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SOCIO-ECONOMIC CONSEQUENCES OF IMPORTED FROZEN TILAPIA IN THE KENYAN AQUACULTURE VALUE CHAIN: STRATEGIES FOR OPTIMIZING LOCAL UNEXPLOITED POTENTIAL

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ABSTRACT

Capture fisheries production sector, which is the main source of consumed fish in Kenya has been declining over the years, causing huge deficit in fish supply in local market. Even though aquaculture has been fronted as a step-gap measure, there are still eminent fish supply gaps, prompting importation of frozen tilapia, mainly from China. However, the imported fish has attracted numerous socio-economic debates between proponents and opponents of fish imports, almost in equal measure. This study investigated the socio-economic consequences of the imported tilapia in the local fish market and value chain linkages in Kisumu County. Primary data were collected using direct interviews with pre-set questionnaires fed into Open Data Kit (ODK) platform, and observations from 60 randomly selected fishermen and 60 fish farmers, 100 fish traders and 96 households. Key Informant Interviews (KII) and Focused Group Discussions (FGDs) were also conducted. About 57% of the respondents processed and traded on the imported frozen tilapia, 27% of them traded on fish from capture fisheries, while 16 % traded on fish from the local aquaculture sector. Imported tilapia was the cheapest at Ksh. 200/kg compared to the locally produced tilapia at Ksh. 320/kg. At least 62 % of the households in Kisumu consumed imported tilapia regularly due to lower prices and availability. About 46 % of the respondents have gained direct employment and experienced improved socio-economic status due to the imported fish, of which 71 % are youth and women. However, about 40% of the respondents reported multiple job losses and degraded socio-economic status due to poor market for the locally produced tilapia, whether from the capture or culture sector. The study concluded that the importation of frozen tilapia can potentially reduce socio-economic returns from the local fisheries and aquaculture value chains. A rational approach is to optimize local fish production to saturate the local market and potentially out-price the imported frozen tilapia. Appropriate government policies tackling the importation of fish into the country can also help reduce the negative impacts of these imported fish on the local fish market systems.

Key words: Fish consumption per capita, Fish value chain, imported tilapia, Market saturation

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INTRODUCTION

Capture fisheries production from Kenyan marine and inland waters has been declining over the years [1], attributable to natural and anthropogenic ecological factors that have threatened the life of aquatic biodiversity in most inland lakes over time [2]. Today, Lake Victoria, which provides over 80 % of the Kenyan fish is choking with several ecological challenges that further reduce fish populations and prevent sustainable fishing activities [3]. Consequently, fish production has declined in Lake Victoria from about 150,000 tons/year in 2013 to 102,000 tons/year in 2020 (Fisheries stat 2021). The decline in fish production resulted in a lower fish consumption per capita that has stagnated at 4.5 kg/person/year, with a persisting fish supply gap of about 350,000 tons/year [4]. The current fish consumption per capita is still much lower than 20 kg/person/year as recommended by the Food and Agriculture Organization of the United Nations (FAO). Aquaculture has always been considered the best option to bridge the fish supply deficit. However, the Kenyan aquaculture sector is facing critical challenges ranging from lack of quality seed and feed [5], weak technology adoption and inadequate training and capacity building [6]. To bridge the fish supply gap, aquaculture activities have been increased while entrepreneurs have taken the advantage to import frozen tilapia from China. However, the importation of frozen tilapia has generated heated debate among fisheries and aquaculture stakeholders, even though the current imported volume cannot bridge the fish supply gap.

