



RELIGION AND DISASTER MANAGEMENT: A STUDY ON TWO SELECTED VILLAGES  
IN COASTAL BANGLADESH

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**Abstract**

Study on cultural elements to reduce vulnerability become so popular in academia. Therefore, over the past few decades, research on the understanding relationship between religion, as a cultural element, and disaster management has also gotten its popularities. Nevertheless, how different religious aspects can influence people to shape up their disaster management strategies remains untold. To address this gap, adopting a mixed-method approach of data collection this study selected two most disaster-prone areas namely, Dacope Upazila and Koyra Upazila, of Khulna District in Bangladesh to collect primary data. The findings of this study reveal that in some areas religious institutions play a significant role through disseminating disaster-related news, providing social supports immediately after a disaster, and acting as a victim support center. Similarly, religious masters as well as other religious leaders have played a leadership role to bind people together. The findings of this study also indicate that the most important role of religion in disaster management was psychological. Besides, religion increase the capacity of community management through enhancing moral responsibilities. However, the lack of coordination of these potential cultural elements remains unused in the field of disaster management. Therefore, through this study, the researcher would like to call upon policymakers' attention to integrating religious elements with other disaster risk reduction elements.

**Keywords:** Religion, disaster, risk reduction, coastal people, community, Bangladesh

**Introduction**

Religion, implies for belief in supernatural power, embedded with human culture from the history of human civilization. Similarly, natural calamities are another traditional affair that has been experienced by the human race over generations. Association between these two elements, nowadays, become a subject matter of social resilience assessment to do community-based disaster management. The importance of the study of the relationship between religion and disaster management has also been highlighted in the third priority of the Sendai Framework for Disaster Risk Reduction (SFDRR) (2015-2030) where it has emphasized cultural resilience along with economic, social, and health resilience (Roy et al., 2022). Besides, SFDRR also has emphasized community participation through assessing community needs and priorities (Roy et al., 2023). In a direction with this view, this study was designed to understand how local communities manage different disasters with the help of religious codes and practices as a part of their culture.

Research in disaster management from the religious point of view is not new. Over the past few decades, several scholarly works have been found on this ground. Most of the literature has followed a normative approach rather descriptive manner. For example, most of the local people of coastal areas of Bangladesh have strongly believed that a disaster is an act of God evident by Garai (2017). Likewise, Call (2012) has revealed that the influence of religion makes people fatalistic. Since, during disaster people used to emphasize more on practicing religious

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activities instead of protecting their lives, and belief that through these activities, God could reduce the magnitude of disaster as well as protect them from the mass distraction (Call, 2012; Paulson & Menjivar, 2012). Paulson and Menjivar (2012) also expressed that during a disaster, these guys used to be busy worshipping many objects instead of saving themselves. Subsequently, loss of life and property had been increased (Call, 2012). Therefore, instead of advocating the importance of religion in disaster management, these scholars have recommended reducing the influence of religion in disaster management.

Unlike the above discussion, some scholars (i.e., Ensor, 2003; Ha, 2015; Hope & Jones, 2014; Roy et al., 2022;) have presented that faith in religious masters, as a key stakeholder, was another important role of religion which sometimes motivates and leads people not to adopt and welcome innovation regarding disaster management. Subsequently, superstition and false beliefs can be found in society. Sometimes, a subculture regarding these superstitions and false beliefs have been found in some community (Ensor, 2003; Ha, 2015; Hope & Jones, 2014; Yari et al., 2019). For instance, if the religious master remains pleased with them then God is also pleased with them (O'Connell, 2018).

Another way, common perception also found that disobeying a religious master's order or words means disobeying God's order (O'Connell, 2018). Moreover, a sense found by Gillard and Paton (1999), Hussain et al. (2014), and Call (2012) among local people is that this divine individual has the power to control natural disasters. Such political influence generally demotivates people to follow government initiatives. For instance, Garai (2017) has evidence that such pressure of religion on local people sometimes hamper governmental initiatives regarding disaster risk reduction interventions. Subsequently, ignoring the latest disaster management strategies and policies by the local people because of the over dominance of religious masters may arise a new subculture.

In a line with the above discussion and focusing on religious-based subculture some scholars like Dekens (2007), Bentzen (2013), Call (2012), Iloka (2016), Baytiyeh and Naja, (2016), Ibrahim et al. (2019) and Roy et al. (2020) have found loss of life and properties due to ignorance of early warning. However, none of them have mentioned whether the religious masters were the primary person who motivates them to ignore the early warning system. Most of them are partially or latently mentioned. Some of them have given a little hint. Like, Ibrahim et al. (2019) through a study in Southwestern Bangladesh have stated,

...The research reveals that jerry-built roads, fear of theft, disbelief, and mistrust about warnings, lack of awareness about hazards, and the poor state of the cyclone shelters are the main reason for non-evacuation during cyclones. Besides, past experiences of warning failures, superstitious, religious beliefs, fatalism, safety issues for women also worked to influence people's decision to leave their houses during the warning periods... (p. 53)

Since no clear indication has been found regarding the influence of religious masters on local people associating disaster management, it is hard to draw a single conclusion without evidence. And beyond no doubt, the religious masters are the critical agents of religion so excluding them and their influence it would be difficult to understand the power of religion in disaster management. As very few studies have presented the role of religious masters in disaster management in a descriptive manner so this study will try to present the role of religious masters in disaster management with special reference to southwest coastal areas of Bangladesh.

Moreover, religious institutions along with religious codes and practices are other elements of the religion that bind people together and drive people to believe in supernatural power. According to this point of view, researchers like Aten et al. (2019), Biggs et al. (2017), Call (2012), Ha (2015), Grandjean et al. (2008), and Sheikhi et al. (2021) have demonstrated that religious institutions, practices, and codes have a major psychological impact on disaster management. For instance, Grandjean et al. (2008) have evidence that ancient religious myth was a psychological mechanism that led humans to find out supernatural explanations about disasters and faith in divine retribution. Emphasizing this point of view Dodds (2015) found a common explanation in each religion that a disaster is an 'Act of God' and it is a consequence of people's misdeed.

Similarly, such psychological understanding regarding the origin of disaster and the consequence of disaster was another attitude that grew from the influence of religion and prevent people from rational decision-making in a crisis moment like a cyclone. Another normative literature shows a negative relationship between religion and community adaptation capacity. Such as, the more religious person is less likely to prepare future adaptation mechanisms at both personal and community levels (Call, 2012). Though the above-discussed literature has presented some aspects of the relationship between religion and disaster management, most of them failed to draw a clear image regarding the power of religion in multiple phases of disaster management. More specifically, how local

people used to do different religious activities in three phases (i.e., pre-disaster phase, during disaster phase, post-disaster phase) of disaster. Therefore, the key emphasis of this study is to present the local people's religious activities in three phases of a disaster. The significance of this study would be a guideline to the policymakers to take the necessary steps to design a resilient community-based disaster management program.

#### *Specific Objective(s)*

- a. To understand the role of religious institutions in disaster management;
- b. To present the religious master's role in disaster management and
- c. To examine how does religion shape local people's coping strategy.

