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Sea safety on traditional fishing crafts along Andhra Pradesh coast

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Abstract
Fishing operations with respect to the distance from the shore, duration of fishing (Time) and the safety measures by traditional fishing crafts- non-motorised (NM), motorised –outboard (M-OBM) and motorised-outboard (M-IBM) have been studied at three coastal fishermen villages- Bandarvanipeta in Srikakulam district, Danavaipeta in East Godavari district and Kothapatnam in Prakasam district have been studied for two years (2003 & 2004). The average distances of fishing operations from the shore were 5.5 km (NM), 12.3 km (M-OBM) and 26.7 km (M-IBM) at Bandarvanipeta; 8.8 km (NM), 12.9 km (M-OBM) and 27.0 (M-IBM) at Danavaipeta; 7.7km (NM), 10.3 (M-OBM) and 22.5 km (M-IBM) at Kothapatnam. The fishing time by NM category was < 24h. It was also shorter period in case of M-OBM, but some time it was 36h at Danavaipeta and Kothapatnam. The fishing period in M-IBM was between 49-60h. As far as communication, radio was in use by all types of boats, cell phones by M-OBM and M-IBM boats, but there were no signal flags. Oil lamps, sails and oars were navigational equipment on all boats. In addition torch lights, compass and tool-kits were in use on M-OBM and M-IBM boats. Life saving appliances on all types of boats were rice, drinking water and emergency items like bread, jam, biscuits and first aid boxes were mostly used by M-OBM and M-IBM boats. The average experience of fishing knowledge on NM, M-OBM and M-IBM boats was 15.4, 13.3 and 14.6 years respectively.

Keywords: Andhra Pradesh, Traditional fishing crafts, Sea safety

1. Introduction
Fishing at sea is dangerous and risks are involved at every stage of navigation until the craft returns the shore safely. The International Maritime Organization (IMO), the International Labour Organization (ILO) and the Food and Agriculture Organization (FAO) are the three specialized agencies of the United Nations organization that play a role in the safety of fishermen at sea [1]. In USA, the fatality rate of fishermen is about 25 to 30 times more than the national average death toll whereas in Australia, it is 143 per 1,00,000 in case of fishermen and that of the whole nation is 8.1 per 1,00,000 nationally [2].

As per the estimates of FAO [3], out of the 36 million persons engaged in fishing and fish farming, approximately 15 million fishermen are employed on fishing vessels operating at the sea and more than 90% of these people are working on vessels with less than 24 m length, indicating that the fatality rate in countries where there is no availability of information may might be higher. An accurate assessment of death of fishermen at sea is impossible, although the ILO's occupational Safety and Health Branch estimates that 24,000 deaths occur annually worldwide [4]. The causalities are very high in developing countries, and it is at least 10 times than those in developed countries [1]. The death toll in fishing activities is exceedingly very high when compared to the National averages of any country according to the data available from countries [5].

The reasons for high death toll may be due to poor safety systems, fleet limitations, inadequate legislation to enforce strict safety measures etc, and these safety measures are often violated as there is a need for exploring new fishing grounds in order to make the fishing economical. The fishing craft requires proper support of safety measures from the point of design, construction and equipment which are intended particularly, for the small scale fishing sector by the artisanal, motorized and mechanized fishing [2]. The coast of Andhra Pradesh is more prone to the frequent cyclones, particularly in the month of May and November [6]. The losses occurred in every such cyclone would be enormous both for the fishing craft and the crew on sea and for the fishing habitations on land.

Some of the cyclonic devastations occurred off the coast of Andhra Pradesh, 1st Nov. 1927 in Nellore region; 28th Oct, 1949 in Guntur region; 17th May 1969 in Guntur, Krishna and West Godavari region; 7th –8th Nov 1969 in East and West Godavari, Krishna and Visakhapatnam region; 19th Nov 1977 in Krishna region; 6th Nov 1996 in East Godavari region [6].

