



NAVIC NAVIGATION WITH INDIAN CONSTELLATION

A study on fishermen families of coastal karnataka and
Their technological orientation with special reference to
Navic devices of ISRO



An initiative by

ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY, MOODUBIDIRE

In association with

INDIAN SPACE RESEARCH ORGANIZATION,



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Indian Space Research Organization (ISRO) is the pride of our nation and has proved its efficacy & Strategic importance in the world. Our Country dreams it has a great level of accomplishing, Rocketing the dreams of common man. Space Technology has been converted into a bread technology for the poor through innovative milestone of ISRO over last decades. We are happy that Alva's Education Foundation got an opportunity to work with ISRO in expanding its mission of reaching the needy and unreached. The project NAVIC has been tendered for its practical and socio-cultural feasibility through the associated work of Alva's Education Foundation and ISRO.

The current report is an logical conclusion of the interaction & Technical dialogue undertaken with 420 fishermen communities of following Coastal areas of Karnataka

- Malpe
- Gangolli-Maravanthe
- Mangalore

This report embodies Socio-Cultural and Technical feasibility of using NAVIC and comparison of other devices for enriching the life of Common Fishermen

We are proud to present this report with finding from 420 fishermen and 12 NAVIC device users to ISRO and thankful for its faith in us in considering Alva's Education Foundation as a worth organisation to associate with. We expect to continue this association of working together and to reach masses.



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Expanding NAVIC need and Motivation

This unique community academia research interaction was initiated by two enthusiast leaders
Shri. A. S. Kiran Kumar, Former Chairman and Dr. P G Diwakar, Director, EPDO



Shri. A. S. Kiran Kumar, Former Chairman



Dr. P G Diwakar, Director, EPDO

The project has a unique objective of deploying the innovative technique of navigation and fishing tool of ISRO. The objectives of this interactions are :

- To understand Socio-Cultural conditions of the area chosen
- To investigate and report the utility & comprehension regarding various government facilities extended for fishermen and fishing as a industry
- To record technical possibilities & limitations of NAVIC tool designed by ISRO
- To present a combined report for further modifications & community centered actions.

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About Indian Space Research Organization (ISRO)

The Indian Space Research Organization (ISRO) is the space agency of the Government of India headquartered at Bengaluru. The main vision of ISRO is to “harness space technology for national development while pursuing space science research and planetary exploration.”

ISRO was formed in 1969, by the efforts of independent India’s first Prime Minister, Jawaharlal Nehru, and scientist Vikram Sarabhai, managed by the Department of Space, which reports to the Prime Minister of The Republic of India. On 22 October 2008, ISRO sent one Lunar orbiter, Chandrayaan-1, and on 24 September 2014 one Mars orbiter, Mars Orbiter Mission, which successfully entered Mars Orbit, making India the first nation to succeed on its first attempt, , and ISRO the fourth space agency in the world as well as the first space agency in Asia to successfully set a record with a launch of 20 satellites in a single payload, one being a satellites from Google. On 15 February 2017, ISRO launched 104 satellites in a single rocket (PSLV-C37) and created a world record. ISRO launched its heaviest rocket. Geosynchronous Satellite Launch Vehicle-Mark III (GSLV-Mk III). On 5 June 2017 and placed a communication satellite GSAT-19 in orbit, With this launch, ISRO became capable of launching 4 ton heavy satellites.

About NAVIC – India’s Indigenous Positioning System



NAVIC: NAVigation with Indian Constellation is India’s very own GPS system. NAVIC was named by Indian Prime Minister Narendra Modi. With These Satellites India has waltzed into the elite club of countries that have their own navigation systems with the launch of the 7th

Satellite of the GPS system, NAVIC is now ready for deployment. With NAVIC, ISRO has not only brought to us another thing to be proud about but will be making it easier to have more accurate navigation facilities. Until now only 4 countries had this technology namely USA, EU, RUSSIA, CHINA respectively. India’s GPS system consists of a total of seven satellites.

Navic will guide fisherman and sailors by showing the shortest route to regions where there is a big concentration of fishes. It will also help them to stay away from foreign waters. It will aid armed forces in accurately determining their positions in combat and direct missiles direct into enemy

territory. NAVIC's position accuracy will aid relief and rescue operations conducted during disaster situations like floods and earthquakes. It will reduce India's dependence on foreign navigation systems such as GPS. NAVIC, when used along with GPS, can ensure minimum technical snags and increasing efficiency. The constellation is already in orbit and system is expected to be operational from early 2018. NAVIC will provide two levels of service, the 'standard positioning service' will be open for civilian use, and a restricted service for authorized users.

The system is claimed to have an accuracy of better than 20 meters. To avail the benefits of NAVIC in our smart phones people will not have to buy a new phone, perhaps some apps will be enough to take care of the functional aspects. It may take some time. Currently, most mobile phones, navigation devices and [Telemetric systems](#) are based on 'GPS' and many of the mobile phones also support GLONASS. Once the system is made operational, device makers and OEM's (Original equipment manufacturer), can incorporate support for NAVIC into their devices. ISRO has already developed a chipset that can be incorporated into devices. But it needs to be manufactured. ISRO is in talks with telecom operators and Smartphone manufacturers to make use of IRNSS system in their devices.

About Alva's Education Foundation



Alva's Education Foundation (R) , the dream child of Dr. M Mohan Alva, a visionary genius with an ability to spot talent youth potential and amazing fund for resourceful ideas for reinventing and restructuring social , Cultural and ethnographic milieu of society is founded to cater the budding talented youth of the society.

Alva's Education Foundation (AEF) located in Moodbidri (Dakshina Kannada District) has 19 institutions under its fold offering kinder garden to graduate and post graduate courses in engineering, medicine, commerce, pure sciences, Para-medical and humanities. AEF has more than 27000 students pursuing their education in various courses out of almost 5000 students are under full scholarship for Academics, Sports, Cultural, Tribal, North East, Economically backward students provided by foundation.

AEF was established with the primary objective of serving the rural youth of the region by providing wholesome education, which apart from focusing on pure academics, also provides opportunities for students to develop their other innate abilities by organizing literary and cultural events/programs. The students are encouraged to participate in these programs at the competition and organizing level. By sensitizing the students to the traditions and culture, AEF is making sincere efforts to preserve the Kannada cultural heritage with its traditions.

Alva's Institute of Engineering & Technology (AIET), a unit of AEF was established in 2008 at Mijar, Moodbidri and is affiliated to VTU, Belgaum. AIET has bachelor programs (BE) in Civil, Computer Sciences, Electronics & Communication, Information Sciences and Mechanical Engineering. So far 5 batches of BE students have graduated from this institute and are working in various organizations across the globe.

ABOUT NAVIGATION WITH INDIAN CONSTELLATION KIT AND APP

It is an autonomous regional satellite navigation system that provides accurate real-time positioning and timing services

- NAVIC – kit and App is a new invention in traffic system developed by ISRO based on the galaxy.
- NAVIC is the special kind of system which functions better than the rest of the GPS system and cheaper compared to other GPS.
- NAVIC – kit and App is specially designed for the fishermen to assist them in their Job. This App provides the accurate information on their location, distance travelled, potential extremes



Socio – Technical prospectus of Fishing & Fishermen with special reference to fishing hubs of Udupi and Dakshina Kannada Districts of Karnataka

Introduction

Fisheries sector plays a crucial role in the National economy. This sector is mainly contributing towards poverty alleviation, supply of animal protein and foreign exchange earnings. Fishing is one of the oldest occupations perhaps it is older than agriculture when man took to settlement on land and its exploitation for production of crops. Relatively, fishing requires a little input of time and equipment. Being a traditional and also an important occupation, the people involved in this sector, face lot of challenges.

Background of the study

Most fishermen have poor fishing equipment which leads to a low catch. Fishermen even lack appropriate storage and preservation facilities. The occurrence of strong wind leads to high waves causing accidental drowning or destruction of fishing vessels and nets. Presence of water hyacinth, entangles and tears the fishing nets and thus hindering movements of Fishing boats. Along with this, the fishermen even face challenges associated with the devices and instruments. Hence to understand the occupational problems and the support system extended to fishermen in coastal regions, this study has been undertaken.

Objectives:

1. To understand the personal profile of respondents.
2. To know the occupational profile of fishermen in coastal areas.
3. To know the usages and implications of fishing devices.
4. To understand the challenges and coping strategies adopted by Fishermen.
5. To understand various Government facilities provided to Fishing community.
6. To recommend strategies based on the suggestive measures of the Fishermen

Area under study:

The present study was carried out at coastal regions of Dakshina Kannada district (Dakke, Bengre, Hosabettu, Panambur) and Udupi District (Malpe, Gangolli).All the people of these areas are more or less involved with the fishing and coastal areas play an important role in improvement of the present lifestyle of fishermen too. Hence, the study is undertaken in this region.

Data Collection:

Data was collected using surveys, Focussed groups, key informant interviews and direct observations. Survey was done for the study and interviewees were selected randomly. The survey design is based on expert advice from the communities of Fishermen for collecting base line fisheries data. Total sample of 420 was collected for the study. 215 respondents were selected from coastal regions of Udupi district and 205 respondents were selected from Dakshina Kannada district.

Implications of the Study:

The results of the study would be of great importance for further research. The recommendations based on the results of the study would be helpful in developing strategies to deal with the problems associated with devices used by the fishermen and also to recommend the concerned Governmental authorities to deal with the problem of fishermen in coastal regions.

Analysis and Interpretation of the data

The collected data has been analysed and interpreted in the following manner.

Types of Boats used for Fishing:

The following table examines the type of boats used by fishermen in coastal areas for fishing.

Table No.1

| Sl.No | Type of Boats | No. of respondents | Percentage |
|-------|---------------|--------------------|------------|
| 01 | Local Boat | 178 | 42 |
| 02 | Persian | 217 | 52 |
| 03 | Deep sea | 25 | 6 |
| Total | | 420 | 100.0 |

Majority, i.e., 52 per cent of the fishermen in coastal areas of Dakshina Kannada and Udupi district makes use of Persian boats for fishing. About 42 per cent of them are traditional fishermen who still use the local boats (Naadadoni) while only 6% of them depends on Deep sea for their fishing purpose.

Number of workers working in Boats:

The below table explains the number of employees in boats.