#### *Role of Religious Institutions and Masters*

The study on understanding the influence of religious institutions and religious masters on humans in a line with disaster management is not new. With the very begging of the twenty-first century, several scholars have paid attention to understanding the linkage between religion and disaster management. For instance, using content analysis Grandjean et al. (2008), Dodds (2015) and Aten et al. (2019) have found ancient religious myths had a psychological setup that helps individuals to believe in supernatural explanations, i.e., disasters are an act of God. Whereas, Mohit et al. (2013) and Sheikhi et al. (2021) have explored a significant role of 'Masjid' as a religious institution in disaster management. At the same time, some others also found a triangular relationship among humans, environment, and religion, where non-religious people had anxiety about religion to environmental issues compared to religious people (Hope & Jones, 2014). The same evidence was also found in another qualitative work of Ager et al. (2015) that local communities who have faith in religion had a vital role to promote resilience during a humanitarian crisis.

Similarly, some literature has presented that there has a mutual relationship between religious masters and disaster management in terms of minimization of vulnerability and increase of resilience in society since local people have deep faith in their words. For instance, Gillard and Paton (1999) and Hesse (2012) have presented that religious denominations have exercised a differential impact of different vulnerabilities. It has also been found that religious institution plays a specific role in a specific place. For example, a study by Paulson and Menjivar (2012) and Mallick et al. (2010) have found that religious institution-based relief had more value in India but low in America where groups and networks had played a good value.

The same evidence was also found in the study of Ha (2015) in Korea that religious institutions influenced building resilience in local communities. Another study in Indonesia quantified that in disaster-prone areas people are more religious rather than in normal areas (Bentzen, 2013). But Call (2012) proved that in Indonesia more religious persons are less likely to prepare for future adaptation, besides he also found a negative relationship on religious belief in urban and rural differences. However, above all studies indicate a particular role of religious masters and institutions associating disaster management. But, at the same time, a clear literature gap has also been visible that very few studies have shown how religion governs the behavior of coastal people of Bangladesh in terms of Disaster Management. Therefore, the novel contribution of this study would be how local people used motivated by religious institutions and religious masters to shape up their disaster management activities.

#### *Sources of Faith*

It is quite common that natural disaster is a natural consequence. But from the religious point of view natural disaster is controlled by supernatural power. However, to understand the power of religion in disaster management it is important to understand the elements that make individuals believe in supernatural objects. In this section of this study, the researchers have reviewed some of the religious documents which can call as evidence and used by religious masters to access their power. In a line with this perception, some scholars believed that over some time people observed that natural disaster remains beyond human control, and so, people believe disaster is an "Act of God" (Dodds, 2015; Furedi, 2007; Yamada, 1981).

Moreover, according to the religious code, God or the supernatural power have created us for some unknown purposes and humans should better seek the purpose and complete it. Hence, a pious person believes if we forget this and disobey the holy order God uses the disaster to control us (Sony and Roy, 2019; Aksa, 2020). The root of this faith is found in the sacred books which are followed by religious institutions and taught by religious masters to the common people. Some important holy books quotations related to the disaster have been enlisted in this section. For instance, Allah Subhanahu WaTaala (SWT) says in the Holy Quran,

And whatever of misfortune befalls you, it is because of what your hands have earned. And He pardons much (The Al-Quran, Sura, Ash-Shura 42:30).

And fear the Fitnah (affliction and trial, etc.) which affects not in particular (only) those of you who do wrong (but it may afflict all the good and the bad people), and know that Allah is Severe in punishment (The Al-Quran, Sura, Al-Anfal 8:25).

Evil (sins and disobedience of Allah etc.) has appeared on land and sea because of what the hands of men have earned (by oppression and evil deeds, etc.), that Allah may make them taste a part of that which they have done, in order that they may return (by repenting to Allah, and begging His Pardon) (The Al-Quran, Sura, Ar-Rum 30:41).

And if the people of the towns had believed and had the Taqwâ (piety), certainly We should have opened for them blessings from the heaven and the earth, but they belied (the Messengers). So, we took them (with punishment) for what they used to earn (polytheism and crimes, etc.) (The Al-Quran, Sura, Al-A'raf 7:96).

Similarly, in the holy Bible about 100 verses found about natural disaster. For instance,

I form light and create darkness, I make well-being and create calamity, I am the Lord, who does all these things (The holy Bible, Isaiah 45:7).

There will be great earthquakes, and in various places famines and pestilences. And there will be terrors and great signs from heaven (The holy Bible, Luke 21:11).

Even some quotes also found in Hinduism which supports these people's source of believe of disaster as a supernatural act. For example,

The whole cosmic order is under me. Under my will it is automatically manifested again and again, and under my will it is annihilated at the end (Bhagavad Gita, Chapter 9:8).

If you become conscious of Me, you will pass over all the obstacles of conditioned life by My grace. If, however, you do not work in such consciousness but act through false ego, not hearing Me, you will be lost (Bhagavad Gita, Chapter 18:58).

Besides, few sacred tales also bear the evidence of great disaster. For example, the great flood's background and description found, along with another sacred book, in Sura 11 (Hud) and 71(Nuh) of the Holy Quran, in Genesis 6:9-9:17 of the Holy Bible. Some points are attached below,

[11.37] And make the ark before Our eyes and according to Our revelation, and do not speak to Me in respect of those who are unjust; surely, they shall be drowned. [11.38] And he began to make the ark; and whenever the chiefs from among his people passed by him, they laughed at him. He said: "If you laugh at us, surely we too laugh at you as you laugh at us". [11.39] So shall you know who it is on whom will come a chastisement which will disgrace him, and on whom will be lasting chastisement come down. [11.40] Until when Our command came and water came forth from the valley, we said: "Carry in it two of all things, a pair, and your own family – except those against whom the word has already gone forth, and those who believe (The Al-Quran, Sura, Hud 11:37-40).

[71.21] Nuh said: "My Lord! Surely, they have disobeyed me and followed him whose wealth and children have added to him nothing but loss. [71.22] And they have planned a very great plan. [71.23] And they say: 'By no means leave your gods, nor leave Wadd, nor Suwa; nor Yaghus, and Yauq and Nasr. [71.24] And indeed they have led astray many, and do not increase the unjust in aught but error.' [71.25] Because of their wrongs they were drowned, then made to enter fire, so they did not find any helpers besides Allah. And there believed not with him but a few. [11.41] And he said: "Embark in it, in the name of Allah be its sailing and its anchoring; most surely my Lord is Forgiving, Merciful (The Al-Quran, Sura, Nuh 11:37-40).

The flood continued forty days on the earth. The waters increased and bore up the ark, and it rose high above the earth. The waters prevailed and increased greatly on the earth, and the ark floated on the face of the waters. And the waters prevailed so mightily on the earth that all the high mountains under the whole heaven were covered. The waters prevailed above the mountains, covering them fifteen cubits deep (The Holy Bible, Genesis 7:17-20).

The study of Sony and Roy (2019) mentioned that the sacred story of great floods is also found in Hindu mythology in different forms. The story-like, “one day the tenth ‘Manu’ caught a small fish. Surprisingly, the fish spoke to him and promised to protect him from the coming deluge. Manu put the fish in a small water-filled container and fed it. The fish grew by leaps and bounds and Manu kept transferring it to larger and larger containers. It grew to immense size and told him to build a big boat and tie it to the fin of the fish and sail towards the northern mountain. The great flood came and it was relentless and the fish which was Vishnu's Matsya Avatar saved humanity from extinction” (Augustyn et al., 1998; Bhatt, 2006). The above message makes some value among people about a natural disaster (Sony & Roy, 2019). So, it is clear that the source of the faith of religion on disaster is embedded with its origins as well as the holy books.

