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Poverty Measurements in Small-scale Fisheries of Ghana: A Step towards Poverty Eradication

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Abstract: This study examined measurements of poverty in small-scale fishing communities of Ghana using FGT techniques and the Sumaila Relative Poverty Indices. Findings show that poverty head-count index was between 35.5% and 50% using the Local Poverty line and up to 80% using the International Poverty line. In terms of vulnerability, irrespective of the main fishing activity, community (rural or urban) and habitat of fishery resources (freshwater or marine), fishers were facing identical sources of vulnerability. Marginalization indicators were relatively better in the urban fishing communities (90%) than in the rural fishing communities (50%-80%).

Keywords: Inland, marine, marginalization, poverty line, poverty, small-scale fisheries, vulnerability

INTRODUCTION

Fishing communities in general are presented as 'backward, informal and marginal' economic actors (Platteau, 1989) and are poorly integrated into national and local decision-making processes (Sugunan *et al*., 2007). In Ghana, as in many Sub-Saharan African countries, many people including policy-makers are of the view that fishing is exclusively for the poor and returns are so marginal that there is little potential for development. Reflecting this marginalization, fisheries are also largely ignored in research on water productivity, agricultural water management, socio-economic research and, more broadly, rural development and poverty alleviation (Bene and Friend, 2009, 2011). Many national policies fail to give fisheries the needed attention.

Poverty exits in small-scale fisheries worldwide and Ghana's small-scale fisheries are no exception. Poverty in small-scale fisheries has been reduced to income and consumption (Bene and Friend, 2009, 2011) and so with its measurements. However, a more thorough measurement and analysis is required by using monetary and non-monetary; quantitative and qualitative measurements or combinations of these given the complex nature of poverty and fisheries. Monetary and quantitative measurements include: income, consumption, headcount ratio, poverty gap and poverty severity. Non-monetary measurements include: vulnerability, land ownership, assets holdings, debt level, access to and quality of health services, education, social infrastructure and financial capital, as well as political and geographical marginalization. Since poverty in small-scale fisheries is multidimensional in nature; it also requires multiple measurements to give a clear picture of poverty levels and ensure effectiveness of poverty intervention programmes.

There is no single best measure of poverty (Haughton and Khandker, 2009). Indeed, a number of poverty measures (Sen, 1976; Kakwani, 1980; Chakravarty, 1983; Foster *et al*., 1984; Shorrocks, 1995) have been devised for measuring and analysing the nature of poverty. Poverty has been measured using a range of indicators that have shifted from simplified statistical/economic indicators based on nutritional inputs, income and consumption within the household, through an approach looking at basic needs requirements (Cox *et al*., 1998), to more recent attempts which try to embrace the multidimensional aspects of poverty.

The Ghana Statistical Services (GSS) has been periodically carrying out living standards surveys to assess the socio-economic conditions and this provide valuable insights into living conditions in Ghana. According to Coulombe and Wodon (2007), the Ghana Living Standards Survey-Round5 (GLSS-5) do not enable valid estimates of poverty for example at the district level and to a larger extent sectoral level including the fisheries sector. In fact, the GLSS 5 hardly contains any detailed information on poverty relating to the small-scale fisheries sector. The 2000

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Housing and Population Census for instance is relatively detailed, but do not contain information on incomes or consumption (Coulombe and Wodon, 2007) to allow for any poverty analysis in fisheries. This indicates that, national surveys, though important, may miss the mark of poverty in the small-scale fisheries. Moreover, since poverty in fisheries have different attributes, causes and origins (Macfadyen and Corcoran, 2002; Bene and Friend, 2009, 2011), it is important to carry out independent analysis of the poverty in small-scale fisheries.

In analysing and fighting poverty, the determination of causes of poverty is key (World Bank, 2000). In this regard, the concepts of vulnerability and marginalization have been identified as central in understanding the impoverishment process in fishing communities (Allison *et al*., 2006). Poverty, vulnerability and marginalization are closely connected and are main dimensions of fishing communities' general deprivation. This new dimension must be recognised and used to understand, analyse and tackle poverty in the small-scale fisheries.

Using a case study of four important small-scale fishing communities in Ghana, an analysis of poverty, vulnerability and marginalization is carried out using both monetary and non-monetary indices which is multidimensional. Possible poverty reduction strategies in the small-scale fisheries in Ghana are also explored. The aim is to raise the profile of small-scale fisheries, as well as incorporate the research findings into local and possibly national poverty alleviations policies on small-scale fisheries. Information derived from poverty measurement would be useful in determining the level and degree of poverty, vulnerability and marginalization to aid in the formulation, monitoring and evaluation of fisheries poverty reduction programmes, thereby ensuring successful fisheries management and quality wellbeing of fishers.

The specific goals of this study are to:

- Measure poverty using both monetary and non-monetary indicators/indices
- Examine vulnerability and marginalization in small-scale fisheries
- Recommend possible strategies to combat (eradicate) poverty in small-scale fisheries

MATERIALS AND METHODS

Area of study: Area of study was Small London (rural inland fishing community, Latitude: 6° 13′ 51″ N, Longitude: 0° 5′ 29″ W), Kpong (urban inland fishing

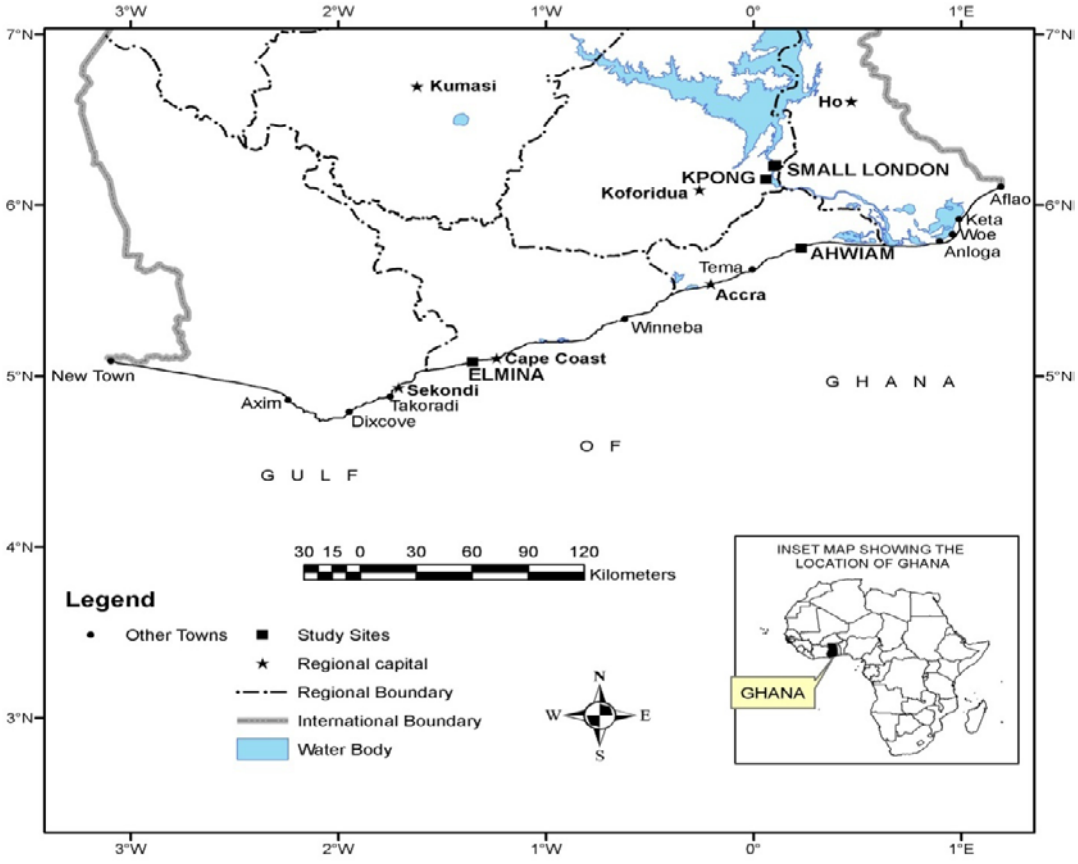

Fig. 1: A map of southern Ghana showing study sites

community, Latitude: 6° 9' 0 N, Longitude; 0° 4' 0 E), Ahwiam (rural coastal fishing community, Latitude: 5° 45' 0 N, Longitude; 0° 13' 60 E) and Elmina (urban coastal fishing community, Latitude: 5° 5′ 0″ N, Longitude: 1° 21′ 0″ W) (Fig. 1). These communities are involved in varieties of important fishing activities and are destinations for a significant number of migrant fishers.

