

DYNAMICS OF FISHERS' LIVELIHOODS IN THE WAKE OF DECLINING FISHERIES RESOURCES IN LAKE VICTORIA

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Abstract

This paper explores the diversity of livelihoods to fishing communities in the wake of declined fisheries resources. A total of 246 respondents were involved in a cross-sectional research design whereby interviews, focus group discussions and observations administered in data collection. Findings from the study indicated that unabated dwindling of fish catch transformed people's lives along Lake Victoria basin. In due course community members particularly those residing along shorelines indulged into devising a range of alternative strategies, including investment into heavy and modern fishing outfits, unscrupulous fishing practices, and migration. The dwindling of fish catches and disappearances of the native fish species stood as intriguing reason for life difficulties experienced by fishing communities on islands of Lake Victoria. Of total interviewed fishers in this study, about 91.6% indicated to have already felt difficulties in making a living from fisheries activities. Fishermen indicated to experience much difficulties in making a living from fishing activity compared to other categories of respondents engaged in other fisheries related activities at shore. Since fishing is of free access whereas everyone can access the fishing grounds, it absorbs majority of fishing communities' population. Hence a persistent declined remuneration from fishing activities paralyses livelihood options to majority of inhabitants in fishing communities more

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particularly the fishing dependent communities. Change in fish consumption pattern, fish trade channel, gender division of labour, fishing techniques, and fish processing techniques were the very eminent diversification options undertaken by fishers to counteract the effects of declined fish catches.

Key words: Fishers livelihoods, Lake Victoria, Declined fisheries, Fishing Communities

1.0 Introduction

Lake Victoria, with a total catchment area of 250,000 km² and water surface area of 68,800 km² situated at 1,134 m above sea level is the world's second largest body of fresh water and the largest freshwater lake in Africa (UNEP, 2004; LVBC, 2011). The lake has a maximum depth of 84 metres (276 ft) and an average depth of 20 metres (66 ft) (World Atlas, 2011). The lake receives most of its water from direct precipitation and its largest influent is the Kagera River which drains its water on the lake's western shore (World Atlas, 2011). Lake Victoria is shared by three countries whereby Tanzania occupies 51% of lake surface area while Uganda and Kenya occupy 43% and 6% respectively (FAO, 2002). Other countries such as Burundi and Rwanda although they are not bearing any share of Lake Victoria's water surface area, they are within the upper watershed that drains into the Lake Victoria through river Kagera (Swallow *et al.*, 2003).

In 2011 Lake Victoria Basin Commission (LVBC) estimated about 35 million people (about 30% of the entire population of East Africa) to live and derive their livelihood directly or indirectly from the Lake Victoria basin. Fishing which is the prime livelihood activity for inhabitants, comprises enormous number of individuals including those involved directly with fishing (fishers and fish workers in both pre- and post-harvest activities) and those who buy and trade fish or its products. The prime support of fisheries in Lake Victoria continued to hold a remarkable potential source of making a living especially to communities living along shorelines until in the early 1990s when the lake's fisheries resources came under increased exploitation pressure (Abila, 2000). Subsequently fish stocks declined along with disappearance of native fish species. Currently, fisheries of Lake Victoria is dominated by three major fish species; Nile Perch, Tilapia and Sardine.

In normal circumstances when people get struck with difficulties they tend to develop different mechanisms to arrest the situation. Fishing communities of Lake Victoria are a good example of people's struggle to attain livelihoods in constrained access to natural resources base. According to Ellis (2000) normally in circumstances of resources scarcity, households tend to construct a range of mechanisms to sustain life. The dwindling of fish catches in fishing communities of Lake Victoria has so far prompted households to adjust their livelihood patterns for attaining different outcomes. Historically, apart from supporting fisheries activities Lake Victoria is known as a treasured media supporting millions of people inhabiting the lake basin. The lake stands as a source of hydro-electric power, source of water for domestic use and irrigated agriculture, tourism, recreation and as a repository for human, agricultural and industrial waste (Gichuki, 2003; LVFO, 2011).

