

Full Length Research Paper

The nature of economic institution in In-land fishing communities of the Lower Volta

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The economic institution and other social institutions such as polity (governance), beliefs or religion, education, family (marriage) influence individuals and the community at large. Their characteristics, preferences and attitudes also maintain or support social relationship, focusing on mechanisms to accommodate strains within relationships (negatively or positively). The study looks at the ability of economic institution to support the introduction of cage culture or innovation in Inland fishing communities. Data were collected through the use of key informant interviews, focus group discussions and quantitative questionnaire administration. The study investigated the potential of economic institution in the adoption of fishery innovation among fishing communities in Dzemeni and Kpando-Torkor. In addition, fisher-folks' knowledge and perception of the economic institution's capabilities were documented. Results indicate that although the economic institution helps to bring jobs, while assisting fishers to easily dispose of their fishes and wares to other city and town dwellers in earning a living for their families, the nature of transportation and increases in fuel prices does not support the fishing industry. It gives the rich "the Market Mummies" opportunity to exploit the fisher-folks through loans and savings. In addition, most respondents had enough knowledge on the capacities of the economic institution, although norms and values in the fishing sector do not allow women to freely take-up fishing. The study therefore recommends that economic growth and other opportunities should be reconciled with the maintenance of values and norms in the economic institution for sustainable development to reduce exploitation by a few through giving of financial supports.

Key words: Volta Lake, economic institution, social institutions, capacities, In-land fishing and innovation, introduction of cage-culture.

INTRODUCTION

The fisheries sectors in many African countries such as Ghana, Namibia, Senegal and Uganda contribute over six percent to their national GDP (gross domestic product). Fish is also an important and inexpensive source of protein, providing at least 50 percent of the essential animal protein and mineral-in-take for 400 million people from the poorest African countries (World Bank, 2004). In Ghana, most communities along the Volta Basin are fishing communities. These communities are sources of large supplies of fresh water fish to the country and its sub-regions. Major economic activities in

these areas are fishing, processing of fish, selling of fish, farming and trading in household goods. These towns in the study area serve as major marketing centres for fish and other produce brought into the communities, from other cities, towns and villages.

Since 1968, there have been efforts by the Ghana Government to develop fisheries in the riparian communities of the Volta Lake (Gordon and Amatekpor 1999). It is believed that the introduction of fish cage culture would improve the livelihood of people within these communities. A study conducted by Pittaluga et al.

(2003) concluded that fishing villages on the Volta Lake are disadvantaged, due to the remoteness of the area and lack of socio-economic infrastructure. Remoteness here is due more to lack of adequate access to the towns. Braimah et al. (2003) and Sutherland et al. (2004) also emphasize that the decline in the fishing industry of the Volta Lake is due to the creation of the dam which compelled people living within these communities to move upstream for their livelihood.

Fish cage culture utilizes existing bodies of water such as dams, rivers, lakes, bays, reservoirs and coves but encloses the fish. This is one of the effective technologies used in raising tilapia. It started out in 1974 in Sampaloc Lake and Laguna Bay and the widely spread practice is found in different regions like in Magat Dam Reservoir in Region II, Egypt, India, and in most parts of Asia. There are two types of cage design - fixed and floating. The fixed cage is suitable with a water depth of 1 to 5 meters and the usual size is 50 to 200 square meters. The floating fish cage, on the other hand, is from 5 meters deep and about 50 x 25 x 3 cubic meters depending on the location of the fish cage. Cage aquaculture has certain advantages over other aquaculture systems that are potentially important in terms of uptake by rural poor and landless people. The integrity of the cage unit means that large, communal water bodies have the crucial ability to culture.

Social institutions such as polity (governance), economics, beliefs or religion, education, family (marriage) influence individuals and community; their characteristics, preferences and attitudes are sometimes a source of conflict and affect communal agreement. They also maintain social relationship, focusing on the mechanisms for accommodating strains within relationships as cited in Cuff and Payne (1984) and Ritzer (1983).

Besides those who catch and produce fish, there are those who process fish and market them and those whose livelihood depends on services to the fishing sector. Marshall (1920) explains that the economic institution comes in to support people to achieve maximum satisfaction from the choices they make in their material wants. He further explains that the economic institution provides and distributes the material resources needed by members of a society to survive. This emphasizes Anthony's (1990) explanation that the economy provides a platform for the production and exchange of goods and services that generate income to improve human needs, wealth and wellbeing. It forms the basis and motivation for work. Fukuyama (2006) also explains that less optimal formal institutions can often be made to work, given the right leadership, judgment, and political will. He also noted even the best institutions will not work well in the absence of a supportive political culture, that is, the matrix of informal norms, values and traditions. This is emphasized by Chu (2003) that economic performance or growth is influenced by polities, since they define and enforce the economic rules of the game. The study took a

look the influence and support of education, family religion and authority in economic development. Under economic institute, the study provides information on how fishers' age, gender and occupation could impact on increasing fish production with cage culture in the Volta Basin. It also looks at the intermediation on the economic institution from government involvement, access to capital, transportation, availability of market and freedom to trade (taxation), types of credit and financial systems. It also examines the labour system and education, presenting their importance in determining the ability of the economic institution to support increase in fish production. In addition, education and the welfare of fishers are also examined.

