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# SUSTAINABLE COMMUNITIES AND NUTRITION CONCERNS IN HOMA BAY, KENYA

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All characters, organizations, and plots described within the case are fictional and bear no direct reflection to existing organizations or individuals. The case topic, however, is a true representation of circumstances in Kenya. The case scenario is complex and does not necessarily have a correct or perfect solution, and thus encourages a judicious balance of creative yet perceptive approaches.

The authors have provided informative facts and figures within the case to help teams. The data provided are derived from independent sources, may have been adapted for use in this case, and are clearly cited such that teams can verify or contest the findings within their recommendations, if it is pertinent to do so. Teams are responsible for justifying the accuracy and validity of all data and calculations that are used in their presentations, as well as defending their assertions in front of a panel of knowledgeable judges representing different stakeholders.

The information and data given in the following text is meant as a suggestive guide but is not considered all-inclusive. Teams may choose any area(s) of approach that they deem impactful and feasible.

## **NARRATIVE**

Jomo is a father living in Homa Bay, Kenya with his wife, Lupita, and their four school-aged children. Jomo's parents moved from Nakuru, Kenya to Homa Bay Town on the Lake Victoria shoreline to participate in the booming fishing industry. Jomo, along with Lupita, now run his parents' fishing business. At its peak, their fishing business had 35 boats allowing his parents to put him and his siblings through school while also continually putting food on the table. However, depletion of fish due to climate change and water pollution, smaller fish size, and the competition from large scale fishing operations, has reduced their boat number to only eight which has hurt their profits immensely.

Jomo and Lupita now experience many facets of food insecurity. They often skip lunch so there will be enough food for their children at each meal and have sent their oldest child to work at a family friend's farm to make more money. Meals contain considerably less fish compared to when Jomo and Lupita were younger and rarely include dietary options to replace the lost protein. However, Jomo will keep undersized fish that he catches to ensure his family still is able to keep fish in their diets and to have fish when guests are present as is customary in local culture.

In recent years, Lupita has become increasingly worried that Jomo will engage in a Jaboya relationship, like many of her friend's husbands, and trade the preferred fish to the women who offer money and sex. Lupita is especially worried about her husband doing this as it could increase his likeliness of being exposed to sexually transmitted infections (STIs). She has seen the devastating effects that HIV/AIDS can have on a family.

Lupita sees how entangled the issues of fish depletion, lack of resources and opportunities for locals, food insecurity, gender-based issues, HIV/AIDS, climate change, water quality deterioration, and more are. Rather than only focusing on individual short-term gains, Lupita would like to approach a local company with a larger proposal that would change the food system in a greater way leading to positive, equitable, and sustainable change for her and her community in the short- and long-term future.

## **BACKGROUND INFORMATION ON LAKE VICTORIA BASIN**

The Lake Victoria Basin, the largest freshwater lake in Africa (2), is surrounded by Kenya, Tanzania, and Uganda (1). These three countries share the lake shoreline, with Kenya making up 6% of the shoreline, Uganda making up 43% of the shoreline, and Tanzania making up 51% of the shoreline. However, six countries share the basin: Kenya, Tanzania, Uganda, Burundi, Democratic Republic of Congo, and Rwanda (1). The lake supports agriculture, aquaculture, tourism, and domestic water supply, while also providing goods, like fish, to about 45 million inhabitants (1,2).

The basin has a catchment area of about 194,200 km<sup>2</sup> that encompasses five East African Countries including Burundi (7%), Rwanda (11%), Uganda (16%), Kenya (22%), and Tanzania (44%) (2). More than 80% of the lake's water comes from precipitation while the other roughly 20% comes from rivers (2). The average annual precipitation over the sub-basin is 1368mm and the average annual potential evapotranspiration is 1486mm (1).

## **BACKGROUND ON HOMA BAY, KENYA**

Homa Bay County is home to around 1.3 million people and spans roughly 3,183.3 sq km (6) along the southern shores of the Lake Victoria Basin. The land was inhabited by the Luo community, known for their agricultural and fishing practices, during the colonial era. The region underwent immense change during the colonial period, most notable, the introduction of the concept of cash crops by the British. (6). Since Kenya gained independence in 1963, many initiatives and investments have been made to improve infrastructure, the agricultural sector, the economy, healthcare, and fishing resources in Homa Bay County (6). In Homa Bay County, 15 of the 40 wards are along the shores of Lake Victoria (7).

In 2018, Homa Bay County's poverty level was 48% compared to the national poverty indicator at 45% (5). Around 57% of Homa Bay County households have access to drinking water compared to 68% of households in Kenya and 27% of Homa Bay County households have basic sanitation services whereas 41% of all households in Kenya do (5). Additionally, only 5% of Homa Bay County households compared to 21% of all households in Kenya utilize clean fuels for lighting, heating, and cooking (5).

