Use of Mobile Phone by Fishermen of the Indus Delta for Weather and Disaster-Related Information

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Abstract

The role of mobile phones in providing vital information to the survivors of disasters and weather alerts to the fishermen communities in coastal areas is being widely acknowledged and studied around the world. In this context, this article deals with the use of the mobile phone in providing information related to weather and disaster situations to the fishermen communities of the Indus Delta region of Pakistan. This includes the analysis of the data about the disaster situations fishermen communities normally face and studying the impact of mobile phones in providing relevant information about the most common disaster-related vulnerabilities of fishermen communities living in the Indus Delta. The article also deals with the use of the mobile phone during disaster situations that include the use of a mobile phone to receive weather–forecast information, receiving disaster alerts, communication between survivors and rescue cum relief agencies, and to obtain guidance for planning fish-catching trips as per weather forecast received through mobile phone. The impact of socio-demographic factors on the use of a mobile phone for disaster and weather-related information by fishermen communities is also analyzed in this article. The data for this study were collected through a cross-sectional survey method from the fishermen of the Indus Delta and it was analyzed with the help of SPSS software to address the research questions related to the topic. The results of the study indicate that mobile phone has penetrated widely among the fishermen communities of the Indus Delta. The results also indicate the use of a mobile phone for receiving weather information and disaster risk reduction to some extent by fishermen communities of the Indus Delta.

Keywords: *Disaster Situations, Fishermen, Mobile Phone, Indus Delta, Disaster Alerts, Weather Information*

Introduction

Accurate and real-time information provides vital help to the survivors during natural calamities and it plays an important role in disaster risk reduction (Gething & Tatem, 2011). In this context, information and communication technologies including mobile phones can potentially play an effective role as a mitigation tool in the aftermath of a natural disaster or emergency (Kaur & Sood, 2020; Mohan & Mittal 2020) This device provides a low-cost mechanism to convey vital information during the emergencies, but there are several limitations which need to be studied to

make it a more effective tool to manage the risks of natural hazards (Alonso et al 2014). Apart from these limitations, information technology tools such as cell phones have made an immense contribution towards disaster risk reduction by providing an easy and faster way for the exchange of information between different stakeholders involved in the process of disaster management (Sébastien & Sébastien, 2014).

The fisheries sector in Pakistan is an important source of livelihood, especially for people living in coastal areas as the country has a coastline of 990 kilometers coastline which is abundantly rich in fish resources (MFF Pakistan, 2016). The contribution of the fish industry to the national economy is also significant (Mohsin et al., 2017). Therefore, the fisheries sector is highly important in terms of food security, employment opportunities, and contribution to GDP (Shah et al., 2018). In this context, the coastal region of Sindh province of the country including the Indus Delta region is rich in biodiversity and fish resources (Amjad, Rasheed & Baig, 2016 & M.M.F Pakistan, 2016). However, Similar to many other coastal regions of the world, the Indus Delta region of Sindh province of Pakistan is also facing several climate change-related stresses resulting in an increasing ratio of torrential rains, heat waves, tropical cyclones, and persisting conditions of drought (Rasul et al., 2012). Therefore, this study was initiated to evaluate the role of mobile phones in providing real-time weather and disaster-related information to the fishermen communities of the Indus Delta to mitigate the disaster hazards.

Literature Review

The effective dissemination of information generated through the early warning systems to coastal communities is considered vital in mitigating the impacts of disasters on the lives and livelihood of the coastal communities (Ahsan et al., 2020). In this context, mobile phones are emerging as an important tool for disseminating weather alerts and warnings. The device is considered highly effective in delivering multiple streams of meteorological information simultaneously to a receiver (Yoder-Bontrager, Trainor, & Swenson, 2017)

Mobile phones are being used to provide agro-meteorological information to farmers in Africa and the device has been a highly useful source for receiving weather alerts for rural farmers, especially in the developing world (Krell et al., 2021) In this regard, the results of a study conducted to find out the most effective methods of delivering weather-related information to the fishermen of the Victoria Lake indicate that an overwhelming majority of the fishers consider mobile phones as their most favorite tools to receive early warning weather alerts (Tushemereirwe et al., 2017).

