

Technological Changes among the Traditional Fishermen

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The present study was conducted to determine the technological changes and impact perception among the fishermen regarding the recommended technological practices. The extent of technological changes in the practices, viz. use of cheaper wood materials for construction of fishing crafts and the use of synthetic fishing net materials were almost complete. The use of chemical wood preservatives was not adopted by any fishermen. The technological change with regard to the use of ice onboard country crafts was 1.61%. The studies revealed that experienced fishermen had low adoption scores. The low technological gap scores had significant relationship with higher investment and maintenance costs of crafts and nets and crew engaged.

Several technologies in the various specialised areas of fishing technology have been evolved to increase the fish production and for better utilization among the clientele (Kandoran & Mary, 1985). Through lab-to-land and other experimental programmes of the Central Institute of Fisheries Technology (CIFT), Cochin efforts were undertaken to disseminate the appropriate technologies among the artisanal fishermen in the local fishing villages.

To provide feedback data to the research and extension systems and to evolve suitable extension strategies, the present study was conducted with the following specific objectives: i) to determine the technological changes and technological gaps among the fishermen for the selected technological practices ii) to analyse the relationship between the characteristics of fishermen and the technological gap, and iii) to find out the impact perception among the fishermen due to the technological changes.

Materials and Methods

The study was conducted in Ernakulam district, Kerala State where the CIFT is located. From the two marine blocks of the district, eight fishing villages were randomly selected. Sixty two fishermen randomly selected from these villages constituted the

sample of this study. Structured interview schedules were used to collect the data from the selected respondents.

In this study, the technological change refers to the extent of adoption of the recommended technological practices and the technological gap refers to the extent of non-adoption of the recommended technological practices by fishermen. The recommended practices included in the study consisted of use of cheaper wood materials, use of chemical wood preservatives, use of in-board/outboard engines, use of synthetic fishing net materials and use of ice.

The technological gap score of each respondent was calculated by an index developed for this study. Accordingly, a three point rating scale was used to measure the gap in respect of each technological practice. The technological gap index score of a respondent was calculated from the ratio of total scores obtained to the maximum possible scores and expressed in percentages. Similarly, technological gap score was calculated for each technological practice and then, the extent of technological change was determined.

Several personal, socio-economic and technological variables were selected for

determining their relationship with the technological gap. The impact perception due to the technological changes was measured by an impact index developed for this study which consisted of 39 items. The collected data were analysed by using the statistical tests, 't', λ^2 and correlation and multiple regression techniques.

Results and Discussion

Table 1 shows the technology-wise gaps and changes among the fishermen. The mean technological gap index score of fishermen was 48.55 ± 10.22 i.e., 48.55 per cent of the recommended technologies were not adopted by the fishermen. The extent of technological changes in the two practices, viz. the use of cheaper wood materials for constructing fishing crafts and use of synthetic fishing net materials, were found to be 100 and 99.19% respectively. But the technology transfer programmes on the use of chemical wood preservatives could not bring about any change and the fishermen preferred the traditional wood preservatives.

The percentage of engine use in country crafts for propulsion in this area was 56.46 per cent. More financial assistance through institutional agencies would further increase their use among the artisansal fisher-

Table 1. *Technological changes among traditional fishermen*

Tech. practices	Tech. gap scores	(n:62) Tech changes
	%	%
Use of the cheap wood materials	0	100.00
Use of chemical wood preservatives	100.00	0
Use of inboard/ outboard engines	43.54	56.46
Use of synthetic net materials	0.81	99.19
Use of ice onboard	98.39	1.61

men. On the use of ice onboard, the extent of technological gap was 98.39 per cent and it might be due to the lack of facilities for icing onboard the fishing craft. The results indicate that for higher adoption of improved technological practices, the extension education programmes would have to be complemented with other supporting services, marketing facilities and technological assistance programmes.

It is evident from Table 2 that among the ten quantitative variables studied in the correlation analyses, only five variables, viz. the number of crew members, experience in fishing, total investment, maintenance cost of craft and maintenance cost of fishing nets, had significant relationship with the technological gap scores of fishermen.

