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Research Article

Household Structure and Livelihood Sources of Fishing Community in Lake Ziway, Ethiopia

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Abstract

Household structure and livelihood sources were studied in Eastern Shoa Zone, in Lake Ziway. Lake Ziway is located in central Ethiopia and the lake is drained by Meki River from the west and Katar River from the east; both feeding the lake at rift floor and then outflow to Bulbula River in southwest. Data were collected during July (2013) through to May (2014) using rapid rural appraisals, field observations and in depth interviews through field surveys. The study identified people's livelihood sources, analyzed household structure and household participation in different commodities was also carried out. The findings indicate that average family size in the three study sites (Site A, B and E) was similar. On the other hand the average family size of study site C and D was very similar which accounts 3 and 3.8 respectively. In all sampling sites male was representing higher proportion and aged between 18 to 60 years of age represented the highest proportion of the fishermen households and accounts 42 to 46%. Fishery, Livestock, Field crops and Horticulture were the major livelihood sources in the study area that engaged by fishermen. Since, fishery sector was the most important income sources in all sampling sites there is an urgent need to tap this potential in order to improve the livelihoods of the communities on this sector.

Keywords: Ethiopia, Household, Lake Ziway, Livelihood sources

Introduction

The Ethiopian economy is heavily dependent on the agricultural sector, which has suffered from recurrent droughts and extreme fluctuations of output (Demeke *et al.*, 2004). Being the dominant sector, agriculture contributes about 50% of total GDP, generates 90% of export earnings and supplies about 70% of the country's raw material to secondary activities (MoFED, 2007). Over 85% of the population is employed in this sector. Ethiopia's economic growths remain dependant on the subsistence rain-fed agriculture sector which is unpredictable and with generally low outputs.

In addition the country depends on the inland waters for the supply of fish as a cheap source of animal protein. It has a number of lakes and rivers with substantial quantity of fish stocks. The total area of the lakes and reservoirs stands at about 7000 to 8000 km^2 and the important rivers stretch over 7000 km in the country (Mebrat 1993). In addition, minor water bodies such as crater lakes and reservoirs make up about 400 km^2 (Wudneh 1998). Most of the lakes are located in the Ethiopian Rift Valley depression, which is part of the Great East African Rift Valley system. Hence, the water bodies support a diverse aquatic life including more than 200 fish species (Redeat Habteselassie 2012). In reality, however, all these capitalized potentials and praises ended in vain contributing little to the well being of the country.

Based on this the Rift valley and its environment are important area in the country in connection with their water resources. It is where lakes useful for agricultural production, industrial and recreation are present. Highlands adjacent to the lake are important

agricultural areas using both rain-fed and irrigation from closely spaced rivers and tributaries and also pump from the lake for horticulture production.

Recently, the cumulative effect of increase in population and climate change that enhance over abstraction of water to meet fast growing demand are threatening the area. The impact is more pronounced in the downstream areas where there is poor groundwater development and the people have been using surface water for home consumption and their livestock. Lake Ziway fisheries have benefited from the Phase I (1981-84) and Phase II (1991-98) fishery development projects assisted by the European Development Fund (EDF). Thus, it is the most developed with maximum contribution of all lakes in the Oromia Region. However, since the lake open accesses to the resources have resulted in mismanagement of the fishery resources.

In order to manage equitable distribution of water and agricultural resources in the area, determination of fishery communities towards the livelihood resources is critically important. Also information about the household structure distribution towards the household activities is important to plan for areas of more feasible development; and the alternative uses of the available resources. The research is therefore, an important input for understand the livelihood of the community and forward alternative management to provide sustainable and equitable supplies for communities in and around the catchment.

Methods

The study Area

Lake Ziway is found in the Ethiopian part of the Great East African Rift Valley. It has an open water area of 434 km^2, average depth of 2.5 m, and an elevation of 1636 m.a.s.l. The Ziway watershed falls in between 7°15'N to 8°30'N latitude and 38°E to 39°30'E longitude covering a total area of about 7300 km^2 (Fig. 1). It is composed of two main rivers, Meki and Katar, flowing into the lake and one river, Bulbula, flowing out of the lake (LFDP 1993). The climate is characterized by semi-arid to sub-humid with mean annual precipitation and temperature of 650 mm and 25^0C, respectively. Five bigger islands are situated in Lake Ziway: Tulu Gudo (4.8 km^2), Tsedecha (2.1 km^2), Funduro (0 .4 km^2), Debre Sina (0.3 km^2) and Galila (0.2 km^2). While the latter two have only a few inhabitants, the three bigger ones are populated with several hundreds of people (Anon. 1999).

