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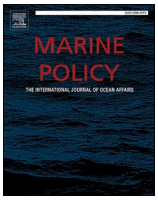

Unpacking the tuna traceability mosaic – EU SFPAs and the tuna value chain

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ABSTRACT

Traceability has been gaining in importance recently and has seen its potential uses within fisheries expanding from primarily food safety to combat illegal fishing and promote sustainability. In the tuna value chain, key processing actors have introduced comprehensive systems allowing consumers to trace products right back to the vessel that caught the tuna and the catch date. Traceability is also an important component of EU SFPAs (Sustainable Fisheries Partnership Agreements). This paper explains the rationale for the EU entering into SFPAs and shows how the current portfolio of SFPAs exhibits an increasing dependence on access to tuna stocks. Utilizing a unique dataset, we present information on area, method of capture and landing site for EU SFPA vessels. We show that there are economic incentives for vessels to misreport, and clear traceability challenges as vessels fish several species and across several areas (both coastal and in areas beyond national jurisdiction - ABNJ). The tuna value chains in Cabo Verde and the Seychelles are then examined from a traceability perspective. As we report, while an EU catch certificate scheme (CCS) operates to cover all tuna products imported into the EU market, there are flaws in the current system which need remedying.

1. Introduction

In the last decade, there has been an increased emphasis on transparency [18] and the expanded use of traceability mechanisms in the global seafood market ([7,19,46,75,79,86], and [8]).[1] Although originally intended to help product recall in the interests of food safety,[2] traceability mechanisms have been progressively harnessed to combat the 'illegal harvesting of seafood and the mislabelling of seafood products' ([68]: A13, Heylar et al. [47]), advance labor standards, and address sustainability concerns in the light of increasingly depleted marine resources ([4]:25).

As a consequence, Roheim et al. [80] have argued that suppliers and traders are increasingly subjected to external scrutiny regarding their sustainability credentials. Thus, in order to assure both their own credibility and the credibility of other value chain operators, there is a strong onus on them to ensure traceability is fully transparent across the value chain. Authors like Stemle et al. [85] have argued that compliance costs, in terms of increased auditing and management requirements and accompanying changes in the production process, may be more than offset by reputational gains, enhanced market access and potential price premiums. [45] provide a detailed overview of how five corporations (Bolton Group, Bumble Bee, Dongwon, Princes and Thai Union) have acceded to demands for greater transparency through the introduction of comprehensive traceability systems and 'Responsible Quality' programs. In the case of Thai Union, the company instituted a global sustainability strategy ('Seachange'), signing a partnership agreement with

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[1] In this paper we understand transparency to be the 'extent to which all the network's stakeholders have a shared understanding of, and access to, product and process related information' [5]82) that they might request, while traceability refers to the ability to trace and follow tuna or tuna-derived products through all stages of production and distribution [33]23). Thus, while a value chain may have mechanisms in place to guarantee full traceability, it will not be fully transparent if one [or more] network stakeholders is unable to satisfy themselves fully as to the provenance of the product.

[2] Love et al. [69] report there were 27.7 seafood recalls per 10,000 tons of seafood consumed in the U.S. over the period 2002–2018. The same authors also note that, over the same period, 1062 reported food outbreaks were linked to seafood consumption, outbreaks which caused 7697 cases of illness, 544 hospitalizations, and 10 deaths. In January 2020, for example, John West recalled sardine products in tomato sauce (FSA, [35]).

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the World Wildlife Fund committing it to ensure full traceability across all its European seafood value chains in 2014 [93]. WWF is further developing blockchain technology to trace and track the journey of tuna from sea to plate.[3] The formation by retailers and supply chain companies of a Global Tuna Alliance (GTA) in October 2019, facilitated the endorsement of the World Economic Forum's Tuna 2020 Traceability Declaration [90]. Central to the Declaration was the belief that 'improving traceability and transparency will significantly improve existing sustainability initiatives and shows the greatest promise for scalability into mainstream commercial activities.' In March 2020 the GTA released the results of a survey of T2020T signatories disclosing that all fishery, distributor and food service companies could trace tuna products in their value chains back to vessels and trip dates [41]. This in turn prompted 67 leading retailers/processors/traders, 21 influential civil society organizations and six governments to announce the 2025 Pledge towards Sustainable Tuna in March 2021 (GTA, [42]), committing the signatories to demonstrably improve value chain practices and fisheries management with a view to delivering the highest standards of environmental performance and social responsibility [16].

