CHAPTER 6
SURVEY RESEARCH DESIGN

6.1 GENERAL

This research work seeks to examine the pattern of usage of mobile advisory services (MAS) and its impact on fisherfolk livelihood through a survey. The study examines the factors that determine the impact of mobile advisory usage. From the review of literature, an evaluation framework was developed for examining the factors. This chapter presents the details of the research design adopted for this study.

6.2 UNIT OF ANALYSIS

The study takes on individuals as the unit of analysis. The fisherfolk community is a closely network community built on collective identity and livelihood. Group membership plays a critical role in sharing the occupational status and livelihood opportunities for fisherfolk. Fishing villages are typically caste based with majority people in a village belonging to a particular caste.

Typically, most fisherfolk’s fishing in teams range from a small family sized unit of 3 to 5 in fibre boats or as a team of 10 to 15 in trawler boats. Most catamaran fisherfolk and small fibre boat owners fish individually or in pairs. PFZ and OSF messages are intended to all fisherfolk in line of work. However, the use of this information is a collective enterprise as the information affects all. The fisherfolk consistently work with the same team but there are also considerable cross-over of fisherfolk from one team to
another. But what is common is that most fisherfolk teams belong to the same caste groups and are often drawn from same village.

Homogeneous groups suggest that information received by one group member is likely to be shared with the rest as a matter of occupational requirement. Despite the fact that fisherfolk work in teams, the information regarding PFZ and OSF are deemed valuable for each individual fisherman. The existence of teamwork implies that there is considerable scope for information sharing. Even when one fisherman fails to receive the message, it is likely that his team member would have got the same. There is inbuilt social redundancy built into the information networks supported by PFZ and OSF.

In this study, efforts were made to ensure there was only one respondent from each team included in the sample survey. This ensured that each respondent also acted as a key informant for the entire team of which he belonged. Therefore, each respondent served two purposes by providing individual-level information, he had to share details on characteristics that could help predict mobile advisory use and impact. By being a key informant, the respondents were also sharing information about their team and groups. Secondly, the sample of 160 respondents could provide an indicator of the characteristics of the whole social networks to which each of these fisherfolk belonged to.

6.3 SURVEY SITE DESCRIPTION

The survey was carried out in two districts. The study area was divided into two parts. The two districts comprising 27 villages in the study area had network coverage from the three major mobile operators. According to fisherfolk interviewed and subsequently verified by the service provider,
the mobile signal reaches up to 15 nautical miles from shore. Geographically, network coverage is 10-15 nautical lines.

One of the districts is the Puducherry union territory and another one is Nagapattinam district in Tamil Nadu. The Puducherry, union territory is an urban locality. The researcher selected some of the villages in Puducherry and additionally covered one more village in the Vilupuram district. Basically, that village is located near Puducherry and fish marketing at Puducherry and mobile advisory are received from the Puducherry VRC.

Generally, study areas classified are located either in the north of the district or on the south of the district. The researcher covered following villages in the Puducherry union territory. These areas were divided into two parts. One is in the Puducherry north region: Verampattinam, Panithettu, Narambai, Chinamuthalaiyarchavadi, and around harbour area. Another area in the Puducherry union territory, Karaikal. Here the hamlets are Kilinchalmedu, Kilakasakudimedu, Kalikuppam, Madapatthur and TR Pattinacherry located.

Nagapattinam district was divided into three parts: northern part is Poompukar, Pudukuppam, Madathukuppam, Nayakkarkuppam, Kilamoorkarai and Chinankudi, Chandarapadi, Chinnupettai. Nagapattinam central part comprises of Akkaraipettai, Kichankuppam, Nambiyar Nagar, Samanthanpetta, Nagoorpattinacherry and Kallar. Nagapattinam southern part comprises of Vellapallam, Puspavanam, Arcottudurai, Kodiyanarai and Siruthalaikadu.

In the north of the district villages are located nearly in the district headquarters and south of the district villages are located far from the district headquarters. Since Nagapattinam gets more reception the district has two VRCs.
One VRC is Nagapattinam district covered more fisheries villages compared to other VRCs. Puducherry VRC is located 20 kilometre from the district headquarters and is in a coastal area. Only two village knowledge centres (Veerampattinam and Panithettu) are located in the coastal areas under control by the Puducherry VRC.

Puducherry, Karaikkal and Nagapattinam have big fish landing centres and boats landing facilities. Poompukar also has a fish landing centre. These places have more than three lakhs population. Poombukar is located in the northern part of Nagapattinam district and Vedharanyam is located in the southern part of Nagapattinam district. Poombukar is a tourist place and has a long historical past. Vedharanyam is the smallest town and is the tipping point (Point Calimere) of the Coromandel Coast opposite to the northern tip of Sri Lanka. Nearby the coastal village Kodiakarai has fibre boats and it is most resourceful area compared to other villages.

In general, Puducherry, Karaikal and Nagapattinam have more trawler boats and more fishing instruments like eco-sounder, walkie-talkies and GPS. Some of the areas use purse ring seine (surukku valai). Nagapattinam northern villages include Poombukar, Chinnakudi, Tharangambadi and Chandrapadi. In central part, Nambiyar Nagar village has purse ring seine for fishing. Puducherry region Panithittu, Karaikal region Mandapathur, Kalikuppam, Kilakasakudimedu have purse ring seine used for fishing. Though government had banned the purse ring seine, it is still used for fishing.