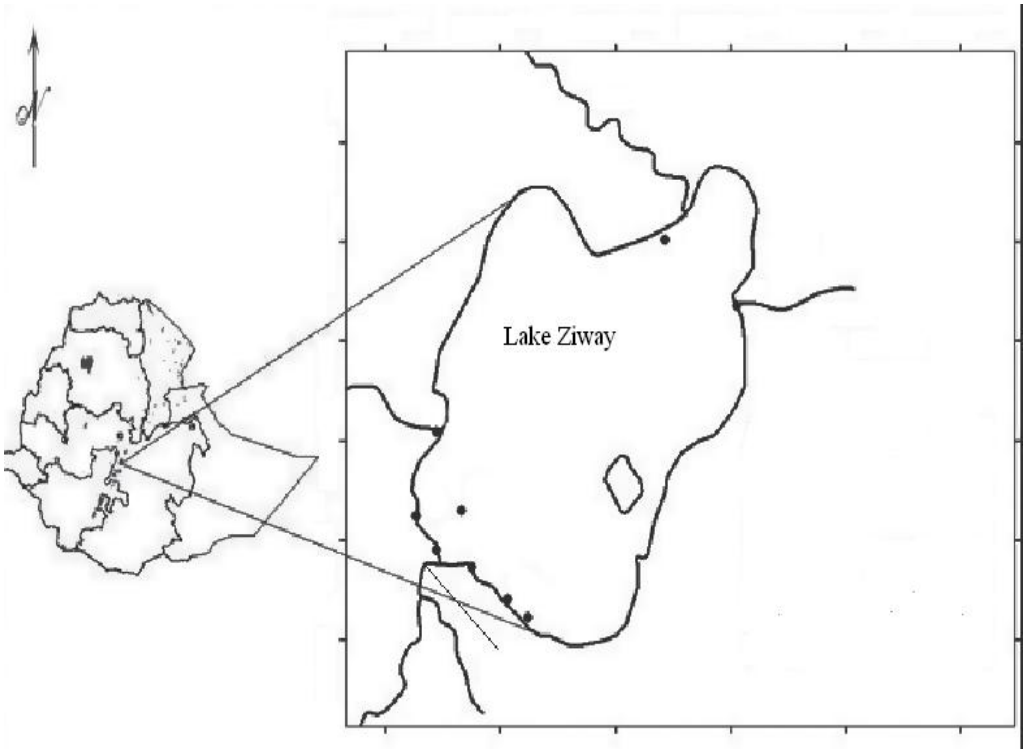

Fig. 1. Map of Lake Ziway

Sampling site

Sampling sites were selected purposeful and grouped into the following: Site A (Around South-West part of the Lake); B (Around South part of the Lake); C (Around East part of the Lake including Tulu Gudo Island); D (Around North part of the Lake) and E (Around West Part of the Lake) (Fig 2).

