	16.67	6.25
Hassle-free procedures	2.08	87.50	4.17	2.08	4.17
Repayment flexibility	6.25	43.75	12.50	33.33	4.17

*SA - Strongly agree, A - Agree, N - Neither agree nor disagree, SD - Strongly disagree, D - Disagree

income of the respondents was ₹12435/-. Their mainstay was fisheries with no alternative livelihood opportunities for fishers. The respondents were selling fish through fisheries co-operatives on an average for 12 years. It was found that the respondents completed at least primary level of education which formed the predominant group (67.82%).

The descriptive statistics of the variables selected for the logistic model showed that 64.19% of members fell in the age group of 30-50 years with majority of them having above primary level of education (67.82%). More than 75 and 65% of fisher members were satisfied with the services provided by co-operatives and WTP for improved marketing services as reported earlier (Uva and Cheng, 2005) (Table 4).

It was evident that among the variables selected (Table 4), fisher members who are willing-to-pay for improved marketing services were those below the age of 30 years with above primary education and selling fish through co-operations for more than 5 years. They were in fact associated with the co-operatives for more than 10 years (Table 5).

Among the variables studied, member's satisfaction regarding co-operative activities are the significant factor with positive relationship which decides their willingness-to-pay for the improved marketing services (Table 6). The variables such as age, education and membership showed no significant relation with member's satisfaction regarding co-operative activities. From this, it was revealed that the satisfaction of members on co-operative activities is the prime factor determining the WTP for the improved

Table 5. Bivariate analysis of members' characteristics and factors influencing the willingness-to-pay (%)

Variables	WTP (N = 69)	Non-WTP (N = 36)
Age		
Below 30	77.82	22.18
Above 30	68.25	31.75
Education		
Below primary level	33.19	66.81
Above primary level	79.26	20.74
Fish marketing through co-operatives		
Less than 5 yrs	45.89	54.11
More than 5 yrs	68.45	31.55
Co-operative member - relationship		
Co-operative member <10 yrs	55.23	44.77
Co-operative member >10 yrs	75.69	24.31
Satisfaction with co-operative services		
Satisfied	66.00	34.00
Not satisfied	42.65	57.35

Table 4. Descriptive statistics of variables used in Logistic model

Variables	Code	Min.	Max.	Mean	Distribution (%) (n = 105)
Age of member fisher					
Below 30 = 1; otherwise = 0	Age 1	0	1	0.17	6.96
30 - 50 yrs = 1; otherwise = 0	Age 2	0	1	0.59	64.19
Above 50 yrs = 1; otherwise = 0	Age 3	0	1	0.24	28.85
Education level of member-fisher					
Below primary level = 1; otherwise = 0	Edu 1	0	1	0.38	32.18
Above primary level = 1; Otherwise = 0	Edu 2	0	1	0.62	67.82
Fish marketing through co-operatives					
Less than 5 years = 1; otherwise = 0	Fishmar 1	0	1	0.28	24.14
More than 5 years = 1; otherwise = 0	Fishmar 2	0	1	0.72	75.86
Co-operative-member relationship					
Co-operative member <10 yrs = 1; otherwise = 0	CM-RELN 1	0	1	0.41	39.81
Co-operative member >10 yrs = 1; otherwise = 0	CM-RELN 2	0	1	0.59	60.19
Satisfaction with co-operative services					
Satisfied = 1; otherwise = 0	Satifr 1	0	1	0.74	76.27
Not satisfied = 1; otherwise = 0	Satifr 2	0	1	0.26	23.73
Willingness to pay for improved marketing services					
Yes = 1; otherwise = 0	Wtp 1	0	1	0.63	65.39
No = 1; otherwise = 0	Wtp 2	0	1	0.37	34.61

Table 6. Logistic results of willingness-to-pay (WTP) for improved fish marketing services

Parameter	Estimate
Intercept	11.965
Age	0.767
Education	-0.653
Membership	-0.571
Member's satisfaction	11.082**
Fish marketing through co-operatives	-23.720**
Likelihood ratio	21.802**

**Significant at 1% level

marketing services. Bhuyan (2007) suggested that without active members 'participation and of members satisfaction, co-operatives cannot survive in the long run.

Among the respondents studied, 66% were willing-to-pay for the installation of improved marketing services. The amount, which they were willing-to-pay for improved marketing services, varied between ₹10 to 50/-. The mode and frequency of payment also differed between respondents (Table 7).

Majority of the fisher members preferred to make the payment in cash (70.67%) separately rather than deduction along with commission charges for fish auctioning. The preferred frequency of payment by the fisher members was 68, 24 and 8% for daily, weekly and monthly instalments respectively.

The services provided by the fishermen co-operatives have diversified over the period of time from credit to

Table 7. Fishers' options on WTP for improved marketing services

Particulars	Frequency	Percentage
Category		
Willing to pay ₹10	47	45.16
Willing to pay ₹11-20	22	21.12
Willing to pay ₹21-30	17	16.43
Willing to pay ₹31-40	13	12.15
Willing to pay ₹41-50	6	5.14
Mode of payment		
Willing to pay as cash	74	70.67
Willing to pay along with commission charges	31	29.33
Payment frequency		
Daily	72	68.00
Weekly	25	24.00
Monthly	8	8.00

business and welfare activities. From the results of the study it is evident that the fishermen co-operatives played a major role in improving the livelihood of fishermen through bonding fishermen, input supply and facilitating fish auctioning activity. The members with more years of association and those selling fish through auctioning were willing-to-pay more for the improved marketing services. The member's participation in the co-operatives was a significant factor in determining the willingness-to-pay of fishermen towards improved fish marketing services.

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