

Supplementary Information

Socioeconomic dynamics of the Ghanaian tuna industry: a value-chain approach to understanding aspects of global fisheries

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Table S1: The 31 organisations or companies in Ghana visited during the 2013 study

Visits, questionnaires and interviews in the field						
Name	Type	Times visited	Questionnaire?	Interview?	Data?	Location
Ghana Customs, Excise and Preventive Service	Governmental	3	No	Yes	Yes	Accra
Ghana Export Promotion Authority	Governmental	2	No	No	No	Accra
Ministry of Fisheries and Aquaculture Development	Governmental	3	No	Yes	Yes	Accra
Ministry of Trade and Aquaculture	Governmental	3	No	Yes	Yes	Accra
Food and Agriculture Organization	Governmental	3	No	No	No	Accra
Environmental Protection Agency	Governmental	2	No	Yes	No	Accra
Ghana Standards Authority	Governmental	1	No	Yes	No	Accra
Friends of the Earth Ghana	Non-governmental	1	No	No	No	Accra
WorldFish Centre	Non-governmental	1	Yes	Yes	No	Sekondi-Takoradi
University of Ghana	Educational	1	Yes	Yes	No	Accra
Ghana National Association of Farmers and Fishermen	Non-governmental	1	Yes	Yes	No	Accra
Ghana Statistical Service	Governmental	5	No	No	Yes	Accra
FAO Statistical Service	Governmental	1	No	Yes	Yes	Accra
Marine Fisheries Research Division	Governmental	5	Yes	Yes	Yes	Tema
Monitoring, Control and Surveillance Division	Governmental	2	Yes	Yes	No	Tema
Monitoring, Control and Surveillance Division	Governmental	1	Yes	Yes	No	Sekondi-Takoradi
Ghana Ports and Harbour Authority	Governmental	3	No	Yes	Yes	Tema
Pioneer Foods Cannery	Private	1	Yes	Yes	No	Tema
Myroc Food Processing	Private	3	Yes (x2)	Yes	Yes	Tema
Regional Fisheries Directorate	Governmental	2	Yes (x2)	Yes	No	Tema
Mankoadze Cold Store	Private	1	Yes	Yes	No	Tema
Afko Fisheries Co. Ltd	Private	4	Yes (x2)	Yes	Yes	Tema
Agnespark Fisheries Ltd	Private	2	Yes	Yes	Yes	Tema
Clear Skies Co. Ltd	Private	3	No	No	No	Tema
Panofi Co. Ltd	Private	4	Yes	Yes	No	Tema
World Marine Co. Ltd	Private	5	Yes	Yes	Yes	Tema
D-H Fisheries Co. Ltd	Private	2	Yes	Yes	Yes	Tema
Rico Fisheries Ltd	Private	2	Yes	Yes	Yes	Tema
Trust Allied Ltd	Private	1	Yes (x2)	Yes	Yes	Tema
TTV Ltd (Tema Tuna Ventures)	Private	1	No	No	No	Tema
G-L Fisheries Ltd.	Private	1	Yes	Yes	Yes	Tema
Total	31	69	23	25+	15	3

Appendix S1: Description of female intermediaries in the tuna industry in Ghana

‘Big Mammies’

Each company has registered Ghanaian customers that sell the tuna to the local market. These customers are usually women, locally known as ‘Big Mammies.’ Companies can have over 14 regular Big Mammies to which they can sell their fish. Big Mammies usually enter the tuna industry at a young age, through female inheritance or their husbands; however, in some cases their family members are not involved with the fishery at all. These women come from all over Ghana; they travel to the cold stores at Tema every month or less often, depending on the tuna landings. Many are businesswomen with other ventures that have done well and/or have access to large bank loans.

One of the Big Mammies who interacted with the principal researcher during the study mentioned that she received her tuna from Tema Tuna Ventures (TTV; one of the largest companies, owned by the Thai Union Group through MW Brands). She contributed to the running of the TTV vessels with capital acquired through banks. She entered the business through her mother, who was also a Big Mammy. Unfortunately her business was experiencing dwindling returns at the time of the study (estimated to be just US\$154.60 for the entire first quarter of 2013). She attributed this to the failure of repayments by Fish Mammies from further away (inland Ghana), who bought the tuna on credit arrangements.