Fishery which is the main source of living to multitude of riparian communities encompasses a variety of activities ranging from in-water fish capture to activities undertaken at shoreline and beyond including fish processing, boat and net making/repair, retail and whole sale businesses, plus other ancillary activities. Fishing itself covers enormous number of individuals including those involved directly with fishing (fishers and fish workers in both pre- and post-harvest activities) and those who buy and trade fish or its products. Therefore, the ongoing decline of remuneration from fisheries activities translates menace to large population of inhabitants who depend on fisheries as major means of livelihood. The current unprecedented decline of fisheries resources has triggered concerns not only to fishing communities living along shorelines but even to non-fishing communities living in the outskirts of the lake basin. The falling trends of fish catch yield amid increasing fishing pressure present a clear manifestation of considerable decline of fisheries potential of Lake Victoria. One of remarkable feature is the scarcity of fish which previously stood as part of fishers' daily meal and source of income. With shoreline natives relying on fisheries activities as prime source of livelihoods, the decline of fisheries resources has apparently rendered households thrive in worrisome likely never experienced before in the history of Lake Victoria fisheries. In response to the loss of remuneration from fisheries, fishing dependent communities have indulged into undertaking enormous number of life survival mechanisms

ranging from diversifying fishing activities itself to involvement into onshore and offshore non-fisheries activities.

Apart from acknowledging the vital role of fisheries to surrounding communities and numerous reported the decline of fisheries resources, scanty available literature has inadequately addressed how fishing dependent communities particularly island inhabitants have adjusted livelihood options amid declined fisheries resources. It is under this scenario that three islands in the Lake Victoria (Lukuba, Mazinga and Bwiro found in Muleba District, Musoma District and Ukerewe District respectively) were investigated to disclose information on how fishing communities thrive in the wake of declined fisheries resources.

2.0 Research Methods

Fishing communities in three islands of Lake Victoria Tanzania were surveyed, namely Bwiro Island in Ukerewe District, Mwanza; Mazinga Island in Muleba District, Kagera and Lukuba Island in Musoma Rural District, Mara. Both Islands are inhabited by fishing dependent communities whereas fishing is the main income generating activity. This study adopted a cross-sectional research design whereas data were collected using interviews, focus group discussions and observation methods. A total of 246 randomly selected respondents in different strata were involved in this study. These included fishing crews, fish traders, fish mongers, boat owners, fishnets and machine repairers, and off-shore fish processors. Random selection of fishers was aided by the register of residents which acted as sampling frame provided by village governments in collaboration with BMU offices. Subsequent focus group discussions were organised from different clusters of respondents. By virtue of their positions, key informants were invited for further discussion to clarify some issues. The structured questionnaire was the main tool for data collection because of its versatility in covering a wide range of issues whereas both open ended and close ended questions were administered. Several modalities for conducting interviews were designed to suit the respondents' availability. For example, fishers' interviews were conducted at their dwellings while for respondents working in off-shore fishery activities the interviews were conducted at their work places. The appropriate time for interviews was scheduled to favour each category of intended respondents. Interviews to fishermen were conducted during their resting hours

while to respondents in off-shore fishery activities were conducted during working hours.

At times where contradictory information was identified during personal interview, a focus group discussion refuted such differences whereby individuals in groups argued and finally a consensus reached. A total of 90 focus group discussions were conducted and separate groups were formed for different category of individuals meant to solicit information that generally had a bearing on that particular group.

Several issues which at first seemed difficult to comprehend and disclosed during formal interviews, were revealed during observation. For example, while it was difficult for fishers to admit for the involvement in illegal fishing, juvenile Nile Perch fish which were observable along several landing sites either in raw or processed forms, and this confirmed the prevalence of illegal fishing practices. According to Axinn and Pearce (2006) observation has the advantage of being able to allow researchers to put themselves into the shoes of respondents, and this allows them to observe a situation as it happens.

The collected data were processed prior to analysis. Data processing was done sequentially, and involved cleaning, sorting, coding and finally entering into SPSS spread sheet version 19.0 ready for analysis. Information from focus group discussions and other qualitative information were coded whereby it involved defining qualitative information into categorical values before being subjected to descriptive analysis where measures such as frequencies and percentages were computed. Quantitative information was analysed using descriptive statistics whereas measures such as percentage, mean, maximum and minimum values were computed. In some circumstances cross tabulations analysis were run to establish associations between and among variables using a Pearson Chi-square analysis.

