DSFA-INFORMATION PAPER

Strengthening Artisanal Tuna and Tuna-like Species Data Collection in Tanzania: Bridging Geographical Gaps

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Abstract

Tanzania has faced underreporting of data on tuna and tuna-like species harvested in its artisanal fisheries for several years. Historically, data collection has been limited to a few fishing grounds, resulting in an incomplete representation of national catches. The country has approximately 500 landing sites dedicated to coastal fisheries, yet only six out of 500 are actively involved in collecting tuna landings. The distribution of these dedicated tuna and tuna-like species sites is uneven and does not align with the intensity of fishing activities. For example, the southern regions of Lindi and Mtwara, where significant artisanal tuna fishing occurs due to their geography, are represented by only a single monitoring site in the south Mtwara site. Similarly, the Zanzibar Channel remains poorly represented despite active fishing in this area. Furthermore, Ferry, the largest landing site in Tanzania and a major hub where much of the tuna catch supplies local hotels in urban centres, has been left out of this monitoring framework.

To address these gaps, more sites from other areas are thought to be prioritized for expansion to ensure broader and more representative coverage of artisanal fisheries. This information paper highlights the suggested plan for the landing site expansion and the criteria to consider for the new site inclusion. Strengthening the coverage and coherence of Tanzania's data collection system will be implemented in parallel with additional sites dedicated to TUNAS.

Key word. Geography, Fishing intensity, Artisanal fisheries, Landing site

1. INTRODUCTION

Promoting the long-term sustainability of transboundary fisheries such as oceanic tunas relies on having accurate data and information about stock status and clear insights into who is fishing, where, and by what methods (Bush *et al.,* 2016). Oceanic tuna fisheries are particularly complex, given the highly diverse range of industrial to artisanal fisheries and the vast spaces and multiple jurisdictions involved (Bush *et al.,* 2016). The management of these fisheries is further challenged by the limited information available on coastal tuna fisheries. The data collected and analyses performed by tuna RFMOs are a main source of scientific information supporting the management, sustainable use, and conservation of biodiversity in the ABNJ (Heidrich *et al*., 2022).

Accurate and representative fishery data are fundamental for assessing tuna and tuna-like species and ensuring sustainable management. In artisanal fisheries, landing sites provide the primary observation points for recording catch composition, effort, and gear use. Expanding the number of monitored sites increases the representativeness of data, reduces bias, and strengthens the reliability of catch and effort statistics (FAO, 1997). Studies from other regions demonstrate that coverage across multiple landing sites captures spatial and temporal variations that single-site monitoring often overlooks (Stobutzki *et al*., 2014). Similarly, market-based approaches have shown that wider coverage of landing sites improves data quality and supports more effective fisheries management (Aura et al., 2019).

2. CURRENT DATA COLLECTION SYSTEM

Artisanal fisheries in Tanzania are widely dispersed, with an estimated 500 landing sites along the coast and islands. Fish catch and effort data are collected through designated beach recorders at a few monitored landing sites. A centralized government institution oversees deep-sea fishing activities across Mainland Tanzania and Zanzibar, ensuring unified management. Catch data for tuna and tuna-like species are submitted to this authority and forwarded to the Indian Ocean Tuna Commission (IOTC). The IOTC requires detailed submissions, including catch data per species

and morphometric information such as fish length. To meet these standards, specialized data enumerators have been trained and equipped with tools to record the necessary information.

Despite the extensive network of landing sites, morphometric data for tuna and tuna-like species are collected at only seven designated sites (Fig. 1). This limited coverage fails to reflect the full scope and diversity of fishing activities, resulting in data gaps and uncertainties in national reporting. Expanding the number of monitored sites is crucial to capture variations in fishing grounds, gear types, and seasonal patterns across the country. For instance, the southern region of Tanzania shows higher fishing intensity based on longline data analysis (Fig. 2; Yahya et al., 2022), yet only one landing site in that area is regularly monitored. Broader site coverage would enhance the representativeness of national statistics, support more robust regional stock assessments, and improve consistency with IOTC reporting requirements.

This paper highlights the need to increase the number of monitored landing sites in Tanzania and outlines approaches that may guide the identification and prioritization of new sites for data collection.

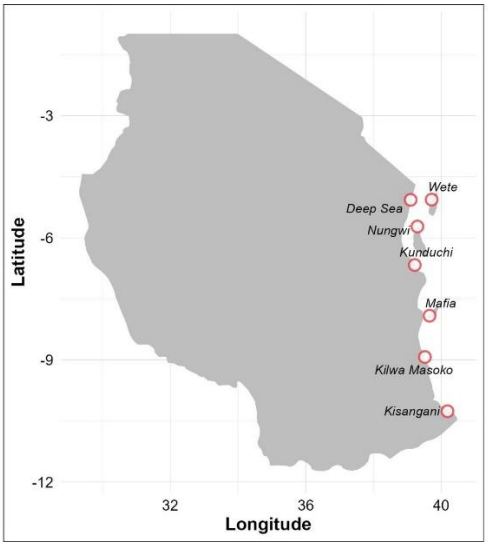

Figure 1. Current landing sites.

