

Assessing Ghana's Fishing Industry: A Case Study of Some Selected Fishing Communities in the Greater Accra Region

Robert G. M. Nyemah¹, Stephen A. Dehlor² and Gabriel S. Akakpo³

Africa is a continent endowed with abundant fish resources in marine, inland or freshwaters. In spite of these benefits, the sector is at risk due to a decline in fish stocks in both marine and inland waters, leading the continent to be losing the potential to harvest between US\$2 to US\$5 billion of economic returns annually. In light of the declining state of the African fisheries sector, this study was conducted to assess Ghana's fishing industry in view of the declining African fish stocks. To achieve the objectives of the study, a system approach was used as a guide for data collection. This included the use of structured questionnaires and interviews targeting fishermen and fishmongers of five selected fishing communities in the Greater Accra Region viz Jamestown, Nungua, Teshie, Tema Newtown and Prampram, as well as the Fisheries Commission and the Ghana Revenue Authority. At the institutional level, officials of the Fisheries Commission and Ghana Revenue Authority were sampled in order to triangulate the study. The research revealed that Ghana's fishing industry is in a declining state with various challenges contributing to the poor performance of the sector. The research also points out that there is lack of policy enforcement by concerned authorities. Finally, the research shows that the industry is a major source of livelihood and revenue generation, but these potentials and opportunities can only be realised with a high degree of fishermen sensitisation, policy enforcement and financial support to address the challenges faced by the sector.

Key words: Fish stocks, fishing gears, fisheries, artisanal, fishing community, livelihood.

1. Introduction

Africa is a continent that is endowed with abundant fish resources in marine waters (oceans) and inland or freshwaters (rivers, lakes, floodplains). During the opening ceremony of the first Conference of African Ministers for Fisheries and Aquaculture (CAMFA) held in September, 2010 in the Gambian capital, Banjul, it was declared that over 10 million Africans derive their livelihood from the fishing industry and are employed in different entry points of the fishing value chain. According to her the fisheries sector of Africa makes a vital contribution to meeting the food and nutrition security needs of millions of Africans and has become a leading export commodity with an annual export value of US\$2.7 billion. It was also echoed

-
1. Dr. Robert G. Nyemah (PhD), Head of Research and Innovation Unit – Regional Maritime University; lecturer in Research Methods, Entrepreneur Creativity and International Business – Ghana Institute of Freight Forwarders. email: robert.nyemah@rmu.edu.gh
 2. Dr. Stephen A. Dehlor (PhD), Deputy Registrar, Academic Affairs – Regional Maritime University. email: deputy.registrar@rmu.edu.gh & drdehlor@gmail.com
 3. Mr. Gabriel S. Akakpo (PhD Candidate), Lecturer in Mathematics and Research Methods – Regional Maritime University. email: gabriel.akakpo@rmu.edu.gh

Nyemah, Dehlor & Akakpo

at the conference that Africa's fisheries sector accounts for over 30% of the African population nutrition and food security, as well as US\$4.3 billion or 8% of annual revenues from international trade (CAMFA, 2010).

According to Food and Agriculture Organization's (FAO) (2014), the African fisheries sector as a whole employs 12.3 million people involving full-time fishermen and full/part-time processors (mostly fish mongers), representing 2.1% of Africa's population between the ages of 15 and 64 years. According to the report, 6.15 million or 50% of the 12.3 million are fishermen, 4.9 million or 42.4% are processors (fish mongers) and 0.9 million or 7.5% work in fish farming. It was also noted that 55% of these fishermen are employed in inland fisheries whereas 42% of processors (fish mongers) work in marine artisanal fisheries, 30% in inland (freshwater) fisheries and 28% in industrial fisheries (FAO, 2014). In terms of value addition, the FAO report showed that the African fisheries and aquaculture sector as a whole account for more than US\$ 24 billion or 1.26% of the joined GDP of all African countries. According to the study, the highest value is produced by the marine artisanal fisheries with 0.43%, followed by marine industrial fisheries with 0.36%, inland (freshwater) fisheries with 0.33%, and aquaculture with 0.15% (FAO, 2014).

In spite of these impressive benefits, the CAMFA (2010) pointed out that the African fisheries sector is at risk due to a decline in African fish stocks in both marine and inland water sources. Experts have therefore warned that Africa may be losing the potential to harvest between US\$2.0 to US\$5.0 billion of economic returns annually due to this decline of African fish stocks and mismanagement of the African fisheries sector. In light with the declining African fish stocks, the Bank of Ghana (2008) reported that Ghana fishing sector's annual contribution to the Gross Domestic Product (GDP) has fallen from 6% (800,000 metric tons of fish) in 1993 to 3.9% (400,000 metric tons of fish) in 2008.