6.4 SAMPLING DESIGN

The potential respondents were collected from the list of voice advisory receivers, maintained by the project implementing agency MSSRF. In order to capture the responses of those not using MAS (and not in the list),
a subsequent snowball method was adopted with each selected respondent asked to suggest a person receiving and/or not receiving MAS.

The sampling strategy involved stratified random sampling, using the list of subscribers of mobile advisories service provided by MSSRF. The stratification based on gender and caste is out of question as all are men and from the same fishing community. However, stratification was based on nature of fishing vessels and region. The sample also included a small section of non-users identified using snowball method, starting from sample respondent. A total of 160 successful survey interviews were completed covering two districts and 27 villages in Tamil Nadu (Nagapattinam) and Puducherry.

Table 6.1 List of target districts and villages

<table>
<thead>
<tr>
<th>Major Areas</th>
<th>Villages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pondicherry – North</td>
<td>Verampattinam, Narambai, Panithittu,</td>
</tr>
<tr>
<td></td>
<td>Chinnamuthaliyarchavadi</td>
</tr>
<tr>
<td>Puducherry South–Karaikkal</td>
<td>Kilinchanmedu, Kilakasakudimedu, Kalikuppam,</td>
</tr>
<tr>
<td></td>
<td>Madapathur,</td>
</tr>
<tr>
<td>Nagapattinam–North Poombuhar</td>
<td>Chinnupettai, Chandrapadi, Chinnakudi,</td>
</tr>
<tr>
<td></td>
<td>Poombuhar, Pudukuppam, Madathukuppam,</td>
</tr>
<tr>
<td></td>
<td>Nayakkarkuppam, Keelamoovarkarai</td>
</tr>
<tr>
<td>Nagapattinam–Central</td>
<td>Nagoorppattinacherry, Samanthanpettai,</td>
</tr>
<tr>
<td></td>
<td>Nambiyar Nagar, Akkaraipettai, Keechankuppam,</td>
</tr>
<tr>
<td></td>
<td>Kalar</td>
</tr>
<tr>
<td>Nagapattinam – South–Vedharanyam</td>
<td>Vellapallam, Pusbavanam, Arcottudurai,</td>
</tr>
<tr>
<td></td>
<td>Kodiyarakarai, Siruthalaikadu</td>
</tr>
</tbody>
</table>
**Table 6.2 Details of village wise respondents**

<table>
<thead>
<tr>
<th>Village Name</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akkaraipettai</td>
<td>5</td>
<td>3.1</td>
</tr>
<tr>
<td>Arcottudurai</td>
<td>12</td>
<td>7.5</td>
</tr>
<tr>
<td>Chandrabadi</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Chinnamuthaliyarchavadi</td>
<td>8</td>
<td>5.0</td>
</tr>
<tr>
<td>Chinnankudi</td>
<td>3</td>
<td>1.9</td>
</tr>
<tr>
<td>Chinnupet</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Kalikuppam</td>
<td>5</td>
<td>3.1</td>
</tr>
<tr>
<td>Kallar</td>
<td>3</td>
<td>1.9</td>
</tr>
<tr>
<td>Keechankuppam</td>
<td>11</td>
<td>6.9</td>
</tr>
<tr>
<td>Kilakasakudimedu</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Kilamoorekarai</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Kilinchalmedu</td>
<td>7</td>
<td>4.4</td>
</tr>
<tr>
<td>Kodiyyakkarai</td>
<td>5</td>
<td>3.1</td>
</tr>
<tr>
<td>Madathukuppam</td>
<td>3</td>
<td>1.9</td>
</tr>
<tr>
<td>Mandapathur</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Nagoorpattinacherry</td>
<td>9</td>
<td>5.6</td>
</tr>
<tr>
<td>Nambiyarnargar</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Narambai</td>
<td>4</td>
<td>2.5</td>
</tr>
<tr>
<td>Nayakkarkuppam</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Panitititu</td>
<td>6</td>
<td>3.8</td>
</tr>
<tr>
<td>Poombuhar</td>
<td>9</td>
<td>5.6</td>
</tr>
<tr>
<td>Puducherry Harbour</td>
<td>5</td>
<td>3.1</td>
</tr>
<tr>
<td>Pudukuppam</td>
<td>4</td>
<td>2.5</td>
</tr>
<tr>
<td>Puspavanam</td>
<td>7</td>
<td>4.4</td>
</tr>
<tr>
<td>Samanthanpettai</td>
<td>6</td>
<td>3.8</td>
</tr>
<tr>
<td>Siruthalaikadu</td>
<td>4</td>
<td>2.5</td>
</tr>
<tr>
<td>TR Pattinacherry</td>
<td>9</td>
<td>5.6</td>
</tr>
<tr>
<td>Veerampattinam</td>
<td>19</td>
<td>11.9</td>
</tr>
<tr>
<td>Vellapallam</td>
<td>7</td>
<td>4.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>160</td>
<td>100.0</td>
</tr>
</tbody>
</table>
The total population of MAS reached approximately 1500 and 10% of population were taken as sample, hence the sample size of 160 which is a justifiable sample to generalize the findings. Given that the project is under the early stage as per Heeks ICT value chain framework, small sample size is both inevitable and justified.

