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IMPLICATIONS OF SOCIO-CULTURAL PRACTICES ON FISHERIES MANAGEMENT: A CASE OF THE BOTTOM-SET GILLNET FISHERY IN THE CENTRAL REGION OF GHANA

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ABSTRACT

The study was conducted to examine the effect of some socio-cultural practices on fisheries management in Ghana. A case study was done on the bottom set gillnet fishery at Apam and Egyaa No.1 in the Central Region of Ghana. Data were collected through field observations and interviews. The study revealed that male children in fishing communities in Ghana were introduced to fishing at younger ages to ensure continuation of the family trade. Fishing partnership systems practiced had the potential to cause underestimation of fishing effort, while exceptions to the fishing holiday practiced in Ghana served as a loophole for violation of the taboo. Some socio-cultural practices hinder the success of some fisheries management strategies. The study recommended that natural resource managers should understand the objectives of the socio-cultural practices of resource users to guide them in the development of their management strategies. Also, alternative livelihood programmes aimed at reducing fishing effort should target the younger age group in fishing households as well, to expose them to other livelihood choices other than fishing. Again, estimation of fishing effort in Ghanaian marine small-scale fisheries should be based on number of fishing gears to ensure reliable estimates.

Keywords Small-scale fisheries, alternative livelihood, fishing holiday, family trade, age, fishing partnership system

Introduction

Interactions between humans and fishery systems are dictated by cultural patterns, habits, customs and institutions (Katikiro *et al.*, 2014), and the management of these fishery systems are guided by these factors. Fisheries resources may be managed by formal or traditional institutions. Whichever management system it may be, the objectives are normally intended to ensure the economic and social value of the resource for future generations. Pauly (1994) was of the view that fisheries management systems where tradition-based regulations control access to a common resource were the most effective.

In Ghana, the marine small-scale sector is managed by both formal and traditional fisheries management systems. The formal system is regulated by the government through the Ministry of Fisheries and Aquaculture Development, and the Fisheries Commission. The sector is governed by the Fisheries Act 625 of 2002 and the Ghana Fisheries Regulations (L. I. 1968). The traditional system has the

Chief Fisher or Chief of the community as the overlord, and is supported by a council to form the traditional authority over fishing activities in every fishing community. The traditional fisheries management regulations are based on socio-cultural beliefs and practices.

Fishing has been considered a way of life (Pollnac *et al*., 2012) and thus intimately tide to socio-cultural beliefs and practices. Socio-cultural traits are handed down from generation to generation through learning-by-doing, and these evolve to represent a 'world view' of the communities (Idang, 2015; Kurien, 2000). The beliefs that back these traits and practices are held in veneration resulting in complete obedience to the regulations (taboos) that define these practices. Fines and animal sacrifices are used to deter people from violating these regulations with the aim of preserving livelihoods and protecting the resource (Dosu, 2017). Socio-cultural practices in fishing communities do not only preserve livelihoods and protect the resource, but also preserve important values such as family traditions, unity, courage, hard work, etc., with particular practices preserving particular values (Idang, 2015). However, the objective of some socio-cultural practices may conflict with others, and even some formal regulations.

In the Ghanaian marine small-scale fisheries, some socio-cultural practices have been perceived an advantage to both traditional and formal fisheries management systems, without which the compliance to the latter might have fallen short. A typical example being the traditional fishing holiday practiced in most fishing communities in Ghana. Nonetheless, some authors have contrary views. According to Dosu (2017), though socio-cultural beliefs and taboos may be considered to play key roles in environmental protection, they could also be factors hindering fisheries productivity in coastal communities. Kurien (2000) similarly attested that social and cultural aspects of society which arose from human interaction and gave an element of specificity to the society, were a hindrance to transforming societal traits to modern world views. In the Ghanaian small-scale fisheries settings, studies that investigated the relationship between socio-cultural practices and fisheries were limited to their influence on fishing activities and fishermen's perceptions. Adjei and Sika-Bright (2019) investigated how traditional beliefs and practices were still held on in Ghanaian fishing communities in the wake of Christianity and Islam and their influence on the fishing activities of these communities. Dosu, (2017) identified the socio-cultural beliefs and taboos practiced in fishing communities in Ghana and further looked at how these beliefs and taboos were perceived by fishers and fisheries authorities. Howbeit, their impact on the management and sustainability of the resource, and to what extent they hinder fish production remain a knowledge gap. The study therefore sought to describe some socio-cultural practices in the marine small-scale fisheries and evaluate their possible effects on some traditional and formal fisheries management strategies, and consequently on sustainability of the resource. The bottom-set gillnet fishery is a vibrant fishery common along the central coast of Ghana.