Ghana is one of the African countries endowed with natural marine resources, especially with the Atlantic Ocean which has the most important potential for the thriving fishing industry (Ekow, 2015). Ghana has been a regional fishing nation with a long tradition of active fishing record dating back to as early as the 1700s when the Fante fishermen embarked on an ocean fishing along the coast of Ghana (Atta-Mills et al. 2004). Again, Ghana has about 550 kilometres stretch of coastline and a total continental shelf of over 24,300 square kilometres to support a vibrant fishing industry. The country also has a system of rivers, lakes and lagoons that forms the basis of inland fishing industry. Accordingly, Ghana's fishing industry has been a major source of livelihood and employment for millions of people across the country accounting for about 5 per cent of Ghana's agricultural Gross Domestic Product (GDP) as well as 10 per cent of animal protein nationwide. Ghanaians consume about 850,000 metric tons of fish per annum with about 440,000 metric tons being produced locally (Ekow, 2015).

The Ghana Export Promotion Council (2010) pointed out that a large section of the impoverished people of Ghana is engaged in the fishing industry with over 150,000 fishermen and over 500,000 others, mostly women, engaged in related work such as processing, distribution and selling of fish. Fisheries in Ghana, as mentioned above, contributes immensely to household income and help in poverty reduction by supporting livelihood of

Nyemah, Dehlor & Akakpo

over 650,000 people involved in the sector. The sector serves as a means in catering for the education, health and other daily family needs, as well as investing in other assets such as land, livestock and fishing gears which in turn bring in income and further reduce vulnerability to poverty, and improving the socio-economic condition of fishing communities.

In terms of division, Ghana fishing industry, according to Bank of Ghana (2008), consists of three sub-sectors, namely: small scale (artisanal or canoes) using traditional wooden dugout canoes; semi industrial small sized inshore trawlers, and the deep sea industrial fleet made up of large trawlers. However, the artisanal sub-sector is said to be the most important in terms of volume of fish output and in number of participants. Mensah, et al. (2006) indicated that the artisanal sub sector contributes to about 70-80% of fish output in Ghana. Anonymous (2003) also mentioned that the artisanal sub-sector accounts for more than 9,918 marine artisanal canoes in 2001.

The need for the study lies in the fact that there are ongoing discussions about the declining state of Africa's fish stocks. Such discussions necessitated the AU's CAMFA conference. Locally, fishermen in Ghana are also complaining about low fish catch in recent years making them unable to break even and improve their living conditions. This unbearable situation has caused most fishing communities to result to the use of destructive fishing methods and gears to boost fish catch and improve income to support livelihood and resulted in the organization of the National Fisheries Governance Dialogue in Accra. Such income and fish catch improvement methods have led to the destruction and harming of Ghana's marine resources, especially fish resources, thus resulting in the gradual collapse of the country's fishing industry with the subsequent decline in the volume of fish catch as well as revenue generation from the fishing industry.

This has put the socio-economic conditions of over 650,000 people involved in the industry at risk, especially local fishermen and other local businesses whose entire livelihood depends on the sector. The above informed the need for the study which is to assess the causes of the poor performance of Ghana's fishing industry, (in terms of the level of fish catch) and make recommendations for the improvement of the sector. The study specifically aimed at achieving the following objectives:

- i. To determine the level of education of those involved in the sector and how the level of education contributes to the poor performance of the sector.
 - ii. Identify various fishing practices and how such practices contribute to the poor performance of the sector and by extension to the destruction and collapse of the once vibrant fishing industry.
 - iii. Examine the types of fishing gears used by fishermen and how they affect the volume of fish catch and contribute to the destruction and collapse of the sector.
 - iv. Review regulatory instruments and their implementation in the sector.
 - v. Highlight the socio-economic importance of the fishing industry.
 - vi. Make recommendations for improvement of the performance of the sector.
- The questions below guided the strict compliance to the focus of the research.
- i. What is the background of the practitioners of the fisheries/fishing sector in terms of education and economic status?

Nyemah, Dehlor & Akakpo

- ii. What are the various fishing practices that contribute to the poor performance of the fishing sector?
- iii. What is the effect of use of fishing gears and chemicals on fishing sector?
- iv. What regulatory instruments are put in place to regulate the fishing sector?
- v. How can fishing subsector of Ghana's economy be improved?