## Materials and Method

### *Background of the Study Area*

To meet the current study's objective two most disaster-prone southwest coastal areas i.e., Koyra 5 no. village and Koyra 6 no. village of Koyra Union under Koyra Upazila and Kailashgonj village and Ramnagar village of Kailashgonj Union of Dacope Upazila of Khulna district in Bangladesh have selected purposively as a study area. The following maps were identifying the locality of the study area (Figure 1). Along with other southwest coastal areas, these two areas have been experiencing frequent natural calamities each year (Saha, 2017).

The socio-cultural background of the population was another motivation that has assisted the researchers to select these study areas. For instance, about 96.9% of respondents of the study area were found who have claimed that they have deep faith in religion and used to follow religious code and practice in most aspects of their daily life. In addition, it also found that about 76.1% of respondents had been used to doing their prayer once a day.

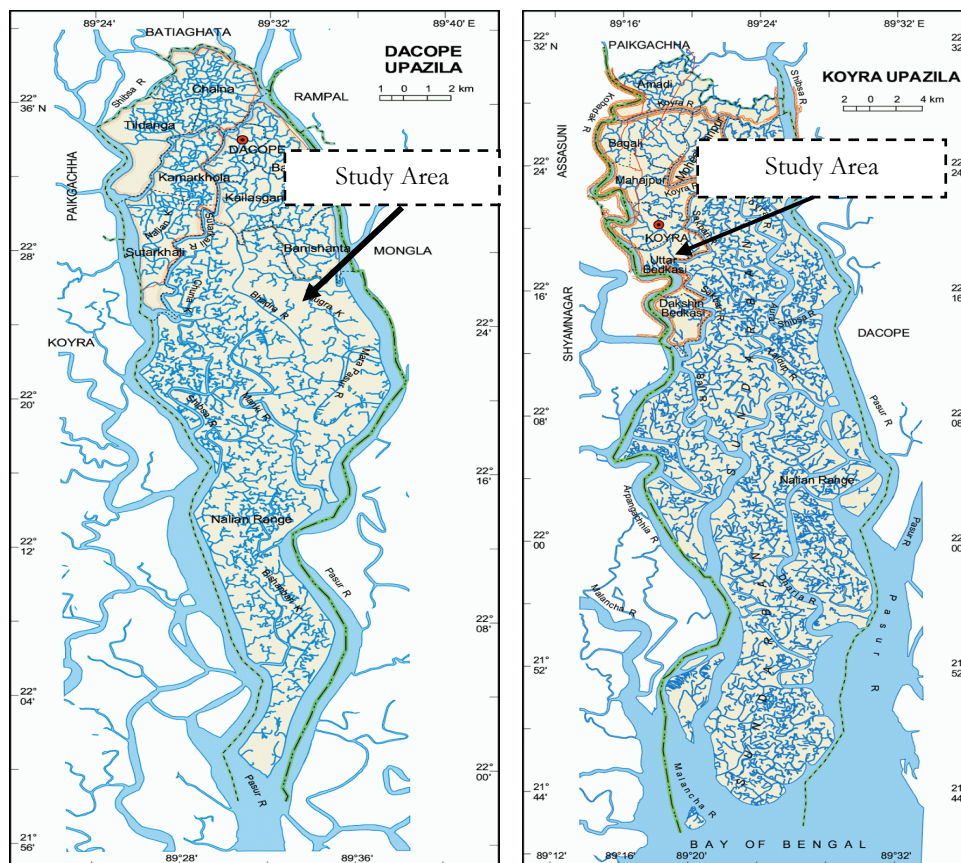


Figure 1. Maps of Dacope Upazila and Koyra Upazila (Local Government Engineering Department, 2018).

### *Study Design*

This study had used both qualitative and quantitative approaches and was descriptive. This current study was dealing with some qualitative variables like religion, disaster management, and so on. Therefore, to understand the existing scenario the researchers adopted qualitative tools to capture respondents' perceptions, feelings, and emotions to meet the objectives. The qualitative section with a semi-structured interview schedule (see Appendix I-III), as well as interview guidelines, were used for the in-depth interview (IDIs), focus group discussion (FGD), key informant interview (KII) to accumulate in-depth data.

Further, to know the majority view regarding the objectives of the study the researchers have also conducted a social survey with a questionnaire. The purpose of this two-phase, descriptive mixed-methods study was to obtain in-depth information and understand how many people hold similar points of view. The unit of analysis of this study was those people who have been living in the study area for the past twenty years and experienced serious natural disasters like the super cyclone Aila in 2009. For KIIs respondents, the religious masters have given special priorities, especially those who have been staying in the study area for the past twenty years.

### *Data collection procedure*

The whole data collection process has been divided into two phases. At the beginning of the first phase, quantitative research questions (see Appendix IV) have used to indicate the relationship or comparison of the independent and dependent variables with participants at the research site. Through purposive sampling eight FGDs (two per village and four for male and four for female, N=25), six KIIs (three per religion), and eight IDIs have been conducted to attain the study objectives. Along with a checklist and an FGD guideline and a recorder, the primary investigator and his two note-takers have collected the qualitative data between November 2019 and April 2020. Though the checklist has been prepared in English, during data collection the conversation has to happen in a local language like Bengali to gather local respondents' perceptions and feelings regarding the study objective. Initial notes have also been taken in the local language.

In the second phase, this study has been used quantitative data to justify qualitative data to present the findings more accurately and the study objectives more logically. The number of households of Kailashgonj union of Dacope Upazilla was 3443 and the Koyra union of Koyra Upazilla is 7788 (Bangladesh Bureau of Statistics, 2014). By using an online sampling calculator with 4.5 confidence intervals and using simple random sampling 455 samples have been chosen to collect quantitative data. Again, two-third of the total sample have been distributed in Koyra union (Koyra 5no. village= 151 and Koyra 6no. village= 152) as it held a higher population size and one-third of the total sample have been distributed in Kailashgonj union (Kailashgonj village= 75 and Ramnagar village= 76). The mean age of the respondents was 46 years old (*SD* 13.5). Besides, 75 percent of respondents were Santayana religious believers, and the rests of the respondents were Muslims. The mean family members of the respondents were about 5 (*SD* 1.5) and the average year of schooling was 7.44 (*SD* 3.5). Besides, the average income of the respondents was BDT 14,241/=, and the mean savings of the respondents was BDT 1,494/= . Most 67% of respondents' housing structure was Kacha, which floors were made of mud and the wall was made of bamboo and tin, and the roof was made of tin.

Moreover, data about respective concepts have been collected by incorporating relevant items in the structured and semi-structured interview schedule and analyzed to comprehend the objectives of the study. This survey has conducted between May 2020 and January 2021. To collect survey data a group of data collectors has been hired from the study areas who were tertiary level students. All data collectors have received two days of training on data collection procedures and ensure ethical stands. Like the qualitative phase, the survey questioner has been prepared in English but during the data collection, the data collectors have asked the questions in their local language.

### *Instruments*

To know the role of religion in disaster management, each of the questions from the checklist, FDG guideline, and questionnaire have been prepared with key emphasis to three-phase of disaster management, i.e., pre-disaster, during the disaster, and post-disaster phase. The role of religious institutions in disaster management has been captured via asking the religious institutional role and activities during a disaster, pre-disaster, and post-disaster phases in the study area. The religious master's role in disaster management has been revealed through religious master's activities in the three-phase of disaster management and particularly the KII and IDI were used to accumulate these religions'

specific information. To examine how religion shapes local people's coping strategies. The researcher has tried to capture respondents' perceptions about religion-based financial aid, early warning, and other coping strategies.