Experimental

Study site

The study was conducted at Apam (5º17′05″N, 0º44′13″W) and Egyaa No.1 (5º10′60″N, 1º6′0″ W) in the Gomoa West district and the Mfantsiman Municipality respectively, in the Central Region of Ghana. Apam is a major urban fishing community, and the fishing industry involves the use of purse seine nets, drift gillnets, hook-and-lines, and set gillnet, with the latter comprising the bottom and mid-

water set gillnets. Egyaa No.1 is a rural fishing community with fishing being done solely by the use of the bottom-set gillnet.

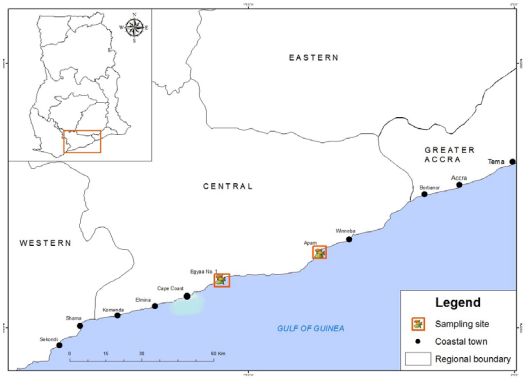

Fig.1: Map of the Central Region of Ghana showing the sampling sites for the study.

Methods of data collection

Primary data was collected through fisher interviews and field observations over a period of five months. A total of 30 fishers were selected from each fishing community and interviewed individually using an interview guide. Fishers were selected based on their activeness in the fishery and their availability. The mean number of canoes operating the bottom-set gillnet at Apam and Egyaa No.1 was 23±3 and 39±8 respectively (Ameworwor, 2018 (Unpublished raw data)). Thirty fishers were therefore selected to possibly get a respondent per canoe. For ethical concerns, verbal informed consent was obtained from every participant of the study.

Field observations

Fishing activities at the landing beach were observed to identify socio-cultural indicators on which fishers were later interviewed. Fishing activities were also observed to identify active fishers in the fishery. Fishers observed to be going or returning from sea, selling their catch, and or mending their gears were considered to be active in the fishery.

Fisher interview

Fisher interview was aimed at investigating socio-cultural indicators associated with the operations of the bottom-set gillnet fishery at Apam and Egyaa No.1. Active fishers identified were selected at the landing beach based on their willingness to grant the interview.

Data analysis

Data collected were analyzed using IBM Statistical Package for Social Science version 21. For the purpose of analysis, data were categorized and coded. All p-values stated were considered to be significant when less than 0.05. Descriptive statistics was computed to summarize and describe the responses. Comparisons across study sites were carried out using bivariate Chi-square analysis for categorical variables, and one-way Analysis of Variance (ANOVA) for continuous variables. Correlation analysis was done to determine the association between some of the indicators that define the socio-cultural practices.

Results

Fishers interviewed were between the ages of 18 to 70 years, with the number of years in fishing ranging from 3 to 53 years and a mean of 22.6±12.7 years in fishing. Respondents were introduced to fishing at young and varying ages and were engaged in tasks including joining others on fishing trips, mending of fishing gears, and helping with logistics for fishing trips. Figure 2 shows the percentage occurrence of various ages at which respondents were introduced to fishing. Majority of respondents asserted to have been introduced to fishing in their early teenage years (11 to 15 years) at both Apam (40.0%) and Egyaa No.1 (31.4%). Variation in the age at which respondents were introduced to fishing was not significant ($F = 0.418$, $df = 1$, $p = 0.521$) between the two fishing communities. Also, there was a strong positive association between age of fishers and

number of years spent fishing at both Apam and Egyaa No.1 (Table 1).

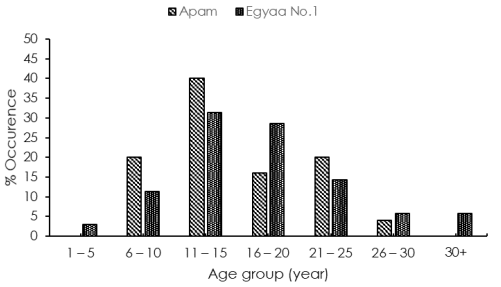

Fig. 2: Percentage occurrence of various age groups at which fishers in the bottom-set gillnet fishery were introduced to the skill of fishing.

Acquiring the skill to fish was either based on personal interest in fishing, or fishing being a family trade. At Apam (72.0%) and Egyaa No.1 (68.6%) most respondents acquired the skill of fishing based on it being their family trade (Table 1). There was no significant difference ($\chi^2(1, N = 60) = 0.082$, $p = 0.775$) between the two communities in the number of fishers that acquired the fishing skill through their personal interest or family trade. Again, 88.0% and 74.3% of fishers interviewed respectively at Apam and Egyaa No.1, had no alternative livelihoods, as fishing was their main occupation, with the two communities showing no significant difference ($\chi^2(6, N = 60) = 3.086$, $p = 0.798$).