The scope of the study focuses on artisanal or canoes sub-sector of Ghana's fishing industry which is most important in terms of volume of output and is approximately 70-80% of all fish output. In terms of number of participants, the artisanal or canoes sub-sector accounts for over 9,918 participants. In this respect, the scope of the study is limited to only the small scale (artisanal or canoes) sub-sector of Ghana's fishing industry. With the influx of people to the Greater Accra Region which doubles as the capital city of Ghana and as a coastal area, there is an enormous increasing pressure on feeding its people especially with fish and related food products. The study therefore covers fishing communities/suburbs of Greater Accra of Ghana such as Jamestown, Nungua, Teshie, Tema New Town and Prampram.

The paper has an introduction section that dealt with the relevance of the study and highlights the research questions, objectives of the study and the scope. The paper also has a literature review section, which provides an in-depth theoretical background to the study. Furthermore, the paper has a methodology section that explained how the study was conducted, as well as a discussion section, which focuses on the educational background of the respondents and their fishing practices. Finally, the paper ends with the findings of the study, followed by conclusion and recommendations.

2. Literature Review

The Marine Fisheries Research Division (2007) defined artisanal fishing as a type of fishing system with an open beach using very basic fishing tools such as dug out boats (canoe), often powered with outboard motors. According to the publication, artisanal fishing is generally considered small-scale because it is solely dependent on local resources. Such system of fishing employs a wide range of fishing gears including hooks and lines, seine nets, surrounding nets and gill nets. The Bank of Ghana report (2008), mentioned that men naturally undertake fish harvesting while women are key in the offshore post-harvest activities such as processing, storage and trading. According to these publications, between 1.5 million and 2 million people are engaged in the artisanal sub-sector of Ghana fishing industry. Additionally, about 500,000 people get employed in the processing, trading, packaging and transportation of fish, as well as canoe building; thus highlighting the socio-economic importance of artisanal fishing and the level of its participant share in the Ghanaian fishing industry.

The Food and Agriculture Organization (FAO) (2007) highlighted the issue of education in fishing communities, especially in the wake of small villages being drawn into large scale market due to technological advancement. Similarly, Maddox (2007) pointed out that the low level of education in fishing communities can be viewed as a hazard as well as a limitation to the full utilization of fishery resources. The author further mentioned that an improved educational level in fishing communities will provide strong foundation on which other

Nyemah, Dehlor & Akakpo

livelihood activities stand. However, it was underscored that fishing communities are not likely to respond positively to schooling and its policies since it does not accommodate the kind of work they do. The author further argued that most fisher folks partially admit that the level of education has no harm/impact on fishing activities. Despite this observation, Maddox (2007) still stressed the view that even though the level of education may not cause any harm to fishing communities, its striking effect such as poor use of resources, lack of understanding of policy guidelines and the overall reduction in economic growth cannot be over emphasized. Lack of education is one of the causes of poor performance in a nation's output with regards to any sector of its economy. In Ghana, lack of education has a striking effect that could be seen wherever it reflects, and that the lack of education in most fishing communities is the main cause of ignorance, poverty, disease and underdevelopment.

Falaye (2008) highlighted the issue of illegal fishing, describing it as fishing activities conducted by vessels, boats or canoes which violates national or international laws governing its waters. According to the publication, such activities which include pair trawling, light fishing, use of explosives and the use of mono filament nets, affect the protein needs and render bare the resources that facilitate fisheries process. Falaye (2008) further argued that under the Ghanaian laws, people are barred from using chemicals such as Dichloro Diphenyl Trichloroethane (DDT), dynamite, cyanides and light as means of fishing. However, fishermen in Ghana still employ these methods with less regard to the harm they cause to the marine environment and fish species.

In terms of revenue generation from the fishing industry, the Marine Fisheries Research Division of the Ministry of Fisheries and Aquaculture (2007) indicated that Ghana's fishing sector contributes about US\$1 billion to government revenue annually. Regrettably, according to the publication, such amount has not been realised since 1995 up to date due to poor performance in the sector. The report also highlighted that stakeholders in the fishing industry have attributed the rapid decline in fish catch to lack of political will on the part of government to enforce and ensure compliance to curtail illegal fishing methods and theft in Ghanaian territorial waters. Martin (2015) emphasised that illegal fishing practices undermine fish stocks by hitting juvenile population. A target of young fish is creating a crisis in Ghana's fishing industry. He further stated that the government of Ghana is developing a monitoring, control and surveillance system to combat illegal fishing but this approach will require an adequate investment of financial and human resources. He went on to say that a continuous decline in fish stock and growing consumption will cause Ghana to import fish to supplement the local fish production at a huge cost.