"Sea safety" refers to the participation and activities associated with safe return to the port at the conclusion of a fishing trip without outside assistance, or more simply "getting home" [7]. The artisanal and small-scale fisheries are the most vulnerable sectors as sea safety measures are the weakest when compared to big mechanised fishing vessels. The traditionally built fishing crafts are poorly equipped in terms navigation, communication and safety. The crew will have little or no training on maritime safety. The introduction of motorisation has proved to be advantageous for more profits and the risk involvement has also been increased because the aim of motorized fishing craft is basically to organize distant water fishing [8]. There is every possibility of increase of the risk as the fishermen venture deep in to the sea and spend more time for fishing compared to the non-motorised crafts which fish within the reach of shore for few hours. But the same traditional non-motorised craft is motorized and employed for the distant water fishing without any check on the seaworthiness and other precautions in respect of sea safety though the fishermen may take certain measures using their wisdom and past experience.

There is no concrete sea safety measures passed through legislation for the sea going fishermen as the existing marine fisheries regulation act does not speak much about this aspect. The mandatory use of life saving and communication appliances is not figured in the enforcement. The search and rescue operations are followed along with mitigation measures according to the contingency plans prepared by the relief and rehabilitation departments of the state. The dissemination of weather bulletins is sent by the meteorological department. The two radio communication towers at Kalingapatnam in Srikakulam and Manginapudi in Krishna districts in 1994 has installed by Department of Ocean Development (DOD) for the dissemination of the bad weather conditions in the sea work only in the event of natural calamity [6]. Krishna and Rajiv [9] explained the use of sea safety measures for fishermen engaged in mechanized and artisanal fishing at Cochin. The other contributions in the field of sea safety and disasters are [10-21].

The present study is a maiden attempt to study non-motorised (NM), motorised- out board (M-OBM) and motorised- in board (M-IBM) with respect to distance of fishing from the shore, duration of fishing activity.

2. Materials and methods

A sample survey was conducted at three distantly located marine fishing villages – Bandarvanipeta (Latitude 18º 21' N; Longitude 84º 08' E) in Gara mandal of Srikakulam district, Danavaipeta (Latitude 17º 10' N; Longitude 82º 27' E) in Uppada Kothapalli mandal of East Godavai district and Kothapatnam (Latitude 15º 27' N; Longitude 80º 12' E) in Kothapatnam mandal of Prakasam district (Fig.1) for two years (Jan'2003 to Dec'2004). Data was collected based on the kind of equipment that the fishermen are carrying, the knowledge index of fishermen on sea safety measures and the nature of risks involved with regard to the distance and the period in non-motorised and motorised fishing crafts etc, from 744 respondents through questionnaire (fishermen and boat owners). The kind of sea safety equipment carried *i.e.* Communication equipment, Navigational equipment, lifesaving appliances on the board [9] and use of the knowledge gained through experience and training were used to test.

Most of the non-motorised fishing crafts are engaged in fishing close to the shore and many of the motorised (OBM & IBM) boats in distant waters by virtue of their ability with engine power. Depending on the need and experience they had previously, the fishermen used to carry different kinds of materials to meet the demands in the case of emergency and other demanding situations while going for fishing. Distance travelled and the time taken for each fishing trip has been collected in order to analyze the risk involvement in each case of the craft. The time taken for fishing trip has been known by calculating the difference between the starting and reaching time whereas the information in respect of the distance has been calculated from the depth charts with reference to the distance from the shore available with state fisheries department after knowing the depth at which they did fishing, from the fishermen. The estimates given by the crew members may not be accurate hence the methodology used by Gendy [22] was adopted.

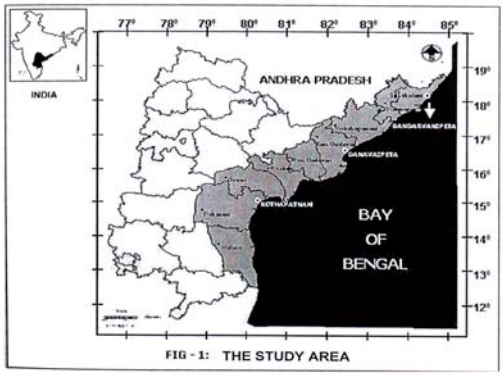

FIG - 1: THE STUDY AREA

3. Results and Discussion

3.1 Distance of fishing

In case of NM category maximum activity was between 10 km distance from the shore (80%) and more than 80% at Bandarvanipeta. Around 20% or less were found at < 20 km and only < 5 % were noticed at < 30 km particularly at Danavaipeta. In M-OBM category, < 55 % of boats at Bandarvanipeta and Danavaipeta were found below 10 km around 20 % of Bandarvanipeta and Danavaipeta boats and < 55 % of Kothapatnam boats at 20m and only 20 % at 30m distance were observed. In case of M-IBM, near-shore operations were minimal (< 5 % at Bandarvanipeta and around 15 % at Kothapatnam), maximum activity (of > 40%) at Bandarvanipeta and Kothapatnam and < 40 % at Danavaipeta. It was also found at distance about 40 km by Bandarvanipeta and Danavaipeta boats and to a lesser extent (< 20 %) at Kothapatnam (Fig. 2)