#### *Data analysis and presentation*

Though the accumulations of qualitative data through FGD, KII, and IDIs have happened in the local language the transcription has been made in English. The researchers have paid special attention during translation between Bengali and English. After the transcription, the principal investigator along with his research assistants have categorized the responses and identified the quotes relevant to research objectives. The whole quotes have been presented in this study under three sub-headings according to the research objectives. Saturated codes have been separated and exceptional codes along with mostly mentioned quotations have been included in the findings section to conclude. Similarly, though survey data have been collected in the local language the data entry in the IBM SPSS, the popular statistic software has been done in English. In the quantitative analysis, only descriptive analysis has been done to support the qualitative data.

#### *Ethical Consideration*

The study was consistent with the principles concerning human research ethics of the Declaration of Helsinki (World Medical Association, 2013), as well as following the guidelines for the responsible conduct of research of the Finnish Advisory Board on Research Integrity (2012). It was fully ensured the anonymity and confidentiality of the respondents. Respondents have been informed about the purpose and type of the study as well as their participation in the study will be voluntary.

### **Findings**

According to the objectives of this study, the findings have been organized under three subheadings respectively, the role of religious institutions in disaster management, the religious master's role in disaster management, and local people's coping strategy from the religious point of view. The first section (sub-heading) has presented the different religious institutional role in the three-phase of disaster management. The next sub-heading has discussed religious masters as well as leaders' role in three phases (pre, during, and post) of disaster management. The last sub-heading of this study has discussed the overall local disaster coping mechanisms concentrating on the religious viewpoint.

#### *The role of religious institutions in disaster management*

According to the findings of this study, there were two types of religious institutions in the study areas. The first one was traditional religious institutions like temples, mosques and the second one was religion-based associations. The findings of these studies indicate that during a disaster both of these institutions have played some specific role such as disseminating disaster-related news, acting as a primary support center, and a place of social integration.

#### *Disseminating disaster related news*

Firstly, disseminating disaster-related news which includes an early warning, emergency preparation, emergency responses, and so on. Through this study, it has been found that very few (7%) respondents have received disaster-related news from religious institutions (Figure 2). In an in-depth interview, a respondent emphasized that,

I am sure, before the Aila, I have heard that some young people were calling us to take shelter on the embankment through using the mosques' mike. (Nomita Roy<sup>1</sup>, 52 years, IDI-5, Dacope)

Similarly, another respondent said that,

The mosque has conveyed disaster news to us and the Imam (the religious leader) have encouraged us to take shelter in the cyclone shelter through mike. (Nibedita, 34 years, FGD-01, Koyra)

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<sup>1</sup> Pseudonyms have used throughout the paper.

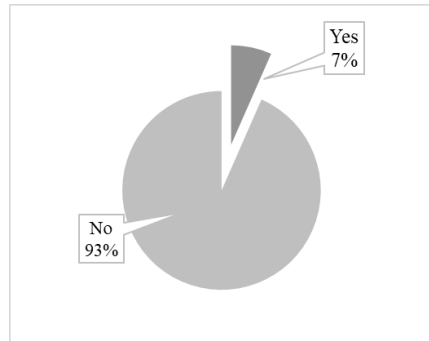


Figure 2. Percentage of respondents' opinion on religious institution providing them disaster news. (Field survey, 2020-2021)

However, the findings of this study revealed that most (93%) of the respondents did not receive any disaster-related news from religious institutions (Figure 2). On this point, a respondent uttered that,

Our mosque's infrastructure is not good. Though we have two mikes but lack of electricity maximum time it was remained unused. And our hujur's (religious leader) hometown is far away from this area. Since he did not know much about the nature of disasters in this area, he failed to aware us. Interesting matter was that, we had come forward to assist him, during the Aila (2009). (Rafique, 63 years, IDI-03, Koyra)

Supporting others on this point a respondent mentioned that,

I think, not only me but also other people in this area ever get any kind of disaster related information from our religious institutions. I don't know how religious institution can provide disaster related information. I think it is government's responsibility. (Sujit Mondal, 58 years, IDI-7, Dacope)

Through this study, it has been found that different factors have influenced religious institutions to disseminate disaster-related news to local people from religious institutions. For instance, religious master's disaster-related knowledge and previous experience, residential location, and availability of resources like electricity to run mike.

#### Religious institution as a support center

Another role of the religious institution has found through this study was the disaster-related aid support which comes in the form of pure drinking water (2.9%), foods and clothes (58.9%), cash (15.4%), only food (22%), and undefined humanitarian support (0.9%) (Figure 3). From figure 3, it is also clear that among all these aids, mostly cooked food and drinking water was very common. On this point, a respondent mentioned that,

There is a deep tub-well in the mosque and many villagers used this water for drinking purpose. During Aila (2009) these tub-well was the primary source of drinking water of our neighboring areas. (Abul-Basar, 63 years, FGD-2, Dacope)

Similarly, another respondent said that,

Our temple has gotten about 1-ton rice and wheat from the government after Aila (2009). It also got cash from government which allocated to the poor people and the also for its infrastructural development. We have received some. Our neighbors also received some relief from those funds. (Momota Rani Mondal, 24 years, FGD-3, Dacope)

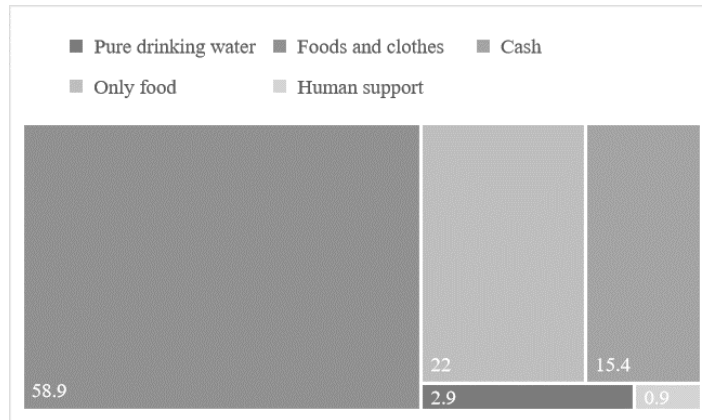


Figure 3. Percentage of different type of supports received by the respondents from the religious institutions. (Field survey, 2020-2021)

Likewise, a respondent mentioned that,

...After natural disaster, I have seen, they [religious institutions] in our area providing support such as foods, clothes etc. Though I don't expect any support from them, because of their unequal distributions, which is not enough according to the demands but these institutions try their level best to help the disaster affected people... The religious institutions generally get financial aid from government, political leaders, and collection from general people. (Heron Kumar Da, 52 years, IDI-01, Koyra)

Moreover, this study found that, in some area people have used their religious institution as a cyclone shelter. Here, most of the respondent at social survey agreed that there was no religious barrier to take shelter in a religious institution during a disaster (Figure 4). On this point a respondent said,

During Aila (2009), I have taken shelter to my nearest mosques... there was no barrier to take shelter on the mosque in our area because all religion promotes humanity not cruelty. (Khairul Shikdar, 55 years, FGD-06, Koyra)

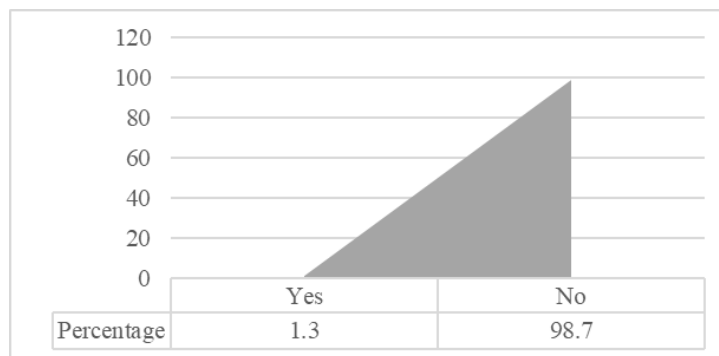


Figure 4. Percentage distribution of responses on religious barrier during taking cyclone shelter in a religious institution. (Field survey, 2020-2021)