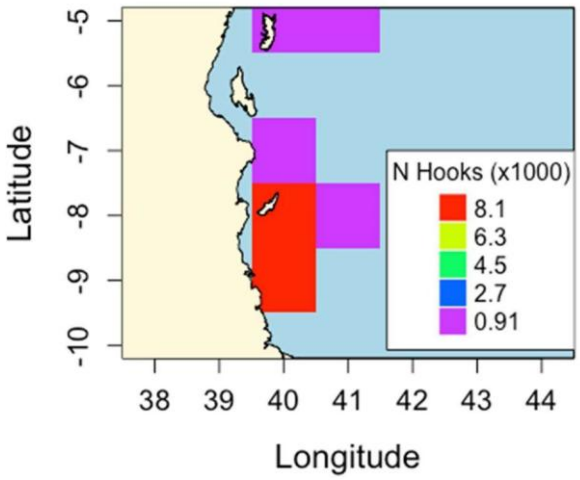

Figure 2. Map of the distribution of fishing effort

3. METHODOLOGY

The proposed approach for expanding tuna and tuna-like species data collection in Tanzania comprises three components: site inventory and stratification, site selection based on criteria, and sample size determination.

1. **Inventory of the existing sites.** A preliminary survey will establish a detailed profile of the landing sites along mainland Tanzania and Zanzibar. Currently, the landing sites dedicated to tuna are spread from 50 to 200km. At each site, information will be gathered on geographic location, levels of artisanal fishing activity, dominant gear types, fleet size, and the extent of tuna and tuna-like species landings based on observed data and local ecological knowledge. Findings from this survey will provide the basis for stratifying the nationwide landing sites by region, gear/fleet characteristics, fishing ground type, and the frequency of tuna landing. Such stratification will ensure that subsequent sampling and site selection capture the diversity and complexity of Tanzania's artisanal tuna fisheries.

2. **Setting Criteria for additional sites for data collection**. A set of well-defined criteria guides the selection of landing sites for sampling to ensure that the data collected are representative, reliable, and relevant for national and regional fisheries assessments. These criteria aim to capture the diversity of fishing activities, geographic distribution, and operational characteristics across sites. The following are some of the requirements to be considered.

    i. **Catch relevance**: Landing sites where tuna and tuna-like species constitute a significant portion of the catch.
    ii. **Fishing effort and fleet size**: Sites with larger numbers of artisanal vessels and diverse gear types targeting tuna.
    iii. **Geographical representation**: Ensuring coverage across coastal regions, islands, Mainland Tanzania, and Zanzibar, capturing different marine ecosystems and fishing grounds.
    iv. **Temporal variation**: Sites where seasonal or periodic variations in tuna landings are expected, to capture variation over time.

3. Determination of Number of Sites to Monitor.

The number of landing sites to be monitored will be determined based on the baseline survey findings, which provide insights into the distribution, scale, and intensity of fishing activities across locations. This information guides a practical and evidence-based selection of sites that adequately represent the fishery while ensuring efficient use of available resources. The approach will consider each site's relative importance, operational feasibility, and the need for balanced spatial coverage, thereby ensuring that the monitoring network is representative and manageable.

4. DISCUSSION

Expanding the number of monitored landing sites for tuna and tuna-like species in Tanzania is a critical step toward improving the accuracy, representativeness, and reliability. Current monitoring at seven sites provides limited coverage and cannot capture artisanal fishing activities' geographic and temporal diversity. By applying a structured approach—beginning with a preliminary survey of 296 sites, selecting sites based on the chosen criteria, and then determining sample size using a standard statistical formula —Tanzania will generate a dataset that better reflects national catches.

This approach also aligns closely with the data submission obligations of the IOTC, which emphasize the provision of comprehensive, standardized, and verifiable catch and effort data from all member states. The current limitation of reporting from only a handful of Tanzanian sites has contributed to the underestimation of artisanal tuna catches, reducing the representativeness of national datasets and limiting their usefulness in regional analyses. By broadening coverage to a statistically derived and stratified set of landing sites, Tanzania can generate more accurate catch, effort, and fleet activity estimates. This, in turn, will contribute to regional stock assessments by reducing uncertainty in input data, improving the robustness of scientific models, and ensuring that the contribution of artisanal fisheries to tuna and tuna-like catches in the Indian Ocean is properly reflected. A stronger national data system will not only enhance Tanzania’s compliance with IOTC requirements. Still, it will also support evidence-based decision-making at the regional and national levels, particularly regarding climate variability and increasing pressure on tuna resources.

Nevertheless, expanding the monitoring of landing sites is not without challenges. Increased coverage will require a significantly larger workforce of trained enumerators capable of collecting accurate, standardized data. Training and supervision mechanisms must be scaled up to ensure data quality and consistency across diverse sites. Data management systems must also be upgraded; Tanzania is at the initial stage of harmonizing three separate systems (Mainland Tanzania, Zanzibar, and DSFA) into one integrated framework. Newly added sites should be in place or at least going simultaneously. Equally critical is the issue of sustainability: reliable monitoring requires continuous financing to support enumerator transport and the maintenance of digital infrastructure. Without consistent investment, data collection could become irregular, leading to gaps and delays that compromise the timeliness and utility of the data. These risks underscore the need for careful planning, phased implementation, and resource mobilization to ensure that expanded coverage delivers the intended benefits.

5. CONCLUSION

Tanzania's artisanal tuna and tuna-like fisheries play an important role in food security, livelihoods, and regional tuna production. Yet, monitoring only seven landing sites does not adequately capture the scale and diversity of this sector. Based on a statistically sound sample derived from the 106 currently surveyed sites, the proposed expansion of monitored sites represents a critical step toward strengthening the reliability and completeness of national fisheries data. By improving the spatial representativeness of monitoring, Tanzania will enhance its ability to provide accurate and standardized catch and effort data to the IOTC, contributing to more robust regional stock assessments and sustainable management of tuna resources in the Indian Ocean.

At the same time, the expansion must be approached strategically to ensure its long-term success. Implementation requires methodological rigor, institutional commitment, adequate financial resources, and improved data management systems. Addressing these factors will allow Tanzania to transition from limited, fragmented monitoring to a harmonized framework that captures the full scope of artisanal tuna fisheries.

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