Regarding fishing gears, the Food and Agriculture Organization (FAO 2015), classified the main fishing gears into eleven categories of which the major ones mostly used by fishermen include surrounding nets, seine nets, trawl nets, hooks and lines, gill nets, grappling and wooding gears. The publication underscored that fishing gears and methods in the past were aimed at increasing production but the present situation contributes to overfished stocks, under exploitation of aquatic resources and environmental pollution in fishing operation. Due to such reasons, modern gear development is now very much focused on selective fishing and gears which have less impact on the environment.

3. Methodology

To a greater extent, the study relied on primary data collected through the use of questionnaires and interviews with selected stakeholders of the sector. For the purpose of this study, a total of 120 individuals were sampled using targeted/purposive sampling and simple random mixed methods. Validated structured questionnaires were distributed to the twenty (20) purposefully selected officials of the Fisheries Commission (10) and Ghana Revenue Authority (10). The basic data generated from these high officials was on the revenue generation, its falls and possible linkages to the wrong fishing practices. Twenty (20) respondents involving fishermen and fishmongers from each of the five fishing communities: Jamestown, Nungua, Teshie, Tema Newtown and Prampram, in the Greater Accra Region who were randomly sampled were interviewed in other to make up for their inability to read and write (majority). They were asked questions based on their educational backgrounds, fishing practices, understanding of regulations governing the sector, as well as economic benefits derived from fishing profession. Data triangulation for the purposes of internal validity was done by seeking some secondary data to support the findings of the study. The study therefore utilized both qualitative and quantitative methods in the data collection and analysis.

4. Discussions

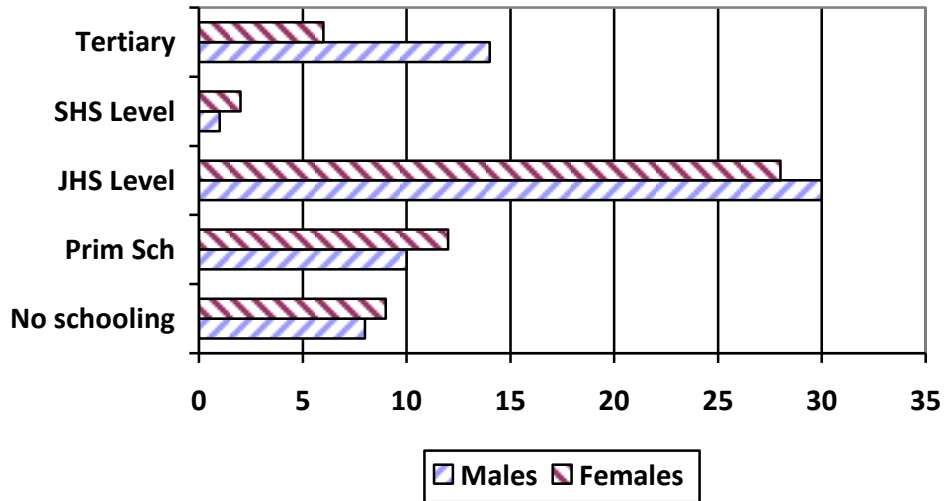
It could be recalled that a set of questionnaires and interview guides were prepared and distributed to the sampled group. The data collected covered gender distribution, educational level, chemicals used for fishing, types of fishing gears used, opportunities to fishing supporting activities, as well as comparison of past and present fish catch records. The data gathered was presented and analysed as follows:

4.1 Educational Background of Respondents

The sample for the research consisted of 120 respondents which was made up of 50 fishmongers, 50 fishermen, 10 from fisheries commission staff and 10 from Ghana Revenue Authority. Their level of education is presented as in figure 1 below.

Nyemah, Dehlor & Akakpo

Figure 1: Educational Level of Respondents



The figure 1 reveals that majority (representing 58 out of 120) of the total respondents have reached Junior High School (JHS) level of formal education; while 22 (10 males and 12 females) acquired primary school education. Of the total of 100 respondents involved in fishing and fish processing activities, only 3 reached the Senior High School (SHS) level. Those with tertiary education background (20 in all) were, however, sampled from the Fisheries Commission and the Ghana Revenue Authority. None of those involved in fishing and fish processing activities, males or females, had tertiary education background, implying that most indigenes in fishing communities do not require tertiary education for their operations.