Moreover, mobile disaster alerts and other applications are being used to provide relevant information to prepare communities for disaster situations during times of natural calamities (Appleby, 2011). Mobile alerts can play an important part in early warning mechanisms to save human lives and mitigate the adverse impacts of disasters on essential infrastructure (Shehara et al., 2020)

The mobile phone is also effectively used for contacting assisting agencies and creating greater coordination during the rescue operation which helps save lives (Toya & Skidmore 2018). The phone call and text messages data collected from mobile phones also help in the search for survivors in the aftermath of a disaster situation (Gething & Tatem 2011, Bengtsson et al 2010). Different mobile

phone applications designed for emergencies are also being used for crisis communication during disaster situations (Sukhwani & Shaw 2020 & Tan et al, 2017).

In the recent past, the mobile phone has become increasingly accessible to the rural communities of the developing world as a cost-effective tool for the exchange of information and social networking ((Bairagi, Roy,& Polin, A. 2011). Therefore, rural communities of the developing world including fishermen are using this device for receiving technical guidance, market information, and business networking (Matuha, 2016). The coastal communities are often vulnerable to different types of natural calamities and in this context, the mobile phone has emerged as a vital tool to provide weather and disaster-related information (Westland et al., 2007). The use of a mobile phone is helpful in many ways for disaster risk reduction in the fisheries sector. Mobile phone applications related to cyclones, sea storm prediction, and weather information are helping fishermen plan their trips and movements accordingly to reduce the risks and ensure their safety (Amrita & Karthickumar, 2016). The importance of the potential use of different mobile phone applications for disaster warnings during times of tsunamis, cyclones, and other natural calamities hitting the coastal areas of the developing world has been acknowledged and enquired about during the past two decades (Rahman, Alam & Chowdhury 2012, Juhana, Widyani & Mulyana 2012).

Theoretical Background

The fields of disaster and crisis management necessitate multidisciplinary research. In this context, crisis communication is considered an essential component of disaster management. It is a specialized area of communication research (Sellnow, & Seeger 2021). In simple terms, communication aimed at mitigating the damages of a disaster can be defined as crisis communication. Whereas, crisis communication related to weather hazards and natural disasters is mainly termed as disaster communication (Zaremba, 2014; Timothy et al., 2010). Furthermore, the process of effective disaster or crisis communication requires developing and delivering relevant information to address public concerns and guiding the communities on how to respond to a disaster to reduce their losses (Beggs, J. C. (2018). According to crisis communication scholars, research related to the theoretical background of crisis communication can help communities as well as other stakeholders to develop resilience and better prepare themselves to face hazardous weather and other disasters ((Sellnow, & Seeger 2021). Recently, mobile phones have emerged as one of the highly effective tools for crisis communication, and the role and effectiveness of mobile phones in different sociocultural settings are being studied utilizing the theoretical background of crisis communication (Paek, & Hove, 2021; Lester, & Karanja, 2008). Thus, the theoretical background of crisis communication was applied to evaluate the role of mobile phones in providing weather and disaster-related information to the fishermen of the Indus Delta

To assess the:

- The use of a mobile phone for disaster-related communication by the fishermen of the Indus Delta
- The use of a mobile phone for receiving weather-related information by the fishermen of the Indus Delta
- The impact of socio-demographic factors on the use of the mobile phone by the fishermen for weather and disaster-related information

Methodology

The data for this study was collected by conducting a cross-sectional survey which is considered a highly useful tool for quantitative research (Mishra, 2013 & Hansen et al., 1998). A close-ended questionnaire was used for this cross-sectional survey conducted in two coastal districts of Sindh province, Pakistan. Two hundred fishermen actively involved in fishing were purposively selected from fishermen communities living in the Indus Delta region, Pakistan. As a complete database about the fishermen's communities was not available, therefore, purposive sampling was used which is considered a viable alternative to random sampling (Singleton & Straits (1999). The researcher visited the actual location of the fishermen living in selected coastal districts to collect the required data. The data was analyzed with the help of SPSS software to answer the research questions of the study. Descriptive and inferential statistical tests were applied to analyze the data and to find a relationship between the use of mobile phones and related socio-demographic variables.