Table No.2

| Sl.No | Number of workers | No. of respondents | Percentage |
|-------|-------------------|--------------------|------------|
| 01 | 0-5 | 55 | 13 |
| 02 | 5-10 | 92 | 22 |
| 03 | 10-15 | 19 | 4.5 |
| 04 | 15-20 | 6 | 1.4 |
| 05 | 20-30 | 23 | 5.5 |
| 06 | 30 and above | 225 | 54 |
| Total | | 420 | 100 |

Out of the total respondents under study, majority, i.e., 54 per cent have above 30 workers working in their boats. 22 per cent have 5-10 workers, 13 per cent have 0-5 workers working in their boats while 15-20 workers are working with only 1 per cent of the respondents.

Age of the respondents:

Ages of the respondents under study are explained here.

Table No.3

| Sl.No | Age | No. of respondents | Percentage |
|-------|--------------|--------------------|------------|
| 01 | 18-25 | 16 | 3.8 |
| 02 | 25-35 | 69 | 16.4 |
| 03 | 35-45 | 211 | 50.2 |
| 04 | 45-55 | 88 | 21.0 |
| 05 | 55 and above | 36 | 8.6 |
| Total | | 420 | 100.0 |

The above table shows that majority of the fishermen under study, i.e., 50.2 per cent belong to the age group of 35-45 years. About 21 per cent of them are in the age bracket of 45-55 years, 16.4 per cent of them are in the age group of 25-35 years. The fishermen in the age group of 18-25 (3.8%) and 55 and above age group (8.6%) is very less. Thus majority of the respondents represent the young age group.

Educational Qualification:

Table No.4

| Sl.No | Educational Qualification | No. of respondents | Percentage |
|-------|---------------------------|--------------------|------------|
| 01 | Illiterate | 99 | 23.6 |
| 02 | Primary | 114 | 27.1 |
| 03 | High school | 155 | 36.9 |
| 04 | PU | 32 | 7.6 |
| 05 | Degree | 10 | 2.4 |
| 06 | PG | 9 | 2.1 |
| 07 | Diploma/ITI | 1 | .2 |
| Total | | 420 | 100 |

Among the total respondents under study, majority, i.e, 36.9 per cent have studied upto SSLC, 27.1 per cent of them have gone upto primary school, 23.6 per cent of the respondents are illiterates. Fishermen with a qualification of Secondary level education are less (7.6%). Only 2.4 per cent of the respondents are graduates and 2.1 per cent have qualification of Post-Graduation. Only one respondent under study is a Diploma holder. Thus educational background of the respondents shows that it is very low.

Fishing experience:

The table examines the experience of the respondents in Fishing.

Table No.5

| Sl.No | Fishing experience | No. Of respondents | Percentage |
|-------|--------------------|--------------------|------------|
| 01 | 0-2 years | 13 | 3.1 |
| 02 | 2-4 years | 9 | 2.1 |
| 03 | 4-6 years | 12 | 2.9 |
| 04 | 6-8 years | 10 | 2.4 |
| 05 | 8-10 years | 28 | 6.7 |
| 06 | above 10 years | 348 | 82.8 |
| Total | | 420 | 100.0 |

The table analyses the fact that majority, i.e, 348 respondents have more than 10 years of fishing experience. About 12 per cent of the respondents under study have fishing experience below 10 years and only 5.2 per cent of them have 4 years of fishing experience. Thus majority of the respondents under study are experienced fishermen.

Native Place of respondents:

Native places of respondents under study are discussed below.

Table No.6

| Sl.No | Native Places of respondents | No. Of respondents | Percentage |
|-------|------------------------------|--------------------|------------|
| 01 | Udupi and D.K District | 334 | 79.5 |
| 02 | Uttara Kannada District | 38 | 9.04 |
| 03 | Koppala District | 13 | 3.09 |
| 04 | Kerala | 9 | 2.14 |
| 05 | Andra Pradesh | 16 | 3.80 |
| 06 | Tamil Nadu | 3 | 0.71 |
| 07 | Uttara Pradesh | 7 | 1.66 |
| Total | | 420 | 100 |

It is shown in the above table that majority, i.e., 79.5 per cent of the respondents under study belongs to Udupi and Dakshina Kannada Districts of Karnataka. 9 per cent of them are from Uttara Kannada district, 3.09% of them are from Koppala districts of Karnataka. It is imperative to note that the respondents are also from other states like, Kerala (2.14%), Andra Pradesh (3.80%), Tamil Nadu (0.71%) and U.P (1.66%). Though the majority respondents are from Dakshina Kannada district, these coastal areas have also attracted many fishermen from other districts and states.

Fishing Place of the respondents:

The table examines the fishing places of the fishermen under study.

Table No.7

| Sl.No | Location of Fishing | No. of respondents | Percentage |
|-------|---------------------------------|--------------------|------------|
| 01 | Mangalore Region(D.k District) | 164 | 39.04 |
| 02 | All the coastal areas | 13 | 3.1 |
| 03 | Arabian sea | 9 | 2.1 |
| 04 | Malpe/Gangolli (Udupi district) | 215 | 51.2 |
| 05 | Bombay | 1 | 0.2 |
| 06 | Karavara | 5 | 1.2 |
| 07 | Goa | 8 | 1.9 |
| 08 | Kochi | 5 | 1.2 |
| Total | | 420 | 100.0 |

The fishing places of majority of the respondents, i.e., 51.2 per cent is Malpe (Udupi district), 39.04 per cent of the respondents prefer Mangalore coastal regions. About 3.1 per cent of the respondents go for fishing in all the coastal areas. 2.1 per cent of the respondents prefer Arabian sea and the remaining respondents (4.5%) prefer other states and districts for fishing.

Type of Family of the respondents:

The table examines the type of family to which the respondents belong.

Table No.8

| Sl.No | Kind of Family | No. Of respondents | Percentage |
|--------------|----------------------|--------------------|--------------|
| 01 | Fishermen family | 392 | 93.3 |
| 02 | Non-Fishermen family | 28 | 6.7 |
| Total | | 420 | 100.0 |

The above table shows that majority of the respondents under study, i.e., 93.3 per cent belong to traditional Fishermen families while 6.7 per cent of them do not represent traditional fishermen families.

Distance travelled for every catch:

Table No.9

| Sl.No | Distance travelled | No. Of respondents | Percentage |
|--------------|--------------------|--------------------|------------|
| 01 | 5-20 Kms | 71 | 16.9 |
| 02 | 20-50 Kms | 82 | 19.5 |
| 03 | 50- 100 kms | 67 | 16.0 |
| 04 | 100-500 kms | 187 | 44.5 |
| 05 | 500 and above | 13 | 3.09 |
| Total | | 420 | 100 |

With regard to distance travelled for fishing, it is found that majority, i.e, 44.5 per cent of the respondents travel for about 100-500 kms. The respondents who travel between 5 - 50 kms are about 36.4 per cent while 16per cent of the respondents travel for about 50-100 kms. It is even found that only 3.09 per cent of the respondents under study travel above 500 kms.

Methods adopted to measure the distance:

The following table analyses the methods adopted by the fishermen to measure the distance.

Table No.10

| Sl.No | Methods to measure distance | No. Of respondents | Percentage |
|--------------|------------------------------|--------------------|------------|
| 01 | Experience/Assumption | 67 | 11.7 |
| 02 | GPS, wireless and fishfinder | 287 | 74.5 |
| 03 | Using rope | 66 | 3.8 |
| Total | | 420 | 100 |

The table shows that majority, i.e,74.5 per cent of the respondents use GPS, Wireless and fish finder device to measure the distance. About 11.7 per cent of the respondents measure the distance on the basis of their experience while 3.8 per cent use a rope to measure the distance travelled.

Kind of Fish available:

The table discusses the kind of fish available for fishermen under study.

Table No.11

| Sl.No | Kind of fish available | No. of Respondents | Percentage |
|--------------|------------------------|--------------------|--------------|
| 01 | King Fish | 10 | 2.38 |
| 02 | Pom Fish | 4 | 0.95 |
| 03 | Pony Fish | 2 | 0.47 |
| 04 | Sole Fish | 8 | 1.90 |
| 05 | Mackerel & Sardine | 234 | 55.71 |
| 06 | All types | 162 | 39 |
| Total | | 420 | 100.0 |

It is found that Mackerel & Sardine are the two specific kinds of fishes which are available for majority of the fishermen in coastal regions(56%).About 39 per cent of them are able to catch all kinds of fishes.

Methods of Identifying Fish:

The table examines the methods adopted by the fishermen to identify the fish.

Table No.12

| Sl.No | Method of Identifying Fish | No. of Respondents | Percentage |
|-------|----------------------------|--------------------|--------------|
| 01 | Knowledge/Experience | 338 | 80.5 |
| 02 | shape of the fish | 22 | 5.2 |
| 03 | Fish finder | 60 | 14.3 |
| Total | | 420 | 100.0 |

It is found that majority of the respondents, i.e, 80.5 per cent identify the fishes on the basis of their knowledge and experience. About 14.3 per cent of the respondents use fish finder to identify the type of fish while 5.2 per cent of them identify them on the basis of their shape. Thus the traditional fishermen identify the type of fish on their occupational experience.

Type of Boat used by the respondents while fishing:

The table examines the type of boats used by the respondents while catching the fishes.

Table No.13

| Sl.No | Types of Boats | No. of Respondents | Percentage |
|-------|----------------|--------------------|--------------|
| 01 | Motorised | 417 | 99.3 |
| 02 | Non-motorized | 3 | .7 |
| Total | | 420 | 100.0 |

Majority, i.e, 99.3 per cent of the respondents use motorised boats for fishing where as only 3 respondents use non-motorised boats for fishing.

Instruments used for Fishing:

The different instruments used by the fishermen is examined here.

Table No.14

| Sl.No | Fishing Instruments | No. of Respondents | Percentage |
|--------------|---------------------|--------------------|------------|
| 01 | Fish net | 58 | 14 |
| 02 | GPS | 242 | 58 |
| 03 | Fish finder | 56 | 13 |
| 04 | Echo sounder | 17 | 4 |
| 05 | Wireless Device | 47 | 11 |
| Total | | 420 | 100 |

Majority of the respondents, i.e, 58 per cent make use of GPS for fishing. About 14 per cent of them use only fishing net while, Fish finder is used by 13 per cent of the respondents. Among the total respondents, 11 per cent use wireless device and it is only 4 per cent of the respondents who use echo sounder Thus most of the fishermen in coastal areas use GPS for fishing.