However, concerns about the feasibility of the pledges made remain. Sectoral concentration, and with it the mosaic of overlapping corporate responsibilities, can actively undermine the transparency of value chain processes, offering an opportunity to draw a veil over the less salutary aspects of the trade. Greenpeace reported that upstream linkages between tuna fishing vessels and traders remains a 'gray area' in traceability terms, and 'tainted catch' (in the sense of IUU fishing and forced labor failings) might well be seeping into the global value chain of the Fong Chun Formosa Fishery Company, the largest global tuna trader [39,40].

Transparency and traceability mechanisms are a leitmotif in EU Sustainable Fisheries Partnership Agreements (SFPA), with tuna the main target of the majority of these access agreements. The EU Resolution (2018/C 058/10) [20] setting out the current external dimensions of the Common Fisheries Program is adamant that 'SFPAs should ensure the *complete traceability* of marine fisheries products' (Clause 64, our emphasis), while the need for transparency is emphasized in multiple clauses of the same Resolution (12, 17, 37, 41–3, 45, 47, 49–52, 55 and 58). Despite this, a joint NGO release the following year [74] expressed concern that (a) current legislation failed to differentiate between traceability for control purposes (i.e., to counter IUU fishing) and traceability for transparency purposes (i.e., product labeling for consumer benefit), and (b) the provenance of imported seafood products could be in question as insufficient information (i.e., catch method, catch area, International Maritime Organization vessel number etc.) was being transmitted along the value chain.

This paper responds to these concerns by examining traceability and transparency in the SFPA tuna value chain, showing how EU sanctioned vessels targeting tuna connect and interact with the major players in the global tuna trade. The EU is one of the largest importers of tuna products, importing 788 thousand tonnes in 2019 [23]. In comparison, SFPA authorized catches (around 125,000 tonnes, see Table 1 and narrative following) account for a relatively small, but not insignificant part of this.[4] However, the EU market is also supplied by EU vessels which have been re-flagged to third countries. [36], for example, point out that while the Spanish tuna fleet comprises 23 purse seiners and accounts for 8% of the global tuna fleet, if the fleet controlled by Spanish companies flying third country flags are included then the fleet more than doubles to 53 vessels (13% of world fleet). In the case of the Seychelles, thirteen industrial purse-seiners fly the national flag, but all are in fact owned by foreign companies (primarily from Spain).[5]

In this paper we employ a unique Directorate-General for Maritime Affairs and Fisheries (DG-MARE) dataset containing information about quantities of catches by species, vessel flag state, spatial origin of the harvest (by FAO sub-unit), month and port state (territory where harvests enter the land-based value chain), and a unique vessel identifier. The data-set covers all reported EU vessel catches under the SFPA agreements for the period 2014–19 and is supplemented by interviews with key value chain interviewees. Section 2 of this paper highlights the importance of tuna in SFPA agreements over the last decade, and the current regulatory requirements designed to ensure value chain traceability and transparency. Section 3 identifies the areas and methods of tuna capture by vessels operating under SFPAs, before documenting where vessels land their tuna catches. Section 4 delves in more detail into how the SFPA tuna value chain functions in two specific countries – Cabo Verde in the Central East Atlantic region, and the Seychelles in the Western Indian Ocean. A concluding section builds on these findings to qualify the effectiveness of current EU SFPA traceability mechanisms across this particular set of tuna value chains.

2. Partnership agreements, traceability and the tuna trade

EU Fisheries Agreements owe their official origins to the November 1976 European Council resolution that created a 200-mile fishing zone along the Northern Atlantic and North Sea coastlines for the European Economic Community [27]. The 'need' for such access rights was precipitated by coastal state's sovereignty concerns, international concerns that led to the formal adoption in 1982 of the UN Convention of the Law of the Sea (UNCLOS). Article 62 of UNCLOS requires flag states having vessels operating in Exclusive Economic Zones (EEZ) of coastal states to follow regulations in place including: "licensing of fishermen, fishing vessels and equipment, including payment of fees and other forms of remuneration, which, in the case of developing coastal States, may consist of adequate compensation in the field of financing, equipment and technology relating to the fishing industry" (62–4.a). EU agreements were swiftly signed with Senegal (1979) and Guinea-Bissau (1980), with a further 18 agreements being registered with coastal states in Africa and Oceania over the following twenty years. In 2002, following a first reform of the EU Common Fisheries Policy, these fishing access agreements were re-titled Fisheries Partnership Agreements and, following a second reform, became Sustainable Fisheries Partnership Agreements (SFPA) in 2014 ([44]:174).