3.0 Results and Discussion

Since fishing is of free access whereas everyone can access the fishing grounds, it absorbs majority of fishing communities' population. Hence a persistent declined remuneration from fishing activities have tended to paralyse livelihood options to majority of inhabitants in fishing communities more particularly the fishing dependent communities. The loss of

remuneration from fisheries activities have exerted life difficulties experienced by majority in the riparian communities. In due course, change in fish consumption pattern, fish trade channel, gender division of labour, fishing techniques, and fish processing techniques were identified in this study to have diversified in the wake of declined fisheries resources.

3.1 Fish Consumption Pattern

One of remarkably accounted effect of declined fish catch yield is the lack of fish in people's menu. Findings from this study revealed that escalated demand of the three major fished species (Nile Perch, Sardine, Tilapia) uncompromised with community's fish requirements. It was observed that as the demand of Nile Perch for export escalated, inadequacy of fish to people's menu took a heavy toll not only to fishing communities but also to non-fishing communities living along Lake Victoria basin. However, much relief to the local communities have emerged following the resurgence of other fish species. This includes haplochromines species previously declared extinct or completely disappeared in catches. This is due to decline stock of the predator (Nile Perch) in the lake. About 26.3% of total respondents cited the decline of Nile Perch as a major factor contributing for the re-appearance of several species endemic to the lake which were once important sources of food and livelihood for the fishing communities.

About 86% of respondents accounted that by early 2000s they had already felt shortages of fish and it was apparent that people were no longer able to get enough fish as part of meal. This is contrary to years before 1980s where artisanal fishery in Lake Victoria was characterized by abundance of several endemic fish species easily accessed by community members. Historically fishing communities depended on fish catches in exchange for income and other valuable items as well as part of food in diet. Many reasons can be articulated but apparently the commercialization of fish and fish supplies made many previous protein sources from the lake unavailable for local consumption.

Table 1: Frequency of Fish and Vegetable consumption in the study area (%)

Consumption frequency	Sardine	Nile Perch (fresh)	Nile Perch (reject/ juvenile)	Tilapia	Vegetables
Not at all	39.0	42.3	12.2	40.7	28.0
Occasionally	30.5	30.1	30.1	30.1	30.1
Frequently	30.5	27.6	57.7	29.3	41.9
Total	100	100	100	100	100

Source: Computed From Field Data (2012).

Findings of this study suggested that with escalated decline of fish, people have turned into eating the previously regarded inferior fish such as Sardine. Formerly Sardine was labelled as a "poor man's food", hence eating Sardine was associated with disrespect to families of fishermen. During this study it was realised that Sardine has become the most affordable fish and source of protein especially to many low income families in the study area. However, despite its affordability, the consumption of Sardine was still fairly low as compared to vegetables and juvenile Nile Perch (Table 1). This is due to escalated demands of Sardine to animal feed manufacturing companies. Staple and Smith (2007) showed that a significant proportion of Sardine was then going into making fish meals exerting competition to low income families who could not afford even the rejected and/or juvenile Nile Perch. The consumption of vegetables and juvenile or reject Nile Perch in the study area gained popularity with the frequent consumption of tilapia, while fresh or large size Nile Perch declined subsequently. The decline of fish catch was also clearly manifested in fish per capita whereas about 72.0 % of respondents in this study indicated to have opted into taking vegetables as an alternative for fish which became a scarce commodity not afforded by majority of households (Table 1). In similar account, Abila (2003) noted that the per capita fish supply along Lake Victoria basin has declined in all three countries in the last decade, with a faster rate of decrease being observed in Tanzania and Uganda.

3.2 Modified Fishing Techniques

Different mechanisms have been devised by fishers in Lake Victoria as response to dwindling fish catches. About 76% of fishers engaged in fish capture testified to have modified their

fishing gears by widening size of fishing nets to trap fish in either direction even in deep waters, while 18% testified to have diversified by investing in outboard engine which enabled them travel far away in search of fish, and easily reach market places. Although few respondents did not like to disclose their identity, they pointed out to have remained in fishing by adopting unscrupulous fishing practices including use of fishing gears declared as illegal, fishing in prohibited areas, and stealing other fisher's property as a way of compensating for their lost property.

