

ENHANCING LIVES AND LIVELIHOODS OF FISHERMEN THROUGH INNOVATIVE TECHNOLOGY APPLICATIONS

By, Ms. Nancy J Anabel, Director In-charge (anabel@mssrf.res.in) & Ms. Eddolin (eddolin@mssrf.res.in), Scientist from Information Education Communication of M S Swaminathan Research Foundation

INTRODUCTION

India is a country with majority of the people depends on agriculture and fishing in the rural area, which constitute the majority of the population. Marine fisheries are an important sector in nation's economy supporting the livelihoods of millions of people inhabiting along the Indian coast line. Indian scenario depicts that 0.9 million fisher folk dwell in 3288 villages across the Indian coastline of 6068kms length and, of whom 37% each are mechanized and motorized and the remaining 26% are in non motorised category. There are 1511 landing centers incorporating the fishing populace of 4million people of whom only 38% of the fishermen are actively involved in fishing and the rest 63% are involved in both fishing and allied activities. The socio economic status of fishing community at the national level reveals that, among the total fishing community, 61% live under Below Poverty Line (BPL) as per the census of marine fishery resources 2010 and 58% at present are literate. The marine food production was 3.07 million tonnes and the revenue generated was approximately 28 crores in 2009-10, but it has grown to 19 % and gained US \$2.84 billion in 2010-11, which is remarkable. The coastline in Tamil Nadu is about 1076 km with 407 landing centers and, 8, 02, 912 fisherfolk, among which 63% are under BPL. However, the data shows that only 38% are involved in fishing, of which 66% are actively involved in fishing while the rest are passive fishermen.

CONSTRAINTS OF FISHERFOLK PRIOR TO THE INTERVENTION OF MSSRF

The national scenario depicts that larger group of economically deprived and socially marginalized with poor literacy and knowledge on world affairs are involved in fishing. In general, the small scale fishermen depend on the traditional knowledge and wisdom to identify the wind direction, wind speed, fish shoal, water current, types of fishes available etc. But as time passes by, the traditional knowledge and wisdom, which helped them in saving their lives and livelihoods along with remarkable profits by huge amount of fish catch started to decline in its accuracy in the context of changing climatic conditions. Fishermen often need to battle against natural disasters like high waves, swells, rough sea, cyclone and tsunami, which pushes them to vulnerability and risks. Lack of timely information, technical know-how and practical do-how are another major factors exacerbates their vulnerability and risks. This has brought out a shift in the behaviors of fishermen to rely on basic technology like hand compass for identifying direction and later into GPS and Eco-sounder. However, they face constraints in using it due to language barrier as everything is in English.