Source of the Instrument:

The table examines the source of instruments used by the fishermen

Table No.15

| Sl. No | Instrument | Source | No. of Respondents | Percentage |
|--------------|---------------------|--------|--------------------|------------|
| 01 | GPS-FURUNO | Japan | 186 | 44 |
| 02 | GPS-GARMIN | India | 18 | 31 |
| 03 | GPS-KODANE | Japan | 38 | 9 |
| 04 | Fish finder- Kodane | Japan | 13 | 7 |
| 05 | Fish finder-Furuno | Japan | 43 | 16 |
| 06 | Wireless-ICOM | Japan | 17 | 8 |
| 07 | Wireless-Motorola | India | 30 | 3 |
| Total | | | 345 | 100 |

Majority of the respondents in the present study use GPS –Furuno(44%) for fishing. With regard to fish finder, majority use Fish finder-Furuno(16%).About 8 per cent of the respondents use Wireless-ICOM for fishing.

App used by the Fishermen:

The App used by the fishermen is presented here.

Table No.16

| Sl.No. | Name of the App | No.of respondents | Percentage |
|--------------|-----------------|-------------------|------------|
| 01 | AIS | 35 | 8 |
| 02 | Track India | 08 | 2 |
| 03 | No App | 377 | 90 |
| Total | | 420 | 100 |

Among the total respondents, only 8 per cent of the respondents use AIS app while 2 per cent of them use Track India App for fishing. Thus it is imperative to note that the fishermen in coastal areas are not using any of the Apps for fishing, which shows that the technical exposure of fishermen in coastal areas of Udupi and Dakshina Kannada districts is very less.

Usage of the Instrument:

Table No: 17

| Sl. No | Name of the Instrument | Usage | No. of Respondents | Percentage |
|--------------|------------------------|---|--------------------|------------|
| 01 | GPS | <ul style="list-style-type: none"> To findout the route To measure the distance | 232 | 55 |
| 02 | Fish finder | <ul style="list-style-type: none"> To detect the rock in the sea To find the availability of fishes | 56 | 13.3 |
| 03 | Echo sounder | <ul style="list-style-type: none"> To detect the obstacles under the sea before putting the net | 10 | 2.4 |
| 04 | Wireless Device | <ul style="list-style-type: none"> Fish finder | 47 | 11.2 |
| Total | | | 345 | 100 |

Among the total respondents who make use of instruments of fishing, it is found that majority,i.e,55 per cent use GPS to measure the distance and to find the route while 13.3 per cent of them use Fish

finder to detect the rock in the sea (13.3%).About 11.2 per cent use wireless device for finding the fishes.

Cost of the Instrument:

The table explains the cost incurred on fishing instruments.

Table No.18

| Sl.No. | Cost of the instrument | No. of respondents | Percentage |
|--------------|------------------------|--------------------|--------------|
| 01 | Below 5,000 | 18 | 4.3 |
| 02 | 5,000 to 20,000 | 37 | 8.8 |
| 03 | 20,000 to 50,000 | 43 | 10.2 |
| 04 | 50,000 to 1,00,000 | 95 | 22.6 |
| 05 | 1,00,000 to 2,00,000 | 204 | 48.6 |
| 06 | 2,00,000 and above | 23 | 5.5 |
| Total | | 420 | 100.0 |

The fishermen in the present study who spend about 1,00,000 to 2,00,000 are about 48.6 per cent. About 22.6 per cent of the respondents spend 50,000 to 1,00,000 for the instrument while 10.2 per cent spend around 50,000. Only 5.5 per cent of the respondents are able to spend an amount of Rs.2,00,000 and above. Thus the table indicates that the fishermen need to spend a huge amount of money on fishing instruments.

Methods adopted to identify potential fishing zone:

The table analyses the methods adopted by the fishermen in identifying the potential areas for fishing.

Table No.19

| Sl.No | Methods | No. of respondents | Percentage |
|-------|-----------------------------|--------------------|------------|
| 01 | GPS | 230 | 55 |
| 02 | Fish finder | 99 | 24 |
| 03 | Trolling | 9 | 2 |
| 04 | Message from Fisheries dept | 17 | 4 |
| 05 | News from other fishermen | 29 | 7 |
| 06 | Experience | 36 | 8 |

| | | |
|--------------|------------|------------|
| Total | 420 | 100 |
|--------------|------------|------------|

It is clear from the above table that majority, i.e, 55 per cent of the respondents use GPS to identify the potential area for fishing. The other methods adopted are Fish finder(24%), Trolling (2%), Message from Fisheries department(4%), News from other fishermen(7%). About 8 per cent of the respondents are dependent on their own experiences for the same.

Methods adopted to identify the location of Fishermen:

The table examines the position or location of fishermen.

Table No.20

| Sl.No | Methods | No. of respondents | Percentage |
|--------------|----------------|---------------------------|-------------------|
| 01 | GPS | 242 | 57.61 |
| 02 | Wireless | 25 | 5.95 |
| 03 | Fish finder | 88 | 20.95 |
| 04 | Trolling | 16 | 3.60 |
| 05 | Compass | 14 | 3.32 |
| 06 | Observation | 36 | 8.57 |
| Total | | 420 | 100.0 |

The location of the fishermen is identified with GPS by majority of the respondents (72.6%).About 20.95 per cent of the respondents use Fish finder to identify the location.5.95 per cent of the respondents are dependent on wireless instrument and 3.60 per cent use trolling for the same. Apart from these, 3.32 per cent of them use compass to identify the location and 8.57per cent are dependent on their own observation for identification. Thus GPS is used by majority for identification.

Methods adopted for the identification of Navigation direction:

Navigation identification methods adopted by the fishermen are explained here.

Table No.21

| Sl.No. | Methods | No. of | Percentage |
|---------------|----------------|---------------|-------------------|
|---------------|----------------|---------------|-------------------|

| | | respondents | |
|--------------|---------------------------|-------------|--------------|
| 01 | GPS | 242 | 57.68 |
| 02 | Wireless | 8 | 1.9 |
| 03 | News from other fishermen | 6 | 1.4 |
| 04 | Trolling | 5 | 1.2 |
| 05 | Weather forecast | 6 | 1.4 |
| 06 | Compass | 34 | 8.1 |
| 07 | Sun direction | 2 | .5 |
| 08 | Experience | 43 | 10.2 |
| 09 | Fish finder | 74 | 17.61 |
| Total | | 420 | 100.0 |

Among the total respondents under study, majority, i.e, 57.68 percent use GPS for navigation direction. About 17.61 percent make use of Fish finder to find out the direction. The other methods used by the fishermen are compass (8.1%), wireless (1.9%),trolling (1.2%),weather forecast (1.4%).Other than these the fishermen makes use of their own experiences(10.2%) as well as sun direction (0.5%) to identify the direction. Communication by other fishermen are also used to find out the navigation direction(1.4%).

Methods adopted to identify the cyclone:

The table examines the methods adopted by the fishermen to identify the cyclone while fishing.

Table No.22

| Sl.No. | Methods | No. of respondents | Percentage |
|--------------|------------------|--------------------|------------|
| 01 | GPS | 48 | 11.4 |
| 02 | Weather Forecast | 165 | 39.3 |
| 03 | Fish finder | 5 | 1.2 |
| 04 | No App | 127 | 30.2 |
| 05 | Wireless | 31 | 7.38 |
| 06 | Experience | 44 | 10.5 |
| Total | | 420 | 100 |

Majority of the respondents, i.e, 39.3 per cent are dependent on weather forecast by the Fisheries Department to know about the cyclone. About 11.4 percent of them make use of GPS, 10.5 per cent decides on the basis of their own experience, fish finders are used by 1.2 per cent of the respondents while 7.38 per cent of them are using wireless for the same. It is to be noted from the above table that 30.2 per cent of the respondents do not have any App to identify the cyclone.

Methods adopted for rain prediction:

The table examines the methods used by the fishermen to predict the rain.

Table No.23

| Sl.No. | Methods | No. of respondents | Percentage |
|--------------|---------------------------|--------------------|--------------|
| 01 | GPS | 17 | 4.0 |
| 02 | Wireless | 112 | 27 |
| 03 | Fish finder | 3 | .7 |
| 04 | Trolling | 2 | .5 |
| 05 | Weather forecast | 176 | 42 |
| 06 | No App | 19 | 4.5 |
| 07 | News from other fishermen | 14 | 3.3 |
| 08 | Experience | 77 | 18.3 |
| Total | | 420 | 100.0 |

The table shows that 42 per cent of the respondents depends on weather forecast by the Fisheries department for rain prediction. Wireless device is also used by 27 per cent respondents. About 18.3 per cent of the respondents predict rain on the basis of their experience. The methods adopted by other respondents include GPS(4%), Fish finder (0.7%), Trolling (0.5%), news from other fishermen (3.3%). It is important to note that 4.5 per cent respondents do not have any app to predict the rain.

Methods adopted to identify the tides:

The occurrence of tide and its identification is explained below.

Table No.24

| Sl.No. | Methods | No. of respondents | Percentage |
|--------------|------------------|--------------------|--------------|
| 01 | Wireless | 34 | 8.1 |
| 02 | GPS | 174 | 41.4 |
| 03 | Fish finder | 2 | .5 |
| 04 | Trolling | 2 | .5 |
| 05 | Weather forecast | 93 | 22.1 |
| 06 | No App | 13 | 3.1 |
| 07 | Experience | 102 | 24.3 |
| Total | | 420 | 100.0 |

Majority of the respondents in the present study, i.e, 41.4 percent use GPS to know about the tides. About 24.3 percent of them use their fishing experience while 22.1 per cent are dependent on weather forecast by the fisheries department. The remaining respondents use wireless instruments(8.1%),Fish finder(0.5%) and Trolling(0.5%) for the same. About 3.1 per cent of the respondents opined that they do not have any App to know about tides while fishing.

Methods adopted to know the problems of wind:

The arrival of wind and its identification by fishermen is examined here.