Other fishers indicated to have adopted the migration and frequent mobility from one beach to another in search of favourable area for fisheries activities (high fish catch, conducive climatic condition, security and safety, and access to reliable market). In extreme cases, fishers who previously owned fishing gears indicated to have sold or abandoned them and resorted into working as crews or labourers into other fishers' vessels. Un-afforded running cost by fishers seemed to be the commonest reason as to why some fishers decided to work as crews or labourers. Following the dwindling catch of larger sized Nile Perch, fishers indicated to have resorted into targeting the smaller sized Nile Perch that are caught using un-recommended smaller sized mesh nets. Principally fishers are required by set fishing laws and regulations to use a 5 inch mesh sized gillnets or above to capture fish that are within recommended sizes (LVFO, 2006). According to the frame survey report of year 2000, use of large gillnets (7"-10") declined considerably while small mesh gillnets of between 3" to 5" increased tremendously. The noted increase use of smaller sized fish net seemed to have been accelerated the high demands of Nile Perch by both local markets and filleting companies.

The noted ongoing dwindling fish catches in Lake Victoria, menaced surrounding communities and more implications became more eminent to fishing communities residing on habitable islands. Emergence of immoral conducts (Table 2) such as increased cases of armed robberies and theft, piracy, commercial sex work, marriage conflicts, were identified by 77.2% of the respondents to have occurred due to the decline of fish catch and subsequent declined fishers' income.

Table 2: Types of Immoral Acts Purportedly Emerged in the Wake of Declined Fish catch (%)

Types of Immoral Acts	Bwiro (n=82)	Lukuba (n=82)	Mazinga (n=82)	Total (N=246)
Emergence of commercial sex workers	45.2	72.7	50.0	56.3
Dissolution of marriages	4.8	1.5	3.2	3.2
Illegal fishing practices	37.1	21.3	35.5	31.0
Robberies	12.9	4.5	11.3	9.5
Total	100	100	100	100

Source: Computed from Field Data (2012).

3.3 Pattern of Fishing Activities

The decline of fisheries resources in Lake Victoria not only shrunk people's earning prospects but also transformed the fishing patterns. Findings from this study revealed that fish capture activities have changed from using traditional fishing gears to use of modern and heavy fishing outfits. Traditionally the commonly used fishing gears during artisanal fishery included traps, baskets and papyrus threads. The emergence of commercial fishery prompted fishers into using modern and heavy fishing outfit to maximise catch yield. Other substantial changes which were noted by respondents in this study is the establishment of several new landings sites which acted as settlements for fishers. Several areas along shorelines were converted to landing sites where fishing camps were also established. In a study conducted in 2000 by LVFO to determine level of fishing efforts, it reported the presence of 1,493 landing sites along the 3,450 km lake shoreline, which is equivalent to one landing site in every 2.3 km of shoreline (LVFO, 2001).

Respondents disclosed that the establishment of Nile Perch fishery to fishing communities did not only lead to decline of catch of native fish species but it also led to technical change in the fishing methods and gears. The latter was reported to have escalated by high price offered by fish processing factories to Nile Perch catches. Fishers mentioned that from Nile Perch fishery, a number of products which emerged as result of Nile Perch fishery that were not there before. These include Nile Perch fillets, maws, trimmings, fats, cheeks, frames and

wastes. Figure 1, 2, 3, 4 and 5 show various Nile Perch products photographed during this study at MwaloniKirumba Fish Market, Mwanza.



Figure 1: Nile Perch Skeletons



Figure 2: Nile Perch Fins



Figure 2: Nile Perch Heads



Figure 4: Nile Perch Red Fillets



Figure 3: Nile Perch Oil Extraction

Following the increased demand for fish especially the most traded Nile Perch, fishers in landing sites asserted to devise preservation mechanisms of prolonging fish shelf life before arriving at the intended destination. This shows the necessity of prolonging fish shelf life because of its perishability. A report of FAO (2005) indicates that fish is one of the most perishable products which necessitate immediate processing once it arrives at landing site.

3.4 Fish Trade Channels

Two trade channels were observed during this study for all traded fish species, namely, Nile Perch, Sardine and Tilapia. One route is intended to feed local markets while the other route fed fish processing factories. The local market route comprised of fishers mostly boat crews who either handed over fish to boat owners or sold them directly to consumers or fishmongers/local traders who took the fish to nearby or distant markets. In this route fish may also fall under traditional processors where they are either smoked, sun dried, deep fried, or salted before they reach the consumers at local markets. It was in the processing section where most women were found though a number of men in this section outpaced that of women.