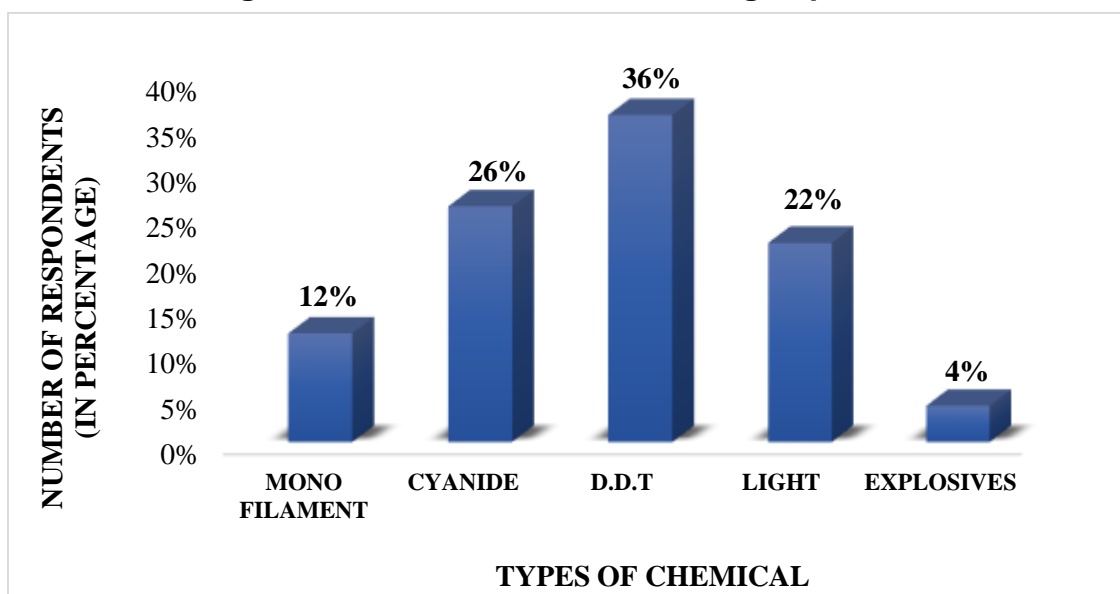
4.2 Fishing Practices

4.2.1 Chemicals

The data on the chemicals/instruments used by the fishermen indicated that the following, according to the respondents, are used by the fishermen: mono filaments, cyanide, DDT, Light, and some explosives. From figure 2, it can be seen that 36% of respondents indicated that Dichloro Diphenyl Trichloroethane (DDT) is used by fishermen in their fishing expedition. This is followed by cyanide with 26% of respondents and light with 22% of respondents alluding to their usage. Again, 12% and 4%, respectively, of the respondents, however, indicated mono filaments and explosives as other wrong practices of fishing. The use of these chemicals/methods as mentioned by Falaye (2008) are harmful to the marine environment because they affect protein needs and render bare the resources that facilitate fisheries production. This forms a major challenge to the fishing industry in Ghana and contributes to revenue reduction in the sector thereby affecting the economic growth of the nation.

Nyemah, Dehlor & Akakpo

Figure 2: Chemicals Used in Fishing Expedition



4.2.2 Fishing Gears

In terms of fishing gears used in fishing expedition, 48% of respondents indicated that fishermen mostly use seine nets in fishing because they believe seine nets are more suitable for fishing with less impact on the environment. This goes to support FAO in its 2015 publication as mentioned in the literature review, that modern fishing gears are now focused on selective fishing and gears which have less impact on the environment. About 28% of respondents also indicated that apart from Seine Nets, fishermen also used surrounding nets, while 20% mentioned the use of gill nets. The rest 4% of respondents, however, said fishermen also use hooks and lines. All respondents, representing 100%, agreed that the type of fishing gears used determines volume and sizes of fish catch.

4.2.3 Employment and Livelihood Support of Fishing Industry

On the issues of the fishing industry ensuring employment and livelihood support, the data indicated that all respondents, representing 100%, indicated that the fishing industry gives employment to many people and supports their entire livelihood. According to respondents, the artisanal sub-sector of the fishing industry generates employment in the areas of canoe building (crafting), net and canoe repairs, fish mongering, processing, and transport operations. Similarly, 40% of respondents indicated that their earnings (income) are enough to cater for them and their family, while 60% of the respondents say that their current earnings are insufficient to cater for them and their family which, accordingly, is due to low fish catch, with all factors being equal, indicating a decline in fish stocks.

