

Ghana Pole and Line FIP

Advice on the management of small pelagic fisheries in Ghana, in particular baitfish fisheries

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Acronyms

CECAF	Fishery Committee for the Eastern Central Atlantic
CP	Contracting Parties
DFAD	Drifting Fish Aggregating Device
EU	European Union
FIP	Fisheries Improvement Project
ICCAT	International Commission for the Conservation of Atlantic Tunas
IUU	Illegal, Unreported and Unregulated fishing
MAP	Multiannual Plan
MPA	Marine Protected Area
MoFAD	Ghanaian Ministry of Fisheries and Aquaculture Development
RFMO	Regional Fisheries Management Organization
FAO	Food and Agriculture Organization of the United Nations
RFMO	Regional Fisheries Management Organisation
SC	Scientific Committee

1 Executive Summary

The Ghana Pole and Line Fisheries Improvement Project (FIP) has identified several areas in the tuna pole-and-line fishery that need improvement. One of them is the live baitfish fishery that is the basis for the pole-and-line tuna fishery, and specifically its lack of management while small pelagic stocks in Ghana are diminishing. The objective of the present report was therefore to present a management plan and recommendations for the small pelagics fishery in Ghana, with particular focus on the baitfish fishery. However, through the course of the contract and based on literature review and stakeholder interviews, it became clear that **the basic information needed to draft a management plan, such as catch composition, was not available.**

In this context, the report is divided between four different sections: status of pelagic stocks, estimation of baitfish fishery catch, management measures in place and final recommendations. The present report provides for the time an **estimation of the total catch of small pelagics used by the tuna pole-and-line fishery in Ghana between 2019-2022.** Using four different methods and auxiliary variables to estimate total baitfish catches, it was estimated that **around 530 tonnes of small pelagics were used annually by the tuna pole-and-line fishery. This catch volume represents less than 1% of the total annual average catch of small pelagics** in Ghanese waters. On the management measures reviewed, the 2015-2019 Ghana national management plan already contain the required management measures but its implementation status is unclear. Finally, several specific management measures applicable to the baitfish fishery were suggested, namely the obligation to record baitfish caught or bought in the logbooks, while observers should continue to report on baitfish used.

2 Introduction

The Ghana pole-and-line Fishery Improvement Project (FIP) started in November 2018, and includes 17-18 vessels operating in the Eastern Atlantic Ocean, in the Ghanaian, Côte d'Ivoire and Beninese Exclusive Economic Zones (EEZs) and to some extent on the high seas. This fishery targets mostly skipjack tuna (*Katsuwonus pelamis*) but some relatively smaller quantities of both bigeye (*Thunnus obesus*) and yellowfin (*Thunnus albacares*) tunas are also caught. The fishery operates with the use of live bait of small pelagic species in combination with drifting fish aggregating device (DFADs).

The evaluation work that led to the development of the FIP workplan (Defaux & Huntington, 2018) highlighted severe weaknesses with the Ghana national management strategy for the small pelagic fisheries, including that of the baitfish which forms the basis of the tuna pole-and-line fishing operations. In this regard, and to meet the FIP workplan requirements, the FIP outsourced an assessment of the status of the management of the baitfish fishery and any possible recommendations to improve it.

3 Terms of Reference

The objective of this consultancy is thus to provide advice on the management of small pelagic fisheries in Ghana, in particular baitfish fisheries. The deliverables are as follow:

- **Present status of the baitfish fishery – update from the previous report**
Review and update the last baitfish fishery management report prepared under the scope of this FIP. This should also incorporate any new or additional information on this matter which has become publicly available since the publication of the said report, including the status and distribution of the relevant stocks.
- **Current national small pelagic fisheries management plan/strategy and evaluate the associated requirements for management**
Understand the current management plan and highlight any specific management measures regarding the baitfish fishery.
- **Evaluate the most appropriate regional management of these stocks and propose changes aimed at improving the national small pelagic fisheries management plan/strategy.**
The consultant should propose what are the most urgent changes to the national management plan so that all the relevant MSC KPIs improve to meet the standard for certification.
- **Propose baitfish-specific management measures** which are to be implemented by both canoes (catching baitfish) and by the P&L vessels, including a mechanism of its regular review. The consultant should devise an adequate plan to make sure all vessels transition quickly to full compliance to the newly-proposed management measures.