During focus group discussion at Bwiro Island women affirmed that the then dominance of men in fish processing was due to high remuneration earned from such off-shore fishery activities. Elder women narrated further that during artisanal fishery fish processing was considered inferior and mostly undertaken by wives of fishers or their daughters. A similar historical account was noted in all three islands. During artisanal fishery women handled fish processing activities whereby on arrival of boats to shore with catch, women would be there to receive the catch and handle it in respect to distribution and trading. Some men who participated in focus group discussions at the island verified the past involvement of women in offshore activities affiliated with fisheries.

The second fish trade channel mainly comprised of Nile Perch and its pre-cuts. Once Nile Perch arrived at landing site were sold to the factory agent where they were sorted, cleaned, weighed and then deep frozen into containers ready for transportation to the factory using out

board motor engine commonly known as containers. Figure 6 shows two parked large outboard motorised engine boats waiting for Nile Perch supplies.



Figure 6: Outboard Engine Container Carrying Refrigerated Nile Perch

Source: Field Survey Observation (2012).

3.5 Fishing Techniques and Gears

The intensified trade in fish especially of Sardine and Nile Perch plus its products has caused fishers to invest more in improved and modern fishing gears to maximize fishing efforts. However, despite huge fishing efforts exercised, low fish catch has continued to be realized. Consequently, fishers in this study tended to invest more in fishing outfits such as engines and powerful boats, changes in the mode of fishing gears operations, travelling long distance from their landing sites in search of better fish catch. Despite such fishing efforts, about 76.4% of fishers who invested in huge outfits continued to experience limited catch of Nile Perch. Subsequently some fishers have turned into fishing of fish species that were previously proclaimed to have disappeared in catch, and now re-emerging. Gillnets, trawls, long lines, and small mesh size nets have remained the basic fishing gears used by most fishers in the study area who mostly have targeted the three dominant fish species, that is Nile Perch, Tilapia and Sardine.

Although all three countries sharing Lake Victoria have agreed on the control and prevention of illegal fishing (LVBC, 2011), the use of illegal fishing gears has prevailed in the study area as it was disclosed by fishers during focus group discussions. In February 2009, the Council of Ministers of Lake Victoria riparian countries approved the zero tolerance measure to wipe out

the use of illegal gears to a minimum of 50% by June 2009 and 100% by December 2009 (URT, 2013). Despite the above convention, use of illegal gears (Table 3) such as beach seines, undersized gillnets, monofilament nets, cast nets and traps or baskets were still prevalent at different beaches surveyed although with different magnitudes.

Table 3: Trend of Illegal Fishing Gears Targeting Nile Perch on Lake Victoria

Gear Description	2008	2010
Traps/baskets	604	928
Cast net	43	44
Long line hooks	4,137,774	4,160,618
Beach seines	1,776	1,301
Monofilament	4,801	2,905
Gillnet less than 5'	87,579	44,843

Source: LVFO Frame Survey 2008 and 2010.

Table 3 shows that while there was a decrease in the use of some illegal gears (beach seines, monofilaments, gillnets < 5') during 2008-2010 there was also an increase in the use of trap baskets, cast nets and long line hooks which indicated a persistent use of traditional fishing gears. About 62% of fishers asserted that the continual use of illegal fishing practices was due to dwindling fish catch which prompted fishers to indulge into unscrupulous fishing practices to suffice market demands. About 42.8% of fishers blamed the governments for exercising little efforts in curbing illegal fishing. These complaints might be due to the fact that most of illegal fishing gears originated from manufacturing industries, therefore the government was to be blamed for not preventing its manufacture.

Other fishers defended the continual use of illegal fishing gears because of inadequate supply of netting materials produced by domestic manufacturing plants which has led to influx use of imported nets although they came at a high price. Robinson (1984) indicated that alternative supplies of manufactured gears were not available due to import restrictions imposed in countries sharing Lake Victoria and because of these constraints artisanal operators resorted to other materials to meet their needs.

3.6 Transformed Gender Division of Labour in fisheries

The fisheries of Lake Victoria continued to be highly characterized by majority of men dominating fish capture activities while minority of women occupied post-harvest activities. Table 4 present results on the then state of gender participation in fisheries in the study area. Majority (76.5%) of women who participated in this study, confirmed to be employed in onshore fish processing, and about 5.9% involved in fish trading mostly as fishmongers, whereas 17.6% worked as porters offloading fish from vessel. This showed that although women engaged in a diverse range of offshore fisheries activities, but fish trading and unloading fish from vessel were only undertaken by women at Lukuba Island and Bwiro Island respectively. This is due to the geographical location of the two islands whereby Lukuba and Bwiro islands are located very close to mainland areas which readily enables some women commuting for fish trading and offloading. This was much evidenced at Bwiro Island where some women fish traders were regularly observed boarding boat transport in the evening returning to their home places in mainland areas.

