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Poverty profile of riverine communities of southern Lake Volta

by

Fabio Pittaluga (ed.)
L. I. Braimah
Alabi Bortey
Noble Wadzah
Awadey Cromwell
Maria Dacosta
Chiara Seghieri
Nicola Salvati

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Fax : (229) 33.05.19 Tél.: (229) 33.09.25 E-mail: RSU.USR@sflp-pmedp.firstnet.bj

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1. INTRODUCTION

The Volta Lake is the largest man-made lake in Africa (8700 km^2) and contributes 90% of the total inland fishery production in Ghana on which some 300,000 fisher folk depend for their livelihood of whom about 80,000 are fishermen and some 20,000 are fish processors/traders (IDAF-Yeji Terminal Report, 1993).

The creation of the lake resulted in the displacement of some 88,000 people (Quartey, 1969), but it also created an immense fishery potential estimated at 40,000 t per year (Vanderpuye, 1986). The government of Ghana initially provided 54 resettlement towns and commissioned a multi-disciplinary project (Lake Volta Research and Development Project – LVRDP) that operated from 1968 to 1977 to improve the living conditions of the lakeside communities (Quartey, 1969). The project actively encouraged an open access system of management and developed the necessary infrastructure and trained man power for the exploitation of the abundant fishery resources (Braimah, 2001). Incidentally the open access system and the expansion policies for fisheries development were bequeathed to successive generations after the project terminated in 1977. Therefore, over the years, the government realized that its objective of enhancing the socio-economic and physical development of the lakeside communities was not being achieved. The government also realized that due to the dispersed settlement pattern of the lakeside communities, the only practical way of developing the lakeside fisheries enterprises was through the establishment of fisheries marketing complexes (centers with facilities for fish landing, handling, processing and marketing, social and training) at the major fishing communities along the lake (IDAF-Yeji Terminal Report, 1993). The Integrated Development of Artisanal Fisheries (IDAF) Project was initiated in 1989 to improve the living conditions of over 75,000 inhabitants in the Yeji sector of the lake through the establishment of a Community Fisheries Centre (CFC) with facilities for fish landing, handling, processing, marketing, training, workshops and social services. The project also provided additional employment and income generating activities including adoption of agroforestry/tree planting activities which it coordinated under its Tree Cover Depletion Minimization Project (TCDM) financed by the Volta River Authority (VRA) in collaboration with other technical agencies.

The pilot activities of IDAF were restricted to the Yeji sector of the lake and it has been the government's desire to collaborate with other development partners to replicate IDAF's experience to the other parts of the lake. In pursuance of this, the government of Ghana sought to collaborate with the Sustainable Fisheries Livelihood Programme (representing a partnership between the FAO, the Department for International Development of the Government of Great Britain and Ireland and 25 countries in West Africa) for the implementation of a pilot project entitled, 'Policies, institutions and processes in support of co-management in inland fisheries livelihoods in Ghana, Côte d'Ivoire, Mali and Burkina Faso. The purpose of the pilot project is 'fisheries livelihoods improved by establishment of participatory co-management mechanisms and the integration of fisheries communities into local development processes'.

As part of the planning phase of the pilot project a poverty assessment was conducted with the main objectives being:

- help identify target beneficiaries of the pilot project;
- establish a baseline of information on the livelihoods for project beneficiaries;
- identify potential indicators to monitor impacts of project on beneficiaries' livelihoods; and

- contribute to the design of the pilot project.

The poverty assessment exercise was based on:

- building on existing knowledge vested in local institutions and people; and
- eliciting information in a participatory manner from what will eventually be the target beneficiaries of any proposed action.

A related objective was to ensure that as many voices as possible were consulted in the inception phase of the project, learning from past experiences (positive and negative), and to ensure that actions are not imposed but jointly constructed among the various stakeholders involved in the process of diagnosis.

2. THE POVERTY CONTEXT IN GHANA

Over the past ten years, Ghana experienced growing and deepening poverty, evidence of the intensification of vulnerability and exclusion among some groups (Ghana poverty reduction strategy, 2002). Moreover, population growth coupled with falling household incomes worsened poverty levels among the people.

Food crop farmers in the country were affected by the highest incidence of poverty. They constitute fifty nine per cent (59%) of the poor in Ghana. This has been due to several factors including lack of access to markets, high cost of inputs and low levels economic infrastructure.

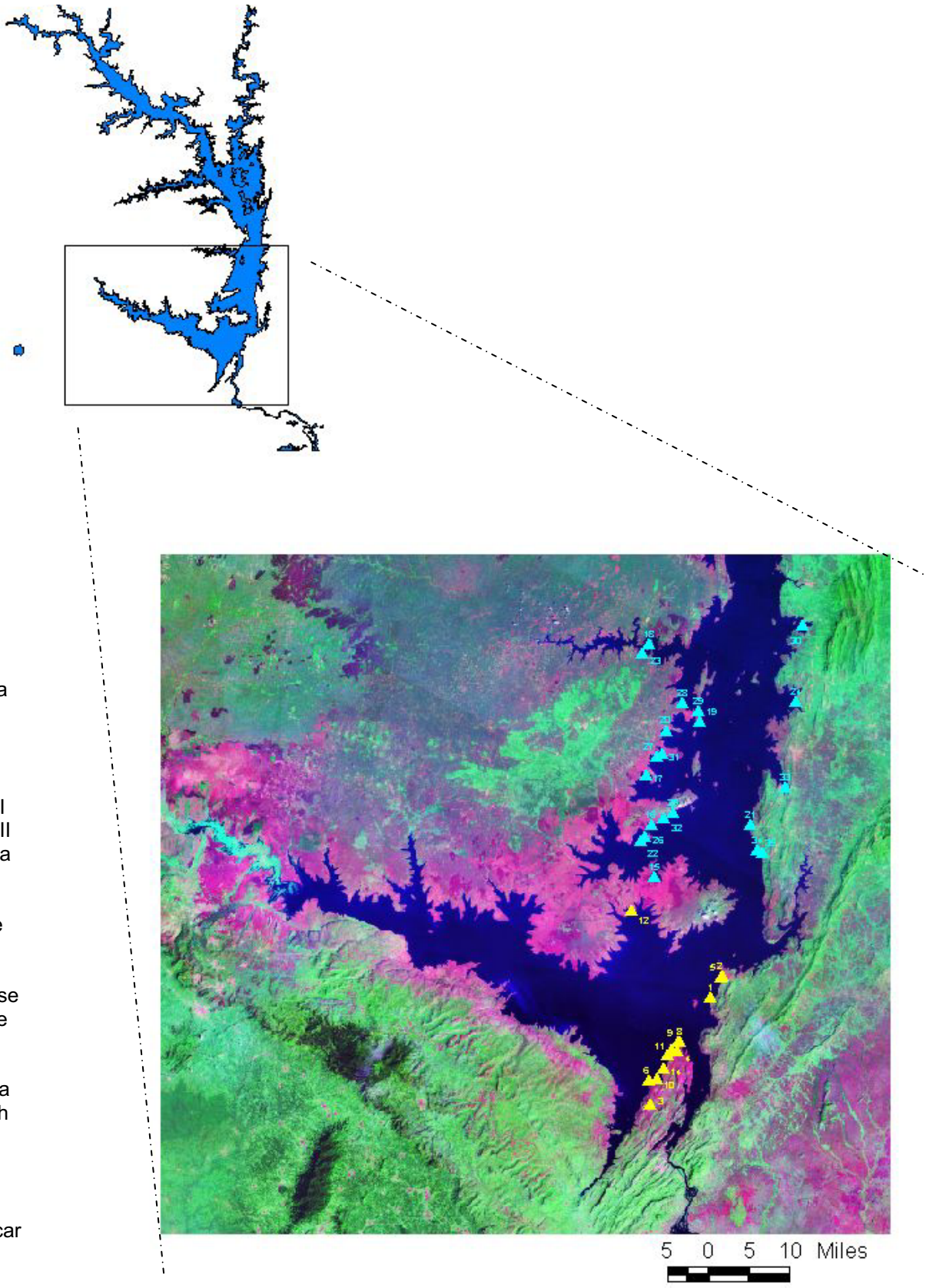
Poverty is higher in rural areas than in urban centers, with peaks in the savanna zones. On the contrary, the rural forest showed a significant reduction in poverty between 1991/92 and 1998/99 (Country assistance strategy for Ghana, 2000).

Pilot project intervention area

Lake Volta has been divided into eight sub-strata (Petr and Vanderpuye, 1964) for purposes of biological work as well as catch and stock assessment studies:

- sub-stratum I — Afram arm
- sub-stratum II — Lower main body
- sub-stratum III — Middle main body
- sub-stratum IV — Upper main body
- sub-stratum V — Oti river arm
- sub-stratum VI — Lower Volta riverine body
- sub-stratum VII — Middle Volta riverine body
- sub-stratum VIII — Upper Volta riverine body

Figure 1 Map of the Volta Lake showing the eight sub-strata of the lake



VILLAGES

1 Adzebui
2 Agordeke
3 Akorkorma
4 Akrusu
5 Atokro
6 Beposo
7 Dzemeni
8 Ewuharai I
9 Ewuharai II
10 Konkodeka
11 Korleso
12 Kpatalidz
13 Kudi Kope
14 Surveylan
15 Abochire
16 New Chiase
17 Achiwlame
18 Adorkope
19 Adordeke
20 Amankwaa
21 Awate Deh
22 Blube
23 Chiasi
24 Daffor To
25 Jabui
26 Madagascar
27 Meyikpor
28 Nyuinui I
29 Nyuinui II
30 Odormitor
31 Salefe
32 Sokpoe Kope
33 Sovie D
34 Wusuta K

▲ = villages sampled in sub-stratum II
▲ = villages sampled in sub-stratum III

The pilot project is proposed by the government to be implemented in sub-strata II (the lower main body of the lake) and III (the upper main body) both being the main lacustrine part of the Volta Lake constituting 29.4% of the total surface area. This means that the beneficiary administrative districts are: Jasikan, Kpando (Volta Region), Asuogyaman, Manya Krobo and Afram Plains (Eastern Region).

Out of a total of 1,232 fishing villages with 71,861 fishermen, the proposed project area will target 100 fishing villages (Braimah, 2000). Although fishing is the main source of employment for fisher folk other employment opportunities have become significant in the lake side communities due to dwindling fish stocks (Agyenim-Boateng, 1989; Maembe, 1992a; Osei-Bonsu, 1995a).

3. METHODOLOGY

The study was carried out by a multidisciplinary team of researchers composed of a team leader, a gender specialist, a socio-economist, and a fisheries specialist. The research team received a 3-day learning by-doing and *experiential* training prior to going to the field. The training was conducted by Fabio Pittaluga, Livelihood Security Vulnerability and Monitoring Officer of SFLP-SIFAR, FAO. Various data collection tools and techniques were pilot-tested in the Kpando District and in Dafor, a fishing community in the same district.

A one-day workshop was organized in the five administrative districts adjoining sub-strata II and III of Lake Volta. Key informants from the administration, the private sector, and civil society were invited to attend. About 15 individuals representing different institutions participated in such workshops. The goal of these sessions was to elicit information about large scale dynamics that affect a given district.

In addition, a sample of 35 villages was selected for a rapid appraisal to cross-check and validate information obtained through the workshops, to fill information gaps, and to include the voices of project beneficiaries. Given the large number of villages to be visited, the difficulties to move about on the ground, and the time limitations, it was decided to organize only one meeting in each village visited, administering a specific tool which will be described in the section below (Data collection instruments). In some cases it was possible to interview men and women separately, whereas in others gender-disaggregated focus groups were not possible due to linguistic constraints.

3.1 Sampling strategy

The Pilot Project for which this poverty profile is carried out concerns 100 villages located in the sub-strata II and III of Lake Volta. Villages are distributed across 5 administrative districts. Due to time and resource constraints, it was decided to consider a sample of 35 villages for the purpose of the poverty profiling exercise, representing roughly 33% of the 100 beneficiary villages. Villages in each district were selected proportionally to the total number of villages accounted for by each district. Results are presented in the table below:

Fig. 2. Number of villages per district composing the sample

Districts	Jasikan	Kpando	Asuogyaman	Manya Krobo	Afram Plains	TOTAL
Number of villages	2	9	6	3	15	35

The selection of the actual villages in each District was operated on the basis of:

(a) the number of fishermen per village;
(b) the number of canoes per village;
(c) the ratio of canoes to fishermen per village;
(d) accessibility.

Unfortunately the Ghana population census was not available to enhance the selection criteria.

The team utilized the ratio of number of canoes to number of fishers as a proxy for indicating differential poverty levels in the villages under study. The assumption was that the lower the ratio, the lower should be the corresponding poverty level as an aggregate indicator at village level. Fishing communities with ratios of 0.31 or less were deemed appropriate for selection in the sample, as this procedure enabled the selection of communities to conform to the district allocation. However accessibility issues were considered when some of the villages were found to be extremely difficult to reach. Because of this, the actual number of villages visited differs slightly from the ones determined in the a priori sample selection (see Appendix 1). In any case, whenever a substitution was necessary, the team took great care to replace the inaccessible villages with alternative villages with not too dissimilar scores on the calculated ratio.

3.2 Data collection instruments

A structured questionnaire based on the Sustainable Livelihood Approach was administered in each of the selected 35 fishing communities in the 5 administrative districts, following a plan drawn for the field activities (see Appendix 2). The questionnaire consisted of 197 scaleable attributes constructed using Likert scales (see Appendix 3), and it was administered only once in each of the villages visited to a group of people representing different voices in the village. In addition to the application of the structural questionnaire, wealth ranking and Venn diagrams were prepared for each village.

The 197 questions refer to different aspects of people's livelihoods and are classified analytically into 12 synthetic variables, i.e. Access to resources, Coping mechanisms, Education, Employment, Financial assets, Food security, Health, Infrastructure, Institutions, Social capital, State of natural resources, and Vulnerability. Each statement considered a particular aspect of one of these synthetic variables. Each statement could be attributed a value from 1 (worst situation) to 5 (best situation). For example, as part of the qualitative evaluation of the natural resource basis, people were asked to attribute a value between 1 and 5 to the following statement:

Statement	1	2	3	4	5
Fish catches over the past 5 years have	Substantially decreased	Somewhat decreased	Remained stable	Slightly increased	Increased considerably

While attributing value to the 197 statements, though, people interviewed were also providing explanations for the reasons why they were scoring one way or the other. This method allowed obtaining a substantial amount of qualitative data that has also been utilized for the analysis of poverty along Lake Volta. In particular, the information collected allowed contextualizing the semi-quantitative responses obtained through the questionnaire. In addition, it provided the framework in which contradictory or inconsistent views could be recorded.

3.3 Data analysis

The data collected during 4 weeks of fieldwork was first analyzed from a qualitative point of view, trying to explain local perceptions of poverty, attempting a classification of the population into wealth classes, and giving an overall picture of the poverty situation among fishing communities of the portion of Lake Volta concerned by the project. Findings were then cross-checked with a statistical analysis conducted on the data collected through the scaleable attribute questionnaire.

For statistical purposes, the 197 micro-variables were condensed into 12 synthetic variables. Considering that data was available only for 35 villages, it would have been impossible to use all 197 variables for any type of analysis. The total value of each synthetic variable was calculated as the simple mean of all component statements.

A first step in the data analysis was the compilation of a series of descriptive graphs on the basis of which villages could be compared with respect to each synthetic variable. Subsequently, correlation analysis was conducted between sets of variables using the Spearman coefficient. The table below presents the values of the Spearman coefficient calculated between pairs of variables. Only 6 out of the 18 relationships analyzed were statistically significant, and only one showed a negative relationship (between Vulnerability and Coping mechanisms). Analytical results are presented in the course of the report.

Table 1. Spearman coefficients calculations

Variable 1	Variable 2	Spearman Coeff.	p-value	Sig.
Coping mechanism	*Vulnerability*	-0.34	0.04	*
Coping mechanism	*Food security*	0.32	0.05	*
Coping mechanism	*Social capital*	-0.26	0.11	
Vulnerability	*Food security*	0.01	0.93	
Vulnerability	*State of resources*	0.01	0.93	
Vulnerability	*Infrastructure*	-0.07	0.68	
Education	*Employment*	-0.001	0.99	
Education	*Institution*	0.35	0.03	*
Employment	*Financial assets*	0.36	0.03	*
Employment	*Infrastructure*	0.05	0.74	
Health	*Food security*	0.08	0.63	
Health	*Infrastructure*	0.00	0.96	
Health	*Institution*	-0.23	0.17	
Social capital	*Institution*	0.30	0.07	
State of resources	*Food security*	0.32	0.05	*
Access to resources	*Food security*	0.40	0.01	*
Institution	*Infrastructure*	0.28	0.09	
Institution	*Financial assets*	-0.02	0.86	

4. POVERTY PROFILE OF LAKE VOLTA COASTAL COMMUNITIES

4.1 Causes of Poverty as perceived by Institutions and by Beneficiaries

Fishing villages along the Volta Lake are described as disadvantaged due to their remoteness and absence of socio-economic infrastructure necessary for self advancement (Maembe, 1992 and Osei-Bonsu, 1995). Being in similar working environments leads poverty to be perceived generally along similar lines but the causes of poverty are varied and numerous and are presented in Table XXX below.

Table 2. Causes of poverty by district

Causes		District				
		Manya Krobo	Kpando	Jasikan	Afram Plains	Asuogya man
Access to resources	No access to land for farming					
	Lack of fishing/farming equipment					
Education	Lack of improved techniques in farming					
	Poor prioritization of needs					
	Laziness					
	Lack of employment skills					
	Poor management of one's resources					
	Ignorance/illiteracy					
Employment	Poor access to marketing facilities					
	High post harvest losses					
	Lack of opportunities for other income generating activities					
	Inability to expand work					
	Lack of hired labor					
Financial assets	No start-up capital					
	No access to loan facilities					
	High cost of inputs (fishing & farming)					
	Lack of credit facilities					
	High interest rates					
Food security	High cost of food stuffs					
	Low fish prices					
Health	Poor sanitary conditions					
	Lack of health facilities					
	High cost of health services					
	High birth rate					
	Teenage pregnancy					
Infrastructure	Lack of cold storage facilities					
	Lack of markets in the fishing villages					
	Poor accessibility to fishing communities					

	Lack of electricity					
	High cost of transportation					
Social capital	Dishonesty					
	Drunkenness					
	Disrespect for authority (elders)					
	Absence of co-operatives to consolidate and strengthen the loose economic/social groups					
	Land disputes					
	Lack of support from institutions					
	Lack of dynamic leadership in the fishing communities					
Vulnerability	Rampant stealing of fish and fishing nets					
	High incidence of bush fires					
	High accident rates on water and loss of fish and nets					
	Fire outbreak during fish processing					
	Destruction of farm lands by cattle					
State of natural resources	Poor soil fertility					
Others	Destiny					

4.2 Poverty distribution between villages

The graph below presents the mean value obtained by each village through the perception survey. The graph shows a degree of homogeneity in the situation between villages, with the global indicator varying from 2.5 to 3 (from a maximum score of 5 which represents the best situation).

Fig. 3. Total average value by village.

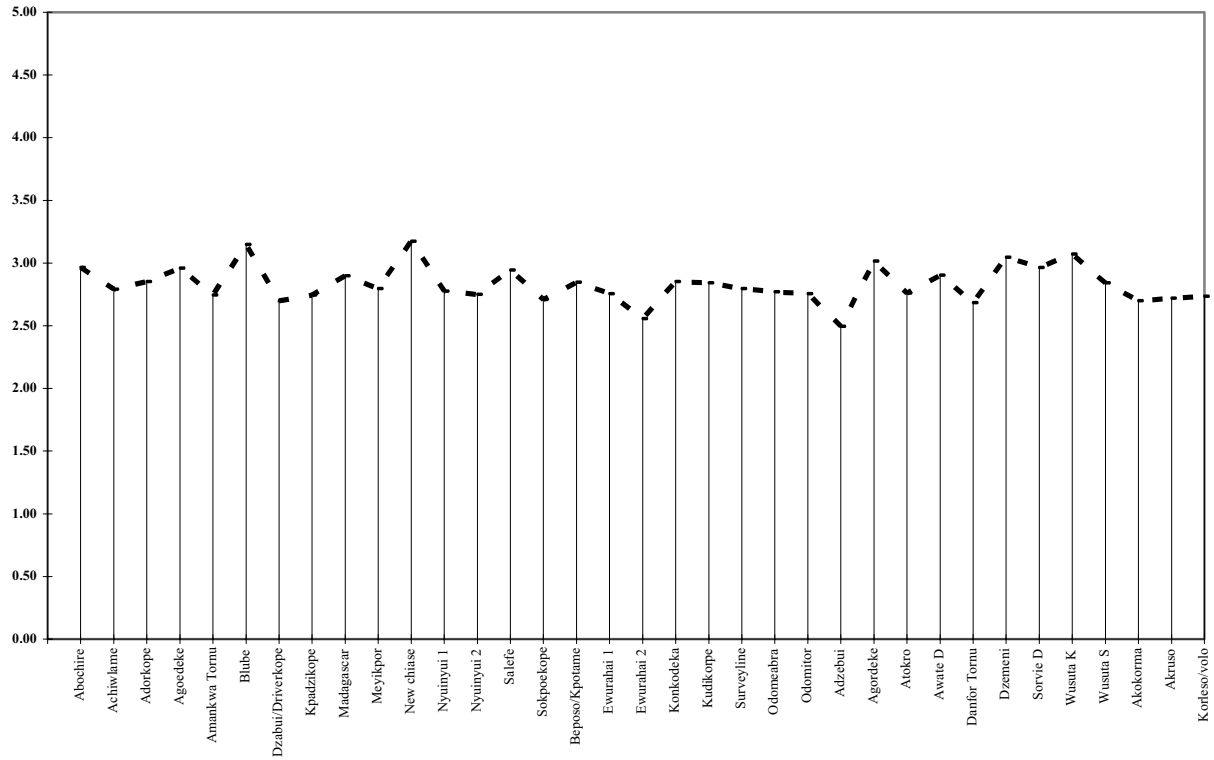
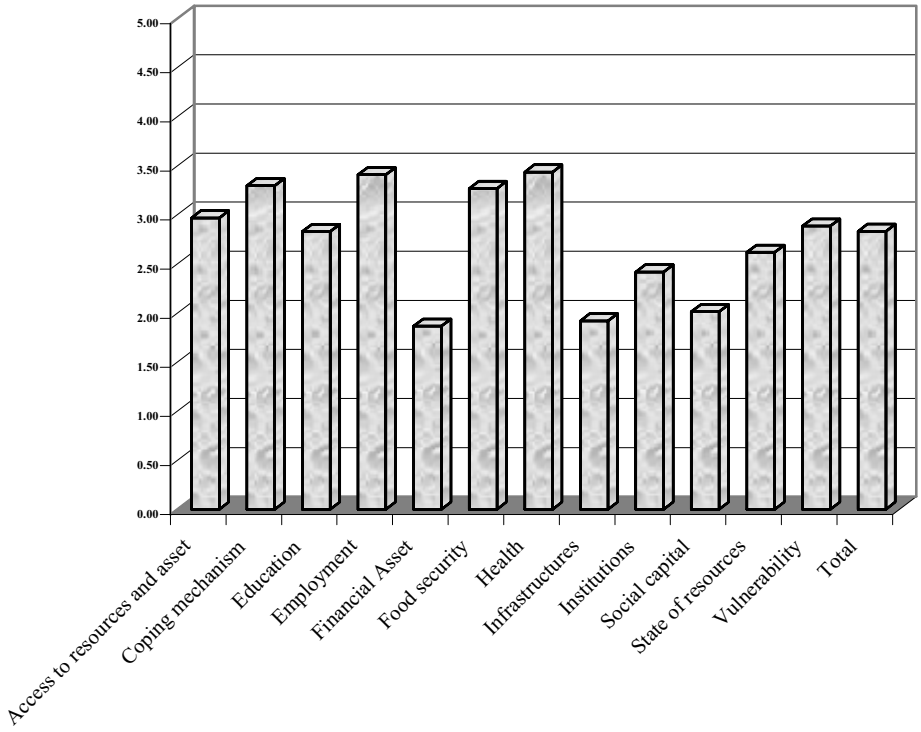


Fig. 4. Average value of all variables analyzed for the entire sample (35 villages)



Overall, the graph above (Fig. 4) seems to suggest that financial assets, infrastructure and social capital are the key issues determining poverty in the villages selected. On the other hand, food security seems to be only marginally a problem, and maybe this can be partially explained by the good employment record that emerges from this analysis.