4 Methods

A systematic literature review was carried out to gather the current available information about the Ghana pole-and-line FIP and the status of small pelagic in Ghana. The bibliographic review considered the following documents:

- Asiedu et al. (2021) Marine Policy paper
- Meeting notes with Ghana Fisheries Commission with FIP Coordinator
- MoFAD (2015) Fisheries Management Plan 2015-2019
- Lazar et al. (2020) small pelagics stock status report
- Caramelo (2022) review
- FIP reports since 2019 (FIP Scoping, FIP Action Plan, 3 FIP reports)
- FIP Audit Report 2022
- **Draft MoFAD Fisheries Management Plan 2020-2024?**

Relevant stakeholders (scientific bodies, managers, independent consultants, etc.) were also contacted to clarify shortcomings and missing information.

Name	Affiliation	Date	Points discussed
Louize Hill	Consultant, Belgium	12/7/2022	<ul style="list-style-type: none"> • Data collection & reporting • Illegal fishing • Fishery management
Francisco Leotte Kat Collison	Thai Union, Portugal Key Traceability, UK	12/7/2022	<ul style="list-style-type: none"> • FIP structure and actions • Catch and ETP species • Data collection • Management measures • Illegal fishing • Fishery co-management
Francisco Leotte Kat Collison Samuel Ayertey	Thai Union, Portugal Key Traceability, UK Ghana Tuna Association	12/7/2022	<ul style="list-style-type: none"> • FIP structure and actions • Catch and ETP species • Data collection • Management measures • Illegal fishing • Fishery co-management
Francisco Leotte Kat Collison Benedictus Ashigbui Sylvia Ayivi Emmanuel Kwdovlo	Thai Union, Portugal Key Traceability, UK Consultant, Ghana Fisheries Commission, Ghana	(26/7/2022) 3/8/2022	<ul style="list-style-type: none"> • FIP structure and actions • Catch and ETP species • Data collection • Management measures • Illegal fishing • Fishery co-management
Maria Sofia Villanueva	DG MARE, European Comission		<ul style="list-style-type: none"> • Illegal fishing • Saiko fishing

5 The Ghana pole-and-line tuna fishery

This section provides a description of the Ghana pole-and-line tuna fishery and is mainly based on the description provided by Defaux & Huntington (2018) and Defaux et al. (2018). The Ghana-flagged pole-and-line vessels fishing for tuna in the Eastern Atlantic Ocean land most of their catches in Ghana, where the vessels are permanently based. The fleet catch mainly skipjack and yellowfin tuna as target species, in association with bigeye tuna. To catch tuna, the pole-and-line vessels use drifting fish aggregating devices (DFADs) and small pelagic fish as bait that they fish directly or buy from the artisanal fleet.

Historically all or part of the Ghana pole-and-line fleet has collaborated with purse seiners to catch tuna (IPNLF, 2012 in Defaux & Huntington, 2018). However, since 22 June 2017 this collaboration was prohibited by the Ghanaian fisheries authorities. Since then, the Ghanaian fisheries authorities has reportedly been deploying systematically an observer on board any fishing trip of a Ghanaian pole-and-line vessel to monitor the fishing activities (Defaux & Huntington, 2018).

Live bait caught by the pole-and-line vessels along the Ghanaian coast include anchovy (*Engraulis encrasicolus*), bonga (*Ethmalosa fimbriata*), horse mackerel or scad (*Trachurus trachurus*) and juvenile sardinella (flat *Sardinella maderensis* and round *S. aurita*), although according to stakeholders presently the catch is composed mainly by anchovy. It must be noted that following the ban of the purse seine collaboration in mid-2017, the Ghanaian pole-and-line vessels were likely to have increased the volume of bait used (Defaux & Huntington, 2018; Defaux et al., 2018).

The live baitfish bought comes from the Ghanaian artisanal sector that predominantly targets the small pelagic fish. The majority of the motorized canoes propelled by 25–40 Hp outboard engines catch small pelagic fish almost all year-round using purse seines, encircling gillnets and beach seines. Again, sardinellas, anchovy and chub mackerel (*Scomber japonicus*) are the most significant small pelagic fish species along the coast of Ghana and in the Western Gulf of Guinea (several authors in Asiedu et al., 2021).