The problem of the study

The introduction of fish cage culture could increase fish production in the Lake. However, the problem is the potential or nature of the economic system to support an increase in fish production. That is, does the present economic system create an enabling environment for the fishers to take advantage of the fishery innovation? Despite the potential of the fish cage culture to increase fish productivity, not much has been done to study the economic institution's ability and the enabling environment to support an increase in fish production.

This paper seeks to address this research gap, to help solve the problem of fish decline in Lake Volta (MoFA, 2004; NDPC, 2006).

The objectives of the study

To study the existing basic economic institution and its ability to accommodate an introduction of cage culture method for increasing fishery productivity among fishing communities in Dzemeni and Kpando-Torkor of the Volta Basin of Ghana.

- Ascertain the potential of economic institution with reference to the adoption of fishery innovation.
- Find out and document fishers' knowledge and perception of the economic institution in the communities.
- To make recommendations based on finding for measures to ensure integration of cage culture.

Insight into study area: background

Dzemeni and Kpando Torkor are riparian fishing communities along the banks of the Volta Lake, in the Volta Region of Ghana. Dzemeni is in the South Dayi District, a newly created district which lies within latitudes 3°20'N and 3°35'N and approximately on longitudes 0°17'E. Kpando and Hohoe to the North with Ho in the East and the Asuogyaman District in the South border it. The Volta Lake forms the Western boundary. Most of

Table 1. Number of respondent.

Type of data	Respondents
Qualitative data	30 opinion leaders 130 (FGD)
Quantitative data	70 fishers

these towns mentioned above serve as major marketing centres for their fish and other produce brought into the communities from other towns and villages. The language spoken is Ewe and there is unity in Dzemeni community under a traditional leader, hence they have respect and recognition for chieftaincy issues (South Dayi District Assembly Development Plan, 2006; Kpando District Report, 2005).

Major economic activities in both areas are fishing, processing of fish, selling of fish, farming and trading in household goods. These goods arrive across the Volta Lake, from the Afram Plains. Some are transported by cargo truck to other parts of the Volta, Eastern and Greater Accra Regions. The major tributaries of the Volta River that serve the fisher-folks of these areas are the Rivers Amu, Afram, Efa, and Danyi. According to the late Togbe Teffutor Oko II of Dzemeni, majority of the fisher folks in the area are migrants from fifteen (15) ethnic groups. These are made-up of the Battors, the Mafi, Vakpa, Sokpe, Vumes, Dofors, Vodoss, Agares, Adas, Fantis, Hausas, Zammlamas, Peki-Wudomes, Mepe and Tefle. The first settlers in the area came from Tongu, the Southern part of the Volta Lake to their present settlement. The main natives, according to the chief, were hunters who came to settle in Dzemeni until the floods, which brought them to their present location. According to the chief fisherman, the first settlers were Togbe Tublo and Togbe Gati. Fishers, who fished from the creeks that existed before the flooding of their lands later, joined the two chiefs and his people in the present Dzemeni town.

Kpando Torkor located in the North-western part of the Kpando District shares boundaries with the Afram Plains District and the Volta Lake. Majority of the people speak Ewe. Tongu, Anlo, Fantis and Ada who lived about 8 kilometres away from the present Torkor land are part of the settlers in the Dzigbe community. The settlers moved to their present settlement to join a farmer, Mr J. K. Donkor, also known as Dzigbe during the 1965 flooding of the Volta River (Kpando District Report, 2000).

An in-depth interview conducted with Togbe Ken Adom of Kpando Torkor and the Kpando District Assembly planner, Mr. Fred Alkty revealed that currently there are Ningos, Fantis, Gas and Nzemas from the Central and Western regions of Ghana who also contribute to the number of settlers in the community. The chief fisher, who handles fishery issues, is selected from the various groups to become leader of the various ethnic fishing groups. The natives of the study area are farmers, a minor activity in the area compared to fishing. Other activities in both communities are trading in food-stuffs

like cassava, "gari", maize, yam, tomatoes, local red rice, beans, pepper, charcoal, ruminants and fishing gear which is another fast growing activity in the area. Dzemeni town is fast growing with lots of migrants from the Northern region of Ghana, who deal mainly in the rearing and sale of animals. Kpando –Torkor is an old fishing complex area, which has deteriorated. People from Niger come all the way to trade and fish in the Volta Lake. Most of the fisher-folks are migrants who have settled in these communities.

METHODOLOGY

For the purpose of this study, both quantitative and qualitative data was collected (Table 1). Secondary data were collected through desk review in addition to information on the study area. Closed and open-ended questionnaires were administered to fishers in the study area, along the Volta Basin to obtain fishers' knowledge and views on the nature of existing economic institutions. Data on existing basic economic institution and their ability to accommodate an introduction of cage culture was solicited with questionnaire, Focus Group Discussion (FGD) and a community workshop with an NGO, Rural Wealth and CSIR Food Research Institute. Semi-structured questionnaire was used in interviewing of key informants as emphasised by Adger (2000). Both open and close ended questions were administered to the fishers. At the end of each interview, the questionnaire was checked for consistency and completeness. Quantitative data collected were coded for easy analysis in variations using the SPSS and Microsoft Excel. Qualitative data were analysed by content analysis.

Rapid Rural Appraisal was also used to cross-check and to validate information obtained through the workshops. This helped to fill information gaps, and to include the voices of project beneficiaries. A cognitive research was undertaken, using the scaling methods to measure the strength of the attribute of the economic institution.