3.2 Duration of fishing (Time)

Maximum duration of fishing operation by NM boats was 12 h and 13-24 h to certain extent with < 10% at Bandarvanipeta, 25% at Danavaipeta and < 20% at Kothapatnam. In case of M-OBM boats, no fishing operations at 0-12 h were recorded at Kothapatnam, whereas 20% at Bandarvanipeta and < 10% at Danavaipeta were recorded. At Bandarvanipeta maximum fishing activity (about 80%) at 13-24 h at Danavaipeta, it was

about < 30% and at Kothapatnam it was more than 60%. There was 25-36h of fishing operations only at Danavaipeta where it was > 40% and it was > 35% at Kothapatnam. About 20% of fishing operations for 37-48h at Danavaipeta and it was < 5% at Kothapatnam. Most of the fishing hours with M-IBM at all three places were 49-60 h and > 61h. It was about 10% for 13-24h at Bandarvanipeta only and < 10% at Bandarvanipeta and Danavaipeta for 25-36h. Fishing duration began from 37-48h in case of Kothapatnam, where it was about 25% (Fig. 3).

3.3 Sea safety equipment

3.3.1 Communication equipment – Radio was the popularly used communication equipment in all types of boats for receiving the weather bulletins and other purposes of entertainment. The use of cell phones for two-way communication and whistles for communicating to the nearest crew was observed in the case of M-OBM and M-IBM boats. Though there was no use of standard signaling flags, a piece of cloth used for cleaning purpose was sometimes become signaling flag to draw the attention of other passerby boats in the case of calling for rescue.

3.3.2 Navigational equipment: Oil lamp, sail and oars were commonly and compulsorily used during the fishing operations. The M-OBM and I-IBM boats mostly used torchlight. Some of the M-OBM and I-IBM boat operators used the compass. Carrying the engine tools for M-OBM and M-IBM boats was the very common observation except in few cases of M-OBM boats.

3.3.3 Life saving appliances: Sufficient rice and drinking water were carried in all the cases of fishing operations depending on the period of fishing. But carrying of emergency items like biscuits, bread, jam, first-aid-box etc, are not in common use in all types of boats. However they were used by M-OBM and M-IBM boats. In a few cases, the M-IBM boats were in use of life jackets / buoys.

Knowledge – It was found that trained crew for fishing and navigation were found on M-OBM and M-IBM boats than on NM category. It was found that the most experienced fishermen were working on the non-motorised fishing boats than the on the motorized ones. The average experience of the crew employed on NM, M-OBM and M-IBM type of boats was 15.4, 13.3 and 14.6 years respectively (Fig's 4 to 7).

3.3.3 Communication perception

Utilization of information sources about the weather bulletins was commonly found in all categories of fishing boat operators. Regarding the understanding of the communication (transcripts) and credibility of weather forecasts, there was some difference of opinion from non-motorised to that of the motorized boats. As against the 18% of fishermen belonging to NM crafts could understand the weather forecasts, only 14.1% of the fishermen had expressed the belief. The situation in M-OBM and M-IBM crafts was 50.4% and 30.8% respectively in understanding the transcripts and 42.5% and 78.3% in expressing the credibility on the weather bulletins. Interestingly, there was a marked adoption of the weather bulletins / message broadcasted through radio by all categories of the fishing boat operators (Fig. 8).

There is high risk involved in on-sea operations particularly by the traditional fishing crafts which are not well equipped with the seaworthiness of the craft, lifesaving appliances, communication and navigational equipment, technical skills, crisis management etc. that required maneuvering the craft in distress.