Table No.25

| Sl.No. | Methods | No. of respondents | Percentage |
|--------------|------------------|--------------------|--------------|
| 01 | GPS | 30 | 7.1 |
| 02 | Wireless | 142 | 33.8 |
| 03 | Fish finder | 3 | .7 |
| 04 | Trolling | 2 | .5 |
| 05 | Weather Forecast | 150 | 36 |
| 06 | No App | 20 | 4.8 |
| 07 | Experience | 72 | 17.1 |
| Total | | 420 | 100.0 |

Among the total respondents, 33.8 percent are using wireless instrument to know about the wind while 36 per cent are dependent on weather forecast by the fisheries department. Though 17.1 per

cent of them make use of their occupational experiences, few of them make use of other methods like GPS(7.1%),Fish finder(0.7%),Trolling (0.5%).About 4.8 per cent of the respondents do not have any app to know about the wind.

Methods adopted to know the sea depth:

Sea depth and its identification by the fishermen is explained below.

Table No.26

| Sl.No. | Methods to know the sea depth | Frequency | Percent |
|--------------|-------------------------------|------------|------------|
| 01 | GPS | 49 | 12 |
| 02 | Fish finder | 234 | 56 |
| 03 | Experience | 15 | 3.5 |
| 04 | Echo sounder | 15 | 3.5 |
| 05 | Rope | 107 | 25 |
| Total | | 420 | 100 |

With regard to sea depth, majority of the respondents in the present study, i.e, 56 percent use fish finder device.GPS is used by 12 per cent of the respondents. About 3.5 per cent of the respondents use echo sounder to findout the sea depth and about 3.5 per cent of them make use of their own occupational experiences. The traditional method of using a rope and a stone is done by 25 per cent of the fishermen in the present study.

Methods adopted to identify the rock:

The present table explains the methods adopted by fishermen to identify the rock in the sea.

Table No.27

| Sl.No. | Methods | No. of respondents | Percentage |
|--------------|----------------------|--------------------|--------------|
| 01 | GPS | 58 | 13.8 |
| 02 | Fish finder | 220 | 52.3 |
| 03 | Rope and GPS | 25 | 6.0 |
| 04 | GPS and Echo sounder | 18 | 4.3 |
| 05 | Experience | 99 | 23.6 |
| Total | | 420 | 100.0 |

In the above table it is clear that majority of the fishermen, i.e, 52.3 per cent use Fish finder device to identify the rock in the sea. About 23.6 per cent make use of their own experience while 13.8 per cent are dependent on GPS. Echo sounder along with GPS is used by 4.3 per cent of the respondents. The traditional method of rope is used by 6 per cent respondents. Thus it can be understood that Fish finder device is commonly used by Fishermen in coastal areas of Dakshina Kannada.

Methods to identify other boats and Travellers ships during fishing:

The technique used by fishermen to identify other boats and traveller ships while fishing is examined below.

Table No.28

| Sl.No. | Methods | No. of respondents | Percentage |
|--------------|------------------------|--------------------|--------------|
| 01 | GPS | 10 | 2.38 |
| 02 | Wireless | 88 | 20.95 |
| 03 | Light from other ships | 270 | 64.3 |
| 04 | Assumption | 52 | 12.38 |
| Total | | 420 | 100.0 |

Among the total respondents under study, majority, i.e, 64.3 per cent identify other boats and traveller ships by its light.20.95 per cent of them make use of wireless device. Very few, i.e, 2.38 per cent use GPS and 12.38 per cent assume the arrival of other boats and traveller ships. Thus it is clear that there is no appropriate device used by fishermen in the present study to identify the arrival of other boats and traveller ships.

Methods adopted to connect to Port:

Connectivity to port by the fishermen while fishing is examined here.

Table No.29

| Sl.No | Methods | No. of Respondents | Percentage |
|-------|--------------------------|--------------------|------------|
| 01 | Wireless | 320 | 76 |
| 02 | Message from other ships | 28 | 7 |

| | | | |
|--------------|-----------|------------|------------|
| 03 | No device | 72 | 17 |
| Total | | 420 | 100 |

In the present study 76 per cent of the respondents use wireless communication device to contact the port while 7 per cent of them send/ receive messages from other ships/boats. But for about 17 per cent of the respondents, there are no any device to contact the port.

Limitations of Devices:

Table No: 30

| Sl. No | Limitations | No. of respondents | Percentage |
|--------|---|--------------------|------------|
| 01 | Unable to follow the Instructions | 72 | 17.14 |
| 02 | No information about banned fishing areas | 16 | 4 |
| 03 | Problems of borders | 21 | 5 |
| 04 | Unknown locations are not identified | 41 | 9.8 |
| 05 | Limited storage on data like waypoints or tracks on GPS | 38 | 9 |
| 06 | Loss of data when GPS gets damaged | 21 | 5 |
| 07 | Loss of fuel in search of fish | 18 | 4.3 |
| 08 | Lack of information about way points | 35 | 8.3 |
| 09 | Durability is very less | 73 | 17.3 |
| 10 | Tearing of the net without fishing direction | 85 | 20 |
| | Total | 420 | 100 |

The table analyses the limitations of the devices used by fishermen in the study. It is found that majority, i.e, 20 per cent agree that the net gets teared without fishing direction.17 per cent of them are unable to follow the instruction of the device.17.3 per cent feel that the durability of these devices are very less. Other limitations include, not providing any information about banned fishing areas(17.14%),problems of borders (4%),non-identification of unknown locations(5%),Limited storage on data like waypoints or tracks on GPS(9.8%),Problems of borders(4%),Loss of data when GPS gets damaged(9%),Loss of fuel in search of fish (5%),Lack of information about way points (4.3%).

Suggestions to improve the device:

Table No: 31

| Sl. No | Suggestions | No. of Respondents | Percentage |
|--------------|---|--------------------|------------|
| 01 | Alert about geo fence regions | 17 | 4 |
| 02 | Information about fishing regions | 35 | 22 |
| 03 | App should work offline in smart phones | 25 | 5.95 |
| 04 | Unlimited storage and cloud backup | 20 | 4.76 |
| 05 | Sharing of waypoints by other fishermen | 93 | 19 |
| 06 | Cost effective and more durable device | 80 | 8.3 |
| 07 | Fish finders need to be improved | 51 | 12.1 |
| 08 | Device to findout other boats and ships | 48 | 11.4 |
| 09 | Wireless device need to be improved | 51 | 12.1 |
| Total | | 420 | 100 |

The suggestions given by the respondents to improve the device shows that, majority, i.e, 22 per cent suggested that the device must provide information about fishing regions. About 24.2 per cent of them suggested to improve the fish finder as well as wireless device. Device to findout other boats and traveller ships were also suggested by 11.4 per cent respondents. About 19 per cent of them expected the sharing of waypoints by other fishermen.4.76 per cent wanted the device to have unlimited storage and cloud back up. The remaining 4 per cent wanted the device to alert about geo fence regions.

Facilities for fishermen by different agencies:

The support system for fishing is examined here

Table No. 32

| Sl.No. | Available Facilities | No. of Respondents | Percent |
|--------|----------------------|--------------------|---------|
| 01 | Kerosene | 12 | 3 |
| 02 | Loan facility | 15 | 4 |

| | | | |
|--------------|---------------------------|------------|------------|
| 03 | Diesel Subsidy | 189 | 45 |
| 04 | No services | 107 | 26 |
| 05 | engine subsidy | 19 | 4 |
| 06 | damage recovery | 4 | 1 |
| 07 | Fishing net | 52 | 12 |
| 08 | Life jacket | 18 | 4 |
| 09 | Scholarships for children | 4 | 1 |
| Total | | 420 | 100 |

In the present study, majority, i.e, 45 per cent are availed with diesel subsidy. About 12 per cent of them are provided with fishing net and loan facility is also provided for about 4 per cent of the respondents. Engine subsidy is provided for 4 per cent of the respondents. About 4 per cent of them are availed with provision of life jacket and 3 per cent are provided with facility of kerosene. Out of the total respondents, four of them opined that damage recovery of boats is also provided. But 26 per cent of the respondents under study do not get any facilities from the Government.

Source of Facility:

The sources from where different facilities are provided to fishermen are discussed here.

Table No.33

| Sl.No | Source of Services | No. of Respondents | Percentage |
|--------------|-----------------------|--------------------|------------|
| 01 | Govt | 255 | 61 |
| 02 | Fishermen association | 113 | 27 |
| 03 | co-operative society | 52 | 12 |
| Total | | 420 | 100 |

In the above table, it is clear that majority, i.e., 61 per cent get the facilities from the Government while 27 per cent get it from the Fishermen association. Co-operative societies also provide services for about 12 per cent of the respondents.

Suggestions to Government:

The following table contains the suggestions given by the Fishermen to the Government.

Table No: 34

| Sl. No | Suggestions to Government | No. of Respondents | Percentage |
|--------------|--|--------------------|------------|
| 01 | Fishing kit need to be provided by the Government | 19 | 4.5 |
| 02 | Services need to include fishermen belonging to APL also. | 101 | 24 |
| 03 | Reduce tax on fishing devices | 18 | 4.2 |
| 04 | Need to provide more subsidy | 34 | 8 |
| 05 | Need to provide Insurance to Fishermen | 52 | 12.4 |
| 06 | Reduce the prices of devices and Apps | 13 | 3 |
| 07 | Financial and employment assistance during off season | 11 | 3 |
| 08 | Financial support to family in case of death | 46 | 11 |
| 09 | Upgradation of devices | 73 | 17 |
| 10 | Proper communication of information about weather,tides and protected fishing zone | 40 | 9.5 |
| 11 | Messages about new fishing zones need to be communicated to all | 13 | 3 |
| Total | | 420 | 100 |

It is found that majority of the respondents,i.e,24 per cent of the respondents opined that almost all the provisions of the Government is meant for fishermen belonging to BPL while APL families are not availed with these facilities. Hence they suggested that the Government must extend these services to APL families also. Other suggestions include, provision of fishing kit(4.5%),reduction of tax on fishing devices(4.2%),more subsidy(8%),Insurance coverage(12.4%),reduce the prices of devices and Apps (3%),Financial and employment assistance during off season(3%) ,Financial support to family in case of death(11%), Upgradation of devices(17%),Proper communication of information about weather, tides and protected fishing zone(9.5%),Messages about new fishing zones need to be communicated to all (3%).

FINDINGS

The following are some of the findings of the study.

