

18. Challenges of Artisanal Fishermen: A Case Study from Sonadia Island, Bangladesh

Md. Mizanur Rahman^{1*}, M. Aslam Alam², Md. Moshir Rahman¹, Mohammad Mamun¹, Ashraful Alam³

¹Bangladesh Public Administration Training Centre, Savar, Dhaka

²Bangladesh Institute for information literacy and sustainable development, Dhaka

³ Offices of Upazila Nirbahi Officer, Saturia, Manikganj

*Correspondence: mizan_peroj@yahoo.com

Abstract: The southern part of Bangladesh is positioned on the orifice of Bay of Bengal and is abundant with marine fisheries' huge potential. Whereas marine resources are considered one of the essential sources of future economic development for many countries, Bangladesh is still lagging in this regard. The country cannot materialise full potentials of marine fisheries since more than 90% of fishers use artisanal fishing equipment, and the reasons behind being artisanal fishers are multifaceted. However, it is crucial to know the challenges of artisanal fishers in achieving Sustainable Development Goals (SDGs). This study explored the challenges associated with artisanal fisheries and finds out the solution to help achieve SDGs by providing recommendations. This study was conducted in one of the islands in Bangladesh's coastal area named Sonadia Island to unveil the challenges. Mainly primary data was collected through questionnaire and focus group discussion with the local government elected representative, fishermen association leader, representative of civil society and Upazila level government officials. Secondary data was used to analyse the regulatory and institutional framework. The targets of SDGs were aligned with the importance of artisanal fisheries and the rights of the fishermen. Piracy, local credit system, and complex market chain were identified as significant challenges. Pro-activeness of different government departments can improve the scenario drastically.

Keywords: Marine Fisheries, SDGs, Rights, Pro-activeness, Government Department

Introduction

Bangladesh is rich in fisheries having 475 marine species (Billah et al. 2018). This sector employs more than 17 million (full time and part time), around 11% of the total population (Department of Forest, 2016). Thus, the country has become one of the self-sufficient countries in terms of fish production.

Fisheries is one of the high growth sectors contributing about 3.6% of the total export earnings, 4.39% to the national GDP. Marine fisheries share 20-24% of total fish production in Bangladesh, where, >90% of marine harvesting comes from artisanal fishing (Billah et al. 2018). Fishes and Fishery resources play a vital role in improving the socio-

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economic condition through food security, poverty alleviation, creating decent works and earning foreign currency (Billah et al. 2018). This essential sector is highly affected by climate change, habitat destruction and other anthropogenic effects (Jackson et al., 2001; Diaz & Rosenberg 2008, Halpern et al. 2008). In Bangladesh's case, the situation is more disappointing because of the lack of policy implementation and law enforcement (Billah et al. 2018). The policy intervention is reflected in two ways: formulation of appropriate policies and implementing existing policies (Andrew et al. 2007, Pomeroy & Andrew 2011). There is an absence of an integrated regulatory and institutional framework in Bangladesh, and effective marine governance (Akhtar et al. 2017). However, the number of artisanal fishers is decreasing day by day in an alarming rate because of marketing issues, natural calamities and more involvement of commercial fishers (Rahman 2017). Thus, they are losing their income in one hand; on the other hand, they have to spend their lion share of income on food and clothing. They are facing enormous challenges during the fishing time (Akhtar et al. 2017).

Sustainable Development Goals (SDGs) put a high emphasis on marine fisheries and artisanal fishers. SDG 14 emphasises on sustainable use of marine resources for sustainable development. Most of the targets of SDG 14 calls for specific actions in regulating harvesting, ending over-fishing and providing access for small-scale artisanal fishers to resources and markets. The principle of Sustainable Development Goals (SDGs) is to ensure that no one is left behind. Artisanal fishers are considered to be among the most vulnerable people in the fisheries sector. Unless and unless appropriate consideration and action are taken, they will be potentially "left behind". Few studies were carried out in Bangladesh to examine the socio-economic conditions of the artisanal fishermen. The challenges, regulatory and institutional arrangements and alignment with Sustainable Development Goals (SDGs) have not been appropriately investigated. This study aimed to analyse and evaluate the socio-economic conditions of the artisanal fishermen, existing national legal and institutional framework. It also examined the challenges of this sector and mapped the targets of SDGs with artisanal fishers. The study will recommend for overcoming the challenges faced by this sector.