The neonatal mortality rate is 32 compared to 21 deaths per 1,000 live births in Homa Bay County versus Kenya (5). The infant mortality rate is 42 compared to 32 deaths per 1,000 live births in Homa Bay County versus Kenya (5). The under-five mortality rate is 61 compared to 41 deaths per 1,000 live births in Homa Bay County versus Kenya (5).

## **SUMMARY OF THE ISSUE**

**Declining Supply.** In Sub-Saharan Africa, fish supply per capita has been declining for the past two decades. Declining harvests of freshwater fish, an increase in fish exports, and Lake Victoria population growth have caused a surge in the demand for fish that cannot be met through traditional fishing methods. Under consumption has been exacerbated by the increased global export of Nile Perch, which has siphoned away fish from local markets. Recent estimates put Kenya's per capita fish consumption at 4.7 kg per year, while current demand indicates consumption could be up to 10 kg per year if there was a steady supply of fish (9). The general situation is that Lake Victoria, like any other lake in Sub-Saharan Africa, has a depleted fish stock and this has significantly affected the access to dietary protein by the community living around the lake region.

**Fishing Supply Chains.** The supply chains for wild caught Lake Victoria fish have two major pathways - one for domestic consumption and one for exports. Cage fish farming is increasing and requires different distribution channels.

Within the domestic supply chain, Fishermen first land their catch at local beaches or small ports around Lake Victoria. Fish are then sold to the local auction house or to fish traders. Jaboya transactions often occur at this point with boat owners and fishermen but can also occur at later stages of the supply chain. Next, fish is sold via local auction houses and distributed using trucks, motorbikes, and headloading (a load carried on the head). Dagaa and tilapia move through domestic wholesale and retail channels to

local markets and street food vendors. High post-harvest losses estimated at 30-40%, happen along the chain due to lack of storage and transport infrastructure (21).

In the export supply chain, commercial trawlers and processors first aggregate Nile perch catches for delivery to export factories. Four large plants (Kencoco, Vic Fish, Alpha Fish, and Lake Bounty) dominate processing of headed & gutted or filleted frozen products (23). Products are then exported globally with key markets being Europe (54% of exports), the Middle East, and Asia. This pathway requires significant infrastructure for cold storage, frozen transport to meet international food standards (22).

Cage fish farming in Lake Victoria is an emerging component of Kenya's supply chains. Cage culture involves raising tilapia or catfish held in floating cages or pens in offshore areas of the lake. This lowers risks of predators and territory fights compared to mainland pond culture. In Kenya, over 2,000 cage fish farms now operate, clustered in the Mbita sub-county of Homa Bay (24). The farms are predominantly small-scale, managed by local youth and farmer groups. Tilapia production reached about 6,400 metric tons per year by 2020, though growth has been slowed by feed costs and technical issues (23). Cage farm production still only accounts for less than 5% of total fisheries volume from Lake Victoria (27). Some are sold directly to fish traders, but the fish is primarily marketed for domestic consumption in local towns or the city of Kisumu via trucking (28).

Overall, domestic channels rely on informal local trade networks with limitations in infrastructure, while exports center on major processors handling large-scale trade of frozen products. Both face sustainability issues and economic inequality challenges in distributing income along each chain.

**Cultural Implications.** Fish are incredibly important in the culture of those living in the Lake Victoria Basin. Many see serving fish at meals as a way of showing appreciation to guests. With the local community holding a deep attachment to the lake, they also are aware of the dependency that money circulation and income has on the fish market and see fish markets as a means of survival (8). Additionally, fish is still regarded as the main source of protein (9). In addition, increased fish consumption is pushed by the Kenyan government as they plan to prioritize fisheries as a means to economic growth (9).

**Impact on Health.** In addition to the scarcity of fish, many of those living in the Lake Victoria Basin also experience food insecurity due to crop failures, livestock deaths, and diminished milk production (11). In the early 1980s, the catch from Lake Victoria was estimated at over 300,000 tons annually, with a per capita fish supply of over 30kg per year for lakeshore populations (19). In 2022, fish consumption per person was at only about 3 kg per year, just 10% of peak levels in the 1980s (20).

In the Homa Bay area, the diet predominantly consists of staple starchy foods, complemented by green vegetables and oil. This dietary pattern is reflective of broader trends in low- and middle-income countries in sub-Saharan Africa where diets are typically high in starchy foods but low in animal proteins, fruits, and vegetables. A study in nearby Kisumu among children aged two years revealed significant nutritional challenges: 23% were underweight, 30% overweight, and there were high rates of

insufficient carbohydrate consumption and iron deficiency. This situation underscores issues like underweight prevalence, rising non-communicable diseases, and micronutrient malnutrition in the region. Malnutrition significantly impacts the immune system as well leading to increased susceptibility to disease having an even greater effect on overall health (26).

