

Policy Brief

Status of longline pelagic fisheries of Kenya's Exclusive Economic Zone

Mary Ontomwa, Edward Kimani, Gladys Okemwa, Athman Abubakar



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Introduction

Pelagic fisheries in Kenya form a vital source of food and nutrition, livelihood, and economic stability for the industrial fishers and the coastal communities. These fisheries are key components that support development of the Blue economy. The pelagic fisheries contribute about 12,489 metric tons, representing about 35% of total marine landings, valued at KES 2.5 billion and form an important portion of the marine products exports from the country. However, there is more potential and economic opportunities in these fisheries, including enhancement of catches and value addition. Kenya's pelagic fisheries are categorized by size into small, medium and large pelagic fishes. Small pelagic species are generally found in the water column and are known for forming large shoals. These include sardines, anchovies and mackerels. The Medium pelagic fishes include species such as the great amberjack rainbow runner, kawakawa, frigate tuna, dolphinfish, barracuda, bonitos, cobia and Spanish mackerel often targeted by industrial purse seine vessels. While the large pelagic fishes include the coastal sharks, tropical tunas, and billfishes such as Swordfish and marlin, targeted by industrial longline vessels.

Exploitation of the pelagic fishes

The small and medium pelagic species are exploited by small-scale fishers using non-mechanised vessels within 12 nm of 9,700 km² territorial waters. On the other hand, the large pelagic stocks are exploited by distant water fishing Nations (DWFNs) including Spain, France, the Seychelles and the Republic of Korea. The industrial fishers operate from nine longline fishing vessels within the 20 – 200 nm offshore exclusive economic zone (EEZ) waters of 142,000 km² area (Figure 1).

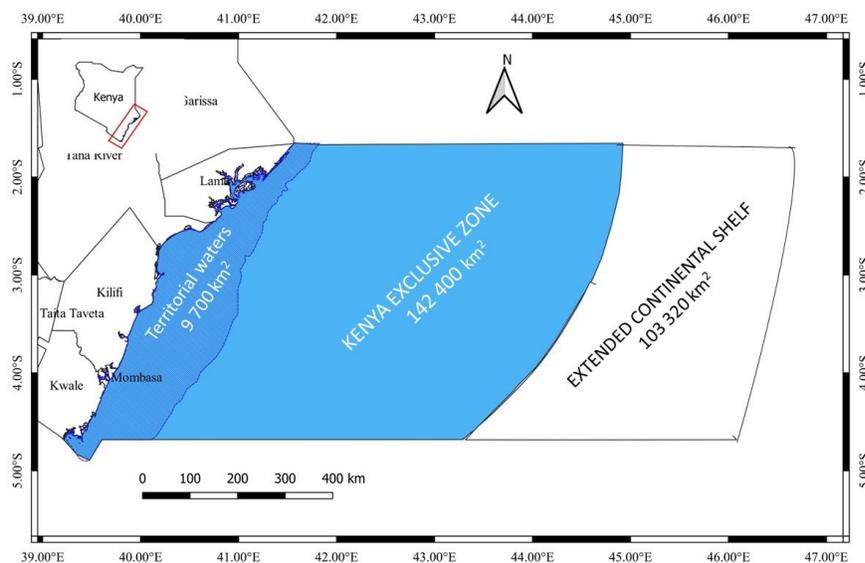


Figure 1: Map of Kenya's Exclusive Economic Zone (EEZ), extended continental shelf, territorial waters and the coastal counties

A range of fishing gears are used to target the pelagic species in , including the ring nets for the small and medium pelagic fishes while the offshore fishes are caught mainly by pelagic longlines and sometimes purse seines trawling (Figure 2). These gears mainly target large tunas (*Thunnus spp.*), Swordfish (*Xiphas gladius*), other billfishes (*Istiophoridae spp.*) and dolphinfish (mahimahi) (*Coryphaena spp.*)