The relatively high value of the variable "Health" is certainly striking. The variable per se summarizes issues related to the availability of medical services and medicines, traditional practitioners, as well as the predominance of diseases and rates of infection. While many of the villages continue to be devoid of medical services, general health conditions seem to have improved according to the views of villages. In effect, malnutrition rates have substantially dropped in fishing communities from a few decades ago, as well as the prevalence of a series of infective diseases because of vaccination campaigns. Mortality rates and maternal mortality has also improved according to local perceptions. Because HIV/AIDS is stigmatized and because of collateral deaths, prevalence of the disease should be considered underreported. If viewed in this context, it is likely that people living in fishing communities perceive their health conditions to have improved generally. Traditional medicine also provides a series of cures to endemic problems in the area. On the other hand, it is risky to view the relatively high score of the "Health" variable as an indicator of good health and sanitary conditions in the region. Malaria continues to be a serious problem, as well as diarrhea and respiratory diseases, while availability of medicines in many villages is beyond reach of most of the population, both in terms of physical presence on the market, as well as capacity to purchase them. In fact, 31 out the 35 villages reported that no primary health care units are functioning in loco, and 28 reported that no medicine distribution centers are operational.

In addition, it is important to point out that the variable "Employment" includes work in family activities, both in agriculture and fishing. Therefore, it should not be interpreted as an

indicator of good employment opportunities in terms of rural or urban wage labor. Considering that children begin contributing to the household economy from very early age (generally from 7 or 8 years old for both boys and girls), it is not surprising that a substantial proportion of the population be economically active.

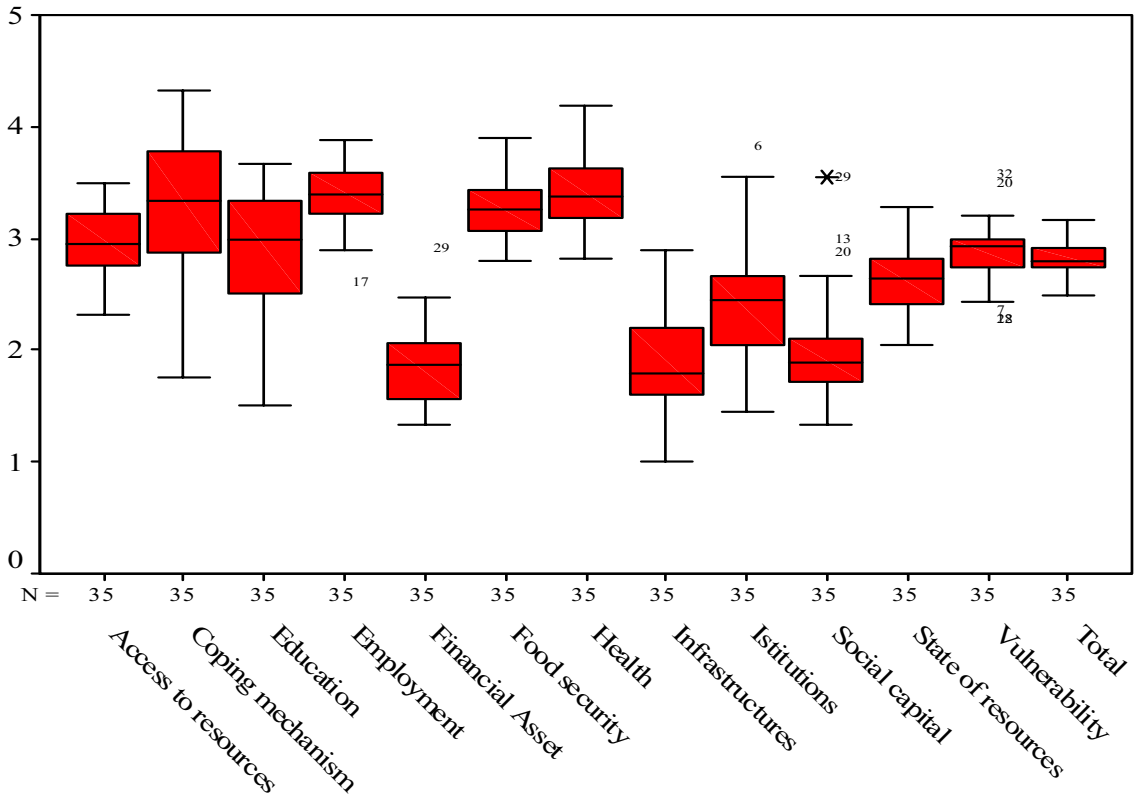
Table 3 below illustrates the variability in the mean calculated for each of the 12 variables that compose the general index presented in the graph above (Fig. 4). The variables "Coping Mechanisms" and "Education" show the highest variability, whereas all others present a lower degree of variability. It can be therefore concluded that, to a large extent, villages experience a high degree of homogeneity with respect to the aspects of poverty investigated here. This trend is confirmed by the variability of the general index, where all values are clustered around the mean value.

Confidence intervals of the variables above were then calculated, to estimate the probability that the means observed from the sample, fall within that very interval (with 95% probability) (see Table 3 below).

Table 3. Variability of all mean values

Variables	Mean value	St. error	Confidence interval	
			Lower Bound	Upper Bound
Access to resources and asset	*2.9670*	*0.3242*	*2.8800*	*3.0541*
Coping mechanism	*3.2952*	*0.6816*	*3.1123*	*3.4782*
Education	*2.8286*	*0.5809*	*2.6726*	*2.9845*
Employment	*3.4079*	*0.2924*	*3.3294*	*3.4864*
Financial Asset	*1.8648*	*0.3814*	*1.7624*	*1.9672*
Food security	*3.2667*	*0.2573*	*3.1976*	*3.3357*
Health	*3.4357*	*0.3566*	*3.3400*	*3.5314*
Infrastructures	*1.9200*	*0.4384*	*1.8023*	*2.0377*
Institutions	*2.4175*	*0.5399*	*2.2725*	*2.5624*
Social capital	*2.0127*	*0.4804*	*1.8837*	*2.1417*
State of resources	*2.6169*	*0.2706*	*2.5443*	*2.6895*
Vulnerability	*2.8837*	*0.2971*	*2.8039*	*2.9634*
Total	*2.8302*	*0.1497*	*2.7900*	*2.8704*

Fig. 5. Confidence interval for mean values of all variables



As indicated in the graph above (Fig. 5), variables presenting greater variability are "Education" and "Coping Mechanisms." The latter, together with "Food Security", "Health", and "Employment" present high average values (between 3.0 and 3.5) with respect to the rest of the variables. On the other hand, a lower variability is presented by variables "Vulnerability", "State of resources" and "Food security", conveying greater heterogeneity between villages.

4.3 Classification into socio-economic groups and characterized

The disparity in levels of poverty among fisher folk can be represented by categorizing the population into three main groups: very poor, average, and better off. All three classes are more apparent in some communities while others are less heterogeneous. Moreover, some characteristics are shared by individuals and families belonging to all three groups throughout the lake, while others are peculiar and specific to particular areas. Some examples are given in the classification below.

The Very Poor

People composing the poorest groups on Lake Volta are usually individuals who sell their labor force in the fisheries or agricultural sectors. They often do not send, or send very few, children to school; they may be peasant fishermen or farmers, have no or little access to means of production, and have meals mostly of cassava dough with little or no corn mixed and hardly with fish. This group includes single parents or widows (Manya Krobo), the unemployed (Afram Plains), the disabled and sick (Afram Plains), and those unable to meet

social obligations such as, for example, funeral contributions (Afram Plains and Manya Krobo).

The very poor often have large families and are not able to cater for some members of the household (especially in Jasikan, Afram Plains and Manya Krobo), they have inadequate access to quantities and quality of food (especially in Afram Plains, Manya Krobo and Kpando). They often live in poor housing (Afram Plains, Manya Krobo and Kpando), are dressed very poorly (all except Jasikan), possess no livestock (Asuogyaman), and usually have neither savings nor access to financial resources. In the case of the Jasikan district, access to land exacerbates the poverty status of this group. In various cases, poorest people are highly indebted (Kpando), and are forced to hire children out for money (Kpando).

According to the perceptions of resource people interviewed during the fieldwork, the very poor account for roughly 50% of the population living in fishing communities on Lake Volta.

Three main sub-groups can be distinguished within this category:

a) *Families who have no means of production and productive capital*. The main source of livelihood is hiring of their labor for fishing, farming and processing of fish on day to day basis. Others rent boat and nets on daily or weekly basis, but are just able to pay rent either in cash or in kind.

b) Families who possess only very poor fishing equipment. This category depends solely on fishing for livelihood as the income generated is not adequate to capitalize other income generating activities.

c) *Peasant farmers*. They are only able to cultivate very small landholdings (1 to 1.5 acres) and lack the necessary inputs (fertilizers etc.) for maximization of yield. Farming activities remain at subsistence level and rarely enable these families to cover all primary necessities. From time to time they would work as temporary labor force on other people's farms.

The Poor

These are individuals or families who have some fishing and farming equipment. They may possess or have access to a boat with about five gillnets, a cutlass and hoe for farming and also possess an average of 0.5 ha of farm land as well as are able to educate some children up to Junior Secretary School level. They may have access to limited financial resources and count on a limited income (Afram Plains, Manya Krobo and Jasikan). They are involved in petty trading, for example shops (Jasikan), although they often operate on borrowed capital (Jasikan). These families usually own small livestock (all districts except Jasikan), are decently dressed according to local standards (Manya Krobo), and have decent/adequate food, cassava meal with adequate corn dough and some fish (Manya Krobo, Asuogyaman and Kpando). People belonging to this group live in houses with aluminum roofing (Asuogyaman) and may own a building in their home town (Afram Plains); can have minimum labor of less than three persons (Afram Plains and Kpando). They can afford some health services (Kpando) and can often cater for larger family sizes (Afram Plains); and are often members of a small scale irrigation co-operative (Jasikan).

Families belonging to this category usually have on their own fishing nets just enough for a fishing crew of two (7 – 10 gillnets) with a fishing canoe without an outboard motor. Such

fishing activities usually yield a limited income. Nevertheless, they can manage to save some small capital to hire laborers for the cultivation of moderate size farm lands of 2 – 3 acres. These families are able to invest some capital in small livestock and poultry, which in these areas function as a form of savings. In hard times, in fact, livestock and poultry are sold and constitute a mechanism to cope with crises. Some petty trading is also undertaken by families belonging to this group.

The Better Off

People belonging to this category are usually farmers or fishers who possess an array of means of production, including canoes with outboard engines, large landholdings as well as hired manpower (Afram Plains, Asuogyaman and Kpando). They can maintain large polygamous families (Afram Plains) and can often educate their children outside the community to Senior Secondary School levels or even higher. They can generate substantial amounts of revenue, (Afram Plains and Jasikan) and hardly ever need to borrow money (Kpando). They live in roofed houses with aluminum sheets (Afram Plains, Manya Krobo and Jasikan) and possess a range of electric appliances such as TV, radio, and a refrigerator (Asuogyaman and Kpando) as well as a house in their home town (Asuogyaman). People belonging to this group are proprietors of cattle (all districts except Jasikan), normally do manage to save money (Asuogyaman), and can afford decent health care (Afram Plain, Manya Krobo and Asuogyaman).

To this group belong also those families who operate road vehicular transport (Afram Plains and Asuogyaman), lake transport (all districts except Manya Krobo), and have fuel depots (Afram Plain, Jasikan and Kpando).

The ability to diversify sources of income and the volume or type of activity is a key factor in determining fisher folk poverty status. Those who depend on fishing only are to be found predominantly in the very poor group; those who are able to undertake other income generating activities on a small scale are in the average group; while the better off are people who have income generating activities of considerable volume, capital intensive, and high yielding such as cattle and grinding mills.

People who are better off usually possess adequate fishing equipment (for example those using gillnets will have between 21 and 45 fishing nets made from three bundles of nets); use several fishing methods and are able to operate into distant rich fishing grounds, using fishing laborers making fishing a very lucrative source of livelihood. These persons may land between 20 and 50 kg of fish per day. In addition to semi-industrial fishing, these families are involved in boat transport, grinding/corn mills and large livestock rearing.

The supplementary activities undertaken as part of the livelihood strategies enacted by the average and mostly by the better off are varied, numerous and gender biased. Income generating activities in which individuals of the latter two groups are involved include farming, poultry rearing, craftsmanship (carpentry, masonry, boat building) and lake transport, all of which are male dominated. Other significant male dominated activities are found only on some parts of the lake and include livestock rearing (all except Jasikan), petty trading (Manya Krobo, Jasikan and Kpando), distilling of local gin (Manya Krobo), blacksmithing (Kpando), firewood selling (Asuogyaman and Kpando), charcoal burning (Afram Plains and Asuogyaman), and tourism (Asuogyaman). The main activities undertaken by women are fish processing and fish trading. Other complementary activities

undertaken by women in the fishing communities are petty trading (sale of food and household essential items), farming, and poultry rearing. Some activities are generally undertaken by women only, such as hairdressing (Afram Plains and Kpando), dressmaking (Afram Plains and Kpando), *gari*/cassava dough processing (Asuogyaman and Kpando), livestock rearing (Manya Krobo and Kpando), and stone quarrying (Kpando).

4.4 Proportion of people belonging to socio-economic groups

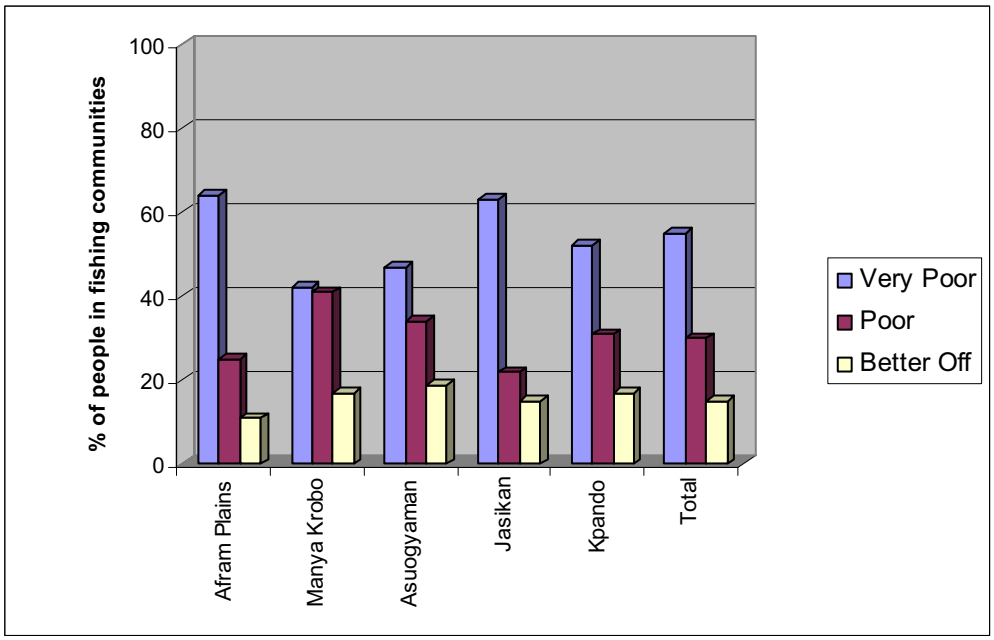
No quantitative data was available at the time of the study for a classification of the fisheries dependent population into socio-economic or wealth groups. Therefore a qualitative approximation was attempted on the basis of wealth ranking exercises conducted in each of the villages. Results of village wealth rankings were then triangulated with expert opinions and informants knowledgeable about the areas under consideration. The results of such estimation should be viewed as a means of understanding the magnitude of poverty among fishing dependent communities in the southern portion of the Volta Lake. Three main wealth categories have been identified in the villages visited. Results are presented in the table below.

Half of fisher folk in the lakeside fishing communities are poor with the highest proportion in the Afram Plains (Table 4 and Figure 6). Some 15% are better off with Asuogyaman having the wealthiest proportion in the area due to their use of drag nets for small clupeids for which there is ready market.

Table 4. Proportion of fishing communities by socio-economic group

Groups	Afram Plains	Manya Krobo	Asuogyaman	Jasikan	Kpando	Total
Very Poor	64	42	47	63	52	55
Poor	25	41	34	22	31	30
Better off	11	17	19	15	17	15

Fig. 6. Wealth categories identified in the villages by district

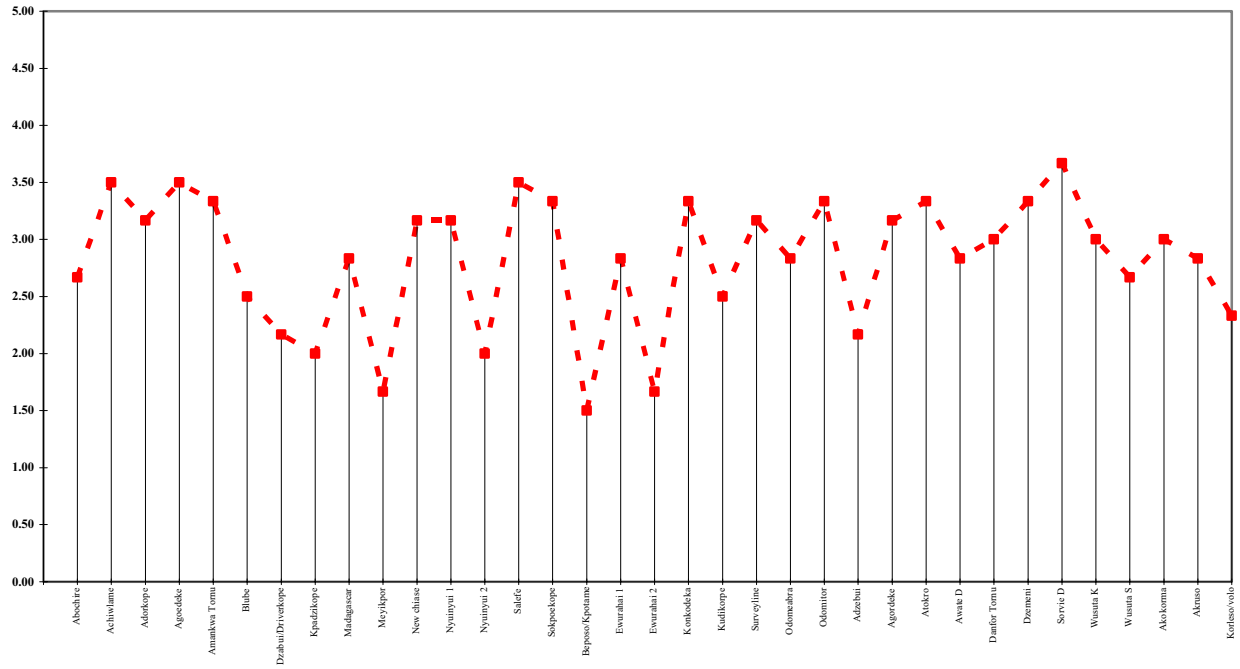


5. THE HUMAN CAPITAL

5.1 Education

The level of education measured by the variable called "Education" (see Fig. 7 below) in this study summarizes aspects of access to educational facilities, the proportion of literate men and women in the general population, and school drop out rates. Results of the survey show a high degree of variability between villages insofar as education is concerned. Villages scoring the lowest values are Meyikpor, Beposokpotame, and Ewurahair2, whereas the village of Sorvie D presents the highest scores.