‘Fish Mammies’

In the local value chain, once the Big Mammies have received their tuna, another group of women will normally buy it from them for processing and/or retailing. These women are referred to as Fish Mammies and comprise two types: Grade-One Fish Mammies will buy tuna in small quantities (between one and ten individual tuna), while Grade-Two Fish Mammies will buy in bulk (up to 50 tuna). At the time of the study, they could buy the tuna for approximately US\$10 per individual for the smaller sizes, and over US\$65 for a large tuna. The tuna in the local market is usually smoked before being sold to consumers. The smoking process takes place in traditional wood-burning ovens and stoves, which are not very efficient and can use large amounts of wood, usually collected from the surrounding area. A large amount of the local fish products eaten in Ghana are processed via smoking. Once the tuna is smoked it can be sold to the next group of Fish Mammies and/or retailed. Thus, the tuna can pass through many Fish Mammies before being sold to the consumer. The sales between the Fish Mammies normally takes place through credit, and the buyer is given a certain time period for making full payment (usually within weeks or months), with interest.

Appendix S2: Synopsis of the institutional setting for the Ghanaian tuna industry

Local bodies and legislation

Ministry of Fisheries and Aquaculture (MoFAD)

The principal national organisation that regulates and controls the Ghanaian tuna value chain is MoFAD. Under this ministry is the Fisheries Commission (FC), which controls the Fisheries Scientific Survey Division (FSSD; previously known as the Marine Fisheries Research Division [MFRD]) and the Monitoring, Control and Surveillance Division (MCSD). In Ghana, all tuna-fishery licensing, certificates and reports are dealt with by the FSSD and MCSD in Tema. MoFAD offices are located in Accra and are headed by a Minister. In terms of data, MoFAD simply receive summaries from their research divisions, which collect the raw data, and treat and compile it for them. At the time of the study, MoFAD had little information on the tuna fisheries—only an annual summary of the industrial landings and monetary values for 2011 and 2012. Methods of collection and detailed information of the tuna data was not known.

Fisheries Scientific Survey Division (FSSD) and Monitoring, Control and Surveillance (MCS)

Tuna fishing regulations are meant to be implemented by MoFAD, but FSSD issues a catch certificate after each trip, which must accompany the landings to show their country of origin. This is according to a European Union (EU) law made in response to illegal, unreported and unregulated (IUU) fishing as well as the recommendations of the International Commission for the Conservation of Atlantic Tunas (ICCAT). According to the FSSD, it is ICCAT that have the main control over them, and each year they compile vast reports for ICCAT. The FSSD reviews the logbooks from each tuna trip, as required by ICCAT; moreover, the annual report made to ICCAT must include the logbook histories for the year. Any quantitative information about the tuna that goes to the 'Big Mammies' (see Appendix S1) is unknown to the FSSD.

In 2012, the MCSD was located in the same building as the FSSD and is in charge of the vessel monitoring system (VMS)—which is extremely important for the industrial tuna fleet. Ghana requires a VMS certificate to be issued with each landing, to indicate where the tuna was caught and so make it traceable. The logbooks are supposed to back up the VMS data. The VMS system is part of an ICCAT–VMS network in which a transmitter is installed on each vessel, a satellite receives information on the position and speed of the vessels and relays it to the MCS in Tema. In turn, this data can be sent on to the MCS programmes of other countries.

At the time of the study, the MCSD had only one VMS system, which was located in their Tema branch for tuna vessels. The VMS system was apparently supplied by ICCAT in November 2012. Before this, Ghana had a contract since 2005, with a private firm (Blue Fingers) from the United Kingdom, to supply a VMS system to control the tuna fleet. Notably, the Ghana Navy is mandated to support the MCSD on periodic sea patrols as part of the monitoring exercise; the MCSD also has the power to ask for naval assistance when they suspect IUU fishing is occurring. Tuna observers are sent out on the vessels from time to time, by the MCSD, since they are required by ICCAT to be present during a two-month period in winter when FADs are banned. During the rest of the year the observers are placed on purse-seiners only at random. The tuna observers are usually marine science students or graduates. Each department of the MCSD has, or is supposed to have, a satellite automatic identification system (AIS) which allows them to identify importing vessels in the maritime waters. The AIS assists the MCSD to distinguish between types of vessels and even the cargo they are carrying. In conjunction with websites (such as marinetraffic.com and vesseltracker.com), the MCS officers can confirm whether there are seafood products on board. In this case, MCS officials will be present at the port to receive a permit for the bulk products. However, officers with the MCSD at Sekondi-Takoradi said they had never worked with these permits before.