The Conceptual Framework of Artisanal Fishermen in Bangladesh

Artisanal fishers harvest fishes for their livelihood generation after generation by using traditional technique and equipment. Usually, they live in the coastal community learns conventional fishing techniques from one generation to other generation inheritably (Rahman 2017). Artisanal fishing indicates method and technique using for catching fish. Generally, it means simple traditional methods such as simple traps and traditional boats and equipment (Batista et al. 2014). However, small-scale fishing and artisanal fishing are not the same, always. The artisanal involves the degree of simplicity or tradition where the small-scale points to the fishery's size (Batista et al. 2014). Artisanal is a kind of subsistence fishing that provides food directly to the concerned family or community (Akhtar et al. 2017). It requires minimum capital and simple technology or traditional techniques prevailing generation to generation. Nevertheless, some definition represents both of the elements. Therefore, it will not be a good idea to differentiate between artisanal

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and small-scale fishing (FAO 2012). If economic condition permits, many traditional fishers are trying to use advanced technology for the fishing purpose. They have a mentality to adopt the latest technology, such as mobile phones, to improve their fishing capacity and reduce risk (Salia et al. 2011, Sreekumar 2011). Since the techniques of fishing of artisanal fishers are different from the industrial/large scale fishing, fish species, and ecological characteristics catching by them are also other. Generally, tropical traditional fishers catch diversify fish species, but most of them are a small adult in size (Batista et al. 2014). In Bangladesh, the artisanal fishermen harvest fishes within a 40-meter depth from the sea surface (Akhtar et al. 2017).

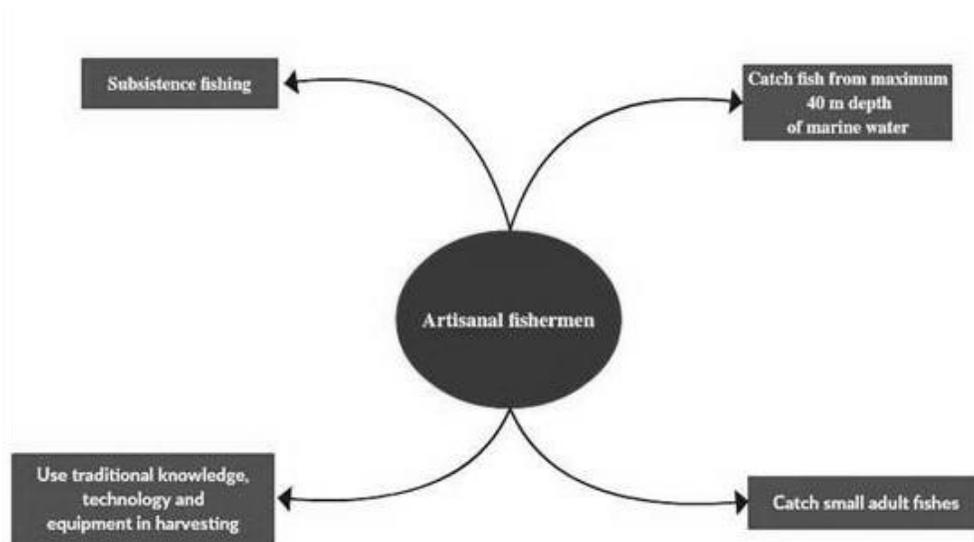


Figure 1: *Conceptual framework of artisanal fishermen*

Methodology

The study was mainly conducted based on primary data. Questionnaire survey and focus group discussion (FGD) are the means of data collection. However, secondary data was used to analyse the regulatory and institutional framework. Secondary data on relevant Acts, Ordinances, Rules, Policies, and Strategies relating to marine fisheries were collected from the concerned Ministries, Divisions, and Department websites. A total of 100 fishermen households were interviewed purposively using a semi-structured questionnaire at Sonadia Island under Cox's Bazar district. The Focus Group Discussion was conducted to know the real scenario of the artisanal fishermen's profession and sketch their inherent problems. Necessary information on the socio-economic condition of fishers was collected through observation and from local government offices. Collected data were analysed using statistical tools. The targets of SDGs were aligned with the importance of artisanal fisheries and the rights of the fishermen. The present study was conducted at *Sonadiadip* (Sonadia Island) under Cox's Bazar District, Bangladesh. *Sonadiadip* is a small Island which is about nine square kilometres (3.5 square miles). It is situated at the offshore of Cox's Bazar coast, the longest unbroken sea beach globally. Two thousand people inhabit