Women fishers reported to be underprivileged compared to their men counterparts occupying fisheries activities that were formerly undertaken by women. This is due to the fact that following an increased export demand for Nile Perch, women's role in fish processing and other post-harvest activities were immediately occupied by fishermen and/or male fish agents. For example, in one of the focus group discussions women at Lukuba Island revealed that most of fish processing activities (fish smoking, deep frying) and marketing around lake shores were formerly undertaken by women until the late 1990s.

Table 4: Gender Participation into Fisheries Activities in the studied islands

Gender	Fisheries activities undertaken by Gender	Bwiro (n=82)	Lukuba (n=82)	Mazinga (n=82)	Total (N=246)
Males (n=229)	In-water fish capture	74.7	67.9	81.6	74.7
	Offloading fish from vessel	4.0	5.1	0	3.1
	Fish trading	2.7	7.7	1.3	3.9

	Fish processing	9.3	15.4	10.5	11.8
	Boat and Net repairing	9.3	3.8	6.6	6.6
	Total	100	100	100	100
Females (n=17)	Offloading fish from vessel	42.9	0	0	17.6
	Fish trading	0	25.0	0	5.9
	Fish processing	57.1	75.0	100.0	76.5
	Total	100	100	100	100

Source: Computed from Field Data (2012).

During this study it was indicated that much of the Nile Perch once offloaded from fishing boats went directly to the weighing fleets where they were loaded into refrigerated trucks or boats, and all these activities were undertaken by men. This shows how improved fish preservation technologies pushed women further from the fishery sector.

During artisanal fishery majority of men considered involvement into fish capture as a status symbol while it was regarded inappropriate for women to undertake. Though men extended working spheres still they dominated in fish capture activities as fishing crews, fishing gear repairers, transporters and traders. Wives and or partners of fishermen living at fishing camps were observed to be involved much in supporting activities conducted at the beaches. Such women were the majority identified in this study to be involved in running restaurants, groceries, kiosk, and other household chores undertaken at beaches. This shows that due to hardship experienced in fisheries activities, many women tended to engage into a diverse range of both fisheries and non-fisheries activities including fish trading to distant markets, owning fishing gears and vessels.

Apart from a list of women enrolled during this study, other women were observed at beaches working in activities ranging from domestic chores in their partners' homesteads, and others worked as cooks, and shop keepers. Leendertse (1990) observed that early before the late 1980's women were being increasingly marginalized in the fishery industry occupying the

smaller scale and less remunerative processing of traditional species while the newer technologies associated with the Nile Perch were dominated by men.

A remarkable difference was also noted on type of household's women came from whereas women from female headed households showed to experience much freedom of engagement into various fishery activities undertaken at the beaches as compared to women from male headed households. This shows how the patriarchal system still played a role in women involvement into fisheries activities. Findings of this study showed that women have been involved in non-fisheries activities including participation in locally-based credit schemes. At Bwiro Island women were found to be good in cooperating and supporting each other in a rotating micro-credit scheme locally named "*fagilia*". This was a kind of a rotational saving and credit scheme whereby each woman saved a certain amount of money per week to a pot which was emptied in every month to a group member until the rotation revolves. Through such kind of contributions, it was evidenced that some women were able to buy fishing gears and fulfil other family obligations at the expense of such money.

4.0 Conclusion and Recommendations

The ongoing decline of fish catch exerted by escalated fishing pressure translate into life difficulties never experienced by inhabitants in the Lake Victoria's fishery history. The re-appearance of native fish species formally declared to have disappeared in catch, thought to exert much relief on communities' access to fish. But instead, the ongoing replenishment management measures for fisheries resources have denied poor fishing communities access to fish. Since fishing activity is the main source of living to majority of lake basin dwellers, the persistent lack of fish to peoples' menu and as source of income, renders to jeopardized livelihoods. Therefore, measures such as establishment of other income generating activities such as aquaculture and farming should be given precedence over other options. These measures will apparently reduce fishing pressure and allow rejuvenation of Lake Victoria's fishery ecology and eventually replenish stock of fisheries resources.

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