ROLE OF MSSRF: CATERING TO KNOWLEDGE NEEDS OF FISHER FOLK

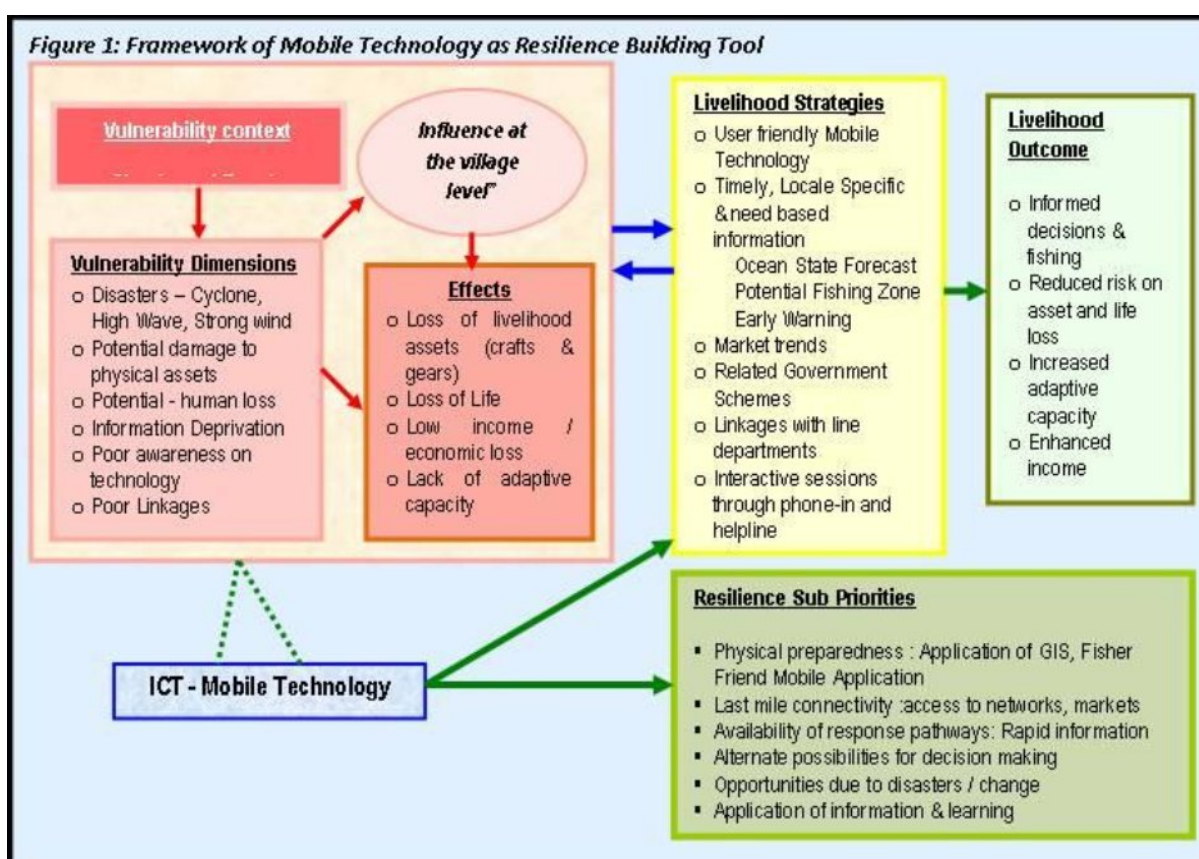
In this context, M S Swaminathan Research Foundation through its Village resource Centres Village Knowledge Centers has been extending scientific information, knowledge and technical inputs using best fit technologies such as Public Address System, Fisher Friend Mobile Application, both internet and satellite based audio and video conferences, phone in programmes, helpline services and so forth. The information and knowledge services of VRC focuses on early warning information like, wind speed, wave height, wind direction, cyclone alerts, high wave alerts, swells and potential fishing area etc through the mobile technology and Electronic display board (EDB).

STUDY AREA AND VULNERABILITY CONTEXT

The study was conducted in 8 villages of 5 coastal districts from Ramanathapuram, Nagapattinam, Cuddalore and Kanyakumari districts in Tamil Nadu. The study locations are highly prone to various types of disasters like cyclone, high wave, variations in ocean state, sea surge, sea ingress etc. The scenario among fishing community depicts that they are deprived of crucial information that would facilitate to have informed fishing responding to such uncertainties. In this context, MSSRF has capitalized the potential of ICTs to reach the last mile for more than a decade and particularly mobile technology during the last 6 years. Relevant and authenticated information and knowledge has been disseminated to the vulnerable community in time. Hence a study was conducted to identify the effectiveness of the services and technology.

Conceptual Framework and Vulnerability Context

Mobile technology has immense potential to play a major role in building livelihood resilience of fishing community. The vulnerability context as portrayed in figure 1 are shocks and trends such as cyclone, flood, high waves, strong winds in the study area. This context bring different vulnerability dimensions such as Potential damages to physical assets, Information Deprivation & Poor Linkages and potential to



threaten human life loss. This in term affects the life and livelihood assets of fishing community such as damages to fishing equipment such as crafts and gears, loss of life, productivity and adaptive capacity to respond to risks and vulnerabilities. Mobile technology is used as a tool to address these challenges by disseminating information and technical know – how on resilience sub priorities as mentioned in Figure 1. It facilitates better preparedness and response among fishing community. The livelihood strategies include relevant policies that give specific guidelines to screen the information / content before sending it to the larger community as it deals with livelihood issues. This ensures the timely delivery of appropriate and quality information / content with authenticated scientific source. As a result the livelihood outcomes

are realized as informed decisions and fishing, reduced risks of livelihood asset and life loss, increased adaptive capacity and enhanced income.

