

## **Innovative Behaviour of Fishermen and Associated Variables**

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The innovative behaviour of fishermen operating plywood craft, plank-built craft and catamaran were analysed. On the innovation-decision behaviour component, all fishermen categories had higher index scores than the innovativeness component. The overall innovative behaviour index scores of fishermen operating these craft were 51.31, 51.21 and 38.13 for the sample from Kerala and 61.44, 43.22 and 41.43 for the sample from Tamil Nadu. The extent of influence of the 22 selected variables on the innovative behaviour of the fishermen is presented.

**Key words:** Innovative behaviour, adoption, fishing craft, fishing, innovativeness

As the technologies introduced are not adopted by all intended fishermen at the same period of time, the technological adoption and the innovativeness vary with the fishermen and are influenced by a number of factors. Rogers and Shoemaker (1971) described the stages in the innovation-decision process. Dozier (1978) and Arulraj *et. al.* (1989) developed threshold models to describe adoption of innovations by individuals in the social system.

The adoption studies among the fishermen (Anon, 1980; Balasubramaniam and Kaul, 1985) aim to identify the constraints in the adoption of innovations. Further, in order to guide systematic methodologies of technology transfer, the behaviour of the fishermen on the innovation-decision process, their innovativeness and the related variables with reference to the selected innovations have to be assessed. This study aims at determining the innovative behaviour of fishermen and the influence of the selected variables on this aspect.

### **Materials and Methods**

Innovation-decision behaviour and innovativeness of fishermen with reference to use of four selected innovations viz.; improved methods of fishing, nylon multifilament fishing net, nylon monofilament fishing net and inboard/outboard engine are studied. The innovation-decision behaviour refers to the behaviour of an individual with reference to the extent of his completion of the various stages of innovation-decision process. Innovativeness refers to the ratio of an individual's number of years of adoption of an innovation to the maximum number of years of adoption of the innovation by a member of the social system. In this study, innovation-decision behaviour, innovativeness and innovative behaviour of fishermen were measured through indices developed for the purpose.

Twenty-one independent variables were selected for determining their extent of influence over innovative behaviour. The data were collected from Kerala and Tamil Nadu. From six selected fishing villages of Trivandrum District in Kerala (Sample 1), data were collected from a random sample of 32 fishermen operating plywood craft, 36 operating plank-built craft and 38 operating catamaran. Similarly, from six selected fishing villages of Kanyakumari District in Tamil Nadu (Sample 2), data were collected from 32 fishermen operating plywood craft, 32 operating plank-built craft and 35 operating catamaran. Structured interview schedules were used to collect data from respondents.

### Results and Discussion

The socio-personal variables of respondents operating different craft in the two samples are given in Table 1. In both samples number of fishing days and number of fishing nets used were less for fishermen operating plank-built craft than the other two categories. Mean total investment on the fishing unit was higher for marine plywood craft followed by plank-built craft and catamaran. Social participation mean scores were higher for the fishermen from Kanyakumari District as most of them were active members in the fishermen co-operative societies.

**Table 1.** Socio-personal variables of fishermen operating three types of fishing craft

Variables	Trivandrum (Kerala)						Kanyakumari (Tamil Nadu)					
	Plywood (n=32)		Plank-built (n=36)		Catamaran (n=38)		Plywood (n=32)		Plankbuilt (n=32)		Catamaran (n=35)	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Age, Years	38.96	11.15	42.41	9.44	37.63	8.48	38.21	11.15	43.34	11.40	37.97	11.44
Education, Years	2.62	2.84	3.72	2.97	3.26	3.06	3.15	2.81	2.18	2.59	2.91	2.26
Experience, Years	23.34	10.95	25.69	10.75	22.15	8.96	22.09	10.79	25.06	12.78	21.68	10.45
Craft size, ft	26.50	1.90	24.44	4.13	20.02	4.84	25.50	3.76	25.40	3.26	18.97	2.86
Fishing days/year	252.18	35.05	238.19	48.96	244.21	44.02	245.46	34.92	214.06	54.40	243.14	35.46
<i>Investment, Rs</i>												
Craft	42086	16843	20146	10911	5350	2971	34828	13973	13922	5816	5243	2579
Fishing net	32081	15807	56944	41790	11419	4589	33164	18486	34956	18820	16217	8216
Engine	36558	10805	19430	15822	-	-	31058	13017	11516	15389	4871	8565
Total	110725	43455	96520	68523	16769	7560	99050	45476	60394	40025	26331	19360
Fishing nets used	2.93	1.21	2.44	1.46	2.86	1.06	2.65	1.00	1.53	0.76	3.31	0.96
Crew members	4.62	0.75	13.47	13.08	3.47	2.20	4.34	0.70	18.12	15.34	3.28	1.17
Family members	5.93	1.64	7.22	2.84	6.15	1.92	5.81	2.71	7.37	2.97	5.60	2.97
Annual income, Rs	16922	10225	30632	36256	9388	6280	38653	31146	33375	28516	12144	6964
Social participation, score	2.37	1.33	1.22	1.22	1.78	1.09	2.28	1.22	2.87	1.26	2.25	1.19
Information source utilisation, score	10.75	3.58	11.63	4.74	11.10	3.23	7.40	3.87	9.56	4.38	8.00	3.27
Information need, index	58.47	13.20	63.26	14.22	61.92	14.44	58.88	8.70	57.70	10.21	55.17	8.74
Perception on attributes of innovations, index	69.33	7.89	65.79	12.30	63.44	10.28	67.07	8.22	67.53	9.21	55.83	10.51

Information source utilisation mean scores were lower (possible range 1 to 44) for all categories of fishermen. Information need scores and technological attributes

perception scores were in the upper middle category due to their varied attitude towards the technological practices, extension support, availability of inputs and services, and due to the influence of socio-economic constraints.

