

RESEARCH ARTICLE

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Food Insecurity and Coping Strategies of Fishing Communities Living in Lake Victoria, Homa Bay County, Kenya

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Abstract

The fishing communities along the shores of Lake Victoria have developed coping strategies to counter their daily life threatening challenges linked to food insecurity by adopting efficient technologies for food production, distribution, and storage. The study focused on the impacts of food insecurity on the livelihoods of members of the fishing community living on the shores of Lake Victoria, Homa Bay County. The objectives of the study were to investigate factors causing food insecurity and impacts of food insecurity to livelihoods of the fishing communities using descriptive survey research design. A sample population of 399 respondents was utilized and reliability ascertained using Cronbach's alpha coefficient on a pilot study. Data was gathered and analyzed using the Statistical Package for the Social Sciences (SPSS). The findings in multiple-response questionnaire show that major factors causing food insecurity are; climate change (95.6%), unstable fish prices (94.7%), poor fish storage methods (93.0%), rapid population growth (85.0 %), seasonal fishing bans by the government (83.2%) and poverty (76.9%). The impacts of food insecurity on the respondents are; poor health (especially HIV infected), malnutrition and diseases (39.1%), loss of property and (85.2%) and substantial fluctuation in food prices (96.5%). Majority of respondents (96.0%), skipped meals especially lunch; (90.0%) sent their children to work at their neighbors' farms for pay and (50.9%) practiced farming as alternative coping strategy. This paper concludes that, food shortages and inadequate food storage played a critical role in causing food insecurity. It is recommended that the county government puts up a cold storage facility to reduce post-harvest loses and also provide opportunities for alternative sources of livelihood in order to reduce over dependence on fisheries resources.

Key Words: Food Insecurity, Factors, Impacts, Fishing Communities, Lake Victoria

INTRODUCTION

Various countries in Africa have experienced the devastating effects of household food insecurity (Clover, 2003). Adverse changes in marine resources under climate change might pose significant threats to the livelihoods and well-being of the communities and countries that depend on fisheries for food and income (Lam *et al.*, 2012). Belhabib *et al.* (2015) also mentioned that poverty was increasing because of increasing costs and over-exploitation of fisheries resources.

World Food Summit defines food insecurity as the lack of physical and economic access to sufficient, safe and nutritious food to meet the dietary needs and food preferences for an active and healthy life (Pinstrup-Andersen, 2009). On a global scale, one in seven people do not have access to adequate food (Godfray *et al.*, 2010). Every year over 10 million people die of hunger and hunger-related diseases. About six million of these are children under the age of five; that is one child's dies approximately every six seconds

(Gibson, 2012). In February 2009, the government of Kenya announced that 10 million Kenyans were food insecure and declared food insecurity a national emergency (Datta and Njuguna, 2009). Descriptions of childhood trauma and life-changing violence were linked with severe food security (Chilton *et al.*, 2014).

The 2007/2008 United Nations Human Development Report noted that almost 24% of Kenyans are living on less than one dollar a day (Uddan.blogspot.com, 2015), therefore not food sustaining (Banerjee and Duflo, 2007). Homa Bay County is located on the southern shores of Lake Victoria in the former Nyanza Province. The old Homa Bay District was previously ranked as one of the poorest districts in Kenya, with over 70% of its population categorized as living below the poverty line. It was also mentioned as one of the districts with high HIV prevalence at 24%, compared to a national average of 7.8% (Sala-i-Martin, 2006; Datta and Njuguna, 2009). Most of the residents of Homa Bay County rely on fishing for subsistence. Fishing communities are often recognized as being amongst the poorest in developing countries, and interventions targeted at improving resource status is central in the fight against poverty (Mills *et al.*, 2011).

Food security is achieved when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (Clay, 2002). Although Lake Victoria is recorded as the largest lake in Africa (Verschuren *et al.*, 2002), food insecurity is reported to be a major problem particularly for the local fishing communities around the area (Godfray *et al.*, 2010). Homa Bay County is characterized by a rapidly growing population, high population density, falling food production, and little resilience to climate change (Datta and Njuguna, 2009).