MSSRF has been using multiple technologies to impart knowledge and skills on fishing technologies and relevant scientific information to address the challenges of fisher folk. It appropriated V- Link system enabling the use of Ms Fax then available in Ms Windows for sending short text messages between two systems located in VRC and VKCs. Subsequently Public Address System was added, which has been used as a guiding beacon of light by fishers for back home from sea. The emerging trend of technology development over the years facilitated MSSRF to appropriate best fit technologies like mobile, wireless phone, Closed User System for audio conferences, satellite and internet based video conferences, K-yan PC and so on.

METHODOLOGY

The study was conducted in 4 coastal districts of Tamil Nadu such as Chidambaram, Thangatchimadam, Nagarcoil and Nagapattinam. Both quantitative and qualitative data were collected using Interview Schedule and Focus Group Discussion. Simple random sampling was followed covering one major landing centre and two villages from each district to administer the interview schedule among 225 respondents ensuring that they accessed most of the ICT based interventions. Focus Group discussion was done ensuring different segment of fishing community. The interview schedule were on Hygienic handling of fishes, Early warning information with OSF and PFZ, GPS and Sea safety measures. The FGD were on new fishing techniques and vulnerability among fishermen before and after VRC and VKC interventions. The data collected from the interview schedule were collated and analysed using SPSS package. The qualitative data collected using FGD has been compared for deriving patterns of benefits realized by the fishing community.

KEY RESULTS OF FISHERIES FOCUSED INTERVENTIONS

Fisher Friend Mobile Application – An Innovative Technology in CDMA

In view of high level penetration of mobile phones in rural areas since 2005, MSSRF has developed a mobile application in Tamil – “Fisher Friend Mobile Application” in collaboration with Qualcomm Wireless Reach using BREW application using TATA’s CDMA mobile in 2007. It was designed to act as a decision making support system catering to the information needs of fisher folks as “one stop shop”. Participatory techniques were followed to understand the requirements of fishers and designed the FFMA. It was a joint effort by MSSRF- Qualcomm-Tata Teleservices – Astute Technology System under the Qualcomm’s Wireless Reach programme and launched in 2007. 100 mobiles were distributed among fishers in different districts. FFMA has been providing PFZ, weather, wave height, wind speed and direction, emergency contact numbers and Govt. Schemes to fishers and they found it relevant. The contents are from authenticated sources like INCOIS, Indian Coast Guard, State Government, local traders and other relevant public and private organizations.

Remarkable benefits have been witnessed by the fishers who used this application. Nearly 20000 fishermen have downloaded this application for accessing the information on a daily basis. Mr. Mayilan, one of the fishers voices "I was able to haul fish worth Rs 2000, 1700 and 900 respectively on three consecutive days than the normal as I used the PFZ information and reached the spot. This also helped me to save on 500 litres of Diesel as the distance travelled reduced. Thus, I was able to save Rs 25000

on Diesel expenses and gain Rs 60,000 from additional catch". Mr. Amaldhas, another fisherman says that he could save his fishing nets and boat after hearing the occurrence of cyclonic storm since he moved them to a safe location. He as even helped his five fellow fishermen to save their nets using the information provided through FFMA.

Fisher Friend Mobile Application in Android with additional features in Phase II

In the growing context of technology and needs among fishermen, a recent version of FFMA has been developed using Android OS in the regional vernacular (Tamil and Telungu) with a few other significant features and refinements in the earlier one and it is currently under pilot testing among fishermen. It offers GPS with PFZ and Tuna Forecasting, alert system while fishers cross international water, marking options of coral reefs, sunken boats, rocky substance, disaster alerts for cyclone, high wave and tsunami, calling facility of significant contact persons like Indian Coast Guard, 24/7 Helpline of MSSRF, officials of Fisheries Department and market details.

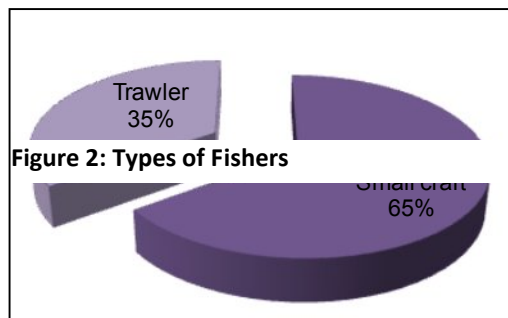
The entire design has been made in view of providing a single solution to meet out the information needs of fisher folk.

