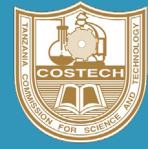# Policy briefing
Issues for sound decisions in fisheries

The need to reverse the declining trend of Nile perch stocks in Lake Victoria

The parent stock population of the Nile perch in Lake Victoria that that measures above 85 cm Total Length (TL) declined to less than 1% of the entire population by 2021. This is a threat to the sustainability of the fishery, the contribution of the fisheries sector to the national GDP and economic development, food security, and livelihoods that are dependent on the perch value chain. Factors including climate change, illegal fishing and ineffective management contribute to this trend. This brief examines the facts and figures of four decades on the perch characteristics, and the drivers of the uncovered trends. It recommends for the Ministry of Livestock and Fisheries to reinstate the regulation on the slot size of the stock to safeguard the parent perch stock and small individuals, reinforce the rebuilding of the stock, and regulate the bait used in the fishing of the perch.

Figure 1. A mature Nile perch grows to an average 1.21 to 1.37 metres.
Photo: Global Environment Facility (CC BY-NC-SA 2.0 license)

> *The causes of decline of Nile perch stocks in Lake Victoria include illegal fishing and overexploitation of large sized Nile perch due to non-observance of the upper limit regulation.*

The importance of fish and fisheries products as the source nutrition and food security and the economy in Tanzania cannot be overemphasized. Fish contribute about 30% to the total animal protein consumed in the country and about 1.8% to the national GDP. The fisheries sector employs nearly 200,000 people directly, and 4.5 million more indirectly. Of the direct employment provided by the fisheries, nearly 110,000 (55%) operate out of Lake Victoria, making the lake the main fisheries employer.

Lake Victoria, the largest tropical lake in the world, is a noteworthy nutritional and socio-economic resource, which is shared between Kenya, Tanzania, and Uganda. The lake is known for its productive fisheries, which are dominated by Nile perch (Sangara), cyprinids (Dagaa), and haplochromines (Furu). It produces nearly 80% of all inland fish productions and hosts one of the most lucrative and significant export commodity, which contributes a lion share to the fisheries-related export earnings of the country. It is arguably the reason why Tanzania is ranked 8th among the top 25 inland fish producers in the world, and second only to Uganda in Africa and East Africa (FAO 2022).

Nonetheless, fish production from the lake are reported to have plateaued, showing no visible increase. The parent stock population of Nile perch in Lake Victoria that measures above 85 cm total length (TL) has declined to less than 1% of the entire population by 2021. This is a threat to the sustainability of the fishery, the contribution of the fisheries sector to the national GDP and economic development, food security, and the livelihoods of the communities dependent on

the Nile perch value chain. Factors including climate change, illegal fishing and ineffective management contribute to this trend. This brief examines the facts and figures of four decades on the Nile perch stocks characteristics, and the drivers of the uncovered trends. It recommends for the Ministry of Livestock and Fisheries to reinstate the regulation on the slot size of the stock to safeguard the parent Nile perch stock and small individuals, reinforce the rebuilding of the stock, and regulate the bait used in the fishing of the perch.

Threat to the value of the Nile perch stock in Lake Victoria

The Nile perch fishery in Lake Victoria employs about 109,397 direct fishers and many more people who are engaged in transportation, processing, mending of fishing gear, and marketing and selling of Nile perch fish products. The fishery generates about 32,609 metric tons of catch for export annually, which has a corresponding value of about TZS 400,195,293,574 (US$ 176,894,902.82). The export revenue translates into about TZS 17.622 billion royalty to the Government of Tanzania, which is a significant input to the country's economy.

The expectations of the public and the Ministry of Livestock and Fisheries (MLF) on Nile perch fishing are high given the socioeconomic significance of fisheries in Tanzania. Amidst the increased demand for fish in the country and the region, the declining trend of Nile perch catches (see Figure 1), sizes (Figure 2) and stocks (Figure 3) are jeopardizing these expectations. Without clear and strong management interventions, 40% of direct and indirect employment in the fishery is projected to lost, and more than 50% of Nile perch industries closed in the next five years. Furthermore, fishers' income from Nile perch will drop to 25% from the current figure of 86%. There is an urgent need for informed and impactful interventions to sustain the stocks and maintain the value chain of Nile perch around and away from Lake Victoria.

Monitoring the stock

The Tanzania Fisheries Research Institute (TAFIRI) conThe Tanzania Fisheries Research Institute (TAFIRI) conducts research and monitoring on fisheries resources in Tanzania Mainland. Fish stock assessment and monitoring of Nile perch were conducted between 2000 and 2020, using different methods including hydro-acoustic method, bottom trawl, frame survey, and catch assessment surveys. Fisheries acoustic methods are part of the routine stock assessment tools used regularly to measure the distribution and abundance of fish over large areas. The data on exploitation patterns were collected following standard Operating procedures (SOPs) for Frame Survey and Catch Assessment survey (CAS). Data collected with frame surveys spanned the years 2000 and 2020, and those with CAS from 2005 to 2021. Length frequency data have been collected since 1984 and were used to assess the long-term trend in Nile perch sizes.