Methods of data collection: Primary and secondary data were utilised through household survey, fishers survey, document analysis, focus group discussions and participatory assessments. Stratified random sampling technique based on the 2004 Ghana Canoe Frame Survey (Amador *et al*., 2006) was used to select the representative fishing households and individual fishers for the study. A total of 50 household and 50 fishers were selected in all sites except Elmina where 80 households and 60 fishers were selected. The survey was carried out between January-December 2010.

Household[1] survey: Household was one of the units of analysis. Household heads were interviewed. Additionally, a group of fishers who landed catches frequently at the landing sites and were also heads of household were contacted and accompanied to their homes for interview. This technique enabled fishing household to be identified easily in the absence of reliable fisheries household data. Data collected include; household income, remittances, consumption, economic activities, credit conditions, accessibility to infrastructure and facilities, assets, basic needs, power and exclusion, livelihood key threats, livelihood strategies, household size and demographic information. Respondents were: crew members, canoe owners, fish traders and non-fishers.

Fisher survey: The aim was to measure poverty at the individual level. This also enabled poverty measurement on the basis of fishing gear and habitat of fishery resources. Fishers were randomly selected and interviewed, either on-site or in their homes. Data collected include; income, consumption, fishing expenditure, gear type, fish marketing, credit conditions, savings, assets, household size and demographic information (Table 1).

Document analysis: Documents were assessed on Consumer Price Index, poverty measurements and assessments, marginalization, vulnerability, sustainable livelihoods, Millennium Development Goals, poverty reduction strategies, poverty and inequality from the following sources: Ghana Statistical Service, World Bank, World Fish Centre, United States Agency for International Development, Food and Agriculture Organization, Department for International Development, Chronic Poverty Research Centre, World Health Organization, Ministry of Food and Agriculture, Ministry of Finance and Economic Planning and the Bank of Ghana.

Table 1: Summary of sample size in household and fisher surveys

Location	Sample Size*	Sampling Strategy
Small London	Household = 50 Fishers = 50 Key informants = 10	Stratified random sampling
Kpong	Household = 50 Fishers = 50 Key informants = 10	Stratified random sampling
Ahwiam	Household = 50 Fishers = 50 Key informants = 10	Stratified random sampling
Elmina	Household = 80 Fishers = 60 Key informants = 10	Stratified random sampling

* Based on 2004 Ghana Canoe Frame Survey (Amador *et al*., 2006) and active canoes estimated

Focus group discussion and participatory assessments: Discussions were held with fishers, fisheries managers, civil servants, local authorities and experts on poverty prevention and reduction policies and programmes relating to small-scale fisheries and possible ways of incorporating them into local and possibly national plans. Additionally, participatory assessments through interviews were carried out with household heads and fishers to identify and rank sources of vulnerability to poverty in the communities (that is; key threats identification, number of times identified and its socioeconomic importance).

Analytical techniques: Various analytical procedures were employed for this study. Descriptive statistical analysis was used to analyse socioeconomic characteristics, vulnerability and marginalization levels. Foster *et al*. (1984) weighted poverty index was employed to determine the extent and level of poverty among respondents. Sumaila (2003) relative poverty-index was also used to analyse poverty at household and gear levels.

Poverty measurement:

Construction of the poverty lines: In order to separate the poor from the non-poor, poverty lines were computed based on GLSS 3 and 4 (GSS, 2000 a,b; Coulombe and Wodon (2007); USAID (2011). Ghana annual poverty line in 1999 was set at GH¢ 70.00 and GH¢ 90.00 for lower and upper poverty line respectively (equivalent GH¢ 6.00/month (lower) and GH¢ 8.00/month (upper). Coulombe and Wodon (2007) computed Ghana annual poverty line for 2005/2006 yielding GH¢ 288.47 and GH¢ 370.89 for lower and upper poverty line respectively (equivalent GH¢ 24.00/month (lower) and GH¢ 31.00/month (upper). In the present study, the 2009/2010 poverty line was adjusted using locality specific and national Consumer Price Index provided by GSS.

The Consumer Price Index (CPI): The Consumer Price Index (CPI) measures the average percentage change of the general price levels in the country, as experienced by consumers, with reference to the price

levels in 2002 (i.e., base year 2002 = 100) (GSS, 2010). National and local Consumer Price Index were used to calculate the poverty index.

The Foster-Greer and Thorbecke (FGT) technique: The Foster *et al*. (1984) formula which had been renewed by the World Bank (2005) was used to calculate poverty indices that include head-count index ($\alpha = 0$); poverty gap index ($\alpha = 1$); and poverty severity index ($\alpha = 2$).

FGT takes the form:

$$P_{\alpha_i} = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{Z - Y_i}{Z}\right]^{\alpha} \quad \text{(Foster } et\ al.\text{, 1984)} \qquad (1)$$

where,

α : Measure of the sensitivity of the index to poverty
Z : The poverty line value
Y_{pi} : The expenditure of the ith poor groups of persons
n : The total population
n* : The proportion of respondents with expenditure below the poverty line and
q_i : The number of persons in the ith group below the poverty line

when $\alpha = 0$,

$$P_o = \sum q_i / n = H \qquad (2)$$

where H is the head-count ratio, that is, the proportion of total income receiving units below the poverty line.

When $\alpha = 1$, P_1 is the income-gap measure (the poverty-gap index (PG):

$$P_{\alpha-1} = PG = \frac{1}{n}\sum_{i=1}^{n} q_i\left[\frac{Z - Y_{pi}}{Z}\right] \quad \text{(Foster } et\ al.\text{, 1984)} \qquad (3)$$

The average poverty-gap, or the amount of income necessary to bring everyone in poverty right up to the poverty line, divided by total population. This can be thought of as the amount that an average person in the economy would have to contribute in order for poverty to be just barely eliminated. This measure is insensitive to income distribution among the poor.

When $\alpha = 2$, the Squared Poverty Gap index (SPG) is generated given by:

$$P_{n-2} = SPG = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{Z - Y_i}{Z}\right]^2 \text{(Foster } et\ al.\text{, 1984)} \qquad (4)$$

To reflect the degree of inequality or severity of poverty among the poor, a greater weight has to be given to the poorest income-earning units and this is achieved by assigning values that are greater than 1 to α.