Results from the Study

A study was done to assess the results of FFMA and other ICT based interventions and the result is stated below:

Respondents Profile

Among the respondents, 65% are boat owners, 35% are labours. The profile indicates that 85% of the respondents fall between the age group of 21 and 50 yrs with the range of fishing experience between less than 5 years and above 30 years, which otherwise called as productive age group. Among boat owners, as stated in Fig. 2, 65% represents small craft holding such as Vallam, Fibre Reinforced Plastics (FRP) and Catamaran for fishing while 35% represent trawlers. The scenario of owning different types of technology among fishers reveals that 47% were with Global Positioning System (GPS), 5% with eco sounder 5%, 3% with Very High Frequency (VHF), 8% with all of these three technologies. However, the fishermen who don't have any technology are 32% among these respondents.



Ocean State Forecast and Early Warning - Sources of Information

Fishers often face uncertainties and are affected by multiple natural disasters such as cyclone, high wave, strong wind, tsunami etc. Fig.3 indicates that multiple sources have been used to get early warning information by fisher folk and within which, 56% depend on VRC, 18% on both Television and VRC, 8% on Television, 14% upon other sources such as

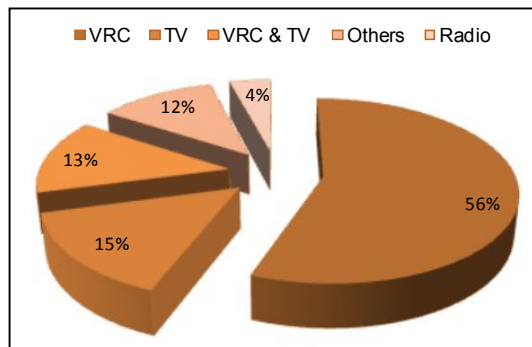


Figure: 3. Sources of Information

peers, fisheries department, News Paper and parish priest and 4% on radio.

The study reveals that the fishers are using such information for taking crucial decisions. The data shows that VRC caters to 74% of fishers providing early warning information to safeguard them from natural disasters and reduce risks.

Informed Fishing

The Fig. 4 shows that 93% of fishers used the information provided through mobile application for informed fishing. Multiple responses given by fishers indicates that they used the early warning information of cyclone, high wave and strong winds and ocean state forecast of wave height, wind speed and wind direction by the VRC using multiple technologies including mobile application for different purposes as stated below:

- 79% of the fishers decided whether to venture into sea or not based on the early warning provided through mobile application
- 39% of the fishers changed the time of fishing factoring wind speed
- 15% has benefited by saving their life from potential disasters while on sea. The information helped them safeguard their life bringing them safe back ashore. Similarly 13% safeguarded their livelihood assets such as crafts and gears.
- 11% have chosen and casted their nets due to the timely information from entangling into danger zones due to high wind speed and casted appropriate nets predicting the type of fish available in congruence to the wind direction. They associated such scientific information to their traditional wisdom and gained benefit out of it.

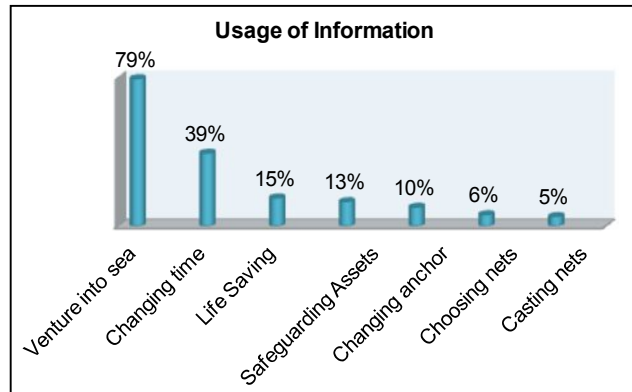


Figure: 4. Usage of information by Fishers

Potential Fishing Zone

Fishers usually rely on their traditional wisdom to go for fishing. Over the years, when the younger