- It is found that majority of the respondents are from Udupi and Dakshina Kannada district and few respondents are also from other states like Kerala(2%),Andra Pradesh(4%),Tamil Nadu(0.7%) and UP(2%).
- Most of the respondents under study use Persian boats.
- Majority are youngsters in the age group of 35-40 years and most of them have educational qualification below SSLC.
- With regard to fishing experience, about 83% of them have more than 10 years of fishing experience.
- The areas chosen for fishing by majority are fishing areas of Udupi district. About 3% go for fishing in all the coastal areas and about 2.1% go for Arabian sea.
- Most of the respondents belong to Fishermen community (93.3%).
- The distance travelled by the fishermen by majority is 100-500 kms. About 3.09% travel more than 500 kms. The travelled distance is measured using instruments like GPS, Wireless and Fish finder (74.5%).
- Almost all types of fishes are available for most of the fishermen (55.71%) and the type of fish is identified on the basis of occupational experience by majority respondents (80.5%).
- Except 3 respondents, everyone make use of motorised boats for fishing.
- GPS is used by majority of the respondents in the study. Other methods are Fish finders, wireless device, echo sounder including fishing net. Majority of them use FURUNO which is a Japan based device(44%).The instruments are used to identify the fishing zone, types of fishes, to predict the rain, winds, cyclone, rock in the sea, for route track and even for navigation direction .The cost of these instruments range from Rs.1,00,000 to Rs. 2,00,000.
- Fishing Apps are not much familiar to the fishermen in the coastal areas.
- GPS is the instrument which is mostly used by the fishermen to identify the potential fishing zone(55%),identify the location(58%),navigation direction(58%),to know about the tides(41%).Along with GPS, they even use Fish finder to know the sea depth(56%),rock under the sea(52%).Wireless communication devices are used to connect to the

port(76%).Dependence on weather forecast by Fisheries department is also found among the respondents to know about cyclone(39%),to predict rain(42%),to identify the wind(36%).The identification of other boats and traveller ships are identified by majority respondents (64%) by the light from other boats as most of them do not have any specific device to identify it.

- With regard to limitations of these devices, most of them are not able to follow the instructions. The devices were found to be very expensive as there is much financial assistance available. Devices are not very durable and hence they do not completely rely on these devices. Fishing Apps are not much familiar to them.
- The suggestions by the Fishermen include, up gradation of fishing devices which can include all the required features especially more on complete information about the fishing regions. Cost of the instruments need to be reduced.
- Services available for fishermen include diesel subsidy for majority of the respondents. No much facility is available for fishermen from APL families. Hence they suggest the Government to extend the services to APL families and also to provide more subsidies.

SUGGESTIONS

Having seen the above challenges, we have come up with suggestive measures that can help the fishermen.

- Up gradation of fishing devices so that a single device can be used which can have all the features necessary for fishing.
- Proper communication about the usage of instruments.
- Though the Government is insisting for the use of Fishing App, due to lack of knowledge and the technical skills, the fishermen are reluctant to use it. Hence proper guidance and awareness need to be created among them with regard to its usage and implications.
- Most of the Fishermen use the devices of other countries. Hence the Government should introduce regional devices depending on the suitability of requirement of Indian Fishermen.
- Financial assistance need to be extended to fishermen.
- Dependence on traditional method of fishing by the fishermen can be reduced by reducing the cost of the device as well as tax on these instruments so that they can go for more usage of Apps and other improved devices.
- Educational assistance to children of fishermen can be of great support.
- As fishing always involve risk and life threat, provision of Insurance can be provided for their life security.
- Financial security in the form of employment to the Fishermen especially during off season.

NAVIC Device – A Socio- technical feasibility and expectation report

NAVIC – Orientation programme –I in Gangolli - Maravanthe

ISRO has undertaken several measures to educate the fishermen about the working and usage of the NAVIC kit and App. The first demonstration was held at Gangolli Persian Boat Unions Board room on 24th September 2018 at 11 A.M. In this demonstration fishermen and boat owners of Gangolli - Maravanthe regions are requested to participate large in number.



Dr. Divakar P.G. Director,EPDO, will address the fishermen regarding the NAVIC kit and App. Sri. Vivek Alva, Managing Trustee of Alva's Education Trust, Dr. Peter Fernandes, Principal, AIET and AIET faculties were the part of this program

NAVIC – Orientation programme –II in Malpe

ISRO has undertaken several measures to educate the fishermen about the working and usage of the NAVIC kit and App. The first demonstration was held at Malpe Persian Boat Unions Board room on 24th September 2018 at 4 P.M. In this demonstration fishermen and boat owners of Malpe regions are requested to participate large in number.

Dr. Divakar P.G. Director,EPDO, will address the fishermen regarding the NAVIC kit and App. Sri. Vivek Alva, Managing Trustee of Alva's Education Trust, Dr. Peter Fernandes, Principal, AIET and AIET faculties will be the part of this program

NAVIC – NAVIGATION WITH INDIAN CONSTELLATION SURVEY

The navigation with constellation survey meeting was held on 1st October 2018 at Persian harbour, Malpe and Gangolli with the presence of Mr. Vivek Alva, Managing Trustee, Alva's Education Foundation, Moodbidri, Dr. P.G Diwakar, Director,EPDO, Dr. Peter Fernandes, Principal, AIET, Mr. Naveen, Mr. Krishna Suvarna, Mr. Santhosh , the Secretaries , Persian Boat , Malpe, and more than 100 fishermen were present for the meeting along with the Professors and Students of Alva's Institute of Engineering and Technology Mijar.

In the meeting various problems were discussed with the local fishermen from Malpe and data was collected from them and the president of NAVIC project Dr. P.G. Diwakar, Director,EPDO gave a brief explanation about the project and what are the benefits the fishermen are going to get from this project.



Dr. P.G. Diwakar, Director,EPDO, Sri Vivek Alva, Managing Trustee, AEF, Moodbidri, Dr. Peter Fernandes, Principal, AIET in Gangolli

The main motive of this project is to come with new navigational instrument for boats at lesser cost by ISRO. The current equipment which is used by the most of the fishermen was Furano GPS for navigation and Icom for wireless communication to the port. Those equipment's which were used they were mainly Japanese and Taiwan made those were very expensive to buy for the local fishermen. The present cost of the entire kit is Rs. 1,05,000 and ISRO is promised to give at the lesser cost. The main demand from the fishermen was they should be able to find out the varieties of fishes and there should be an alarm to be fixed to the boat for the alert for the other fishermen.

After the meeting the students of AIET went for the field survey and collected data from fishermen's and Boat Owners.



Survey by the Students of AIET in Persian Boat at Malpe



Discussion with fishermen by Dr. P.G. Diwakar, Director, EPDO and Sri Vivek Alva, Managing Trustee, AEF, Moodbidri in Malpe

NAVIC – Orientation programme -III

The navigation with constellation survey meeting was held on 4th October 2018 at Panjurli Temple, Malpe with the presence of Prof. Kurian, Principal, Alva's Degree College, Moodbidri, Sri. Shivkumar Asst Director, Fisheries Department, Government of Karnataka, Mr. Yashodhara Ameen, President, Persian Boat Union, Malpe Mr. Naveen, Mr. Krishna Suvarna, Mr. Santhosh , the Secretaries , Persian Boat Union , Malpe, and more than 400 fishermen were present for the meeting along with the Professors of Alva's Institute of Engineering and Technology Mijar.



Discussion with fishermen by Prof. Kurian, Principal, Alva's Degree College, Moodbidri

In the meeting various problems were discussed with the local fishermen from Malpe and data was collected from them and Prof. Kurian gave a brief explanation about the project and what are the benefits the fishermen are going to get from this project . Sri. Shivkumar Asst Director, Fisheries Department, Government of Karnataka, suggested to add Transponder (Automatic Identification system) features to the Navic Kit as it is mandatory from the Government.

After the meeting the Professors of AIET went for the field survey and collected data from fishermen's and Boat Owners.

NAVIC – Demonstration and kit distribution

The NAVIC – Demonstration and kit distribution was held on 4th October 2018 at Persian harbour, Malpe with the presence of Mr. Vivek Alva, Managing Trustee, Alva’s Education Foundation, Moodbidri, Mr.Akhileshwar, Senior Scientist, ISRO, Bangalore, Mr. M Saxena, Senior Scientists, ISRO, Bangalore, Mr. Bhargav, Senior Engineer, Antrix Software Bangalore, Mr. Naveen, Mr. Krishna Suvarna, Mr. Santhosh , the Secretaries , Persian Boat , Malpe, and more than 150 fishermen from both malpe and gangolli harbour were present for the demonstration along with the Professors of Alva’s Institute of Engineering and Technology Mijar.



Navik Kit Demonstration and Distribution with fishermen by Sri Vivek Alva, Managing Trustee, AEF, Moodbidri and scientists, ISRO, Bangalore in Malpe

Mr.Akhileshwar, Senior Scientist, ISRO, Bangalore, Mr. M Saxena, Senior Scientists, ISRO, Bangalore and Mr. Bhargav, Senior Engineer, Antrix Software Bangalore, have demonstrated and explained the usage of the Navic Kit. The Navic kit was distributed to selected 12 fishermen from both Malpe and Gangolli region.



Mr. Vivek Alva addressed the gathering and requested to make use of the kit and to give correct feedback on the same. And also suggested the secretary of Union, Mr. Krishna Suvarna, to handover the kit to other 12 fishermen after 15 days of usage.

