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Research Article

Application of ICTs in marine capture fisheries of Andhra Pradesh, India

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ABSTRACT

Marine capture fisheries have crucial contributions to the world's well-being and prosperity. In the last five decades, world fish food supply has outpaced global population growth and today fish constitutes an important source of nutritious food and animal protein for much of the world population. Technology from its pristine form to its highest and sophisticated materials is the guiding light of human civilization. Nearly three-fourths (72.50%) of the fishermen belonged to young to middle age groups, most of the respondents had little/poor levels of education, a greater part of the respondents had more than 20 years of experience in fishing. For a majority of the respondents, fishing was the only occupation. Above average was involved in10-15 hrs of fishing on each fishing day. Among all seasons, the most productive fishing season is October to December. The majority of the respondents got an average daily fish catch in excess of 300 kg. Bulks of the respondents were going for fishing in the range of 20-60 Nm. A more than average of the respondents doing fishing in the depth range of 80-120 m. Most of the respondents needed information on navigation and sea safety measures, potential fishing zone, the daily report on weather condition of the sea, responsible fishing, endangered species, maintenance of crafts against fouling organisms to undertake fishing in a safe and sustainable manner and market information on catch arrivals. Improving the fishing activities, need-based information related to effective harvesting and post-harvest technologies, market intelligence, and conservation of resources should be disseminated to the fisher-folk through these Radios, TV and mobile tools.

INTRODUCTION

Information and Communication Technologies can be defined as "technologies that facilitate communication and processing and transmission of information by electronic means". This broad definition of ICT includes technologies like radio, television (TV), video, Digital Versatile Disk (DVD), telephone (both fixed line and mobile phones), satellite systems, computer and network hardware and software as well as the equipment and services associated with these technologies like video conferencing, e-mail, blogs etc. (Shraddha, 2010). In short, ICT is a comprehensive term that covers all advanced technologies in manipulating and communicating information. The ICTs has ushered in an era of the knowledge explosion in all spheres of human development and this has further accelerated growth and development in all sectors. Fisheries is one of the fastest growing sub-sectors of agriculture and it is considered as sunrise sector and it holds the hope and promise for meeting out the food and nutritional security of a vast majority of the world's population. The world fish production stood at 167.2 million tons in 2014 with the total value of USD 160.2 billion of the total global production, the contribution from capture fisheries was 93.4 million tonnes (55.86%) of which 81.5 million tonnes (87.25%) came from marine capture fisheries. In India, the estimated annual marine fishery resource potential is 3.93 million tonnes (FAO, 2016) and it provides a livelihood for 14.5 million people. Modern technological equipment has made a significant contribution to changing the status of the marine fisheries sector in our economy into a vibrant one. Latest technological externalities like ICTs in the marine fisheries have brought about a great transformation in fisherfolk population both in their personal life styles as

well as in their livelihood activities. In fact, expansion and development of marine fisheries sector through ICTs like GPS navigation, satellite communication and wireless connectivity etc., are quite significant. Application of ICTs in marine capture fisheries enhances the livelihood activity of marine fisherfolk besides reduces people's vulnerability, paving the way for social equality and ultimately bringing the fisherfolk into the mainstream society for overall development.

MATERIALS AND METHODS

The present investigation was carried out to study the application of information and communication technologies in marine capture fisheries of Andhra Pradesh. Among nine maritime districts, the two maritime districts East Godavari and Visakhapatnam districts were selected for the study based on the maximum number of crafts and total fishermen population. One hundred and twenty fishermen were selected randomly from the selected four taluks and 12 fishing villages. The data were collected by personal interview with the help of well structured and pretested interview schedule. The Collected data were analyzed by using statistical tools are percentage analysis, use of mean and standard deviation software package i.e. Statistical Package for Social Science (SPSS 16.0).The simple correlation coefficient was estimated to measures the degree of association of each of the independent variable with the dependent variable. Multiple linear regressions used to find out the functional relationship between the independent and dependent variables.