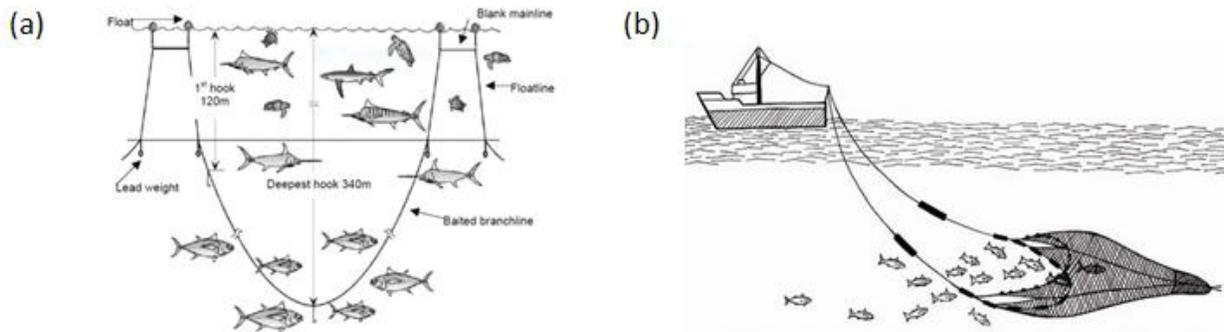


Figure 2: Illustrations of (a) longline fishing and (b) purse seine fishing

Challenges facing Kenya's pelagic fisheries

The fisheries are faced with multifaceted challenges which may hinder the development of Kenya's Blue Economy. They include: limited scientific information, poor market structures and operational systems in the country which has facilitated the export of unprocessed fish, limited Monitoring Control and Surveillance of fishing activities coupled with a scarcity of institutional and financial capacity leading to high levels of illegal, unregulated and unreported fishing all which complicate the management of the pelagic fisheries. Another challenge associated with Kenya's pelagic fisheries is limited exploitation of the fisheries by local fishermen due to a lack of capacity and limited capital hindering the realisation of potential economic benefits of Kenya's pelagic fisheries resources. Additionally, due to high dependence on foreign nations to exploit the pelagic fisheries, the local people have limited access to job opportunities, income and revenue.

Status of the longline pelagic fisheries

Catch and fishing effort trends for the longline pelagic fisheries

Cumulatively, about 17.3 million fishing hooks were deployed between 2016 and 2024 yielding a total catch of 3,433.6 mt in the industrial pelagic longline fishery. Fishing effort and catches fluctuated in time with high catches landed between 2018 through 2020, while the lowest catches were in 2017, attributed to the amount of fishing effort (number of hooks) deployed in the respective years. The reported catches and fishing effort dropped sharply in 2021 during the

Covid-19 pandemic outbreak that influenced most of the fishing activities. However, the data in 2022 and 2024 indicated increasing effort and catches (Figure 3).