Relative poverty index: An index measuring relative poverty of fishers has been proposed by Sumaila, (2003). The index provides managers a way to measure the likely pressure on the sustainable management of fisheries that may result from this poverty. It also deals with the level of poverty in the fishing community relative to the poverty line in a country as a whole. Sumaila's poverty index has two components: (1) for subsistence or small-scale fisheries; (2) commercial or large-scale fisheries (Sumaila, 2003). Since the present study is small-scale fisheries, the first index is used, which is mathematically expressed as follows:

$$P - Index_{\text{fishing community}} = \frac{\text{Income}_{\text{fishing community}}}{\text{Income}_{\text{poverty line}}} \quad \text{(Sumaila, 2003)} \qquad (5)$$

However, since the present study focus on fishing households and specific fishing gears (i.e., *Ali Poli Wasta*, hook & line, drifting nets, beach seine and set nets), the equation was re-expressed as:

$$P - Index_{\text{fishing household}} = \frac{\text{Income}_{\text{fishing household}}}{\text{Income}_{\text{poverty line}}} \qquad (6)$$

$$P - Index_{\text{fishing gear}} = \frac{\text{Income}_{\text{fishing gear}}}{\text{Income}_{\text{poverty line}}} \qquad (7)$$

P-Index $_{fishing\ household}$ is the average income of fishing household. Household income was further divided by number of dependents that each household support to get per capita income. This gives poverty information at household level.

P-Index $_{fishing\ gear}$ is the average net income of particular fishing gear. Net income was further divided by number of fishers operating a particular gear to get per capita income. This gives poverty information at both individual fisher and gear level.

Income $_{poverty\ line}$ is the income below which a person, family or household is considered to be below the poverty line in a given country. In the present study, both the local and upper poverty lines were used.

Non-income poverty indicators/index: Socioeconomic conditions, assets holdings, power level, savings, bonds, insurance, pension schemes, accessibility to infrastructure and basic services (education, health, banks, micro-credit institutions and communication, market and government institutions), social structure, basic needs and degree of dependence on fishing as livelihood portfolio were assessed as indicators of poverty, vulnerability and marginalization.

RESULTS

Income, expense and non-monetary indicators: Income and consumption are indicators of poverty and hence, wellbeing. Generally, higher income

Table 2: Socio-economic conditions in fishers communities

Indicators	Small London	Kpong	Ahwiam	Elmina
Monthly consumption (GH¢) (mean) ± (sd)	308.5±144.8	335.1±236.2	310.3±53.1	348.2±273.4
Monthly consumption per capita (GH¢) (CPC)	42.2	51.8	67.7	68.9
Household with savings (%)	46	40	24	27.5
Monthly savings (GH¢) (mean) ± (sd)	189.5±158.3	89.3±7.9	112.6±179.3	186.7±195.3
Household with pensions, social security and bonds (%)	36	22	6	18.7
Household with health insurance (%)	52	64	18	75
Household with assets (%)	100	100	100	100

corresponds to higher consumption. However, this general assumption may not be observed in many rural communities in Ghana. The reason is that, majority of inhabitants in rural communities have farms that supply them food. Hence, expenditure on food which takes a major share of household expenditure is low compared to urban areas. Additionally, expenditure on health is also low because majority of the inhabitants in the rural communities prefer traditional treatment. Generally, expenditure on housing is also low in rural communities.

Overall, the monthly average consumption was: Small London GH¢308.5; Kpong GH¢335.1; Ahwiam GH¢310.3; and Elmina GH¢348.2 (Table 2). Consumption was higher in the urban communities (i.e., Elmina and Kpong). Consumption per capita was not significantly different among sites (ANOVA, df = 3, $p>0.05$). Overall, monthly per capita consumption was higher in Elmina (GH¢68.9).

In terms of savings (Table 2), it seems that the inland communities were slightly better than the coastal communities in terms of percentage of households that saved. Small London had the highest percentage (46%) with average monthly savings of GH¢189.5. It is also worth mentioning that, since Small London is basically a migrant community, many households tend to transfer most of their earnings back to their home towns to undertake major projects (such as housing, business, land acquisition, etc.). The form of savings varies from livestock, keeping cash at home, lending, bank deposits and saving unions (Table 3). Bank deposits and saving unions were generally the preferred form of savings (about 38%-71%). Most fishers who save also quickly withdraw their savings because of what they term "hardship conditions" which is usually common during the off-peak seasons.

With regard to pension and social security schemes (Table 2), the picture also seems to be different between inland (22%-36%) and coastal (6%-18.7%) communities. The percentage of households that have pension and social security in Small London was 36%. The reason is that, since it is a predominantly migrant fishing community, majority of fishers may want to have some sort of future security when they finally return to their home towns.

Households with health insurance facility (Table 2) were higher in the urban communities (64%-75%) than rural (18%-52%) communities. Reasons cited by those who were not registered or covered by health insurance include; high premium, unsatisfactory and lack of confidence in the whole programme, had no knowledge, guardian or partner not registered and therefore not covered, or were yet to register. All the households (100%) possess fishing and household assets as well as other valuable assets such as land, building, farm/cash crop, furniture. There were natural assets (sea and reservoirs) in all of the studied locations.

Table 3: Household with savings and form of savings

Poverty index	
Small London	Livestock: 18.75 Cash: 31.25 Bank deposit and saving unions: 50
Kpong	Livestock: 4.76 Cash: 23.81 Bank deposit and saving unions: 71.43
Ahwiam	Livestock: 7.69 Cash: 46.15 Bank deposit and saving unions: 38.46 Others (credit): 7.69
Elmina	Cash: 39.13 Bank deposit & saving unions: 60.87

Household income: In this analysis, household income comprises income from agricultural (i.e., fisheries: fishing, fish farming, trade, processing, boat building and farming: crops and livestock), non-farm activities (i.e., petty and artisanal trade: dress making, plumbing, electrician, welding, draftsmanship, food selling, provisions store operating, driving and photography), formal employment (private and public: civil servants, community police, administration, casual labourer, teaching, factory work) and other sources (retirement benefits, religious benefits, remittances and transfers) (Fig. 2 and 3).

The existence of a dominant agricultural based economy in the communities is clear with more than half of the sample making income or livelihood from fishing and farming (Small London 64.7%, Kpong 67%, Ahwiam 80% and Elmina 85.6%). Agriculture makes between 64.7% to 67.4% of economic activity at the national level.

Household expenditure: Figures 4 and 5 show the comparison household expenditure for Small London and Kpong; and Ahwiam and Elmina, respectively. Nearly more than half of the household expenditure is on food (49%-76%), with education being next (13%-21%). Education expenses include; tuition fees,

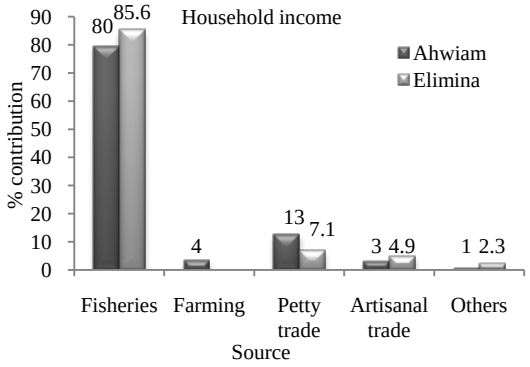

Fig. 2: Comparison of household income contribution between small London and Kpong

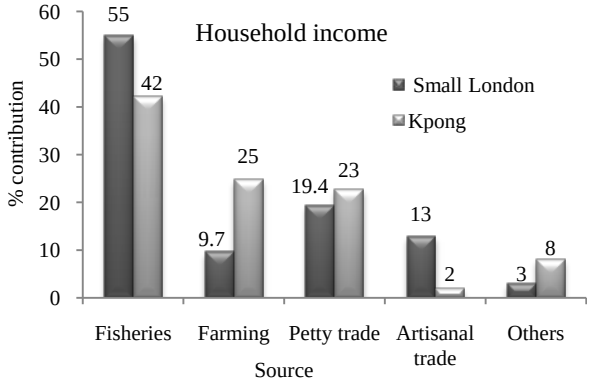

Fig. 3: Comparison of household income contribution between Ahwiam and Elmina

uniform, books, pocket money and transportation. Due to relatively high subscription to the national health insurance scheme (18%-72%), between 3%-21% of the household expenditure is on health. Households without health insurance spend about 5% - 14% household income on health. Social contributions (1%-6%) include; contributions to self-help projects, weddings, dowries, funerals or other ceremonies. Other

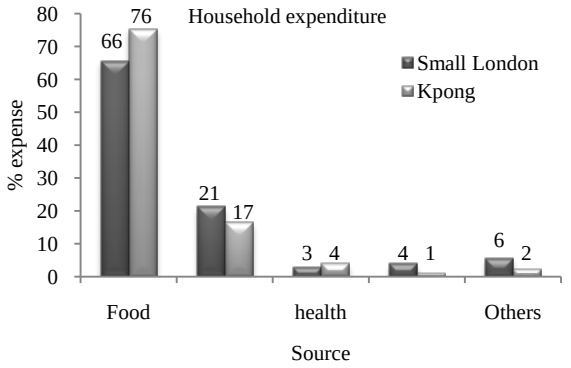

Fig. 4: Comparison of household expenditure distribution between small London and Kpong

miscellaneous expenditures (2%-10.3%) includes rent, electricity, fuel, clothing, transportation and taxes (TV licenses and property).