Fig. 7. Value of Education by village



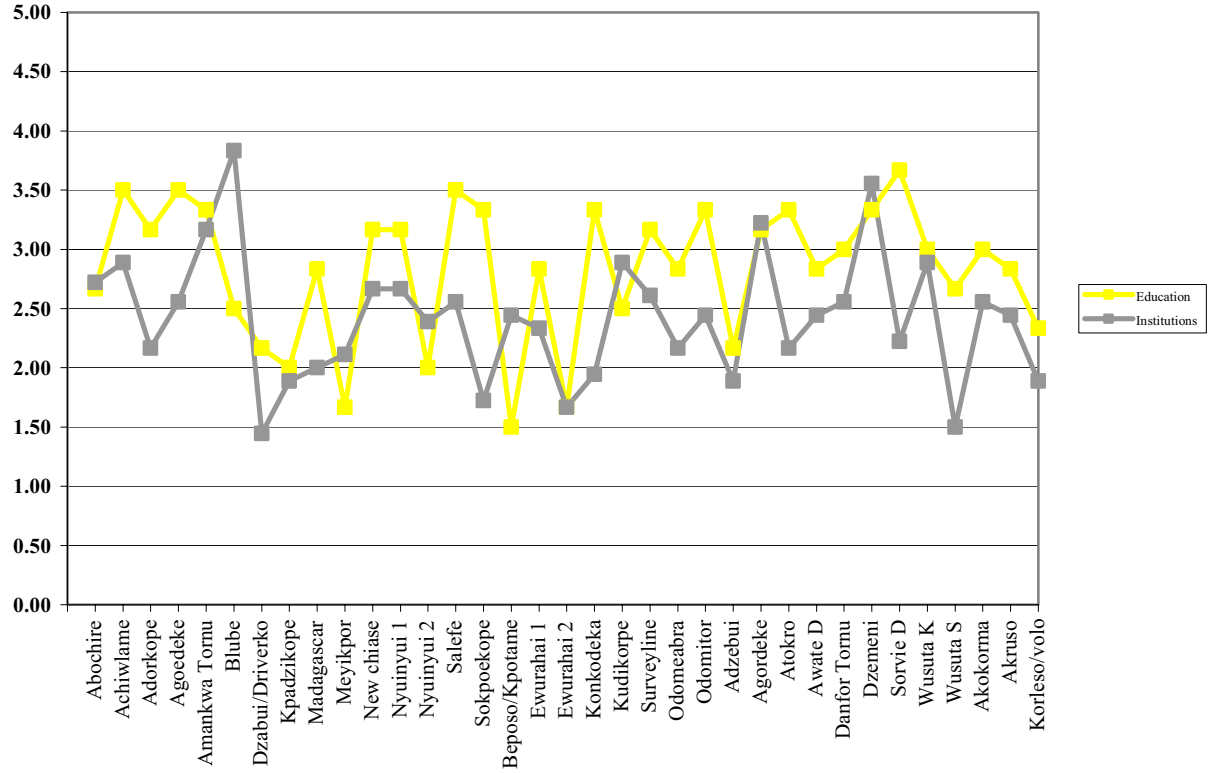
Many adult men are literate although the level of education is very low. No community recorded 100% literacy rate. In general, it was recorded that approximately 70% of women have very little education and the variability observed in the graph above is imputable primarily to differential adult women literacy rates in the villages. On the contrary, education among boys and girls in the districts covered is very high. In 15 communities all boys and girls of schooling age are enrolled, although only few manage to reach the SSS[1] level. Access to primary education, however, seems to be very polarized, with 15 villages reporting no functioning primary school unit and 16 reporting a fully operational institution.

The correlation coefficient calculate between the variables "Education" and "Employment" is not, however, statistically significant. On the other hand (see Fig. 8 below), there is a positive relationship between the indicators of "Education" and "Institutions" (0.35), suggesting that

[1] Senior Secondary School

the level of education of the population is related to the presence of institutions (not only educational institutions) and greater incentives in social organization in general.

Fig. 8. Value of education and institution for each village.



In addition to formal education, in 80% of the communities surveyed all fishermen have substantial knowledge of fishing techniques. On the other hand, non-traditional agriculture is rarely practiced in the fishing communities, with only 2 out of 35 communities where substantial portions of the population commonly use non-traditional agriculture practices.

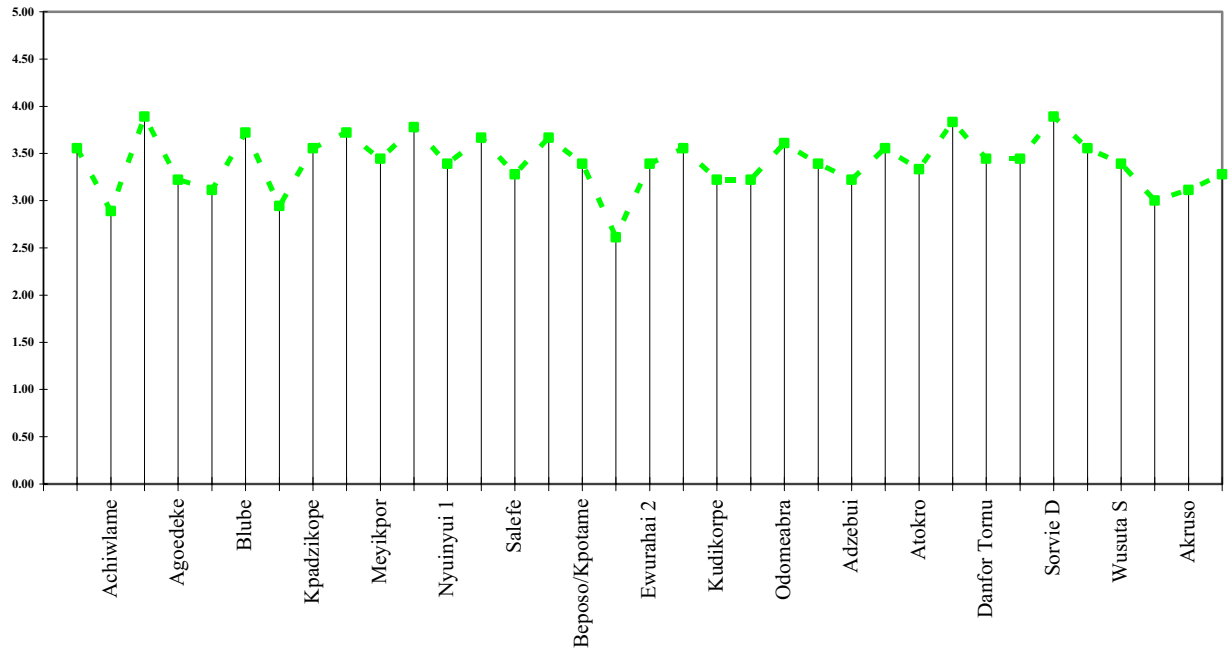
5.2 Employment

The indicator called "Employment" is constructed on the basis of availability of employment opportunities, share of the population currently economically active, working conditions, frequency of work-related accidents and child labor. All villages, with the exception of Ewurahair l, present fairly high values, indicating a general state of well-being insofar as employment-related aspects of poverty are concerned.

In the Manya District all communities studied recorded few being unemployed. In 68.6% of the communities surveyed, all adult women are employed, whereas in the Asougyaman district, 50% of the communities have some level of unemployment.

Employment opportunities in the agricultural sector showed a slight decrease over the past five years. On the contrary, the fisheries sector has absorbed a growing number of people, with 37% of the communities surveyed showing a considerable increase in employment opportunities. The highest number of communities experiencing a significant increase in fisheries employment were in the Kpando District.

Fig. 9. Value of "Employment" by village.



Occupational hazards or injuries related to work do occur but are not very frequent. Only in the Afram Plains 5 of the 15 communities work-related injuries were considered to be a serious problem.

6. LIVELIHOOD STRATEGIES

6.1 Fishing

Even though fisher folk engage in numerous activities, fisheries related activities provide a substantial contribution to their livelihoods (Table 5).

Table 5. Percentage contribution of income generating activities to livelihood of fisher folks in the project area.

Activity	Afram plains	Manya Krobo	Asuogyaman	Jasikan	Kpando	Average
Fishing	70	70	80	70	80	74
Farming	5	10	15	20	10	12
Livestock	10	-	-	-	-	-
Others	20	20	5	10	10	13

Using catch and effort data for the year 2000 (Braimah, 2001), the total value of fish catch can be estimated as ¢352 billion for the lake, with sub-strata II and III (the pilot project operational area) contributing to ¢66 billion, i.e. approximately 18.9% of the total (Table 6), for the benefit of some 14,933 fishermen (Braimah, 2000).

Table 6. Estimated value (¢) of fish catch per sub-stratum of the Volta Lake for the year 2000. Cpue is catch per unit of effort and value in cedis is billions ($x10^9$)

Sub-strata	No. of canoes	Average cpue/canoe/day	Annual catch (t)	Value (¢) $x10^9$
I	3620	4.6	3357	40.0
II	1795	5.0	1809	21.8
III	3059	6.0	3700	44.2
IV	2685	5.0	2706	32.4
V	2636	4.9	2604	31.2
VI	3167	8.3	5299	63.6
VII	5369	7.9	3551	102.6
VIII	1704	3.9	1340	16.0
TOTAL			**29,366**	**352**

However, the average catch per unit of effort per day for the lake has been declining. From 16.4 kg/canoe/day in 1991 it fell to 12.2 kg/canoe/day in 1996 (De Graaf & Ofori-Danson, 1997) and in 2000 it was only 5.8 kg per canoe per day (IDAF Report, 2001). Therefore the contribution of fishing to the overall livelihood of the fishing communities has been diminishing over the years and hence the ever growing importance of alternative income generation activities. As a consequence of diminishing returns, some fishermen are known to fish only when the main (June - September) and the tilapia seasons (February) start (Agyenim-Boateng, 1989; Asare & Osei-Bonsu, 1993).

The percentage composition by weight of the fish species landed comprise: Tillapiine spp 38%; *Chrysichthys* spp 34%; *Synodontis* Spp 11%; *Labeo* Spp 3%, elephant snout fishes 2.5% and others.

Fishing methods tend to change with the seasons (Table 4). The major season is from June – September (the rainy season) and fishermen set gillnets in the off-shore areas using bigger mesh sizes. Other fishing methods used include bamboo pipes and drift gillnets. The lean season occurs between November – April/May (the dry season) when the lake is receding and fishermen set gillnets in the inshore areas. Other fishing methods used during the dry season are the 'nifa nifa' (surrounding nets combined with pot traps), 'acadja' or 'atigya' (Fish Aggregating Devices), beach seines and line fishing. The use of beach seines, purse seines, and mosquito nets have been reported in many villages surveyed. In addition, bamboo traps are used in roughly 60% of the communities, with a prominence in the Afram Plains district.

Fishermen are unanimously recognizing that the lean season is unrewarding and difficult, and that during that time of the year they become so poor that a large proportion of families are unable to meet daily domestic fish requirements for their upkeep.

Table 7. Seasonality of fishing gear on Lake Volta

	J	F	M	A	M	J	J	A	S	O	N	D
Palm traps												
Driftnets												
Cast nets												
Nifa Nifa												
Acadja												
Beach seines												
Bamboo pipes												
Lift nets												
Winch nets												
Gillnets												
Wangara												
Hooks												

Legend: used sparingly best month not used

6.2 Fish processing

Fish preservation through salting is a common practice in the fishing communities. In 49% of the communities, everybody has salting equipment, and in another 17% of the communities many people have salting equipment. Only 5% of the communities in Kpando and Jasikan district reported that salting is not carried out.

All communities have ovens for fish processing. In 53% of the communities all the women have fish processing ovens and in 28% of the communities many women have ovens. In 49% of the communities nobody is employed in fish processing and in 22% of the communities few people work for others in fish processing.

6.3 Agriculture

Farming, jointly with fishing, constitutes the most important occupation in fishing communities of Lake Volta. It is carried out by men, women and children alike, and it is predominantly subsistence oriented although some surplus may be sold. Farming has

become significant since 1983 when a substantial depletion of fish stocks began (Agyenim Boateng, 1989) but to date no large scale commercial farming is being undertaken in the region. Most common farming techniques are slash and burn, as well as using rudimentary technology such as hoe and cutlass. The low level of technology intrinsically limits the total possible acreage to be cultivated. Irrigated agriculture is undertaken on a limited scale only in the Kpando and Jasikan districts and by well off families and it is usually done by men who cultivate vegetables on a large scale (okra, pepper, and tomatoes) for commerce.

Some crops are grown by both men and women. These include cassava, maize, groundnuts, cowpea and rice and they are mostly rain fed or grown in draw down areas. Yam and sugar cane are normally men's' crops, while sweet potato and rain fed vegetables are women's. Cassava and maize are the most widespread food crops in fishing communities, although cassava is the more important of the two.

Ethnic groups differentially value agricultural activities. Whereas the Ewe communities attach importance to farming and produce their staple foods, the Ningos, Effutus and Senyas seldom farm and tend to obtain their cereal supplies through fish bartering. On the other hand, the Ada cultivate small cassava and vegetables near their villages.

Fertility of soils in the communities has worsened over the past five years. 63% of the communities confirm this position.

Cassava is cultivated in almost all communities since it constitutes the main staple of the people. There has been a slight decrease in the land cultivated for cassava. 25% of the land used for cultivation of cassava/yam has not changed. 17% indicated an increase of cultivated land area while 22.5% indicated a decrease.

Slash and burn agriculture is very common in the forest and savannah woodland areas along the lake. This is in practice in 37% of the communities while in 25% of the communities this is not practiced.

Crop rotation is virtually not practiced as 82% of the communities indicated negative response. Due to the scarcity of land and other problems associated with migrant farmers, the land is not left to fallow, even where it is practiced the proportion of land left to fallow as decreased. In few areas where the land is left to fallow the duration of the fellow period has also reduced. 65% of the communities do not practice crop rotation.

In general, crop yields have remained stable in 6% of the communities, while 53% mentioned a slight decrease and 28% substantial decrease respectively. Only two communities representing 6% responded to a slight increase in crop yields.

Finally, irrigation is not commonly practiced. 87% of the communities responded there is no access to irrigation pumps, although a few families in about 13% of the communities did manage to do irrigated farming.

6.4 Livestock rearing

Animal rearing is an important activity found throughout the lake area with the exception of the Jasikan District where headmen have established various bans to protect farm crops. Chicken, turkeys, ducks and guinea fowls of local breed, are found in all the fishermen

compounds. Small livestock (sheep and goats) are also grown, whereas pigs and large livestock are found only in a few villages and are usually the property of the wealthiest members of communities. Among the cattle holders are also Fulani tribesmen who are traditionally pastoralists and who gained grazing rights from local landowners. Dogs are kept in some villages and used for protection and as aid in hunting.

Though livestock both small and large are reared in the communities very few people own them. Men and women in about 45 of the communities own small livestock. With respect to large livestock, 42% of the communities comprising of male and female respondents own large livestock. None of the communities indicate that everybody has large livestock.

Livestock diseases are very common among the fishing communities especially in the case of small ruminants because veterinary services are not available in the communities. Diseases affecting large livestock are not very common as 40% responded negative to large livestock diseases over the past one year.

A lot of people are involved in livestock rearing though it varies from community to community. In 9% of the communities, everybody is involved in livestock rearing and many people are involved in 35% of the communities.

6.5 Petty Trade

Men do petty trading in some fishing communities by selling drinks (particularly the local gin), cigarettes and minor supporting essential supplies, in small local shops. Petty trading for women is restricted to salt, cooked food, gari (processed cassava), cigarettes, sugar and other essential supplies which are retailed along the beaches. Even though cash is used, most of the items are exchanged for fish which later is processed and sold at major fish marketing centers.

6.6 Gari/Cassava dough processing

This activity is at its peak between July and September, when the rising lake begins to cover cassava plantations along the shores of the lake. Cassava is pealed and grated into cassava dough for consumption and for sale. Some of the dough is fermented or fried into gari. Gari processing is an activity carried out solely by women.

6.7 Remittances

The total outflow of remittances far exceeds that of inflows. The outflows comprise regular remittances to family members (fathers or mothers) in hometowns for the acquisition of property (real estate) on their behalf, covering funeral expenses (Afram Plains, Jasikan and Kpando) or festivals. Inflows from abroad occur relatively sparingly (Asuogyaman), as are those from within Ghana on the urban – rural axis (Asuogyaman). The trend reflects the seemingly temporary nature of fishermen as settlers in coastal villages. Even though they live most of their lives in fishing villages on Lake Volta, they perceive their presence there as temporary, while they tend to invest in more permanent housing in their villages of origin. It is for this reason that traditional land owners demand royalties from them since no socio-economic benefits are derived by their presence in the communities.

Apart from few people in two communities in the Afram Plains who receive money from urban centers, the phenomenon of urban-rural remittances is a rarity in the area. The communities rather send money and other forms or remittances to relatives in their place of origin. It is significant that in three communities of the Afram Plains district, everybody remits back home.

6.8 Alternative livelihood opportunities

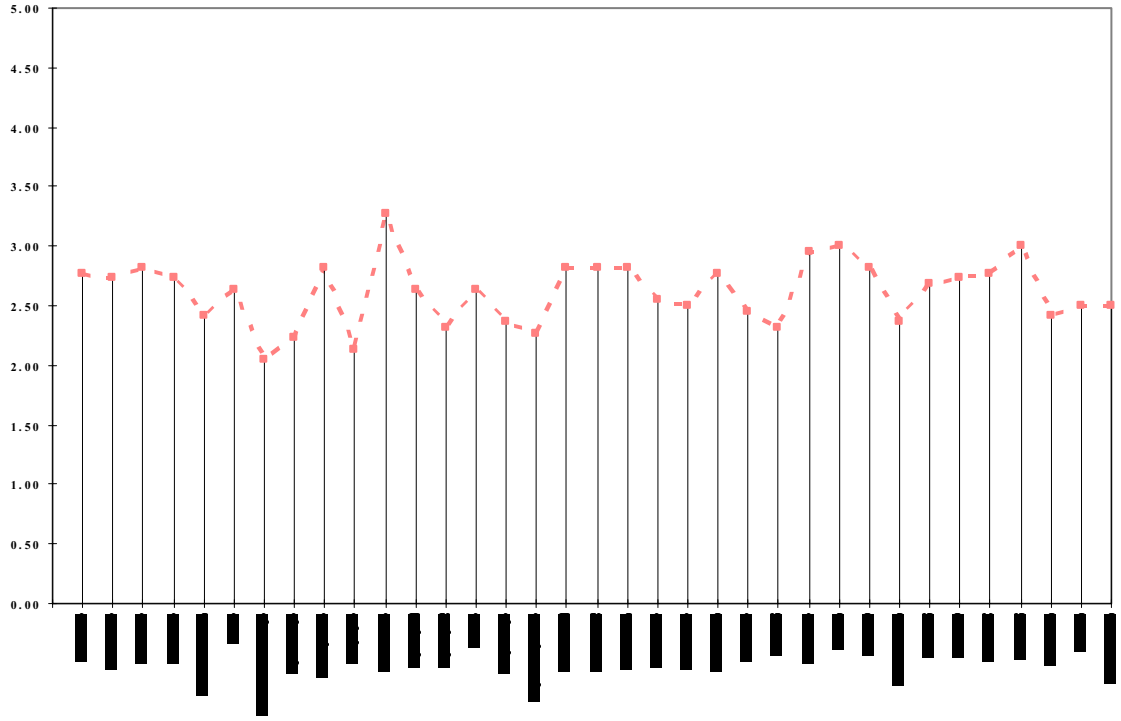
Fishing communities along Lake Volta are conscious that they cannot live of fishing alone. Diversification of income-generating activities was recognized by many as an important road to improved livelihoods. Opportunities to diversify risk exist in the agricultural sector and in some cases are seen successfully being operated in some fishing communities include: dry season irrigation, bee-keeping, cash crops (cashew nuts), snail farming, grass-cutter farming, livestock rearing (pigs), rice farming, woodlot and orchard establishment, mushroom farming, and improved poultry breeds to improve local stocks.

Artisans are not common in the lake communities. Very few people in 74% of the communities have artisans. Harvesting wood for sale as fuel wood is not a common trade along the lake. In 82% of the communities nobody is involved in the sale of fuel wood.

7. THE NATURAL RESOURCE BASE OF SOUTHERN LAKE VOLTA

The state of natural resources as measured by the indicator presented in the graph below (see Fig. 10) does not seem to evidence any particular difference between villages, considering the low degree of variability.

Fig. 10. Value of "State of resources" by village.



The low value range (2 to 3.50) of the indicator, however, seem to indicate a general declining state of the natural resource base. Although the measurement may seem static, many of the Likert scale statements composing the indicator were phrased as a function of time, and thus can support the conclusions drawn above[2].

7.1 Aquatic resources

Fish catches on Lake Volta are steadily decreasing according to various studies conducted over the past decades (Cappolla & Agadzi, 1977; Agyenin Boateng, 1989; Braimah 1995, and De Graaf & Ofori-Danson 1996). Declining catch volumes are attributed to a reduction in total rainfall over the same period in conjunction with increasing fishermen population, the use of chemicals for fishing (Jasikan), the use of illegal fishing methods (including the use of chemical poisons on the Afram Plains), as well as the development of farming along the banks of the lake which destroys brushes in which fish dwell (Afram Plains). The sizes of fish caught are also decreasing and large size fish species such as *Lates* spp., *Labeo* spps and

[2] For ex: *The proportion of lands left fallow over the past 5 years has*: (1) substantially decreased; (2) decreased; (3) remained stable; (4) increased; (5) substantially increased.

Distichodus spp, are rarely, if at all, caught. Today, fishermen commonly complain about a greater proportion of very small fish in their catches.