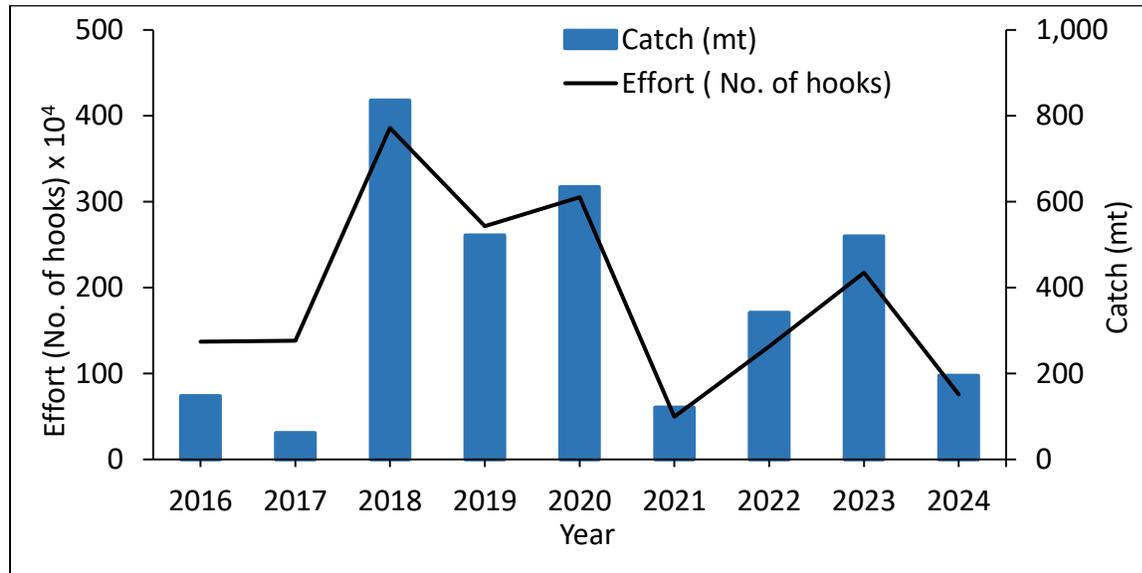


Figure 3: Fishing effort and catch trends for the industrial pelagic longline fishery

Catch composition

Eighty-six fish species belonging to 28 families were recorded during the longline pelagic fishery surveys conducted by KMFRI between 2020 and 2025. The estimated catch for a commercial industrial longline vessel is over 300 mt annually. Economic analysis based on current market prices of the products, fixed and variable costs, shows a positive net profit from the fishery (Table 1)

Table 1. Estimated revenue, fixed costs, variable costs, gross and net profit for a longline fishing vessel

Item	KES
Total revenue	337,541,486
Variable costs excluding taxes	115,892,500
Total fixed cost	68,093,300
Gross Profit	153,555,686
Taxes	48,197,820
Net Profit	105,357,866

Data from the surveys show that the family Xiphiidae was the most dominant, representing 61.2% of the total catch. This was followed by the Scombridae, which made up 21.6%, and the Carcharhinidae, which accounted for 7.0%. Other families such as Coryphaenidae, Gempylidae, Sphyrnaeidae, and Istiophoridae were also recorded, contributing 2.0%, 1.8%, 1.6%, and 1.6% respectively. Swordfish (*Xiphias gladius*) was the most abundant species, with a total catch of 2013.0 mt, accounting for 58.6% of the landed catch. Its proportion in the catch increased steadily over the years, reaching the highest level in 2021. Yellowfin tuna (*Thunnus albacares*) was the second most abundant species, contributing 440.2 mt (12.8%). The highest proportion was observed in 2016 and 2017, while the lowest was in 2021. The Blue shark (*Prionace glauca*) contributed 393 mt overall, accounting for 11.5% of the landed catch. The contribution by the species was minimal in 2016 and 2017 but consistently increased from 2018 through 2024. Bigeye tuna (*Thunnus obesus*) contributed 218.9 mt (6.4%) of the catch, with the highest proportion in 2017 and the lowest in 2024. The proportion of the six most abundant species in the catches varied notably across the years.