6 Status of small pelagic stocks

Advice for the management of small pelagic fisheries in the Gulf of Guinea is usually prepared every 2 to 3 years under the scope of the FAO CECAF Small Pelagics Working Group (SPWG). The work is based on fishery-dependent data collected by authorities in member countries and supplemented with data and information obtained from fishery-independent stock assessment surveys conducted through the FAO/Norway EAF-Nansen Programme using the R/V *Dr Fridtjof Nansen*.

Of the stocks analyzed by the CECAF Small Pelagics Working Group South (SPSWG), two were found to be overexploited and almost exhausted: round and flat sardinella, and the CECAF recommendation is to not increase catches above the average of the last five years in order for the biomass to grow (SPSWG considers the stock in very bad condition, near collapse, and the fishery should be closed). One stock was considered not fully exploited: anchovy, and SPSWG recommended, as a precautionary measure, that the catch level should not exceed the 2017 catch levels (50,000 tonnes) for Ghana, Togo and Benin (no data for Ivory Coast). No assessment model could be applied for the other stocks due to either lack of data,

poor quality of data or sometimes no reliable model results. For these stocks, as a precautionary measure, the 2018 SPSWG and 2019 Committee recommended that the catch level should not exceed the average of the last five years or in some cases the catch of the last year of the series (Annex 1 in CECAF, 2019; Caramelo, 2022).

In accordance with the FAO results, the landings of the small pelagic species in Ghana show a continuous decline over the past two decades. Since 2020, there has been a drastic decline in the landings of round sardinella. Landings of the anchovy fluctuated over the period, however, landings increased significantly after 2016 (Figure 1).

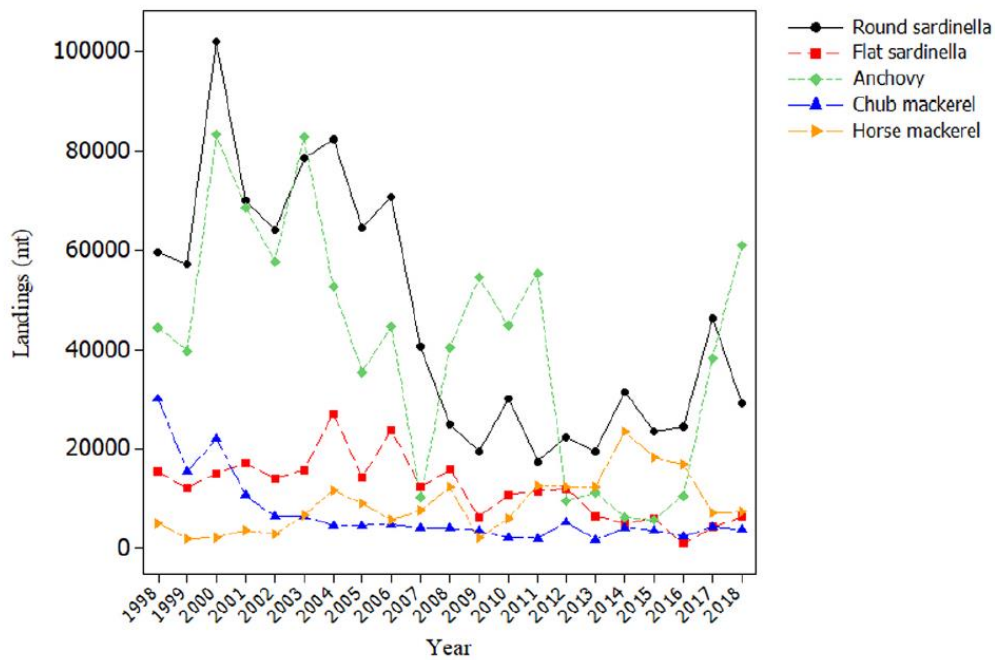


Figure 1- Landings of important small pelagic species in Ghana (Asiedu et al., 2021).