Lake Victoria supports an estimated 25 million people living in the Basin, with a projected gross economic product of US\$3–4 billion yearly, mainly from subsistence

agriculture and fishing in Kenya, Uganda, Tanzania, and parts of Rwanda and Burundi (Mailu *et al.*, 2001). Kenya has been facing severe food insecurity problems, in 2008, an estimated 1.3 million people in rural areas and 3.5 – 4 million in urban areas were food insecure (WHO, 2010). The current food insecurity problems are credited to several factors, including the frequent droughts in most parts of the country, high costs of domestic food production due to high costs of inputs especially fertilizer, displacement of a vast number of farmers in the high potential agricultural areas following the post-election violence which occurred in early 2008, high global food prices and low purchasing power for significant proportion of the population due to high level of poverty (FAO, 2015).

Fishing has been an important source of livelihood for many Kenyans for many years (Morara *et al.*, 2015). The roles of men are in fish production and fish processing and marketing role is left for females (Kizito *et al.*, 2017). HIV incidences are highest (26.2%) in the beach communities along Lake Victoria (Camlin *et al.*, 2013) attributed to the fish-for-sex phenomenon in small-scale fisheries (Béné and Merten, 2008). The fisheries policy objectives recognize the role of fish in improving food security locally, but the need to maximize foreign exchange supersedes the interest for domestic food security (Abila, 2000). The industrial and domestic demand for fish has increased pressure on the Lake, leading to unsustainable fishing and rising fears of long-term food insecurity (Abila, 2000).

This study was guided by Maslow's theory of human needs in pinpointing the importance of food as a basic need (Maslow, 1954). The theory implies that food insecurity is often linked directly to poverty and it limits individuals' abilities to meet other needs, such as holding a stable job or paying for housing (Setting the Table for Systemic Change, 2012). The objective of this study was to investigate the factors causing food insecurity and to identify the impacts of food insecurity to the livelihoods of the fishing

community living along the shores of L. Victoria in Homa Bay County, Kenya.

RESEARCH METHODOLOGY

Research Design

This research adopted a descriptive survey research design to sample a population of 399

respondents. The reliability of the research instruments was ascertained using Cronbach's alpha coefficient through a pilot study. Data was gathered and analyzed descriptively then coded and entered in the Statistical Package for the Social Sciences (SPSS).

Study Area

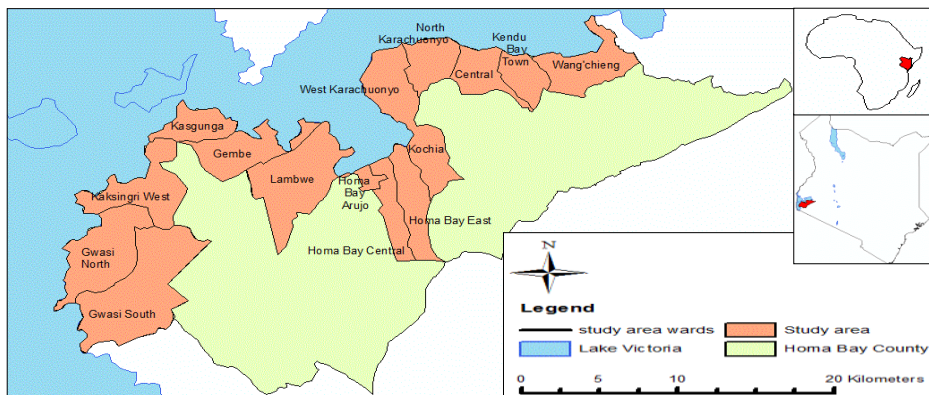


Figure 1. Map Showing the Position of Homa Bay County [Modified from Hansen *et al.* (2013)]

Homa Bay County has an area of 3,154.70 km² and lies at an elevation of about 1195 m. The county has 40 wards, but the ones along the shores of L. Victoria are only 15. These 15 wards formed the study area for this research not only because of their close but also because they are home to the fishing community.

Target Population

The target population of this study was comprised of all the residents of 5 wards out of

the 15 wards along the shores of Lake Victoria. These were the members of the community substantially dependent on or significantly engaged in the harvesting and processing of fishery resources to meet social and economic needs. The total population of the fifteen wards was 354,956 people. Table 1 below shows the population of each of the 15 wards along the shores of L. Victoria in Homa Bay County as documented by (KNBS, 2010).