The fishing operations of non-motorised (NM) fishing boats are mostly confined to limited distance from the shore only. Generally, these fishermen will venture in to sea in a group of fishing boats belonging to the same or nearby villages and return to the shore in the same fashion after the fishing operations. In case of any eventuality of crisis, the other fishing boats in the group will come to the rescue of the ill-fated boat, whereas the M-OBM boats whose operational area is slightly distant is somewhat risk bound compared to the non-motorised boats [8]. The M-IBM boats are much more risk-prone whose fishing will be for longer distances from the shore. As such, there is an increase of risk involvement, as the motorized fishing boats will undertake the fishing operations in distant waters. Yadava [23] has reported that artisanal and small–scale fishing crafts are unequipped to meet the sea safety challenges and with dwindling resources in coastal waters, the fishermen are venturing deeper into the sea. The wide spread use of outboard engines in fishing has further increased the need for sea safety concerns [14]. Similarly, as the fishing trip of non-motorised boats is for shorter period, the fishermen can reach the shore easily finding the landmarks to which they are familiar with. In the case of M-OBM boats, whose fishing trip takes an average period of 21.2 hrs, it may also be the little difficulty to reach the shore or for communicating to others. But the real problem lies with the M-IBM boats whose average fishing period is around 55 hrs as the fishermen cannot find any landmarks or communication in the mid-sea. According to TFCS [24], the fishing time taken by the motorised crafts is more than that of than the non-motorised crafts.

It has been found that many boat operators are using the radio on board which not only facilitate to receive the weather forecast but also keep them entertained during fishing. Carrying the whistles by the M-OBM and M-IBM boats is really the awareness of the boat operators on communication needs. The use of cell phones by the some of the M-IBM boat operators is the best example of necessity created for the distant water fishing as an advanced communication equipment for contacting the kith and kin on land and in exchange of the welfare and the possibility of catches with the required trade arrangements by the time the boat reaches the shore. 80% of the mechanized crafts use some of the suggested equipment at Cochin [9].

It is common that the need of oil lamps, sails, paddles are the minimum requirement for the purpose of mobility while the boats go for fishing in sea. Carrying torchlight is appropriate to overcome the problems during gales because oil lamps cannot withstand. The use of magnetic compass by some of the M-OBM and M-IBM boats is again an advanced step to secure the lives when the boat has lost the direction and control in distress weather. It is apparent that about 69.6% of M-OBM boat operators are only carrying the engine tools. It indicates that some of the M-OBM boat operators are not cautious of the engine failures and are negligent of the sea safety. The magnetic compass was used by 81% of the mechanized crafts at Cochin [9].

Among life saving appliances, all fishermen carry minimum requirements of ration and drinking water only during the period of fishing trip. They will not bother about the untoward events, as many of them are not carrying emergency life saving materials like bread, biscuits and first aid boxes etc. Of

course, carrying emergency food and first aid boxes at the rate of 63.2 % and 42.5% respectively by the fishermen of M-IBM boats is a good sign of realization. However, as many as 18.3% of the M-IBM boat operators carry the life jackets and life buoys. It may be concluded that the traditional boats are ill-equipped and it requires a lot of effort to make the fishermen realize and accept the use of these gadgets compulsorily. Krishna and Rajiv [9] reports that about 30% of the mechanized crafts carry life buoys during fishing activity at Cochin.

The fishermen acquire the Knowledge of fishing practices from their ancestors since the times immemorial. The average experience of 17.3 years in case of non-motorised fishing boat operators indicates that it is a mixture of both aged and young ones, dominated by the aged fishermen who restrict themselves with the traditional non-motorised practices and do not have any enthusiasm to motorise the crafts. On the contrary the boat owners of M-OBM and M-IBM consist of less experienced fishermen young fishermen who are enthusiastic and show inclination to take challenges in motorizing the crafts. However, the experience and the physical fitness of the fishing crew matters the most in sea safety. As far as the trained crew is concerned, M-IBM boats have the maximum with 92.5% followed by M-OBM with 52.9% and non-motorised with 22%. It is also another indication of motorisation of the traditional fishing crafts is adopted more by the young fishermen and the training is the driving force behind to make their minds to go for distant water fishing. TFCS [24] reported that the young fishermen (42%) in the age group 31 – 40 have mostly motorised their craft followed by the middle aged fishermen (29%) in the age group of 41 – 50 years.

