

Technological Gaps Among Small and Large Craft Fishermen

S. Balasubramanian, Braj Mohan, M.K. Kandoran and A.K. Kesavan Nair
Central Institute of Fisheries Technology Cochin - 682 029

Due to the motorisation of traditional crafts and the resultant increase in the fuel consumption, the size of fishing craft operated by the fishermen has assumed importance. This paper describes the characteristics of small and large craft fishermen, and the extent of technological gaps among these fishermen. The study also analyses the influence of the characteristics of small and large craft fishermen on their technological gap scores. Further, the operational constraints of fishermen in the use of improved technologies are given along with suggestions to bridge the technological gaps.

In order to provide systematic technological orientation to the extension services, it is necessary to identify the existing technological gaps among the traditional fishermen. Due to the motorisation of traditional craft, and the resultant increase in the fuel consumption, the size of fishing craft has assumed importance. This paper presents the study conducted with the following objectives: (i) to determine the characteristics of small and large craft fishermen and the extent of technological gaps among these fishermen (ii) to find out the influence of the selected characteristics of small and large craft fishermen on their technological gap scores and (iii) to analyse the constraints of fishermen in the use of improved fishery technologies.

Materials and Methods

The study was conducted in the selected fishing villages of Ernakulam district in Kerala state. Fortyfour fishermen who owned/shared large fishing craft and 36 fishermen who owned/shared small fishing craft were selected for the study. Structured interview schedules were used to collect the data from the selected respondents. Fishing craft below 10.9m OAL were classified as small craft and those above classified as large craft. In order to determine the technological gap, the improved practices such as use of cheaper wood

materials, chemical wood preservatives, in-board/outboard engine, appropriate synthetic net materials and appropriate size craft were considered for the study.

A three point rating scale was used to measure the gap in respect of each technological practice and the technological gap score of each respondent was calculated by an index developed for this study. The data were analysed using 't' test, X^2 test, correlation and multiple regression analyses.

Results and Discussion

i) Characteristics of small and large craft fishermen

Table 1 reveals the characteristic of small and large craft fishermen measured quantitatively.

It is evident that there were significant difference between the small and large craft fishermen in respect of socio-personal variables such as fishing days in an year, crew members of the craft, annual income and total investment of the fishing unit.

There were no significant difference between the small and large craft fishermen in respect of age, experience, total family members, mass media exposure and technological gap scores. From the technological gap mean scores, it is evident that the

Table 1. *Characteristics of small and large craft fishermen*

Characteristics		Small craft fishermen (n:36)		Large craft fishermen (n:44)		Combined (n:80)		t'
		\bar{X}	S.D	\bar{X}	S.D	\bar{X}	S.D.	
Age	(Yrs)	36.583	11.936	37.704	12.892	37.200	12.406	0.399
Experience	"	19.250	10.779	20.500	13.363	19.937	12.209	0.453
Fishing days in a year	(no.)	241.250	50.813	208.591	53.419	223.287	54.447	2.781 **
Total family members	"	6.167	1.920	6.659	2.744	6.437	2.407	0.909
Crew members	"	2.389	0.964	39.773	10.410	22.950	20.240	21.448 **
Annual income	(Rs.)	4322.222	2517.721	5579.546	3013.271	5028.750	2859.281	1.996 *
Mass media-exposure index	(Scores)	54.626	22.752	49.996	19.356	52.079	20.944	0.984
Total investment of the fishing unit	(Rs.in 1000)	12.692	7.407	255.114	47.967	146.024	126.515	30.002* *
Technological gap	(Scores)	51.391	7.043	51.140	8.354	51.254	7.744	0.143

*Significant at 4 per cent level; **Significant at 1 per cent level

technological adoption or non-adoption did not vary significantly between the small and large craft fishermen. This might be due to the influence of socio-technological and environmental factors. Similar observations were made by earlier workers (Rogers & Shoemaker, 1971; Anon, 1980; Singh, 1981 and Balasubramaniam & Kaul, 1985).

Table 2 presents the qualitative characteristics of small and large craft fishermen. As there was no significant association between the size of the craft operated and the variables such as education and organisational membership, these two variables did not differentiate significantly. However, the variables such as ownership pattern, use of outboard engines, and types of fishing had significant association with the size of the craft operated by the fishermen.