**Pollution and Climate Change.** Fish depletion has occurred for decades due to water quality deterioration, climate change, upstream factors, and overfishing. Many factors are contributing to water quality deterioration in the Lake Victoria Basin, including untreated effluents and wastewater from industries, urban areas, and informal settlements that are discharged into the basin and agricultural and land management practices that are unsustainable (3). The rivers feeding Lake Victoria pass through farming regions where agro-pesticides and fertilizers are used in large quantities to increase yields of produce such as coffee and tea (13). These agricultural fertilizers and chemicals have encouraged the growth of the fast-spreading water hyacinth which now covers about 5% of the lake's surface in Kenya (13). As a result, there has been a depletion in fish stock and biodiversity, and an increase in turbidity, zones that lack oxygen, the cost of treating water for domestic use, invasive plant species hindering navigation and power generation, and infant exposure to pathogens that can lead to stunted development (3).

## **COMPLICATING FACTORS**

**Gender Based Issues:** Men typically fish, but women make up 90% of fish traders (4). As fish have depleted, Jaboya culture has increased (4). Jaboya relationships involve transactional sex that provides women with access to fish and/or the preferred fish from the fishermen (4). Women usually are still paying for fish and add sex to the offer to make it more competitive (4). Jaboya relationships have exacerbated HIV/AIDS risks around Lake Victoria in Kenya.

### **Some key aspects:**

- Over 25% of fish traders report being in jaboya relationships. Condom usage is low, with estimates varying from 6-37%, increasing HIV risk (14, 15).
- Jaboya and high mobility of fishermen has contributed to an HIV prevalence of 27% around Lake Victoria, nearly three times the national average (18). Fishing communities show 50-60% higher rates of HIV than the general population (17).
- Besides exposure to HIV infection, reproductive health impacts include unintended pregnancies, unsafe abortions, high maternal morbidity/mortality ratios, and potential violence/abuse of women in transactional sexual relationships (14).
- Stigma and lack of anonymity undermines disclosure of HIV status among fisherfolk. Less than 50% disclose their status, more so if people lack a steady partner or income, limiting their access to health services (16).

In summary, jaboya relationships arising from women's weak socioeconomic status have had severe public health consequences due to intersecting issues of gender inequality, poverty, stigma, lack of health service access and information.

As of 2022, 55% of women aged 15-49 who had ever been married or had an intimate partner had experienced physical, sexual, or psychological/emotional violence committed by their most recent husband/partner with 40% experiencing this in the last 12 months (5).

**Economic Impact:** The economy in Homa Bay is dependent on the fishing industry. In 2017, the aquaculture and fisheries sector employed over 500,000 people and supported over 2 million people while also contributing 0.8% to Kenya's Gross Domestic Product (12).

Additional complexities of the economics and structure of the fishing industry in Lake Victoria contribute to fish depletion and prevent fish from being easily available to locals for income and food purposes. First, there is high fragmentation of the fishing sector resulting in many job roles such as the fish traders and cooling van drivers. The number of individuals who handle the fish between catching and selling at market means each person must take their share of the profits, contributing to the inflated price of fish (29, 4). Second, locals face challenges when it comes to accessing resources and gaining opportunities. For locals, this commonly looks like exclusion from lake activities from large scale fish farms and limited financial support for alternative fishing sources such as aquaculture (cage fishing) (8, 29). While cage fishing is typically profitable, it usually has expensive start-up costs due to the price of fish seed and feeds which can be out of reach for locals (10).

The decline in family incomes has led some young women migrating to energy-rich countries of the gulf region to work as domestic servants. While this provides opportunities to send money back to the family in Kenya, there have been reports of poor treatment of workers. Kenya banned private recruitment agencies from sending any domestic workers to six Gulf countries from 2014 to 2017. Now an agreement requires pre-departure training before migrating. Not all of the problems have been resolved by this though. Kenya's Ministry of Foreign Affairs recommended a temporary halt to recruitment to Saudi Arabia in September of 2021 with the reports of the deaths for 41 Kenyans so far that year (13).

## **CONCLUSION**

A local organization is looking for proposals to improve the health and food system of those in the Lake Victoria Basin. With the overall goal of improving the health of the local communities living in Homa Bay, Kenya, your task is to create an equitable and sustainable intervention proposal addressing issues in the food system that impact health in the Homa Bay population.

The proposed intervention should focus on short- and long-term solutions that empower and incorporate the local community while also considering the health of the community system. Proposed solutions should not completely disenfranchise those that depend on the current fish industry system. The local organization is open to alternative protein sources, but the intervention proposal should address the availability and affordability of fish. The intervention proposal should also include elements that address the issue from a food systems-level perspective. A rough budget with at least one funding source identified must be included in the proposal.

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