Absolute poverty indices: The head-count, depth and severity of poverty computed are presented in Table 4 to 7. Using the lower national poverty line of GH¢429 (GH¢ 41/month), the incidence of poverty were; Elmina (31.25%), Kpong (48%), Ahwiam (56%) and Small London (60%). In terms of the national upper poverty line of GH¢632 (GH¢52.7/month), the incidence increases with the lowest incidence rate at Elmina (53.75%), Ahwiam (58%), Kpong (60%) and Small London (70%). Using the international lower poverty line of GH¢687.96 (GH¢57.33/month), the incidence of poverty were; Elmina (55%), Kpong (68%), Ahwiam (72%) and Small London (80%). Overall, the incidence of poverty is still high and significantly different among sites (ANOVA, df = 3, $p<0.05$). Poverty was significantly higher in the rural areas than urban areas in both habitats (i.e., inland and coastal). It is also worth pointing out that, the head-count index at both the local and national lower poverty lines were almost equal; while the head-count index at both the national upper and international poverty lines were also almost equal, an indication of the closeness of the poverty lines.

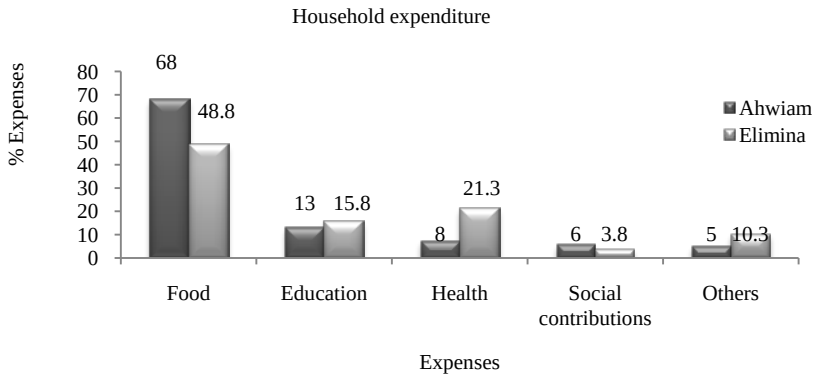

Fig. 5: Comparison of household expenditure distribution between Ahwiam and Elmina

Table 4: Poverty indices based on local poverty line

Poverty index	Small London	Kpong	Ahwiam	Elmina
Head-count index – P0	60	48	50	32.50
Poverty gap index – P1	0.10	0.13	0.26	0.14
Poverty severity index – P2	0.05	0.07	0.19	0.05

Table 5: Poverty indices based on lower national poverty line

Poverty index	Small London	Kpong	Ahwiam	Elmina
Head-count index-P0	60	48	56	31.25
Poverty gap index-P1	0.09	0.14	0.21	0.13
Poverty severity index-P2	0.05	0.08	0.17	0.04

Table 6: Poverty indices based on national upper poverty line

Poverty index	Small London	Kpong	Ahwiam	Elmina
Head-count index- P0	70	60	58	53.75
Poverty gap index- P1	0.19	0.22	0.32	0.17
Poverty severity index- P2	0.11	0.14	0.23	0.08

Table 7: Poverty indices based on international poverty line

Poverty index	Small London	Kpong	Ahwiam	Elmina
Head-count index- P0	80	64	72	55.00
Poverty gap index- P1	0.20	0.23	0.33	0.20
Poverty severity index- P2	0.13	0.16	0.25	0.09

Apart from the poverty head-count, higher order measures of poverty provide important information on poverty rate (i.e., poverty gap and severity). When considering the poverty gap (i.e., distance separating the poor from the poverty line) and severity (i.e., inequality among the poor), it can be realized that these indices were relatively lower in the following order; Elmina (0.14-0.20 P_1 and 0.04-0.09 P_2), Small London (0.9-0.20 P_1 and 0.05-0.13 P_2), Kpong (0.13-0.23P_1 and 0.07-0.16 P_2) and Ahwiam (0.21-0.33P_1 and 0.17-0.25 P_2). These indicate that majority of individuals or households in Elmina and Small London live just below the poverty line, while few members are below the poverty line in Kpong and Ahwiam. The poverty gap was significantly different for all the sites (ANOVA, df = 3, $p<0.05$).

Also, income inequality among the poor is low in Elmina and Small London while it is high in Kpong and Ahwiam. This was significantly different for all the sites (ANOVA, df = 3, $p<0.05$). Thus, the poverty head-count alone may not be much relevant (except in monitoring poverty alleviation policies, in this case fisheries), but the degree or how severe the individual or household poverty is. The trends observed are as follows: Elmina (lower incidence, lower gap and lower severity); Small London (higher incidence, lower gap and lower severity); Kpong (lower incidence, higher gap and higher severity); and Ahwiam (higher incidence; higher gap and higher severity).

Relative poverty-index fishing household and relative poverty-index fishing gear: Figure 6 and Tables 8 and 9 show the relative poverty indices at both household and gear levels. Net per capita income of fishing households and fishers (gears) were compared with poverty line/threshold levels. From the results, fishing households in Elmina are far from being poor, with a relative poverty index of 2.7. In other words, the average fishing household in Elmina was about 2.7 times richer than the average household in Ghana. Fishing households in Small London (1.5), Ahwiam (1.3) and Kpong (1.1) were also relatively better. But this analysis does not give indication on poverty gap and inequality between incomes as FGT reveals (Table 4 to 7).

From the results of relative poverty index fishing gear, the performance of the various gears decreases when the poverty line is changed from the local to the upper national poverty line. In the inland communities, beach seine gear at Small London was far better (10.29-13.00) while spear (1.04-1.32) had the lowest index at

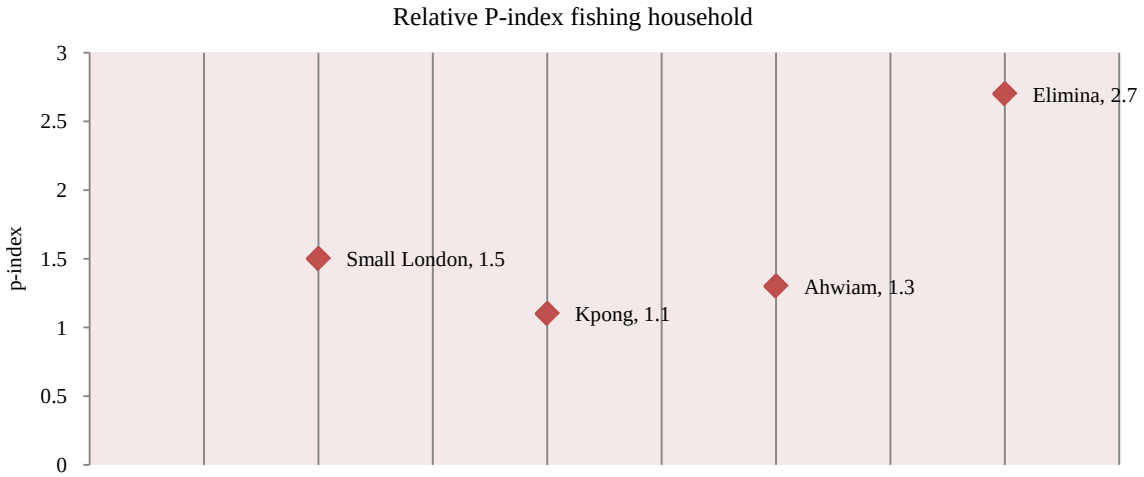

Fig. 6: Relative poverty-index fishing household at all sites (2010)