Unlike them, another group of respondents also found who have not received any notable aid from the religious institution. Durga Vaskor Roy, a 78 years old 2nd IDI respondent who lives in Koyra, stated that religious institutions do not play any significant support during any disaster except some early warning. Similarly, a FGD respondent said that,

No relief has come from any mosque or temple rather than the villager's collect money from the village to reconstruct the mosque. (Aklima, 32 years, FGD-1, Koyra)

Howsoever, most of the respondents did not receive any financial aid from the temple and mosques in the study area. The respondents have not perceived that it was religious institutions duty to provide their any relief during or after a disaster. On this point a respondent mentioned that,

The religious institution did not provide any financial or another support to the disaster affected people because it had no sufficient resource moreover it also depends on the help of others. (Motiar Rahman, 55 years, KII-1, Koyra)

Another respondent mentioned that,

...I do not get any support from temple/ mosque. Additionally, I don't get any basic requirements from religious institutions after facing any sever disaster. But my expectation is that the person who lost his/her home at least they deserve some instant help from religious institutions after occurring disaster, since generally we all provide different support to these institutions. And they always have some fund which should have spent for human kind. (Anila, 50 years, IDI-08, Dacope)

Among all the respondents, some respondent (6%) mentioned that instead of religious institution there were a religious association in the study area via which they used to support disaster affected vulnerable people. One of the members have said that,

We had a religious organization named "Natonarayan Mandir Sangathon". In this organization we meet together three to four times in a year to make fund and decision. This organization tries to find out the old and disable people during the disaster and search the house having little food and water to supply them dry food, water and basic Medicare. (Plabon Roy, 32 years, KII-3, Dacope)

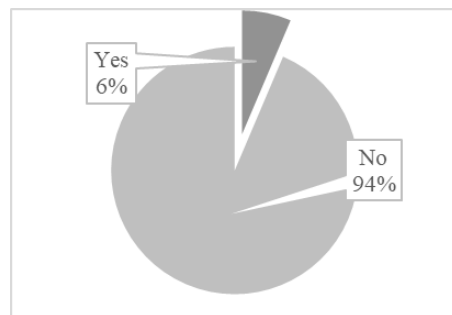


Figure 5. Percentage of respondents who have received some relief from a religion-based association in the study area. (Field survey, 2020-2021)

The findings of this study have revealed that religious institutions as a social support plays a significant role in mostly post disaster phase. This institution plays a symbol, based on which one group of people deliver different social supports and the other group used to receive it.

#### Social integration role of religious institution

Through the social survey most of the respondent (89.2%) negatively responded on social integration role of the religious institution whereas only 10.3% respondents have agreed positively (Figure 6). From their perception religion has an active role in bringing people together which helps to cope with disasters. For instance,

I think that the religious activities have impact on community integration. Because religion teaches us to be assembled with community and mankind is a great virtue. The religious value encourages rich people to assist poor people such motivation can make an equilibrium in our society...such values drive people to assist one another even in the crisis moment. (Abul-Basar, 63 years, KII-2, Koyra)

Similar views also found in another respondent's opinion,

...Religion helps us to be assembled with community and overcome critical situation collectively. (Heron, 35 years, FGD-02, Dacope)

Another respondent mentioned that,

Through day-to-day worship program, people used to gather in one place and exchange their feelings. Take care of each other which lead them to be intimated with each other...especially in the Friday most of the Muslim people along with the children assemble together to pray... similarly I have also seen the Santayana religious people in our community worship together.... In such manner the community bonding used to increase which may help people any crisis moment. (Mr. Washim, 52 years, KII-4, Dacope)

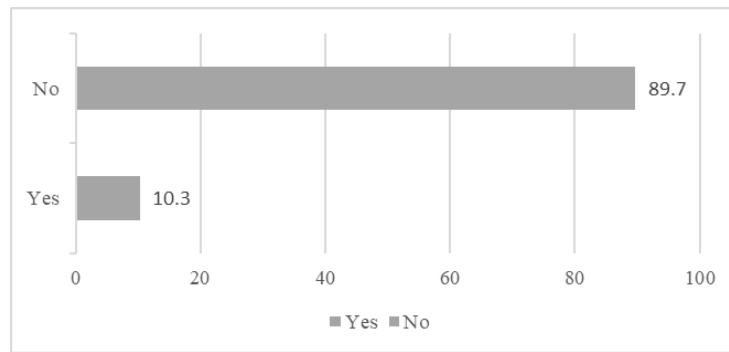


Figure 6. Percentage distribution of respondents about social integration role of religious institution. (Field survey, 2020-2021).

In term of social integration role this study found two perceptions from two group of people. One the one hand, one group of people who did not believed that religious institution has a significant role in social integration during disaster which is very important to do resilient local communities. On the other hand, another group of respondents who were mostly religious masters as well as leaders strongly believed there were a special role of religious institution to increase social integration in local communities.

#### *Role of religious master's in disaster management*

The findings of first phase of this study present that in the study area the religious master's used to play multidimensional role in disaster management. Notwithstanding that at the second phase it was found that most of the respondents (87.5%) have responded negatively about the role of religious master in disaster management (Figure 7).

However, through first phase it was found that raising awareness was very common role that highlighted by most of the respondents which also supported by 12.5% respondent in the second phase. One of the specific points was that some religious masters in the study area were also member of the village disaster response committee. On this point a respondent mentioned that,

The Imam Shaheb (Muslim religious master) of our area used encourages, and motivate the general people to hold their confidence during any disaster. Each weekend he also gives some speech focusing on disaster related preparation. As a Moajjin (assistant of the religious master), I used to provide the disaster news to the villagers through the mike of the mosque. (Abul-Basar, 63 years, KII-2, Koyra)

Similarly, another respondent said that,

Our Thakur (Santayana religious master), used to convey disaster news and motivate us not to do immoral activities. Thus, we can save ourselves from the disaster...the Thakur used to take incentive after finishing worship. (Momota, 36 years, IDI-04, Koyra)

Sometimes, instead of religious masters some religious leaders used to come forward to assist the vulnerable people. On this point a respondent mentioned that,

Before any natural disaster, the members of our association, Natonarayan Mandir Sangathon, come forward to warn people and raise awareness among the people. Take people to the cyclone shelter. Reconstruct the embankment and houses... During Aila (2009) our organization have raised handsome amount of fund through using our personal link and constructed 100 cyclone resistant houses in our area. (Plabon Roy, 32 years, KII-3, Dacope)

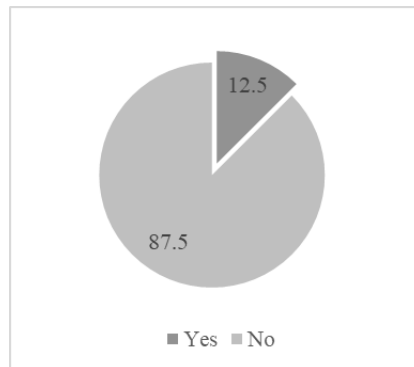


Figure 7. Percentage distribution of respondents' opinion on role of religious masters in disaster management. (Field survey, 2020-2021)

Likewise, through this study the leadership role of religious masters also found. For instance, Mr. Washim, 52 years old religious master and 4<sup>th</sup> KII respondent, have mentioned that he used to try to integrate the community people to combat a disaster collectively. Though they did not work organizationally, they have tried to support the poor people as much as they can. On this point a respondent elaborated that,

In our area, most of the time our *Imam Shabeb* lead and motivate us to involve various social services. Like, last year we have involved in reconstruct two vulnerable people houses. Each of our community members has taken part to these activities. Some have given money and some have given labor. And this way the poor family's vulnerability has been minimized. (Atikur, 57 years, IDI-06, Dacope)

On the same point another respondent stated that,

People used to obey religious masters without any questions. So, a religious master can use these people in different ways under their leadership social reconstruction and inter-personal communication can be build and rebuild which can be helpful during any disaster. (Nomita Roy, 52 years, IDI-5, Dacope)

Moreover, providing psychological support by the religious masters was another notable role found in this study.