RESULTS AND DISCUSSION

A majority of the fishermen belonged to young to middle age group (72.50%) this finding is in line with that of Singh (2009) and Sivaraman (2009). Had the little/poor level of education (66.66%)finding is in accordance with that of Tyagi *et al.* (2007), more than 20 years of fishing experience (51.67%)observation is in line with the conclusions of Singh (2009) and Jeeva *et al.* (2011).Exhibited medium to high levels of print media and portal usage.TV (98.33%), mobile (96.67%) and NGOs (76.66%) were the important information sources to which the respondent was already exposed to. The state Dept. of fisheries (70.00%), NGOs (67.50%) and MPEDA (53.33%) were the major extension organizations with which the respondents maintained linkages. Among the various mass media channels, TV was the most popular one. Fishermen associations, community organizations, village panchayats and harbor mechanized boat owner/crew associations were the important social organizations in which the respondents participated and a majority of the respondents exhibited the medium level of social participation. Regarding participation in training programs, most of the respondents have not undergone any training program earlier. The majority of the respondents exhibited the medium level of knowledge on ICT in fisheries. This finding derives support from the results of Senthil (2008). Regarding occupation, a majority of them treated fishing as the sole occupation, engaged for more than 10 even up to 15 hrs in fishing on each fishing day, it is accordance with the findings of Chauvin *et al.* (2010) and Mane and Sundaram (2011) undertook fishing for more than 20 up to 25 days in a month and engaged in fishing for 8-10 months in a year. The findings are in accordance with the findings of Balasubramaniam *et al.* (2003) and Jeeva et *al.* (2011). A majority of the respondents, on an average, got more than 300 kg of fish on a fishing day, undertook fishing at a distance of 20-60 Nm from the shore, operated their gears in the depth range of 80-120 m and their vessels had more than five tonnes of fish holding capacity. For a majority of the fisherfolk, the annual income was more than Rs.1.5 lakh, their annual expenditure was more than Rs. One lakh and the annual saving were in the range of Rs. 15,000-45,000. A majority of the respondents operated mechanized fishing vessels and they used gillnet, hook, and line and trawl the net for fishing. Regarding the socio- psychological variables, the majority of them exhibited the medium level of innovativeness. The results corroborated with the findings of Veeraputhiran (2000) and Jeeva, *et al.* (2011). Economic motivation and scientific orientation with respect to the respondent's perception about ICT tools, a majority perceived ICT tools to be reliable, complex to use, costly, useful, very much needed by them and were willing to use the ICT tools in fisheries. A majority of the respondents had the medium level of positive perception about the application of ICT tools by fishermen.This finding derives support from the works of Arivukkarasu and Sujathkumar (2005) and Senthil (2008).Among the various ICT tools owned/operated by the respondents, mobile, TV, VHF, Echo sounder and GPS were the popular ones and a majority of the respondents exhibited the medium level of usage of ICT tools.

Association between application of ICT tools by fishermen and the independent variables

The zero order correlation coefficient was worked out to study the type and magnitude of the relationship between application of ICT tools by fishermen and the socio-personal, socio-economic, socio-psychological and other independent variables are presented in Table 1

The results presented in the Table 1 revealed that except four independent variables *viz.*, print media and portal usage (X_4), occupational status (X_{11}), fishing season (X_{13}) and perception about the application of ICT tools in fisheries (X_{26}), all the remaining 22 independent variables exhibited significant association with the dependent variable either at 1% level or at 5% level. Of the 22 independent variables, 17 independent variables viz., information source exposure (X_5), extension linkage system (X_6), mass media exposure (X_7), social participation (X_8), participation in training programmes (X_9), knowledge level (X_{10}), average daily fishing duration (X_{12}), daily average fish catch (X14), fish holding capacity (X_{15}), fishing distance (X_{16}), fishing depth (X_{17}), annual income (X_{18}), annual expenditure (X_{19}), annual saving (X_{20}), type of gear (X_{22}), innovativeness (X_{23}) and scientific orientation (X_{25}) exhibited positive significant association 1% level and three variable viz., educational status (X_2), experience in fishing (X_3) and economic motivation (X_{24}) exhibited positive significant association at 5% level. Only two variable viz., age (X_1) and type of craft (X_{21}), exhibited negative significant association at 5% and 1% levels respectively; from the findings, it could be inferred that enhancements made in the 21 independent variables as mentioned above would positively influence the dependent variable. However, progress in age and type of craft will negatively influence the application of ICT tools.