NAVIC KIT ANALYSIS AND FEEDBACK

FEEDBACK-I

| Sl. No. | Personal Details | | | |
|-------------------------------------|-----------------------------------|---------------------------------------|--------------|---|
| 1. | Name of Fisherman | Kishore Karkera | | |
| 2. | Boat Name | Persian / Chakra Raja | | |
| 3. | Contact Number | 9035649800 | | |
| 4. | Numbers of Workers in Boat | 38 | | |
| 5. | Distance Travelled for Fishing | 70-80 Nautical Miles | | |
| 6. | How many times NAVIC device used | 20 Times | | |
| Currently Using Instruments | | | | |
| Sl. No. | Name of the Instruments | Cost | | |
| 1. | Fish Finder | 50,000/- | | |
| 2. | GPS | 40,000/- | | |
| 3. | Wireless | 15,000/- | | |
| 4. | Transponder (AIS) | 60,000/- | | |
| Suggestions and Requirements | | | | |
| Sl. No. | Problems | Methods Adopted | Use of Navic | Remarks |
| 1. | Potential Fishing Zone | By Experience | √ | The potential Fishing zone information is not getting updated for every 6 days |
| 2. | Position of Fisherman | GPS | √ | It is not displaying the Latitude & Longitude of the given location , distance between the current location and the potential fishing zone, |
| 3. | Navigation Direction | | √ | |
| 4. | Cyclone | Text message from the Govt & Wireless | X | |
| 5. | Rain Prediction | | X | |
| 6. | Tides | | X | |
| 7. | Storm (Wind speed) | | X | |
| 8. | Sea Depth | GPS | X | |
| 9. | Rock in Sea | | X | |
| 10. | Other Boats and Travelers Ships | By Experience | X | |
| 11. | Connectivity to port | | X | |
| 12. | Automatic Identification of Boats | Transponder | X | |

FEEDBACK-II

| Sl. No. | Personal Details | | | |
|-------------------------------------|-----------------------------------|---------------------------------------|--------------|---|
| 1. | Name of Fisherman | Krishna Suvarna | | |
| 2. | Boat Name | Persian / Jala Durga -I | | |
| 3. | Contact Number | 9880846410 | | |
| 4. | Numbers of Workers in Boat | 38 | | |
| 5. | Distance Travelled for Fishing | 50-70 Nautical Miles | | |
| 6. | How many times NAVIC device used | 15 times | | |
| Currently Using Instruments | | | | |
| Sl. No. | Name of the Instruments | Cost | | |
| 1. | Fish Finder | 50,000/- | | |
| 2. | GPS | 40,000/- | | |
| 3. | Wireless | 15,000/- | | |
| Suggestions and Requirements | | | | |
| Sl. No. | Problems | Methods Adopted | Use of Navic | Remarks |
| 1. | Potential Fishing Zone | By Experience | √ | The potential Fishing zone information is not getting updated for every 6 days |
| 2. | Position of Fisherman | GPS | √ | It is not displaying the Latitude & Longitude of the given location , distance between the current location and the potential fishing zone, |
| 3. | Navigation Direction | | √ | |
| 4. | Cyclone | Text message from the Govt & Wireless | X | |
| 5. | Rain Prediction | | X | |
| 6. | Tides | | X | |
| 7. | Storm (Wind speed) | | X | |
| 8. | Sea Depth | GPS | X | |
| 9. | Rock in Sea | | X | |
| 10. | Other Boats and Travelers Ships | By Experience | X | |
| 11. | Connectivity to port | | X | |
| 12. | Automatic Identification of Boats | Transponder | X | |

FEEDBACK-III

| Sl. No. | Personal Details | | | |
|-------------------------------------|-----------------------------------|---------------------------------------|--------------|---|
| 1. | Name of Fisherman | Naveen | | |
| 2. | Boat Name | Persian / Karnataka Hithaishi | | |
| 3. | Contact Number | 8453099188 | | |
| 4. | Numbers of Workers in Boat | 32 | | |
| 5. | Distance Travelled for Fishing | 40-60 Nautical Miles | | |
| 6. | How many times NAVIC device used | 15 Times | | |
| Currently Using Instruments | | | | |
| Sl. No. | Name of the Instruments | Cost | | |
| 1. | Fish Finder | 50,000/- | | |
| 2. | GPS | 40,000/- | | |
| 3. | Wireless | 15,000/- | | |
| Suggestions and Requirements | | | | |
| Sl. No. | Problems | Methods Adopted | Use of Navic | Remarks |
| 1. | Potential Fishing Zone | By Experience | √ | The potential Fishing zone information is not getting updated for every 6 days |
| 2. | Position of Fisherman | GPS | √ | It is not displaying the Latitude & Longitude of the given location , distance between the current location and the potential fishing zone, |
| 3. | Navigation Direction | | √ | |
| 4. | Cyclone | Text message from the Govt & Wireless | X | |
| 5. | Rain Prediction | | X | |
| 6. | Tides | | X | |
| 7. | Storm (Wind speed) | | X | |
| 8. | Sea Depth | GPS | X | |
| 9. | Rock in Sea | | X | |
| 10. | Other Boats and Travelers Ships | By Experience | X | |
| 11. | Connectivity to port | | X | |
| 12. | Automatic Identification of Boats | Transponder | X | |

FEEDBACK-IV

| Sl. No. | Personal Details | | | |
|-------------------------------------|-----------------------------------|---------------------------------------|--------------|---|
| 1. | Name of Fisherman | Purandar Maindon | | |
| 2. | Boat Name | Persian / Jai Padmaja | | |
| 3. | Contact Number | 8618506797 | | |
| 4. | Numbers of Workers in Boat | 32 | | |
| 5. | Distance Travelled for Fishing | 40-60 Nautical miles | | |
| 6. | How many times NAVIC device used | 20 times | | |
| Currently Using Instruments | | | | |
| Sl. No. | Name of the Instruments | Cost | | |
| 1. | Fish Finder | 50,000/- | | |
| 2. | GPS | 40,000/- | | |
| 3. | Wireless | 15,000/- | | |
| Suggestions and Requirements | | | | |
| Sl. No. | Problems | Methods Adopted | Use of Navic | Remarks |
| 1. | Potential Fishing Zone | By Experience | √ | The potential Fishing zone information is not getting updated for every 6 days |
| 2. | Position of Fisherman | GPS | √ | It is not displaying the Latitude & Longitude of the given location , distance between the current location and the potential fishing zone, |
| 3. | Navigation Direction | | √ | |
| 4. | Cyclone | Text message from the Govt & Wireless | X | |
| 5. | Rain Prediction | | X | |
| 6. | Tides | | X | |
| 7. | Storm (Wind speed) | | X | |
| 8. | Sea Depth | GPS | X | |
| 9. | Rock in Sea | | X | |
| 10. | Other Boats and Travelers Ships | By Experience | X | |
| 11. | Connectivity to port | | X | |
| 12. | Automatic Identification of Boats | Transponder | X | |

FEEDBACK-V

| Sl. No. | Personal Details | | | |
|-------------------------------------|-----------------------------------|---------------------------------------|--------------|---|
| 1. | Name of Fisherman | Devdas Puthran | | |
| 2. | Boat Name | Persian / Rajkumar | | |
| 3. | Contact Number | 9902828163 | | |
| 4. | Numbers of Workers in Boat | 40 | | |
| 5. | Distance Travelled for Fishing | 40-50 Nautical Miles | | |
| 6. | How many times NAVIC device used | 01 | | |
| Currently Using Instruments | | | | |
| Sl. No. | Name of the Instruments | Cost | | |
| 1. | Fish Finder | 50,000/- | | |
| 2. | GPS | 40,000/- | | |
| 3. | Wireless | 15,000/- | | |
| Suggestions and Requirements | | | | |
| Sl. No. | Problems | Methods Adopted | Use of Navic | Remarks |
| 1. | Potential Fishing Zone | By Experience | √ | The potential Fishing zone information is not getting updated for every 6 days |
| 2. | Position of Fisherman | GPS | √ | It is not displaying the Latitude & Longitude of the given location , distance between the current location and the potential fishing zone, |
| 3. | Navigation Direction | | √ | |
| 4. | Cyclone | Text message from the Govt & Wireless | X | |
| 5. | Rain Prediction | | X | |
| 6. | Tides | | X | |
| 7. | Storm (Wind speed) | | X | |
| 8. | Sea Depth | GPS | X | |
| 9. | Rock in Sea | | X | |
| 10. | Other Boats and Travelers Ships | By Experience | X | |
| 11. | Connectivity to port | | X | |
| 12. | Automatic Identification of Boats | Transponder | X | |

FEEDBACK-VI

| Sl. No. | Personal Details | | | |
|-------------------------------------|-----------------------------------|---------------------------------------|--------------|---|
| 1. | Name of Fisherman | Ramesh Mendon | | |
| 2. | Boat Name | Persian / Rathiyamma | | |
| 3. | Contact Number | 9964583596 | | |
| 4. | Numbers of Workers in Boat | 38 | | |
| 5. | Distance Travelled for Fishing | 50-70 Nautical Miles | | |
| 6. | How many times NAVIC device used | 15 times | | |
| Currently Using Instruments | | | | |
| Sl. No. | Name of the Instruments | Cost | | |
| 1. | Fish Finder | 50,000/- | | |
| 2. | GPS | 40,000/- | | |
| 3. | Wireless | 15,000/- | | |
| Suggestions and Requirements | | | | |
| Sl. No. | Problems | Methods Adopted | Use of Navic | Remarks |
| 1. | Potential Fishing Zone | By Experience | √ | The potential Fishing zone information is not getting updated for every 6 days |
| 2. | Position of Fisherman | GPS | √ | It is not displaying the Latitude & Longitude of the given location , distance between the current location and the potential fishing zone, |
| 3. | Navigation Direction | | √ | |
| 4. | Cyclone | Text message from the Govt & Wireless | X | |
| 5. | Rain Prediction | | X | |
| 6. | Tides | | X | |
| 7. | Storm (Wind speed) | | X | |
| 8. | Sea Depth | GPS | X | |
| 9. | Rock in Sea | | X | |
| 10. | Other Boats and Travelers Ships | By Experience | X | |
| 11. | Connectivity to port | | X | |
| 12. | Automatic Identification of Boats | Transponder | X | |

FEEDBACK-VII

| Sl. No. | Personal Details | | | |
|-------------------------------------|-----------------------------------|---------------------------------------|--------------|---|
| 1. | Name of Fisherman | Nithyanand Kharvi | | |
| 2. | Boat Name | Nada Doni | | |
| 3. | Contact Number | 9902611244 | | |
| 4. | Numbers of Workers in Boat | 25-30 | | |
| 5. | Distance Travelled for Fishing | 30-40 Nautical Miles | | |
| 6. | How many times NAVIC device used | 8 Times | | |
| Currently Using Instruments | | | | |
| Sl. No. | Name of the Instruments | Cost | | |
| 1. | GPS | 40,000/- | | |
| 2. | Wireless | 15,000/- | | |
| | | | | |
| | | | | |
| Suggestions and Requirements | | | | |
| Sl. No. | Problems | Methods Adopted | Use of Navic | Remarks |
| 1. | Potential Fishing Zone | By Experience | √ | The potential Fishing zone information is not getting updated for every 6 days |
| 2. | Position of Fisherman | GPS | √ | It is not displaying the Latitude & Longitude of the given location , distance between the current location and the potential fishing zone, |
| 3. | Navigation Direction | | √ | |
| 4. | Cyclone | Text message from the Govt & Wireless | X | |
| 5. | Rain Prediction | | X | |
| 6. | Tides | | X | |
| 7. | Storm (Wind speed) | | X | |
| 8. | Sea Depth | GPS | X | |
| 9. | Rock in Sea | | X | |
| 10. | Other Boats and Travelers Ships | By Experience | X | |
| 11. | Connectivity to port | | X | |
| 12. | Automatic Identification of Boats | Transponder | X | |