Religious leaders encourage us to faith in God as he [Almighty] will save us from the disaster. At first, I consider same things after getting disaster news from any source; these are making consciousness, creating mass awareness etc. Such psychological support generally creates a hope among the people. (Heron Kumar, 52 years, IDI-01, Koyra)

However, the findings of this study also reveal that in some areas the religious masters did not do any significant contribution not only the disaster management but also to community members. For instance, conceding other FGD members, a respondent has argued that,

The *Imam Sabbeb* in our village did not play any significant role in disaster management. They did not try to aware people, confront disaster news, and help others perhaps, they eventually did not consider anything for the helpless which they could do without any difficulties. Even they have forced people to reconstruct mosques with the help of relief funds which is purely unethical. (Mr. Rahman, 55 years, FGD-03, Koyra)

Similarly, conceding other Mrs. Anila, 50 years of 7<sup>th</sup> FGD member of Dacope have said that the religious leaders have hardly contribution to help them during a disaster. Religious leaders don't motivate or integrate the community people to combat a disaster collectively during disaster. According to her, the religious masters as well as leaders only busy at taking care of themselves and their needs. Nevertheless, the contribution of religious masters in different phase of disaster management cannot be ignored. The findings of this study indicate that based on religious master's experience and knowledge they used to exercise their power in any crisis moment.

*Local people's coping strategy from religious point of view*

Pattern of belief toward natural disaster

Human perceptions in any events are different from one another. Toward natural disaster, it also differs from each other. In a line with this view, the findings of this study show that some respondents considered disaster as a curse of the God for their wrong deeds. For instance, one respondent mentioned,

It is known to all that Allah used to control the natural disaster. In order to keep people in right path, the natural disasters are happening in different time. In our holy book we also found it. When we do not lead our life according to religious code of conduct and frequently violate the religious norms, natural disaster came from God as his order to punish the people. (Ashikur Rahman, 55 years, FGD-04, Dacope)

Similarly, another participant stated that,

...The Cyclone Aila (2009) was a consequence of our mal-activities...before Aila people forget about the God and involved different harmful activities to the society and so to do check and balance Almighty given this disaster to us. (Abul-Basar, 63 years, FGD-08, Koyra)

Supporting above a religious leader has stated that,

Religion is useful for disaster management. Religious activities such as praying, reciting holy books are helpful to reduce stress of the believers during disaster. (Mr. Washim, 52 years, KII-4, Dacope)

The findings of this study also present that after a tremendous natural calamity, the religiousness among the common people used to increase. For instance, a respondent mentioned,

Previously, I did not perform religious function like prayer regularly, but after Aila, I am performing religious activities regularly. Now, I am a Moajjin (assistant of religious master) of my village mosque. (Motiar Rahman, 55 years, KII-1, Koyra)

In a line with this view, the findings of this study indicate that in some study area the community used to organize collective worship to protect them from any natural hazard. On this point a respondent mentioned that,

To control disaster, the villagers organize collective worshipping ceremony and try to make the Thakur (God) pleased. Thus, minimum extreme natural events can take place in our area. After Aila (2009) you can see none of such extreme calamities happened in this area. I think Thakur pleased on us. (Pakhi Ghosh, 24 years, FGD-07, Koyra)

Role of holy books on local coping mechanism

The findings of this study also present that most of the respondents believing pattern regarding disaster used to shaped by the holy books. Most of the respondents (82.2%) used to believe such activities generally assist them to remain calm during any crisis moment (Figure 8). For instance, a respondent said that,

After reading my religious books (Santayana religion), I have come to know that all disaster is controlled by specific god and goddess. If I can make them happy through honest worship. Then, to some extent, I will be safe. (Prya, 27 years, FGD-05, Dacope)

Supporting Pray another member of same FGD utter that,

I believe God himself enforce the disaster to control the creation and God stop the disaster after showing his power. I depict 'when we pray to God during disaster, it is true that the losses of the disaster become low'. I believed the God Mohadev (God of Hindu religion) who control the disaster and I believed only Mohadev can keep us safe from the disaster. Because I am also read it in our holy books and all verses in the holy book have said by the God himself. (Simato, 31 years, FGD-05, Dacope)

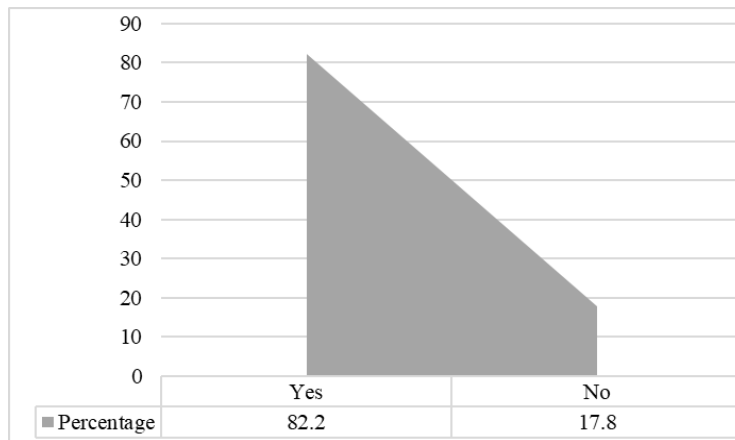


Figure 8. Percentage distribution of respondents who believed religious code can reduce their mental stress during any crisis moment. (Field survey, 2020-2021)

Similarly, another respondent mention that,

Natural disaster given by the god and the human and the creature are also saved by God from disaster and human being has no control over it. (Rafique, 63 years, IDI-03, Koyra)

The holy books as a religious symbol placed a special role in disaster management. The findings of this study show that, during a disaster female respondent both in Santayana and Islam religion used to recite holy book. For example, Rohima Begum, 41 years old, FGD respondent of Dacope said that she strongly believes that holly book alleviates mental tensions in a disaster. From her faith on God, during Aila (2009) she used to recite her religious holy book again and again. And she believed that her losses in the super cyclone was minimum compare to others. Similarly, another FGD respondent said that,

During Aila (2009), I had used to recite Ramayon. And I found my house safe and sound when I came from the cyclone shelter. (Subita, 39 years, FGD-03, Koyra)

Besides this, most of the respondents feel calm and confident through reciting holy books during any natural events. In a line with this perception Karim Sheikh, 67 years old FGD respondent of Koyra, added that reading holly book could reducing his pain. According to him this is the “Liberation in faith” which he meant the power of believe. He also added that his religious practices make him confident. From his point of view, most of the community members did not perform any activities to increase his confidence for disaster management. He has believed that such positive attitude is necessary to manage any disaster.