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this small Island. There is a myth behind the naming of this lucrative Island. It is locally believed that hundreds of years ago, a large sheep loaded with gold sank due to Portuguese pirates' attack. After that local people went for searching for gold and gradually the Island got its name as *Sonadia*. This crescent-shaped Island located about seven kilometres on the north-west of *Cox's Bazar*. This Island is rich in wildlife and natural beauty. The western coast of *Sonadia* Island is sandy, and the waves are bringing in colourful shells which always adorn the golden beach. This Island is the sanctuary of migratory birds. During winter, tourists flock here to see the migratory birds. Birds such as sand plovers, little stints, fantail snipes, avocet-sandpipers, grey plovers, black-bellied terns, geese, herring gulls, grey herons, cattle egrets, and yellow bitterns can be seen. Thousands of beautiful red crab is another main attraction of tourist of this Island. It is also a famous fish drying spot. The main occupation of the people of this Island is fishing and salt cultivation. Almost all the fishermen living on this Island are artisanal fishermen.

Results

Mapping of SDGs' targets with artisanal fisheries

Target 14.B states 'provide access for small-scale artisanal fishers to marine resources and markets'. SDG 14 specifies actions in artisanal fisheries, allows access to resources and markets and implements the UN Convention of Law of the Sea (UNCLOS). A number of 09 goals are highly aligned with artisanal fisheries. About 32 targets are linked to this sector. Artisanal fisheries sector was resonated broadly with SDGs-14, 8, 2 and 1.

Table 1: Aligning targets of SDGs with artisanal fisheries

SDG	Targets	SDG	Targets
 1 NO POVERTY	1.3, 1.4, 1.5, 1.B	 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	9.B
 2 ZERO HUNGER	2.1, 2.2, 2.3, 2.C	 12 RESPONSIBLE CONSUMPTION AND PRODUCTION	12.2, 12.3
 3 GOOD HEALTH AND WELL-BEING	3.8, 3.D	 13 CLIMATE ACTION	13.2, 13.3, 13.B
 6 CLEAN WATER AND SANITATION	6.2, 6.3, 6.6, 6.B	 14 LIFE BELOW WATER	14.1, 14.2, 14.4, 14.6, 14.B
 8 DECENT WORK AND ECONOMIC GROWTH	8.2, 8.3, 8.4, 8.5, 8.10	 16 PEACE, JUSTICE AND STRONG INSTITUTIONS	16.5, 16.6, 16.7
		 17 PARTNERSHIPS FOR THE GOALS	17.14

Regulatory and Institutional Arrangements

The artisanal fisheries sector is mainly regulated by ‘The Marine Fisheries Ordinance 1983’ and ‘The Marine Fisheries Rules 1983’. The safety and security have been described by ‘Coast Guard Act 2016’.

Table 1: Regulatory framework for artisanal fishers in Bangladesh

Title of the laws	Components about artisanal fishermen
The Protection and Conservation of Fish Act 1950	<ul style="list-style-type: none"> • definition of artisanal fishers, net, size of mesh and current jal • banning period • fish size to be harvested • provisions of framing rules
The Marine Fisheries Ordinance 1983	<ul style="list-style-type: none"> • definition of fish, fishery, vessel, local fishing vessel, and foreign fishing vessel • appointment of Director and such other fisheries officers • a delegation of power to directors • issuing licenses for all marine fishing • not interference in maritime navigation • provisions of framing rules
The Marine Fisheries Rules 1983	<ul style="list-style-type: none"> • the procedure of issuing permits for marine fishing • set conditions for issuing licenses for local and foreign fishing vessels • guidelines for local and foreign fishing vessels • the manner of storage of gear • inspection of fishing vessels • area for artisanal fishing
Abhaya Ain, 2018	<ul style="list-style-type: none"> • marine weather forecasting • provisions of framing rules
Coast Guard Act 2016	<ul style="list-style-type: none"> • to preserve the sovereignty of the geographical boundary • to prevent crimes • to establish rights over resources • to ensure maritime safety • to protect the adjacent land areas • to protect the national interests of Bangladesh
Disaster Management Act 2012	<ul style="list-style-type: none"> • to strengthen risk reduction to reduce the loss of life and properties at an acceptable level • to ensure humanitarian relief activities to the • affected people
Bangladesh Water	<ul style="list-style-type: none"> • the right to access water

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Act, 2013	<ul style="list-style-type: none">• access to drinking water and water for domestic usage
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The Department of Fisheries is responsible for assessing, managing aquatic resources and mandated for increasing fish yield. As a nodal department, they will coordinate other departments for upgrading the socio-economic conditions of the artisanal fishermen. Bangladesh Coast Guard is mandated to ensure the security of the artisanal fishermen and control piracy in the maritime areas.