The small craft fishermen (100%) had own craft and most of them (above 90%) used non-motorised craft and gill nets for fishing. On the contrary, the large craft fishermen were mostly share-holders of craft (95.45%) and they had used outboard

engines and seine nets for fishing operations (100%).

These results also imply that whenever the recommended technological practices need higher investment, the organised groups of artisanal fishermen may adopt these practices through the assistance of active social organisations and developmental agencies.

ii) Variables influencing technological gap scores of small craft fishermen.

Among the eight quantitative variables studied, only four variables namely, family size, crew size, annual income and total investment of the fishing unit had significant and negative correlation with the technological gap scores of small craft fishermen (Table 3).

The partial regression coefficients reveal that only total investment of the fishing unit had significant and negative influence on the dependent variable. Therefore, total investment of the fishing unit is an important variable influencing the technological gap scores of small craft fishermen.

Table 2. *Qualitative variables of small and large craft fishermen*

Variables	Small (n:36)		Large (n:44)		Total (n:80)		X ²
	No.	%	No.	%	No.	%	
Education							
a. Primary school	30	83.38	37	84.09	67	83.75	0.0083
b. High school	6	16.67	7	15.91	13	16.25	
Ownership pattern							
a. Owners	36	100.00	2	4.55	38	47.50	72.3445 **
b. Share holders	-	-	42	95.45	42	52.40	
Orgl.membership							
a. Member	31	86.11	39	88.64	70	87.50	0.1154
b. Non-members	5	13.89	5	11.36	10	12.50	
Use of Engines							
a. Motorised	3	8.33	44	100.00	47	58.75	68.6525 **
b. Non-motorised	33	91.67	-	-	33	41.25	
Type of Fishing							
a. Seine net fishing	-	-	25	66.82	25	31.25	
b. Gill net fishing	34	94.44	-	-	34	42.50	
c. Seine net fishing & other nets	-	-	19	43.18	19	23.75	79.9999 **
d. Gill net fishing & other nets	2	5.56	-	-	2	2.50	

**Significant at 1 per cent level

In the multiple regression analysis, R^2 is found to be 0.6265 and F value is highly significant. Hence, the variables taken in the analysis had accounted for 62.65 per cent of the variability in the technological gap scores of small craft fishermen. The prediction equation derived from the analysis is also given in Table 3.

Table 4 reveals the relationship between the independent variables and technological gap scores of large craft fishermen. It is evident that experience, fishing days in a year, annual income, and total investment of the fishing unit has significant and positive correlation with the technological gap scores of large craft fishermen. The partial regression coefficient of two variables such as fishing days in an year, and total investment had significant and positive influence on the dependent variables. R^2 is found to be 0.5864 and F value is highly significant. It indicates that 58.64 per cent of the

variability has been explained by the selected variables.

Unlike small craft fishermen, the large craft fishermen might have had higher technological gap and lower adoption, inspite of the increase in the investment of the fishing unit and in the number of fishing days in an year. Therefore, it is suggested that all the traditional fishermen must be considered as a target group for the development efforts and through active social organisations and community participation, these fishermen may have to be assisted to bridge the technological gaps.

The results of correlation and multiple regression analyses, between the independent variables and technological gap scores of small and large craft fishermen combined together, are given in Table 5. It is evident that none of the correlation coefficient is significant. The multiple

Table 3. Correlation and multiple regression analyses between the independent variables and technological gap scores of small craft fishermen n:36

Var. No.	Variables	Correlation coefficient (r)	Partial regression coefficient (bi)	Standard error (SEbi)	t'
X ₁	Age	-0.0156	-0.1741	0.1999	0.8706
X ₂	Experience	0.1112	0.2905	0.2279	1.2747
X ₃	Fishing days in a year	-0.2179	-0.0039	0.0228	0.1730
X ₄	No. of family members	-0.3345 *	-0.5261	0.5210	1.0097
X ₅	No. of crew members	-0.5724 **	-1.5239	1.2097	1.2597
X ₆	Annual income	-0.3496 *	-0.0005	0.0005	0.9281
X ₇	Mass media exposure index	-0.0661	0.0076	0.0389	0.1962
X ₈	Total investment of the unit	-0.7391 **	-0.4363	0.1928	2.2634*

$$a = 67.2459$$

$$R^2 = 0.6265$$

$$F = 5.6611^{**}$$

$$Y = 67.246 - 0.174 X_1 + 0.291 X_2 - 0.004 X_3 - 0.526 X_4 - 1.524 X_5 - 0.001 X_6 + 0.008 X_7 - 0.435 X_8$$

*Significant at 5 per cent level; ** Significant at 1 per cent level

regression technique reveals that the partial regression coefficients of two variables namely experience and total investment of the fishing unit were found to have significant and positive influence on the technological gap scores. However, R^2 is low (0.1838) and not significant. Therefore, when the small and large craft fishermen

categories are combined together, the independent variable studied did not explain significantly towards the variability in the technological gap among traditional fishermen.