The seasonality of the catch is widely experienced by most fishermen especially among the very poor class as certain species can only be caught at certain seasons which requires a change in fishing gear or methods and demands further investment beyond the reach of the ordinary fishermen.

45% of people interviewed in sixteen communities agreed that over the past five years fish catches have substantially decreased, while 49% reported a more moderate reduction in fish catches over the same period. Only people from one community reported that fish catches have increased considerably.

34% of the communities responded that fish sizes have remained stable over the past five years, while 42% reported that fish size has on average somewhat decreased. In 45% of communities people interviewed reported that the diversity of fish species caught over the past five years has being stable, while 34% reported a mild decrease. Only 6 communities in the Afram Plains reported a substantial decrease in the diversity of species caught.

While fish catches are fast declining fish prices are not increasing accordingly, and this is widely blamed on the exploitative tendencies of the distant fish traders who by the soft loans granted to the fisher folk can always bargain for unrealistic prices not commensurate with the cost of production.

7.2 Land

Acquisition of land for farming has become an issue due to the enforcement of the VRA Act 46 by the VRA. By this Act, VRA[3] has all rights on, and owns all lands from the lakebed to the 86 m contour line. VRA has also enforced a government directive banning farming activities in the gorge area of the lake due to siltation problems further aggravating land accessibility (Asuogyman).

Lands are becoming unfertile due to frequent use without replenishment of soil nutrients and yields are shrinking, due to prohibitive prices of fertilizers (Manya Krobo and Kpando). The "hauza system" which restricts cattle to designated areas limits the availability of land for grazing by large livestock in Manya Krobo. Yet still, unfavorable land tenure systems which involves a sharing of farm produce with the land owners at an acceptable ratios (e.g. 2 : 1) which even vary from area to area has worsened the plight of subsistence farmers who are not able to cope with the demands of land owners. Such dynamics are making access to land extremely difficult for many families (Jasikan and Kpando).

Overall, men have more access to land for gardens than women, whereas access to land for food crops is somewhat more equal between among men and women. Two communities in the Afram Plains and one in the Kpando District stand out as not having any access to land for crops at all. On the Afram Plains, however, access to land does not seem to be problematic for most villages, although land tends not to be cultivated due to destruction of farm crops by alien cattle herds, the high cost of labor force, the ever dropping prices of farm produce, and the absence of, or high cost of agricultural inputs.

[3] Volta Lake Authority

Land can either be rented or obtained under share-cropping agreements. The latter are called Abosa, and crops are divided up on the basis of a 2 to 1, or 3 to 1, ratio between farmers and landlords.

7.3 Forests

Forests along Lake Volta are being heavily impacted by an ever increasing wood extraction for household consumption and fish smoking. Asare & Osei-Bonsu (1993) noted that the vegetation along the lake is at various stages of degradation. Three major zones have been identified:

a) *completely deforested zone*, ranging from about 2 km from the lakeshore where tree density is at 2-4 trees per hectare;
b) *degraded zone* ranging from 2 to 3 km from the lakeshore where tree density is at 10-20 trees per hectare
c) *disturbed zone* which has tree population of over 30 mature trees per hectare.

The rate of deforestation due to household consumption and fish processing is estimated at 0.25 to 0.2 km per annum on average. Other causes of deforestation are: charcoal burning, bad farming practices, cutting of wood for fishing (atigya and bamboo pipe fishing), bush fires, and grazing by large herds of cattle from neighboring Burkina Faso. High rates of deforestations are also a function of illegal chain saw operators extracting lumber. These have resulted in the elimination of nearly all Forestry Commission unprotected trees from the lake area.

In some parts of the lake (Asuogyaman, Jasikan and Kpando) awareness-raising campaigns are attempting to introduce energy-saving and fuel-efficient fish processing techniques as well as alternative energy facilities such as use of LPG. Currently, groups of people are being organized into management committees and formed to effectively manage reforestation programmes through the development of woodlots and orchards for income generation.

Forest products have also substantially decreased over the past five years. This is due to the activities of charcoal burners and cutting of wood for fuel wood. 49% of the communities responded of a substantial decrease of forest resources. Only two communities in Afram Plains and one in Asougyaman responded positively to considerable increase in forest resources. Agro forestry/reforestation is not practiced in the fishing communities as 78% responded that tree planting is not carried out in the communities at all.

In the few forested areas along the lake the condition has worsened as the forest products are harvested for fuel wood and charcoal. 20 of the 35 communities reported of the worsening situation of nearby forests over the past 10 years. Due to the fast depletion of forest resources coupled with the ban on tree cutting for fuel wood imposed by land owners, 81% of the communities indicated that they do not cut trees for fuel wood.

7.4 Wildlife

The traditional hunting system of selective burning of areas cordoned off by hunters and their dogs is the principal cause of the intense pressure on wildlife. This practice often results in wider and uncontrollable bushfires that destroys large acreages of forest. Bush fires, however,

are also a consequence of bad farming practices, such as the traditional slash and burn techniques still widely utilized in the region. In general, people interviewed reported that the number of wild animals for hunting have decreased, and 49% of the communities responded that wild animals have not been available in the communities over the past five years.

A large part of the lake between the Obossom and the Sene arms is a reservation area but poachers are frequently encroaching on this game reserve. The result is that certain types of monkeys, boars and even hippos are becoming endangered.

8. ECONOMIC CONDITIONS OF SOUTHERN LAKE VOLTA

8.1 Markets

Most fishing villages do not have their own markets and depend on a few lakeside larger towns for the commercialization of their catch. This creates a high dependency ratio[4] on the existing fish markets especially in those markets in the project area.

Fish markets used by the fishing communities in a district can be listed in order of importance (number of fishing communities in the district that attend a market) (Table 8).

Table 8. Fish markets listed in order of importance to a district (number of fishing communities in the district that visit that market)

	AFRAM PLAINS	MANYA KROBO	ASUOGYAMAN	JASIKAN	KPANDO
MARKET TOWNS	Kpando Torkor	Akateng	Marine	Abotoase	Gemini
	Gemini	Akrusu	Frankadua	Kwamekrom	Kpando Torkor
	Donkorkrom	Akotoe	Akosombo		
	Amankwa	Akortoma	Atimpoku		
	Tornu				
	New Chiasi	Assesewa	Labalabo		
	Agordeke		Akosombo Textile Ltd.		
	Etsi				
	Amanfrom				
	Akateng				
	Fosu				

It can therefore be concluded that some fishing communities channel their products through market towns outside their administrative boundaries. For instance nearly 80% of the fish markets used by the fishing communities in the Afram Plains are situated outside the district. While a few markets are accessible by paved roads (Asuogyaman, Jasikan and Kpando) most of them are accessed by unpaved and in the wet season their state is deplorable.

8.2 Fish commercialization

The section below describes the different types of commercialization of aquatic resources enacted by fishing communities of Southern Lake Volta.

Fresh fish

Fresh fish landed on daily basis is either sold for cash (Afram Plains and Kpando) or given on credit to wives at a lower price than normal (10-20% lower). Another portion of the daily fish catch is also sold to other women traders. In some areas rebate rates are not used, and wives would obtain fresh fish at the same price as would be sold to other women (Asuogyaman and Jasikan). In other cases, especially on market days, it is fishermen themselves who send the daily fresh fish catch to the market.

Processed fish

Some fishermen give the daily catch to their wives for processing. Women would then sell on a weekly basis the processed fish at a local market and hand over the revenues to their husbands.

The principal processing methods are smoking, salting, sun-drying, fermentation and drying. Processing is done predominantly by fishermen's wives and children.

In general, two main types of boats are used to transport fish to markets but in areas where purse seines (winch nets) operate, a third type is available:

- transport boats of length overall between 12 and 20 m and carry an average of 32 baskets[5] of fish, passengers and other assorted goods;
- canoes of length overall between 5 and 9 m mainly used for fishing but on market days can carry an average of 4 baskets of fish;
- winch boats of length overall 9-12 m used for purse seining but on market days can load an average of 21 baskets.

On arrival at the beach, fish processors from the fishing villages are assisted by local trading partners at the marketing centre in unloading the fish from the boat. The partners supervise the transportation of the fish to their sheds in the market and pay all levies and tolls to the concerned district assembly and/or traditional authority. Some village based fish processors, however, do not have local trading partners. The local trading partners are usually women intermediaries who provide services to fishers as well as to fish traders from urban centers. Services include financing of fishing inputs, provision of accommodation to the villagers, allocation of space in sheds to sell fish and keep their belongings. Provision of such services to the village based fish processors by the local fish traders entitles them as middlemen to have a right over the fish brought by fishers to the market.

Local trading partners also act as guarantors for fishers to secure fishing inputs on credit from net sellers. Similar to middle-women, they assist villagers with bargaining and selling of fish

[5] There are three types of cane baskets: small basket of diameter 50-69 cm; medium basket of diameter 70-89 cm; and large basket of diameter 90-120 cm. (Vander Stratyne, 1993).

to fish traders coming from afar, and usually charge a 10% commission over the value of fish sold which is later on shared equally with the village based fish processor.

In towns like Kpando Torkor, Kwamekrom and Abotoase, where the market comes frequently (every 4 days), re-smoking facilities are a prominent feature. Fish, in fact, is hardly ever properly smoked before making it to the market. Such facilities are owned by women who re-smoke fish using drum ovens, charging a re-smoking fee of ¢2000 per basket of 70 – 80 cm diameter. Re-smoking improves on quality as it is handled by professionals at the marketing centers, hardens the fish as the moisture content is reduced, kills off any maggots already present and generally prepares it for its onward journey which may last some 2 – 3 days before its final destination. The cost of re-smoking is generally taken into consideration before re-pricing the fish at the final destination.

Some fish trading is carried out at the beach on market days. Young and small-scale traders (usually women) meet with those fisher folk who are not tied to any local partner and bargain for fish, which is in turn sent to the main market for re-sale.

Some village based fish processors avoid all intermediaries and sell fish directly to customers from distant towns that approach them at the market.

Overall, it is estimated that 30% of the fish caught is sold through the local fish traders (middle-women), 15% by the young and small scale fish traders at the beach, another 15% sold by the wives of fishermen directly to distant fish traders at the fish markets, while about 40% through whole sale fish trade.

Wholesale fish trading

The large proportion of fish is sold on a wholesale basis. Wholesale traders travel to fishing villages to purchase processed fish only and return to the lakeside market within 2 – 3 days with the fish already prepared for the journey to the urban centre. In this way the wholesale fish trader comes to the fish market only to look for fish already packed. At times, fish is handled by multiple intermediaries before arriving to urban markets.

Even though most of the fish is sent to major urban centers (Accra, Kumasi, Nkawkaw and Koforidua) as the first or primary distribution centers often retailing is not done there until the fish has reached the second to third secondary distant fish markets.

The volume of fish bought by the distant fish traders (not the local middle women who can grant credit and other services) is a function of two dominant variables: financial assets and the years of operation in the trade. Successful older traders can count on confidence and trust among providers of fish. This facilitates their purchase on credit which is then paid on subsequent visits. The average number of baskets of fish bought ranges from 1 to 2 large baskets or 2 to 3 medium size baskets.

8.3 Fish prices

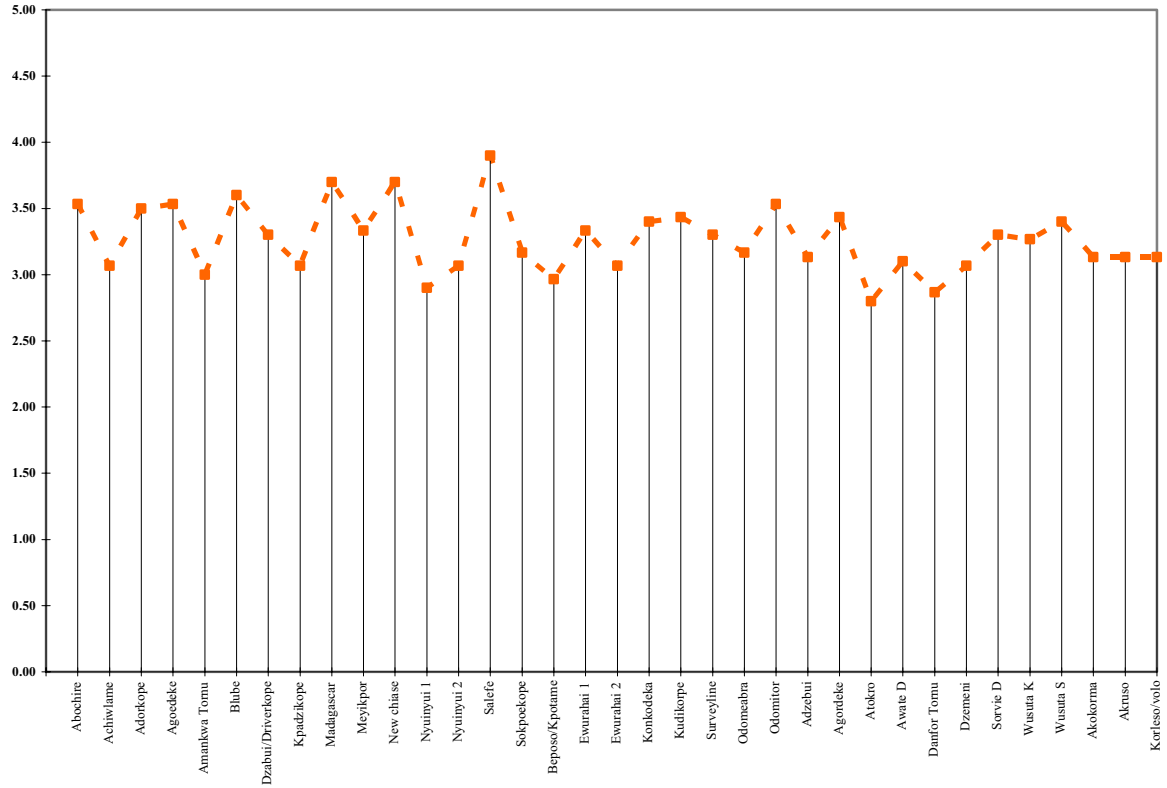
Fish prices vary according to past experience of the fisherman, the village-based fish processor, the local fish trader (the middle-woman) and the distant fish trader, the season of the year, the fish species, and bargaining skill of the buyer and the relationship of the buyer to the seller. Often the initial price is fixed by the village-based fisherwomen having taken into account the cost of fishing (cost price given by fisherman), processing, transportation, labor charges, the tax and levies at the marketing centre and loan servicing. After which a mark-up of up to 20-100% is added which varies from district to district. Since pricing is determined by bargaining some mark-ups are made very high to safeguard the actual cost so that when the upper limit is obtained then to the village-based fish processor it is a good market day, while the lower limit is a poor market. Increasing costs of production and transportation are making it difficult for the fisher folk to continue maintaining the same level of mark-up. In the Yeji area Maembe, 1992 found the mark-up to be between 10-25% far lower than currently in the project area. Other factors influence pricing: the quantity of fish in the market; the presence of marine fish at the marketing centre; the level of fish stocks which influence the quantity catches (glut); and finally the size of fish available to be sold. Fish traders have preference for big fish and are prepared to pay higher prices. A large *Synodontis* was found to be selling 30% higher than the smaller sized ones of the same weight (Agyenin Boateng, 1988). Irrespective of species or size, generally fish sells higher in the lean season from December – March (dry season) than from June to October (bumper season and rainy season).

9. DIET AND NUTRITION

9.1 Food security

As far as food security is concerned, the indicator developed and called "Food Security" here is based on issues of access to food, availability of food throughout the year, as well as diet composition, malnutrition, and food related diseases (worms, diarrhea, etc.). The indicator presents a fair degree of homogeneity between the villages sampled, with mean values ranging from 3 to 3.5. Noteworthy is the position of the village of Salafe which scores close to 4. This village, however, seem to stand out as an outlier with respect to all other indicators as well.

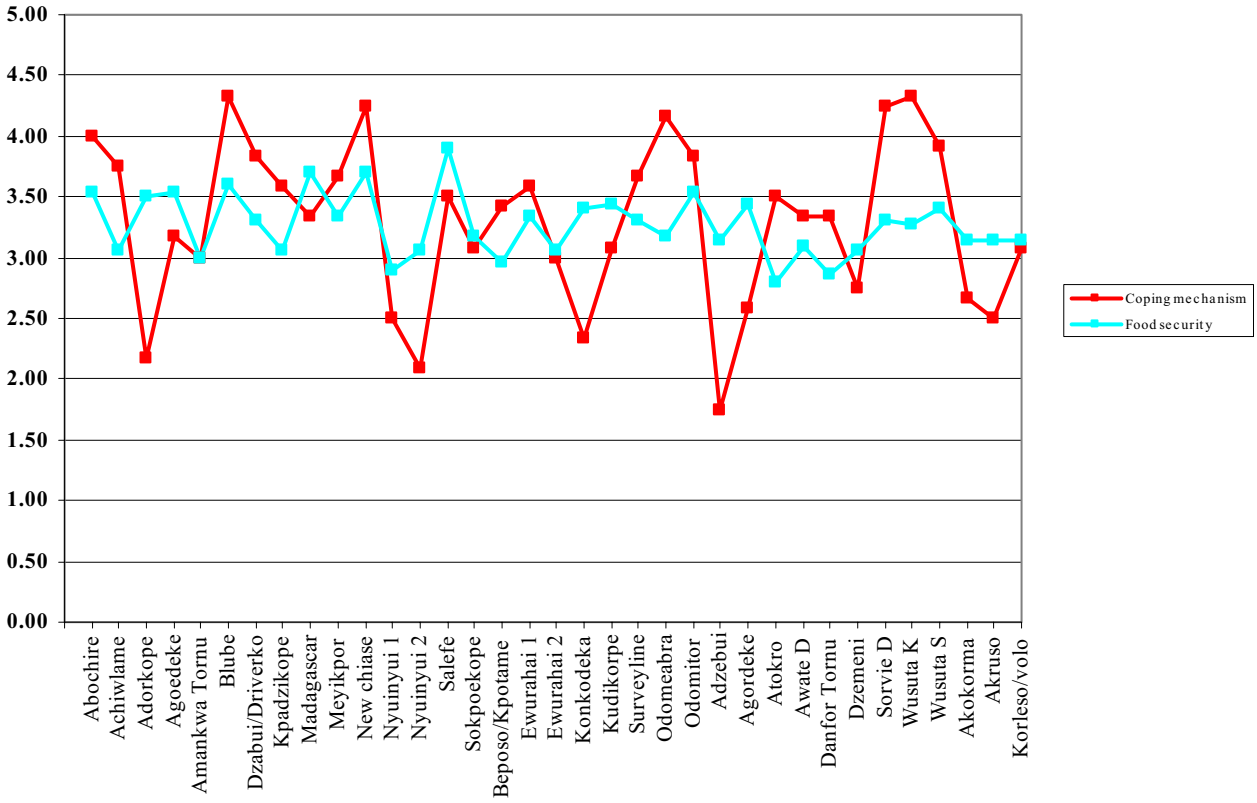
Fig. 11. Value of "Food security" by village.



The Spearman coefficient calculated between the indicators "Coping mechanisms" and "Food security" is positive and also significant, at the 5% level (see Fig. 12 below). This means that we can reject the null hypothesis of no relationship between the two variables, and conclude that there is an influence forcing them to move in the same direction, and that food security is reinforced by better coping capacity and vice versa. However, considering the low level of correlation between the variables "Coping mechanisms" and "Vulnerability," it can be concluded that food security in these villages is not a function of the total level of vulnerability but stems from other issues. This is confirmed by a correlation coefficient close to 0 between the two variables "Vulnerability" and "Food security."

This conclusion is also confirmed by the analysis of the correlation between the variable "Food Security" and two other variables, specifically "Access to Resources" and "State of resources." In both cases the correlation coefficient is positive, i.e. 0.32 and 0.40 respectively.

Fig. 12. Value of coping mechanism and food security for each village.



As far as productive capacity for own consumption, it was recorded that in 32% of the communities granaries (maize) are empty for 4 to 6 months a year, while in 25% of the communities the deficit period ranges from 2 to 4 per year.

With respect to the other main staple crop, cassava harvests in 45% of the communities usually lasts for more than 8 months, while in 32% of the communities supplies are sufficient for periods from 4 to 8 months only.

9.2 Nutrition

Men's daily food intake in the dry and rainy season varies between two and three meals a day. During the rainy season 71% of the communities take three meals a day while in the dry season 49% of the communities take two meals a day. The intake by the women also follows the same trend.

The daily food intake of both male and female children varies between 2-4 meals per day. 9% of communities show that both male and female children take two meals each during the dry season. The quality of food consumed by male and female does not vary. Nutritional intake with regard to food quantity and quality shows interesting results. In about 55% of villages surveyed, adult men and women do not consume similar quantity of food, with women eating

generally less than their male counterparts. Similar observations were made in 53% of villages with regards to the boys and girls.

Malnutrition among children is not common in the fishing communities of southern Lake Volta. In 83% of the community respondents reported very few cases of malnourished children.

In 79% of villages visited, respondent reported that water is rarely or never boiled before consumption.

9.3 Diet composition

Cassava and maize are the main staple foods in the fishing communities. In 94% of the communities, cassava is consumed daily, while in 71% of the villages maize is eaten daily by most people. Meat and eggs are rarely consumed, although protein intake is compensated by daily fish consumption, although in small quantities.

Vegetables are available but not in large quantities throughout the year. However, only in 11% of the communities people manage to eat vegetables every day, while in 37% of the communities vegetables are consumed at least a few times a week. Fruits, on the other hand, are consumed only sometimes by relatively few people.