Apart from indicating a decline in fish stocks, the study also confirmed the 2014 FAO report, which pointed out that African fisheries sector as a whole employs 12.3 million people as full-time fishermen or full-time and part-time processors (fish mongers). The study further pointed

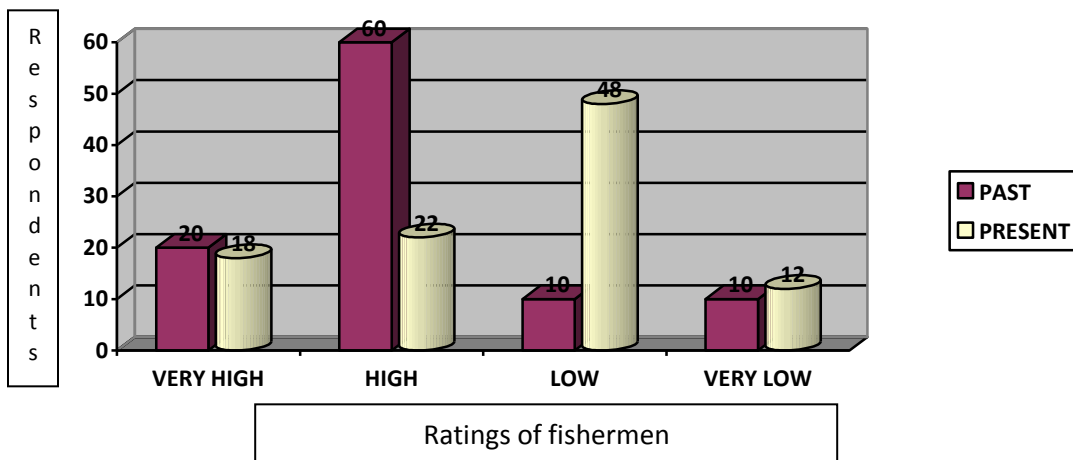
Nyemah, Dehlor & Akakpo

out that the highest value is produced by the marine artisanal fisheries with 0.43%, followed by marine industrial fisheries with 0.36%, inland (freshwater) fisheries with 0.33%, and aquaculture with 0.15%.

4.2.4 Past and Present Fish Catch by Fishermen

The data on comparison between the amount of fish catch in the past and the present indicated varied levels of responses. Whereas 20% responded it was very high in the past, 18% alluded that it is very high presently. Again, as 60% responded high in the past 22% said it is high now. As 10% said it is low in the past, 48% responded low presently. Finally, whereas 10% responded very in the past 12% said it is rather very low presently.

Figure 3: Respondents' rating of fish catch in the Past and the Present



It is evident, from the above Fig.3, that there is a drastic reduction in fish catch presently as compared to the past. This is demonstrated by the fact that majority of respondents, representing 80% (20% very high and 60% high) indicated a high volume of fish catch in the past as opposed to 60% (48% low and 12% very low) of the same number of respondents indicating that fish catch is presently low. Again, whereas 80% responded fish catch was high in the past, only 40% of them felt fish catch is high presently. On the whole the respondents were of the view that fish catch was high in the past and low presently. The responses also show that revenue and income earned from fishing activities has tremendously reduced, indicating a declining crisis situation.

4.2.5 Impact of Fishing Gears and Chemicals on Volume of Fish Catch

The study reported that fishing gears and chemicals used by the fishermen have greater impact on the volume of fish catch. All the respondents confirmed that inappropriate use of fishing gears and chemicals contribute to pollution of marine waters and resources. According to respondents the types of fishing gear and chemical determine the quantity of fishes that could be caught as well as the distance with which the gears can be used. Similarly, respondents indicated that fishing gears and chemicals contribute to destruction and pollution, if used inappropriately. These respondents further explained that apart from

Nyemah, Dehlor & Akakpo

unpermitted fishing by intruders, for the decline in fish stock in view of the fact that the use of inappropriate fishing gears and chemicals results not only in the destruction of the marine water and its resources, such as fish, but also leads to the harvesting of juvenile fishes.

4.2.6 Regulations and their Enforcement

When the respondents were asked if they were aware of regulations governing the fishing sector, the data revealed that majority (64%) of the respondents are aware that there are regulations governing fishing activities in Ghana, while 36% are not aware of such regulations. Regarding the enforcement of the regulations, 70% of the respondents who responded they were aware said that the regulations are not enforced at all, while 30% indicated that the regulations are enforced but not as often as it should be. The response means that lack of regulatory compliance or enforcement might be the contributing factor of the use of wrong fishing gears and chemicals by fishermen which destroy fish species or juvenile fish results in the declining fish stocks in the country.