The extent of adoption of four improved practices among the respondents is given in Table 2. The extent of adoption was nearly 100% only with reference to the use of nylon multifilament nets. Fishermen operating plywood craft in both samples had higher adoption percentage followed by plank-built craft operators and catamaran operators for all the practices except the nylon monofilament nets. On the adoption of nylon monofilament nets, the fishermen operating catamaran in both samples had higher adoption percentages (71.05% in sample 1 and 54.28% in sample 2) than the fishermen operating plank-built craft and plywood craft. The catamaran operators had not adopted the improved methods of fishing and motorisation of craft due to high investment. Among them, the fishermen of Kanyakumari had higher adoption percentages than those of Trivandrum.

**Table 2.** Extent of final adoption and innovation-decision behaviour of fishermen

Technological practices	State	Plywood craft (K=32, TN=32)		Fishermen operating Plankbuilt craft (K=36, TN=32)			Catamaran (K=38, TN=35)			F	
		Adop-tion, %	IDB	Adop-tion, %	IDB	Adop-tion, %	IDB	Adop-tion, %	IDB		
											$\bar{X}$
Improved methods of fishing	K	100.00	87.81	11.28	66.66	83.05	14.89	0.00	50.78	14.59	77.31**
	TN	100.00	88.75	11.28	43.75	75.31	20.31	25.71	59.42	25.43	17.90**
Nylon multifilament fishing net	K	100.00	92.50	8.42	100.00	90.55	11.19	100.00	86.84	12.75	2.39
	TN	100.00	91.56	9.87	100.00	90.62	8.40	94.28	86.85	13.45	1.77
Nylon monofilament fishing net	K	6.25	28.12	26.81	22.22	39.44	37.79	71.05	62.89	38.40	9.07**
	TN	40.62	60.93	35.95	3.12	39.37	22.56	54.28	62.85	37.38	5.14**
Inboard/out-board engine	K	100.00	91.56	8.46	66.66	72.77	30.10	0.00	32.10	24.17	60.91**
	TN	96.87	89.37	9.81	43.75	50.62	37.83	22.85	47.42	37.04	18.14**

K = Kerala; IDB = Innovation-decision behaviour; \*\* Significant at 1% level; TN = Tamil Nadu

Innovation-decision behaviour index mean scores reveal that 100% adoption could be achieved without the completion of all other stages in the innovation-decision process. This might be due to factors such as the need, the attributes of innovation and the group participation in reducing the difficulties involved in such adoption. Due to incomplete innovation-decision behaviour, mostly as a result of socio-economic constraints and non-availability of supporting services, the extent of adoption of innovations had high variations among the fishermen operating plank-built craft and catamaran.

The “F” values show that there are significant differences among the fishermen operating plywood craft, plank-built craft and catamaran on the innovation-decision behaviour with reference to the adoption of four improved practices.

The innovative behaviour mean scores of the fishermen are given in Table 3. On the extent of innovativeness, all fishermen categories had lower index scores than on the component 'innovation-decision behaviour'. As a result of slow spread of innovations among the fishermen, even though the innovators had higher number of years of adoption, the average fishermen had less number of years of adoption. Further, the higher innovation-decision behaviour mean scores indicate that the fishermen had fairly crossed most of the stages in the innovation-decision process and finally, they had not adopted the innovations due to socio-economic constraints.

**Table 3.** Innovative behaviour of fishermen operating three types of fishing craft

Variables	State	Fishermen operating						F
		Ply wood craft (K=32, TN=32)		Plank built craft (K=36, TN=32)		Catamaran (K=38, TN=35)		
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	
Innovation- decision behaviour	K	75.00	8.15	71.04	13.73	58.15	13.68	18.37 **
	TN	82.65	10.01	63.98	14.64	64.14	18.18	17.09 **
Innovativeness	K	27.62	16.88	31.37	19.53	18.11	9.64	6.95 **
	TN	40.24	18.19	22.48	14.19	18.73	8.73	21.75 **
Innovative behaviour	K	51.31	9.58	51.21	13.95	38.13	9.79	16.37 **
	TN	61.44	11.66	43.22	12.73	41.43	11.63	27.73 **

K = Kerala \*\* Significant at 1% level; TN = Tamil Nadu

The 'F' values confirmed the differences between the different categories of fishermen in both samples. But, among the three categories in the sample from Trivandrum, the fishermen operating plywood and plank-built craft were more or less equal and those operating catamaran were far behind on the two components viz., innovation-decision behaviour and innovativeness. Similarly, in the other sample, the fishermen operating plank-built craft and catamaran were more or less equal and fishermen operating plywood craft were far advanced. This is also reflected in the overall innovative behaviour index scores of fishermen. The average level of innovative behaviour scores reveal that the fisheries extension schemes have to be strengthened to speed up the adoption of innovations and to reduce the time-lag in adoption among different categories of fishermen in the fishing villages.