6.5 QUESTIONNAIRE

A questionnaire was developed based on the results of the focus group discussions and the outcomes of the qualitative data collection, through the phase I of the study. The questionnaire was developed originally in Tamil (regional language of Tamil Nadu) and was subsequently translated into the English for the purpose of the presentation of the findings. The questionnaire was itself developed through an interactive process with several pilot testing of various versions of the questions. The study adopted the technique of cognitive interviewing to build a standardized form of the questionnaire.

The questionnaire was prepared with the inputs from the experts of state government fisheries department (Joint Directors), the National Centre for Sustainable Development (senior scientists), academics in the fisheries areas (the Madras Institute of Development Studies), the dissemination officers of MSSRF and the project leader, INCOIS.

6.6 CODING

To address the pattern of use of mobile advisory services in relation to geographical, demographic and socio-economic characteristics, location, VRC dissemination centre, distance from district headquarters, community access, primary job, income, equipment assets, age, education, sea experience, and a number of days fishing were used as independent variables.
6.7 LOCATION AND MARKET ACCESS

The geographic difference plays a critical role in mediating the effects of the mobile phone on development outcomes. Uneven geographic distribution of economic and human resources will reflect the way mobile phone affects development outcomes. For studies on mobile communication, the idea of place and space play a significant factor in mediating mobile effects. Geographic differences are closely tied to communication structure.

The key challenge in using geographic indicators as a causal factor in the model is that geographic differences can contain the multitude of local differences that are hard to separate from the locations. What aspects of geographic difference play a role in the development outcome? In this study, four indicators of location namely district, dissemination centres, distance from headquarters, and community access in geographic differences that can be hypothesised to have an effect on the development outcomes have been adopted. The location was divided based on the following items, location of the district, dissemination centre, distance from district headquarters and community access.

6.7.1 District Location

Fisherfolk village locations were classified based not on the official classification of the sample site. Villages located in the districts were coded 1 (Puducherry area), 2 (Karaikal area), and 3 (Nagapattinam area) based on the government district administration. Later Puducherry and Karaikal were merged as one district. Data indicated that 40.6% from Puducherry and Karaikal, 59.4% are from Nagapattinam district.
6.7.2 Mobile Advisory from the VRCs

The fisherfolk who received the advisory were also classified into three categories based on the VRCs. Three VRCs covered two districts. Dissemination centres coded (1) Nagapattinam VRC centre, (2) Vedharanyam VRC centre and (3) Puducherry VRC centre. Puducherry VRCs covers five villages in Puducherry and four villages in Villupuram district and Nagapattinam VRCs covered Karaikal (Puducherry southern area) and northern areas of Nagapattinam district. Vedharanyam VRC located southern part of Nagapattinam district and covered southern areas. Data indicated that 51.9% from Nagapattinam VRC, 21.9% are from Vedharanyam VRC, and 26.3% are from Puducherry VRC.

6.7.3 Distance from District Headquarters

The main town is traditionally the place where conflicts and issues concerning fisherfolk are resolved. Towns host government institutions, administrative support such as these from district collectors, office or revenue department offices. These are the important places where issues concerning fisherfolk are extensively resolved with institutional arrangements that are closely tied to district headquarters. Hence distance from the district headquarters services as an important indicator for access.

Further, the researcher finds the distances between respondents’ village and district headquarters. The distances range between 1 km to 78 km. The classified distance is near headquarters like 1 km to 6 km for short distances and 7 km to 30 km for medium distances, and 31 km and above for long distances. Data indicated that 32.5% are from the short distance, 32.5% are from the medium distance and 35% are from the long distance from the district headquarters.
6.7.4 Community Access (Market Access)

The model considers access to markets (proximity to their landing centres) as another key factor. While many landing centres also act as market, it is also the case that many landing centres are a few miles away from the major markets. Distance means that fisherfolk landing in these centres have to incur the small additional cost of transport to the nearest market, thus increasing the price of the fish. However, the final price they can demand depends on the availability of fish in the main landing centres. Therefore, the impact of mobile advisory services can also be expected to differ in the degree to which individuals have access to the market.

Coastal villages have market availabilities and some of the coastal villages do not have market availabilities. Some coastal villages have market facilities, landing centres or naturally boat docking facilities. The marketing availabilities decide some of the benefits of the fisherfolk. Data indicated that 41.9% respondents are from market availability villages and 58.1% respondents are from the non-market location in the coastal villages.

From the above considerations, the researcher found differences in mobile advisory service use and adoption in relation to socio-demographic characteristics, socio-economic status and geographical differences.

6.8 SOCIO-ECONOMIC STATUS (SES)

Socio-economic status (SES) commonly in fisherfolk community can be estimated in several ways, but the previous research has indicated that technology acceptance among fisherfolk depends on the occupational status of fisherfolk within the community (e.g. owner vs labour) and type of boat and gear ownership. Generally, those with large mechanised boats are more likely to be from higher SES than traditional, artisanal fishing community.
The socio-economic factors were measured using the following indicators: equipment asset and income. Equipment asset was measured using boat types which was classified into six categories: (1) not have boat (2) traditional wooden boat (katumaram) (3) non-motorized fibre boat (4) motorized fibre boat (5) motorized wooden trawler boat (6) mechanized trawler boat. The questions included details on the values of the boats, along with their type and characteristics. Other equipment owned by the boat owners like (1) GPS (2) eco-sounder (3) walkie-talkie (4) ice box (5) transport were identified and their values were recorded. The boat value range between Rs. 20,000 (non-motorized fibre boat) to Rs. 60,00,000 (mechanized trawler boat). Some of the fisherfolk have more than one boat. Researcher included the second boat values. The respondents (n= 28, 18.5%) have more than one boat. The value ranges between Rs. 1,00,000 to Rs. 25,00,000.