FEEDBACK-VIII

| Sl. No. | Personal Details | | | |
|-------------------------------------|-----------------------------------|---------------------------------------|--------------|---|
| 1. | Name of Fisherman | Naveen Kharvi | | |
| 2. | Boat Name | Nada Doni | | |
| 3. | Contact Number | 9972574139 | | |
| 4. | Numbers of Workers in Boat | 30-35 | | |
| 5. | Distance Travelled for Fishing | 30-40 Nautical Miles | | |
| 6. | How many times NAVIC device used | 7 Times | | |
| Currently Using Instruments | | | | |
| Sl. No. | Name of the Instruments | Cost | | |
| 1. | GPS | 40,000/- | | |
| 2. | Wireless | 15,000/- | | |
| Suggestions and Requirements | | | | |
| Sl. No. | Problems | Methods Adopted | Use of Navic | Remarks |
| 1. | Potential Fishing Zone | By Experience | √ | The potential Fishing zone information is not getting updated for every 6 days |
| 2. | Position of Fisherman | GPS | √ | It is not displaying the Latitude & Longitude of the given location , distance between the current location and the potential fishing zone, |
| 3. | Navigation Direction | | √ | |
| 4. | Cyclone | Text message from the Govt & Wireless | X | |
| 5. | Rain Prediction | | X | |
| 6. | Tides | | X | |
| 7. | Storm (Wind speed) | | X | |
| 8. | Sea Depth | GPS | X | |
| 9. | Rock in Sea | | X | |
| 10. | Other Boats and Travelers Ships | By Experience | X | |
| 11. | Connectivity to port | | X | |
| 12. | Automatic Identification of Boats | Transponder | X | |

FEEDBACK-IX

| Sl. No. | Personal Details | | | |
|-------------------------------------|-----------------------------------|---------------------------------------|--------------|---|
| 1. | Name of Fisherman | Gopala Kharvi | | |
| 2. | Boat Name | Nada Dhoni | | |
| 3. | Contact Number | 9591477752 | | |
| 4. | Numbers of Workers in Boat | 30-34 | | |
| 5. | Distance Travelled for Fishing | 30-40 Nautical Miles | | |
| 6. | How many times NAVIC device used | 5 Times | | |
| Currently Using Instruments | | | | |
| Sl. No. | Name of the Instruments | Cost | | |
| 1. | GPS | 40,000/- | | |
| 2. | Wireless | 15,000/- | | |
| Suggestions and Requirements | | | | |
| Sl. No. | Problems | Methods Adopted | Use of Navic | Remarks |
| 1. | Potential Fishing Zone | By Experience | √ | The potential Fishing zone information is not getting updated for every 6 days |
| 2. | Position of Fisherman | GPS | √ | It is not displaying the Latitude & Longitude of the given location , distance between the current location and the potential fishing zone, |
| 3. | Navigation Direction | | √ | |
| 4. | Cyclone | Text message from the Govt & Wireless | X | |
| 5. | Rain Prediction | | X | |
| 6. | Tides | | X | |
| 7. | Storm (Wind speed) | | X | |
| 8. | Sea Depth | GPS | X | |
| 9. | Rock in Sea | | X | |
| 10. | Other Boats and Travelers Ships | By Experience | X | |
| 11. | Connectivity to port | | X | |
| 12. | Automatic Identification of Boats | Transponder | X | |

FEEDBACK-X

| Sl. No. | Personal Details | | | |
|-------------------------------------|-----------------------------------|---------------------------------------|--------------|---|
| 1. | Name of Fisherman | Subhan | | |
| 2. | Boat Name | Persian | | |
| 3. | Contact Number | 8310858567 | | |
| 4. | Numbers of Workers in Boat | 28-30 | | |
| 5. | Distance Travelled for Fishing | 80-90 Nautical Miles | | |
| 6. | How many times NAVIC device used | 4 | | |
| Currently Using Instruments | | | | |
| Sl. No. | Name of the Instruments | Cost | | |
| 1. | Fish Finder | 50,000/- | | |
| 2. | GPS | 40,000/- | | |
| 3. | Wireless | 15,000/- | | |
| Suggestions and Requirements | | | | |
| Sl. No. | Problems | Methods Adopted | Use of Navic | Remarks |
| 1. | Potential Fishing Zone | By Experience | √ | The potential Fishing zone information is not getting updated for every 6 days |
| 2. | Position of Fisherman | GPS | √ | It is not displaying the Latitude & Longitude of the given location , distance between the current location and the potential fishing zone, |
| 3. | Navigation Direction | | √ | |
| 4. | Cyclone | Text message from the Govt & Wireless | X | |
| 5. | Rain Prediction | | X | |
| 6. | Tides | | X | |
| 7. | Storm (Wind speed) | | X | |
| 8. | Sea Depth | GPS | X | |
| 9. | Rock in Sea | | X | |
| 10. | Other Boats and Travelers Ships | By Experience | X | |
| 11. | Connectivity to port | | X | |
| 12. | Automatic Identification of Boats | Transponder | X | |

FEEDBACK-XI

| Sl. No. | Personal Details | | | |
|-------------------------------------|-----------------------------------|---------------------------------------|--------------|---|
| 1. | Name of Fisherman | Madhavan | | |
| 2. | Boat Name | Persian | | |
| 3. | Contact Number | 9611050016 | | |
| 4. | Numbers of Workers in Boat | 25-30 | | |
| 5. | Distance Travelled for Fishing | 80-90 Nautical Miles | | |
| 6. | How many times NAVIC device used | 8 | | |
| Currently Using Instruments | | | | |
| Sl. No. | Name of the Instruments | Cost | | |
| 1. | Fish Finder | 50,000/- | | |
| 2. | GPS | 40,000/- | | |
| 3. | Wireless | 15,000/- | | |
| Suggestions and Requirements | | | | |
| Sl. No. | Problems | Methods Adopted | Use of Navic | Remarks |
| 1. | Potential Fishing Zone | By Experience | √ | The potential Fishing zone information is not getting updated for every 6 days |
| 2. | Position of Fisherman | GPS | √ | It is not displaying the Latitude & Longitude of the given location , distance between the current location and the potential fishing zone, |
| 3. | Navigation Direction | | √ | |
| 4. | Cyclone | Text message from the Govt & Wireless | X | |
| 5. | Rain Prediction | | X | |
| 6. | Tides | | X | |
| 7. | Storm (Wind speed) | | X | |
| 8. | Sea Depth | GPS | X | |
| 9. | Rock in Sea | | X | |
| 10. | Other Boats and Travelers Ships | By Experience | X | |
| 11. | Connectivity to port | | X | |
| 12. | Automatic Identification of Boats | Transponder | X | |

FEEDBACK-XII

| Sl. No. | Personal Details | | | |
|-------------------------------------|-----------------------------------|---------------------------------------|--------------|---|
| 1. | Name of Fisherman | Damodhara Kharvi | | |
| 2. | Boat Name | Nada Dhoni | | |
| 3. | Contact Number | 9902628465 | | |
| 4. | Numbers of Workers in Boat | 30-35 | | |
| 5. | Distance Travelled for Fishing | 30-40 Nautical Miles | | |
| 6. | How many times NAVIC device used | 3 Times | | |
| Currently Using Instruments | | | | |
| Sl. No. | Name of the Instruments | Cost | | |
| 1. | GPS | 40,000/- | | |
| 2. | Wireless | 15,000/- | | |
| Suggestions and Requirements | | | | |
| Sl. No. | Problems | Methods Adopted | Use of Navic | Remarks |
| 1. | Potential Fishing Zone | By Experience | √ | The potential Fishing zone information is not getting updated for every 6 days |
| 2. | Position of Fisherman | GPS | √ | It is not displaying the Latitude & Longitude of the given location , distance between the current location and the potential fishing zone, |
| 3. | Navigation Direction | | √ | |
| 4. | Cyclone | Text message from the Govt & Wireless | X | |
| 5. | Rain Prediction | | X | |
| 6. | Tides | | X | |
| 7. | Storm (Wind speed) | | X | |
| 8. | Sea Depth | GPS | X | |
| 9. | Rock in Sea | | X | |
| 10. | Other Boats and Travelers Ships | By Experience | X | |
| 11. | Connectivity to port | | X | |
| 12. | Automatic Identification of Boats | Transponder | X | |

CONSOLIDATED REPORT ON NAVIC KIT FEEDBACK

Alva's Education Foundation® in collaboration with ISRO has conducted a study on Occupational challenges of fishermen community in coastal regions of Dakshina Kannada and Udupi district. In the process of survey, a NAVIC Kit was distributed among 12 Fishermen in Malpe (a fishing region of Udupi district) in order to find out the effectiveness of the device. The evaluation of the kit including the feedback of the fishermen is presented below.

Type of Boat:

Table No.1

| Sl. No. | Type of boats | No. of respondents | Percentage |
|---------|---------------|--------------------|--------------|
| 1 | Persian | 8 | 66.7 |
| 2 | Deep sea | 4 | 33.3 |
| | Total | 12 | 100.0 |

Navik kit was distributed among 12 respondents. Among them, 67 per cent use Persian boats for fishing while 33 per cent make use of Deep sea boats.

Number of workers working in boats:

Table No.2

| Sl. No. | Number of workers | No. of respondents | Percentage |
|---------|-------------------|--------------------|--------------|
| 1 | 0-30 | 4 | 33.3 |
| 2 | 30-40 | 8 | 66.7 |
| | Total | 12 | 100.0 |

Out of the total respondents, majority, i.e., 67 per cent of the respondents have 30-40 workers working in their boats while 33 per cent have around 0-30 workers.

Distance travelled by the respondents:

Table No.3

| Sl. No. | Distance travelled | No. of respondents | Percentage |
|---------|--------------------|--------------------|--------------|
| 1 | 0-50 | 1 | 8.3 |
| 2 | 50-100 | 4 | 33.3 |
| 3 | 100-150 | 3 | 25.0 |
| 4 | 150-200 | 4 | 33.3 |
| | Total | 12 | 100.0 |

Out of total 12 respondents, 33 per cent travel around 150-200 kms and another 33 per cent of the respondents travel for about 50-100 kms for every catch. About 25 per cent of them travel 100-500 kms and only 8 per cent travel within 50 kms.