Results

The common disaster situations faced by fishermen

The data in the table below relates to the risk perception of the fishermen communities living in the Indus Delta about the common type of disasters faced by them during their work.

Table 1: *Common disaster situations faced by fishermen*

Items	N	Yes (%)	Sometimes (%)	Never (%)
1. Cyclone	200	125 (62.5)	52 (26.0)	23 (11.5)
2. Problem with the boat	200	55 (27.5)	14 (7.0)	131 (65.5)
3. Lost the route	200	34 (17.0)	13 (6.5)	153 (76.5)
4. Stormy weather	200	127 (63.5)	51 (25.5)	22 (11.0)

The data provided in the table above indicate that stormy weather is the most common disaster situation that fishermen of the Indus Delta face during their professional activities. Sixty-three percent of the respondents stated that they have frequently faced this situation whereas 25.5% stated they face this situation sometimes. Only 11 % percent of respondents claimed that they have never faced this type of situation in their lifetime. Cyclones emerged to be the second most common disaster situation faced by the fishermen of the Indus Delta as 62 % of them have faced cyclone situations during their work while 26 percent of the respondents stated that they have faced this situation sometimes in their life. Only 11.5 percent of the respondents claimed that they had never faced a cyclone situation in their lives. Fifty-five percent faced the problem in their boat during the fishing trip whereas 7 percent stated that they face this situation sometimes, whereas, a majority of the respondents claimed that they have never faced a situation of problem in their boat. The majority of the fishermen (76.5%) claimed that they had never faced the problem of losing the route during their fishing trip.

Mobile phone use during disaster situations

The data in Table 2 provide an overview of the use of mobile phones for weather and disaster-related information during disaster situations, the perception of the fishermen about the utility of

mobile phones for receiving weather-related information, disaster alerts, and communication with authorities for rescue and relief.

Table 2: *Factor analysis of mobile phone use during a disaster situations*

Mobile phone use during a disaster situations		**Factor**
	Mean	**Loadings**
Factor: Mobile phone use during disaster situations	**1.31**	
To receive weather forecast information	1.39	.74
To receive disaster alerts	1.22	.72
To inform officials about disasters	1.14	.66
To get rescue and relief guidance	1.35	.87
To plan fish-catching as per forecast received on mobile	1.44	.71
Cronbach's Alpha (Reliability score %)		.79
Eigenvalue		2.77
% of variance		55.48

Extraction Method: P.C.A. Rotation Method: Varimax with Kaiser Normalization (Eigenvalue >1). Higher scores equal greater mobile usage. The scale ranges from Agree=3 to Disagree =1.

The responses of the fishermen about these five statements were scaled from Agree = 3 to Disagree = 1. Those five statements are as under:

(a) to receive weather-forecast information (b) to receive disaster alerts (c) To inform officials about disasters (d) To get rescue and relief guidance (e) To plan fishing catching as per the weather forecast received on mobile.

To find the relationship of these statements with each other Factor Analysis test was applied. Resultantly the factor named "mobile phone use during disaster situations" with Eigen figure higher than one developed. The total variance of this factor stood at 55.48%. The Cronbach's coefficient alpha test results show the figure (.79). Whereas, the score of Bartlett's test stood at (337.90) ($p<.000$), and the K.MO figure emerged as .73, $p<.000$.

Moreover, the reliability value of all the statements was > .40 which supports the clustering of mobile phone usage during an emergency in one factor.