Facts and figures on the decline of the stocks

Figure 2 shows a declining trend in Nile perch catches, with the highest value in 2010 and the lowest in 2021 at less than 90,000 MT. This decline is also vivid in the sizes of the Nile perch being caught as shown in Figure 2. The mean Nile perch fish size had declined to less than 40 cm (TL) from a mean length of nearly 80 cm (TL) in 1989.
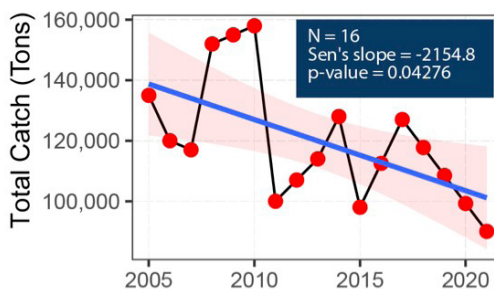

Figure 2: Nile perch mean catch over the period of 16 years (2005 – 2021).

There was a sharp decline in fish sizes from 1999 to 2000 which necessitated the institution of a lower (50 cm) and upper (85 cm) slot sizes in the fishery as a management tool (see Figure 3 & 4).
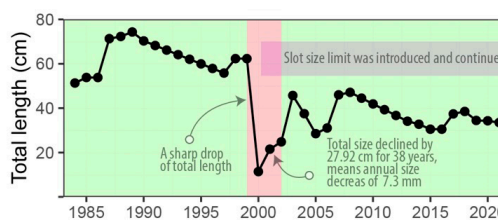

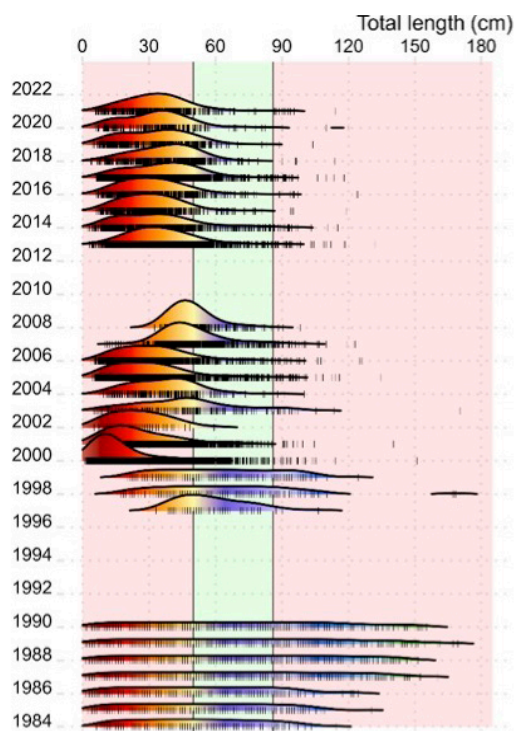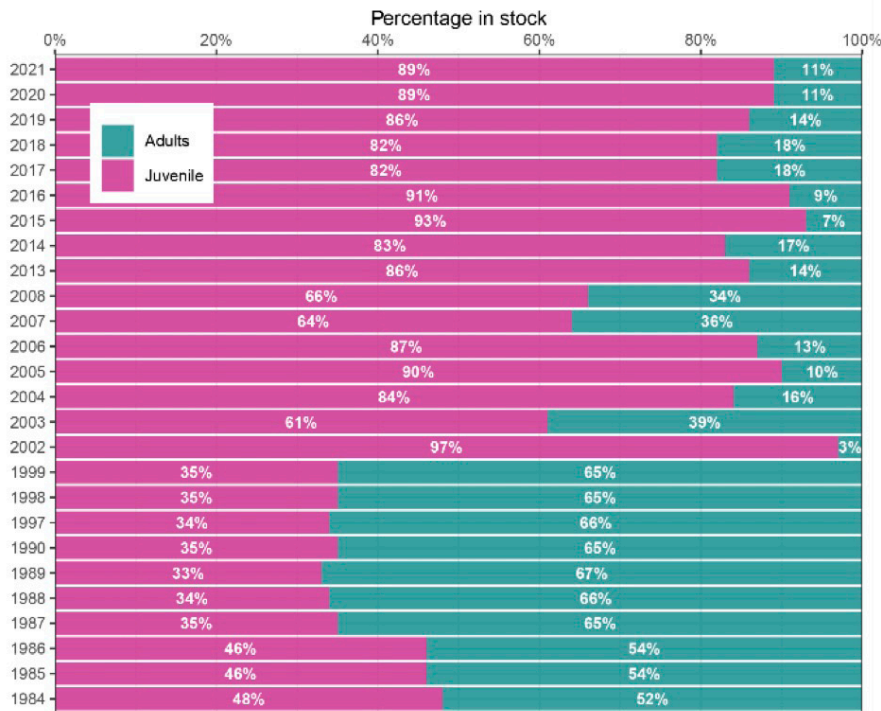**Figure 3:** Change in mean sizes (TL) of Nile perch for the period 1984 - 2021

Figure 4: Density plot of Nile perch sizes indicating the decline in the 50-85 cm (yellow band) individuals in Lake Vitoria for 1984-2021.