The four economic variables viz., total investment, maintenance cost of craft, maintenance cost of fishing nets, and crew members engaged had significant negative correlation with the technological gap. These results indicate that the adoption of

Table 2. *Correlation analyses between the selected variables and the technological gap scores of traditional fishermen*

Var. No.	Variables	n	Correlation co-efficients (r)
X ₁	Age	62	0.2303
X ₂	Total family members	62	-0.0810
X ₃	Crew engaged	62	-0.7635 **
X ₄	Experience	62	0.3331 **
X ₅	Fishing days per year	62	0.0874
X ₆	Mass media exposure	62	-0.1419
X ₇	Annual income	62	-0.0865
X ₈	Total investment	45	-0.8470 **
X ₉	Maintenance cost of craft per year	41	-0.4970 **
X ₁₀	Maintenance cost of fishing nets per year	37	-0.5552 **

**Significant at 1 per cent level

Table 3. *Quantitative variables and the mean technological gap scores of fishermen*

Variables	Low tech. gap category (<48.5)			High tech. gap category (>48.5)			't'
	n ₁	Mean	SD	n ₂	Mean	SD	
Age, Years	36	33.44	11.79	26	38.31	12.46	1.56
Total members of family	36	6.27	2.01	26	6.04	2.16	0.44
Crew engaged, No.	36	30.61	14.77	26	2.88	3.56	9.36**
Experience, Years	36	15.03	9.08	26	19.96	11.66	1.87
Fishing days per year	36	190.17	54.19	26	205.00	61.14	1.01
Mass media exposure, Scores	36	47.84	15.89	26	43.58	15.99	1.04
Annual income, Rs.	36	3433.89	2206.82	26	3115.38	1494.44	0.64
Total investment, Rs.	21	202333.33	72326.40	24	8033.33	5169.97	13.14**
Maintenance cost of craft per year, Rs.	22	12750.00	14699.97	19	1065.79	779.97	3.45**
Maintenance cost of fishing nets per year, Rs.	21	11533.33	10631.48	16	662.50	871.49	4.07**
Average fuel cost per day, Rs.	35	755.43	498.04	-	-	-	-

**Significant at 1 per cent level

the improved technological practices involved more investment and maintenance expenditure and increased information support and assistance from the crew members. These tallies with the findings of Tyagi & Tyagi (1988) who reported that the economic variable, socio-economic status had negative correlation with the technological gap and it was the most important determinant of technological gap in sugarcane cultivation.

Further, among the five significant variables, only experience had significant and positive correlation with the technological gap scores. It reveals that well experienced fishermen had higher non-adoption scores. Earlier studies of Kaul & Balasubramaniam (1982) and Katarya (1989) had also reported similar negative relationship between experience and adoption of innovations. In this situation, to reduce the technological

gap, positive attitudes, peer group participation and need oriented institutional assistance and facilities may have to be developed among the fishermen.

Table 3 presents the mean scores of socio-personal and economic variables of fishermen among the low and high technological gap categories. The 't' tests reveal that only four variables viz. crew engaged, total investment, maintenance cost of craft and maintenance cost of fishing nets had significant differences in their mean scores between the low and high technological gap categories. It confirms the earlier analysis that the low technological gap scores of fishermen had significant relationship with the higher investment, maintenance cost of crafts and nets, and crew engaged.

It is evident from Table 4 that the five qualitative variables such as ownership pat-

Table 4. Qualitative variables and the technological gap scores of traditional fishermen