Table 2: *Institutional arrangements for artisanal fishermen*

Departments	Mandates
Department of Fisheries	<ul style="list-style-type: none">• disseminates improved aquaculture technologies• offer extension services• facilitates arrangements for institutional credit for fishermen• facilitate alternative income-generating activities• formulates and implement development projects towards the sustainable use of fisheries resources, ensuring food security• issues certificates for the fishing vessels and identity cards for the fishermen
Department of Forest	<ul style="list-style-type: none">• issues seasonal passes and permits fishing in the mangroves wetlands
Bangladesh Coast Guard	<ul style="list-style-type: none">• protects from piracy• rescues during disaster• channelises meteorological weather forecast and alert
Department of Disaster Management and Union Parishad	<ul style="list-style-type: none">• Distributes food grains during short-term Hilsa fishing bans

Demographic Profiles

It was found that the socio-economic condition and lifestyle of the respondents were almost similar. The religion, educational status, house type, sanitation status, food habit, health condition, land ownership, occupation, monthly income, and expenditure follow a uniform pattern. It is found in the household that most of the family members are female. Male are mainly income earner, and they frequently go to sea for fishing. Sometimes, male go to sea for a month. Most of the household members found within 5-35 years age class.

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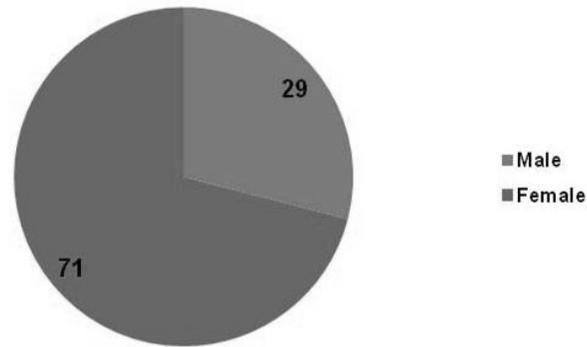


Figure 2: Gender composition of Sonadia Island

Socio-economic conditions

The inhabitants of Sonadia depend on fishing and salt cultivation for their livelihoods. A few people involved in firewood collection from the Para forest, fish processing, and the cultivation of cereal crops in the *Char* land. Almost all the houses (94.7%) are made by mud, bamboo, and *Chhan* (a local tree species) known as *Kaccha*. Only 2% of houses were Tin shed building. The absence of electricity indicates this Island is far away from getting citizen amenities. About 50% of household use the solar energy while 24.1% household use kerosene lamp, which is locally known as *Kupi* and rest of them use a candle for dinner time and go to bed earlier to save fuel. No health centre was established in the area to date. Sick people need to go *Moheskhali Upazila* by waterway which is 19 km away from this Island. Community people have to depend on medicine shop and medicine seller for their primary treatment and normal sickness. Local people claim that they do not get Vulnerable Group Feeding (VGF) cards. Only *Hilsa* fishers get 10 kg rice during banning time of *Hilsa* fishing. However, all the fishermen do not get this rice as compensation.

Literacy

The illiteracy rate was 96%, and only one man passed a Secondary School Certificate from this Island residing in the town.

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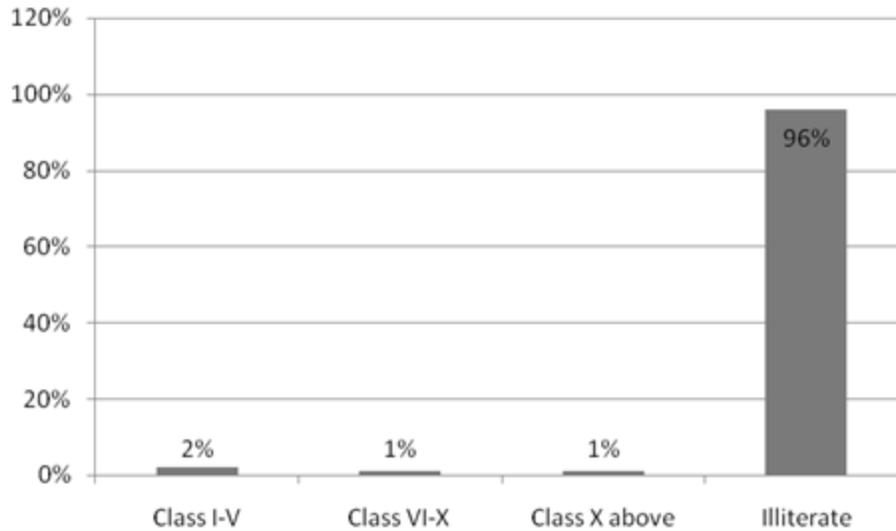


Figure 3: Literacy Rate of local people of Sonadia Island

The Average Income

Most of the fishermen's average income was 15,000 to 20,000 taka per month, and most of the family (77.3%) had a single earning person.