Usage of Navik Kit

Table No.4

| Sl. No. | Usage | No. of respondents | Percentage |
|---------|--------------|--------------------|--------------|
| 1 | 5-10 Times | 6 | 50.0 |
| 2 | 10-15 Times | 4 | 33.3 |
| 3 | 15-20 Times | 2 | 16.7 |
| | Total | 12 | 100.0 |

After the kit was distributed, majority of the respondents (50%) have used the kit for 5-10 times while 33 per cent of the respondents have used it for about 10-15 times. The kit was used for 15-20 times by only 17 per cent of the respondents.

Instruments used at present by the Fishermen:

Table No.5

| Sl. No. | Instruments | No. of respondents | Percent |
|----------------|---------------------------------|---------------------------|----------------|
| 1 | Fish Finder, GPS, WIRELESS, AIS | 1 | 8 |
| 2 | Fish finder, GPS, Wireless | 11 | 92 |
| | Total | 12 | 100 |

Among the total respondents, majority, i.e, 92 per cent make use of Fish finder, GPS and Wireless device for fishing while only 1 respondent is using Fish finder, GPS, Wireless and AIS.

Cost of Fish finder:

Table No.6

| Sl. No. | Cost | No. of respondents | Percentage |
|----------------|----------------|---------------------------|-------------------|
| 1 | 40,000-50,000 | 11 | 91.7 |
| 2 | 50,000 -60,000 | 1 | 8.3 |
| | Total | 12 | 100.0 |

Among the total respondents, 92 per cent have paid Rs.40, 000 to Rs.50, 000 for the instrument while 8 per cent have paid Rs.50,000 to 60,000.

Cost of GPS:
Table No.7

| Sl. No. | Cost | No. of respondents | Percentage |
|---------|---------------|--------------------|--------------|
| 1 | 30,000-40,000 | 12 | 100.0 |
| 2 | Total | 12 | 100.0 |

It is clear from the above table that, almost all the respondents using GPS have paid a total amount of Rs.30,000 to 40,000 for the instrument.

Cost of Wireless:
Table No.8

| Sl. No. | Cost | No. of respondents | Percentage |
|----------------|----------------|--------------------|--------------|
| 1 | 10,000- 20,000 | 3 | 25.0 |
| 2 | 20,000- 30,000 | 9 | 75.0 |
| Sl. No. | Total | 12 | 100.0 |

Out of total 12 respondents, majority, i.e, 75 per cent have paid Rs.20,000 to 30,000 while 25 per cent respondents have paid Rs.10,000 to Rs.20,000 for the wireless device.

Cost of AIS:

Table No.9

| Sl.No | Cost | No. of respondents | Percentage |
|-------|----------------|--------------------|--------------|
| 01 | 50,000 -60,000 | 1 | 8.3 |
| 02 | Not using AIS | 11 | 91.7 |
| | Total | 12 | 100.0 |

Among the total respondents, majority (92%) are not using AIS, while the remaining respondents who use the device spent about Rs. 50,000 to 60,000.

Methods adopted for identifying problematic areas:

Table No.10

| Sl. No | Problematic areas | Methods adopted | No. of respondents | Percentage |
|--------|-----------------------------------|-----------------|--------------------|------------|
| 01 | Potential Fishing zone | Experience | 12 | 100 |
| 02 | Position of Fishermen | GPS | 12 | 100 |
| 03 | Navigation Direction | GPS | 12 | 100 |
| 04 | Cyclone | Wireless | 12 | 100 |
| 05 | Rain prediction | Wireless | 12 | 100 |
| 06 | Tides | Wireless | 12 | 100 |
| 07 | Storm | Wireless | 12 | 100 |
| 08 | Sea depth | GPS | 12 | 100 |
| 09 | Rock in sea | GPS | 12 | 100 |
| 10 | Identifying other boats and ships | Experience | 12 | 100 |
| 11 | Connectivity to port | Experience | 12 | 100 |
| 12 | Automatic Identification of boats | Transponder | 12 | 100 |

Usage of NAVIK Kit:
Table No.11

| Sl. No. | Usage | No. of respondents | Percentage |
|----------------|--|---------------------------|-------------------|
| 1 | Potential Fishing Zone, position, navigation | 12 | 100.0 |
| | Total | 12 | 100.0 |

Navik Kit has helped all the 12 respondents in identifying potential fishing zone, fishermen's position and also in navigation direction.

Limitations of the Kit:

The following table examines the limitations of the kit as observed by the Fishermen in the present study.

Table No.12

| Sl. No. | Limitations | No. of respondents | Percentage |
|----------------|---|---------------------------|-------------------|
| 1 | Potential Fishing zone not updated for every 6 days | 2 | 16.7 |
| 2 | No display of Latitude and Longitude of the location | 1 | 8.3 |
| 3 | Device showing the same location after 30 days | 2 | 16.7 |
| 4 | No accurate information about the availability of TUNA fish | 2 | 16.7 |
| 5 | No prior information about Cyclone, rain prediction, tides, storm, depth of sea and rock in sea | 1 | 8.3 |
| 6 | Not tracking other boats and traveller ships | 1 | 8.3 |
| 7 | Not connecting to port | 1 | 8.3 |
| 8 | No automatic Identification system in the device | 1 | 8.3 |
| 9 | No Alert signal during the time of emergency | 1 | 8.3 |
| | Total | 12 | 100.0 |

Suggestions by the respondents:

After the usage of kit by the respondents, they have suggested for the improvement of the kit in following ways.

Table No.13

| Sl. No. | Suggestions | No. of respondents | Percentage |
|---------|---|--------------------|--------------|
| 1 | Updating Potential Fishing zone | 2 | 16.7 |
| 2 | Detection of Potential fishing zone in Karnataka and Kerala | 2 | 16.7 |
| 3 | Displaying the Latitude and Longitude values along with the distance | 1 | 8.3 |
| 4 | Detection of location of TUNA fish and other fishes | 1 | 8.3 |
| 5 | Updating the information for every 6 days | 1 | 8.3 |
| 6 | Accurate Information about cyclone, rain, tides, storms, sea depth, rock in sea | 1 | 8.3 |
| 7 | Tracking other boats and travellers ships | 1 | 8.3 |
| 8 | Connectivity to nearest port | 1 | 8.3 |
| 9 | Adding AIS features to NAVIK | 1 | 8.3 |
| 10 | Adding alert signal | 1 | 8.3 |
| | Total | 12 | 100.0 |

FINDINGS

The following are some of the findings of the study.

- The distance travelled by the fishermen by majority is 100-500 kms. About 3.09% travel more than 500 kms. The travelled distance is measured using instruments like GPS, Wireless and Fish finder (74.5%).
- Fishing Apps are not much familiar to the fishermen in the coastal areas.
- The potential Fishing zone has been directed to Tamilnadu and Andrapradesh, which has nearly 80 to 90 Nautical Miles
- Navigation direction in the device is showing only the direction, but it is not displaying the Latitude & Longitude of the given location. It is hard to find the distance between the origin and the potential fishing zone.
- As per the Navic information, which shows the location of TUNA fish in specific location, but during the travel, they are finding the fish much before the given location in several location which is not displayed or detected in Navic
- They are also expected prior information regarding Cyclone, Rain predictions, Tides, Storm, depth of sea and also presence of Rock in sea. It should also track other boats & Travellers ship nearby and connectivity to the nearest port
- As per the Government rule, it is mandatory to install Transponder (Automatic Identification System)
- Alert signal during the time of emergency for the better safety of the fisherman
- The potential Fishing zone information is not getting updated for every 6 days. Even after 30 days, the device is showing the same location
- With regard to limitations of these devices, most of them are not able to follow the instructions. The devices were found to be very expensive as there is much financial assistance available. Devices are not very durable and hence they do not completely rely on these devices. Fishing Apps are not much familiar to them.

SUGGESTIONS

Having seen the above challenges, we have come up with suggestive measures that can help the fishermen.

- Up gradation of fishing devices so that a single device can be used which can have all the features necessary for fishing.
- Proper communication about the usage of instruments.
- Fisherman needs the potential fishing zone to be detected in Karnataka and Kerala rather than Tamilnadu and Andrapradesh
- They wanted the software or device to display the Latitude and Longitude along with the distance as showing in GPS
- Fisherman also wanted the detection & location of King Fish, Lady Fish, Macarel, Prawns, Silver Fish and Pompret, Sardine
- They wanted the software or device which gives accurate information on Cyclone, Rain predictions, Tides, Storm, depth of sea, presence of Rock in sea. It should also track other boats & Travellers ship nearby and connectivity to the nearest port
- They have requested to add Automatic Identification System feature to the Navic device
- They have requested to add Alert signal feature to the Navic device
- They have requested to update the information for every 6 days in Navic Device
- Though the Government is insisting for the use of Fishing App, due to lack of knowledge and the technical skills, the fishermen are reluctant to use it. Hence proper guidance and awareness need to be created among them with regard to its usage and implications.
- Financial assistance need to be extended to fishermen.
- Dependence on traditional method of fishing by the fishermen can be reduced by reducing the cost of the device as well as tax on these instruments so that they can go for more usage of Apps and other improved devices.
- Educational assistance to children of fishermen can be of great support.
- As fishing always involve risk and life threat, provision of Insurance can be provided for their life security.
- Financial security in the form of employment to the Fishermen especially during off season.

CONCLUSION

We are contented in presenting the conclusions arrived from this study for academic & technical up gradation among all the stakeholder involved in the study. The need and expectation of fishermen community with respective policies support, technical support and program support is presented here for consideration

The livelihood strategies of Fishermen will create opportunities for more income as well as increase the resource base of coastal areas. The present study was mainly undertaken to study the occupational challenges of Fishermen community in coastal regions of Udupi and Dakshina Kannada Districts of Karnataka. Though most of them are from Fishing families, the advancement in technology has made them pose wide variety of problems. Instruments or devices used in fishing are not easily accessible to all the categories of fishermen. The support system by the Government is also very weak. The increasing cost of devices and lack of awareness about recent apps for fishing has created new challenges for fishing community in the coastal areas. The Government must take keen interest in resolving the problems of these Fishermen so that it can contribute towards the sustainability of Fishing occupation.

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