Among the respondents and people interviewed were reverend ministers, pastors, traditional chiefs (Information collected at Kpando Torkor and Dzemeni on January 8th to 20th 2007). Other respondents included leaders of the various fisheries groups, head teachers, fisheries officers of the Ministry of Agriculture, some fishers from the communities and the chief fishermen. Some national award winners in fishery, the minister for fisheries and the chief director for the Ministry of Fisheries as well as the Assembly men in both communities were questioned. In addition, some heads of families and nurses from the communities were also included. Informal consent was sought from all study participants.

The researchers stayed in the study areas for a period of one and a half months respectively. Staying in the communities helped to build familiarity and rapport. It also facilitated informal discussions and demonstrated some commitment to the community (Kumekpor, 2002). In

addition, it enabled questioners to take advantage of impromptu conversations with fishers and record them.

The sample frame

The pilot project for this adaptive strategy was carried out in two (2) fishing districts located in the Volta Basin of Ghana namely, South Dayi and Kpando District Assemblies. The total population of Dzemeni and Kpando_Torkor according to the 2000 Population and Housing Census of Ghana is 3,403 in Dzemeni and 2,702 in Kpando Torkor, with an average GNP/capita of US\$372 (CGIAR, 2004) (The GNP/ capita of communities in the Volta Basin ranges from Mali with US \$190 to Côte d'Ivoire with US \$710, making these areas one of the poorest regions of the world. The poverty line in Ghana is C700,000 cedis and C900,000 cedis per adult per year, at the 1999 constant price value, which is equivalent to about US \$90 (CGIAR, 2004)). In each district 3 villages were selected using stratified sampling. In all, 230 people were selected proportionally to the total number of villages accounted for by the districts and their nearness to the Lake. The study was done through the use of household survey and questionnaire administration. Ten questionnaires were not added due to the fact that ten respondents from Kpando-Torkor barely completed their questionnaire and some did not submit their questionnaire.

Theoretical underpinning

The study is based on the theory that the performance or potential of the society or economy as a whole is dependent on the social institutions, in ensuring its survival and growth. This is based on the assumption that certain basic necessities in the economy is provided to facilitate its survival and development (Parsons as cited in Haralambos and Holborn, 2000). Many functionalists believed generally that the basis of agreement by members in a society is on value consensus where there is maintenance of order, stability and cooperation in the society. Assimeng (2006) also indicates that there is strength (capacity) in togetherness as well as in solidarity. This collaboration among the social institutions helps to strengthen each other to ensure its survival and growth. North (1990) also believes that the importance of an institution in the growth theory, or more generally economics, is in analysing the economic institution. Proponents of free-market insist that if yes indeed institutions matter, then they do so in the way that those institutions that promote the dissemination of the market logic to other possible areas within the society are beneficial. Whereas institutions that hinder market mechanisms (in getting the prices right) are detrimental to growth and welfare. In Amable and Chatelain (1995), it is

indicated that a bank-based financial system favours long-term innovation projects, whereas a market-based financial system favours short-term projects. Palokangas (1996) explains "wage bargaining conducted by trade-unions is favourable to the workers' wages, which incites skilled people to innovate and is in the end favourable to growth...." The potential of the economic institution is mainly through support in the form of finance or advice (Adger and Kelly, 1999).

Benabou (1996) explains that socialization, education and issues that pertain to information influence the individual's accumulation of human capital. North (1990) is also of the view that, the incentive structure of a society and political institutions are the underlying determinants of economic performance.

JUSTIFICATION

To ascertain the potential of the economic institution, the study identifies and documents current issues within the economic institution of two fishing communities in two districts of Ghana, to be used by stakeholders in fishery to promote cage culture method in similar communities. Chambers (1970) explains that social and administrative problems encountered by the Volta Basin resettlement program were lack of social cohesion, differences in dialects and mannerisms, political rivalry between chiefs, rural system of owning allegiances to tribal chief. Social institutional influence on innovation backed by research findings had been appreciated over considerably long periods and had influenced the incorporation of technology in the activities and issues pertaining to livelihood.

As indicated by Amu-Mensah (2007), although the economic institution was ranked third as one of the most important social institutions, there should be a way in which policy reforms can change the power structure to strengthen the role of the economic institution. This, according to Stuart (1997), will improve its performance to positively influence fishery innovation. An institutional analysis of modern social systems of innovation and production can be made, using the concepts of complementarity and hierarchy of institutions. The East Timor National Development Plan Report (2005) shows how social and cultural structures can be barriers to economic growth thus influencing a nation's effort to reduce poverty. According to Agyenim-Boateng (1989), traditional authority, religion and the family are institutions that can have coercive power over an individual's perception and choice in riparian communities.

Hence, the starting point for addressing the institutional capacity is by examining the economic institution's relation to fisheries resource use and the kind of support it offers to boost fisheries development. Thus the usefulness in promoting the exploitation of cage culture potential to reduce hunger will help Ghana to achieve one

of the Millennium Development Goals of providing food security in Ghana (MoFA, 2004).

Similar studies conducted in the Philippines and Tanzania by Tietze et al. (2001) show the number of fisher-folks had started to increase due to the support of social institutions to take advantage of new improved opportunities, in addition to other changes in infrastructure that are more recent. This has led to more occupational shifts into fishing from other sectors of the rural communities.