Of all the four variables taken for testing the communication perception of the respondents, it is noticed that almost all the three categories of the traditional fishing crafts operators are utilizing the information sources like radio, TV, newspaper etc, to know the weather bulletins of their choice depending on the availability. With regard to the understanding of the communication, the fishermen are not able to express the exactness of the weather bulletin. Only the younger and educated fishermen are able to understand the meaning of the weather transcripts broadcasted by the media. This draws the attention of the all the concerned authorities about the need of preparation of the transcripts on the lines of communicable language with the colloquial speech that the fishermen can understand easily.

The feedback information gathered on credibility of the perception is very important in order to test how best the weather bulletins are useful for the purpose of broadcasting among the fishermen. It is observed that the credibility has been increased, as the risk involvement is more in motorised boats operators who engage themselves in distant water fishing. Interestingly, the non-motorised fishing boat operators are though not the strong believers of the weather bulletins take the weather bulletins as serious as the motorised fishing boat operators in abstaining from the fishing as suggested by the meteorological department whose advice to the fishermen will come through the radio.

The traditional boat operators do not keep any equipment, as a precautionary measure because of the limited fishing area. It may not be a big problem for them to return to the shore easily on hearing the weather bulletin received from any member in the group who carries radio. The M-OBM and M-IBM boats who venture deep into the sea for catching the high valued fish need all kinds of sea safety measures to mitigate the loss of lives and properties.

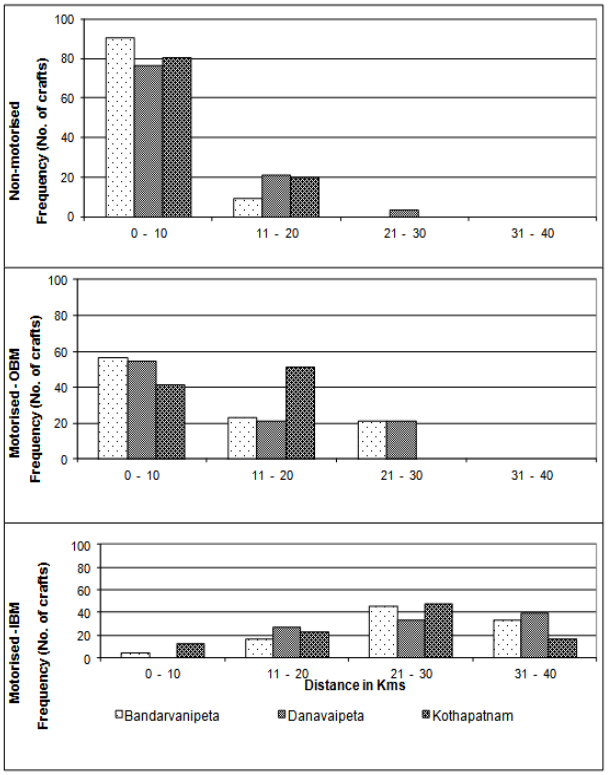

Fig 2: Fishing operations of the traditional fishing crafts (distance from the shore)

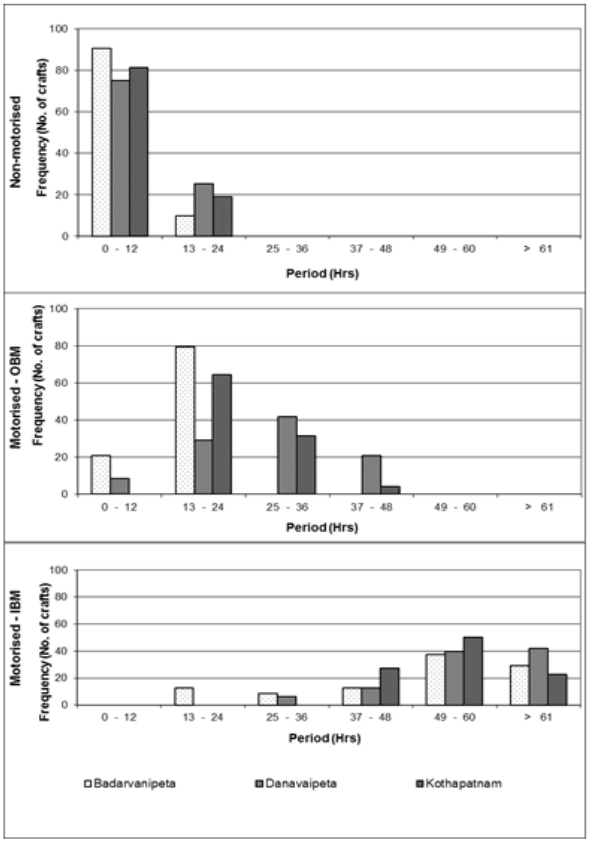

Fig 3: Fishing operations (Time) by traditional fishing crafts.