Figure 5: Percentage of immature individuals in the population of Nile perch in Lake Victoria

Furthermore, decline in the Nile perch catches can also be seen in the stock assessment data where Nile perch stocks declined from 689,365 metric tons in 2000 to 335,170 in 2021, indicating an average annual declining rate of about 2.5%.

Additionally, there is a clear decline of individuals with sizes above 50 cm with the category of the fish measuring 50 to 85 cm making up less than 1% of the population (Figure 4). The population structure of Nile perch is, thus, dominated by small-sized fish where individuals with less than 50 cm make up 99% of Nile perch stock.

During the same period, the percentage of immature individuals in the population of Nile perch increased from 48% in 1984 to 89% in 2021 (Figure 5) indicating that there is critically low number of mature individuals to maintain the stocks at sustainable levels.

Possible causes for the decline of the Nile perch stock

Possible causes of decline of Nile perch stocks in Lake Victoria include illegal fishing and overexploitation of large size Nile perch due to non-observance of the upper limit regulation. The use of illegal gears, such as beach seine have caused destruction of breeding and nursery grounds. High demand for fish and fishery products driven by population growth and change in lifestyle may be indirectly causing the decline. The boom of Nile perch processing industries in late 1990s may have caused the first episode of size-overexploitation (see Figure 3). This situation is even critical today due to the boom of the fish maw business. The demand for high-value Nile perch maws has exacerbated the demand for big-sized Nile perch, which are the parent stock, thus causing the decline of the stock.

The human population in the lake zone has increased from less than 10 million residents in 1980s to 45 million residents in 2017 (World Bank 2018). The basin population is growing at a rate of 3.5 percent each year, which is among the highest population growth rates in the world with an average population density of 250 people per square kilometer. The growth has spiked demand for fish as food and increased pressure on to this fragile resource. The population growth in the East Africa region and globally also has increased the commercial demand for the fish.

The Fisheries Regulations of 2009, amended by GN 492 of 2020 lifted the restriction against fishing the Nile perch measuring over 85 cm. In addition, there is no restriction on the types and size of baits used with the longline gear to fish for Nile perch. This increases the uncontrolled capture of the parent stock and directly threatens the entire fish population directly.

The decline of mature Nile perch is attributed to use of gear which targets large-sized Nile perch. These include the longline fishery, which has seen a 2430% increase in the number of hooks from 356,196 in 2000 to 9,008,469 in 2020. This trend accounts for the decline in harvestable Nile perch.

Conclusions

The Nile perch stocks are depleting. The Nile perch population structure is dominated by small body size individuals. Similarly, size at maturity and fish abundance or biomass have also declined. The percentage of the Nile perch parent stock is currently lower 1%, indicating that the stock cannot regenerate without deliberate management efforts. Meaning that the Nile perch fishery in Lake Victoria is not sustainable, and that the stocks may reach a tipping point and deplete if emphatic management interventions are not implemented. If this trend continues

unabated, the Nile perch industries in Lake Victoria may collapse, affecting employments, community livelihoods, and government and value chain actors' revenues. Since the population structure of the Nile perch is dominated by small individuals, there is a promising future if immediate management interventions are instituted to allow the Nile perch recruits to grow to adults and repopulate the stocks.

POLICY RECOMMENDATIONS

The following recommendations are provided to the government, institutions, and communities for consideration and immediate action. Effective action shell help improve biomass status of the Nile perch and sustainability of its stock in Lake Victoria.

Short-term interventions:

- Establishment of a special enforcement auxiliary or paramilitary unit to coordinate and execute law enforcement operations all the time instead of the current one-off effort which cannot ensure compliance.
- The upper limit of slot size regulation above 85cm should be reinstated to safeguard the parent Nile perch stock.
- Revision and gazettement of critical habitats and reinforce management measures that rebuild and conserve the Nile perch stock.
- Introduction of and enforcement of regulations on type and size of bait for Nile perch fishery.

Long-term interventions:

- Establishment of an Authority which will be entrusted with all enforcement and management of fisheries.
- Engagement of the communities and all stakeholders to institute closed areas and seasons, and establishment of right-based fisheries management.
- Establishment of a Fisheries Development Fund to ensure availability of management funds.

Acknowledgement

Further reading

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CONTACT

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