Kisumu County is an emerging economic hub in Kenya and is expected to increase its population and economic status after the upcoming Africities Summit held in April 2022. Other upcoming infrastructural developments expected to spur population growth and city economy include the Lake Victoria port, construction of 42km promenade and the agribusiness zone (Kisumu County Integrated Development Plan 2021). These activities are expected to breathe life to the many collapsed industries in Kisumu, create thousands of job opportunities and increase the socio-economic status of the local people. The expected surge in the human population will certainly influence the food docket, in which fish is expected to play important roles. This should incite the acceleration of local strategies to improve fish production to supply the surging demand. With the dwindling catches of Nile perch, which is mostly processed for the European export market [7], tilapia plays a significant role in the provision of fish protein for the human population. Today, the majority of Kenyans have embraced fish-eating, thanks to the many 'Fish Eating Campaigns' that was initiated by the government to improve fish consumption. Fish has high quality proteins with several health benefits especially to children, lactating mothers and

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people with various illnesses, hence the need to produce sufficient fish for the growing population [8].

Today, Kisumu County is the gateway through which imported frozen tilapia gets into the Kenyan markets and later transported to other markets in western Kenya. The importation of frozen tilapia in the Kenyan fish market has generated mixed reactions from the local fishermen, fish farmers, fish traders, processors and consumers. There have also been media reports indicating possible impacts of imported frozen tilapia on human health (https://www.kenyans.co.ke/news/35478-fish-imports-china-found-contain-toxic-substances) and socio-economic issues affecting local people. Local researchers and leaders have voiced their concerns on the potential impacts of frozen tilapia, and whether the government should ban the imports or not (https://nation.africa/kenya/blogs-opinion/blogs/-there-s-a-need-to-reconsider-plan-to-ban-fish-from-china-3504328, https://www.standardmedia.co.ke/opinion/article/2001420098/of-chinese-tilapia-imports-and-our-huge-unexploited-potential). However, data-driven information on the impacts of the imported frozen tilapia is scanty, hence, the need for the study. This study investigated the socio-economic implications of imported frozen tilapia on the local fish market and value chain in Kisumu County.

MATERIALS AND METHODS

Study area

This study was conducted in Kisumu City and selected peri-urban towns and market centres (Figure 1) within Kisumu County.

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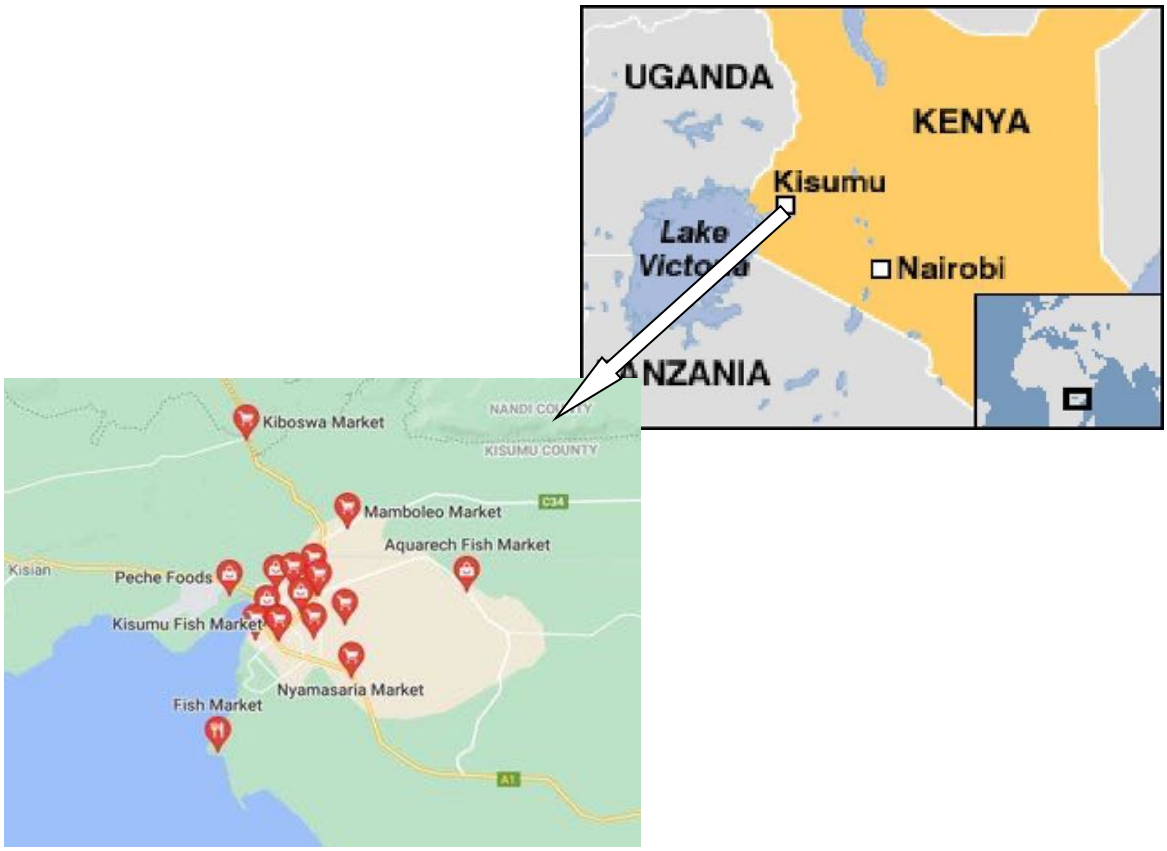