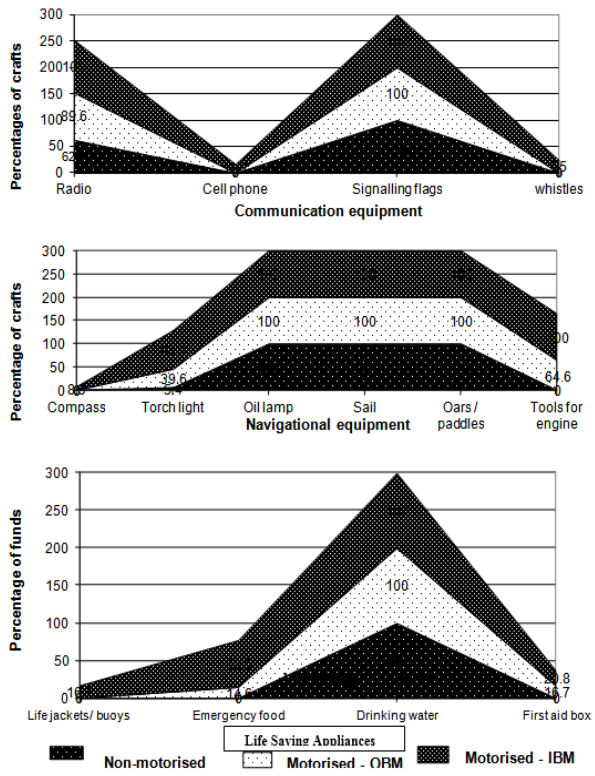

Fig 4: Sea safety equipment of traditional fishing crafts at Bandarvanipeta

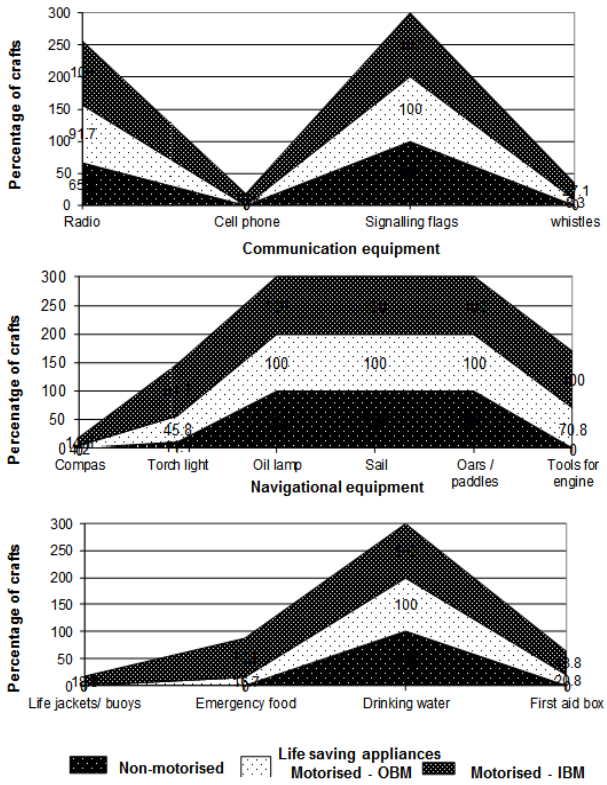

Fig 5: Sea safety equipment of traditional fishing crafts at Danavaipeta

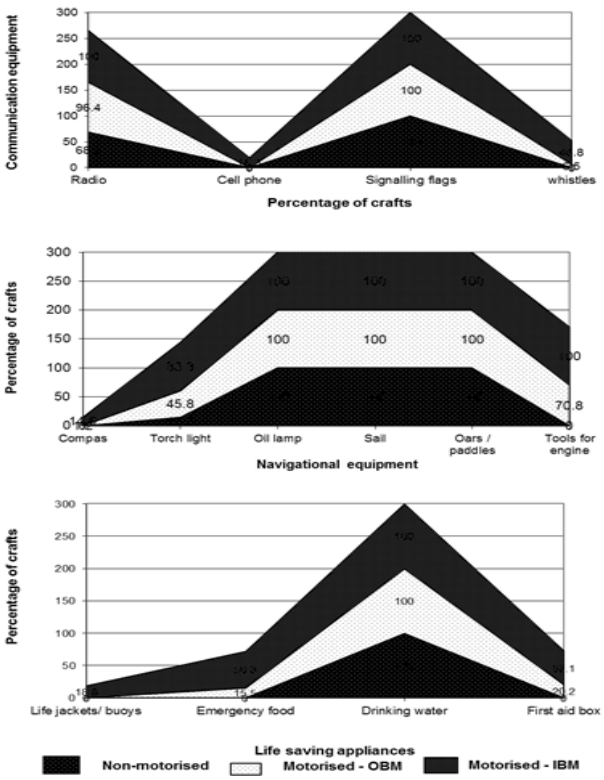

Fig 6: Sea safety equipment of traditional fishing crafts at Kothapatnam

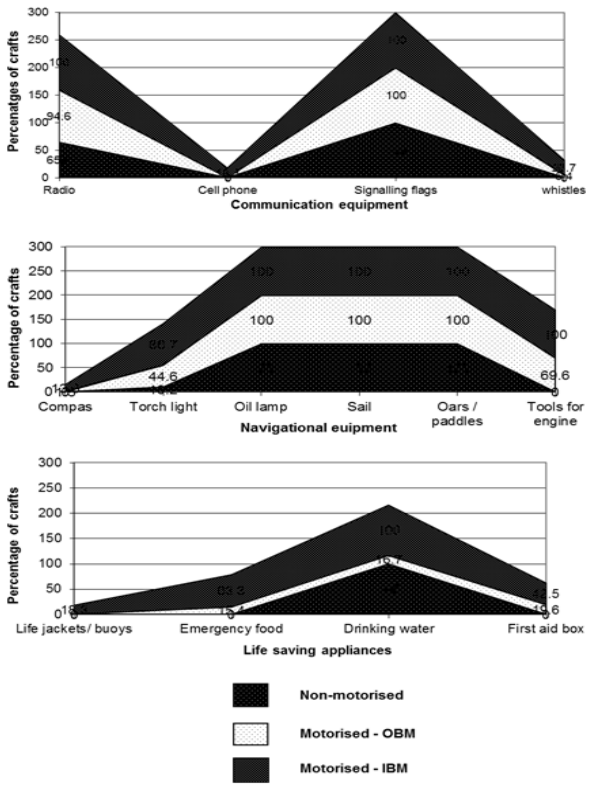