The gear net value range between Rs. 20,000 to Rs. 20,00,000. The GPS value cost range between Rs. 5000 to Rs. 1,15,000. The eco-sounder value cost ranges between Rs.10,000 to Rs. 1,20,000. The walkies talkies value cost ranges between Rs.13,000 to Rs. 34,000. After tsunami, most of the fisherfolk got ice boxes free of charges at minimum cost. The ice box value cost range between Rs. 2,500 to Rs. 2,00,000. Most of the respondents have no transport vehicle facilities. The transport vehicle value cost range between 3,00,000 to 37,00,000. Researcher computed all equipment values. The equipment value cost ranges between Rs. 30,000 to Rs. 74,10,000.

The respondents who indicated they have up to Rs. 2,40,000 value equipment for fishing operation were labelled as low equipment ownership. Respondents who indicated Rs. 2.4 lakhs to Rs. 5 lakhs value equipment using fishing were labelled as medium equipment ownership. Respondents who indicated more than Rs. 5 lakhs to Rs. 12.5 lakhs were labelled as moderate equipment ownership. Respondents who indicated value of
equipments cost more than Rs. 13 lakhs and above using fishing were labelled as high equipment ownership.

Income - Income was measured by two indicators. The researcher asked expected income and the approximate income of the fisherfolk. Data indicated the expected income range between Rs. 3000 to Rs.1,00,000. The current monthly income range between Rs 1500 to Rs.1,00,000. Monthly income based on their response was coded into the following indicators: (1) up to Rs. 10,000 (2) Rs. 15,000 to Rs. 20,000 (3) more than Rs. 25,000. Their responses were grouped into low income (n=79, 49.4%), moderate income (n=61, 38.1%) and high income (n=20, 12.5%) group to bring the groups.

6.9 SOCIO-DEMOGRAPHIC FACTORS

Age, education and occupational information fall under socio-demographic factors. Age has been identified as one of the major factors differentiating mobile use. Age is also closely tied to number of years of experience in fishing occupation and thus determines the pattern of use. The researcher selected different age group of respondents. The respondents were asked to provide their age in years as on their last birthday. Some of the fisherfolk do not remember the date of birth and some of the fisherfolk verified it with the ID card. The respondent age ranged between 21 and 65. The mean age was 39.54 years (std. error .511) with a minimum of 21 years and highest age of 62. The age was grouped into three categories representing 21- 35 years (n= 58, 36.3%), 36- 44 years (n=55, 34.4%), and 45 years and above (n= 47, 29.4%). Then age redefined two categories 21 years to 39 years (n=84, 52.5%) and 40 years and above (n=76, 47.5%).

Education is one of the major features of mobile phones and its ability to bridge the education divide was not possible with computers and the internet. Mobile phones are widely used across all fisherfolk, irrespective of
the educational levels. Hence the model does not expect differences to exist between education and the exploratory variables. Prior research and conventional wisdom in knowledge gap analysis suggest that respondents’ education has a strong influence on socio-economic status. To test the relationship between education and technology use, the respondents were asked the following question: “What is the highest educational qualification you have attained?” with the response choices educational qualifications were categorized into four groups: (1) illiterate and no formal education, (2) primary school (1-5th standard), (3) up to matriculations level, and (4) higher secondary to any degree. The respondents’ responses were redefined which helped in categorizing those who indicated low to be labelled as illiterate and primary education (1-5th standard). Respondents who indicated moderate were grouped as middle school level (6-8th standard). Respondents who indicated high were grouped as secondary school level education and above. Data indicate that (n= 69, 43.1%) had low level of education, (n= 43, 26.9%) had middle level of education and (n= 48, 30%) had secondary level education and above.

Most fisherfolk in Tamil Nadu either fish in their own boats typically small catamaran or fibre boats, while also working as a member of a crew in trawlers. The respondents who indicated low job were group of fisherfolk employed in catamaram, fibre boat without engine, fibre boat, trawler boat, and outboard engine fibre boat. Respondents who indicated a moderate job were grouped as fibre fisherfolk and respondents who indicated a high job associated with trawlers, co-owner of trawler fisherfolk, own trawlers, fish buyer and resellers, ice plant owners. Data indicate that (n= 26, 16.3%) had low level of job, (n= 68, 42.5%) had moderate job and (n= 66, 41.3%) had high job.
Experience in the sea: Respondents were asked to indicate as to how many years were spent actively engaged in the marine fishing. The experiences in terms of complete years was classified into following categories (1) less than 10 years, (2) 10-20 years experiences, and (3) more than 20 years. Data indicated that 15.6% had less than 10 years experiences in the sea, 41.9% had more than 10 years and less than 20 years experiences and 42.5% of respondent more than 20 years experiences in the sea.

Number of days in spent at sea per trip (sea days): Communication needs depend upon on the number of days spent in sea. Respondents were asked to indicate the number of days continuously stayed in the sea, per trip for fishing. The sea days were classified into following categories (1) allied fishing activities/ not direct fishing, (2) one day in the sea for catching operation, (3) more than two days and less than four days and (4) more than five days stayed per trip in the sea. Data indicate that (n=5, 3.1%) allied fishing activities/ not direct fishing, (n=60, 37.5%) a day in sea, (n=52, 2.5%) more than two days and less than four days, and (n=43, 26.9%) more than five days stayed per trip in the sea.