Table 8: Comparative analysis of relative poverty-index fishing gear between small London and Kpong

Site	Gear	Net per capita income (GH¢)	P-index (local)	P-index (national)
Small London	Beach seine	6501.27	13.00	10.29
	DGN	1237.50	2.48	1.96
	HL	2930.51	5.86	4.64
	Trap	1640	3.28	2.59
	Spear	660	1.32	1.04
Kpong	Beach seine	4641.5	9.65	7.34
	DGN	1279.17	2.66	2.02
	HL	2880	5.99	4.56
	Trap	1330	2.76	2.10
	Cast net	1266	2.63	2.00
	Spear	732	1.52	1.16

DGN = Drift Gill Net, HL = Hook and Line

Table 9: Comparative analysis of relative poverty-index fishing gear between Ahwiam and Elmina

Site	Gear	Net per capita income (GH¢)	P-index (local)	P-index (national)
Ahwiam	APW	8437.50	15.53	13.53
	DGN	2482.13	4.57	3.93
	HL	1897.85	3.50	3.00
	Set net	2281.79	4.20	3.61
	Lobster net	5175.00	9.53	8.19
Elmina	APW	12408.75	24.09	19.63
	HL	4084.01	7.93	6.64
	Set net	8856.00	17.20	14.01
	Lobster net	8246.87	16.01	13.05

both upper and local poverty lines. In other words, the average fisher operating beach seine gear in Small London was about 10.29-13.00 times richer than average fisher operating different gear in Small London and Ghana in 2010. In the marine communities, *Ali Poli Wasta* (APW) gear at Elmina was far better (19.63-24.09) with hook and line at Ahwiam having the lowest index (3.00 -3.50) at both upper and local poverty lines. Overall, fishing gears at Elmina had better indices than other communities. Gears with relatively low poverty indices are probably likely to fall into extreme poverty, all things being equal (most vulnerable gear groups).

Analyses of both relative poverty fishing household and fishing gear were based on net income. However, since consumption and household size were not taken into account unlike FGT, it cannot solely be used to judge the overall poverty level of fishers. It thus needs to be combined with other indices. In effect, relative poverty fishing household and fishing gear give indication that fishing contribute to greater part of household income and poverty reduction. Whereas the relative poverty fishing household may be more relevant for social and economic purposes; relative poverty fishing gear may be more relevant for fisheries and environmental management purposes. The two, if put together will give better understanding of wellbeing of fishers (social, economic and natural issues).

Vulnerability and marginalization: As shown in Table 10, the results demonstrate that urban fishing communities were less isolated and relatively better (90%) with social amenities than rural fishing communities (50%-80%). Accessibility to bank and microcredit institutions was a major problem in the rural communities. As a result, sizeable proportions of the fishers (31%-46%; Table 3) in the rural communities saved in cash in their own homes. Rural banks seem to be inactive in the rural communities. Thus, accessibility to credit facilities is limited. Majority of respondents at Ahwiam indicated that they had bank accounts with Shai Rural Bank at Dodowa, which is about 67 km from Ahwiam.

There was no formalized social structure in both the rural and urban communities which might lead to large numbers of people being discriminated against. All the sites had almost 100% heterogeneous

Table 10: Fisherfolk vulnerability and marginalization indicators

Site	Access to medical facilities	Clean water	Toilet/ sanitation facilities	Communication facilities	Accessible road throughout the year	Bank and microcredit institutions	School	Access to large market	Local administration centre	formalized social structure	%
Small London	+	-	+	+	+	-	-	+	-	-	50
Kpong	+	+	+	+	+	+	+	+	+	-	90
Ahwiam	+	+	+	+	+	-	+	+	+	-	80
Elmina	+	+	+	+	+	+	+	+	+	-	90

+ = present - = absent

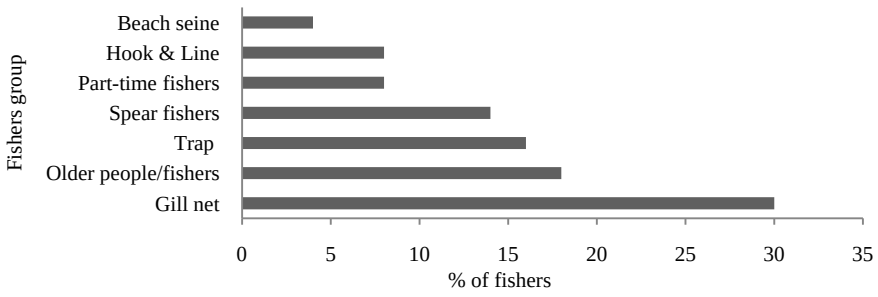

Fig. 7: Vulnerability groups in Kpong

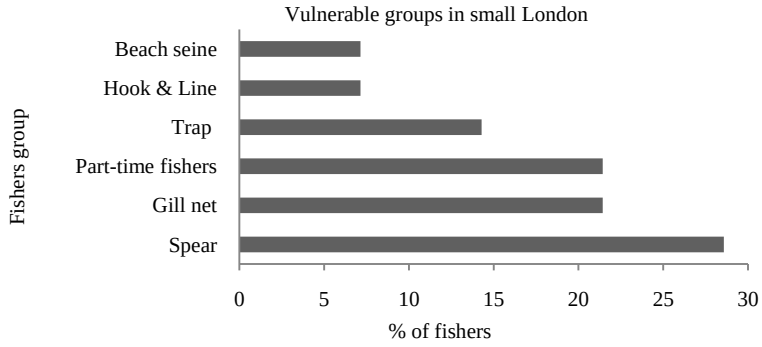

Fig. 8: Vulnerability groups in small London

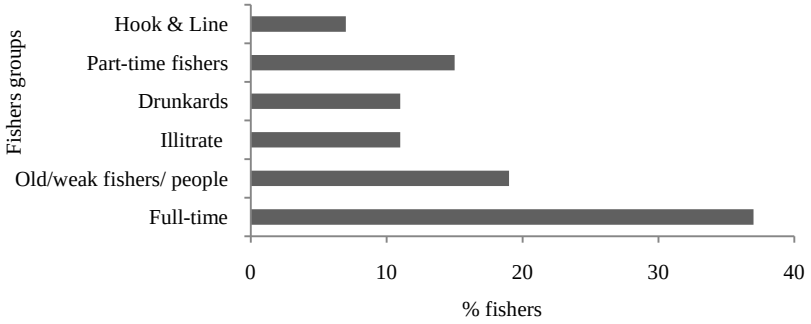

Fig. 9: Vulnerability groups in Elmina

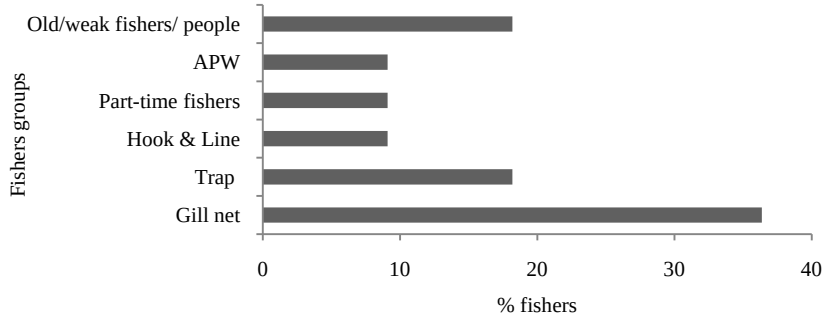

Fig. 10: Vulnerability groups in Ahwiam

populations. Social exclusion was not a main theme arising during discussions on poverty. Indeed, there were efforts made by the communities to include certain disadvantaged members of the communities. The overall picture is one of general inclusiveness. At the national level, all communities were free to participate in national decisions (such as; elections, protest and other political activities).