The results of the analysis in Table 2 show that to plan fish-catching as per mobile received weather forecast emerged as the highest-rated statement (Mean = 1.44). Whereas, the second-highest use of the mobile phone was to receive weather forecast information (Mean =1.39). Furthermore, the item that scored the third highest mean value (Mean = 1.35) under this factor was "to get rescue and relief guidance". Moreover, the second last mean value (M=1.22) emerged for the statement "to receive disaster alerts". In the end, the lowest-rated statement was "to inform officials about the disasters" (M=1.14).

Impact of socio-demographic variables on the use of mobile phones during a disaster situations

To evaluate the impacts of socio-demographic factors including educational status, age categories, professional experience, monthly income, and monthly expenditure on cell phones on the perception of the fishermen community of the Indus Delta about the role of mobile phones during the disaster-related situation an additional statistical analysis was conducted on the data applying Mann-Whitney U test. This analysis was aimed at finding any significant relationships between the use of the mobile phone during the disaster situation and socio-demographic factors.

Mobile phone use during disaster situations and education status

First of all the usage of mobile phones during disaster situations was analyzed in the context of the educational status of the respondents of the study. The results are provided in the table below.

TABLE 3: *Mobile phone use during disaster situations and education status*

Mobile use during a disaster situations	Education status			
	Uneducated Mean rank	Educated Mean rank	MW-U	P-value
To receive weather forecast information	98.39	105.10	4193.00	.31
To receive disaster alerts	101.05	99.30	4026.00	.72
To inform officials about disasters	98.94	103.89	4240.00	.23
To get rescue and relief guidance	99.42	102.86	4102.00	.56
To plan fish-catching as per forecast received on mobile	98.53	104.79	4167.00	.33

Note: Higher scores equal a greater level of mobile phone usage. Scale ranges from Agree = 3 to Disagree =1

The results regarding the impact of education on the use of the mobile phone during a disaster situation show that the educated fishermen receive weather forecast information on mobile more frequently (Mean rank= 105.10) compared to uneducated fishermen (Mean rank = 98.39). Contrary to that the ratio of uneducated fishermen receiving disaster warnings/alerts on mobile phones while onshore is higher (Mean rank = 101) in contrast to educated fishermen (Mean rank= 99.30). The educated fishermen use mobile phones more frequently to inform officials about disasters (Mean rank= 103.89) in comparison to their uneducated counterparts (98.94). Similarly, the majority of the educated fishermen (Mean rank= 102) stated that they receive rescue and relief guidance on mobile phones while a relatively small number of uneducated fishermen (Mean rank= 99.42) agreed with the statement. The ratio of educated fishermen who plan their fishing trips after receiving weather forecasts on a mobile phone was higher (Mean rank= 104.79) than that of uneducated fishermen (Mean Rank=98.53). However, P values for all the statements discussed in Table 3, were found statistically non-significant, > 0.05.

Mobile phone use during a disaster situation and age categories

TABLE 4: *Mobile phone use during a disaster situations and age categories*

Mobile use during a disaster situations	Age categories			
	Up to 40 Mean rank	Above 40 Mean rank	MW-U	P-value
To receive weather forecast information	103.43	93.83	3832.50	.15
To receive disaster alerts	100.95	99.47	4176.50	.77
To inform officials about disasters	101.80	97.54	4059.00	.31
To get rescue and relief guidance	102.27	96.46	3993.00	.34
To plan fish-catching as per forecast received on mobile	103.38	93.93	3838.50	.15

Note: Higher scores equal a greater level of mobile phone usage. Scale ranges from Agree = 3 to Disagree =1