The next objective is to assess the perceived impact of mobile advisory on marine fisherfolk's livelihood, and the indicators used to measure it are MAS use, information credibility, safety and decision making, and impact of PFZ use.

6.10 MEASURES OF MOBILE ADVISORY USE

Mobile advisory use was measured using four indicators. (1) reception, (2) adoption, (3) attention, (4) frequent use of mobile advisory.

‘Reception’ is operationally and defined as a dichotomous variable checking if the fisher folk received advisory or not. Data indicate that (n=133,
83.1%) respondents mobile advisory received, and (n=27, 16.9%) respondents advisory not received.

‘Adoption’ is mobile advisory adoption and was measured using three indicators. Firstly respondents, where mobile advisory adopted indicate, if they had used the mobile advisory services provided by MSSRF. Mobile advisory adoption was measured using three indicators. Respondents who indicated earlier starting time of mobile advisory or more than one year to two years were grouped as high adoption. Respondents who indicated ‘recently’ or a ‘less than one year’ were grouped as moderate adoption (late adopter). Respondents who indicated still not got the mobile advisory were labelled as non-adopter. Data indicate that non-adopter (n= 27, 16.9%), moderate adopter (late adopter) (n=87, 54.4%), and highly adopter (n=46, 28.8%) (early adopter) of mobile advisory.

‘Attention’ is defined as to how closely do you follow the mobile advisory (1) not received / no attention (low), (2) sometimes attention (moderate), and (3) often attention (high). Data indicate that (n= 25, 15.6%) never / rarely attention, (n= 79, 49.4%) sometimes attention, and (n= 56, 35%) often and regularly attention of the mobile advisory.

‘Frequent use of mobile advisory’ is defined as to how frequently you followed or used the mobile advisory. The categories are (1) never or rarely (low), (2) sometimes (moderate), and (3) often (high). Data indicate that (n=27, 16.9%) low use, (n=119, 74.4%) moderate use, and (n=14, 8.8%) high use for fishing activities.

Reliability Statistics: A reliability test was performed on the four items (reception, adoption, attention, frequent use of mobile advisory) which gave Cronbach’s alpha of 0.748 which suggest a highly reliable scale. The four scale values are summed up to provide a total score for the conventional
form of use with higher score indicating higher usage. The scale values range from four to eleven. Redefine the values for three categories low usage, medium usage and high usage. Data indicate that (n=76, 47.5%); low use (n=41, 25.6%) medium use, and (n=43, 26.9%) high use.

6.11 INFORMATION ACCURACY AND CREDIBILITY

Mobile advisory use is also likely to be moderated by trust in the information made available through these services. With the extensive literature on message design, source credibility has been well recognized as an important factor in acceptance of respondents’ perception of the credibility of information is likely to moderate both knowledge levels and perceived impact. Generally higher perceived information credibility is likely to be associated with higher levels of knowledge and influence on the four dimension of perceived impact.

Information credibility was measured using the following two items. Mobile advisory information about wind speed and wave height. To what extent do you think mobile advisory information about wind speed and wave height is accurate? With the following response choices, a) not received b) often accurate c) mostly / always accurate. In the survey found that respondents (n=27, 16.9%) not received or not used mobile advisory, (n=34, 21.3%) sometimes accurate mobile advisory, and (n=99, 61.9%) gave mostly / always accurate mobile advisory.

Four dimensions of impact of mobile advisory were identified during the thematic analysis of focus group data. The statements made during the focus groups were transferred into questions regarding the impact of mobile advisory. The lead question was: "next, we would like to ask you few questions about how helpful mobile advisory in your fishing related activities". The survey found that (n=27, 16.9%) respondents gave the not
received / not relevance and (n=119, 74.4%) sometimes/often relevance, and (n=14, 8.8%) gave always relevance of the mobile advisory for fishing activities. The next objective is to assess the perceived impact of mobile advisory on marine fisherfolk's livelihood. Safety, decision making and PFZ were used as indicators.

### 6.12 IMPACT OF OSF ON SAFETY

The impact was of safety categorized into two variables: (1) navigation safety, and (2) equipment safety.

The impact on ocean state forecast (OSF) on safety was measured using the following two items. Item one is to what extent is the mobile advisory helpful in guiding you in safe navigation for fishing with the following response choices a) not received b) sometimes helpful for safe navigation c) always helpful for safe navigation. The survey found that (n=28, 17.5%) respondents gave the not received / not using, (n=37, 23.1%) sometimes helpful for safe navigation and (n=95, 59.4%) gave always helpful for safe navigation.

Item two is to what extent is the mobile advisory helpful for safely moving fishing equipment in critical weather conditions with the following response choices (a) not received / not using, (b) sometimes helpful for safely moving fishing equipments, and (c) always helpful for safely moving fishing equipments. The survey it was found that (n=29, 18.1%) respondents gave the response as ‘not received / not using’, (n=59, 36.9%) ‘sometimes helpful’ for safely moving fishing equipments, and (n=72, 45%) gave ‘always helpful’ for safely moving fishing equipments.