Table 1. Population of Wards along the Shores of L. Vitoria in Homa Bay County

No.	Name of Ward	Size (km ²)	Total Population
1	Wang'chieng'	95.4	33,336
2	Kendu Bay Town	46	20,371
3	Central Karachuonyo	37.3	13,409
4	North Karachuonyo	58.3	23,614
5	West Karachuonyo	50.2	26,069
6	Kochia	68.9	26,554
7	Homa bay East	69.2	20,858
8	Homa Bay Central	25.9	22,781
9	Homa Bay Arujo	13.3	19,768
10	Lambwe	14.2	22,315
11	Gembe	94.1	19,046
12	Kasungu	74.7	19,653
13	Kaksingri West	104.2	22,021
14	Gwasi North	125.2	30,598
15	Gwasi South	206.9	34,563
Totals		1083.8	354,956

Sample and Sampling Procedure

The researcher used the list of all the names of the fifteen wards within the study area, and then the random number tables as provided for by (Rand.org, 2001) were used to select five out of fifteen wards to participate in the study. The names of the wards were obtained from table 1 above. The random number tables are composed of the digits from zero (0) through nine (9), with an approximately equal frequency of occurrence (Rand.org, 2001). The five wards satisfactorily met the sampling needs for this study (which is 30% of the fifteen wards) as stated by (Mugenda

and Mugenda, 2003). The sample size was obtained using the random numbers tables (Table 1 above), then substituted in the formula for determining sample size (Ellen, 2012).

$$n = N / (1 + N * e^2)$$

Where:

- N = population size
- n = sample size
- e = significance level (0.05)

Therefore:

$$n = 115959 / (1 + 115959 * 0.05^2) = 398.6249 \approx 399$$

Wards Identified from Table of Random Numbers

No.	Ward	Population	Sample size
1	Wang'chieng'	33336	115
2	Gembe	19046	66
3	Kochia	26554	91
4	North Karachuonyo	23614	81
5	Central Karachuonyo	13409	46
Total		115959	399

The table of random numbers was also used to select the respondents within the study area targeting heads of households. Ten (10) stakeholders were purposively selected in the five wards depending on the subject matter and relevance to this study. The total sample size for this study was 399 respondents. 10 experts aided in the scheduled interview. Primary quantitative and quantitative data was collected from the selected respondents using structured questionnaires and key informant interviews. Observations were captured in photographs and document analysis was used to collect secondary data.

To ascertain validity, the questionnaires were peer reviewed to ensure questions reflected the concept of study. The reliability of the questionnaires was determined using the Cronbach's alpha coefficient which considers any value above 0.7 to be an appropriate threshold (Mugenda & Mugenda, 2003). The data collected from the field was extracted and stored in Microsoft Excel. To facilitate the data processing exercise, the data was coded and entered in SPSS. A master codebook was designed to ensure that all the

questionnaires were coded uniformly. The data from the questionnaire was subjected to computation of simple statistics such as frequencies, totals, percentages, tabulations and cross-tabulations and presented in form of tables, graphs and charts.

Demographic Information of the Study Population

145 (36.3%) respondents were female and 254 (63.7%) were male. Out of the 399 respondents 102 (25.6%) were single, 241 (60.4%) married, 15 (3.8%) separated, 7 (1.8%) divorced and 34 (8.5%) widowed. 112 (28.1%) respondents ranged between 18-25 years, 81 (20.3%) 26-30 years, 93 (23.3%) 31-35 years, 55 (13.8%) 36-40 years and 58 (14.5%) above 41 years. 1 (0.3%) was unemployed, 118 (29.6%) farmers, 165 (41.4%) fisher folk, 112 (28.1%) engaged in small businesses while 3 (0.8%) were civil servants. The staple food for 32 (8.0%) respondents was vegetables, 30 (7.5%) was maize while that of 327 (82.0%) respondents was fish. 7 (1.8%), 1 (0.3%) and 2 (0.5%) respondents preferred meat, yam, and rice respectively. Source of staple food for the respondents was farming 70 (17.5%) and

fishing activities 329 (82.5%). 57 (14.3%) were uneducated, 159 (39.8%) had a primary school education only, 168 (42.1%) had a secondary school education, 10 (2.5%) had Diplomas and 5 (1.3%) had a Bachelor's degree.