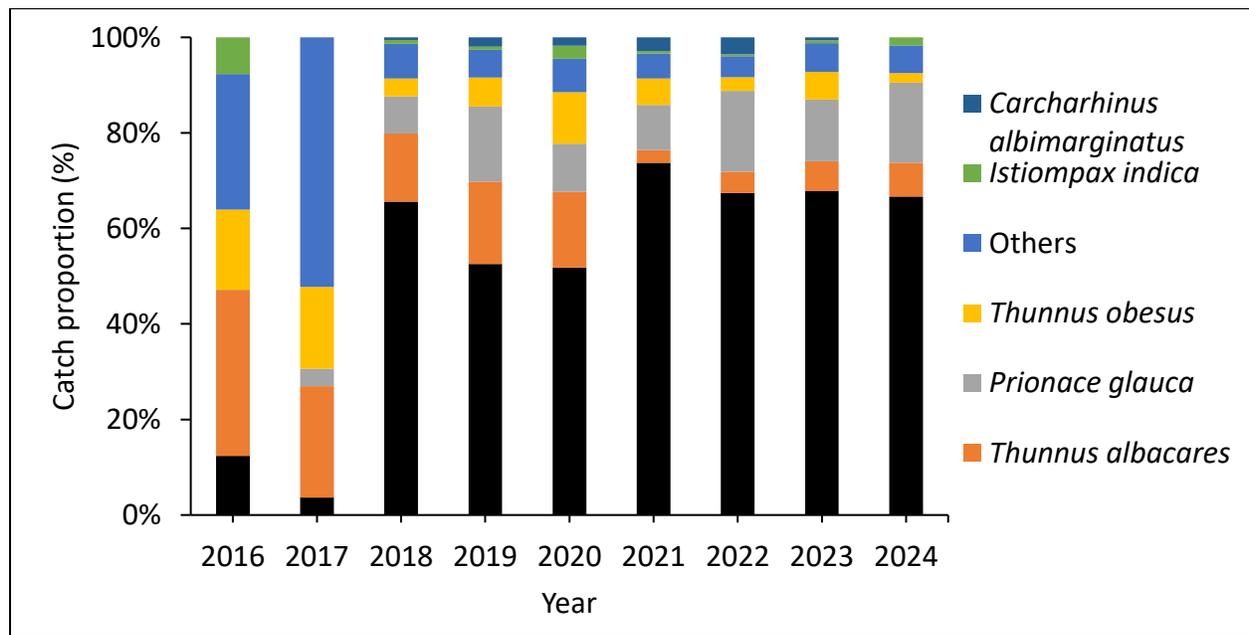


Figure 4: The proportion of key species caught in the industrial longline pelagic landings between 2016 and 2024 period

Catch per unit effort (CPUE)

Swordfish catch rates remained high over the years with peaks recorded in 2016, 2018 and 2024. The highest catch rate of 1187 kg·1000 hooks⁻¹ was recorded in 2024 while the lowest catch rate of 624 kg·1000 hooks⁻¹ was observed in 2017. Bigeye tuna catch rates fluctuated over the years with the highest catch rate of 411 kg·1000 hooks⁻¹ recorded in 2021. The catch rates for Yellowfin tuna were stable and lowest during the 2016 – 2024 industrial fishing period. Catches for Blue shark decreased in 2017 then remained stable with slight fluctuations between 2018 and 2024.

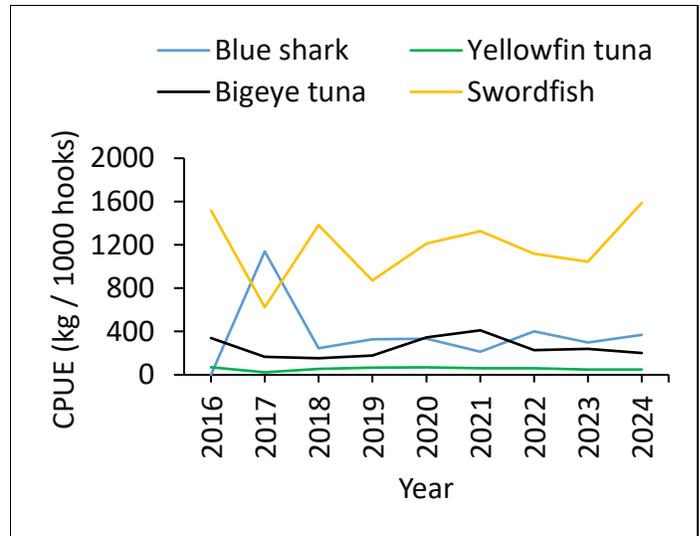


Figure 5: Annual catch per unit effort (CPUE) (kg·1000 hooks⁻¹) for Swordfish, Blue shark, Yellowfin tuna and Bigeye tuna caught during the 2016-2024 longline pelagic industrial fishery

Monthly variations of Swordfish show some variations in catch rates (CPUE), with a clear upward trend from May through September when the highest CPUE of 1,179.5 kg·1000 hooks⁻¹ was recorded. The observed patterns suggest that more Swordfish are caught during the southeast monsoon (SEM) season compared to the northeast monsoon (NEM) season, likely due to seasonal changes in fish behaviour or abundance of the fish. There were relatively stable long-term and minor seasonal variations of Bigeye tuna and Yellowfin tuna catches during the period. The monthly variation of Bigeye tuna catch rates was narrow and highest in April, May and October, while the catch rate for Yellowfin tuna was highest in May. The Blue shark catch rates were higher between April and July compared to August to December and January to March. The catch rates reveal a declining trend, indicating that season has an effect on the Blue shark catches in the industrial longline pelagic fishery.