Potential of the economic institution

The economic institutional influence in fisheries productivity is mainly through direct and indirect means; some affect the individual and the community positively and negatively. They also occur in the form of putting the right infrastructure in place to promote development as well as economic direction that helps individuals to adjust to changes or difficulties in the development of their lives. The above information explains the performances of the society as a whole with the assumption that meeting certain basic needs of the society facilitates its survival and development (Parsons as cited in Haralambos and Holborn, 2000).

Certain values and norms of the society, which are subtle like taboos concerning use of the lake, are still being adhered to, since they are part of the socialization processes of the fisher-folks' lives. These attitudes when acquired are difficult to erase from everyday societal life. Most of the fisher-folks and the opinion leaders spoken to during the rapid rural appraisal and the focus group discussions gave their impressions on how the institutions influence or affect their livelihoods. The study took a look at the influence and support of education, family religion and authority in economic development. Under economic institute, the study provides information on how fishers' age, gender, occupation, finances, market availability and transportation could have impact on increasing fish production with cage culture in the Volta Basin.

Occupation of respondents

Until recently the term fishermen instead of fishers was used to represent people who fish or people involved in the fisheries sector. It is therefore not surprising that majority of the respondents, forty-one representing nearly 59%, were males while twenty-nine, making up nearly 41% of the total respondents were females.

The indicator in Table 2 helps to establish the fact that males are the majority in the fisheries sector. Most of the women interviewed however indicated that they support their husbands by processing the fish they catch. From Table 1, the question as to what their occupation was,

established that, 42 of the respondents representing 58.6% were fishers, the rest of the respondents, 41.4% make up the number of processors. Some respondents worked only as fish smokers, or as traders in fresh fish. One person representing 1.4% was into drying and salting only. Only one woman out of the 29 women interviewed indicated that she was in the fishing business as well as into the processing and trading of fish. This explains why the number of fishers has moved to 42 instead of 41 males interviewed. Some of the respondents both male and female indicated that they either smoked, or traded in smoked fish. According to the chief fisherman in Dzemeni (Mr Golo Godstime), the community considers fishing as a difficult job, and therefore women need to concentrate on the processing aspect, which is closer to the home.

The age and gender in the economic institution

Respondents were between the ages of 35 to 55 years; most of them had at least primary education, while others had secondary and tertiary education. Some had not been to school at all, but are successful in business ventures.

A cross tabulation of gender and age shows that majority of the respondents in both age groups are between the ages of 35-44. The data also give an indication of the number of female and male working in the fishery sector. Most women between the ages of 15-24, that is group one, are either in school, into other businesses or not interested in the fishing business. They could also be busy taking care of their young ones since many of the young ones were observed carrying their younger siblings. Majority of the women in the fishery business are within the age group of 35- 44, the productive age group suitable for any absorption.

Education

In a comparative analysis of the two different communities, Dzemeni had 17.5% making up 7 respondents, who indicated that they have had no formal education, which is about the same number of fishers who have education secondary. Yet in Kpando-Torkor 46.7%, representing 14 of the fisher-folks interviewed do not have a formal education, which represents majority of the fishers in the Kpando-Torkor community.

The age is presented in groups of five as indicated in Table 3.

Majority of the respondents fell within the young and strong work force as seen from Table 4 with a mean value of 3 and a standard deviation of 0.939. The age range of this population lies within 25 to 55 years, representing 97.5% of the total number of respondents. Dzemeni's age group ranges between 25 and 44, making

Table 2. Type of occupation.

What is your occupation?	Frequency	Percent
Fishing	42	58.6
Processor- (freezing, smoking, salting, drying)	16	24.3
Smoker	5	7.1
Trader in Fresh Fish	6	8.6
Drying and Salting	1	1.4
Total	70	100.0

Source: Fieldwork.

Table 3. Gender and age groups cross-tabulation of respondents.

Gender	Age groups (5 Groups)					Total
	15-24	25-34	35-44	45-55	56-64	
Male	3	5	25	8	0	41
Female	0	2	13	6	8	29
Total	3	7	38	14	8	70

Source: Fieldwork.

Table 4. Characteristics and respondents level of knowledge (Descriptive Statistics).

Age	Mean ± standard deviation	Sample size	p-Value
Entire sample	3.24±0.939	70	2.301-4.179
Dzemeni	3.10±0.871	40	2.229-3.971
Kpando-Torkor	3.43±1.006	30	2.424-4.436

Educational level	Mean ± standard deviation	Sample size	p-value
Entire sample	3.10±1.678	70	1.422-4.778
Dzemeni	3.45±1.535	40	1.915-4.985
Kpando-Torkor	2.63±1.771	30	0.859-4.401

Knowledge	Mean ± standard deviation	Sample size	p-value
Entire sample	1.69±0.468	70	1.222-2.158
Dzemeni	1.75±0.439	40	1.311-2.189
Kpando-Torkor	1.60±0.498	30	1.102-2.098

Source: Fieldwork. *means significant of 0.5.

up 72.5% of the population. Kpando-Torkor's age group is within 25 to 55 plus, making up 76.6% of the population.

Dzemeni's workforce appears to fall within younger and stronger age bracket.

With education the entire population falls within the first and fifth range which comprises those who do not have any education (30%), those with Middle School Leaving Certificate (MSLC) and secondary and commercial / vocational education. Those with high education do not fall within the range. This indicates that highly trained people do not appear to take up a trade in the fishing industry in both communities.