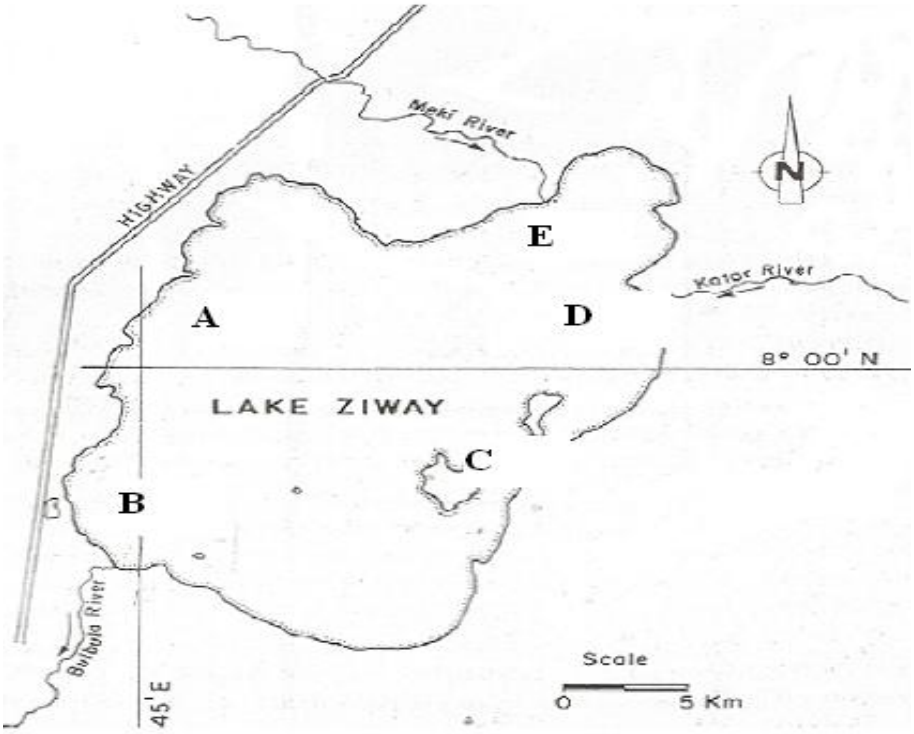

Fig. 2. Sampling sites

Sample Selection and Sampling procedures

The sample size required for the study was determined by the formula recommended by Arsham (2005) as follow:

$N = 0.25/SE^2$, where N = sample size

For a SE of 10% the computed sample size for each peasant association was 100.

Based on this five peasant associations were purposively selected based on more fishing activity practices and convenes for logistic reasons. Accordingly, from each peasant association 25 households who owned fishing equipments and more experience in fishing activities were randomly selected. Hence, a total of 125 households were selected. A household usually consists of a person or a group of persons who live together in the same homestead/compound but not necessarily in the same dwelling unit, have common housekeeping arrangements and are answerable to the same household head.

Questionnaire survey and analysis

The type of questioner that conducted in the study area was semi-structured questionnaire. Then before administer pre-tested were conducted. In order to conduct the household survey, a total of two enumerators who speak the same language, Afan Oromo and Amharic, were recruited. The enumerators were also trained before launching the survey to make them understand the purpose of the survey and to be familiarized with the questionnaire. The content of the questionnaire prepared to interview sample survey includes, general questions related to household and livelihood resources information of the fishery community and samples were collected monthly between July, 2013 and May, 2014. Finally, the data generated were coded and analyzed using descriptive statistics were used to derive frequencies and averages.

Results and Discussion

Household structure

Household members, for the purposes of this study, comprised all those who, at the time of survey, were physically reside in the same house as the household head. Table 1 gives details on household size and age distribution in the study area. Average family size per household in the study site A, B, C, D and E were 5.8, 5.1, 3, 3.8 and 5.6 respectively. The average family size in the three study sites (Site A, B and E) was similar. On the other hand the average family size of study site C and D was very similar which accounts 3 and 3.8 respectively. This finding was not comparable to Fixa (2004) reported that the average family size of 6.67 and 6.43 in the study area of Doni Kumbi and Bato Degaga in the same order and also 6.14, 6.3 and 6.65 persons per household respectively for Ada, Gimbichu and Boset (Abera 2008). This is due to difference if farming system of the area that focused on agriculture as well as livestock production and that had enough agricultural products for their income. While, in this study fishing communities were mainly focused on fishing for their livelihood income due to that had not enough arable land for cultivation of field and horticultural crops; and also for livestock rearing to produce adequate products for survival and as a result forced to minimal household size.

Male to female ratio in general male was representing higher proportion in all sampling sites (Table 1). This finding was contradict to other finding (Abera 2008) reported that female to male ratio within a household female was representing higher proportion in the area of Ada, Gimbichu and Boset district. The different sex ratio is difficult to explain. Probably, it could be attributable to feeding habit differences between the areas. Hence, further study is required to see if the same factors could be responsible for sex ratio results.

The research population is generally youthful as 42 to 46% of them were aged between 18 to 60 years of age represented the highest proportion of the fishermen households, another one-third aged between 12-18 years while the rest less likely to provide productive labor (less than 12 years of age and more than 60 years of age) ranged from 6 to 21%.