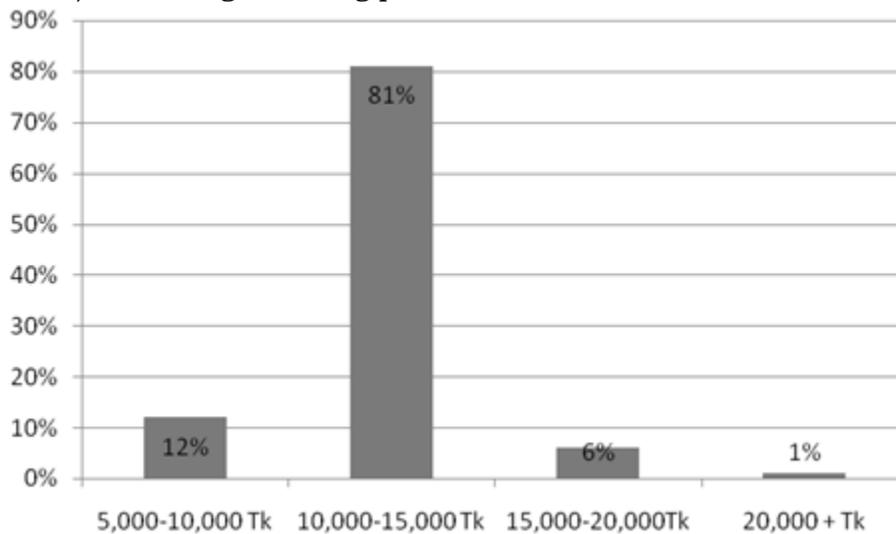


Figure 4: Monthly income status of artisanal fishers in the study area

Despite having difficulties in earning, most of the family (73.7%) installed tube well. However, the household of the study area's sanitation condition was extremely poor as only 1.9% household had a sanitary latrine, where 23.7% had semi *Pucca*. The rest of the toilet was *Kaccha*, but open defecation was not recorded in the study area. Community people do not have cultivable land as they mainly work for fishing and salt cultivation. Nevertheless, very few of them are involved in agriculture in Char area. Homestead vegetable production is very popular there though there is a high scarcity of open space. The land is *Khas* (government-owned fallow land) in nature.

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Ownership of Fishing Equipment

Despite fishing as the main occupation, very few had their boat and net for fishing. It was found that 73.1% of artisanal fishers do not have their boat and net and depend on others. They mainly harvest fish from the surrounding area of the coast. Most of the boats are shallow engine run (52%) while the rest is a country boat locally known as *Dingi*.

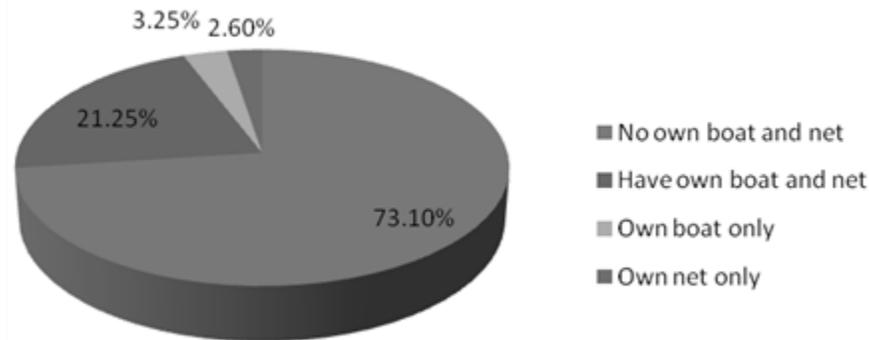


Figure 5: Fishing instruments having the status of fishermen in the study area

Most of the time fishermen do not know weather forecasting while they are in the sea. Before going to sea, they try to know whether forecasting from the land. Sometimes, they stay in the sea for a couple of days, and in that time they hardly know weather information. In the sea, there is no coverage of the mobile phone network.