Figure 1: Map of the relative position of Kisumu City and the Fish markets from where the study was done (red dots)

Kisumu City borders Lake Victoria at Winam Gulf, and is the gate-way of imported frozen tilapia into Kenya. The current human population in Kisumu County is estimated at 1.2 million and is projected to double by 2030 (KNBS 2019). The land area of Kisumu County is 2085.9 km^2 with a shoreline on Lake Victoria, occupying northern, western and part of the southern shores of the Winam Gulf thus making it a major centre of fishing.

Data collection

A cross-sectional survey design was employed to gather data using a pretested structured questionnaire administered to randomly selected fishermen, fish traders, processors and consumers in Kisumu County. The questionnaires were fed into Open Data Kit (ODK) and transferred into Smart mobile phones for easy data capture by the enumerators. Data gathered included demographic information, fish species, source of fish, size, quality and pricing, type of fish traders and consumer fish preferences. Key informant interviews (KIIs) and focused group discussions (FGDs) were also used to obtain insights from opinion leaders in the fish production, processing and market.

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Data analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS Inc. version 23.0). Descriptive analyses were done using means, median, percentages, standard deviation, and ranges. Statistical significance was considered when $\alpha = 0.05$. The data were then presented in charts, tables and text. Data from KII and FGDs were transcribed and some reported verbatim. This then aided in the interpretation of the results of the questionnaires. No thematical analysis was done to the text data collected in this study.

RESULTS AND DISCUSSION

A total of 316 respondents were directly interviewed, of which some were part of KIIs and FDGs. Fish in Kisumu markets were obtained from various sources - imported tilapia, aquaculture and capture fish, with tilapia being the most popular traded fish at 83% (both imported and locally produced combined). Other species such as Nile perch and African Catfish were also available in the markets but in smaller proportions at 17% (both species combined). Whereas farming and consumption of African catfish are restricted by some cultural norms, Nile perch was mostly available as skeleton-fried fish as highly-priced fillets are exported in other markets, mainly Europe. The major source of capture fish was Lake Victoria while most cultured fish were obtained from farms and cages. A significantly higher proportion of respondents (57%) traded on imported frozen tilapia while 15 % and 26% of the respondents traded on fish from aquaculture and capture sources, respectively. An insignificant proportion of the respondents (2%) traded on fish obtained from other sources such as small water bodies, mainly dams and rivers (Figure 2).