Dzemeni's respondents fall between the second and fifth education range, with the mean age of three. This indicates that 95% of the 40 respondents are within the primary to commercial/vocational education group. Kpando-Torkor's respondents fall between those with no education and those with secondary education. Data collected also show that about 46.7% of the respondents do not have any education.

Knowledge and awareness condition of respondents was analysed on the basis of what they know about the chief fisher's functions in relation to their fishing activities. There was a "Yes (3)", "No (2)", "Not sure" (1) and "Refuse to answer (0)" response from respondents, with

explanation to assess the depth of answers given.

With a mean study population of 1.69 it was evident that the study population has good knowledge of the activities of their chief fisher. Though 68.6% of respondents gave the right explanations to the activities of the chief fisher, some did not have any idea about his importance in their fishery activities let alone what his responsibilities were. Knowledge is very important for an uptake of any innovation; therefore the study indicates the need for education.

Results indicate that majority of the fishers have attained some level of education, taking into consideration those with MSLC, secondary and commercial/vocational education.

From each of the communities, 10% of the respondents have attended a commercial or vocational institution, which implies that they had learnt some trade; yet these respondents are working as fishers. This could be attributed to the fact that the fishing business is good compared to other jobs in the community. The absence of tertiary trained people in the fishing population however indicates that the trade may not be attractive to them. Socialization of young ones into fishery is very common and this was confirmed by the fishers who indicated that fishing is part of their culture and it was therefore difficult to move into other trade areas. In Kpando-Torkor in particular, many more people without education are in the fishing trade and this could be either due to less access to formal education or to strong cultural attachment to the fishing trade.

The nature of the market

A market "day" in Dzemeni starts from Wednesdays and ends on Fridays. Wednesdays are for the wholesaler who will sell to the second or third retailer coming from other towns and cities, as well as those who bring in foodstuffs and wares from nearby towns and villages. On Thursdays, the market mummies for fish do their purchases, load their trucks from Thursday to Friday, and leave the town on the same Friday. Every fifth day after a market is another market day for Kpando Torkor. This means that if a market day fell on the 25th of November, the next market day will be on the 29th of November. Unlike Dzemeni their market days last for only a day. It is however a taboo for a fisherman to sell to another man's wife without his consent. A breach of this rule or taboo can develop into an inter-family strife, which could lead to a divorce. In certain cases, the fisher-folks exchange fish for foodstuff or vegetables among friends and family friends within the community.

Fish traders send their produce to major markets in Ghana, Togo (Kpalime) and Benin. In Accra the Capital of Ghana, the traders sell at Agboghloshie and Adabraka. The traders also market their smoked-fish, ice packed or salted fish in other parts of Ghana, like Hohoe,

Golokwatie, Ho, Somanya, Odumase, Akosombo, Koforidua, Anum, and Tema. The fish traders sell only some selected types and sizes of fish to restaurants, hotels, and 'Chop bars' in the country. Some customers also come from the areas mentioned above to buy fish for retailing. Many of the fish traders are fishers' wives or customers who support the fishers financially or with nets, outboard motors and fuel. These groups of customers buy their fish directly from the fishers. Some of the buyers smoke the fish; others retail the fresh fish to fish smokers, who in turn sell the smoked fish to middle-persons buying in large quantities to retail to those who sell to the final consumers. Unlike the frozen fish, the smoked and salted fish goes through several exchanges before it gets to the last consumer at a very high price, taking into consideration the transportation cost involved.

The market areas consist of both open fish markets along the Volta Lake in Dzemeni and Kpando Torkor. Some have roofed stalls, although some still prefer to sell in the open space, due to its closeness to the lake and easy access to boat and ferry passengers who are their main source of market produce. The Kpando Torkor Market is part of a fisheries complex with fairly well developed infrastructure. It includes a fisheries school, store and a boat-building yard. Information from the Ghana Districts homepage on the internet (<http://www.ghanadistricts.com>) indicates that the facilities are currently not in use and have deteriorated. Dzemeni's open-air fish market is patronised by people from all over Ghana and Togo.

Preservation of fish

The "Chokor" smoker ovens are the major means by which fish smokers preserve their fish in the smoked state (Figure 1). Some fish smokers use the local ovens instead of the "Chokor" smoker which is more convenient and closer to their homes. This is because not every fish smoker has a flexible family obligation to go to the smoking centre housing the "Chokor" smoker.

The CSIR Food Research Institute (FRI) in a workshop at Dzemeni introduced a new oven called "FRI oven". According to Dr. Mrs. Margaret Ottah-Attipoe, a senior researcher of the Food Research Institute, the oven requires little labour and can smoke large quantities of fish compared to the "Chokor" smoker. The oven fire is not directly under the fish and this prevents the fish from charring. It is lightweight and easily operated by one person. Ice blocks made from big containers are sold to the fish processors interested in selling fresh tilapia and lates (Adanbge: "Lesi", Twi: "Akwebi") to their clients. Fresh fish sellers place crushed ice blocks in-between layers of fish in a raffia basket heavily lined with jute sacks to insulate the contents from outside heat. The Gratis Foundation and the Presbyterian Foundation have a fish-smoking project in Dzemeni and Kpando Torkor



Figure 1. “Chorkor” smoker at the smoking centre.

respectively. They support the fishers in the building of large smoking centres.