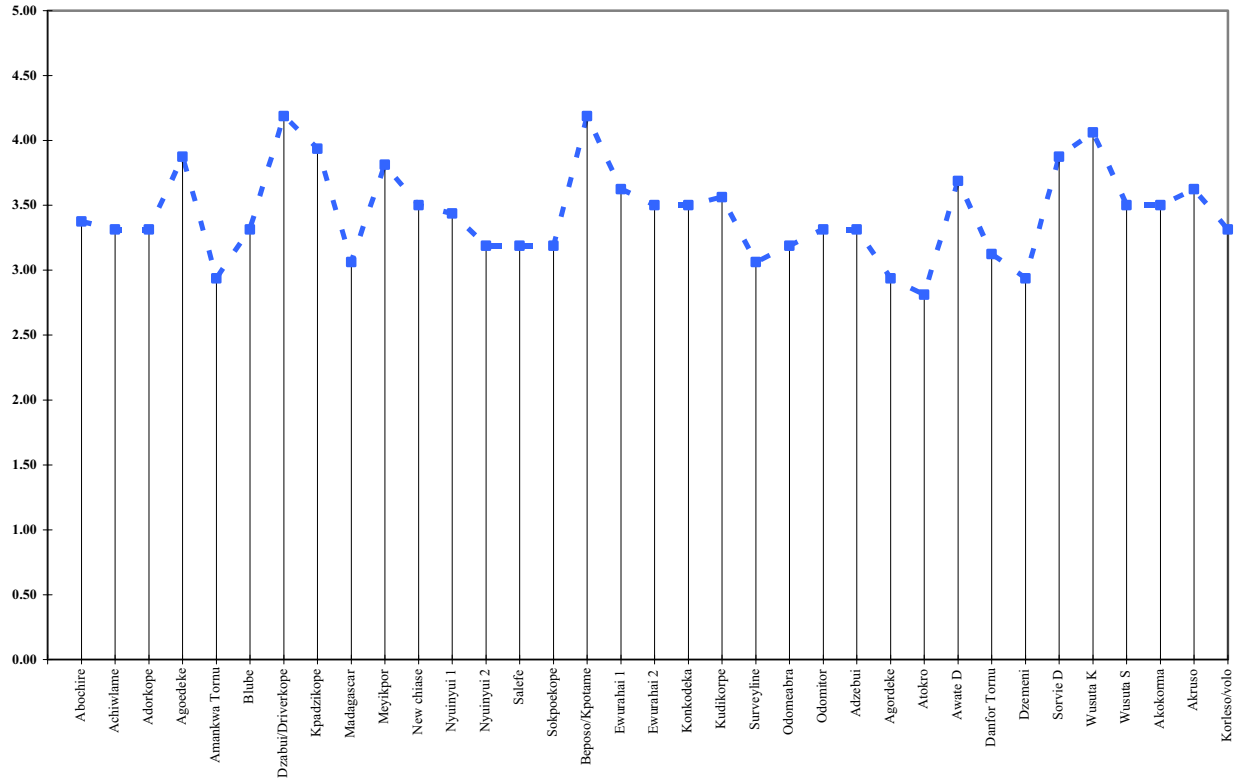
Pulses only marginally appear in the diet composition of these fishing communities. Among these, cowpea is sometimes consumed in 67% of the communities, while groundnuts enter the diet of fishing dependent people only sporadically.

Starches also figure as unimportant items in the diet of these populations. Potato and yam, in fact, are rather uncommon in fishing dependent people's diets.

10. HEALTH CONDITIONS

The graph below summarizes responses of the perception survey with respect to health conditions. This indicator includes aspects of access to health facilities, morbidity rates, access to medicines, mortality rates, and availability of traditional medical facilities. Although a certain degree of variability can be seen, most villages score between 3 and 4.5, indicating fairly good sanitary conditions overall with no real outliers in either direction.

Fig. 13. Value of "Health" by village



10.1 Disease prevalence

Apart from two communities in the Kpando District all the communities reported a high incidence of bilharzias (water-related disease), and malaria throughout the year. Diarrhea was reported to be prevalent in 95% of the communities surveyed, equally affecting adults and children. HIV/AIDS, on the other hand, was not claimed to be significant in 95% of the communities surveyed, possibly representing a form of underreporting due to the social stigmata associated with it.

Respiratory diseases are also commonly affecting these fishing communities. In 28% of the communities respondents reported that many people suffer from acute respiratory infections all year round.

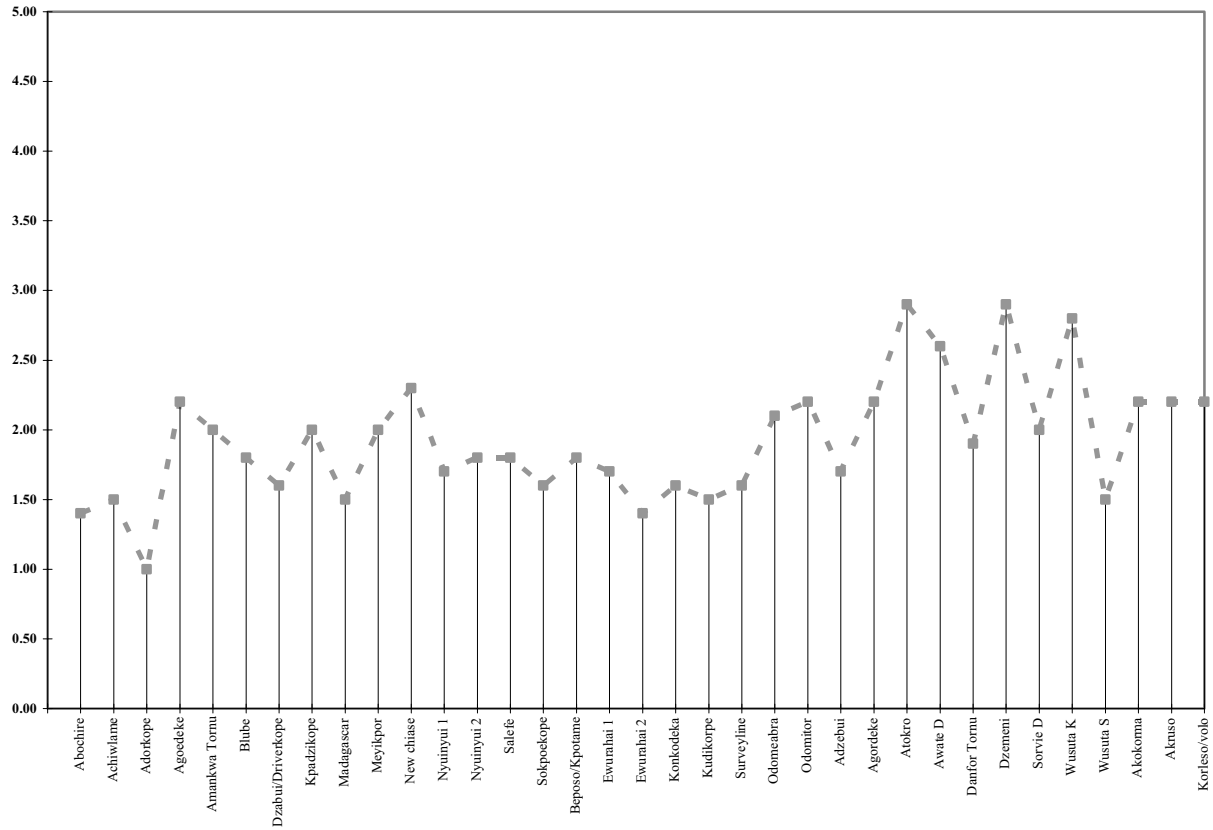
No data was available insofar as anemia is concerned. However, only few communities reported low birth weight of children, which can be used as a proxy indicator for maternal health and, more broadly, women's anemia. In addition, maternal death during child birth is

rare in the fishing communities. In fact, 77% of the communities have not recorded any death associated with child birth over the past five years.

11. INFRASTRUCTURE

The indicator summarizing aspects of poverty related to infrastructure suggests a problematic picture. With the exception of three villages, all others scored below 2.5, i.e. closer to the most unfavorable situation as measured by the indicator. In particular the villages of Adorkope and Wususta S present the lowest values among all.

Fig. 14. Value of "Infrastructures" by village



11.1 Social and physical infrastructure

Approximately 45% of the communities indicated that primary school units are malfunctioning, while 97% of the communities responded a similar condition of impasse with regards to primary health centers. Even in the few schools available, however, inadequate staffing, lack of textbooks and equipment is lamented.

None of the villages is accessible by paved roads. 45% of the communities are accessible by unpaved roads. On the other hand, all but one of the communities are accessible by water, although journeys on the lake are often difficult due to the massive presence of tree stomps emerging from the water surface or sub-merged but dangerous to navigation. The absence of hospitals in the areas under consideration means that sick people from the fishing villages are

sent to the nearest clinic or hospital in transport boats. Medicines, furthermore, are available only from drug peddlers going from village to village to sell drugs.

The remoteness of most fishing communities denies them of extension services: in 49% of the villages visited, for example, no agricultural agents turn up. No services of the Fisheries and Veterinary Departments were available in most of the fishing villages. As far as adult literacy programmes are concerned, only 32% of the communities are serviced all year-round under the Non-Formal Educational Programme.

With the exception of 4 communities in the Kpando District, no other community can count on electricity. Therefore, ice producing facilities and refrigeration services are generally not available.

Lack of drinkable water restricts the fishing communities to the consumption of lake water except a few villages in which some NGOs have sunk some bore holes, as in the case of Manya Krobo district. There are generally no sanitation facilities available, apart from a few pit latrines which are not well maintained. Almost all the communities, in fact, go to the toilet on free range.

11.2 Housing

Families in 82% of the communities have no formal housing (cement or bricks) structures. In areas where these structures are available only few families have them. Fishermen regard their various communities as temporary habitant/residence, thus they put up only temporary structures. Very few people in 14 of the communities have houses in their place of origin. Eleven communities out of the fifteen in the Afram Plains indicate many people have houses in their place of origin. This situation may be interpreted as an indicator that people living off fishing in the Afram Plains district are not originally from those areas, and that they recently migrated thereto.

In 62% of the community pit latrines are non existent. Only in Manya Krobo district records one community where every house is equipped with this facility.

97% of the communities covered have no running water in the houses. Similarly about 91% of the houses do not have communal water wells/with or without pumps. Only one community in Afram Plains indicates that every house has access to community water wells.

12. ACCESS TO CREDIT AND FINANCIAL INSTITUTIONS

12.1 Credit

Not all fishermen have sufficient resources to purchase fishing inputs, and relatively few fishermen have access to formal credit from formal banking institutions.

However, the Agricultural Development Bank, some rural banks, and private entrepreneurs are using innovative schemes to capitalize the fishing industry. These include the *Susu* collection scheme: individuals pay a certain contribution on a weekly basis for a given period of time. Once a certain amount has been reached, that individual is entitled to receive a loan amounting to up to twice the total contribution deposited. Interest rates on such loans average 30% annually (Asuogyaman and Kpando). There are also Susu rotation schemes, where individuals contribute a given amount, and on a weekly basis the total collected is handed out to one member of the scheme. Beneficiaries of that loan rotate on a weekly basis and no interest rates are charged.

Fishermen obtain credit from fish traders. Fish traders provide fishing inputs to fishermen who in turn extinguish their credit by ensuring a constant fish supply to the creditor. Fishermen are, in fact, under obligation to sell their catch to that particular fish trader until the credit has been extinguished. Fish is sold with a rebate that ranges between 10% and 25%. According to estimations of fishers in Manya Krobo, the cost of credit obtained through this system can be up to 50% a month.

Fishers can also obtain credit from nets' sellers. Fishers are supposed to deposit a minimum of 50% of the total cost of gear. However, if a local fish trader acts as a guarantor no deposits are demanded. Credit is granted for periods of time ranging from two to four weeks, and interest rates vary from 25% to 40% for the two-week credits, and approximately 47% for the whole month.

In addition, some villages in the Afram Plains operate their own welfare fund schemes. This obliges fishermen to make daily or weekly contributions, from which credit can be obtained at an average monthly interest rate of 40%. Micro-credit schemes, on the other hand, are rare for fishers.

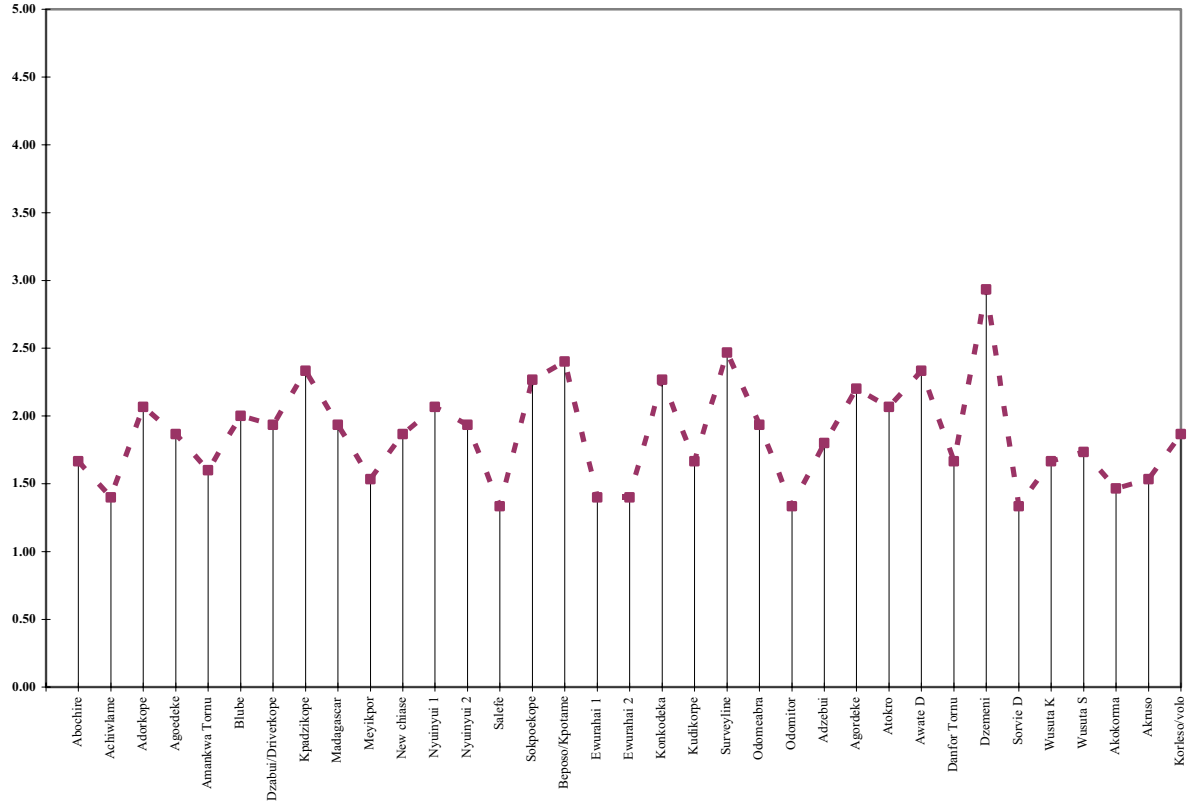
Very few fishermen use money lenders to borrow capital. Those who do so have usually no other choices, considering that interest rates are very high (30% to 100% per month in Asuogyaman; 40% biweekly, or 10% daily in Afram Plains). At times, fishers can obtain credit from their wives (Afram Plains and Asuogyaman) at no interest.

Credit facilities through the informal system either in the form of cash or inputs is what is currently sustaining the fishing industry. Many people in 49% of the communities rely on credit for fishing gear. While in two of the communities everybody relies on credit for fishing gear, 22% of the communities do not have access to credit for their gear.

Susu system either on regular collection basis or rotating is not very common in the communities 71% of the communities do not operate collection susu system and 49% do not operate a rotating system. However in two communities in the Afram Plains the susu rotating schemes are always practiced.

Both men and women do not have access to revolving funds in all the fishing communities. Only one community in the Afram Plains has access to micro-credit schemes. Women in two of the communities have access to micro credit but the credit scheme is not very regular. Interest rates vary from very low to very high. Informal credit (money lenders) though is available only 57% of the men and 63% of the women access it. This is due to the high interest rate.

Fig. 15. Value of "Financial asset" by village



The semi-quantitative indicator constructed to represent the financial situation of families living in villages of Southern Lake Volta builds is based on observations about access to credit, presence of financial institutions, savings, and interest rates applied by formal and informal credit institutions. With the exception of the village of Dzemini, most villages scored below 2.50 and many below 2.00, which indicates a rather difficult situation with respect to the financial aspects related to poverty.

12.2 Savings

The analysis of the relationship between the variables "Employment," "Financial assets" and "Infrastructures" reveals an interesting picture as far as savings is concerned. Correlation coefficient between Employment and Financial Assets is positive (0.36), as well as between Employment and Infrastructure, although this latter is 0.05. From the graphs below, however, (see Fig. 16 and 17) it seems evident that while unemployment in villages is quite low, the possibility of converting revenues into savings is also very low. This may be partially explained by the low level of infrastructure scored by most villages, which could contribute to high transaction costs resulting in low rates of returns. Although the variable "Financial

assets" includes also aspects of access to credit, this is not contradictory, considering that access to credit is often a function of available liquidity.

Fig. 16. Value of employment and financial asset for each village

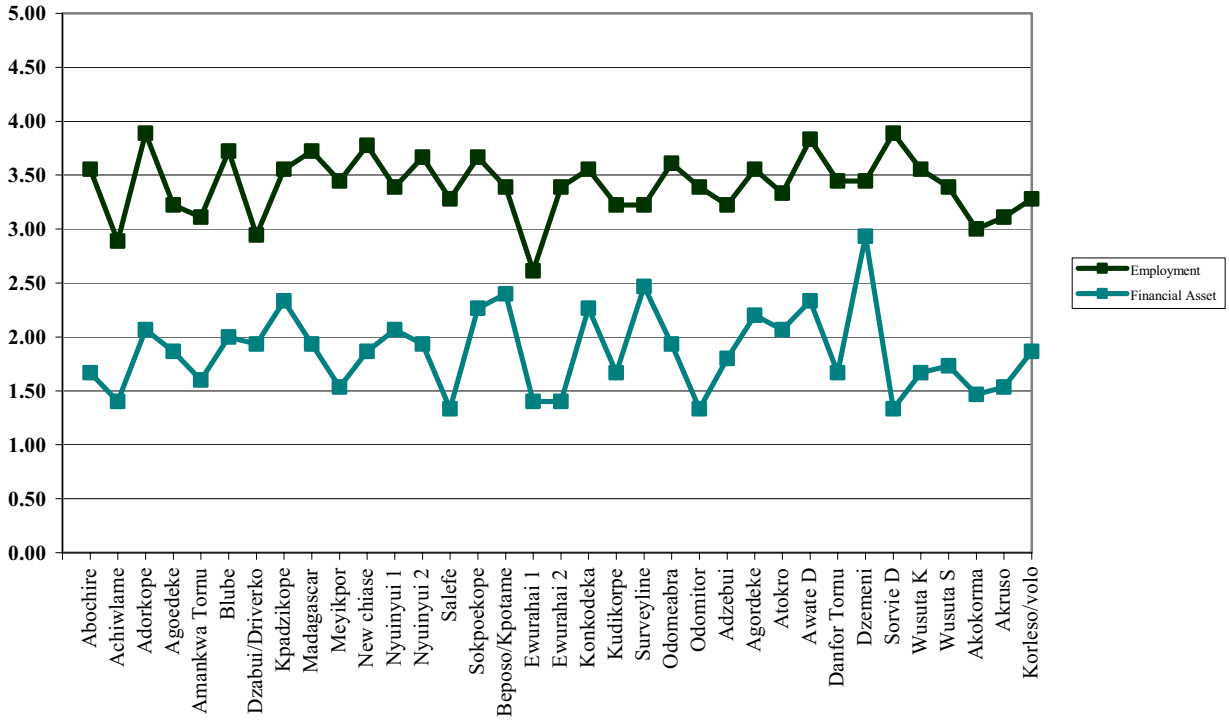
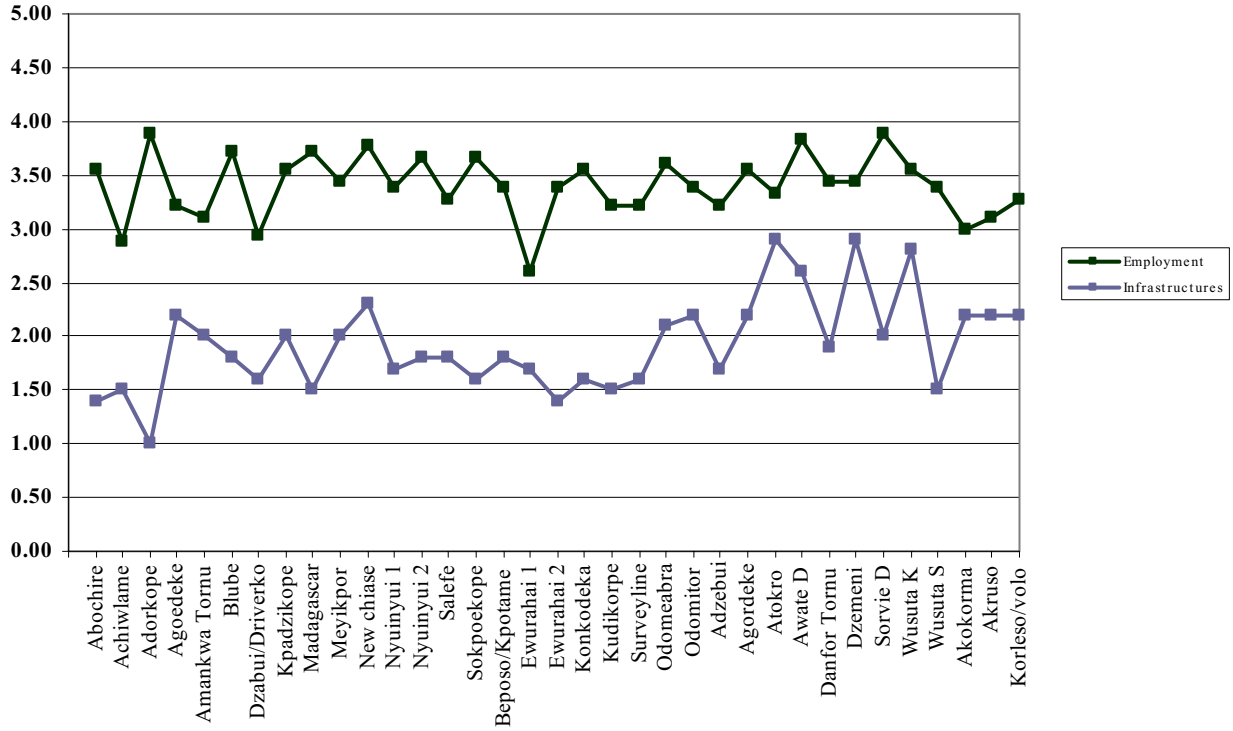


Fig. 17. Value of employment and infrastructures for each village



On the other hand, it was reported that saving as a habit is not very common in the fishing communities visited. Very few men or women operate group or individual savings. It is significant to observe that in 42% of the communities only a few men have individual bank account, while in 45% of the communities no women possess a bank account.