#### Social supportive role of religion in disaster management

The findings of this study show that religion usually encourages people to support others and such social supports can contribute a lot in any disaster management. On this point a respondent expressed,

I believe during disaster, helping the helpless people means helping the God and God becomes pleased and it is considered as a great chance to come closer to the God. I believe during the disaster, to become stress free pray to God is a mandatory task. (Mr. Shobuj Ahmed, 32 years, FGD-06, Koyra)

For reducing disaster risk, many religious activities are also seen in this area which is helpful to increase social solidarity among the community people. Religious activities and practice differ from religion to religion. In Muslim religion milad-mahfil (a religious concert) and so on were arranged whereas, in Santayana religion, they recite Hary Krishno, Hara Krishna, Kriishna, Krishana Hary Hary (one of god’s name in Santayana religion) or different types of religious doctrine One of the respondents explain that,

We arrange milad and doa-mahfil (Muslim religious program) to make our god happy. We pray help to Allah during this activity. Through this collective actions Allah may please on us. (Abul-Basar, 55 years, FGD-07, Dacope)

Another participant belongs to Santayana religion stated that,

Montro (specific religious quote), Jogya (Specific religious activities), Kalipuja (Worship to Goddess Kali), Monasapuja (worship of snake goddess), giving vog (sacrifice food) to the river are the religious activities we used to perform during a disaster. (Putul Rai, 24 years, FGD-01, Dacope)

Likewise, another respondent mentioned that,

...When cyclone happened, I call Gangadebi (river Goddess) and worship to the Pabandebota (air God). I also called Ramshita (God and Goddess) ...which make me mentally strong and reducing disaster loss. (Biswnapada, 40 years, FGD-08, Koyra)

#### Role of religious symbol in disaster management

The findings of this study show that different religious symbols have been worshiped by most of the respondents of this study. Though people of the study area were not aware about the significance of these symbols in disaster management, during disaster it has evident that these religious objects have protected life and property. For instance,

There is a banyan tree beside my tea stall. There is also a stone under the base of the banyan tree. People from different village come here and keep money, sugar, milk and so on to keep happy of their god. However, during Aila (2009) because of this tree in this side the embankment has not broken and the houses were safe. (Rafique Talukdar, 63 years, IDI-03, Koyra)

Likewise, some people used to recite some specific religious quotation to them from a natural event. Motiar Rahman, 55 years old 1st KII respondent of Koyra, said that,

I used to recite darudsharif in the time of disaster. I don't know if it is useful or not but it gives me intensive mental strength. (Motiar Rahman, 55 years, KII-1, Koyra)

Similarly, one of the respondents said,

I usually recite doa Younus during disaster. I learnt it from our Imam Shaheb. Besides it, I also recite Azan during a natural disaster which I learnt from my grandfather. I think it works well. (Atikur Rahman, 57 years, IDI-06, Dacope)

The finding of this study also shows that, sometimes respondents used to vest themselves to the god and believed that in such manner they can save their family members. On this point a respondent mentioned that,

During Aila (2009), I was remembering the name of mu almighty and praying to almighty frequently. I have prayed like "Hey God! I am offering my life to your hand; it's your time to save me and my surroundings. (Durga Vaskor Roy, 78 years, IDI-02 Dacope)

Through the social survey it was also found that about half of the respondents have supported such perception in the study area (Figure 9). Some respondents of this study, like Anila, believed that disaster make their faith on religion strong. She expressed as,

...But my religious knowledge might help me control disasters such as before occurring disaster I am praying much more than the normal situation such as call the Almighty repeatedly and again as well as read the holy book "Geeta". Even after just getting knows about the disaster, at first calls my almighty to save my life. (Anila Mitra, 50 years, IDI-08, Dacope)

The findings of this study also reveal that immediate after a disaster most of the respondents have done a thanks giving prayer from their own ways. At the community level *Miladmahfil* was very popular form of thanks giving religious ceremony of the Muslim people.

After disaster, some changes are seen in religious activities. Some people thanks to God by doing prayer, worshipping, *milad* and so on. Some people donate money and devote committed materials which they decided during the disaster to be stop and prevent loss of their wealth. (Ataur Rahman, 47 years, FGD-04, Dacope)

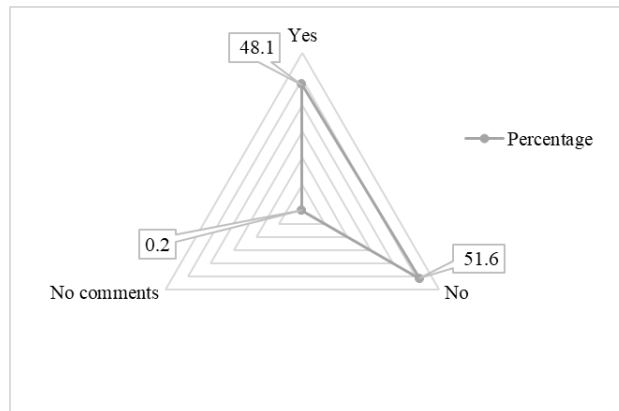


Figure 9. Percentage distribution of respondents whose religious value have changed after the super cyclone Aila in 2009. (Field survey, 2020-2021)

Similarly, another respondent mentioned that,

We collect money and worshiping materials from the villagers after disaster and do worshiping with the help of a *purohit* (religious master). (Oshim, 37 years, FGD-05, Dacope)

This study also found that female respondents also try to express they're thanks to God in their own way. For instance, Asma Begom said,

We arrange *talim* (gathering for religious knowledge sharing) within our village for spreading religious messages, but after the super cyclone (2009) we have failed to organize it for three years. Notwithstanding that now we are used to arrange it regularly... After Aila (2009) when we (women) have first meet for *talim*, we have prayed to Allah and given thanks to him to protect us. (Asma Begom, 45 years, FGD-08, Koyra)

Role of religious symbol in disaster management, according to the findings of this study, generally happened in three phases of a hazard. But these roles generally happen unconscious behavior. Controlling stress and increase of courage was another important role of religious symbols and practices shown by the findings of this study.

#### Religion's role on climate induced migration

The findings of this study also show that in the post-hazard phase international migration also happened based on the religion. On this point a respondent mentioned,

from my neighborhood, after the super cyclone Aila I have seen some Santayana religious people have migrated to India. It seems to them as India is a country of Santayana religion and here, they were depriving of basic needs. Some people have relatives in India and after the super cyclone Aila they have gone to their relatives. (Firoz Ahmed, 39 years, FGD-06, Koyra)

Similarly, another respondent said,

After the Super cyclone Aila, some of my family members have gone to India for five years to seek livelihood. (Nomita Roy, 52 years, IDI-5, Dacope)

#### Role of religion on the upper-class people to disaster management

Although few people (19.3%) in the social survey received the upper-class people's aid in the super cyclone Aila (Figure 10). But in the first phase findings of this study depict that rich people used to play an active role in local disaster coping mechanism. For instance, during a natural calamity most of the rich people come forward to assist poor people from their moral concern. But from the religious point of view these activities is a mandatory task of the upper-class people.