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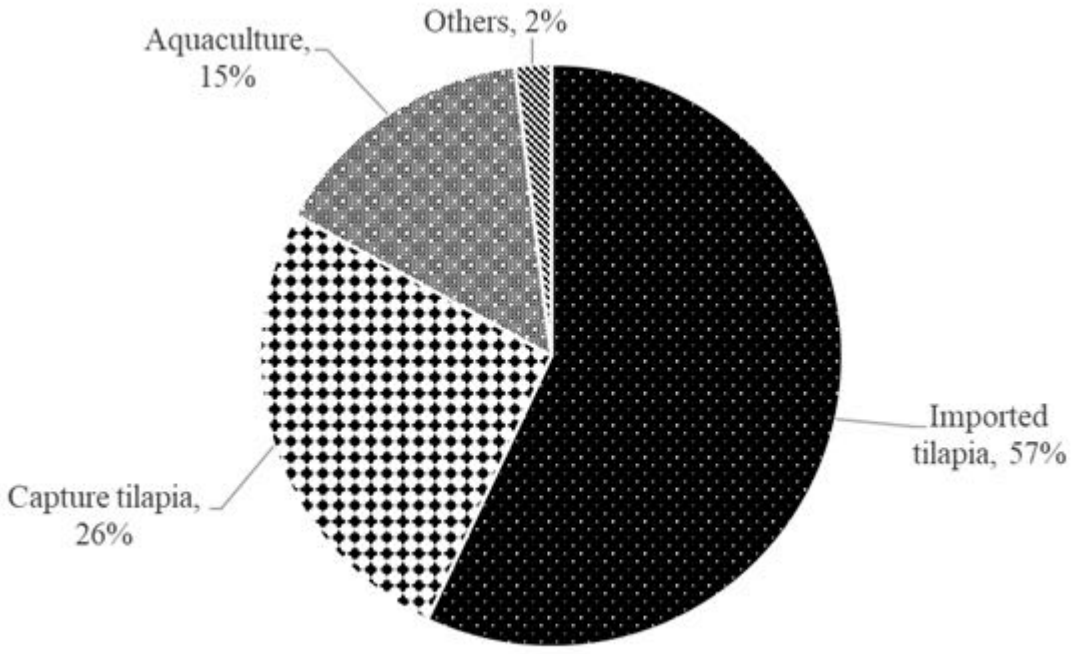

Figure 2: Proportion of the population that traded on Tilapia from different sources in Kisumu County., N = 316

Findings in this study have demonstrated that the importation of frozen tilapia into Kenya has varied socio-economic implications on the fisheries production and value chain linkages in Kisumu County. Kenya's demand for fish is at 500,000MT against the domestic production capacity of 180,000MT in 2019 [9]. The consumption of fish across the country is continuing to rise due to the rapid population increase [10]. Increased consumption is also a result of increased awareness about the nutritional benefits of fish, particularly through trainings and 'eat more fish' campaigns around the country. At present, domestic fisheries and aquaculture production cannot meet the demand thus allowing importation to bridge the demand-supply deficit. However, even with the importation of frozen tilapia, the fish supply deficit is still significant.

Within the docket of imported frozen tilapia, a majority of the value chain players were youth aged between 20-35 years, who accounted for 70% of the respondents (Figure 3).