Reliability Statistics: A reliability test was performed on the two items which gave Cronbach’s alpha of 0.929 which suggest a highly reliable
The two scale values were summed up to provide a total score for the conventional form of safety impact with higher score of high safety impact. The scale values range from two to six. The sum low (n=34, 21.3%), medium (n=55, 34.4%), and high (n=71, 44.4%).

### 6.13 IMPACT ON DECISION-MAKING

Impact on decision-making was categorized into three variables (1) decision making, (2) choice of nets and travel distances, and (3) overall helpfulness.

Impact on decision making was measured using the following three items. Item one is “To what extent do you think the mobile advisory is helpful for your fishing activities”. The following response choices a) not received b) rarely helpful / helpful c) often helpful/ always helpful were included. The survey it was found that (n=27, 16.9%) respondents gave the not received the mobile advisory or never helpful, (n=123, 76.9%) gave rarely helpful / helpful, and (n=10, 6.3%) gave often helpful/always helpful.

Item two is “To what extent do you think the mobile advisory is helpful in your decision to go to the sea for fishing activities?” The following response choices a) not received / not using b) sometimes helpful for my decision c) most of the times helpful for my decision were received. The survey it was found that (n=27, 16.9%) respondents gave the not received the mobile advisory or never helpful for decision-making, (n=29, 18.1%) sometimes helpful for decision-making, and (n=104, 65%) gave most of the times helpful for decision making.

Item three is “To what extent is the mobile advisory helpful in deciding the choice of the net and distance to be traveled for fishing (Decision on net types and travel distance)?”. The following responses were received as
choices a) not received / not using b) sometimes helpful for my decision c) most of the times helpful for my decision. The survey found that (n=94, 58.8%) respondents gave the not used for decision making, (n=43, 26.9%) sometimes helpful for decision making, and (n=23, 14.4%) gave most of the times helpful for decision making about the choice of the net and distance to be travel for fishing.

Reliability statistics: A reliability test was performed on the three items which gave Cronbach’s alpha of 0.759 which suggest a highly reliable scale. The three scale values were summed up to provide a total score for the conventional form of decision making with higher score high impact of decision making. The scale values ranged from three to nine. The sum low is (n=58, 36.3%), medium (n=39, 24.4%), and high (n=63, 39.4%).

6.14 ECONOMIC IMPACT OF PFZ

Economic impact of PFZ was categorized into four variables (1) increased profitability, (2) increases income, (3) reduces search time, and (4) reduces fuel expenditure.

Impact on the economic impact of PFZ was measured using the following four items. Item one is “To what extent is the PFZ mobile advisory helpful for increasing the amount of profit?” The following response choices (a) no (not receiving / not useful/ not increasing the profit) (b) yes (sometimes increasing the profitability). The survey found that (n=110, 68.8%) respondents gave the not received / not useful/ not increasing the profit and (n=50, 31.2%) sometimes increasing the profitability received.

Item two is “To what extent is the PFZ mobile advisory increased income for your fishing operation?” The following response choices (a) No (not receiving / not useful/ not increasing my income from fish sell) (b) Yes
(sometimes increasing my income from fish sell) were received. The survey was found that (n=107, 66.9%) respondents gave the not received / not useful/ not increasing the income and (n=53, 33.1%) sometimes/ often increasing the income. Item three is “To what extend is the PFZ mobile advisory help reduce your travel time for searching fish?”. The following response choices (a) No (not receiving / not useful/ not reducing the travel time) (b) Yes (sometimes reducing the travel time) were received. The survey was found that (n=112, 70%) respondents gave the not received / not useful/ not reducing the travel time and (n=48, 30%) sometimes or often reducing the travel time.

Item four is “To what extend is the PFZ mobile advisory reduce fuel expenses in your fishing operation”. The following response choices (a) No (not receiving / not useful/ not reducing the expenditure on fuel) (b) Yes (sometimes reducing the expenditure on fuel) were received. The survey was found that (n=112, 70%) respondents gave the not received / not useful/ not reducing the expenditure on fuel and (n=48, 30%) sometimes or often reducing the expenditure on fuel.

Reliability statistics: A reliability test was performed on the four items which gave Cronbach’s alpha of 0.982 which suggested a highly reliable scale. The four scale values were summed up to provide a total score for the conventional form of economic impact with higher score higher economic impact. The scale values ranged from four to eight. The sum low (n=112, 70%); and high (n=48, 30%).

6.15 IMPACT ON PFZ PRODUCTIVITY

Impact on PFZ productivity was categorized into three variables (1) catching size, (2) bigger size of fish, and (3) catching the desired fish.
Impact on the productivity of PFZ was measured using the following three items. Item one is “To what extent is the PFZ mobile advisory increased catching size in your fishing operation?” It had the following response choices (a) No (not receiving/not useful/not increasing the size of my catch), and (b) Yes (sometimes increasing the size of my catch). In the survey was found that (n= 104, 65%) respondents gave the not received / not useful/ not increasing the size of the catch, and (n= 56, 35%) sometimes or often increasing the size of the catch.

Item two is “To what extent is the PFZ mobile advisory increased the size of fish for your fishing operation?” It had the following response choices (a) No (not receiving/not useful/not help me catch bigger fish), and (b) Yes (sometimes help me catch bigger fish). The survey found was that (n=106, 66.3%) respondents gave the not received / not useful/ not help the catch bigger fish and (n=54, 33.7%) sometimes or often help the catch bigger fish.