The use of mobile during disaster situations was also explored in terms of age level and the results show that the fishermen of younger age category (up to 40 years) receive weather forecast information on a mobile phone more frequently in comparison to their counterparts of age category of above 40 years (Mean Rank= 103.43 VS 90.87; MW-U=3832.500; P=151). In terms of receiving disaster warnings/alerts on mobile while onshore the fishermen with the age category of up to 40 years were found more active users (Mean Rank = 100.95; MW-U=4176.500; P=.771) in comparison to their counterparts of older age category (Mean Rank=93.83, MW-U=4176.500; P=.771) According to data the number of fishermen aged up to 40 years who use a mobile phone to inform officials about disasters is higher (Mean Rank=101.80 MW-U=4059; P=.308) in contrast to the fishermen aged above 40 years (Mean Rank= 102.27). Similarly, the fishermen of a younger category (up to 40 years) receive rescue and relief guidance on mobile more frequently (Mean Rank= 102.27; MW-U = 3993.000) than fishermen aged above 40 years (Mean Rank=96.46). The same trend is visible in the last item of the table as the majority of the fishermen aged up to 40 years plan their fishing trips as per weather forecast received on mobile while the number of fishermen aged above 40 years in the same context is relatively low (Mean Rank= 103 .38 MW-U= 3838.500 P = .146).

Thus, the results show that the mean of all the five statements was higher for the fishermen who belonged to the younger age category, therefore, it is concluded that mobile phone is more effective for weather information and disaster situation in the perception of a relatively younger category of fishermen. However, P values for all the statements discussed in Table 3, were found statistically non-significant, > 0.05.

Mobile phone use during disaster situations and professional experience

TABLE 5: *Mobile phone use during disaster situations and professional experience*

Mobile use during disaster situations	**Professional experience**			
	Up to 10 Mean rank	**Above 10 Mean rank**	**MW-U**	**P-value**
To receive weather forecast information	99.27	100.83	3266.50	.84
To receive disaster alerts	102.49	99.97	3234.50	.66
To inform officials about disasters	97.38	101.33	3187.00	.40
To get rescue and relief guidance	93.82	102.28	3037.50	.22
To plan fish-catching as per forecast received on mobile	99.46	100.78	3274.50	.86

Note: Higher scores equal a greater level of mobile phone usage. Scale ranges from Agree = 3 to Disagree =1

The impact analysis related to the influence of professional experience on the use of the mobile phone during disaster situations indicates mixed trends. In the case of receiving weather forecast information on mobile senior fishermen were more active users (Mean rank= 100.83; MW-U 3266.500; P=.83) in comparison to their junior counterparts (Mean rank = 99.27). Furthermore, the junior fishermen receive disaster warnings/alerts on mobile more frequently (Mean rank= 102.40; MW-U= 3234.500; P= .66) in comparison to their senior counterparts (99.97). However, senior fishermen are more active in contacting the official in a disaster situation (Mean rank=

101.33; MW-U=3183.00; P=40) contrary to their junior counterparts (Mean rank=97.38). Similarly, the fishermen with professional experience of above 10 years receive rescue and relief guidance more frequently (Mean rank=102.28; MW-U=3037.500; P=.21 than those fishermen who have professional experience of up to 10 years. The seniors also plan their fishing trips more often after receiving information on mobile phones (Mean rank=100.78; MW-U= 3274.500; P=.85). However, the results for P values of all the statements remained statistically non-significant, > 0.05.

Mobile phone use during disaster situations and monthly income

The usage of mobile phones during disaster situations was also analyzed in the context of the monthly mobile expenses of the respondents of the study a statistical analysis Mann-Whitney U test was applied. The respondents were divided into two categories. 1= High income level = above 10000 2= Low income level= Up to 10,000. The test was aimed at assessing whether any significant relationship could be found between the monthly mobile expenses categories and the role of mobile phones during the disaster situation. The results of the test are given below.