Taxation

The Ghana Government does not impose taxes on the fishers’ activities. However, some levies are collected from those who transport smoked fish to others towns. Officers of the fisheries department also prepare waybills for large quantities of fish that leave the communities (Information collected from Kpando and Dzemeni Fisheries Officers (Hukporti C. Kojo. And Duamakor Peter) 20th and 22nd July, 2006).

There is a complementary economic activity in the fishing communities, in addition to fisheries activities due to the potential of the area for farming. Both men and women take up farming with the assistance of other household members with the main aim of providing food for the family. Extra or additional income is made from the sale of surplus foodstuff sold to people in and outside the communities. Farming is undertaken during the lean season for fish, that is from February to June and part of July when the fish catch starts to increase. Some money is collected in the form of taxes at a barrier that has been erected by the district assembly, for goods that are transported beyond the barrier. An amount of GH 3.00 to 5.00 is charged for every basket of fish or 5 kg bag of maize.

Loans and savings

Some few fishers keep records of their sale and expenditure to be able to determine their profit; however this is not widespread and many of them realise the essence of book keeping very late, when they go bankrupt.

Sources of credit are mainly from family members.

Mainly, the women undertake the pre-financing of fuel, equipment, outboard motors, fishing nets, new boats and other essentials and in return, the fishermen are morally compelled to sell their catches to their creditors. The belief among some fishermen interviewed is that, the women get richer through this system of credit. In this way, there is a prolonged and increasing indebtedness of the fishers to their wives and other female lenders and the men are unable to put together a working capital. In Dzemeni, there is the National Inland Fishermen Council.

There are some banks in other nearby communities where the people can access loans but the idea of keeping money in the banks does not really appeal to most fisher-folks due to the high bank charges and interest on their loans. Interest rate on loans ranges from 10% every week from moneylenders to 30% per annum by the banks as at 2007. The fishers have easy access to their money from traditional savings co-operatives “Susu” immediately the need arises but with the banks, they sometime have to wait for weeks. The formal banking system is thus not very convenient for them. Among the banks that the communities can access in and around their localities are the Agricultural Development Bank, Ghana Commercial Bank, Anum Rural Bank and some other rural banks.

Traditional saving and credit groups “Susu” also exist in the communities, but the fishers have not really developed it well in Dzemeni although some fisher-folks are in such “Susu” associations. In Kpando Torkor, most of the “Susu” groups have died down due to mistrust among the fisher-folks. Sometimes Ten (10) to Forty (40) members make up the “Susu groups, who make periodic contributions to a collector, who may not necessarily be a fisher-folk. On weekly or on monthly basis, members contribute to the fund. The collector arranges for each contributor to receive the total contributions for the month in bulk. Each member in turns collects the share of money until the cycle money collection ends, with the last person on the “Susu list, after which the rotation begins again.

However, in case of an emergency, the group caters for the needy person even if it is not yet the person’s turn to collect the share of the money. They all have some mutual understanding in this system of putting their money together to support each other to purchase equipment and other necessities. Some of the fisher-folks indicated that they have started accessing money from the national poverty alleviation fund, but the amount involved is not enough to expand their businesses in any meaningful way. Some of the fisher-folks collect the outboard motor on lease to fish at GH C40.00 cedis per day. Leasing of outboard motors has become a source of income for some fisher-folks. According to some fisher-folks, this system supports the poor in the fisheries business to go to the deep parts of the lake to fish and earn a living. Most fisher-folks save money for future needs by investing in cows, houses, jewellery and cloth.

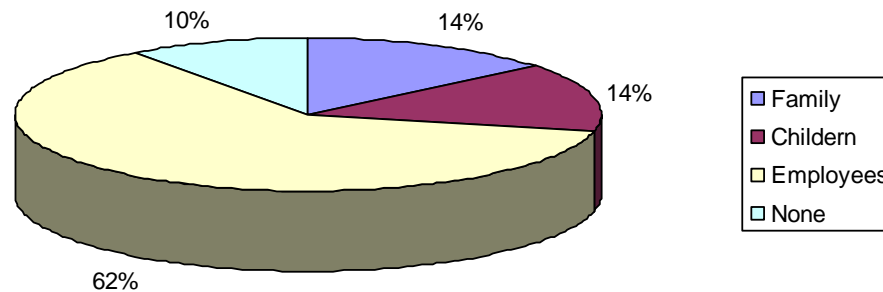


Figure 2. Category of assistants. Source: Field work.

The fisher-folks sell most of these items in times of financial crises, to make ends meet. Others also save with the banks, in exchange for accessing loans available in the banks.

Transportation

The Oil Marketing Companies (OMCs), GOIL Star and Allied Aviation are the major suppliers of premix fuel for the engines of the outboard motors. In most cases, the suppliers of fuel indicated that, the supply of premix fuel to the fishers is on credit. They only sell to the fisher-folks again only when payment for the previous credit is honoured. Waterways play a major role in transporting goods and humans from one village to the other and for marketing. Like access roads, waterways facilitate the growth of the local economy in the riparian communities. Transportation and commuting are costly due to increases in fuel prices. Most of the cargo and passenger boats, (Ewe: *Agbawhui*) use two to three outboard motors to power their engines. These boats play a major role in transporting fish and passengers from these major centres and beyond, distributing and collecting smoked fish from even the remote villages in the area. The cargo boats depend on revenues earned from fish transport, although they also transport foodstuffs and other product, fish and charcoal forms the greater part of their cargo, yet the fish weighs and costs more to transport. The larger boats always wait along nearby villages to pick cargo and passengers from smaller boats to the major marketing centres. Good and passengers are finally transported by big Nissan buses and trucks that come on market days to transport fish to the big towns and cities.