Item three is “To what extent is the PFZ mobile advisory increased desired fish catching?”. It had the following response choices (a) No (Not receiving/not useful/ not increase the overall quality of fish), and (b) Yes (sometimes increase the overall quality of fish). The survey found was that (n=106, 66.3%) respondents gave the not received / not useful/ not increase the quality of fish, and (n= 54, 33.7%) sometimes or often increase the quality of fish.

A reliability test was performed on the three items which gave Cronbach’s alpha of 0.971 which suggest a highly reliable scale. The three scale values were summed up to provide a total score for the conventional form of productivity with higher score higher productivity. The scale values range from three to six. The sum low (n=106, 66.3%), and high (n=54, 33.8%).
6.16 IMPACT ON OSF MOBILE ADVISORY

A composite variable named impact mobile advisory OSF information was created using the sum of low (1), moderate (2) and high (3) for five items of (1) mobile advisory helping for fishing occupations, (2) mobile advisory helping for decision making, (3) mobile advisory helping safety navigation, (4) mobile advisory helping for safety for nets, and (5) crafts and mobile advisory helping for choosing the nets and travel distances.

A reliability test was performed on the five items which gave Cronbach’s alpha of 0.910 which suggest a highly reliable scale. The five scale values were summed up to provide a total score for the conventional form of OSF impact with higher score high OSF impact. With the lowest score representing low OSF mobile advisory impact, the medium score representing moderate impact of OSF mobile advisory and the high score representing for high OSF mobile advisory impact. Further, the total score was categorized into three groups with (n=52, 32.5%) representing low impact, (n=57, 35.6%) representing moderate impact, and (n=51, 31.9%) high impact.

6.17 IMPACT OF MOBILE ADVISORY PFZ INFORMATION (8 ITEMS)

A composite variable named in the impact mobile advisory PFZ information was created using the sum of low (1), moderate (2) and high (3) for eight items of (1) PFZ information usage level, (2) PFZ usage profit level, (3) PFZ advisory reduce fishing and traveling time, (4) PFZ advisory reduce the fuel expenditure, (5) PFZ advisory increased fish catching level, (6) PFZ advisory increased income, (7) PFZ advisory identity good size of fish, and (8) PFZ advisory good quality of fish.
A reliability test was performed on the eight items which gave Cronbach’s alpha of 0.996 which suggest a highly reliable scale. The eight scale values were summed up to provide a total score for the conventional form of PFZ impact with higher score high PFZ impact. The scale value ranged from eight to twenty-four, with the lowest score representing low PFZ mobile advisory impact, the medium score representing moderate impact of PFZ mobile advisory and the high score representing for high PFZ mobile advisory impact. Further, the total scores were categorized into three groups with (n=52, 32.5%) representing low impact, (n=57, 35.6%) representing moderate impact, and (n= 51, 31.9%) representing high impact.

6.18 MOBILE ADVISORY IMPACT PERCEPTION SCALE (13 ITEMS)

A composite variable named mobile advisory impact perception scale was created using the sum of low (1), moderate (2) and high (3) for 13 items (1) mobile advisory helping for fishing occupations, (2) mobile advisory helping for decision-making, (3) mobile advisory helping safety navigation, (4) mobile advisory helping for safety for nets, (5) crafts and mobile advisory helping for choose the nets and travel distances, (6) PFZ information usage level, (7) PFZ usage profit level, (8) PFZ advisory reduce fishing and traveling time, (9) PFZ advisory reduce the fuel expenditure, (10) PFZ advisory increased fish catching level, (11) PFZ advisory increased income, (12) PFZ advisory identify good size of fish, and (13) PFZ advisory good quality of fish.

A reliability test was performed on the thirteen items which gave Cronbach’s alpha of 0.936, which suggested a highly reliable scale. The thirteen scale values were summed up to provide a total score for the conventional form of overall mobile advisory impact with the higher score and high mobile advisory impact. The scale values ranged from thirteen to
thirty-nine, with the lowest score representing low mobile advisory impact, the medium score representing moderate impact of mobile advisory and the high score representing for high mobile advisory impact. Further, the total scores were categorized into three groups with (n=58, 36.3%) representing low impact, (n=51, 32%) representing moderate impact, and (n=51, 32.1%) representing high impact.

The last objective is to test the knowledge gap hypothesis in the context of fishing communities’ adoption and use of mobile advisory services.

6.19 KNOWLEDGE LEVEL TEST INDICATORS

During the focus group discussions, the specific questions asked were ‘what it to be a fisherman?’ ‘What knowledge and skills make fisherfolk?’ ‘What typical fisherfolk are expected to know and understand?’ The questions led a series of responses, which were coded as knowledge level.

Overall during the course of the three focus group discussions, several themes were recurring: safety, government schemes, institutional support, helpline, fishing restrictions and, general knowledge. Five dimensions of fisherfolk knowledge were identified during the thematic analysis of focus group data.

6.19.1 Knowledge of Safety

To find out the fisherfolk who had high knowledge level in fishing, a series of fifteen questions were asked, out of which the fisherfolk who got 11 to 15 marks were considered to have the high level knowledge, 7 to 10 were considered to have the medium level knowledge and below 7 were considered to have the low level knowledge.
Knowledge of safety was measured using the following two items:
1) How many kilometre wind speed is safe for fishing in the sea? with following response choices (a) not known (b) 50 to 60 km wind speed (c) 40 to 50 km wind speed (d) 30 to 40 km wind speed e. 20 to 30 km wind speed.