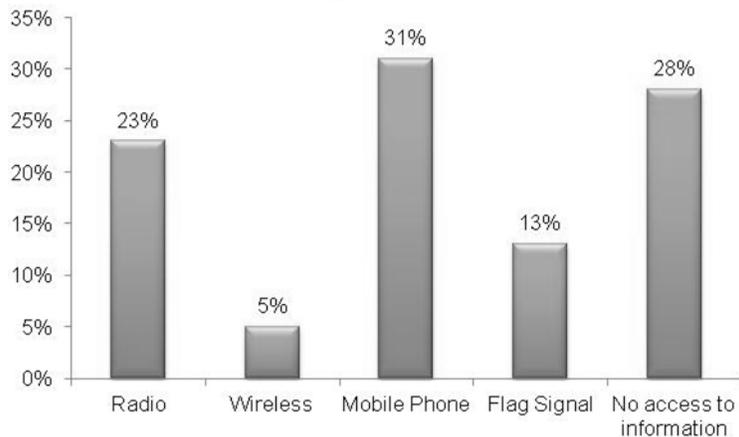


Figure 6: Medium of getting weather information

Fishers in the study area like radio to get authentic information and weather forecasting. Thus, radio is popular to them till now. Radio is the only way of knowing the weather forecast while in the sea. But a significant portion has no devices either for communication and entertainment (Figure-6).

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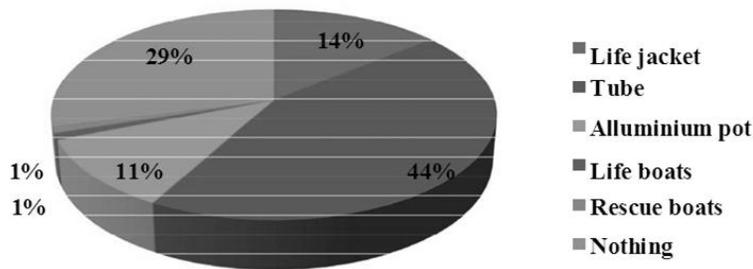


Figure 7: Safety measures during fishing

Only a few of the respondents keep life jacket during fishing in the sea. Most of them (44%) use tube and they feel comfortable to use it. Besides, some of them use a large aluminium pot, which is used for carrying fishes. A significant portion does not use anything as a safety measure (Figure-7).

Challenges

The respondents identified a lot of challenges in artisanal fishing (Figure-5). Piracy appears as the primary threat for the life and profession of the artisanal fishermen. The appearance of Burmese pirates poses a significant threat for the artisanal fishermen in the study area. They attack suddenly and loot fish and other valuable items. The local pirates sometimes involved in the kidnapping. Sometimes they kill the fishermen. The respondents reported that the Bangladesh Coast Guard is not proactive in controlling piracy. They do not have any formal channel to get the loan for improving their fishing techniques and technology such as a modern boat, nets, and equipment. Therefore, they have to depend on *Dadan* (a local credit system with very high interest) and *Mahajan* (the loan provider). The state banks have no activities in this area. The fishermen have to pay 100% interest in *the Dadan* system. The respondents reported that they get only 30% of actual price due to a complex market chain. They identified 07 classes of intermediaries like the collector, *majhi* (Captain of the boat leads the team in fishing or collection of fishes), *Chhota Mahajan* (traditional small moneylender and fish buyer), *boro Mahajan* (traditional big moneylender and fish buyer), *aratdar* (a commission agent for stocking and selling), wholesaler and retailer (Figure-6). In case of taking *Dadan*, the fishermen are bound to sell fishes to the specific *Mahajan* providing the loan.

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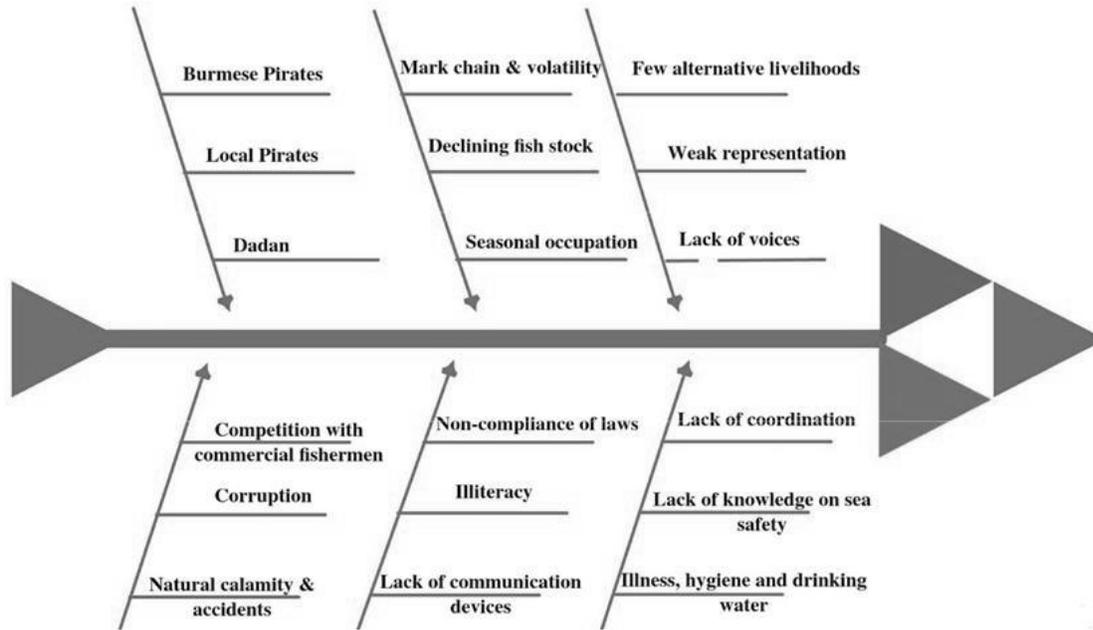