It was observed in the communities that fishing businesses were either solely owned or owned through partnership, the latter of which was of three types. Partnership Type I existed between two people, where one partner owned the canoe and the other owned the gear (fishing net), and both were part of the fishing crew. The catch was shared between the two and other crew (if any). Type II was between a canoe and gear owner, and another gear owner. The two partners formed part of the crew and the two fishing gears were fished simultaneously. However, catch from the two gears were not combined, rather, catch from a gear was solely owned by the owner of that particular gear. Two or three people were involved in partnership Type III. For this partnership, one partner owned the canoe, another owned the gear and the third one did the fishing (where three partners were involved), or one partner owned the canoe and gear, and the other did the fishing (for two partners). The canoe and/or gear owner was usually not part of the crew, and the catch was shared among all partners.

Ownership of fishing businesses by partnership was observed to be the most common in the two fishing communities (96.0% and 91.4% of respondents respectively at Apam and Egyaa No.1). The occurrence of the various partnership types in the fishing communities is shown in Table 1. Most of the respondents at Apam (70%) and Egyaa No.1 (53.1%) were involved in partnership type II. There was no significant variation between the two communities ($\chi^2(3, N = 60) = 4.010$, $p = 0.260$) in the number of respondents involved in the various partnership types. Canoe owners formed 72.0% of respondents at Apam and gear owners formed 84.0%. At Egyaa No.1, majority of respondents owned gears (68.6%) compared to canoes (40.0%).

Tuesday was supposed to be a fishing holiday at Apam and Egyaa, however, all respondents in the two fishing communities affirmed fishing on Tuesdays. Fishing was done every day of the week in the fishery. Fishers set nets, and landed catch even on Tuesdays. Compliance to the traditional fishing holiday was based on the soak time (duration of time from deployment of the fishing net to its retrieval from the water) decided on by a fisher. Setting of the net and hauling in of the catch on the same day was however avoided on a Tuesday.

TABLE 1

Various indicators that defined the socio-cultural characteristics of the Bottom-set gillnet fishery at Apam and Egyaa in the Central Region of Ghana

Socio-cultural indicators	Study site	
	Apam	Egyaa No.1
Association between age and years in fishing (*r*)	0.91	0.79
Acquisition of fishing skill (%):		
Family trade	72.0	68.6
Personal interest	28.0	31.4
Alternative livelihood (%):		
Yes	12.0	25.7
No	88.0	74.3
Fishing business partnership (%):		
Partnership type I	16.7	12.5
Partnership type II	70.8	53.1
Partnership type III	22.5	34.3

**r* - Pearson coefficient

Discussion

The high proportion of respondents that entered the fishing as a family trade and were introduced to fishing between the ages of 11 to 15 years revealed that fishing in Ghana is largely a family business and children in fishing communities were taught the fishing trade from a tender age. The observation was in line with findings made by Lawson (1968), and Marquette *et al*. (2002) concerning the family business nature of Ghanaian small-scale fisheries. Asiedu & Nunoo (2013) made similar findings where most respondents in their study were introduced into fishing by a relative, mostly a father. Dosu (2017) also reported that boys started learning how to fish by accompanying their fathers to sea as early as age 10. This was to ensure that most males, if not all, in fishing households follow and maintain the family tradition of fishing. The socio-cultural practice of enrolling male children in fishing households into fishing from a tender age to ensure continuation of the family trade encourages overcapacity in the fishery. The objective of this practice therefore sharply contradicts the objective of governmental fisheries managing institutions to depopulate the small-scale marine fishery sector. Overcapacity has been identified as one of the major factors threatening the sustainability of some economically-important fish stocks in Ghanaian waters (Ministry of Fisheries and Aquaculture Development, 2015).

The exposure of male children to fishing from childhood, and fishing being a family trade, suggest that fishing units (canoes, fishing nets and outboard motors) were possibly handed down from generation to generation as an inheritance, and fishing may probably be the first trade that male children in fishing communities were exposed to. These perhaps had an effect on their choice of occupation, as suggested by the high proportion of respondents without alternative livelihoods. In most rural fishing communities, the choice of fishing as a livelihood may be due to fishing being the best available option (Cobbina, 2018). A number of authors have recommended alternative livelihood as a management option towards reduction of effort and overcapacity in Ghanaian fisheries in the face of declining stocks (Aho, 2013; Asiedu & Nunoo, 2013; Coastal Resources Center, 2013; Friends of the Nation, 2015; Nunoo & Asiedu, 2013; Nunoo *et al*., 2014). Alternative livelihood programs in fishing communities have targeted fishers and other active players in small-scale fisheries with the objective to gradually minimize or completely stop their dependence on fishing. Contrariwise, this study revealed (by the strong positive association between age and years in fishing) that as people enter fishing as children,

most of them remain fishing most of their lives. This may explain the failure to achieve long term positive impact on fishing effort reduction (Lazar *et al.*, 2018), as most fishers return to solely fishing after practicing their alternative skill for a short while (Monnereau & Pollnac, 2012). To ensure fishing effort reduction through alternative livelihood, alternative options of livelihood should be introduced at ages when children are likely to start receiving training in fishing. Alternative livelihood programs should therefore target the young age group (11 to 15 years) in fishing households and not only the older fishers, in order to expose them to other livelihood choices other than fishing.