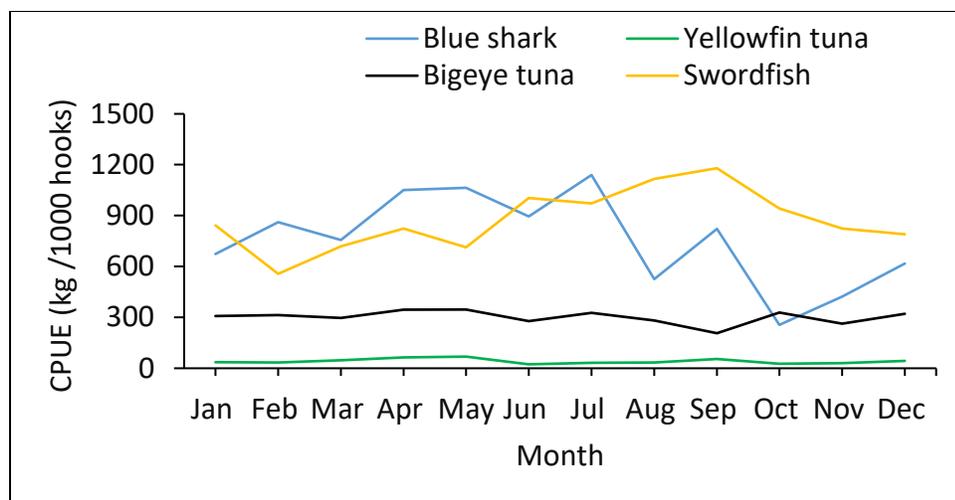


Figure 6: **Monthly catch per unit effort (CPUE) ($\text{kg}\cdot 1000 \text{ hooks}^{-1}$) for Swordfish, Blue shark, Yellowfin tuna and Bigeye tuna caught during the 2016-2024 longline pelagic industrial fishery**

Size at capture for the dominant species

The length at which 50% of Swordfish reach maturity (L_{50}) is $L_{50} = 138.2 \text{ cm}$. About 62.8% of the Swordfish fish caught between 2016 and 2024 were immature. The mean sizes of Swordfish caught showed notable fluctuations, with a clear long-term declining trend. In 2016, 2019 and 2020, mean sizes were $189.8 \pm 7.1 \text{ cm}$, $143.1 \pm 5.5 \text{ cm}$ and $140.8 \pm 1.0 \text{ cm}$, respectively, all above the maturity threshold ($L_{50} = 138.1 \text{ cm}$). A lower proportion of Blue shark individuals caught (28.5%) were immature, with the mean for all years above $L_{50} = 213.9 \text{ cm}$, except in 2021 when a mean size of $166.3 \pm 25.4 \text{ cm}$ was recorded. Most of the Yellowfin tuna fish caught forming 77.6% were immature having sizes less than $L_{50} = 143.6 \text{ cm}$. The mean sizes of the fish were lower in all the years except in 2018 when a mean of $147.1 \pm 1.1 \text{ cm}$ was observed. However, only 10.1% of the Bigeye tuna individuals were immature and the mean sizes were above the $L_{50} = 102 \text{ cm}$ except in 2023 when a mean of $81.5 \pm 3.5 \text{ cm}$ was registered (Figure 6). The occurrence of high proportions of immature fish for the dominant species in the industrial longline pelagic fishery is an indication of overexploitation of the stocks.