Labour

Category of people used as assistants

Respondents representing 14% said they use their family members as assistants in their fisheries activities, another 14% of the respondents said they make use of

their children after school (Figure 2). Forty three respondents forming 62% employed people to work for them and 10% of the respondents explained that they work alone since they are not financially sound to pay wages. They also indicated that most of their children were either very young to help or are in schools outside their district. Most of the respondents explained that they employ people from “over bank” meaning the Afram Plains, Yeji and other towns in other regions. Most of the fishery assistants have employment on contract basis and work for a period of one to four years or more, which helps the employee who is in most instances an apprentice, to learn the fisheries trade.

Fishers knowledge and perception of the economic institution

Questions were asked with reference to the importance and functions of their market, infrastructure, the chief fishermen and government officials in relation to fishery activities.

Respondents were of the view that the economy helps to bring in jobs while assisting them to exchange goods and services. Through this means, the fishers are able to earn a living to feed their families. Other respondents indicated that the economy creates the avenue for the easy disposal of their fishes and wares to people from other towns and cities for income. Through the sale of goods and services to outsiders, developmental activities also spring up, thus helping to cater for their needs and improve facilities in their community. In addition, the community is also able to provide better services to visitors who come there to buy and sell. These facilities also serve as a source of taxation for nation building. One of the complaints from the fishers was that the price of fish keeps increasing depending on the level of catch and this makes it difficult for many people to buy especially when prices are high. They also make losses during such times when fish is in abundance, especially when they are not able to readily dispose of their catch.

About 60% of the fisher-folks spoken to agree that the lack of fish supply is population driven. The belief is that

Table 5. Level of respondents' understanding of fisheries productivity.

Variables	Frequency	Percent	Cumulative Percent
Not at all understood	3	4.3	4.3
Not understood	1	1.4	5.7
Fairly understood	19	27.1	32.8
Understood	18	25.7	58.5
Very well understood	21	30.0	88.5
No Response	8	11.4	100.0
Total	70	100.0	

there are too many fisher-folks trying to earn a living from the finite resources of the Volta Lake. Some also indicated that the prices of goods and fishing inputs are very high due to the price hikes in fuel. According to many of the respondents interviewed, it is difficult to earn a living or sustain their families since loans are not easy to come by and if secured, the interest rates are very high.

The study shows that fisher-folks do not have an appropriate way of pricing their fish and it does not help them to get the fishes' worth. The market mummies rate the prices of fish very low when market days coincide with other towns. In this case the fishers are forced to sell their fish at very low prices due to lack of customers. Others indicated that there was the need to improve market facilities since the whole market becomes muddy and unhygienic during the rain. The fishers explained that the state of the markets does not encourage outsiders to enter their markets to trade and therefore prefer to trade elsewhere.

In Dzemeni, the National Inland Fishermen Council and other such associations enable people to act together for some common objectives. The associations help the fishers to access credit to support each other during sickness, deaths or births. Some fishers maintain loose ties while others have strong ties. Kpando-Torkor does not have this system of associations and almost all the fishers belong to the main National Fisheries Association. They only meet when the Ministry of Fisheries has some information for them or during their general meetings that take place once or twice in a year. The chiefs of the various ethnic groups head the different fishing groups, based on the different tribes. These leaders contribute to the regulation of fishing activities in both communities. In the case of Dzemeni, the chief of Dzemeni heads the chiefs of ethnic groups to bring about collaboration.

Knowledge in Fisheries productivity and dissemination of information

Most of the respondents understand what increasing fish productivity meant (Table 5). 4 of the respondents either did not understand at all or had heard about increased

fisheries production but did not understand what it meant. Nineteen (19) respondents had a fair understanding of what it meant to increase fisheries productivity. And eighteen (18) respondents said they understood the term.

Twenty-one (21) respondents representing 30% indicated that they understood the term very well. Those who had understanding in increasing fisheries production gave further explanations. Twenty-one (21) of the respondents indicated that it was a system the government wanted to put in place to manage their fisheries resources with the cooperation of the fishers, for the purpose of increasing the fish they caught and sold, so as to increase and sustain their livelihoods.

DISCUSSION

The age group, knowledge and experience of respondents in the fishery business over the years give good indication of fishers' level of predisposition to the protection and maintenance of fisheries resources in the communities. The analysis of the ages of the respondents is important to cage culture adaptation, since it gives an idea of the turnover rate of fisher-folks and indicates that younger fisher-folks are entering the profession. This information is necessary to find out if an increase in fisheries productivity will have a ready fisher population to embrace it. If the majority are old, the tendency of the project becoming viable will then be questionable. According to Townsley (1998) where fisheries resources are on the decline, or access to fisheries is threatened, the society adjusts by placing priority on the education of the children so that they can move out of the sector more easily and thus sustain family livelihoods. Indications in the communities are that labour will not be a problem to cage culture adoption.