Table 6*: Mobile phone use during urgent situations and monthly income*

Mobile use during urgent situations	**Monthly income**			
	Up to 10000 Mean rank	**Above100000 Mean rank**	**MW-U**	**P-value**
To receive weather forecast information	97.58	105.26	4350.00	.23
To receive disaster alerts	100.12	101.13	4664.50	.84
To inform officials about disasters	102.92	96.55	4611.50	.11
To get rescue and relief guidance	98.94	103.04	4519.00	.48
To plan fish-catching as per forecast received on mobile	92.83	113.01	3761.50	.00

Note: Higher scores equal a greater level of mobile phone usage. Scale ranges from Agree = 3 to Disagree =1

The use of mobile during disaster situations was also explored in terms of income level and the results show that fishermen with higher income levels were relatively more convinced of the role of mobile phones during disaster situations. The results show the majority of the fishermen with higher income levels claimed that they receive weather forecast information on mobile phones (Mean rank= 105.26 MW-U= 4350.000; P=.226) while the number of weather information receivers on mobile among the fishermen with low-income levels was relatively low (Mean rank=97.58). The number of respondents receiving disaster warnings/alerts on a mobile phone was also high among the fishermen with a high-income level (101.13; MW-U= 4664.500 P=.835) the trend was relatively low among the fishermen with a low-income level (Mean rank= 100.12). However, the data shows a different trend in terms of using a mobile phone to inform the officials about disasters as the fishermen with low-income level lead in this area and the majority of them use this mobile phone for this purpose (Mean rank= 102.92; MW-U= 4611.500; P=.108). On the contrary, the mean rank of mobile phone users to inform officials about disasters is relatively less among the low-income level fishermen (Mean rank=96.85). In the case of receiving rescue and relief guidance on mobile, the fishermen with high-income levels lead with a mean rank of 03.04 in comparison to fishermen with low-income levels (98.94). Similarly, the majority of the fishermen with high-income levels claimed that they plan

their fishing trips as per weather forecast on mobile (113.01) while the mean rank for mobile users for the same purpose among the fishermen with low-income levels remained 92.83. However, the results for P values of all the statements remained statistically non-significant, > 0.05 except the item fifth U = 3761.50 (Z = - 3.27), p = 00.

Use of cell phone during disaster situations and monthly mobile phone expenditures

The usage of mobile phones during disaster situations was also analyzed in the context of the monthly mobile expenditure of the respondents of the study with the help of the Mann-Whitney U test. The respondents were divided into two categories as far as monthly mobile expenses are concerned 1= High spenders = above 10000 2= Low spenders= Up to 10,000. The test was aimed at assessing whether any significant relationship could be found between monthly mobile phone expense categories and the role of mobile phones during the disaster situation. The results of the test are given below.

TABLE 7: *Mobile phone use during urgent situations and monthly mobile expenses*

Mobile use during urgent situations	**Monthly mobile phone expenses**			
	Up to 500 Mean rank	**Above 500 Mean rank**	**MW-U**	**P-value**
To receive weather forecast information	95.80	105.21	4529.00	.13
To receive disaster alerts	99.01	101.99	4851.00	.53
To inform officials about disasters	99.44	101.57	4893.00	.59
To get rescue and relief guidance	98.34	102.67	4783.50	.44
To plan fish-catching as per forecast received on mobile	96.52	104.49	4601.50	.18

Note: Higher scores equal a greater level of mobile phone usage. Scale ranges from Agree = 3 to Disagree =1

The topic of mobile use during the disaster situation by the fishermen community was further explored in terms of monthly mobile expenses and the respondents were distributed in two categories. The results show that the high spenders lead in several mobile phone users for receiving weather forecast information on mobile (Mean rank=105. 21; MW-U=4529.500; P=.126) in comparison to low spenders (Mean rank=95.80). Furthermore, the trend of receiving disaster warnings/alerts on mobile is also more common among the high spenders (Mean rank=101.99 MW-U=4851.000 P=.526) in contrast to the low spenders. In addition, the use of mobile to inform officials about disasters is also common among the high spenders (101.57; MW-U= 4851.000; P=.586) in comparison to the low spenders (99.44). Similarly, the majority of the high-spending fishermen claimed that they receive rescue and relief information on mobile phones (Mean rank=102.67; MW-U= 4783 P=.438) while the mean rank of low spenders in terms of use of a mobile phone for this purpose remained at 98.34. Continuing with the same trend the majority of the high-spending fishermen claimed that they plan fishing trips as per weather forecast received on mobile (Mean rank=104.49; MW-U=4601.500 P=.183) in contrast to the low-spending fishermen (96.52). However, the results for P values of all the statements remained statistically non-significant, > 0.05