Figure 8: Fishbone diagram showing challenges identified by the respondents

The respondents stated that the Department of Fisheries does not improve their capacities; instead, they take a bribe during vessel registration and issuing identity cards. The fish stocks in the shallow water declined drastically due to invasion by the commercial fishermen. They push the artisanal fishermen back to the coast. The corruption and nepotism of the Union *Parisad* in food grain distribution during *Hilsa* banning period was reported.



Figure 9: Intermediaries in the market chain

Discussion

Most coastal area populations are involved in fishing with the country boat and traditional techniques (Hossain et al. 2008). Sonadia Island has become an attractive place for the migration of the fishermen in the winter season. It is very easy to harvest fishes around this Island (Uddin 2016). Even, the Island has a huge potentiality for the dry fish industry. In this study, the highest proportion of fishers was found with the age range of 15 to 35. Ibrahim et al. (2018) found similar results in three islands under Barguna district. The illiteracy rate was highly disappointing comparing to the national literacy rate. In the coastal Island, the literacy rate is lower than the mainland (Billah et al. 2018, Ibrahim et al. 2018, Rashed et al. 2016). Monthly income of the fishermen of this Island is almost similar to other islanders. Ibrahim et al. (2018) reported identical income at Atharo Gachia of Barguna district. The conditions of the houses and sanitation are reported the same at Bhatiari, Chittagong. Like Sonadia Island, radio is also popular among the artisanal fishermen in Chittagong coast (Akhtar et al. 2017). Another study revealed that piracy and invasion by industrial trawlers are the significant challenges for the artisanal fishermen. In addition, accidents, declined fish stock, sudden fall of fish price, a collision between boats, lack of formal training and boat without fitness were identified as the artisanal fishermen's challenges (Akhtar et al. 2017). The negligence and ill-treatment by the Bangladesh Coast Guard were reported in that study. The coastal areas of Bangladesh and ecosystems are highly affected by climate change (Rahman & Vacik 2014, Rahman & Vacik 2015, Rahman & Vacik 2016). Natural calamities will be one of the fatal challenges in the upcoming day for the artisanal fishermen.

The artisanal fishing is mainly regulated by 'The Marine Fisheries Ordinance 1983' and 'The Marine Fisheries Rules 1983'. The safety and security have been described by 'Coast Guard Act 2016' (Islam et al. 2016). The Department of Fisheries is responsible for managing artisanal fishing. The negligence, bribery, and corruption are reported in many studies (Islam et al. 2017, Shamsuzzaman & Islam MM 2018, Islam et al. 2016). Islam (2010) reported that *Dadan* system and the presence of a group of intermediaries in market chain caused deprivation and high-income inequality.

Recommendations and Conclusion

Bangladesh is doing everything to achieving SDG-14, despite having limitations in the regulatory and institutional framework. Bangladesh is also committed to implementing the UN Convention of Law of the Sea (UNCLOS), to conserve and use the marine resources sustainably for sustainable development. The target 14.B states the protection of rights of artisanal fishers. So, it is an integral part of achieving SDG-14. On the hand, the principle of SDGs is to ensure that no one is left behind. The present research objective was to identify the challenges facing by the artisanal fisherman and recommend the way forward for future direction based on a case study from Sonadia Island. The findings provide an inside picture of understanding the condition and status of artisanal fisherman so that policymakers can take appropriate policy related to this issue. This study unearthed the