12.3 Financial institutions

Institutions granting financial services include formal banking institutions, micro-credit schemes as well as informal institutions. While the major formal institutions are based exclusively in the district capitals most of the rural banks have agencies operational in some of the large fishing towns. Only a few micro-credit institutions exist in the project area and at their early formative stage. The informal financial operations are conducted by private individuals in the fishing communities but recently some formal and micro-credit institutions are getting involved. Most fishermen mostly in the very poor and average classes use the informal institutions more as the terms for access are not stringent but based on one's contributions. The requirement (co-lateral) expected for access to loans from the formal institutions is lacking to most fishermen hence relatively few fishermen who are in the better-off class use this facility. However the rural banks which are being supported and encouraged by the Bank of Ghana are gaining the confidence of fisher folk hence there is a high patronage by the average and better-off classes. One of the incentives is the relatively low interest rate on borrowed capital.

Formal Financial Institutions

Agricultural Development Bank operates at Asuogyaman and Jasikan and renders services (credit and savings) to fisher folk. Only a few fisher folk in the better-off class are able to get access to the loan facilities due to collaterals (houses) established at their home towns.

Ghana Commercial Bank operates in all district capitals. Due to restructuring all agencies and non performing district branches have been closed making its banking services become even less available to fisher folk. Lack of collateral makes only a few fisher folk in the better-off class benefit from the services of the Ghana Commercial Bank.

Rural Banks
These banks are established by the Bank of Ghana to mobilize funds from the rural areas for development of these areas. Their clientele therefore are rural communities within a defined catch area even though some rural banks have expanded their operations through establishment of agencies in other towns. The rural banks have managed over the years to gain the confidence of fisher folk to an extent that the average to better-off classes use their facilities. Some of the banks are particularly sponsoring fish processing operations hence encouraging more and more women to save with them. These include the Afram Rural Bank (Afram Plains), the Upper Manya Rural Bank (Manya Krobo), the Anum Rural Bank (Jasikan, Kpando and Asuogyaman), the Guaman Rural Bank (Jasikan), the Adonteng Rural Bank Jasikan), and the Asubonteng Rural Bank (Jasikan).

Micro-credit Institutions

The programme *Freedom from Hunger* at Afram Plains work with the Afram Plains Rural Bank to provide credit to women traders.

Social Investment fund (funded by the Government of Ghana, the African Development Bank and the UNDP) offers credit in the form of inputs and financial credit to recognized associations.

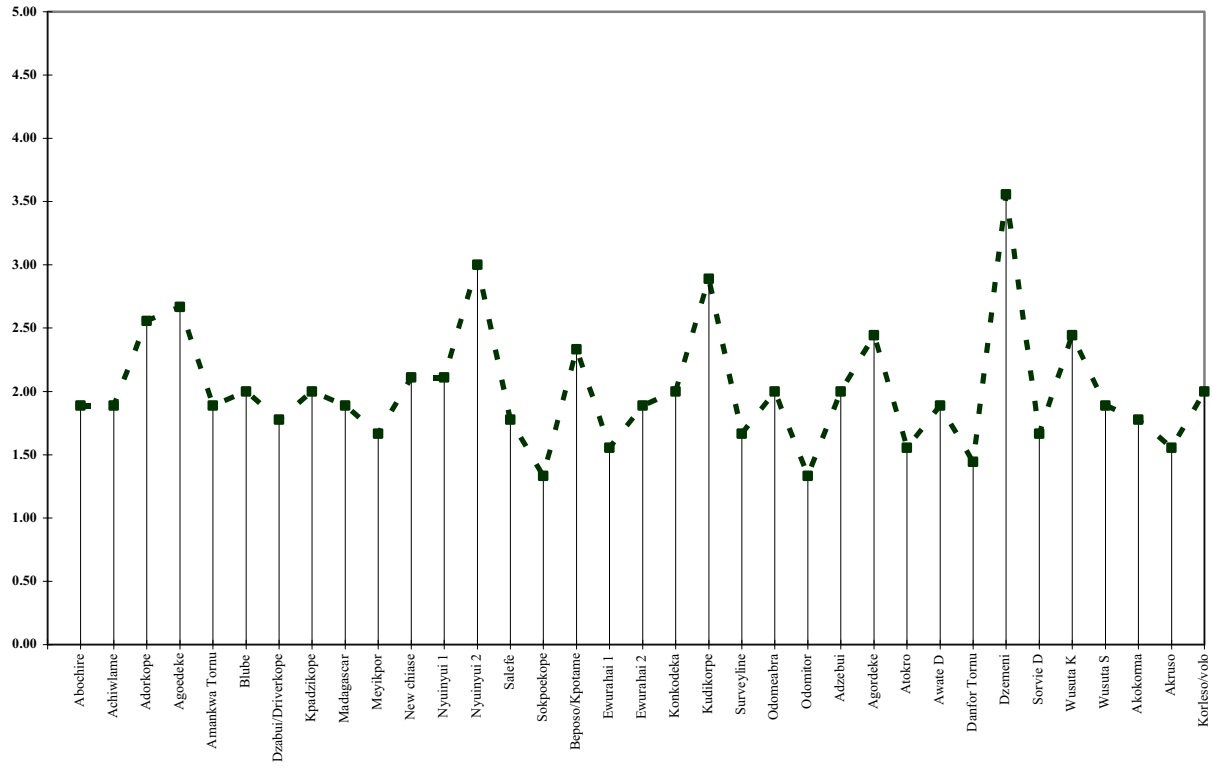
Informal Credit Institutions

Various types of informal operations exist in the lake area. These include private susu rotation schemes (Afram Plains, Asuogyaman, and Jasikan), private susu collections (Manya Krobo, Jasikan), the Manya Krobo Rural Susu collection scheme, as well as money lenders (present in all districts) and the Anum Rural Bank Susu collection scheme (Asuogyaman Kpando and Manya Krobo).

13. SOCIAL CAPITAL

The "Social capital" indicator is built on observations regarding people's capacity to organize themselves, existence and functionality of social safety nets, and people's degree of participation in social and civic life. The graph points to a generally low level of social capital in most of the villages, with a few exceptions standing out from the general trend below 2.50 levels, but which are nevertheless fairly low overall. The difficulties in organizing and of constituting functioning groups came out strongly in many villages, and representatives of local institutions saw this trend particularly in relationship to ethnic diversity found in many of the villages.

Fig. 18. Value of "Social Capital" by village



13.1 Village organizations

Social and cultural groups are operational in many fishing communities. These groups are formed mainly along ethnic lines. However, 17% of the communities do not count with any functioning social or cultural group. On the other hand, groups associated with commercial activities are virtually non-existent. In fact, 63% of the communities do not have any. Only one out of the 15 communities visited in the Afram Plains district has a commercial group operating well. 42% percent of the communities have functional local development committees, while 22% do not have any in place.

Most of the fishing communities are composed of different ethnic groups, with the exception of 28% of the communities, where one single ethnic group is recorded. Four out of the thirty-five communities reported as many as five ethnic groups.

Segregation along tribal lines, and separate leadership for each ethnic group is the rule. This often constitutes a problem when village-wide activities involving more than one ethnic group need to be organized. The presence of a village chief, furthermore, is often only a formality and often devoid of executive power. Local people attribute it to the fact that the village chief stems from the autochthonous tribe that usually owns the land, and is accused of not understanding the customs and traditions of the groups that came to settle there from elsewhere. Thus, any attempt to enforce rules and customs proper of the autochthonous groups is met with resistance and suspicion, which in turn undermines the authority of the village chief. In addition, the village chief depends on royalties and taxes collected in an arbitrary and exploitative manner from the settler tribes. This often complicates the interethnic discourse on the ground. This weakness in social capital is at the roots of many failed attempts to set up organized groups at the village level.

In some cases, in fact, village chiefs have undermined the formation of some groups (especially youth groups although not the dancing groups) which are believed potential threats to his authority by increasing the power exerted by a given ethnic group in the village.

13.2 Gender participation in institutions

Gender participation in the institutions is highly skewed in favor of males. The ratio is on the average 10:1 because some of the responsibilities require females to reside in remote areas which often times is not acceptable to them. This was the case throughout the project area. Besides, there are no adequate qualified female staff to be posted at the District level as the female staff strength is relatively negligible; in some Departments there may be only one female or no female at all.

13.3 Groups formed within communities

Social capital is strongest in Kpando and weakest in Jasikan (Table 9). Town Development Committees which plan and carryout development activities in the fishing communities either by self-help or by promoting outside intervention are operational only in the Afram Plains and Manya Krobo districts. Even though traditional authority exists in all the fishing communities, the lack of these Town Development Committees brings about non-cooperation and lukewarm attitude among inhabitants concerning issues of the entire community. In such areas it is no doubt that no community projects are undertaken and conflicts are bound to be prevalent.

Community Based Fisheries Management Committees (CBFMCs) are means being used by Government through which co-management of fishing rights and resources are forged with the local stakeholders but in the project area they are found only in two districts (Asuogyaman and Kpando). One of the primary responsibilities of the CBFMCs is conflict resolution therefore their absence in a community exacerbates the already precarious situation of disunity among the fisher folk.

Some groups members are also members of other groups who then automatically act as the link between groups otherwise the formal way of linkage between groups is through the traditional authority which plays an intermediary role. In some communities where the ethnic factor is strong, tribal heads perform intermediary roles between the ethnic group and the traditional authority which subsequently undertakes the linkage between groups.

Lack of trust due to the exploitation of the settler communities through imposition of high taxes, levies and royalties by the traditional authorities has impaired the role of the traditional authority as intermediary. There is high suspicion among settler groups that the traditional authorities do no act in their interest and therefore blatantly disregard the intermediary responsibility of the traditional authorities.

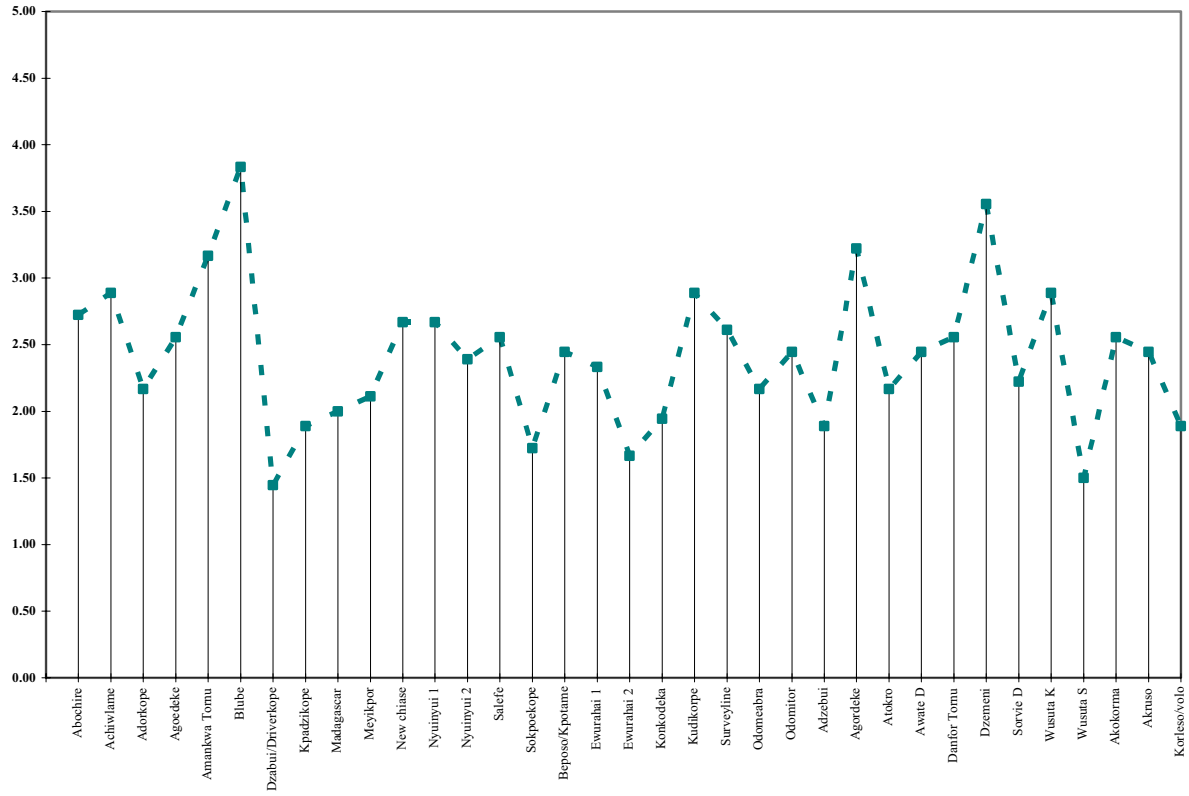
Table 9. Types of existing organized groups by district

GROUPS	AFRAM PLAINS	MANYA KROBO	ASUOGYAMAN	JASIKAN	KPANDO
Church groups					
Traditional authority (Chief & elders)					
Unit committees					
School Management Committees					
Drumming and dancing groups					
Fish processors group					
Football clubs					
Fishermen's group					
Traditional worship					
Sugar cane farmers					
Parent Teacher Associations					
Town Development Committees					
Susu group					
Welfare group					
Farmers association					
Inland Fishermen Council					
Community Based Fisheries Management Committees					
Traditional healers					
Water and sanitation committees					
Watchdog committees					
Maize traders association					
Akpeteshie sellers association					
Moslim worship					
Health Volunteers					

13.4 Formal Institutions

The indicator called "Institutions" is constructed on observations about presence or absence of social services and other institutions in the village (or accessible by villagers though not located physically there), capacity of leaders to mediate or resolve conflicts, existence of organized groups with a social, cultural or economic orientation, as well as functionality of institutions serving villagers. This indicator presents a high degree of variability between villages, indicating a high level of heterogeneity ranging from 4.00 (village of Blube) to levels below 1.5 scored by the Wusuta S village.

Fig. 19. Value of "Institutions" by village



Several institutions exist on the ground, although they often operate at sub-optimal level due to lack of funds and problems with mobility on the lake. Besides, interventions are often limited to district capitals while fishing communities are hardly ever reached. On the other hand, these institutions have district-level offices and can often count with well-trained staff and can be motivated to work well.

14. IMPACTS OF LAWS AND REGULATIONS ON LIVELIHOODS OF FISHING DEPENDENT COMMUNITIES

14.1 Laws

By-laws on protection of the environment

Non-legal regulations have been passed by some district assemblies for the protection of the Volta Lake and conservation of the forests. These include by-laws against tree cutting for fishing (atigya) and charcoal burning for household energy requirement. The Volta River Authority (VRA) Act bans farming along the banks of the lake to check siltation of the lake, especially at the gorge.

While these by-laws and regulations are well meaning for checking environmental degradation they are as well denying fisher folk some additional sources of livelihood. In recognition of this VRA is actively promoting alternative sources of income generating activities as well as promoting energy efficient and energy saving methods for household activities and fish processing in the fishing communities. Another measure being undertaken is the promotion in the fishing communities of tree planting through woodlot and orchard development. The combined effect is reduction of tree cover depletion by 60% in the fishing communities along the Volta Lake (TCDM Terminal Report, 1998).

PNDCL 229 on bush fires

PNDC Law 229 forbids the setting up of bush fires. If effectively enforced, this law would help protect farmers' crops that are often destroyed, as well as wild life, potentially boosting up game for hunters. Bush fires are generated mostly by farmers and hunters who start the fires in remote areas very difficult to patrol. Perhaps the involvement of chiefs would help reduce the incidence since they know the farmers and the location of their farms and could easily bring such culprits to book.

PNDCL 256, the Fisheries Law of 1991

The law prohibits use of illegal methods of fishing including the use of active fishing gear, poisons and dynamites. The law prescribes the use of mesh sizes, which are 3 inches for monofilament nets, and 2 inches for nylon nets. This law enhances the conservation of fisheries resources and it's expected to positively affect fishermen's livelihoods However lack of an effective monitoring system is making the law ineffective and the resources are still being dissipated.

Forestry Conservation Act.

This act of parliament is often used to stop farming at the Akosombo gorge area due to prevalent land slides occurring there.

14.2 Projects

Mobile health services

The VRA operates a mobile health services with a launch called 'Onipa Nua' for communities along the Volta Lake. The medical personnel carry out both preventive and curative medicine. This mobile service started in 1990 and it is mainly for communities not accessible by road. The mobile boat services are becoming more and more irregular and

fishing communities are viewing the arrangement as a blessing when it arrives at the village and are depending of drug peddlers for their health needs.

The Kpando District Health Administration also operates two boats to the communities on the coast which are not accessible by road and to the islands. These were donated by WHO and UNICEF.

PLAN Ghana

PLAN International Ghana started operation in Ghana in 1993 in Asesewa (Manya Krobo District) Bawjiase (Gomoa District) and Mankesim (Mfantsiman District). PLAN is working in 113 communities involving over 14,000 specific children and assists the community where it operates in its entirety. The guiding principles of PLAN are to address the felt needs of families and communities, assist them to prioritize them, promote co-financing by communities and PLAN and management of projects by communities. Areas that PLAN has been assisting are: growing up healthy; learning; habitat; livelihood; and building relationship, in collaboration with the Ministry of Health, Ministry of Education (Ghana Education Service) District Assemblies of the programme areas, Planned Parenthood Association of Ghana and other international NGOs, UNICEF.

Women Development Fund (WDF)

The Ministry of Women and Children's Affair is operating the WDF for women farmers across the country. The programme was set up in 2001. As at June 2002 a total amount of ¢7.06 billion has been disbursed to nearly 15,000 women. The programme has been very successful and this could be attributed to the assistance of the banks where repayments are made. The beneficiaries deal with the banking institutions where they pay annual 20% interest rate. The banks and the District Assemblies are the key players in the disbursement of the loan and they monitor and supervise the farmer's activities and their areas.

Hunger project

The Hunger Project Ghana is affiliated to the Hunger Project International based in New York, U.S.A. and was established in 1996. Its objective is to support rural communities to end hunger and poverty. Key areas of support are: food security; access to health; access to credit; access to education and women empowerment. The project supports community initiated projects and promotes external basic materials that are not available locally i.e. roofing sheets, cement and books. The Hunger Project collaborates with the following organizations: UNICEF, Ministry of health, Non – Formal Education Division, Ministry of Food and Agriculture and the District Assemblies. The Project has been operating in the Dangme East, Asante Akim South, Kpando, Kwahu South and Mfantsiman Districts and it is open to all communities in the designated districts.

Village Infrastructure Project (VIP)

The Village Infrastructure Project became effective from February 1998. It is a poverty reduction intervention to enhance the quality of life of Ghana's rural poor through increased transfer of technical and financial resources to develop and sustain basic village-level infrastructure. It is expected to strengthen and build the capacities of local communities and District Assemblies to manage and operate the resources. It is active in rural water infrastructure, rural transport infrastructure, post-harvest infrastructure and institutional strengthening and capacity building.

Implementation and collaborating Institutions are: Ministry of Food and Agriculture; Ministry of Local Government and Rural Development; Ministry of Health; Ministry of Environment and Science; Ministry of Works and Housing; Ministry of Roads and Transport; Ministry of Employment and Social Welfare; Ministry of Trade and Industries; Ministry of Finance; Department of Feeder Roads; National Board for Small Scale Industries; Department of Co-operative; Ghana Irrigation Development Authority; and NGO. The Implementation is district-based and district managed so the existing administrative scheme is being used for project management.

FORUM project

The Ministry of Food and Agriculture collaboration with International Tropical Forest Action Programme are implementing The Forest Protection and Resource Use Management Project (FORUM) Project . FORUM Project is supported by the German Government. The FORUM Project is functional in Jasikan and Kpandu Districts.

The FORUM Project has three (3) Components:

(a) protection of remaining natural woodland and the rehabilitation of degraded forest stands; crucial aspects include the necessity to increase the value of the forest to local population, and the support, of the Regional forestry Office in protection and rehabilitation. As a start, the concentration on two forest reserves (Kabo and Odomi River Forest Reserves) was recommended;

(b) reduction of the pressure on these two (2) forest reserves by buffer zone development, buffer zone development include the promotion of agricultural and rural industry (e.g. To reduce the risks of fire and to reduce the necessity to farm in on-reserve forests) and some infrastructural measures for the benefit of the local population; and

(c) establishment of woodlots in the south of the Volta Region; this was meant mainly to produce fuel wood and by this to reduce the necessity to use trees from the natural forests i.e. An extended buffer zone.

In general, most of the projects are national in character but in the project area Kpando District is more endowed than for example the Afram Plains which has no project on its own due to accessibility (Table 10).