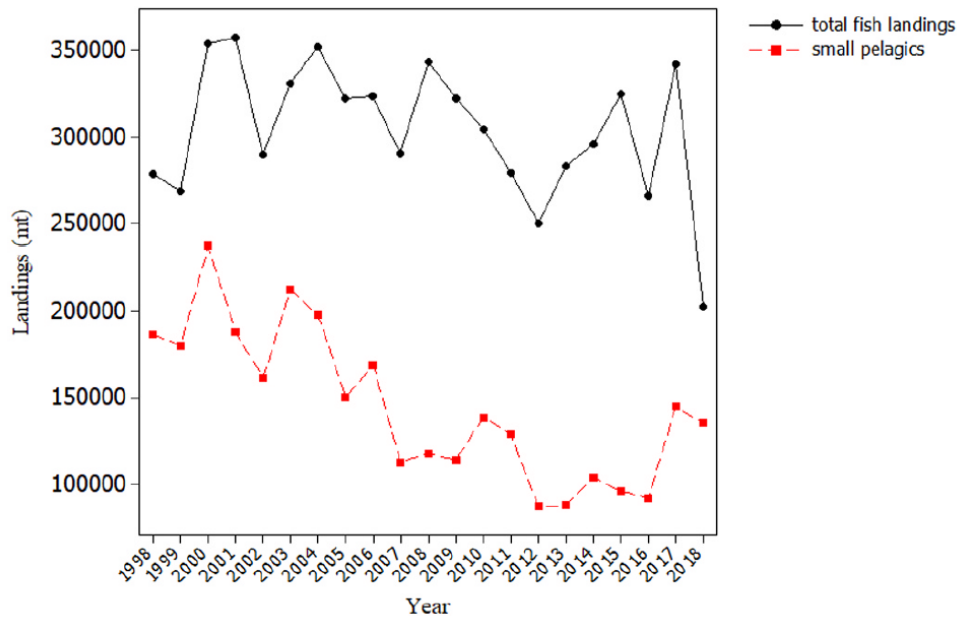


Figure 2 - Total fish landings and small pelagic fish stocks in Ghana (Asiedu et al., 2021).

7 Status of the baitfish fishery

The first question to be asked when analysing the impact of a fishery is what are they catch composition (what, where and how much does it catch?). In other words, how much is the fishery contributing to the stock/population total catches? Because depending on its contribution, so to depends its management and the required measures.

Unfortunately there seems to be an almost total lack of knowledge regarding the Ghanese live baitfish fishery that targets small pelagics to be used as live bait for the tune pole and line fishery. This is somewhat surprising, considering that this issue has been already identified by Defaux & Huntington (2018) in their scoping document for a FIP.

Based on stakeholder information collected during this project, presently the fishery is based almost exclusively on anchovy, as sardinella stocks have diminish significantly over recent years. The pole-and-line boats may fish directly for the live anchovy (which lasts longer in the holding tanks alive, up to a week) or they may buy from canoes (has less survivability, around a couple of days, because of several handling events and use of chemicals and light while fishing). According to the 2019 observer reports of the tuna pole-and-line vessels accessed, only in one occasion in 8 trips did the boat actively fished for live bait, while in the remain occasions the boat bought the live baitfish from canoes. The baitfish is paid in tuna catches, that are nonetheless reported in the logbooks (see next sections) instead of money since 2017?

Finally, since the live baitfish is moved from the canoes to the pole-and-line boats, it is not landed and therefore is not monitored in the national catch statistics. There are also no reporting requirements to record the baitfish bought or caught by the pole-and-line vessels.

7.1 Methods

To estimate the catch taken by the baitfish fishery, either by fishing directly or buying from the canoes, several methods to estimate the baitfish catch were considered:

1. **Number of buckets** declared by the Ghana Fishing Association 2019-2021, considering an average total wet weight of fish of 18-20 kg per bucket, and that each bucket has between 25-30% baitfish
2. **2019 Observers reports** with baitfish information, considering a 15 kg weight per bucket and that 8 out of 17 (47%) 2019 observers reports have bait information.
3. **Quantities of tuna paid.** The observers report that baitfish is paid with tuna directly to the canoes. In subsequent investigation, it was made aware that the tuna paid to the canoes is reported in the logbooks, **but annotated with a different code?**
4. **% of baitfish used per tuna caught.** It is reported that between 8-15% of baitfish is needed to catch tuna. Therefore if there is an estimation of total tuna caught with the use of live baitfish, then one could estimate the total catch of baitfish used.