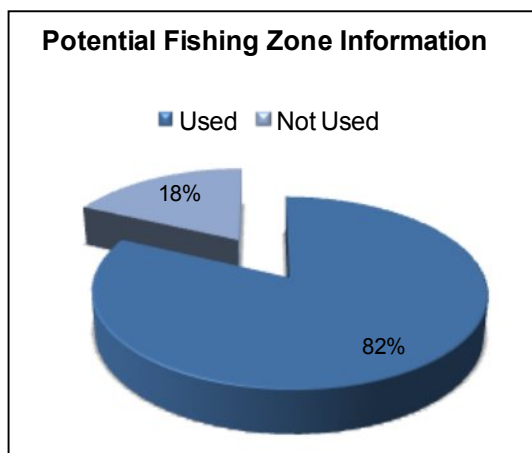


Figure 5. Use of Potential Fishing Zone information

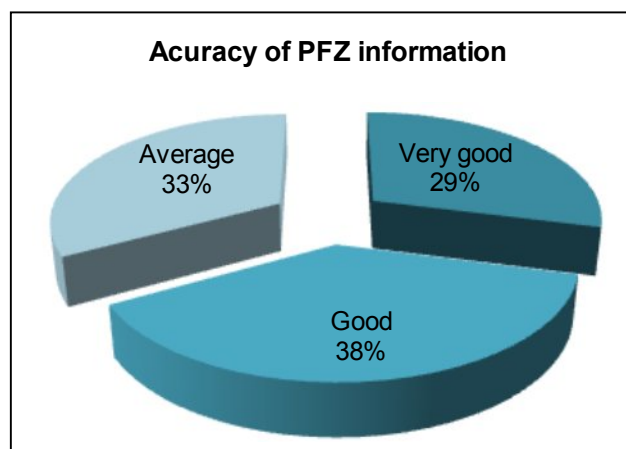


Figure 6. Accuracy of Potential Fishing Zone Information

generation step into fishing and exposed to technology and advancement, there is a shift from using traditional wisdom.

The qualitative data from Focus group discussion reveals that they spend time, fuel and efforts to search fish shoals on sea. To address this, MSSRF in association with Indian National Centre for Oceanography and Information Service (INCOIS), Ministry of Earth Science provides timely information on Potential Fishing Zone with GPS coordinates to the fishers using mobile application, public address system and audio messages. The data in Fig.5 shows that 82% of the respondents among the total receivers used PFZ information and 18% didn't use it because, they have a problem in their GPS. To all, 100% found it beneficial, but with the varying degree in their level of satisfaction such as 29 % found it very good, 38% as good and 33% as average as presented in Fig. 6.

Economic Benefit Realized by the Fishers

To all, 100% they captured fishes than usual. But the type of fishes that they captured determined the economic gain due its economic value. 56% has benefited with **increase in income**, 15% rarely benefited and 29% has no benefit due to this information. The reason for not realizing the benefit is due to the type of fish, which is used as poultry feed and they find no variation in the fish catch than the usual. Though fishers are not attaching value for it, the amount that they spend for poultry feed is a gain.

While analysing the 56% of respondents, it was identified that 53% has got up to Rs. 5000 increase in their income in addition to what they get, 28% gained additional income of Rs. 6000 to Rs. 20000, 13% received Rs. 21000 to Rs. 50000 and 7% got above Rs. 50000 gain as stated in Fig. 7.

The type of benefits realized by them indicate that they were able to save time and navigate to the fishing ground quick (41%), save diesel consumption (38%), catch increased quantity of fishes (16%), pass on information during emergency (3%) and experienced increased confidence (2%).