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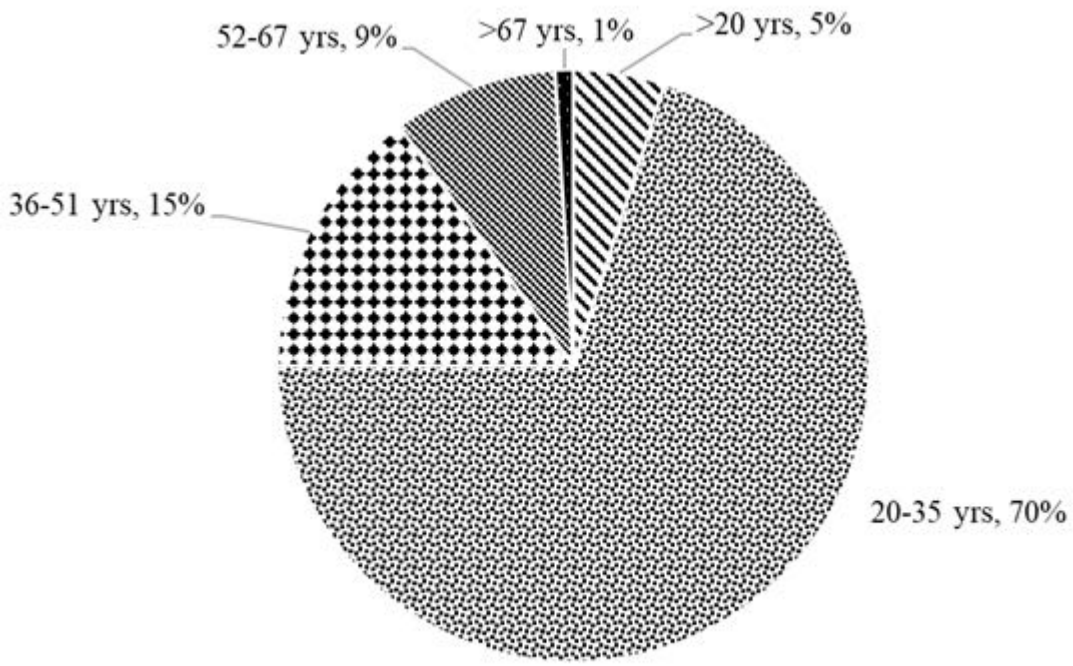

Figure 3: Age groups of respondents trading in imported tilapia in Kisumu County N=180

With the decline of capture fisheries, most fish traders have no other options but imported frozen tilapia. Fishing efforts and unsustainable fisheries in Lake Victoria will continue to increase until the open-access fishing system is replaced by proper enforcement of the licensing system [13]. Fish traders include several women at the beaches, who locally process fish before selling them to other traders popularly known as 'mama karangas' (fish mongers). The fish value chain is probably the longest as it contains several economic nodes including production, marketing and distribution, value addition, post-harvest each with specific players. Fishermen experience fluctuation in the amount of fish caught at different periods of the year.

The majority of residents in Kisumu County belong to the fisherfolk community. Fish consumed in Kisumu County is either obtained from the wild (lake, rivers and other large streams), farmed (ponds) or from the imported fish depots. The place from which fish traders get their fish depends on the types of fish they deal with. Therefore, fish traders dealing in other fish types rather than tilapia are obliged to get their fish from either the wild or from fish farms. Even though tilapia is obtained from all the three fish sources in Kisumu County, the majority of the fish traders obtain their tilapia from the imported fish depots. The fish sold at the depots are relatively cheaper than the local fish harvested in the fish farms or captured from the wild.

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A majority of the value chain actors dealing in imported tilapia were traders, who accounted for 59% of the respondents interviewed. Other players include processors, transporters (mostly Boda Boda operators - young men ferrying people and goods using motorbikes) and others such as service providers (Figure 4).