4.2.7 Socio-economic Benefits of the Fishing Industry

The data analysis also reveal that the fishing industry provides enormous socio-economic benefits for participants in the sector by contributing to poverty reduction and providing livelihood support. All the respondents were of the view that

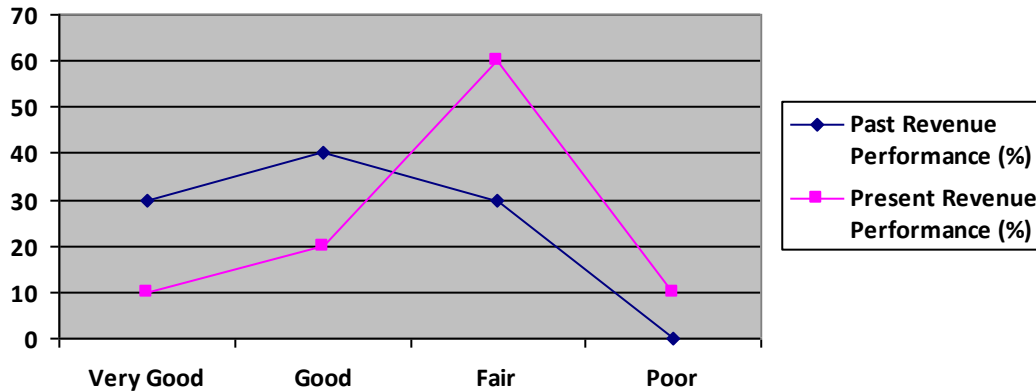
- *Fishing industry can provide sufficient income to cater for their domestic expenses including payment of wards' school fees and hospital bills among others.*
- *Fish mongering is a lucrative business which can be relied upon as a means of employment*
- *Fishing sector can contribute to poverty reduction, if regulated properly, in the fishing communities as well as Ghana as a whole.*

The respondents complained that the dwindling trends of the fishing sector is a great source of worry to them since their future cannot be guaranteed if things remain the way they are presently.

4.2.8 Revenue Generation from the Fishing Industry

According to data from Ghana Revenue Authority (GRA) and fisheries department respondents, as shown in figure 4, revenue generation was quite impressive in the past as compared to the present. About 70% of respondents, 30% and 40% acknowledged that previous revenue generation from the fishing industry in Ghana was very high and high respectively, whereas 30% of the respondents said revenue from the fishing sector is still impressive. On the other hand, 60% of the respondents confirmed that current revenue generation from the fishing industry is not as expected but is fairly impressive.

Figure 4: Revenue Generation from the Fishing Industry



5. Findings of the Study

From the data analysis and interpretations, the study uncovered, revealed and confirmed the various research questions as follows; firstly, the study revealed that most fishermen and fishmongers have low level of education indicating that most fishing communities are not enthusiastic about formal education due to belief that education has no significant impact on fishing activities. This contributes to the mismanagement of fishery resources and the lack of understanding of fishing policy guidelines, as noted by Maddox (2007). It also contributes to the poor performance of Ghana's fishing industry and has affected the volume of fish catch and revenue generation.

Secondly, the study observed that the widespread use of non-permitted fishing practices such as use of poisonous and destructive chemicals and wrong fishing gears are the prime causes of the present-day declining fish stocks and catch. This development was on the basis that these wrong practices result in the destruction of marine resources and harvesting of juvenile fish stocks, as well as rendering bare resources that facilitate fisheries process, as noted by Falaye (2008).

Thirdly, the study revealed Ghana's fishing industry provides enormous socio-economic benefits for participants in the sector, contributing to poverty reduction and livelihood support, confirming the 2010 report of Ghana Export Promotion Council, which indicated that Fisheries in Ghana contributes immensely to household income and help in poverty reduction by supporting livelihood of over 650,000 people involved in the sector. There is a drastic reduction in fish catch presently as compared to the past. This finding explains why revenue and income earned from fishing activities has tremendously reduced, indicating a declining crisis situation. Revenue generation in the past was also quite impressive than now. The finding is a confirmation of the 2007 publication of the Marine Fisheries Research Division of the Ministry of Fisheries and Aquaculture in which it is mentioned that Ghana's fishing sector contributes to about US\$1 billion to government revenue annually, but such amount has not been realised since 1995 up to date due to poor performance of the sector. This further supports the Bank of Ghana (2008) report in which the Bank said that Ghana fishing sector's annual contribution to Ghana's GDP has fallen from 6% in 1993 to 3.9% in 2008.

Nyemah, Dehlor & Akakpo

Finally, the issue of regulatory instruments put in place to regulate the fishing sector, the study observed that policy guidelines in the fishing industry over the years have not really been enforced by regulatory bodies. Most fishing folks, on the other hand, were not aware of policy guidelines regulating the sector. The lack of awareness and enforcement of policy guidelines has resulted in unwholesome negative fishing practices such as the use of unapproved fishing gears and chemicals, which, according to Falaye (2008) contribute to illegal fishing activities and harm to the marine environment because they affect protein needs and render bare the resources that facilitate fisheries process, forming a major challenge to the fishing industry in Ghana and contributing to revenue reduction in the sector and affecting the economic growth of the nation.