Table 4 presents the extent of influence of the selected variables on the innovative behaviour of fishermen operating different types of fishing craft in the sample from Kerala. It is seen that among the plywood craft operators, though six variables had significant positive correlation, none of the 22 variables had significant influence over their innovative behaviour in the regression analysis. But, the 22 variables taken together had explained 73.8% of the variations in the innovative behaviour. However, the innovative behaviour of fishermen operating plywood craft in this sample could not be predicted with the present set of variables as the F value was not significant.

Among the fishermen operating plank-built craft, the variables such as age, information source utilisation and innovation-decision behaviour had positive influence

**Table 4.** Influence of selected variables on the innovative behaviour of fishermen in Kerala

Variables	Operating								
	Plywood boats (n = 32)			Plank-built craft (n=36)			Catamaran (n=38)		
	r	b	t	r	b	t	r	b	t
Age	0.263	0.842	0.699	0.027	1.0549	**3.042	0.058	-0.1644	0.513
Education	0.009	0.465	0.325	-0.193	-0.5957	1.123	**0.446	0.8467	1.467
Experience	0.220	-0.926	0.757	0.071	-1.0586	**3.281	0.113	0.2074	0.850
Size of fishing craft	0.102	0.003	0.001	-0.242	0.5138	1.380	**0.421	0.0373	0.101
Fishing days/ year	0.063	0.066	0.734	0.124	-0.0717	2.083	0.151	-0.0331	1.372
Investment on craft	-0.016	0.0001	0.434	-0.299	-0.0002	1.214	0.274	0.0004	1.010
Investment on net	**0.509	0.0002	1.336	-0.093	-0.0001	1.546	0.194	0.0001	0.196
Investment on engine	0.307	0.0001	0.478	**0.459	-0.0002	1.780	-	-	-
Fishing nets used	**0.460	-0.884	0.215	*0.339	2.5596	1.330	0.152	0.2798	0.197
Crew	0.047	-2.333	0.491	**0.539	-0.6277	2.039	0.238	-0.5144	0.609
Family members	-0.279	-1.427	0.854	0.059	0.4819	0.906	-0.171	0.0195	0.038
Annual income	-0.094	-0.002	0.881	*-0.364	0.0001	1.098	-0.025	-0.0002	1.398
Social participation	*0.400	2.466	0.885	**0.484	1.9420	1.766	*0.344	-1.5981	1.637
Information source utilisation	0.149	-0.854	0.928	*0.563	1.1772	**2.989	-0.270	-0.0439	0.141
Information need	0.308	0.007	0.032	-0.033	-0.0526	0.312	-0.144	-0.0211	0.229
<i>Innovation</i>									
Cost perception	*-0.414	0.219	0.709	-0.031	0.0969	0.858	0.036	0.0189	0.189
Compatibility	*0.356	-0.197	0.408	0.018	-0.0703	0.620	0.146	-0.1546	1.456
Profitability	0.214	0.317	0.714	0.051	-0.1706	1.414	0.245	0.0025	0.027
Complexity	0.299	0.100	0.371	0.162	-0.0113	0.195	0.191	0.1138	1.483
Feasibility	0.331	-0.114	0.288	0.141	0.1401	1.176	0.014	0.0255	0.245
Inputs availability	0.134	-0.098	0.354	0.074	-0.3115	*2.861	0.270	0.1158	1.498
Innovation-decision behaviour index	**0.476	0.473	1.068	**0.763	0.6205	**4.592	**0.891	0.8237	**8.10
*Significant at 5% level R <sup>2</sup> = 0.7380 R <sup>2</sup> = 0.9643 R <sup>2</sup> = 0.9421									
**Significant at 1% level F = 1.153 F = 16.975** F = 12.411**									

while the variables such as experience and inputs availability perception had negative influence over the innovative behaviour. All the 22 variables taken together had explained 96.43 percent of the variation and the F value was highly significant. Similarly, among fishermen operating catamaran, all the 22 variables had jointly accounted for 94.21 percent of the variation in their innovative behaviour and the F value was highly significant.

It is also seen that the perceptions on the six attributes of innovations had not influenced the innovative behaviour significantly. This might be due to the nature of fishing occupation and socio-economic constraints wherein even with higher perceptions over number of years, the average fishermen could not adopt the innovations. The results emphasise the need for continuous operation and monitoring of marine fisheries extension schemes so as to positively influence the fishermen on their felt and unfelt technological requirements. Comprehensive projects with educational and service facilities would reduce the time lag in adoption and accelerate the diffusion of innovations among fishermen.

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