The FSSD, MCSD and Customs, Excise and Preventive Service (CEPS) are required to monitor any of the transshipment activities carried out. According to the MCSD, this takes place upon anchorage outside of Tema harbour.

Legislation

The Fisheries Act 625 from 2002 and the Fisheries Regulation L.I. (Legislative Instrument) 1968 from 2010 are the major pieces of legislation that govern the tuna fleet. The FC, and therefore the FSSD and MCSD, were established to implement this legislation. The Act includes all policies related to inland, freshwater and marine fisheries as well as aquaculture. The L.I. was drawn up to enforce the Act and includes measures for conservation as well as plans for development in Ghanaian fisheries and aquaculture. The Act and the L.I. include regulations for the tuna fleet that try to ensure Ghana maintains some type of share in the fisheries and yet attracts foreign investors who can cover the heavy financing.

Forty percent of the questionnaire respondents said the Act and the L.I. are the main rules that govern their role in the tuna industry; following this was international legislation. Thirty-five percent of the respondents also indicated that the ICCAT recommendations and the EU regulations were the most important in the tuna industry.

Ghana Standards Authority (GSA)

The GSA is very present in the tuna industry at the production and processing stages. Permits and certificates are issued by the GSA before tuna can move through the value chain to be exported or sold in Ghana. The GSA controls all aspects of hygiene and quality standards, both on board the tuna vessels and in the processing plants. Hygiene and sanitation on board is investigated by reviewing all cabins, toilets, kitchens and meeting areas. Cleaning records should be kept for the entirety of the fishing expeditions and these are reviewed by GSA to check whether they are up to standard. Medical records are also inspected as it is important to know how patients were isolated and treated. The tuna-holding facilities are thoroughly inspected for any damage or liabilities. The tuna is frozen to -9°C , and this temperature is maintained for the entire trip. The GSA has temperature monitors in each ship's hold, and at the time of docking the temperature profiles for the trip are measured randomly. The GSA asks for health and safety to be upheld on vessels yet they do not regulate it. The GSA does incorporate EU regulations into their policies because a very large proportion of the tuna goes to the EU. Before a vessel leaves for a trip, the GSA again conducts an inspection and issues another certificate. In the research questionnaires, stakeholders revealed that exporting to the EU is a difficult procedure because of the stringent standards that must be met; the United States has much lower standards but that market is more closed towards Ghana.

Ghana Customs, Excise and Preventive Service (CEPS)

The CEPS has substantial data on tuna imports and exports, as it monitors the flow of tuna in and out of Ghana (both the origin and destination). The CEPS controls all the Ghanaian borders (land, sea and air). Officers at its various checkpoints register the tuna products on a computerised system as the products pass into, out of, or sometimes through Ghana. Once registered electronically, CEPS offices all over Ghana can observe the imports or exports that have just arrived in or left the country. The Harmonised System (HS) code, which all commodity imports have, allows the customs officer to apply the correct value-added tax (VAT). The customs administration works quite closely with the FC and its sectors, assisting them mainly in the port of Tema.

Ministry of Trade and Industry (MoTI)

The MoTI holds all the traceability reports for the export-oriented tuna value chain, presided over by a traceability committee. However, no traceability information on tuna exports was available for this research.

Ghana Investment Promotion Centre (GIPC)

It is here the tuna fishing business starts officially. To set up a tuna fishing company as a joint venture, each investor needs to register US\$10 000-worth of equity at the GIPC, showing at least 50% Ghanaian dividend throughout the venture. This requirement is in accordance with Ghanaian law (the Fisheries Act 625). The accounts are occasionally audited to confirm that Ghana always has at least a 50% share in the business ownership. The operational costs, however, can be paid for by the foreign counterpart, which is usually Korean.