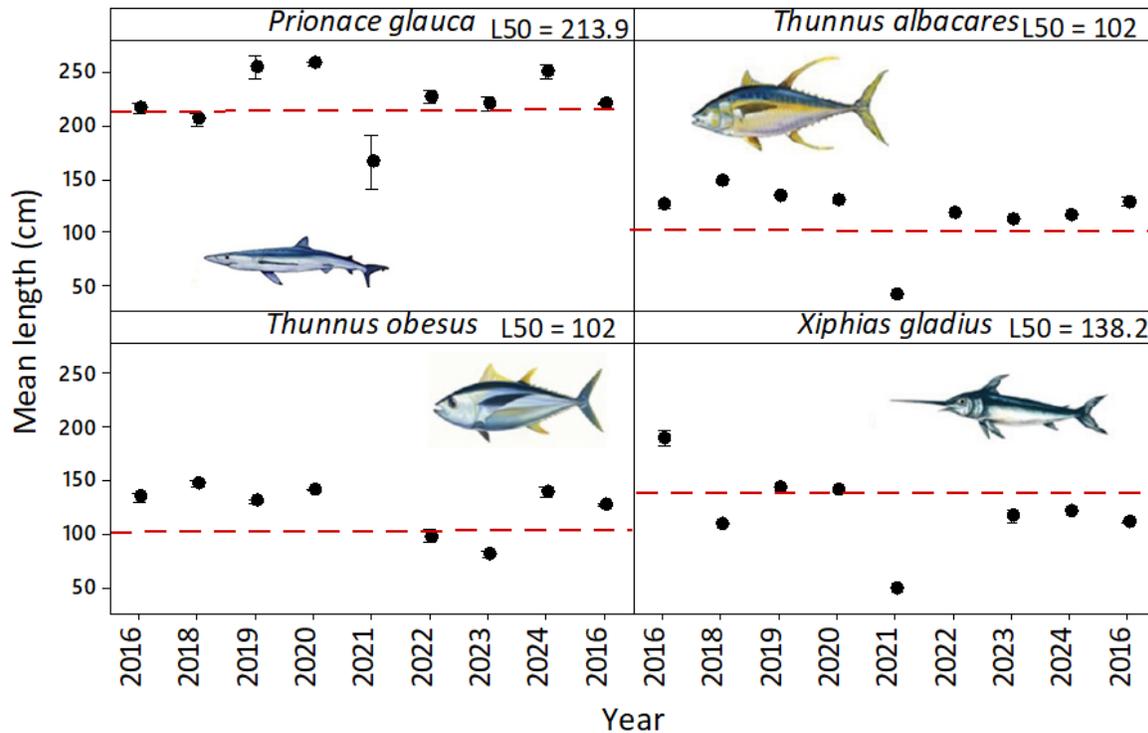


Figure 7: Mean sizes and lengths at which 50% of the fish mature (indicated by the red dashed lines) for Swordfish, Blue shark, Yellowfin tuna and Bigeye tuna caught during the industrial longline pelagic fishing

Conclusion and Recommendations

Results provide basic information of the catches and population characteristics of the key commercial species in the industrial longline fishery with Swordfish, *Xiphias gladius*, Blueshark, *Prionace glauca*, Bigeye tuna, *Thunnus obeseus* and Yellowfin tuna, *Thunnus albacares* being the key commercial species. The estimated annual catch for a longline vessel is 300 mt with estimated positive net profit taking into account the fixed investment and the variable operating costs. Over the recent years, Swordfish has become more dominant, demonstrating likely changes in relative abundance of targeting by the fishery.

Catch per unit effort for the four commercial species show no marked changes over the period indicating stable stocks. However, changes in mean sizes over the years and large proportions of immature individuals in the catches were noted.

Most of individuals of the dominant species caught had lengths less than the size at maturity and a large proportion of immature fish were caught between June-August. Catching small fish before maturity size may lead to overfishing, so it is advisable to enhance management measures, such as control of fishing months to reduce catching juveniles or avoid fishing in known spawning areas.

References

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