iii) Constraints in the use of improved technologies

Table 4. Correlation and multiple regression analysis between the independent variables and technological gap scores of large craft fishermen n:44

Var. No.	Variables	Correlation coefficient (r)	Partial regression coefficient (bi)	Standard error (SEbi)	t'
X ₁	Age	0.2786	-0.0240	0.3441	0.0697
X ₂	Experience	0.3108 *	0.0364	0.3321	0.1097
X ₃	Fishing days in a year	0.5736 **	0.0689	0.0192	3.5936 **
X ₄	No. of family members	0.1949	-0.1390	0.4770	0.2914
X ₅	No. of crew members	0.0878	0.0744	0.1073	0.6940
X ₆	Annual income	0.3820 *	0.0005	0.0005	1.0316
X ₇	Mass media exposure index	0.00001	-0.0058	0.0484	0.1196
X ₈	Total investment of the unit	0.6107 **	0.0721	0.0222	3.2459 **

$$a = 13.8745 \quad R^2 = 0.5864 \quad F = 6.2038^{**}$$

$$Y = 13.874 - 0.024X_1 + 0.036X_2 + 0.069X_3 - 0.139X_4 + 0.074X_5 + 0.001X_6 - 0.006X_7 + 0.072X_8^{**}$$

* Significant at 5 per cent level; **Significant at 1 per cent level

Table 5. Correlation and multiple regression analyses between the independent variables and technological gap scores of fishermen (combined category).

Var. No.	Variables	Correlation coefficient (r)	Partial regression coefficient (bi)	Standard error (SEbi)	t'
X ₁	Age	0.0154	-0.3550	0.2159	1.6442
X ₂	Experience	0.0326	0.4746	0.2238	2.1203*
X ₃	Fishing days in a year	0.0171	0.0267	0.0181	1.4757
X ₄	No. of family members	0.0021	0.2533	0.4383	0.5779
X ₅	No. of crew members	0.0001	-0.2113	0.1105	1.9121
X ₆	Annual income	0.0144	-0.0005	0.0004	1.2085
X ₇	Mass media exposure index	-0.0028	-0.0218	0.0407	0.5355
X ₈	Total investment of the unit	0.0205	0.0408*	0.0177	2.3053*

$$a = 50.0571 \quad R^2 = 0.1838 \quad F = 1.9989$$

$$Y = 50.57 - 0.355X_1 + 0.475X_2 + 0.027X_3 + 0.253X_4 - 0.211X_5 - 0.001X_6 - 0.22X_7 + 0.041X_8$$

*Significant at 5 per cent level.

In general, the artisanal fishermen reported the following problems in the use of improved technologies; (i) Need for more credit facilities (47.5%), (ii) Need for appropriate technologies to increase the catch per unit effort (32.07%), (iii) High maintenance cost of engines and boats (24.52%), (iv) Lack of special schemes for fishery technological development (18.86%), (v) Low price during peak season and lack of bargaining power of crew members (13.20%), (vi) Lack of own fishing craft and gear (13.20%), (vii) High cost of fishery inputs (11.32%) and (viii) Under-employment.

The study suggests that the extension services in the region shall have to play a crucial role to bring about technological development. In this context, the various developmental agencies may have to be

actively involved through appropriate schemes to provide the technological assistance and two way flow of information.

References

- Anon (1980) Report of the workshop on Extension Service Requirements in Small-Scale Fisheries, BOBP/Rep/6, Madras
- Balasubramaniam, S. & Kaul, P.N. (1985) *Indian J. Extension Education*, 21, 80
- Rogers, E.M. & Shoemaker, F.F. (1971) *Communication of Innovations: A cross-cultural approach*. The Free Press, New York.
- Singh, Y.P. (1981) *Problems in Transfer of Agril. Technology in Management of Transfer of Farm Technology*, NIRD, Hyderabad.