RESULTS AND DISCUSSIONS

Causes of Food Insecurity

The study investigated the extent to which poverty caused food insecurity within the study area. 76.9% of the respondents 'strongly agreed' and 19.8% 'agreed', however, 3.3% of the respondents were opposed to this opinion. This study is in harmony with the perspectives of World Bank (World Bank, 2008) that poverty greatly causes food insecurity. One in every seven people on a global scale cannot access adequate food (Godfray *et al.*, 2010). 83.2% of respondents attributed the seasonal bans on fishing by the government as a cause of food insecurity (24.8% 'strongly agreed' and 58.4% 'agreed'). However, 16.8% of the respondents were of a contrary opinion (13.0% 'disagreed' and 3.0% 'strongly disagreed' and 0.8% of the sampled population 'didn't know' if the fishing bans had an impact on food security). Fishing communities are often recognized as the poorest in developing nations (Mills *et al.*, 2011). The 2007/08 United Nations Human Development Report illustrates that about 24% of Kenyans are living on less than one dollar a day (Uddan.blogspot.com, 2015). Therefore, the decline in fish stocks significantly contributes to fish unavailability (Abila, 2000). Rapid population growth in the fishing community was cited as a significant cause of food insecurity by 85.0% of the respondents (37.6% 'strongly agreed' and 47.4% 'agreed'). The industrial and domestic demand for fish has amplified fishing pressure on the lake, leading to unsustainable fishing and rising uncertainties of long-term food security (Abila, 2000). Homa Bay County is characterized by a rapidly growing population and a high population density (Datta and Njuguna, 2009, which increases the demand for fish and fishery products leading to overexploitation. Kratch and

Schulz, (1999) also highlighted rapid population growth as one of the causes of food insecurity. High population growth causes household food insecurity (Barrett, 2010). The global population is expected to grow from the present 6.8 billion people to about 9 billion by 2050 (Garcia and Rosenberg, 2010), the impacts of this magnitude of population boom might be catastrophic with regards to food insecurity. Overpopulation is linked to poor fishing methods and food insecurity (Roeger *et al.*, 2016).

The study tested whether or not dependence on one source of food caused food insecurity within the study area. 1 (0.3%) respondent did not know whether dependence on one source of food caused food insecurity, 149 (37.3%) strongly disagree, 148 (37.1%) disagreed, 39 (9.8%) agreed, while 62 (15.5%) strongly agreed to this. On the contrary to findings of this study, Abila (Abila, 2000) associated the limited access to fish with socio-cultural preferences on fish consumption compared to other foods. However, despite efforts to upsurge food production and boost food security, only 18% of Kenya's territory is appropriate for farming (Omamo, 2003). Coastal populations are increasingly relying on fisheries despite the increasing costs (Belhabib *et al.*, 2015). This means that the fishing communities consume fish in particular without minding the high purchase cost. This study was not in agreement with this notion. 95.7% of the respondents considered the effects of climate change as a factor resulting to food insecurity (58.4% 'strongly agreed' while 37.3% 'simply agreed'). The outcome of this study satisfied the theory that Homa Bay County is less resilient to climate change (Datta and Njuguna, 2009). Global warming has a negative impact on agricultural yields, particularly in developing countries (Karfakis *et al.*, 2011). Climate change results in fundamental alterations to ecosystem structures and functions (Hobbs *et al.*, 2009). Such adjustments include food shortages, food insecurity and much more.