Figure 7 to 10 show the results of vulnerable groups in the communities. To a larger extent, the vulnerability groups are confirmed by the results of relative poverty index fishing gears indices. For instance, gill net fishers at the inland communities were more vulnerable to poverty because of low and seasonal catch, relatively high fishing costs (nets, baits, ice, repairs). Overall, the elderly/weak fishers were more vulnerable to poverty in all communities. The reason is that they are unproductive and mostly unable to make enough income for living. The lack of social intervention programmes in the fishing communities worsens their case.

The responses derived on sources of vulnerability (Fig. 11 and 12) present some important similarities between the two habitat communities. In particular, in both habitat communities, lack of cash/access to credit/capital, fishing season/ fish stock-related issues and lack/poor fishing equipment were among the most important sources of vulnerability. Lack of infrastructure, poor market and low prices were also identified as a major issue. Lack of cash/access to credit/capital was identified as the major sources of vulnerability. Respondents indicated that with cash they can meet almost all the basic needs and other responsibilities (such as housing, food, clothing,

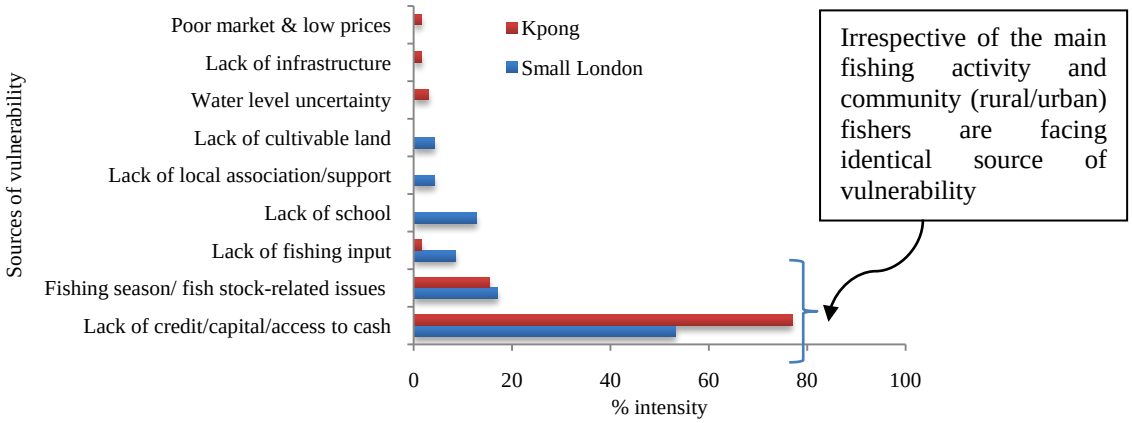

Fig. 11: Comparactive analysis of vulnerability between fishers in Kpong and small London

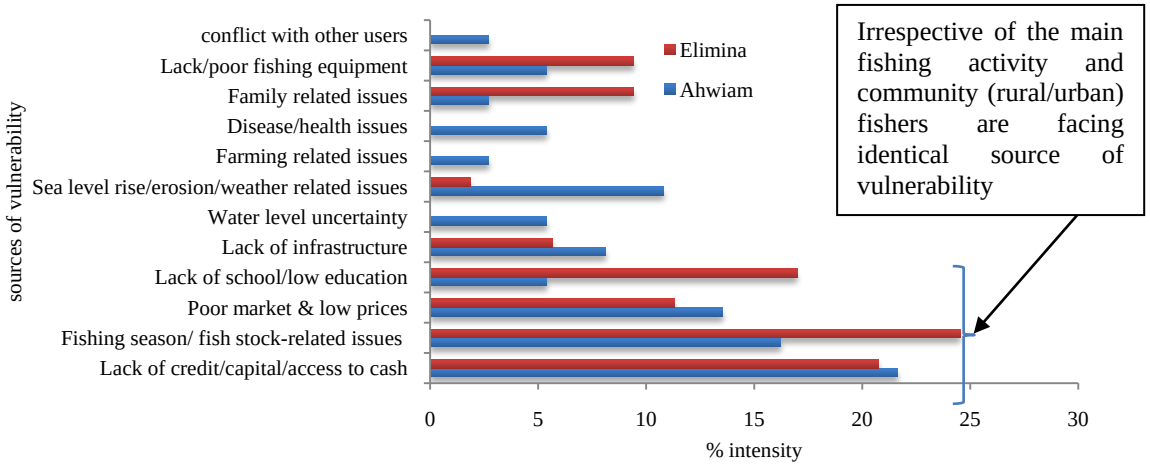

Fig. 12: Comparactive analysis of vulnerability between fishers in Elmina and Ahwiam

education). Hence, to reduce vulnerability and poverty, the poor should be helped to make more money. Fishing season/fish stock-related issues include; fluctuating and depleted stock levels and unpredictable fishing seasons. Lack/poor fishing equipment relate to unavailability and high prices of fishing equipment. But by extension, it relates to fishers inability to pay for those fishing equipment which can also be related to the general lack of cash/ access to credit.

Lack of cultivable land and other farming related issues were also identified, especially, in the rural communities (Small London and Ahwiam). This suggests that the rural fishing communities prefer farming as a source of income diversification. Lack of infrastructure includes landing sites. Closely related to infrastructure is poor market, low and unstable fish prices (i.e., pricing, transportation, advertisement, insurance and credits).

DISCUSSION

Measurements of poverty have evolved from a focus mainly by low consumption and low income and encompassing a lack of basic needs (access to food, shelter, health and sanitation). Today, a more comprehensive measurement involving poverty, vulnerability and marginalization have been widely adopted in understanding the wellbeing and impoverishment in small-scale fisheries (Allison *et al*., 2006). An analysis of poverty level through qualitative and quantitative measurements is useful in understanding the dimensions of poverty; formulating and monitoring of poverty reduction strategies. It also bring to the forth the poverty profile of the poor and their communities, thereby drawing the attention of interested stakeholders (i.e., policy-makers, managers, researchers, fishers, donors, international organizations and non-governmental organizations).

The present study has been able to analyse poverty in small-scale fisheries by quantitative and qualitative measures. There is general perception as well as some existing scattered head count index on poverty in small-scale fisheries of Ghana. However, there are huge missing indicators on poverty gap, severity, vulnerability and marginalization as well as poverty indices on fishing gears. The present study is useful in

understanding the level and degree of poverty in small-scale fisheries of Ghana as it brings out the fine details that most poverty analyses and hence poverty intervention programmes have been missing. It should be noted that any poverty intervention without the right analyses and indicators will miss the mark of being effective.

Income, consumption and non-monetary indicators: Average annual household expenditure and per capita consumption expenditure encountered in the study were higher than the average national annual household expenditure and per capita consumption expenditure of GH¢1,918.00 and GH¢644.00, respectively (GSS, 2008). The debate whether the current national average expenditure is appropriate in relation to poverty analyses is beyond the scope of this study.