Table 10. Summary of projects, location and type of intervention

Project	Manya Krobo	Kpando	Jasikan	Afram Plains	Auogya man	Type of intervention
Mobile health services						Health
Plan International						Children issues
Women Development Fund						Women empowerment
Hunger Project						Food security, health, credit, education, women empowerment.
FORUM						Environment
VIP						Women empowerment

15. IMPACT OF POLICIES AND PROCESSES ON THE LIVELIHOODS OF ARTISANAL FISHERIES

The section below attempts to highlight the positive and negative impacts that policies and macroeconomic changes have had on the livelihoods of artisanal fishing communities of southern Lake Volta. Each programme or trend is analyzed separately.

15.1 Structural Adjustment Programme (SAP)

The Government of Ghana in 1983 adopted the Structural Adjustment Program (SAP). The impact on the rural communities is quite widespread. The SAP seeks to promote the liberalization of the local economy thereby eliminating price controls and subsidies while reducing government expenditure on social services and ensure a more efficient use of the resource. Trade liberalization has made fishing inputs much more available but expensive due to the unstable Ghanaian cedi.

15.2 Free Compulsory Universal Basic Education (FCUBE)

Education has been identified as one of the most effective ways to reduce poverty especially among women, the rural poor and urban slums dwellers (Oduro, 2000). It increases their accessibility to economic opportunities and maximizing their potentials to create wealth.

Rural children especially along the Volta Lake face substantial difficulties in their quest for education. They walk several kilometers to school and study in dilapidated structures apart from having no teachers to handle lessons. Most teachers refuse postings to these areas due to remoteness and lack of social amenities. In addition, it is difficult to find minimal equipment such as pencils, copybooks or textbooks.

The government introduced the Free Compulsory Universal Basic Education (FCUBE) in 1996. The principle of FCUBE is to ensure that every child of schooling age has access to basic education to increase literacy rates in the country. FCUBE offers free basic education covering tuition fees only. However, expenses to be borne by families include school

uniforms, pens and pencils, the Parent Teacher Associations contribution and transport, which constitute about 75% of the total expenses at the primary level. In some schools, furthermore, children are charged for examinations, water, electricity, sports, maintenance, equipment extra curriculum. Only one third of Junior Secondary School leavers manage to enter Senior Secondary School.

15.3 Cash and carry system of health delivery

In July 1985 the cash and carry concept was introduced into the health delivery system by promulgation of L.I. 1313. Under this system patients are to pay for full cost of health services provided at government health delivery centers. Exemptions are given to the elderly, antenatal care clinic, HIV/AIDS and communicable diseases, malnutrition and poor people including disabled if classified as pauper as well as children under 5 years of age.

A revolving fund was established in 1992 to use the accumulated savings to supplement funds provided by the government. However, the Government could not meet its financial obligations. This compelled many health institutions to restrict health services to those covered by exemption. There are instances where patients unable to afford the services flee from hospitals without settling in full hospital expenses.

The implementation of the cash and carry programme is not satisfactory, as the target beneficiaries of the exemption do not enjoy the services. One important effect was the sharp drop in attendance at the Out-Patient Department of the various government hospitals and clinics. To overcome this problem forty five Districts and three Sub- Metropolitan areas have been selected by Mutual Health Organizations (MHOs) for the establishment of Mutual Insurance Schemes to replace the cash and carry system. The MHOs are non-profit health insurance schemes with a strong community focus while membership contributions to the scheme are community rated and shared across a pool of individuals.

15.4 Removal of subsidy on agriculture production

Prices of agricultural inputs such as fertilizers, improved seeds, insecticides, fungicides and other agricultural machines were subsidized until the end of 1990. The essence of the subsidy is to encourage the use of modern and improved inputs.

It was anticipated that the removal of the subsidies will be reciprocated by an increase in the prices of the farm product but this was not so. Farmers are not able to purchase the modern and improved seeds and seedlings indicated by the agricultural extension agents. Ghana is one of the lowest fertilizer consuming countries in the world and the removal of the subsidies has worsened the situation. Hence fisher folk are not able to buy fertilizers leading to low crop yields.

In 1990 the consumption rate per hectare of fertilizer in Ghana was 4.5kg, and Nigeria 12.1kg. This has led to the poor performance of the sector up to date. Many rural dwellers run short of the basic staples and thus become net purchasers of food in during the lean season. The yield per hectare of root tubers and plantain declined by 8.5%. The yield per hectare of the cereals also showed decline ranging from 0.9% to 13.6%.

15.5 Forestry master plan

A Forestry Master Plan for efficient management of the natural resource of the country was prepared in addition to regulations on the utilization of the forest resources for judicious exploitation of the forest resources and reforestation. The master plan which covers the entire country has made the acquisition of lumber for boat building very difficult and expensive to an extent that relatively fewer new boats are entering into fishing.

15.6 Trade liberalization

Trade restrictions were imposed to reduce imports and improve the balance of payments. The trade liberalization policy was launched in April 1983. It involved the quantitative controls of imports, higher tariffs on imports eliminating all prices and distribution controls and liberalization of the exchange and payment systems. This policy was adopted to allow market forces to operate and remove process distortions. It was meant to open the economy to allow free flow of good and services. Fishing inputs consequently were made available to fisher folk although the prices were very prohibitive.

15.7 Land tenure system

Land tenure along the Volta Lake has been identified as one of the major bottlenecks against increased agricultural production. The land ownership system in the country is to some extent based on ethnicity. The Government has not yet espoused a national land tenure policy which is expected to streamline the chaotic land applied by the various and numerous "paramountcies" along the lake. On the lake the land owners are the indigenous tribes and all others are settlers and it is the latter who require land for farming and even for their abodes. Land is released for farming based on terms which hold only in a particular paramountcy. Since the terms are not the same throughout the project area it means the effect of land tenure is not uniformly experienced. Land leased out for construction of abodes attract yearly royalties. There is no gender consideration in the acquisition of land in the project area provided the terms stipulated by the land lords can be met. The land tenure system particularly in the Afram Plains as far as fisher folk are concerned seems to be unfavorable as such many do not farm and rather batter fish for food stuff. The Land owners prefer to lease the land for cattle grazing rather than to fishermen for farming.

15.8 Bush fire prevention policy

Bush fires occur from August to November, which corresponds to the peak of the hunting season, and from January to March, when land is prepared for farming. The Ghana Wildlife Society has put in place some measures banning hunting between August and November each year, but is unable to effectively monitor and enforce the ban. Groups of hunters with dogs cordon off areas of bush or forests and burn and then kill everything within, after which the fire so generated is allowed to burn on to destroy trees further degrading the environment. The consequence is that the lake area is becoming typical savannah with relatively fewer trees available for fuel wood for fish smoking. This has effect on the quality of smoked fish products from the lake.

15.9 Decentralization policy

The Government of Ghana passed the local government Act. 462 in 1993 to establish and regulate a local government system for Ghana. The Act seeks to ensure the development, management, and protection of the Districts by the respective District Assemblies.

The functions of the District Assemblies are, inter alias:
- development planning and budgeting;
- provision of social infrastructure;
- monitoring the execution of projects;
- management of human settlements and the environment.

Apart from the sub committees of the district levels, there are Area Councils and Unit Committees put in place to ensure the effective development of the communities. These sub structures are created to bring power and decision making to the grassroots level. The communities are expected to be part of the budgetary preparation as their concerns will be channeled through the unit committees and Assembly representatives. The Central government is expected by law to transfer a minimum of 5% of national revenue to the District Assemblies to be used to finance programmes and projects. 20% of this is allocated to activities towards poverty reduction. Lack of adequate budgetary allocation to the District Assemblies has made their input to poverty reduction to be far from desirable. However some district assemblies have disbursed quite some sums of money to fish processors in the project area. No fishermen groups have been considered as yet. Decisions of allocation are often taken by a sub-committee established by the assembly.

Since most of these fishing communities along the Volta Lake are not accessible by road, they have not benefited significantly from the decentralization process. The communities are only accessible by water and most of the officials of the District Assemblies find the lake transport not quite safe. Even though the decentralized structures exist rarely are fishermen nominated to them. It is also true that most fishermen are illiterate and can hardly contribute at meetings and it is often capitalized on to marginalize them.

15.10 Poverty alleviation programs and projects

Several actions have been initiated with regards to poverty reduction in Ghana. These include:

a) Ghana poverty reduction strategy (GPRS)
The GPRS has an agenda for growth and poverty reduction over a 3-year period (2002-2004). The goal is to create wealth by transforming the nature of the economy to achieve growth, accelerate poverty reduction and probation of the vulnerable and excluded groups within a decentralized, democratic environment. Implementation of the GPRS is yet to commence also in the project area.

b) Emergency social relief programme (ESRP)
ERSP is a short-term (3-year) emergency public remedy to compensate the destitute who suffered from macro-economic policies and other shocks in highly depressed regions and districts (GPRS, 2001). It is an integral part of the Ghana Poverty Reduction Strategy (GPRS). Its purpose is to ensure that immediate actions are taken to relief people in distress

before the GPRS comes into being in 2002 and to facilitate these measures throughout the GPRS. Activities of ESRP although planned also for the project area are yet to be started.

15.11 Social Investment Fund (SIF)

The SIF is a project that provides support for poor communities in the country to improve their livelihoods. The Project is being funded by the Government of Ghana, African Development Bank and the United Nations Development Programme.

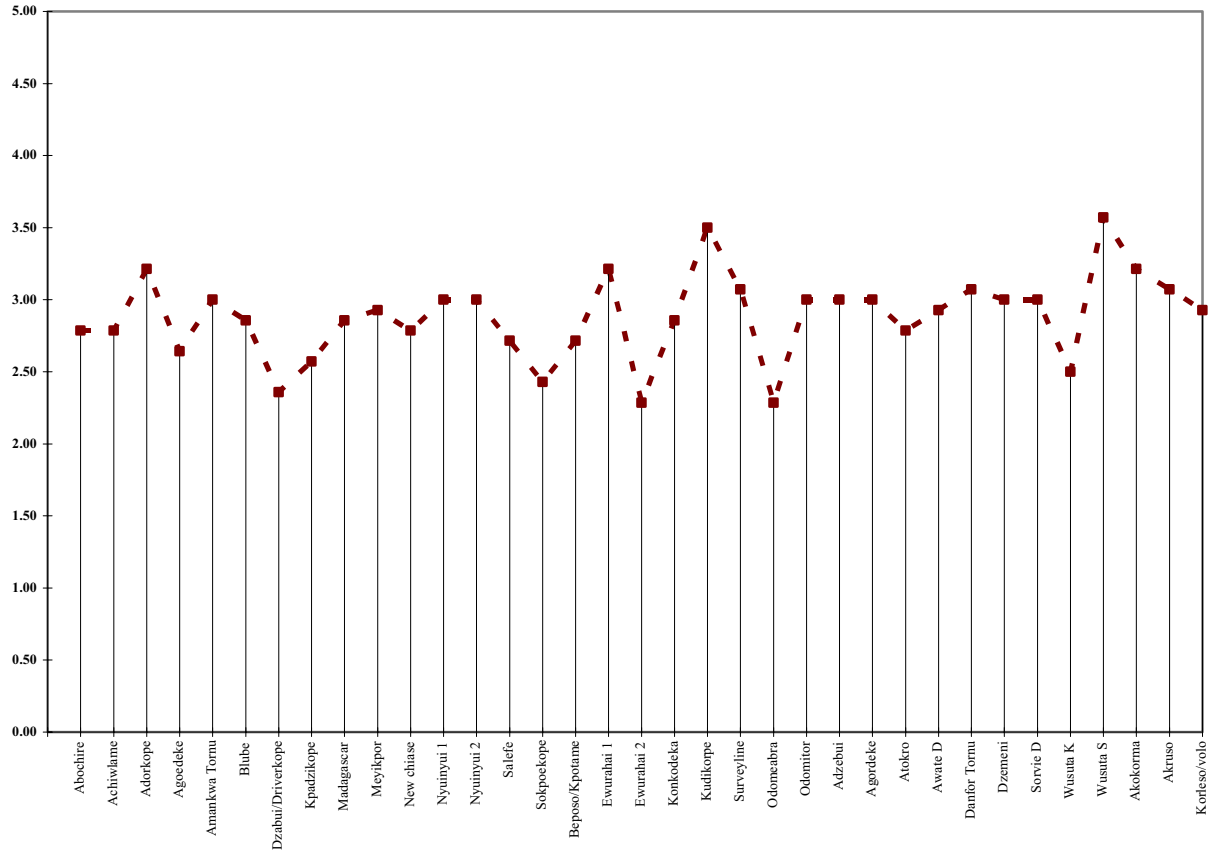
SIF provides training to local entrepreneurs NGO, CBO, District Assemblies, Small Scale financial institutions and networks (such as *susu* collectors) to enhance their roles in urban and rural development programmes. It supports macro finance institutions to improve their service-delivery to the poor. It also provides money for lending to micro finance institutions.

SIF started working on a pilot basis in 5 districts in 1997 and by the middle of June 2002 forty-five districts are being covered including the Afram Plains, Kpando and Manya Krobo districts of the project area. So far no projects have been initiated in any of the fishing communities. The management of SIF expressed the desire to collaborate with the pilot project in reaching out to the fishing communities.

16. THE VULNERABILITY CONTEXT

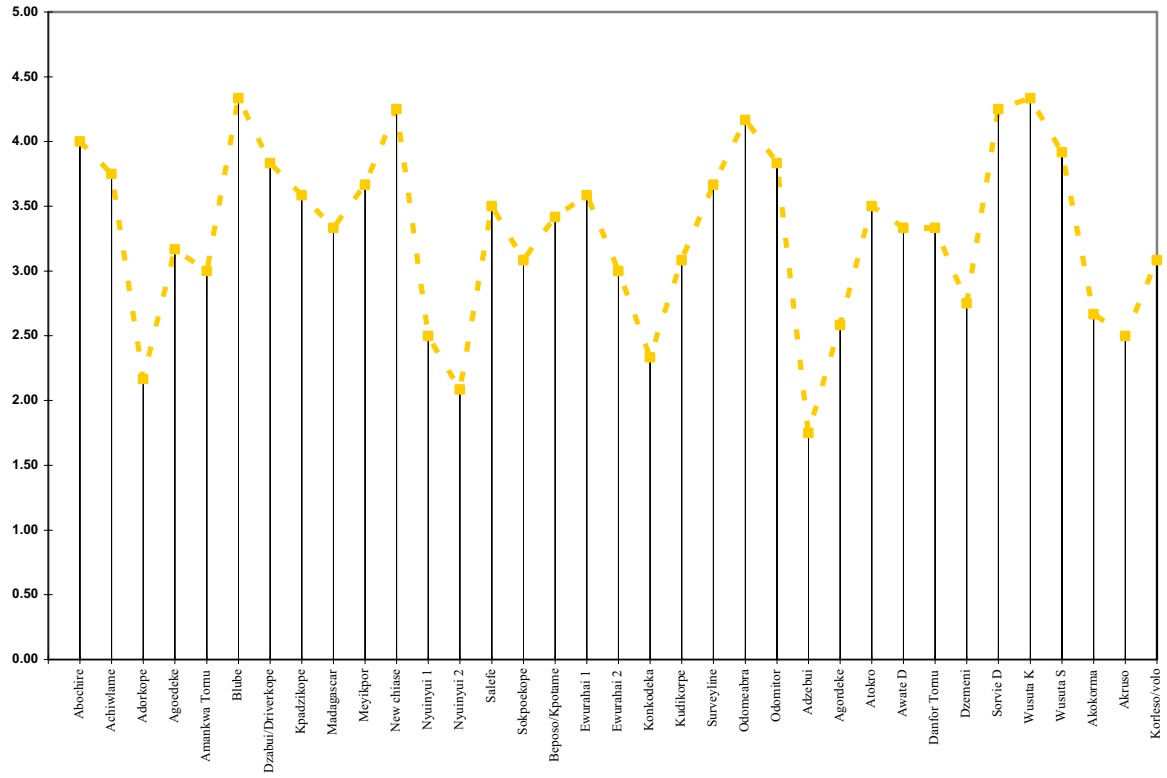
The indicator constructed to measure levels of vulnerability in the villages studied is based on observations concerning conflicts within and between villages, environmental factors affecting production, as well as price fluctuation for primary commodities in the area. The indicator ranges between 2.50 and 3.50, indicating an overall low variability and therefore homogeneity of the vulnerability situation across villages.

Fig. 20. Value of "Vulnerability" by village



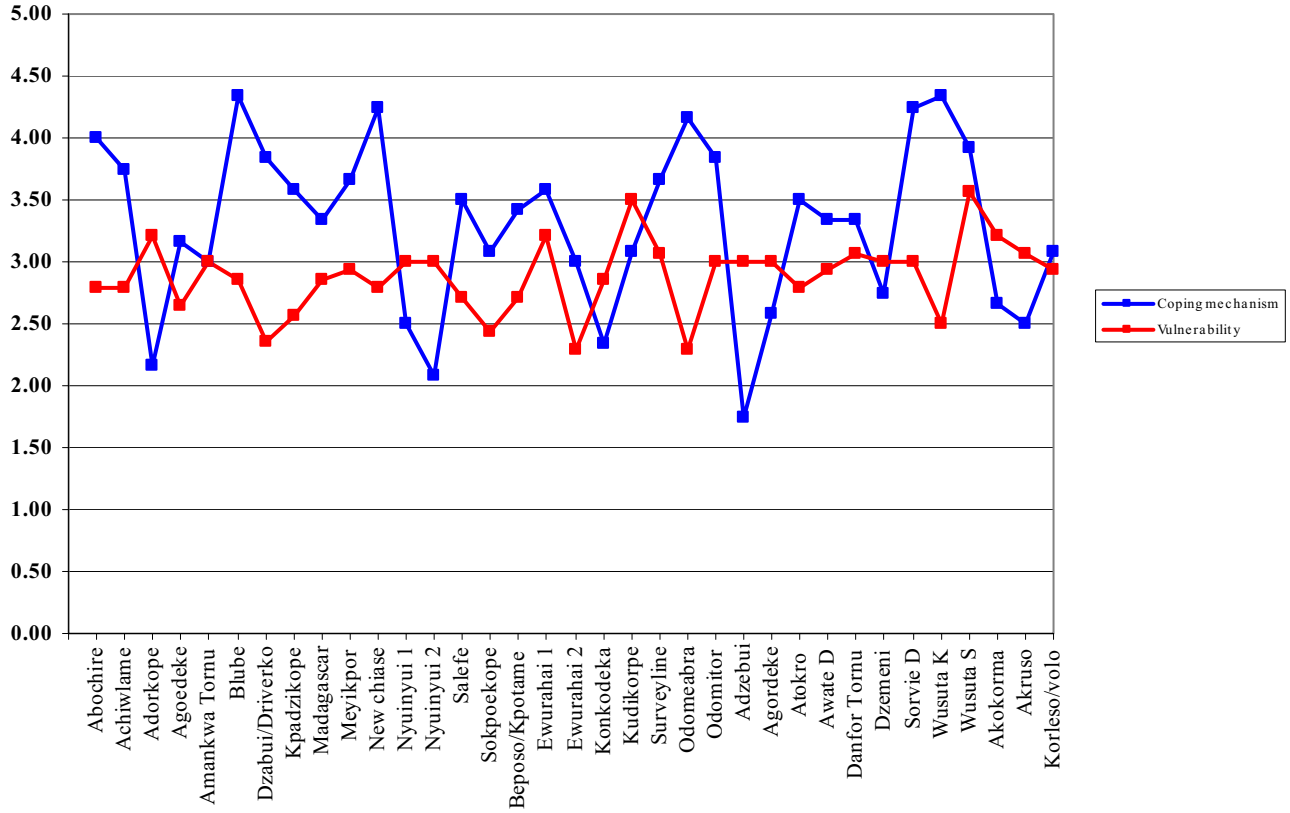
The "Coping mechanisms" indicator wants to measure the capacity of villagers to respond to shocks and disasters. It is based on a series of behaviors which have historically been associated with times of crisis in the area. Among these are: reduction of quantities of food intake, reduction of diet diversification, buying food on credit, capacity to obtain credit or food from neighbors or relatives, sale of productive assets, and child labor. The array of responses to crisis seems to vary considerably from village to village, ranging from scores close to 4.50 to responses below 2.00. Asking for credit from formal institutions and from relatives and neighbors seem to account for the largest amount of variability between villages and seems in line with the general conclusions about the weakness of social capital in these fishing villages. Most typical responses to crises include the sale of livestock and the reduction of food intake, both in terms of total quantities as well as in the diversification of the diet. Buying food on credit also constitutes a common strategy. On the other hand, sale of productive assets, short-term migration and children labor are rare.

Fig. 21. Value of "Coping mechanism" by village



The Spearman coefficient calculated for all villages using the indicators "Coping mechanisms" and "Vulnerability" is negative (-0.34) and significant at 5% level. This means that there is no direct relationship between the scores obtained by villages on the two scales, and that is many villages high scores of the indicator "Coping mechanisms" correspond to low scores of the variable "Vulnerability." This trend is very prominent in Wusuta K and Blube. On the other hand, in villages like Adorkope and Adzebui, high levels of vulnerability are associated with low levels of coping capacity. These trends seem to imply that villages that face worse crises either in terms of gravity of the shocks or regularity of their occurrence, have developed better coping mechanisms than those facing a lower level of vulnerability (see Fig. 22 below).

Fig. 22. Value of coping mechanism and vulnerability for each village



16.1 Demographic changes

The growth rate in the fishing villages is 5.1% (Deri, 1999) which is far above the national average of 3.1%. Youths among artisanal fishers marry as early as 17 years of age, and 93% of married couples have more than 4 children. Lack of formal education, family planning, and the desire for more children as an indicator of higher social status contribute to a sustained population growth. Fertility rates are also very high, especially in correspondence with a heavy concentration of population at the bottom of the population pyramid, where 60% of males are aged between 17-50, while 83.3% of females between 17 – 45.

16.2 Changes in political environment

The change of government from centre right to ultra right has caused some instability and abandonment of some development projects as seen in the Afram Plains.