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real scenario of Bangladesh's artisanal fishermen, where Sonadia Island is a case. In that context, integrating artisanal fisheries into policy agendas, namely concerning poverty alleviation, food security, social protection, decent work, and climate adaptation is highly essential. Facilitating artisanal fisheries will help to conserve the marine resources as well as the Bay of Bengal. Policy interventions are crucial to ensure that artisanal fishers are enabled to know and realise their rights and contribute to the development. To overcome the challenges of the artisanal fishermen of Bangladesh, this study recommends

From the field data, we have seen that the study area's Artisanal fishermen do not have modern equipment and technology for catching fish. The consequence of which, they cannot go beyond the 40 meters of seawater and deep-sea area. The commercial fishing ship can easily catch fishes in the deep seawater and beyond 40-meter depth. Still, they are catching fishes in the shallow water due to lack of monitoring from the government. In turn, it causes over-extraction of fishes in the coastal area, hampering fish harvesting sustainability. Therefore, the government should stop commercial fishing using the ship in the shallow water to end over-extraction and protect the rights of artisanal fishers.

We have also found that the literacy rate is very low in the study area. We have observed only one inhabitant of the Sonadia Island who has completed higher secondary education though he lives in Cox's Bazar city. Even fishers' children do not attend any school other than *Maqtab* (Mosque based religious, educational institution) since they do not have any school in their village. As a result, they are inheriting this profession with no education and institutional knowledge of fishing. On the other hand, the fisherman does not have any knowledge about modern fishing and technology. They even are not aware of the consequence of over-extraction and sea pollution. Therefore, the government should take the appropriate measure to increase the literacy rate by establishing formal educational institutions and to provide the necessary training for fishing by the fisheries department.

From the study, it was revealed that artisanal fishers of the said study area do not have any modern surviving equipment to survive during a natural disaster. They carry some tubes or plastic balls to float in the seawater during a natural disaster to survive. They do not have the economic capacity for posing modern equipment though those are very much essential for their lives saving. Therefore, relevant department such as the Department of Disaster Management should provide the life jacket as a relief to increase climate adaptation capacity.

In the coastal area like Sunadia Island, the government can introduce and establish Community Radio, which can help them update information about weather from time to time. The artisanal fisherman does not have any modern technology to get real-time data, the situation even worse when they are in the sea for fishing. On the other hand, in absence of Fish telemetry technology,' they cannot catch much fish since they do not have knowledge and technology to get fish. Therefore, the government can take necessary initiatives for providing artisanal fisherman Fish telemetry technology' and in case of broadcasting environment or community radio for fishermen could be installed in the

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coastal area for a time to time weather forecasting and providing guidelines for sustainable fishing.

There is no special provision for the artisanal or small scale fisherman for getting interest free loan or soft loan by any government schedule bank or commercial bank. As a result, they have to rely on local *Mahajan* to get a loan, especially during fishing time for buying traditional boat and equipment. Even, during the prohibited time of fishing and crisis time, they have to depend wholly on loan from the tradition loan providers charged compounding interest as they do not have any other options. Consequently, they cannot accumulate the benefit of fishing as we stated in the result discussion part. Therefore, this study recommends that the state banks should provide loans to stop the monopoly business of the *Mahajan* and to improve the socio-economic conditions of the artisanal fishermen. On the other hand, Bangladesh Rural Development Board (BRDB), Social Welfare Department and Cooperative Department should provide microcredit through the particular scheme to improve the fisherman's socio-economic conditions.

Piracy is one of the severe problems faced by the fisherman of the coastal belt of the country. Even, neighbouring countries fishing boats some enter our coastal belt for fishing purpose. The responded blamed the law enforcement agencies such as Coast Guard and Bangladesh Navy for not taking sufficient measure. Fisherman also mentioned that the responsible agencies are not patrolling regularly and adequately, especially in the country's deep-sea territory. As a result, Bangladesh's fisherman has to encounter the piracy problem, even some by the neighbouring countries. Therefore, Bangladesh Coast Guard should be proactive in controlling piracy.

Because of the presence of Middleman or intermediaries group in the market chain, artisanal fishers are not getting more than only 30% of their fish's actual price. There are 07 classes of intermediaries like the collector, *majhi*, *Chhota Mahajan*, *boro Mahajan*, *aratdar*, wholesaler and retailer. The fisherman is not able to accumulate the benefit from their activities. Sometimes they have to pay bribery (in cash or by fish) to the law enforcement agencies for selling their fish. In some cases, they cannot sell their fish without prescribing bazaar or market by the middleman or loan providers. Therefore, the government should take immediate actions and required polices for clearing the intermediaries group from the market chain.

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