Table1. Zero-order correlation and multiple regression analysis of application of ICT tools by fishermen
'A' Value**:** 16.784

SI. No.	Variables	Correlation 'r'	Regression analysis		
			'b' Value	Std. Error (b)	't' Value
1	Age	-0.181*	0.040	0.340	0.119
2	Educational status	0.189*	-0.079	0.169	-0.469
3	Experience in fishing	0.225*	-0.328	0.289	-1.133
4	Print media and portal usage	0.174	0.083	0.300	-0.275
5	Information source exposure	0.449**	-0.061	0.081	-0.757
6	Extension linkage system	0.611**	0.125	0.089	1.400
7	Mass media exposure	0.427**	0.195	0.103	1.897
8	Social participation	0.578**	0.292	0.080	3.672**
9	Participation in training programme	0.384**	0.024	0.653	0.037
10	Knowledge level of fisherfolk on ICT	0.319**	0.047	0.047	1.007
11	Occupational status	-0.072	-0.800	0.317	-2.524*
12	Average duration of fishing on each fishing day	0.801**	1.419	0.450	3.156**
13	Fishing season	0.041	-0.022	0.067	-0.328
14	Daily average fish catch	0.770**	-0.092	0.327	-0.280
15	Fish holding capacity	0.806**	0.851	0.447	1.905
16	Fishing distance	0.592**	-0.615	0.419	-1.470
17	Fishing depth	0.591**	0.269	0.581	0.462
18	Annual income	0.886**	1.741	0.535	3.252**
19	Annual expenditure	0.851**	0.722	0.504	-1.433
20	Annual saving	0.770**	0.433	0.356	1.216
21	Type of craft	-0.383**	1.584	0.666	-2.378*
22	Type of gear	0.544**	0.347	0.161	-2.157*
23	Innovativeness	0.449**	0.007	0.144	-0.757
24	Economic motivation	0.189*	-0.467	0.239	-1.956
25	Scientific orientation	0.578**	0.301	0.187	3.672
26	Perception about application of ICT tools in fisheries	-0.027	0.019	0.112	0.169

R^2 **:**0.879; F**:**26.075; ** = significant at the 0.01 level of probability * = significant at the 0.05 level of probability

Multiple regressions

A perusal of Table1 reveals that the selected independent variables accounted for 87.90 percent of the variation in the application of ICT tools by fishermen. The 'F' value was 26.075. The variable social participation (X_8) was found to have a positive and significant relationship with an application of ICT tools by fishermen at p=0.01. This would mean that a unit increase in social participation would increase the application of ICT tools by 0.292 units, keeping other variables constant. Similarly, the independent variable occupational status (X_{11}) was found to have a negative and significant relationship with an application of ICT tools by fishermen at p=0.05. This would mean that a unit increase in occupational status would decrease the application of ICT tools by 0.8 units, keeping other variables constant. The variable average duration of fishing on each fishing day (X_{12}) was found to have a positive and significant relationship with an application of ICT tools by fishermen at p=0.01. This would mean that a unit increase in average duration of fishing on each fishing day would increase the application of ICT tools by 1.419 units, keeping other variables constant.

The independent variable annual income (X_{18}) was found to have a positive and significant relationship with an application of ICT tools by fishermen at p=0.01. This would mean that a unit increase in annual income would improve the application of ICT tools by 1.741 units, keeping other variables constant. The independent variable type of craft (X_{21}) was found to have a negative and significant relationship with an application of ICT tools by fishermen at p=0.05. This would mean that a unit increase in a type of craft would decrease the application of ICT tools by 1.584 units, keeping other variables constant. The variable type of gear (X_{22}) was found to have a negative and significant relationship with an application of ICT tools by fishermen at p=0.05. This would mean that a unit increase in a type of gear would decrease the application of ICT tools by 0.347 units, keeping other variables constant.

CONCLUSION

Most of the respondents needed information on navigation and sea safety measures, potential fishing zone, the daily report on weather condition of the sea, responsible fishing, endangered species, maintenance of crafts against fouling organisms to undertake fishing in a safe and sustainable manner and market information on catch arrivals. Twenty-two independent variable that exhibited the significant relationship with the dependent variable, two variables viz. age and type of craft exhibited negative relation and remaining variables exhibiting positive relationship. Most of the respondents were had perceived scope for the reduction the fuel cost, weather conditions are more accurately predicted and shared among boats, All most all the respondents opined financial constraints for the purchase of high-cost ICT instruments. The strategies for