The business nature of the small-scale fisheries was defined in the current study by unique partnership systems which were characterized by involvement of the canoe and/or gear owner in the fishing operations (Marquette *et al*., 2002), and sharing of the catch among the fishing crew (Acheson, 1981). Partnership type II, which was practiced by majority of the respondents resulted in many gear owners, and comparatively less canoe owners as confirmed by the results. Most of the canoes encountered in the study were embossed with numbers. This implied those canoes have been documented by the fisheries managing body, the Fisheries Commission, as effort units in the bottom-set gillnet fishery. Accounting for fishing effort based on the number of canoes, which is usually norm, will result in underestimation of fishing effort in the bottom-set gillnet fishery as two gear owners fish simultaneously, using one canoe. Estimating fishing effort based on number of fishing gears or number of gear owners may give more reliable estimates. This socio-cultural practice is therefore a limitation to reliable effort data for informed management decisions. The partnership systems, nonetheless, may be beneficial to the fishers by lowering their individual input cost, and increasing their profit as premix fuel and extra labor cost are shared among partners.

The taboo of no fishing on a certain day of the week, according to Dosu (2017), is the most predominant socio-cultural practice among Ghanaian small-scale fishers. As social instruments, this and other taboos have been guiding traditional natural resource management, ensuring the protection of aquatic species in their habitat. Reasons given by respondents for fishing on Tuesday were in line with exceptions to the taboo reported by Abane *et al.* (2013). According to the authors, going to sea before Tuesday and staying at sea, or returning to land on Tuesday does not amount to a violation, but selling the catch on the Tuesday violates the taboo. The violation of the taboo by the bottom-set gillnet fishers by selling their catch on Tuesdays may possibly be due to, in modern day, non-availability of fish storage facilities such as cold rooms and freezers at the landing sites to safely store their catch for sale the next day. However, if the violation was based on availability of storage facility, then it could be avoided by just not going to sea on Tuesday. This was because, the taboo was established long before the arrival of modern fish storage facilities on the coast of Ghana, yet, it was observed sacredly until recent times. While in some fishing communities in Ghana nobody is allowed to enter the water with a gear or canoe on a fishing holiday (Dosu, 2017), the exceptions to the taboo (Abane *et al*., 2013) in Apam and Egyaa No.1 have offered a loop hole for its violation in recent times. The objective of this traditional management strategy will be defeated in communities like Egyaa No.1, where only the bottom-set gillnet is used. As revealed by Katikiro *et al.* (2014), due to perceived changes in the fisheries, once sacred things are losing their sacredness, leading to diminishing respect for nature, and violation of

religious taboos. Pauly (1994) also confirmed the breakdown of traditional management schemes, coupled with non-enforcement of formal management regulations, as symptoms of *Malthusian overfishing*. As defined by the author, this type of overfishing occurs when fishers continue to fish in the face of resource decline due to poverty and lack of alternative livelihood, and with the number of fishers increasing with time through recruitment of their own male children and new entrants. These could explain the violation of the fishing holiday taboo in Apam and Egyaa No.1. Disregard of fishing taboos, which were once strictly observed, suggests a breakdown of traditional fisheries management systems, which further puts the future of the Ghanaian small-scale fisheries at risk of collapse.

Conclusion

The study revealed that though some socio-cultural practices may be effective as tools in fisheries management, the objective of some others directly conflict with the objective of some traditional and formal fisheries management strategies. That is, while some socio-cultural practices are drivers to achieving fisheries management objectives, others become a drag. Understanding the various socio-cultural practices of fishing communities is therefore important for the development of effective fisheries management strategies. The study recommends that natural resource managers should study and understand the objectives of the socio-cultural practices of resource users to guide them in the development of their management strategies. Secondly, alternative livelihood programmes in developing countries, aimed at reducing fishing effort, should also target the young age group in fishing households, and not only fishers. This will expose them to other livelihood choices other than fishing, and contribute to reducing overcapacity in small-scale fisheries in the long term. Also, for more reliable estimates, fishing effort in Ghanaian marine small-scale fisheries should be estimated based on number of fishing gears or number of gear owners rather than the usual number of canoes.

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