Inadequate fish storage methods were attributed by a majority of the respondents as a cause of food insecurity (93.0%). According to the research findings, 94.7% of all the respondents believed that the unstable fish prices caused food insecurity in the wards bordering Lake Victoria (56.6% ‘strongly agreed’ and 38.1% ‘agreed’). This study complimented the work of (Ghaly *et al.*, 2010) who projected that that one-fourth of the world’s food supply and 30% of landed fish are lost through microbial activity alone. They noted that food preservation is necessary for increasing shelf life and upholding nutritional value, texture and flavor. Reduction in fish supply has serious consequences on both the economics and nutrition of a fishing nation (Kent, 1997). Traditional food storage practices in developing countries cannot guarantee protection against pests of staple food crops like maize; local storage structures are dilapidated and ineffective against storage pests (Tefera *et al.*, 2011). Food losses occur in the field, during harvesting, processing and in storage, most farmers lack access to modern methods for harvesting, processing and storage (Abass *et al.*, 2014). Smallholder farmers end up selling their grain shortly after harvest, only to buy it back at a higher price just a few months after harvest, tumbling into a poverty trap (Kumar and Kalita, 2017).

Expansion of the tourism industry leads to an increasing demand of fisheries resources causing the poor, as well as the fishers, to eat less fish and other seafood, and thereby limiting their nutritional protein consumptions (Makame *et al.*, 2015). Kherallah *et al.*, (2002) associates the variation in the standards between markets as a key contributor to the culmination of food insecurity

Impacts of Food Insecurity

A total of 177 (44.4%) of the respondents experienced malnutrition related diseases. 140 (35.1%) out of the 399 respondents knew someone who succumbed to malnutrition. 84 (21.1%) of the 399 respondents had migrated to other areas due to food insecurity. Out of

this number of migrants, 40 (47.6%) had migrated once, 22 (26.2%) twice, 5 (6.0%) thrice and 17 (20.2%) respondents four times or more. Approximately a quarter of children under five years are underweight in Benin (FAO, 2015). The global malnutrition level was 15.0% which portrayed an increase in malnutrition rates globally (WHO, 2004). Children’s meals were reduced in crowded families which also translated to children from such households being underfed in the process food rationing (Ruiz-Castell *et al.*, 2015). 19% of young children in Cameroon were found to be underweight, and infant mortality rate was on a growing rate (Smith *et al.*, 2017). 11 (2.8%) of respondents households faced educational challenges due to food insecurity. Most children of fishermen do not go to school (Rugar *et al.*, 2015). The household greatest priority is money for food or food itself as expressed in the hierarchy of needs (Cherry, 2015) as drafted by (Maslow, 1954). The hierarchy suggested that people were motivated to fulfill basic needs before moving on to other needs (Cherry, 2015). Economic challenges (16.3%), migration (6.3%) and other factors (6.1%) were among other impacts. There is high vulnerability of full-time fisher folk which is identified by mobility as a key factor increasing vulnerability (Béné, 2009). Female fish dealers frequently migrate to beaches (Camlin *et al.*, 2013). 340 (85.2%) of the 399 respondents lost their property as an effect of food insecurity, 385 (96.5%) of these agreed that food insecurity has caused a fluctuation in food prices, therefore Safeguarding global food security for an increasing population remains a major challenge particularly against the background of increasing food prices paired with growing income levels and changing demand patterns in the developing world (Grote, 2014). According to Doss *et al.* (2014), since 2008 a surge in large-scale land grabs were taking place in low- and middle-income countries globally. Tefera *et al.* (2011) pointed out that smallholder farmers ended up selling their grain soon after harvest, only to purchase it back at an expensive amount of money just a few months after

harvest. Both Trostle (2010) and GLICA (2008) proved that the rise in prices of the world staple foods (wheat, rice, and corn) created a threat to food security.

CONCLUSIONS AND RECOMMENDATIONS

The severity/level of food insecurity was moderate. Most households desired to satisfy their need for food before any other thing. This showed that the need for food was superior to other needs within the fishing community. The study recommends the county government to provide a cold storage facility for fisheries products to reduce post-harvest losses due microbial activity. Awareness on the importance of seasonal bans on fishing activities should be created in order to change the perceptions on the role of seasonal bans as a cause of food insecurity. The County Government should encourage the fishers to have alternative sources of livelihood, in order to reduce the over reliance on fisheries resources through provision of grants to local groups.

ACKNOWLEDGEMENT

The authors thank the University of Eldoret for opportunity given to the first author who conducted this study as part of his M.Sc in Human Ecology in 2018.

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