Variables	Technological gap				Total (n:62)		χ^2 value
	Low		High		No.	%	
	No.	%	No.	%	No.	%	
<i>Education</i>							
1. Illiterate	3	8.33	2	7.69	5	8.07	0.52
2. Upto primary school	30	83.34	23	88.46	53	85.48	
3. Upto high school	3	8.33	1	3.85	4	6.45	
<i>Ownership pattern</i>							
1. As owners of craft & net	3	8.33	20	76.92	23	37.10	35.87**
2. As shareholders	18	50.00	-	-	18	29.03	
3. As owners of net	-	-	1	3.85	1	1.61	
4. As fishing labourers	15	41.67	5	19.23	20	32.26	
<i>Type of fishing</i>							
1. Gill net fishing	4	11.11	23	88.46	27	43.55	48.01**
2. Seine net fishing	31	86.11	-	-	31	50.00	
3. Seine net & gill net fishing	1	2.78	-	-	1	1.61	
4. Cast net fishing	-	-	3	11.54	3	4.84	
<i>Social participation</i>							
1. Member in organizations	23	63.89	22	84.62	45	72.58	1.64
2. Non-members	13	36.11	4	15.38	17	27.42	
<i>Size of craft used</i>							
1. <36' craft	1	2.78	26	100.00	27	43.55	58.07**
2. >36' craft	35	97.22	-	-	35	56.45	
<i>Wood material used</i>							
1. Cheeni (<i>Tetrameles nudiflora</i>)	1	2.78	9	34.61	10	16.13	33.63**
2. Aini (<i>Artocarpus hirsuta</i>)	34	94.44	6	23.08	40	64.52	
3. Mango (<i>Mangifera indica</i>)	1	2.78	11	42.31	12	19.35	
<i>Net materials used</i>							
1. Nylon monofilament	34	94.44	3	11.54	37	59.68	43.22**
2. Nylon multifilament	2	5.56	19	73.07	21	33.87	
3. Nylon monofilament and multifilament	-	-	1	3.85	1	1.61	
4. Cotton, nylon multifila- ment and monofilament	-	-	3	11.54	3	4.84	

**Significant at 1 per cent level

Table 5. Multiple regression analysis between the independent variables and impact scores of traditional fishermen

Var. No.	Independent variables	Correlation coefficient(r)	Partial reg. coefficient(bi)	Standard error	't' value
X1	Age	0.0043	0.175	0.210	0.8333
X2	Total family members	-0.2856 *	-0.606	0.544	1.1139
X3	Crew members engaged	0.9141**	-0.261	0.106	2.4623*
X4	Experience in fishing	-0.1076	-0.159	0.240	0.6625
X5	Fishing days per year	-0.1331	0.011	0.021	0.5238
X6	Mass media exposure	-0.1156	0.029	0.066	0.4394
X7	Annual income	0.2303	0.000	0.001	0.0000
X8	Technological gap	0.1112	-0.365	0.169	2.1598*

*Significant at 5 per cent level; **significant at 1 per cent level; n=62; $R^2 = 0.2296$; $F=1.975$

tern, type of fishing, size of craft used, wood materials used for constructing the craft, and net materials used had significant association with the technological gap. Hence, these technological variables would have to be taken into account while planning and implementing any strategy to reduce the technological gap.

The mean impact perception score of the fishermen was 34.52 ± 8.13 (range 17.94 to 51.28) which indicated that the artisanal fishermen did not agree with many of the technological and economical impact items. It might be due to their medium level of technological adoption (52.45%) and less significant benefits.

The results of multiple regression analysis between the independent variables and impact perception of fishermen are given in Table 5. The results reveal that the partial regression coefficients of two variables, namely, crew members engaged and technological gap had significant and negative influence over the variation in their impact perception. However, the R^2 value was low (0.2296) and the F value was non-significant. Therefore, the findings suggest that the socio-personal variables studied have almost no significant influence over the impact perception of fishermen.

The results of the study suggest that continuous extension educational efforts would have to be undertaken by the various fisheries development agencies to achieve the desired technological changes among the fishermen. As the technology adoption is positively related to the investment and other economic variables, the experimental technology assistance programmes would have to be operated in the selected areas. Further, the technological variables shall have to be periodically monitored for further development.

The authors are thankful to the Director, Central Institute of Fisheries Technology, Cochin-29 for permission to publish this paper. Technical assistance of Shri K.K.Sudhanandan and Shri K.D.Jos are gratefully acknowledged.

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