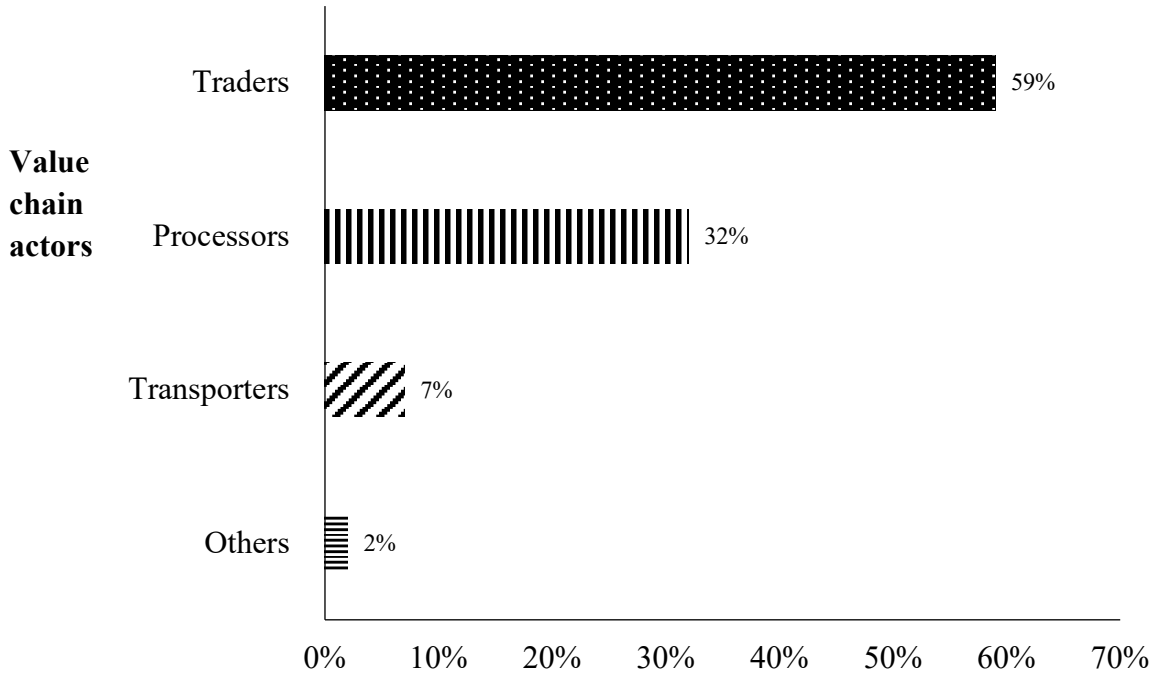

Figure 4: Proportions of the different value chain actors dealing in imported tilapia in Kisumu County

In terms of socio-economic implications, a majority of the respondents (40%) associated job losses to the imported tilapia in the market. Others (22%) cited reduced production of local fishes, social conflicts (20%) and poverty (10%). These are negative impacts of these imported tilapia on their livelihoods. However, some 7% of the respondents reported improved income (positive impact) associate with the imported tilapia (Figure 5).

"…when the fish was still plenty in the lake, our tuktuk (three-wheeler) business was good. I could do several trips to Dunga Beach and back. Today, many women get Chinese fish and transport using Bodaboda".
This concern was expressed by one three-wheeler operator in Kisumu.

As revealed in this study, 57% of the local fish sellers prefer the imported fish to locally produced fish because of their low prices compared to the local fish. Imported tilapia was the cheapest at Ksh. 200/kg compared to the locally produced tilapia at Ksh. 320/kg.

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"…the fishermen and fish farmers sell fish at very high prices, and this makes it hard for us to make any profits. The fish from China are cheap".
This was said a fish trader in Dunga Beach.

Furthermore, the imported fish are readily available at the depot regardless of the production season. Whenever the fishermen return to the landing sites with no catch, it was observed that some fish traders make a call to their motorists who bring them the imported fish to the beach. The fish are then unpacked from the white boxes into the troughs. After gutting and scaling, they are sold at a higher price (as fish from the lake) to customers who are made to believe the fish were caught from the lake.

"It is very difficult to differentiate imported Chinese tilapia from the one caught in the lake. These traders are just too cunning".
One fish buyer claimed this during the interviews.