Discussion and Conclusion

It is observed that the use of mobile phones during marine fishing can contribute to reducing disaster risk and improving the security of fishermen (Ahmed, Rashid & Mahmood 2021). In addition to it, such a type of use of a mobile phone in the fisheries sector is recognized globally (Nthane, 2020). However, the use of the mobile phone during the disaster situation in coastal areas of Pakistan was rarely explored systematically. In this context, this study explored the use of a mobile phone for disaster and weather-related communication by the fishermen of the Indus Delta region of Pakistan. In addition to it, this study was also aimed at exploring the common disaster situations normally faced by the fishermen communities living in the Indus Delta. The results of the study indicated that stormy weather is the frequently occurring disaster situation faced by the fishermen of the Indus Delta followed by the cyclone, so, an effective early warning system (EWS) is highly important in terms of disaster risk reduction in the Deltaic region. Moreover, a large number of fishermen with a mean of 1.44 were using mobile phones for relevant disaster and weather-related information before planning their fish-catching trips, but on the contrary, the ratio of fishermen regularly receiving weather forecast information was relatively low with a mean of 1.33. A sizeable portion of the respondents which was lesser than the majority with a mean of 1.35 was using mobile phones for rescue and relief guidance during the disaster situation. The ratio of receiving disaster alerts and informing the officials about the disaster situation was the lowest with a mean of 1.22 and 1.14 respectively.

Additionally, analysis of the impact of socio-demographic factors on the use of mobile phones during times of disaster indicates the trend that compared to the uneducated the educated fishermen were more frequent users of mobile phones for receiving weather –-forecast information, communicating with officials to get rescue and relief guidance and planning their fishing trips as per weather forecast received on a mobile phone. Similarly, the fishermen younger than 40 years were more frequent users of mobile phones for disaster and weather-related information in contrast to their counterparts in the above 40 years age group. Added to that, the fishermen having professional experience of fewer than 10 years were found more frequent users of mobile phones for weather and disaster-related information in comparison to their counterparts with professional experience of more than 10 years. In the same way, fishermen with a monthly income of more than 10000 PK rupees were more frequent users of mobile phones for disaster and weather information in contrast to the fishermen earning less than that. Lastly, the fishermen who spend more on mobile also use the device more frequently for receiving weather and disaster information.

Suggestions

The relevant research indicates that cellular technologies are a reliable source of communication during disaster response coordination. These technologies are useful for covering the information needs of vulnerable coastal communities (Yulianto, Utari, & Satyawan, 2020). However, the findings of this study indicate that currently less than a majority of the fishermen of the Indus Delta are using mobile phones for receiving disaster and weather-related information, disaster alerts, and communicating with authorities for rescue and relief guidance. Therefore, it is necessary to motivate and equip more and more fishermen to use mobile phones for disaster risk reduction. This type of

motivation and technological help can create a sense of ease of use for communities to seek disaster-related information through ICTs including mobile phones (Ahadzadeh, & Sharif 2017). Studies in other South Asian countries also indicate that motivational training of fishermen communities and infrastructure development in cell phone technology in coastal regions can play a role in disaster risk reduction and fisheries development (Jaffers et al 2019 & Ahmed, Rashid & Mahmood 2021). Thus, the government and other organizations working for disaster risk reduction in coastal districts should take some initiatives to educate and equip the fishermen communities living in the coastal areas of Sindh province of Pakistan to utilize the full potential of information communication technologies including cell phones for disaster preparedness in the region.

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