6. Conclusions

The study concluded that the first and most important solution to the rapid declining fish stock in African coast and that of Ghana is the urgent need for the enforcement of policy guidelines to prevent the use of unapproved fishing gears and chemicals and to avoid harvesting of juvenile fishes. Fishing communities must be sensitized about policy regulations in the sector and the consequences of using unapproved fishing gears and chemicals which leads to the pollution and damage of the country's marine resources.

Also, frantic efforts should be made to sensitize fishing communities about the importance of education to better help them understand the management of the marine resources upon which their livelihood depends. In this regard, national government should endeavour to provide for them educational facilities such as schools, libraries and ICT centres, amongst others to enhance their standard of living.

Finally, the study recommended that for any effective solution measure to be implemented there must be a substantial financial investment by the government in the sector. By doing so and with due diligence and close monitoring the declining marine fish stock can be halted in order for the sector to realize its full potential as a major source of livelihood support and revenue generation for national development.

The study is limited to only the small scale (artisanal or canoes) sub-sector of Ghana's fishing industry. Other coastal areas and fishing communities in Ghana other those in Greater Accra Region had not been included in the study. Therefore, generalisation out to be done with caution with regard to the population. The study therefore covers fishing communities/suburbs of Greater Accra, namely: Jamestown, Nungua, Teshie, Tema New Town and Prampram. The study is also limited in terms of coverage and sample size.

References

- Anonymous, 2003, Fish collection of the Royal Ontario Museum. Royal Ontario Museum.
- Atta-Mills, J 2004, The decline of a regional fishing nation: The case of Ghana and West Africa. *Natural Resource. Forum*, 28: 13-21.
- Bank of Ghana, 2008, *The fishing sub-sector and Ghana's economy*. Retrieved June 2, 2015 from <http://www.bog.gov.gh/index.php/publication>
- CAMFA 2010, Opens with Call to Stop Illegal Activities on Africa's Waters. Retrieved February, 2016 from <http://allafrica.com/stories/201009210876.html>
- Falaye, EA 2008, *Illegal Unreported Unregulated (IUU) fishing practices in West Africa (Nigeria & Ghana)*. Marine Resource Assessment Group Ltd. London.
- Ekow, EM 2015, *Declining fish stock worrying...4 million livelihood affected*. Retrieved in April, 2015 from <http://thebftonline.com/business/agribusiness/18219/declining-fish-stock-worrying-4-million-livelihoods-affected-.html>
- FAO 2007, *The issue of Illiteracy in Africa. The case of fishing communities in West Africa*. Report of the twenty-seventh session of the committee on fisheries. Rome.
- FAO 2015, *Types of fishing gears and their impact on fisheries*. Retrieved in February, 2016 from www.fao.org>FAO Home> Fisheries & Aquaculture.
- FAO 2014, *The value of African fisheries*. Fisheries and Aquaculture Circular No. 1093, Rome, 2014
- Ghana Export Promotion Council 2010, *A glance of the fisheries sub-sector of Ghana's economy, 2010 report*. Retrieved on May 10, 2015 from www.gepaghana.org/news.php
- Haakonsen, JM 2001, *Artisanal Fisheries and Fishermen's migration in Liberia*. In: Overa, R. (Ed.) *Institutions, mobility and resilience in the Fante migratory fisheries of West Africa*. CMI Working Paper 2001. Christian Michelsen Institute, Bergen, Norway
- Maddox, B 2007, *What can ethnographic approach tell us about the consequence of literacy? Comparative Education (Vol. 43/7): 253-272*
- Martins, A 2015, *The Africa report.com. Environmental Justice Foundation*. Environmental Practices and Illegal fishing.
- Marine Fisheries Research Division 2007, *The contribution of artisanal fisheries and Aquaculture sector of Ghana's fishing industry*. Retrieved in June 2015 from www.mofad.gov.gh
- Mensah, et al. 2006, *The study of Gender characteristics in the organisation of marine artisanal fishing in Ghana*.
- NFED 2009, Tracer Study. Terminal Phase report. Performance in Ghana's Agriculture and Education sector, (Volume 1). Accra: AB INTEL LTD.
- Overa, R 2001, *Institutions, mobility and resilience in the Fante migratory fisheries of West Africa*. CMI Working Paper 2001:2. Christian Michelsen Institute, Bergen Norway.
- 3rd National Fisheries Governance Dialogue 2013, *Ghana's fish catch declining*. Retrieved on Aug. 19, 2013 from <http://www.theaccramail.com/?p=1335>