There is a general inadequacy in the allocation of funds to decentralized departments to meet obligations hence they are not up to their tasks.

Up to now there is no effective collaboration between the assemblies and heads of the decentralized institutions due to mistrust and suspicion about loyalty.

However a positive change is seen in the present government's policy of encouraging more participation of women in the local government administration both at the local, district and national levels.

The change of government has liberalized the sale of premix fuel for outboard motors so that many outlets exist to fishermen to obtain the product to enhance fishing operations.

16.3 Prevalence of diseases

Fishing communities are plagued with several diseases, some of which are prevalent throughout the year but with seasonal peaks in terms of infection rates, as in the case of malaria which is the most common in fishing communities. In some communities (Manya Krobo and Asuogyaman) diarrhea is second to malaria (Table 8). HIV/AIDS is gaining importance (Manya Krobo and Asuogyaman), occupying the respectively third and fourth position in order of prevalence. Work-related diseases and accidents occupy the second position in the Afram Plains, while upper respiratory and skin disease are second and third position in Kpando and Manya Krobo respectively.

Table 11. Prevalence of diseases in order of importance in four selected districts on the Volta Lake.

Disease	Disease prevalence by district			
	Afram Plains	Manya Krobo	Asuogyaman	Kpando
Worm infestation				
Malaria				
Urine retention (URT)				
Diarrhea				
HIV (AIDS)				
Chicken Pox				
Upper respiratory infection				
Skin Diseases				
Hypertension				

Red = endemic
Green = rare

16.4 Disaster Proneness

Seasonal bush fires occur from November to March when the rains have long stopped, the water on the lake is low, and the grass is dry. Farmers and hunters are the primary cause of such events.

Rain storms are experienced in the rainy season (Afram Plains and Kpando) and between March and May (Manya Krobo, Asuogyaman and Jasikan) which cause boats to hit tree stumps and cause accidents on the lake.

Landslides occur mostly in the gorge area of the lake (Manya Krobo and Asuogyaman) between June and July. These land slides cause erosion problems for the lake.

Floods are seasonal and occur between July and September throughout the lake region and cause fishermen to move their houses further upland. Fishermen have the tendency to move their houses as close as possible to the lake and are displaced during high water levels.

At a different level, boat accidents occur throughout the year, although more frequently during the rainy season from July to September. High water levels reduce the visibility of tree stumps which become dangerous obstacles while traveling on the lake. Poor boat maintenance and overloading also contribute to the high number of boat accidents.

The hardest months are from February through April. During these months rainstorms are prevalent and devastating. Fish catches are lowest and food reserves often have already been consumed. During these months, in some areas in the Afram Plains there are terribly strong storms and complete absence of rain hence no agricultural activity is undertaken except for the better-offs who have irrigation equipment.

16.5 Vulnerable areas

People living along the banks of Lake Volta enact similar livelihood systems. Therefore the definition of vulnerable areas is rather a function of exogenous factors than of specific livelihood components. In particular, accessibility, differential rainfall patterns, and links to markets are the most significant determinants of people's overall vulnerability status. These factors, in fact, impact on people's capacity to produce and commercialize their products, as well as their capacity to access primary necessity food and non-food items and social infrastructures such as health and education.

Parts of the lake are inaccessible throughout the year and lack marketing facilities. This is the case of the middle Manya Krobo area from Yognuasi (Gyakiti) to Abobeng, as well as the numerous islands dotting the entire coastline (about 50). In these places getting to a major marketing centre for supplies or health treatments is indeed problematic.

Savannah areas, as in some parts of the Afram Plains, are also very poor due to limited food availability as a result of poor rainfall. This is the case of the area from Salife to Agordeke and New Tease to Tigikope.

Vulnerability is less pronounced in the Upper Manya area (from Akateng to Akorkoma) and the Middle Belt of Asuogyaman (particularly the Akosombo) area are more accessible. There is at least an unpaved road, although often in bad conditions, as well as some market towns. Other regions are only accessible during the dry season, as in the case of Dafor Tornu and Wusuta, which are completely isolated during the rainy season.

Finally, some areas are accessible throughout the year and have marketing facilities. These are located in the Lower Manya district (Kpong area), and the Southern Belt of Asuogyman (the Atimpoku area). In general, bigger towns (Gemini, Kpando Torkor and Kwamekrom) along the lake are also considered less vulnerable than the rural surroundings.

16.6 Coping mechanisms

A variety of behaviors are enacted either individually or collectively by people in fishing communities to mitigate the impacts of crises of different natures. Obtaining credit in kind (food) or in monetary terms figures as one of the most common coping strategies for these communities. Credit can be obtained from neighbors and relatives, as well as from moneylenders. 44% of the communities, furthermore, reported that many people look for food on credit during hard times.

In 36% of the communities all the inhabitants reduce food intake per day in times of crisis, while sale of productive assets is uncommon in the fishing communities, with the only exception of livestock. In 28% of the communities it was reported that this practice is utilized by large numbers of families in hard times.

Sale of jewelry by women as a coping strategy was reported as uncommon in 53% of the communities visited.

Selling fish at prices lower than market price was instead reported to be a common practice to offset times of crisis. This was reported in 36% of the communities visited.

Migration, on the other hand, is only utilized by few families as a mode of coping with crises. For example, in 36% of the communities people reported that nobody leaves the village in search of better options during lean periods.

Finally, child labor has been indicated as a manner to increase total household income by 4 of the 35 communities surveyed.

17. RECOMMENDATIONS

On the basis of the observations obtained through this assessment, the following recommendations can be made to improve the livelihoods of people in fishing communities of Southern Lake Volta.

17.1 Improve sustainability of natural resources management

Fisheries

Fishermen complained about the apparent over exploitation of fish stocks. The current low catch per unit of effort is mainly due to uncontrolled entry into fishing on the lake. It is necessary for the Volta Lake fisheries management plan to be put in action to reverse the depletion of the fish resources. The pilot project could play a key role in collaboration with the Department of Fisheries and the District Assemblies in the implementation of the fisheries management plan. However, for the management plan to be effectively executed it is advisable to form and train the Community Based Lake Management Committees and Zonal Committees, which should be supported to undertake the necessary management functions at the village level. This issue is particularly relevant, given that the high cost of MCS cannot be met by the Department of Fisheries. It is also necessary to facilitate collaboration with the Department of Fisheries and other institutions and agencies to monitor activities affecting other natural resources in the region and that could impact lake productivity.

Forests

The estimated deforestation rate of 1.4 km yr^{-1} (Asare & Osei-Bonsu, 1993) is alarming and threatens the useful life span of the lake and its resources. The depletion of tree cover and general environmental degradation through inefficient farming methods, bush burning, cutting of yam stakes, building poles and overgrazing should be checked as an urgent matter. Measures to conserve the forests should include:

- establishment of agro-forestry micro-projects in all communities, through provision of adequate logistic and motivation to staff of the Ministry of Food and Agriculture and the Forestry Commission and assistance to inhabitants who undertake tree planting;

- establishment of fodder banks, training in tree-planting and contour farming as part of proposed agro-forestry micro projects. Detailed proposals with specific targets and requirements should be presented to NGOs and District Assemblies for support.

Between 85% and 95% of energy required for cooking, *gari* and fish processing comes from fuel wood. In order to minimize the rate of depletion of tree cover in the fishing communities, there is need to strengthen on-going energy saving and fuel efficient systems on the lake. These include use of *chorkor* smokers, mud stoves and smokeless stoves for commercial purposes. The relatively higher technical and economic efficiency of the *chorkor* fish smoking device could contribute to better forest conservation practices along the lake. The expansion of the use of *chorkor* smokers could be instrumental to reducing vulnerability of women along the lake. DOF, VRA, FOE, EPL, Premix Committee and EPA should co-ordinate their activities for the promotion of *chorkor* smokers, LPG, fish smoking appliances

to conserve fuel wood and fisheries resources in the long term and other mechanisms aimed at maximizing technological and economic efficiency and financial returns with minimal exploitation natural resources.

The pilot project could look into the possibility of introducing alternative sources of energy such as LPG, kerosene and biogas. In this regard, collaboration with the Women in Agriculture (WIAD) of the Ministry of Food of Agriculture, the National Council for Women and Development and NGOs in that area could be forged to support the program on a larger scale.

Wildlife

Wildlife is being threatened mainly by bush fires and hunters. To minimize bushfires, it is necessary to collaborate with the National Fire Service to enhance the formation and training of fire fighting vigilantes. Special incentives could be instituted initially by the project and later by concerned District Assemblies to ensure continuity of action. The Ghana Police Service should be sensitized on anti-bush fire laws to be invoked against culprits. Furthermore, the annual close season for some wildlife should be enforced by the Wildlife Services of the Forestry Commission in collaboration with the District Assemblies and more severe strives should be inflicted to poachers.

Land

Continuous cropping has reduced the fertility of soils, while fertilizers are out of the reach of most people in fishing communities. Since the size of land available for cultivation is a constraining factor, agro-forestry interventions for maintenance of soil fertility should be adopted. These many include: a) improved fallows using combination of fast growing tree and herbaceous legumes; b) mixed intercropping with leguminous trees; and c) alley cropping with fast growing leguminous shrubs such as *Leuceana* and *Gliricida*. The possibility of using organic manure (including compost and animal droppings) should also be presented to the communities.

17.2 Capacity building in activities in the fisheries sector

Lack of adequate technical skills is attributed to the inefficiency and the chaotic nature of the fishing industry on Lake Volta. To turn the industry around and make it profitable so as to reduce poverty there is need for training in various areas:

- Gear technology. Use of appropriate material, care and maintenance of gear and craft and use of appropriate sails for fishing to reduce fuel costs;
- Improved fish handling, processing and marketing. The *chorkor* oven has been found to be ideal in Ghana for traditional fish processing and needs to be promoted in the fishing villages by the pilot project;
- Basic book-keeping and business management skills. One of the causes of poverty is illiteracy as it diminishes profit margins of illiterate entrepreneurs. Basic training in these skills will enhance profits and guide business decision making.

On the other hand, to improve the performance of transport boats so as to reduce accidents on the lake it is necessary to deliver training in:

- Boat handling, care and boat safety on the lake. Boat operators should be made knowledgeable of: good maintenance and problems of overloading; periodic inspection of boats for seaworthiness and safety; and legislation covering licenses, construction, loading, safety equipment, crew certification etc.

- Outboard motor handling, trouble shooting, repair and maintenance which will enhance the lifespan of outboard motors.

17.3 Promotion of alternative livelihoods

The overdependence on fishing as a source of livelihood is fast depleting the fisheries resources as well as destroying the lakeside environment. This situation is not yielding the required dividends expected to move the majority of fisher folk out of poverty. There is therefore a need to improve the enabling environment for the promotion of alternative income-generating activities in fishing communities. Traditional production methods need to give way to improved technologies to raise the magnitude of contribution of existing activities like farming and livestock rearing. The rate of socio-economic benefit could be enhanced given the fact that basic know-how is already available in the communities and would not require considerable investment.

The qualitative assessment of the current state of agricultural development effort in Ghana (MOFA 2001) provides a helping force in its comparative ranking of overall benefit-costs of 12 alternative livelihoods. The assessment points to viable alternative livelihoods which can be promoted to supplement fishery livelihoods. Distribution, feed processing, roots and tubers (including cassava cultivation), food processing and livestock production are alternative livelihoods which could be combined with fishery livelihoods including aquaculture, in convenient and viable and well integrated mixes. Other viable alternative livelihoods that can be promoted are snail farming, mushroom growing, agro-forestry, cassava farming and Batik and tie and dye making in communities along the lake in order to reduce the pressure on the fishery.

17.4 Co-ordination, networking and integration between institutions

Although the institutional presence on Southern Lake Volta is still lacking in many respects, there is a strong need to foster greater co-ordination, networking and integration among stakeholders working in artisanal fishing communities. This co-ordination should take into account strengths and weaknesses of the each institution and, on the basis of these, define specific entry points for action within their mandates. This seems to be particularly urgent for the Afram Plains district, which has been declared priority area for poverty reduction in Ghana, and where a variety of national and international stakeholders are currently designing their programmes of action for the near future.

The need for improvements in the liaison between DOF and other institutions involved in the utilization of inland water resources seem to be a crucial step for the improvement of people's livelihoods in the area. The DOF should take a more active role in attracting other agencies to join a multi-sectoral scheme for the development of the fisheries and related sub-sectors in the Volta Basin.

Specifically, there is the need for DOF to explore the following options:

- explore possible collaboration with other institutions in order to facilitate the transformation social and financial assets of the fishers along the lake;

- DOF, VRA, FOE, ADRA, Pre-mix Committee and District Assemblies could network through co-financing arrangements to pool resources against campaigns for sustainable livelihoods, alternative livelihoods and closed season programmes such as agro-forestry and food for work packages that are currently promoted by ADRA;

- DOF, NICFC, CCT and other input distributors should better co-operate and coordinate to ban illegal fishing gear imported and distributed to inland canoe fisher-folk.

- Finally, expanding the membership of the Fisheries Commission to include key players in Volta Lake Fisheries such as the NICFC and VRA should also be considered.

Conflicts within and between villages are frequent, and leadership is often weak. In particular, the organization of communal groups for the advancement of the villages as a whole seems to be a difficult enterprise. Some essential committees, which should be present and functional such as village development committees, are lacking in most communities, thus placing additional responsibilities on the headmen - themselves incapacitated because illiterate. There is a strong need to enhance stability, peace and progress in the villages and this could be improved by upgrading the managerial and organizational skills of village headmen. Wealth creation can only take place in an atmosphere of peace within and between villages.

On the other hand, limited staffing, operational funds, mobility and logistics significantly impair the capacity of key institutions to operate, despite their presence is desperately needed in fishing communities. Critical extension services/support for production are lacking in fisheries, veterinary, animal health care and crop farming. Also absent are primary health care and banking services, as well as services relevant to provision of social safety nets to the communities. Initially, it is important to provide budgetary support as a catalyst to stimulate co-operation and collaboration, while encouraging the District Assemblies to play a facilitation role in the long run. The pilot project could identify NGOs operating in these areas and seek their collaboration to enhance the provision of much needed services. At the village level, it is necessary to foster the formation of appropriate committees to collaborate with the institutions and to play an advocacy role with the District Assemblies and higher levels.

At village level, many groups exist as loose associations, of which only a few are economic/commercial oriented. It is essential that groups be trained and graduated into cooperatives to enhance their bargaining power in collectively seeking credit and marketing opportunities.

17.5 Promotion of Code of Conduct for Responsible Fishing

In the implementation of the CCRF, DOF should concentrate more on behavioral change strategies using a multi media approach such as the community/ regional stations, the curriculum of NFED, drama, peer education and farmer's field school approaches.

WIFAD could also be made to help deliver CCRF messages to women such as wives of the fishermen, fish processors and financiers of fishery gears and expeditions.

Delivery of credit and other socio-economic infrastructure being promoted by institutions in the lake communities should run with equal emphasis on promotion of CCRF.

17.6 Improve community participation in CBFMCs

In view of the need to effectively meet the objectives of fish stock conservation, promote fishery livelihoods and thereby reduce vulnerability to poverty, it is recommended that modern fisheries management addresses social, political, legal, economic and biological factors. Thus, fisheries management will have to involve compromise including full participation of fishers in the formulation and enforcement of fishery laws and by-laws, as well as the mitigation of conflicts between various interest groups on the lake.

Community leaders' participation in CBFMCs should therefore be strengthened to sustain the interest of the communities in their activities.

17.7 Improvement of nutritional and health status

Diet diversification

Cassava and corn are the staples and the only food items eating daily with some amount of fish. Even though malnutrition is absent among children it is obvious that non availability of other important food items in their diet increase the incidence of ill-health among the fisher folk. Poultry and livestock are kept only as savings and are not or rarely eaten by the communities. There is therefore the need to collaborate with the Nutrition and the Community Health Departments of the Ministry Health, the Women in Agricultural Development of the Ministry of Food and Agriculture and the Food Research Institute of the Council for Scientific and Industrial Research for a vigorous sensitization campaign in the fishing communities on the need to introduce other food items in their diet such as cowpea, meat, fruits groundnuts etc. A food supplement program in collaboration with the World Food Program could be vital.

Food security

The number of food deficit months (4-6 months) for even the vital staples (cassava and maize) is unacceptably high. Apart from the food supplement program it is necessary to initiate a food security program to be financed with a proposed revolving loan scheme to buy and store food, which should be released during the normal food deficit months. Nearly 80 – 90% of fishermen's earnings are used on food. The food security program could be expanded by collaborating with the District Assemblies and NGOs in the area.

Health

Some of the diseases are work related and may be mitigated by education programs. Since the Ministry of Health is currently facing staff and mobility problems, village based volunteers could be trained and equipped with basic tools and medications for application in their communities with oversight responsibilities occasionally by the Ministry of Health.

Some of the illnesses are more prevalent or intense in the wet season and are exacerbated by careless practices. Dumping waste and defecating in unconfined places contribute to pollution of water during the wet season. Non-treatment of drinking water during the raining season contributes immensely to ill-health. There is a need for education on maintaining a clean and healthy environment, construction of places of convenience, avoiding contact with the lake water and, above all, boiling of water before drinking.

17.8 Improving social infrastructure

All fishing villages along the lake are severely disadvantaged with respect to social and physical infrastructures. They lack educational facilities, schools, teachers and teaching aids. There is no potable water, electricity, clinics, markets and recreational facilities and depend on fisheries as a means of employment. To improve this dismal situation, it is necessary that fisher folk be sensitized to accept their present settlements as 'permanent' homes rather than as 'temporary' dwelling places and construct better houses, since 80% of their useful life is spent in the fishing villages. Better housing could serve as collateral to convince and erode the idea that fishermen are too mobile and unreliable for credit. It could attract District Assemblies to incorporate the villages in their development plans.

District Assemblies could be assisted by the pilot project to solicit support from bilateral and multi-lateral agencies through development of well thought through development plans. NGOs could also be sensitized to incorporate some components in their development plans. Existing NGOs like PLAN International, GTZ and Action Aid could be persuaded to extend their current coverage areas.

17.9 Establishment of a revolving loan account

Poverty is generally a rural phenomenon, mainly because incomes are low and no employment opportunities exist in the villages. Villagers lack the funds to procure inputs for fishing, fish processing and farming. Fisher folk have no access to formal credit to expand their operations and increase their incomes. The inability of some fisher folk to procure inputs compels them to use unorthodox and illegal means, such as bamboo pipes and poisons. The condition could be improved by establishing revolving loan schemes specifically targeting fishing communities. This could be established through NGOs, the Government of Ghana, the pilot project, or District Assemblies' common fund.

The pilot project could initially assist in drawing up the modalities for establishing, managing and utilizing the fund. Credit recoveries could be made on weekly basis as fisher folk bring their fish for sale. The village elders (headsmen), given the respect they command in the village, could be involved in supporting the credit application and guaranteeing repayment.

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APPENDIX 1

COMMUNITY DISTRIBUTION OF FISHERMEN AND CANOES

Name of District	Name of Community	No. of Fishermen	No. of Canoes	Ratio Canoes/Fishers
KPANDO DISTRICT	Danfor Tornu	195	68	0.35
	Sorvie D	51	19	0.37
	Awate D	139	36	0.26
	Wusuta K	77	24	0.31
	Wusuta S	39	12	0.31
	Agordeke	243	70	0.29
	Atokro	40	12	0.30
	Dzemeni	334	99	0.30
	Adzebui	65	8	0.12
	Tsitsikope	57	15	0.26
JASIKAN	Odomitor	185	56	0.30
	Odomeabra	-	-	-
MANYA KROBO	Akruso	149	46	0.31
	Korleso/volo	65	21	0.32
	Akokorma	205	68	0.33
ASUOGYAMAN	Ewurahai 1	34	10	0.29
	Ewurahai 2	53	15	0.28
	Kudikorpe	84	22	0.26
	Surveyline	68	22	0.32
	Tsitsikope	57	15	0.26
	Konkodeka	121	36	0.30
	Beposo/Kpotame	23	6	0.26
AFRAM PLAINS	Blube	56	21	0.38
	Madagascar	148	46	0.37
	Abochire	75	23	0.31
	Sokpoekope	39	12	0.31
	Dzabui/Driverkope	34	10	0.29
	Achiwlame	104	35	0.34
	Meyikpor	98	30	0.31
	Salefe	82	25	0.30
	Amankwa Tornu	52	20	0.38
	Agoedeke	46	18	0.39
	Nyuinyui 1	39	13	0.33
	Nyuinyui 2	62	21	0.34
	New chiase	-	3	0.43
	Adorkope	-	-	-
	Kpadzikope	-	-	-

APPENDIX 2

PLAN FOR FIELD WORK

DAY	DISTRICT	VILLAGE
1	Kpandu	Kpandu
2	Kpandu	Dafor Tornu
3/4	Kpandu	Atokrokpo Agordeke Adejebui
5	Jasikan	Jasikan
6	Jasikan	Odornitor Odormeabra
7	Kpandu	Dzemeni
8/9	Kpandu	Wosuta K Wosuta S Awate Sovie
10	Manya Krobo	Krobo Odomase
11	Manya Krobo	Akruso Korlesu/Volo Akorkoma
13	Asuogyaman	Atimpoko
14	Asuogyaman	Ewurahai (I) Ewurahai (II) Kudikope
15	Asuogyaman	Surveyline Konkodeke Beposo/Kpotame
17	Afram Plains	Donkorkrom
18	Afram Plains	Agordeke Meyikpor Salefe Amankwa Tornu
19	Afram Plains	Blube Madagascar Kpadzikope Achiwlame
20	Afram Plains	Sokpoekope Dzabui/Driverkope Abochire
21	Afram Plains	Nyuinyui I Nyuinyui 2 New Chiasi Adorkope
23/24	Kpandu	Kpandu
25	Jasikan	Jasikan
26	Manya Krobo	Manya Krobo
27/28	Asuogyaman	Atimpoko