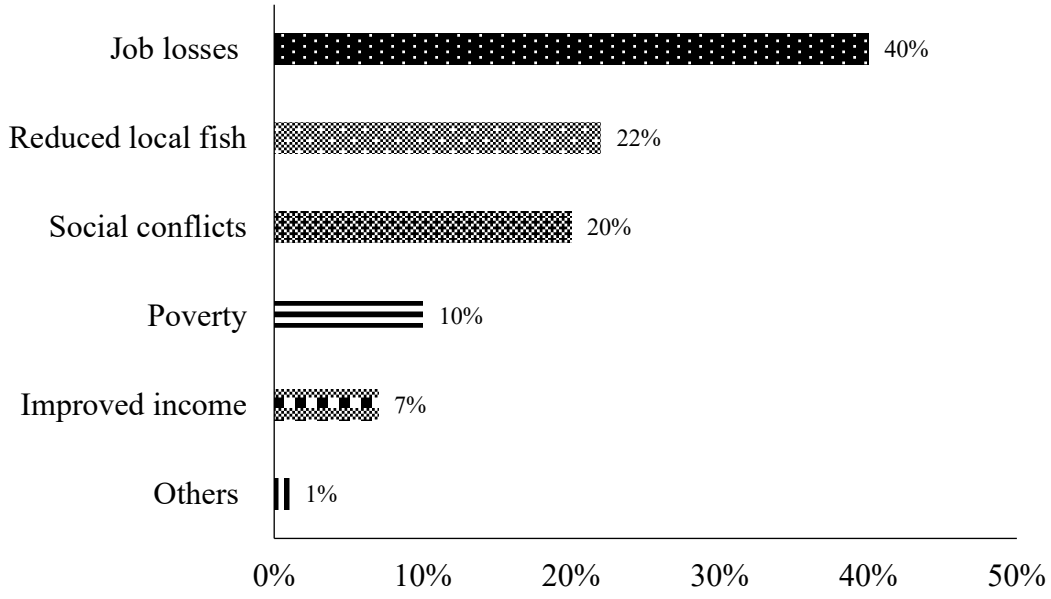

Figure 5: Socio-economic impacts of imported tilapia among market players in Kisumu County

When asked to rank the possible strategies that can be adopted to help reduce the negative impacts of imported frozen tilapia on the local fish market, the respondents cited improved access to credit facilities as the most important at 23%. They cited lack of access to credit facilities to expand their businesses to be a hindrance to their economic growth. This problem is not only unique to Kisumu but the Kenyan aquaculture sector at large. Many researchers have pointed this out as a bottleneck in fish production [14]. Research in other countries like South Africa [15] shows that

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credit access and support in the agriculture sector including aquaculture tend to fail especially if such programs are not based on a sound analysis and understanding of the sector. It is, therefore, imperative that such programs be based on sound research data. Some of the challenges facing the aquaculture sector in many African countries are beyond the control of the farmers themselves and require more efforts from several stakeholders earlier highlighted by Madibana *et al. [*16].

"Our businesses are very small and getting loans is hard. I mostly get loan from mobile loan Apps like Tala (a popular *online* mobile loans App in Kenya*) which are very expensive".*
A fish trader posed

Closely rated to this were government subsidies and tax regulations that will help levelized the playing field in the fish markets. Other strategies are summarized in Figure 6.