Fig 7: Sea safety equipment of traditional fishing crafts (Overall)

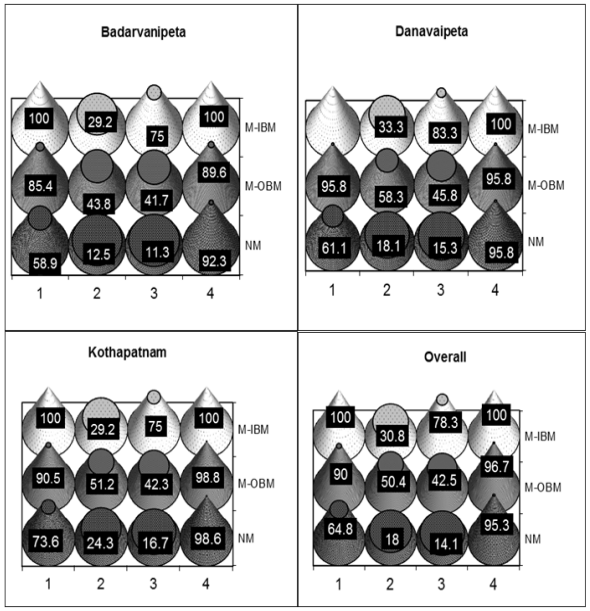

Fig 8: Communication behaviour of fisherman at three different stations and Overall

1. Fishermen who use the information source
2. Fishermen who can understand the communication
3. Fishermen who believe the weather forecast
4. Fishermen who adopt the weather forecast

4. Acknowledgements

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