As there were some surplus income left after expenses, between 24-46% of the households made some savings, especially during the major fishing seasons (July-September). Saving amount was generally low as a result of marginal income. But this is a good indicator as fishers plan for the future and save. Economists generally assume that people's willingness to save for future consumption grows with their incomes. It seems natural that the poorer people are, the less they can afford to plan for the future and save (Soubbotina, 2004).

Income sources in the fishing households were dominated by fishing and farming (64-86%). This is more than the national average of about 64.7-67.4% (Adjasi and Osei, 2007; GSS, 2008) and also confirms to pattern observed by Pittaluga *et al.* (2003) and Bene and Friend (2009) estimates that fishing and related activities contribute on average over 70% of households' revenues, along Lake Volta for instance. This strongly indicates the existence of dominant agricultural based economy and over-dependence on natural resources (such as, sea, lakes, forest, fish and land). Thus, the urgent call for sustainable resource management (in this case, fishery) must be given the attention to as pressure would continue to be exerted on Ghana's natural resources.

In general, all the households had some ownership of household, fishing and other valuable assets (cars, outboard motors, shares). However, the level of ownership of valuable assets is much higher in urban communities than in rural communities (an indicator of higher poverty in rural compare to the urban communities, if asset is regarded as function of income). Asset holdings were higher in Elmina than in other urban communities. Households with health insurance facility were also higher in the urban communities (64-75%) than rural communities (18-52%). Furthermore, households with pension and social security schemes were higher in inland communities (22-36%) than the coastal communities (6-18.7%).

Absolute and Relative poverty indices: Consumption expenditure was the main variable that was used in estimating the absolute poverty indices (i.e., head-count index-P0; poverty gap index-P1; and poverty severity index-P2). Generally, consumption have been identified as a better indicator and better measured than income. In addition, consumption may better reflect a household's actual standard of living and ability to meet basic needs (Fields, 1994; Coudouel *et al*., 2002). In general, fishing activities and to a large extent fishing incomes may fluctuate either annually or even on a daily basis whereas consumption remains relatively stable. In other words, consumption is more stable indicator than income in poverty analysis.

Result of poverty head-count index indicates high incidence of poverty, especially, in the rural communities. In general terms, it can be said that the head-count index for inland rural fishing communities is about 60%-80% whilst the head-count index for coastal rural fishing communities is about 50%-72%, depending on the poverty line (Table 4 to 7). This is in conformity with other studies that have shown that poverty is still quite pervasive especially in the rural areas in Ghana, even after many economic reforms (GSS, 2000 a,b; Sowa, 2002; Adjasi and Osei, 2007; Owusu and Yankson, 2007). On the national front, the current poverty head-count index at national poverty line is 28.5%, while the rural head-count index is 39.2% and urban-head count index is 10.8 % (World Bank, 2011a). Extending the incidence of poverty to Sub-Saharan Africa (considering the fact that Ghanaian fishers often migrate to other parts of the region), the head-count index is about 58.7% in rural Sub-Saharan Africa which is higher than Ghana's head-count of 28.5% (World Bank, 2011a). Poverty is noted to be vast, deep and almost chronic and has been found to be dominant in rural Africa more than the urban populace (Ali and Thorbecke, 2003; Ali *et al*., 2002). The proportion of the poor making their living in rural areas has remained and is expected to remain, strikingly high (IFAD, 2011).

In terms of extreme poverty (lower poverty line) defined as those whose standard of living is insufficient to meet their basic nutritional requirements even if they devoted their entire consumption budget to food, the incidence were 60% and 56% for rural inland and coastal communities, respectively. The head-count index for local and national lower poverty lines yielded almost the same result, an indication of closeness between the national and local/district poverty line. Using the national upper poverty line, the incidence goes high and worst off when the international poverty line is used. Thus, fishers fall in and out of poverty as the poverty lines are adjusted. The debate whether the national and the international poverty lines are appropriate is beyond the scope of this study. However,

generally speaking, the richer a country is, the higher its national poverty line (Soubbotina, 2004).

The level of income shortfall of the poor and the extent of income inequality among the poor are also important in assessing poverty/wellbeing. From the results in Table 4 to 7, the poverty gap is significantly different for all the fishing communities (ANOVA, df = 3, $p<0.05$). Additionally, based on Table 4 to 7, the poverty severity is significantly different for all the sites (ANOVA, df = 3, $p<0.05$). The FGT results (Table 4 to 7) show that, head-count can be high while poverty gap and severity remains low, as in the case of small London which is better when compared to Kpong and Ahwiam. Elmina had a better poverty gap and severity. A lower average income shortfall of the poor mean lower poverty and the level of impoverishment is said to be lower. In this case, the per capita cost of eliminating poverty in Elmina and Small London will be lower than Kpong and Ahwiam. Also, the distribution of income among the poor in Kpong and Ahwiam were worse as compared to the poor in Elmina and Small London. As a result, the very poor fishers face high degree of poverty if their income is transferred to the less poor (example, fishers without fishing assets and crew members). Any poverty reduction policy and assessment in the small-scale fisheries should seriously take into consideration the poverty gap rate and severity rather than absolute figures (i.e. head-count ratio) alone, which will give better idea about the per capita cost of eliminating poverty as well as severity. Unfortunately, many policymakers and organizations working on poverty usually look for the head-count in assessing the effectiveness of their policies over time.

Results from both relative poverty index fishing household and relative poverty index fishing gear indicate a general lower indices except in few gears, such as, *APW*, lobster net and beach seine (Table 8 and 9) and households in Elmina (2.7 relative poverty index, Fig. 6). In general, fishers and fishing households had lower per capita income as a result of marginal income from fishing and other economic activities. It should be noted that, fishing is an occupation and source of livelihood for about 2.2 million people in Ghana (BNP, 2009; World Bank, 2011b). This reality, however, remains largely unknown to majority of stakeholders, more critically-policymakers and planners. If the already existing marginal income of fishers get lower further, then, thousands of fishers and millions of their dependants risk falling into the poverty trap and deprivation, which may have adverse effect on national (especially fisheries) development (such as, high rural-urban migration, slow rural development and weak social structure) and hindrance to fisheries management.

It is worth mentioning that, since the relative poverty index fishing gear is estimated based on net income (revenue minus costs), it may give an indication of profitability of a particular fishing industry. The natural tendency is the likelihood of a particular industry to be over-capacitated, in terms of its relatively better poverty indices which may affect our ability to manage the ecosystems and the fishery resources sustainably. Large scale-fishers are likely to explore this, which may have severe impact on the ecosystem rather than the impact of small-scale fishers. This generally supports Gordon (1954), Stillman (1975) and Hardin (1968) assertion that, if fishing is making more than normal profits then more and more fishers will enter the fishery until all resource rents have been dissipated. Each new boat that a fisher adds bring him a gain of almost +1, whereas the effects of overfishing will be shared by all and his loss will therefore be only a fraction of -1. The small-scale fisheries sector of Ghana cannot afford this.

In monitoring poverty in small-scale fisheries, it would be advisable to combine both absolute and relative indices to complement each other. Relative poverty always considers that a portion of the population (fishers) would always remain poor, regardless of level of development in the fisheries sector. Absolute indices are best suited for analysing the impacts of poverty alleviation policies in fisheries sector (Minvielle, 2004).

Generally, poverty in fisheries is taken for granted (Bene and Friend, 2011) and are poorly integrated into the national or local decision-making processes (Dugan, 2005; Sneddon and Fox, 2007; Sugunan *et al*., 2007), which need to be changed in the case of Ghana. Realistically, the small-scale fisheries in Ghana face major constraints (such as, lack of infrastructure, education, credit, low technology and weak institutional representation) which need to be tackled urgently. This will ensure quality wellbeing of thousands of fishers across the country that depends on fisheries as a source of livelihood, as well as better management of fishery resources. Poverty will hinder effort to achieve sustainable fisheries management.