Table 1. Household size and age distribution in the study area

	Study Area														
	Site A			**Site B**			**Site C**			**Site D**			**Site E**		
Household characteristics															
	Min.	**Max.**	**Mean**	**Min.**	**Max.**	**Mean**	**Min.**	**Max.**	**Mean**	**Min.**	**Max.**	**Mean**	**Min.**	**Max.**	**Mean**
Household size	3	14	5.8	4	13	5.1	2	7	3	3	10	3.8	4	13	5.6
Male	1	9	3.3	1	9	2.9	1	5	1.8	1	6	1.9	1	7	3.1
Female	1	6	2.5	1	4	2.1	1	2	1.5	1	4	1.8	1	6	2.5
Household age distribution (%)															
Age < 12 years	21			14			11			13			17		
Age 12 -18	28			35			29			32			30		
Age 18 - 60	45			42			44			43			46		
Age > 60	6			9			16			12			7		

Livelihood sources

Fishery, Livestock, Field crops and Horticulture were the major livelihood sources in the study area that engaged by fishermen. Fishery sector was the most important income sources in all sampling sites. Except site D (Around North part of the Lake), for the rest that Field crops, Horticulture and Livestock production were put as in decreasing order of importance (Table 2).

Focus of Livestock production next to fishery was due to availability of farming land around the area as compare the rest sites. Hence, due to this fact the proportion of oxen was high as compare to other livestock community in the study area. While, in the study area of A, B, C and E Fishermen mainly focus on cattle for milk production for livelihood purposes. This is due to shortage of land for agriculture that was not interesting to put oxen for draught power for crop production. On the other hand, Abye (1993) indicated that over 90 percent of the farmers in the highlands use animal traction for food crops production. Mulugeta *et al*. (1998) also revealed that the majority of farmers in Eastern Wollega depend on oxen.

Since, as indicated by Table 2, the fishery industry has been of critical importance to the economy and to the social well-being of the fishery community. It provides a vital source of food and economic well being for the people in the study area. However, current harvest trends and fishery conditions put these attributes of the industry at risk. It is threatened with problems of overexploitation, environmental degradation and consequently unrecovered resources resulting in loss of its potentials and fishermen cannot afford their livelihood from the resources

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Table 2. Ranking of the most livelihood sources based on their function in the study areas

	Priority																			
livelihood sources	Site A				Site B				Site C				Site D				Site E			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Fishery	98.0	0	0	0	100	0	0	0	100	0	0	0	100	0	0	0	100	0	0	0
Livestock	0	19.1	35.2	49.4	0	21.0	31.6	55.1	0	14.2	32.5	52.4	0	43.1	33.2	29.2	0	22.4	25.1	44.1
Field crops	0	60.5	9.3	16.1	0	56.4	14.3	17.1	0	55.1	20.3	15.6	0	35.7	42.5	28.4	0	43.5	16.7	19.9
Horticulture	2.0	20.4	55.4	34.5	0	22.6	54.1	27.8	0	30.7	47.2	32.0	0	21.2	24.3	42.4	0	34.1	48.2	37.0

Rank 1: highest priority; and Rank 4: least priority

Although, Fishery and other agriculture remains the main source of livelihoods in most area of the study areas, there is an increasing awareness that livelihood diversification plays a strategic role in rural systems. For instance, Davis *et al.* (2007) In Ethiopia, in most cases, smallholders are trapped in declining farm productivity and therefore agriculture alone (agriculture is subject to high risk due to mainly climatic factors and price fluctuations) cannot support many farm households in rural areas (Garedew *et al.*, 2009; Devereux *et al.*, 2005). For instance, in the "Tigray" region, farm households diversify their livelihood sources into non-farm activities derived by both low farm income and availability of surplus family labor (Woldenhanna & Oskam, 2001). In less-favored areas of Ethiopian highlands, land degradation, population growth, stagnant farming technology, and drought necessitate the development of non-farm employment opportunities (Holden *et al.*, 2004). Further, data taken by two repeated surveys from different parts of Ethiopia revealed that wealthier households tended to have more diversified non-farm income streams than those who are poorer (Block & Webb, 2001). Lemi (2005) reported that participation in non-farm activities is mainly driven by demographic factors.

In the north-western highlands of Ethiopia, destitute households and female-headed households have more diversified livelihoods than non destitute households to off-set agricultural deficits (Sharp *et al.*, 2003). From eastern highlands of Ethiopia, Legesse (2003) described different dimensions of livelihood diversification strategies pursued by the farmers to off-set the various risks, mainly agricultural shocks, of rural livelihoods

Household participation towards different Livelihood sources

Figure 3 gives a summary of the occupational participation of the household. In the study areas men were the ones doing most of the fishery activities (Fig.3). The higher proportion of field crops and horticultural production activities were done by boys and accounts 45% and 40% respectively. Mostly the participation of women and girls to the livelihood resources were high in the livestock production. It accounts 40% and 30% for women and followed by girls respectively (Fig.3). Almost there were no participation of women and girls towards fishery activities and it accounts the same proportion (2%) (Fig.3).