For the estimation of the total catch of baitfish used by the Ghanaese tuna pole-and-line fishery, it was considered that while the baitfish is released alive it has very low survivability, not only because of being handle several times but also due to the use of light and chemicals used in its capture that lowers its survival rate, and therefore the catch is considered with 0% survivability. This is also consistent with the MSC criteria that without data to demonstrate survivability, a precautionary approach should be taken and thus a 100% mortality should be considered.

7.2 Results

The different methods described above give similar results, to a total estimated catch of 530 tonnes of baitfish used per year (Table I). Considering around an average total annual small pelagics catch of 125,000 tonnes (Figure 2), the pole-and-line tuna fishery contributes to around 0.4% of the catches of small pelagic species.

Table I – Annual total baitfish catch (tonnes) used by the eight tuna pole-and-line vessels in Ghana between 2019 and 2021, using four different estimation methods and considering around eight fishing trips annually.

Method	Variable	Estimated total baitfish catch (tonnes)		
		2019	2020	2021
1. Buckets declared GTA	18 litres bucket containing 30% baitfish	576.2	507.0	514.1
2. 2019 Observer reports	15 litres bucket containing 30% baitfish	441.4	NA	NA
3. Tuna payments				
4. Proportion baitfish to tuna catch	8-15% baitfish used			

8 Review Ghana small pelagic fisheries management

In Ghana, commercial fishing for small pelagic fish is guided by a number of policy framework which is based on the broader Fisheries Act, 2002 (Act 625), Fisheries (Amendment) Act, 2014 (Act 880) Fisheries Regulations, 2010 (L.I. 1968) and Fisheries (Amendment) Regulations, 2015 (L.I. 2217) (Asiedu et al., 2021). In addition, management measures applicable to small pelagics are also included in a national Fisheries Management Plan. Presently a new plan is being prepared to replace the outdated plan that covered the period 2015 – 2019.

Ghanaian legislation enables real-time monitoring of the pole and line vessels by VMS (but not through an automatic identification system). Sanctions have been recently updated. Also, Ghana published a FAD management plan in 2015, following ICCAT requirements. Finally, Ghana has implemented an observer scheme on board its national pole and line fleet since mid-2017, in particular to ensure that collaboration with purse seiners does not occur anymore (Defaux & Huntington, 2018).

The Ghanaian pole-and line-vessels are authorised to catch bait within waters shallower than 30 m depth through their fishing licences.

8.1 Recommendations for small pelagic fisheries management

As stated before, the national management plan 2015-2019 (MFAD, 2015) included several measures that should be introduced. Without knowledge if any the measures proposed were actually implemented, all the management measures listed are still considered to be applicable. These can be summarised by the four global measures listed by Asiedu et al. (2021):

- Fortify fisheries enforcement unit to ensure effective monitoring and surveillance to eradicate saiko and other forms of illegal fishing.
- Limit entry into the fishery through restricted licensing particularly for artisanal fisheries as required by Fisheries Act 625 (2002).
- Amend the timing of closed seasons to coincide with the peak breeding season of small pelagics and extend the duration of the closed season for both artisanal and industrial sectors.
- Increase frequency of stock assessments of the small pelagic species particularly for sardinellas and anchovy.

8.2 Baitfish fishery management measures

Specifically for the live baitfish fishery, several management measures can be already taken, and some have already been proposed by Defaux & Huntington (2018):

- Logbooks should be expanded to allow for reporting of baitfish catch and bought,
- Compulsory reporting needs to be introduced for the baitfish caught or bought. It should be recorded separately in the logbooks,
- Observers reporting should continue to include baitfish recording.

9 Recommendations

Considering the general lack of data regarding the live baitfish fishery that feed the pole-and-line fishery, it is highly recommended that a data collecting and monitoring programme be initiated. This programme should collect data on the canoes fishing, namely catch composition and volumes, area of operation, fishing techniques, but also on the catch by the pole-and-line boats.

Considering the FIP existence and the willingness of FIP vessels skippers to participate, it is also suggested that the programme could be initiated within the FIP activities, to be moved to the national fisheries authorities in the short term.

10 References

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