Ghana Ports and Harbour Authority (GPHA)

The GPHA is in control of the tuna-vessel movements and activities inside the Tema Fishing Harbour. The GPHA has records of tuna-vessel calls made per annum, and operational statistics on fish export and import, which includes tuna landings. As the tuna fleet is quite large, the GPHA is frequently in contact with the vessels for piloting, docking, offloading and berthing activities. Officers from the GPHA work closely with the crew and staff from the tuna ventures once a vessel enters the fishing harbour. The GPHA generates independent reports of all tuna landings.

The Freezone Enclave

The Tema Freezone Enclave was created to aid economic development in Ghana. Two others are located at Accra and Sekondi-Takoradi. Tuna products that are not consumed in Ghana can be exported free of duty tax. A maximum of 30% of produce can go to the Ghanaian national market. However, the products that are sold to Ghanaian businesses are treated as imports and taxed accordingly.

Non-governmental organisations

The Ghana Tuna Association (GTA) comprised representatives from all 10 fishing companies. Over 40% of the respondents from this group indicated that their organisation has provided the main platform where all companies can interact and discuss the tuna industry and business. At the time of the study, the head of the GTA was the director of the Panofi Company.

Other groups that were engaged during the research were the Ghana National Association of Farmers and Fishermen (GNAFF) and the National Fisheries Association of Ghana (NFAG), which are bodies that represent organisations from the agriculture and fisheries sector, both private (e.g. tuna companies) and public. The study revealed that these two groups provide support to fisheries by giving stakeholders a chance to voice opinions and concerns as well as helping to campaign for needed resources. Furthermore, they can help the ministries involved in the tuna industry by providing the needed data, such as registered fishermen in the sector. According to the ex-president of GNAFF, the majority of those who were involved in the enactment of the laws are those associated with the industrial sector, with no involvement of the artisanal fishermen.

International bodies

International Commission for the Conservation of Atlantic Tunas (ICCAT)

Ghana is a member of ICCAT and therefore must follow all their recommendations. Each vessel is required to buy an ICCAT license every two years.

In 2012, the cost of this license for a purse-seiner was US\$15 000. Every two years there is an international meeting at which the recommendations are discussed and new ones are made. Recommendations include: the prohibition of FADs during certain months; using catch certificates; having tuna observers; increased standards of port inspections; and using trade restrictions and the setting of quotas. During the study, the FSSD and the MCSD indicated that the ICCAT recommendations have had some control over the tuna industry. The FC enforces the regulations on the individual companies, while ICCAT applies the recommendations and their commensurate sanctions when flouted by Ghana as a country. In 1996, ICCAT began to require import bans on non-member tuna (Francis 2007),¹ eventually forcing Ghana, for the sake of their market, to become a member.

The European Union (EU)

Many aspects of EU legislation affect the Ghanaian tuna industry and trade arrangements between them. Many respondents said that trying to keep up with the EU's health and safety or quality standards, which are very stringent, is

¹Francis, K. (2007) Individual interests, public detriments: an institutional economics analysis of the ICCAT's Atlantic bluefin tuna policies. Madrid, Spain: International Commission for the Conservation of Atlantic Tunas. Available at: https://www.pugetsound.edu/files/resources/1359_IndividualInterestsPublicDetriments.pdf [accessed 15 August 2018]

hard work. One respondent noted that the EU should focus more on the actual fishing activity than constantly on food safety.

Under Economic Partnership Agreements (EPAs) with the EU, Ghana receives preferential import duty rates into the EU. This boosts the competitiveness of the Ghanaian tuna entering EU markets. The 2000 Cotonou Agreement is the basis for these preferential tariffs, as the successor of the Lomé Agreement in 1975.

The processors must adhere to the different health, safety and quality certifications that EU markets require. Processors must be issued with many different types of certificates and they need to be audited before the tuna products can be sold in the EU. The Société Générale de Surveillance (SGS, based in Switzerland) is an international inspection, testing and verification company that provides some of the required documentation needed to sell in the EU. The SGS looks at all aspects of tuna production in Ghana before certifying the processors; it also verifies health and safety, environmental impact, quality control, risk assessment, product safety and more.

The British Retail Consortium (BRC) is a trade association that issues the food-safety certifications demanded by most supermarkets in the United Kingdom. Therefore, the Ghanaian processors must apply to them, adopt all the recommendations, and pass the audits before being able to sell in that market.