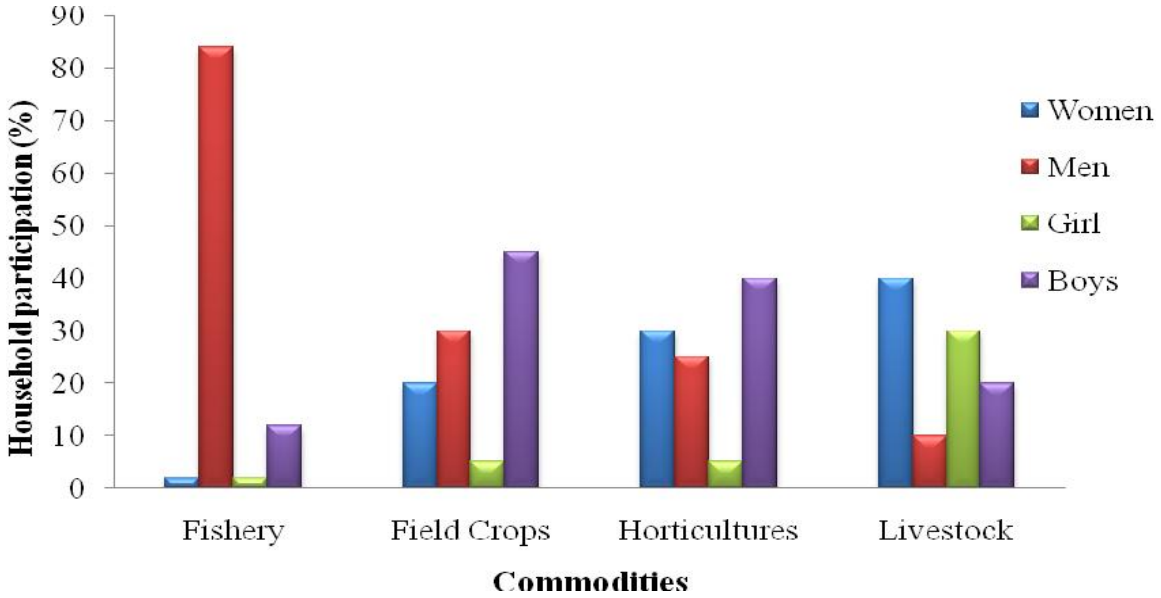

Fig. 3. Participation of household members for the commodities as livelihood resources

In general the result in the study areas women and girls were the ones doing most of the livestock activities (Figure 3) were similar to the study conducted in the area Ada, Boset and Gimbichu. It accounts 60.2% in Boset, 70.38% in Ada and 85.7% in Gimbichu were done by women and Girls (Abera, 2008). Similarly in southern Ethiopia, a high involvement of women in livelihood diversification is observed and cash income from non-farm sources was important particularly for the poor households in order to offset low agricultural incomes (Carswell, 2002).

Conclusions and recommendations

Fishery activity was predominate livelihood source in the study area. Individuals who practiced other farm activities did so as a livelihood supplement to the agricultural proceeds, either for diversification purposes or coping mechanisms for both food security and poverty alleviation. Most fishery communities across the area seemed to have sufficient food for most times of the year, but the protein source (fishes) was highly over exploited and the common foods were predominantly high carbohydrate in nature, a characteristic often associated with poor communities.

Hence, based on the above findings the following recommendations are forwarded: Since, fishery was predominant for household sources for the communities, undesirable condition mainly due to increasing number of gears beyond the capacity of the lake, use of small mesh size gears for juveniles and fishing on the breeding grounds that affect the protein source. Hence, the issue of appropriate management is an urgent need to increase fishery as a source of food,

income and employment. This can be done either by the government or by the fishing communities themselves or by both.

In addition to diversify the income of the fishery community around the area needs to popularize improved technology based on fishermen community priorities for value addition to agricultural products and market issues for better income generations. Further, establishing and strengthening partnerships between the agricultural development sectors and other stakeholders is required to address the identified gaps.

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