During Aila (2009) in our area Mr. A (one of the richest persons of this study area) have opened his door and made his home as a primary cyclone shelter. Besides, he also given us food and cloths as much

as he can...I think he have done this not for humanity but for fear of God. As he is a pious man as per my knowledge. (Heron Kumar Mondal, 52 years, IDI-01, Koyra)

Similarly, another respondent mentioned that,

In our religion, Allah ordered the rich people to donate to the poor and vulnerable people not as aid but as a right. I am confident that in a disaster management such philosophy can contribute significantly...Even after Aila (2009) I have seen a huge amount of aid and relief have come here in the form of Zakat. (Abul-Basar, 63 years, KII-2, Koyra)

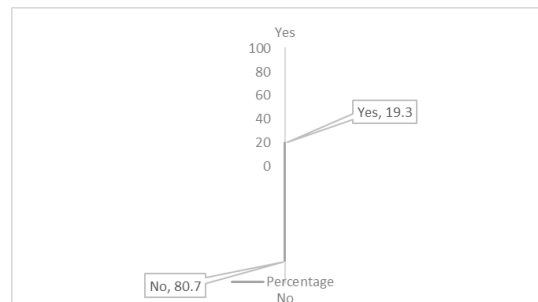


Figure 10. Percentage of respondents who have received the upper-class peoples aid during the supper cyclone Aila in 2009. (Field survey, 2020-2021)

## Discussion

Over the past few years, building a resilient community for any crisis management has gotten its popularity both in the national and international spheres. Therefore, several international frameworks and legal instruments like SFDRR are used to emphasize understanding cultural aspects apart from political, economic, and geographic aspects (Roy et al., 2023). In a line with this view, applying the mixed approach of data collection this study has tried to describe how different religious institutions, religious masters, and religious codes and customs govern people in three phases of disaster management.

However, through a systematic review and meta-analysis, Sheikhi et al. (2021) have found a significant role of religious institutions in terms of early responses and taking part in the recovery phase. Similarly, Paulson and Menjivar (2012) also explored the popularity of religious institution-based relief distribution in India. Supporting these earlier studies, this empirical also reveals that religious institutions in southwestern disaster-prone coastal areas not only take part in early responses and recovery phases but also religious institutions play the role of the support center. Especially, collection and distribution of relief in the post-disaster phase were also found in the study of Mohit et al. (2013) and Ha (2015). Nevertheless, unlike other studies, most of the respondents (93%) did not agree on the role of a religious institution in preparedness and mitigation efforts due to a lack of sufficient resources in the religious institutions.

According to Ibrahim et al. (2019), the cause of non-response to early warning of the southwest coastal areas the local people was due to having mistrust on modern disaster management system and having deep faith in religion. In that case, the findings of this study can guide the policymakers for future planning. For instance, religious institutions often act as a shelter was another important finding of this study which was hardly presented in earlier studies. But to gather people in one place in any crisis period was not so easy especially in those areas where the follower of different type of religion lives together like Bangladesh. Notwithstanding that this study has found most of the respondents (98%) have agreed that during a disaster there was no religious barrier to take shelter in religious institutions. From this viewpoint, through this study, it can be recommended that religious institutions can be used as a shelter and it would be easy to encourage people to take shelter in religious institutions.

The findings of this study also revealed that in terms of receiving financial aid most of the respondents supported the religion-based association rather than institutions. The result of such query indicates a lack of coordination between religious institutions and religion-based associations since about 98% of respondents did not believe religious institutions can play a significant role in social instigation. According to Ha (2015) using religious believes and systematic coordination between local government and various religious institutions can be developed a resilient disaster management program in those societies where the multi-religious people live together. Similarly,

most of the respondents of the KII through this study have recommended doing integration between various religious institutions and government organizations.

Howsoever, the findings of this study further present multiple responses about religious master's role in disaster management. Though the majority (87%) of the respondents did not believe that religious masters have a direct role in disaster management, most of the respondents of KII and IDI believed that raising awareness was a very common role that used to practice by religious masters in the coastal areas. Besides, some latent roles like encouraging upper-class people to donate to vulnerable people and assisting local disaster management committees via giving advice were other important findings. Some earlier studies (i.e., Ensor, 2003; Hope & Jones, 2014; Yari et al., 2019; O'Connell, 2018) have emphasized that religious masters generally lead people to grow fatalistic beliefs which discourage people to do disaster preparedness behavior. But, in this study, no such evidence has found that religious leaders have created any fatalistic beliefs among the respondents. Conceding Call (2012) and Hussain et al. (2014) findings, that in some disaster-prone areas religious masters are generally considered as divine individuals by the local people, this study also evident that religious masters have a very low impact on the southwest coastal areas except some oral motivation.

Coming to religious influence on local people's pattern of beliefs, the findings of this study found most of the respondents believed disasters happen because of their misdeeds. Like O'Connell's (2018) study, this current study also evident that the religious masters in southwest coastal areas of Bangladesh have a significant influence on people's understanding regarding the cause of the disaster. However, this study also found that immediately after a disaster people become more religious than in the pre-disaster phase. After a disaster to increase faith in disaster and to express the faith in religion some respondents of this study have organized some religious concerts. Such findings indicate that religion plays a vital role in increasing collective consciousness.

However, to understand the role of holy books in disaster management this study has explored that most of the respondents (82.2%) believed that these religious objects play a vital role to make them calm in any crisis moment. Likewise, Aten et al. (2019) and Sheikhi et al. (2021) also mentioned that the religious code and practices have a psychological role in a crisis moment. Similarly, this study also explored that religious values have grown moral concerns regarding disaster management which can be characterized as the social supportive role of religion in disaster management. Unlike many other studies, this study found a notable role of religious symbols in disaster management. For instance, about half of the respondents have believed that during a disaster reciting sacred words has helped them to increase their mental strength. Through building resilience these findings do not have a manifest impact but for crisis management, this finding can give a direction to provide victim support in a natural event.

Moreover, this study partially found the role of religion in climate-induced migration. Since very few respondents have discussed this issue so this study failed to draw a strong conclusion on this point which can be one of a limitation of this study. Therefore, it would be recommended to do further study on this statement. To understand the power of religion in disaster management it also found that religious code and practice make rich people donate their surplus wealth to vulnerable people which have an important contribution to local coping mechanisms that did not highlight in the study of Garai (2017). Overall, this study has revealed that religion makes people do different types of activities associated with disaster management in the southwest disaster-prone areas of Bangladesh. Most of them happen unconsciously but can play a significant role to increase capacity to do a community-based disaster risk reduction intervention.

## **Conclusion**

In conclusion, it has been clear that religion as a cultural element has a significant influence on the local coastal people of Bangladesh which can strengthen the local disaster management strategies. Certainly, social support and collective responses are so important to manage any crisis. On this point, this study has highlighted the social supportive role of religious institutions in a natural event. Similarly, the leadership role is another important role that needs to guide people to meet any challenges. In a line with this perception, this study also found that religious masters and leaders have a significant role to motivate people to deal with the immediate shock of a disaster. Remaining psychologically strong is also very important to manage any natural hazards. In a direction with existing literature, this study also found the most important role of religious code, value, and practices to enhance coastal people's psychological strengths in any natural events.

Besides, increasing collective consciousness, uniting people under one umbrella, and increasing the sense of moral responsibility is also important findings that can help people to reduce their vulnerabilities. In terms of

community-based disaster risk reduction interventions, these findings can guide policymakers to understand the importance of integration between religious elements and different development organizations. Such a collaborative approach can build resilience among the local communities. However, this study also highlighted that based on religious master's knowledge and experience they used to serve their societies but still they have a notable influence on society. So, it would be recommended that if some knowledge enhancement programs can be launched in the coastal areas regarding disaster management with key emphasis to religious masters, then these groups of people can contribute more to the local disaster coping mechanisms.

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### Availability of data and material

Upon request

### Code availability (software application or custom code)

Upon request

### Conflicts of Interest

The authors declare no conflict of interest.

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