The level of fishers' education gives an indication that the comprehension of certain basic issues in fisheries will not be much of a problem to their understanding of an innovation. There is a clear difference in the educational background of the fishers in both communities. The level of education in Kpando-Torkor can have a strong repercussion on increasing productivity through the cage culture, due to their limitation to read and write issues

concerning the cage culture. Their understanding of the fishery and certain technological issues will be limited. The educational level influences the individual's ability to take up an innovation, but the collective spirit of Dzemeni will be to their advantage if the educated ones would be used to educate the less educated fishers. This information also gives an indication of the social institutions' previous experience in coping with changes in fisheries activities. By implication, this means that their level of sensitivity to change or an innovation will be higher than that of any community without such an experience.

Although the infrastructure in Kpando-Torkor market is much better, it was evident from the study that, Dzemeni has a larger market than Kpando-Torkor. This is due to the fact that most of the satellite communities have easy access to the Dzemeni market from their villages and they belong to the same fishing associations as Dzemeni. This could be due to the fact that development of the market was done without consulting opinion leaders or in cooperation with the communities.

Data show that it is difficult to earn a living or sustain families considering the fact that loans are not easy to come by and if secured, the interest rates are very high. This issue of low income earnings due to high interest rate is emphasised by Townsley (1998) who indicated that patterns of investment in fishing equipment at the household level will affect the demands on the household economy. Associations like the National Inland Fisher Council and other such associations enable people to act together for some common objective by helping the fisher folks to access credit facilities, premix fuel to fuel their outboard motors and buy fish in large quantities for sale. This system of accessing credit should be improved for increasing fisheries productivity in the communities especially the "Susu" system since the system is not well developed. Therefore, this institution needs to be regularised to ensure that no individual absconds with the fishers' money. The difficulty in accessing credit especially from the banks in the communities can also create the environment where the rich will continue to take advantage of the poor fishers. The poor fishers in effect will not be able to take up cage culture due to their financially poor status.

Data indicated that 62% of the respondents are in the position to employ people to work for them, although this depends on different numbers of employee and levels of educational background. The availability of skilled labour among others in any innovation uptake is very important (Norman, 1972). Hired labour is the dominate form of human resources especially in Dzemeni compared to Kpando-Torkor. It is expected that fishery innovation will enhance the use of hired labour within the study area due to the level of unemployment in both communities. Although family labour is very important in fish production in the area because majority of the fishers fish in the lake which is close to their homes, the quality of such labour is questionable in due to technological innovation in fishery.

Hired labour could also be costly. Notwithstanding the quality of hired labour could be determined by the employer. In cage culture which is technically, hired labour will be appropriate taking the two options of labour into consideration.

Gender discrimination was not a very serious issue, although in a subtle way the cultural environment does not allow women to fish. The provocations to fish as a woman are subtle, and have no simple responses. The explanation given was that the norms and values in the fishing sector do not allow women to freely take-up fishing as an occupation. Yet, there is no negative direct pressure from any authority, preventing women from fishing. This is a marked deviation from business. It is assumed that considerable individual and collective constraints have to be overcome for an increase in fish production. Data indicate the need for consensus building by all stake holders, where all individuals and groups come together especially government institutions to collaborate with all the social institutions, to bring about an increase in fishery productivity through cage culture. In addition, a strong will to change is necessary for an increase in fish production.

CONCLUSION AND RECOMMENDATIONS

In conclusion, the nature of road or river transport in both study areas does not support the fishing industry. Increase in fuel prices also has a rippling effect on the prices of fish on the market as well as overhead cost of fishing, making it difficult for the fishers to get the worth of the fishes. Likewise an increase in the price of fish means a reduction in the quantity of fish to be purchased by the customer or sale of fish on hire-purchase which becomes a problem for the fisherman if the client decides to abscond. Prices fluctuate based on the fish catch and losses are incurred during bumper harvest. Marketing days which coincide with that of other near communities also affect the prices of fish, which has to be reduced to compete with the prices in other markets.

Hotels or proper sleeping places for customers who sleep overnight are not in the best of conditions to encourage or increase the patronage of customers from distant cities and towns, especially during the rainy seasons where the whole area becomes flooded and muddy.

Due to the lending system in the communities, the "Market Mummies" or women creditors continue to get richer. A better system will help the fisher-folks to increase their income since the interest on the loans will be reduced. Increase in the amount provided by the Poverty Alleviation Fund will also help alleviate the problem of high interest rates from the "Market Mummies". A well organised "Susu" system will go a long way to support the fisher-folks financially for a sustainable cage culture.

The system of fishing associations should be

encouraged in Kpando-Torkor especially to reduce the problem of conflicts in the area. It is also important if all the different tribes decide to come under one leader who has their interest at heart.

Finally improved market facilities, loan system, storage, transportation, water and roads will go a long way to help not only people in the study area but for clients from different parts of the country in the fish trade and fish consumers as well. The fishers in groups or association should be encouraged, through improved financial support or assistance from government since the government finds it difficult to give individual financial assistance. This will ensure the sustainability of innovation (cage culture) in the fishery sector. The introduction of employees to assist in fisheries is very encouraging, as long as it will cause a reduction in the exploitation of children, of school going age.

It is recommended that economic growth and other opportunities are reconciled with the maintenance of values and norms in the economic institution for sustainable development. It is therefore necessary that the appropriateness of an innovation for the exploitation of the fishery resources should be assessed with reference to the fisher's ability to make use of the innovation, in reducing poverty for economic growth. In addition, facilities leading to fisheries development should be improved in the major fishing communities to boost economic growth thereby reducing poverty.

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