2) What is the safest wave height for fishing in the sea? with following response choices. (a) not known, (b) 1-4 feet (1), (c) 3-4 feet (0.5), (d) 4-5 feet (0), and (e) 5-6 feet (0). The correct responses are given in the brackets.

In the survey it was found that 50.6% respondents gave the correct answers and 19.4% gave nearly correct answers to the question 1 and 35% gave the correct answer and 18.1% gave nearly correct answered to question 2.

6.19.2 Knowledge on Government Schemes

Knowledge of government schemes were measured using the items:
(1) ‘What is the fisherfolk special insurance scheme name?’ With the following response choices: (a) not known, (b) money back policy, (c) Life policy, (d) Janatha I, (e) Janatha II.

Item 2) ‘How much amount will be given during banned fishing time?’ (a) don't know, (b) not given any amount from government, (c) Rs. 2000, (d) Rs. 3000, and (e) Rs. 4000.

Item 3) ‘What is the disbursed special allowance amount given to marine fisherfolk families during the lean fishing season?’ (a) don't know, (b) not given any amount from government, (c) Rs. 1000, (d) Rs. 2000, and (e) Rs. 4000. In the survey it was found that 1.9% respondents gave the correct answers and 89.1% gave wrong answers to the question 1 and 53.8% gave the
correct answer and 46.3% gave wrong answer to question 2 and 52.5% gave correct answer and 47.5% gave wrong answer to question 3.

6.19.3 Knowledge on Institutional Support

Knowledge of institutional support was measured using the following four items. Item one is ‘Where is the University of Fisheries located in Tamil Nadu?’ with the following response choices (a) don't know, (b) Tuticorin, (c) Kayalpattinam, (d) Nagapattinam, and (e) Nagercoil.

Item two is ‘Which institution is helping in safety fishing and in providing potential fishing zone information?’ with the following response choices (a) not knowing, (b) ISRO, (c) INCOIS, (d) Fisheries Department, (e) MPEDA, (f) MSSRF, and (g) Reliance Foundation. The importance of Reliance Foundations can be understood in the context of increasing public-private partnership initiatives which was only emerging at the time of this study. Reliance industries limited started the non profit organization Reliance Foundation involving the following programme areas such as rural transmission, education, health, urban renewal, arts, culture and heritage. The rural transmission is one of the programme information services which operated since 2013. The information services involved mobile based advisory and help line for farmers and fisherfolk across India. This services were only beginning at the time of the study.

Item three is ‘What is coastal police helpline phone number?’ with the following response choices (a) not known, (b) wrongly answered with mobile aid, (c) answered with mobile aid, (d) 1011, e ) 1001, and f) 1093.

Item four is ‘What is the fisherfolk coastal guard helpline phone number?’ with the following response choices (a) not known, (b) wrongly answer with mobile aid, (c) correctly answer with mobile aid, (d) 1500, (e)
1511, and (f) 1554. In the survey found that 53.1% respondents gave the correct answers and 46.9% gave wrong answers to the question 1 and 18.1% gave correct answer and 61.3% gave nearly correct answer to question 2 and 68.1% gave correct answer and 31.9% gave wrong answer to question 3 and 100% gave wrong answer to question 4.

6.19.4 Regulatory Restrictions

Knowledge on regulation was measured using the following three items. Item one is ‘What net size does the government recommend for fishing?’ with the following response choices (a) not known, (b) 12mm - 18 mm, (c) 18mm - 28 mm, (d) 28mm - 32 mm, and (e) 35mm above. Item two is ‘What are the government banned net types?’ with the following response choices (a) not known, (b) gill net, (c) trawler net, (d) single trawl roller net, and (e) ring seine, double roller net.

Item three is ‘How many nautical miles are under the governmental control power of the coastal area (from the shore)?’ with the following response choices (a) not known, (b) 5 nautical miles, (c) 8 nautical miles, (d) 12 nautical miles, and (e) 10 nautical miles. The survey it was found that 25% respondents gave the correct answers and 75% gave wrong answers to the question 1 and 100% gave the correct answer to question 2 and 6.9% respondents gave the correct answers and 93.1% gave wrong answers to the question 3.

6.19.5 Occupational and General Knowledge

Knowledge on occupational experience was measured using, the following one item. ‘How much ice required for one kg fish preservation?’ with the following response choices (a) don't know, (b) one kg fish and quarter kg ice, (c) one kg fish and half kg ice, (d) one kg fish and one kg ice,
and (e) one kg fish and two kg ice. In the survey it was found that 62.5% respondents gave the correct answers and 37.5% gave wrong answers to this question.

General knowledge was measured using the following two items. Item one is ‘What type of nutrition is avail in the fish?’ with the following response choices (a) not known, (b) oil nutrition, (c) vitamin nutrition, (d) protein nutrition, and (e) fat nutrition.

Item 2 is ‘What is the name of fish revolution?’ with the following response choices (a) don’t know, (b) sea fish production revolution, (c) yellow revolution, (d) blue revolution, and (e) sea fish revolution.

In the survey it was found that 28.8% respondents gave the correct answers and 44.4% gave nearly correct answers to the question 1 and 13.8% gave the correct answer and 86.2% gave wrong answered to question 2.

The next chapter provides a detailed statistical analysis of the survey and draws out the finding of the study.