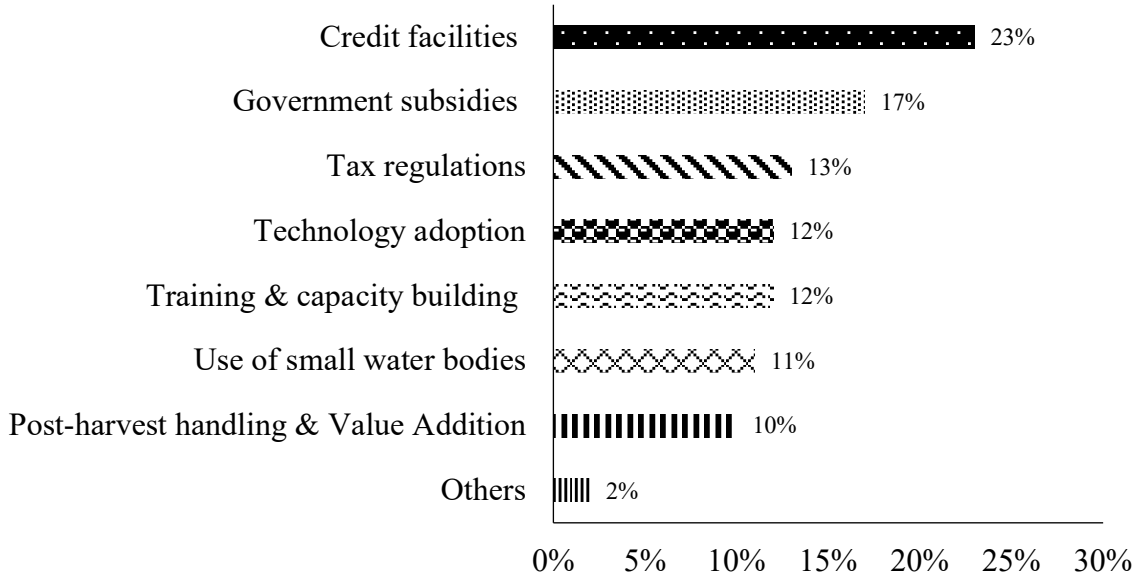

Figure 6: Ranking of strategies by the market players in the fisheries sector in Kisumu County

Whereas some 46% of the respondents have gained direct employment and experienced improved socio-economic status due to the imported frozen tilapia, 40% of the respondents reported multiple job losses and degraded socio-economic status due to poor market for the locally produced tilapia, whether from capture or culture sector.

"I shifted my boda boda (motorbike) base to a shade outside imported Chinese tilapia depot and I make more money transporting fish to the markets. For me, it is good

thing".
This sentiment was expressed by one of the bodaboda operators in Kisumu. Other respondents also cited social conflicts as some family members were not comfortable consuming fish whose source and production protocol are unclear.

"Some of these traders lie about the source of their fish to their customers. They will tell you the fish is from the lake then you realized it is not as sweet as the one from the lake. Which means it is imported. This sometimes has led to confrontations".
One of the Beach Management Unit officers in Dunga Beach stated during a KII.

Loss of jobs and poverty have been eminent mainly in aquaculture regions, which have been hit by lack of market, post-harvest losses and reduced income. There is a need to improve local fish production to saturate the market, thus out-price the foreign fishes automatically. To realize this goal, fish farmers are calling for the government to consider reviewing aquaculture policies to include tax exemptions and incentives, especially on aquaculture inputs. Other thoughts have mooted a complete ban on frozen tilapia imports. The problems associated with cheap imported tilapia are not unique to Kenya. Reports from Zambia and other countries also point to the fact that the fisheries and aquaculture sector in the country is also facing similar challenges [17]. However, this option may only attract unnecessary diplomatic frictions. As a signatory to World Trade Organization (WTO), Kenya is bound to accept free trade, and also exports fish and fish products to other foreign markets such as Europe and Congo which are the most important regional and international markets for Kenyan fish currently. Kenya is well endowed with enormous ecological resources that can be converted into sustainable fish production units. For example, there is a need to convert small-water-bodies (SWBs) such as rivers, small lakes and dams to fish production hot-spots. The SWBs are regularly distributed in most rural areas, and they offer perfect opportunities to rejuvenate rural aquaculture. There is a need to intensify training and capacity building on innovative aquaculture technologies, value addition and marketing protocols. Aquaculture must be considered as a business to achieve sustainability goals. There is also need for a paradigm shift among policy makers, producers and fish consumers to help realize the dreams of reducing these negative effects of imported tilapia into the African countries. This cannot be left in the hands of a certain section of the population as suggested by Tschirley *et al.* [18].

"The government needs to do something to reduce the importation of frozen Chinese tilapia into this country. Fish sellers and farmers also have a role to play".
Said a market leader at the Kisumu fish market during the FGD session.

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CONCLUSION

The study has revealed that the importation of frozen tilapia has significant socio-economic impacts on the production and other value chain linkages associated with locally produced fish. For Kenya to achieve sustainable fish production, there is a need for a paradigm shift towards inclusive production protocols using sustainable techniques. Policy reviews targeting subsidies and tax exceptions should be considered especially on aquaculture inputs. There is also need to support local aquaculture sector in order to increase fish production to bridge the huge supply gap in the fish value chain. There is also need to better manage wild fisheries to help the stocks to recover from the pressures associated with overfishing, pollution and other poor resource management challenges facing the fishing industry in Kenya and the African continent in general. This can serve as a long-term approach to reviving the fisheries sector and improving the livelihoods of the various players in the sector.

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