Marginalization and exclusion: In the present study, it was observed that all the fishing communities were not geographically and politically isolated, with all-year accessible road network, presence of communication and sanitation facilities and accessibility to market, education, medication and health services and local administrative centres, though limited in the rural communities (Table 10). There were no formalized social structure and no form of discrimination against any class of people from accessing the fisheries resources. However, many rural fishing communities in Ghana are geographically isolated, operating in remote areas. For instance, Bene and Friend (2009, 2011) observed that, many fishing communities in Ghana are marginalized as a consequence of their geographic and

political isolation (e.g., large parts of Lake Volta remain inaccessible throughout the year). The remoteness of most fishing communities on Lake Volta for instance, limits their access to basic services such as health, education, banks and micro-credit institutions. The FAO had also acknowledged that, "small-scale fishers generally live in remote and isolated communities, are poorly organized and politically voiceless and often highly exposed to accidents and natural disasters" (FAO, 2000). Artisanal fishing communities in Ghana are among the most marginalized. Living and working conditions are poor and communities usually do not have access to health and sanitation facilities, education and adequate housing (ICFS, 1997). Whatever the case may be, geographic isolation need to be tackled urgently by bringing more infrastructure development to the small-scale fishing communities, which may lead to wealth creation and poverty reduction.

Geographical isolation has long been recognised as a constraint on the economic development of many rural areas (Bene and Friend, 2009, 2011). To a large extent, the rural small-scale fishers are often excluded from processes of development planning at the macrolevel, evidence of absence of local government administration centre in Small London and Ahwiam suggests. Over the last few years, considerable attention of the government and even some developmental partners has focused more on the new oil and gas industry. Such magnitude of attention has not been seen in the small-scale fisheries, probably, their role and contribution to the economy is poorly known or unappreciated. Acute economic, political and institutional marginalization of the fishing communities in general has been identified as the root cause of poverty in small-scale fisheries (Bene, 2003; Allison *et al*., 2006).

Accessibility to bank and microcredit facilities was also very limited in the rural communities. This in itself is not surprising as poor access to formal credit has been long recognized in rural development literature as one of the major constraints for poverty alleviation (IFAD, 2001; World Bank, 2002). Limited access to credit facilities will seriously affect the fisher's capacity to escape poverty.

The above discussion points to an important conclusion: poverty and poverty reduction in small-scale fishing communities can only be partially related to direct increase in fish catch, promoting alternative livelihoods and reducing fishing pressure by moving people out of fishing. The obvious measures needed to enhance wellbeing in the fishing communities are provision and accessibility to credit, fishing inputs, fish stocks related issues, provision of infrastructure and political support to the communities. Most of the potential for major progress in poverty reduction in fishing communities is related to factors outside the conventional productivity domain, such as access to public services, infrastructure, education, marketing and health facilities (FAO, 2005; Bene and Friend, 2009, 2011). Hence, policies should be directed towards making these facilities and services more available in the small-scale fishing communities.

Vulnerability: In general, fishers and fishing communities were vulnerable to poverty mainly because of: lack/limited access to credit, lack of fishing inputs/infrastructure, basic social services, safe water and poor sanitation condition, as well as poorly functioning markets for fishery products. Their vulnerability to poverty is further deepened by the low returns on fishing which is their major occupation.

The mostly coping mechanism adopted by the fishers is by drawing on their savings, migrate, use child labour or avoid the risk all together. These affect their investment capacity in the sector, as well as high vulnerability rate of HIV/AIDS as fishers sometimes migrate to endemic areas. In some cases, migrant's fishers are regarded with suspicion by some sections of the local people. In December 1998, Ghanaian migrant fishers were driven out of part of southwest Cote d'Ivoire when local inhabitants burned their settlements (US Department of State, 2000). Although illegal and discouraged, child labour is often a key strategy for the poorest households. Also coastal children are found working in the inland Lake Volta fishery. Pragmatic action is therefore required from all interested stakeholders (government, managers and researchers, NGOs) to work assiduously to reduce the source of vulnerability and assist the vulnerable groups. A recent review of the literature on poverty in fishing communities by Macfadayen and Corcoran (2002) concludes that, targeting the sources of vulnerability and vulnerable groups (those with a high chance that they will fall into poverty), may be as important to poverty alleviation as focusing on those who are currently the poorest in income or material asset terms.

Recommended strategies to combat (eradicate) poverty in small-scale fisheries: In view of the findings made on poverty measurements in the small-scale fisheries of Ghana, the following recommendations and strategies are presented for their implementation to enhance poverty alleviation and management of the small-scale fisheries:

- Investments in infrastructure should be made urgently in the fisheries sector which will lead to wealth creation and vulnerability reduction. Fishers should also be assisted to make more money through wealth creation. The single most important thing that is needed to get fishers out of poverty is to find ways of making more money. This could be

undertaken by Government, NGOs, developmental partners and private sector.

- Collective action from all stakeholders (managers, donors, researchers and fishers) in working together to address the problems of poverty alleviation in small-scale fisheries of Ghana. Development practitioners and donors should also fulfill their commitment to the government to implement its poverty intervention programmes. For researchers in particular, there is an urgent need to documenting and analysing policy reforms, social, political and structural processes (including power relationship) within and outside the small-scale fisheries sector. There is the need to raise the poverty profile of the small – scale fisheries as a whole and devise efficient systems of knowledge transfer.
- In terms of the overall data management and systems in relation to poverty in small-scale fisheries, there are few data available, scattered and not well coordinated, hence the need for coordination. Government agencies, research institutions, universities and NGOs should take action on this.
- Agencies and individuals interested in poverty analyses in the small-scale fisheries must incorporate all the dimensions such as vulnerability, marginalization and assets holdings, but not solely rely on income and consumption indices so as to give broader picture of the poverty profile. The failure of many poverty alleviating interventions in fisheries could be attributed to poor understanding of the nature before initiatives are planned and implemented.
- There is the urgent need to address all the causes of poverty simultaneously, *viz-a-viz* accessibility to credits, fishing inputs, accessible roads, health facilities, market. In this regard, the urgent need to improve access of fishers to inputs, credit and market by government, NGOs and the private sector. This will ensure poverty reduction and ultimately sustainable fisheries management.

CONCLUDING REMARKS

Through poverty measurement, vulnerability and marginalization analyses, the complex and dynamic nature of poverty in small-scale fisheries can be explored. This will aid in formulating effective poverty prevention and reduction strategies. Both absolute (head count index, poverty gap and poverty severity) and relative (fishing household and gear) measurements were applied in this study to give a comprehensive profile of poverty in small-scale fisheries in addition to vulnerability and marginalization.

The poverty indices were generally high, especially in inland and rural coastal communities. Vulnerability and marginalization need to be reduced, *viz-a-viz* provision of clean water, schools, banks and microcredit institutions and local administration. These will improve wellbeing of inhabitants in the fishing communities. Factors that lie outside the fisheries that contribute to poverty needs to be given serious attention.

In conclusion, all stakeholders (policy makers, donors, NGO's, fishing communities and researchers) must play their roles through formulation of policies, provision of amenities, support community partnership and poverty research. Good policies will be the main instrument to minimize poverty in small-scale fisheries; at the end of the day, it is a matter of political will. With diverse and complementary actions, poverty in small-scale fisheries could be minimized.

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End note:

1: Household includes nuclear families, group of families or unrelated individuals living together and pooling their resources for the purpose of meals. Household members are assumed to pool income and see fair distribution (Fields, 1994; Ssewanyana, 2009).