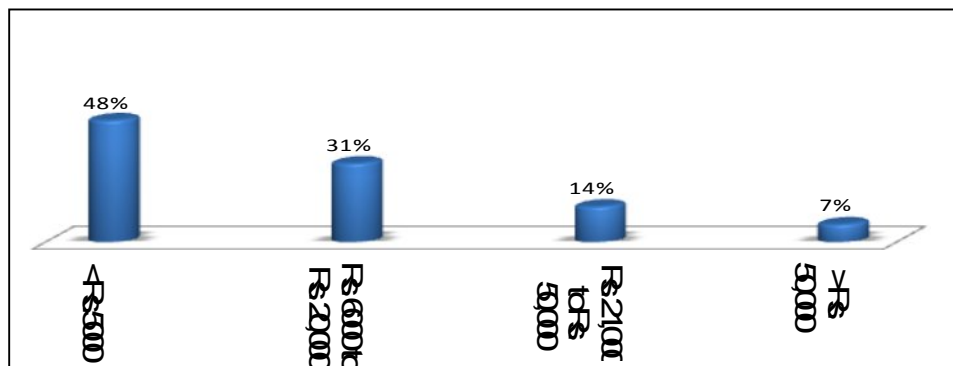


Figure 7. Economic Benefit gained by Fishers

Technology Transfer - Global Positioning System

Earlier, fishers were not much aware of the potential of GPS in fishing and VRC facilitated to raise awareness about technologies and build their knowledge and skills on using it for fishing. It helps fishers to navigate in sea and direct them to the Potential fishing zone. Fig. 8 indicates that 76% of the respondents have GPS and the rest 24% do not have GPS. Among those who have GPS, 55% had GPS before the intervention of training by VRC and the remaining 21% purchased it only after training, it reflects their level of confidence and behavioural change.

The pre and post assessment of technology transfer highlights that there is an increase in the awareness and knowledge among fisher folk about GPS and its potential features. Among those who had GPS before, only 3% were aware of using the entire features of GPS while 14% did not use it and the rest used it partially for marking GPS points and tracking routes.

Considerable increase has been found in their knowledge during the post training. Additionally 9% of fishers gained the entire functions of GPS, 22% of them mark routes, 18% mark points, 15% tracking, 8% settings, setup and go to navigation, 6% know setting proximity alert or setting alarms, 5% know marking Fish potential area and reverse routes and 2% of the respondents told that they had forgotten due to their low educational background.

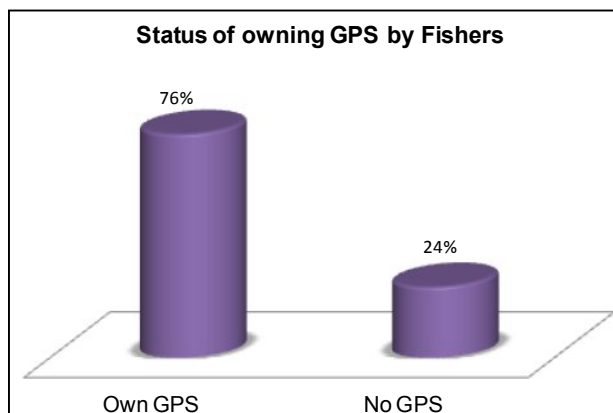


Figure 8. Status of Fishers owning GPS

Benefits of GPS usage

Most of the fishers expressed that usage of GPS has brought them immense benefits. The type of benefits that they harvested belong to (a) navigate to potential fishing zone and catch more fishes (62%) (b) safety and protection during fishing in sea (53%), (c) decreased diesel cost – (20%), (d) repairing faults in GPS within short span and (e) increased confidence (9%).

FINDINGS AND CONCLUSION

Fishers rely on new technologies in the changing context of climate. Technology plays a major role in addressing their immediate requirement. Unlike other livelihoods, fisheries found to be tough and challenging as uncertainties occur often and lack of facilities like connectivity inside sea. Fishers are challenged by taking new technologies due to their poor educational background, because most of the technologies like Global Positioning System are in English. Taking technology that are relevant in regional vernacular in time with authenticated information help them to take timely decisions reducing risks and maximizing economic returns. The early warning information not only save their life, but also help them in safeguarding their livelihood assets. As highlighted in Fig.1, technology helps in reducing risks and maximizes economic return.

BIBLIOGRAPHY

CMFRI Marine fisheries Census, 2010, Department of Animal Husbandry, Diaring and Fisheries, Ministry of Agriculture.

CMFRI Marine fisheries Census, 2005, Department of Animal Husbandry, Diaring and Fisheries, Ministry of Agriculture.

GOI (2011), Ministry of Statistics and programme implementation, Manual on Fishery Statistics, www.mospi.gov.in

Shyam S Salim and R.Narayana kumar (2012), Manual on World Trade Agreements and Indian Fisheries paradigms: A policy Outlook ,306

GOI (2011-2012), Department of Animal Husbandry, dairying & Fisheries, Ministry of Agriculture, Annual Report.