As [91] notes, EU fisheries agreements are deeply entangled in trade partnership agreements and rules of origin considerations, with EU policy documents from the late 1990s recognizing 'the potential of using trade in seafood products… as a tool for achieving sustainability goals internationally'. Campling, [9] for example, in his study of the canned tuna trade preferences argues that such non-reciprocal preferences were integral to the emergence of an ACP tuna canning industry and, by extension, helped facilitate the signing of new FPAs in the 1990s. The emphasis on 'sustainability' post-2014 is attributed by [48] to a shift away from the early 'pay, fish, go' type agreements. The 'third-generation' SFPA heralded a new era of cooperation where, in return for access, the EU now provided funds and expertize to help 'strengthen partner countries capacity to ensure sustainable fishing in their own waters.'.

In practical terms, a Protocol establishes the species covered by each SFPA. It also details the maximum number of EU vessels authorized to fish under the agreement, their nationality and the annual financial contributions that will be paid by the EU (principally a flat rate) and the vessel operator (fixed and tonnage-linked) to the coastal state [21]. The Protocol is accompanied by a General Agreement and Annexes laying down the operational nature of the contract (where the fishing will take place, how catches will be monitored and controlled, state crews and observer provisions). While early access agreements signed with West African states focussed on coastal and demersal species (referred to as 'mixed' agreements), the agreements became increasingly tuna-centric with time ('tuna' agreements) as the Table below indicates.[6]

[3] See https://www.wwf.org.nz/what_we_do/marine/blockchain_tuna_project/

[4] Converting EU imports to whole weight using FAO conversion factors, although uncertain [43], suggests SFPA catches represent about 10% of EU imports.

[5] We are grateful to an anonymous reviewer for alerting us to this fact.

[6] Primarily a TFA, the agreement also allows for the extraction of 2000 tonnes of hake p.a. (max 2 vessels).

At the start of 2022, thirteen SFPA are operative (while a further three ceased to operate during the study period). Seven agreements relate exclusively to tuna (TFA), two are predominantly tuna-focussed (TFA+), while three of the four 'mixed' agreements contain a small tuna component. Tuna SFPAs cover primarily FAO major fishing area 34 (Central East Atlantic, CEA) and 51 (Western Indian Ocean, WIO). The most important of these agreements in tuna volume terms are with the Seychelles (50,000 tonnes), Mauritania (20,000 tonnes) and Senegal (14,000 tonnes). While these agreements (TFA plus TFA+) provide for the annual harvest of up to 126,300 mt[10] from developing country waters, only 85% of this volume (107,106 tonnes) was landed in 2019 – representing 1.3% of global tuna landings in the same year. The stipulated reference tonnage was exceeded in the case of Mauritius (109%), Mauritania (130%) and the Seychelles (104%) triggering increased tonnage-linked contributions from vessel owners, while catches in the Gambia substantially undershot the reference tonnages. The financial compensation offered through these agreements is not insignificant. The major beneficiary is Mauritania (m€ 61.6 annually – exclusive of additional payments made by vessel owners in terms of advance and tonnage catch contributions), with Morocco (m€ 41.5), and Guinea-Bissau and Greenland (circa m€ 16) lagging some way behind. The seven TFAs alone generate nearly m€ 10 annually for the host nations, of which roughly 50% is in the form of sectorial support which "aims to promote sustainable fisheries development in the partner countries, by strengthening their administrative and scientific capacity through a focus on sustainable fisheries management, monitoring, control and surveillance". In addition, vessel owners contribute with a mixture of fixed (advance payment for access) and variable (per tonne) fees, which added up to an annual average amount of m€ 4.9 for the seven FTAs according to the latest evaluations.

Since the first EU agreement valuation was completed for the European Parliament in 1999 [11], SFPAs have generated a substantial volume of critical scrutiny in the academic press. Antonova, [2] and Okafor-Yarwood and Belhabib, [76] have argued that SFPAs are undermining the long-term food and economic security of African nation states, while Jönsson, [62] accuses the Senegalese SFPA of accelerating 'youth's forced migration to EU countries.' In a similar vein, [44] stress that while SFPAs can lead to gains in trade for the signatory nations, the magnitude of these gains will 'hinge on proper redistribution of benefits and proper management of resources. A similar view is espoused by Kadfak and Antonova, [64] who note that while the current EU-Senegalese SFPA shows a 'promising improvement' over its predecessors, the division of benefits is still conditioned by the 'two countries relative power imbalance.' This imbalance has caused Iheduru [53], Kaczynski and Fluharty [63], Carneiro, [10] and Le Manach et al. [67] among others, to question whether the signatory nations have received adequate compensation for the resources yielded to EU fleets. Mulazzani and Malorgio, [73] in contrast, focus on how such agreements contribute to overfishing, while [3] accuses the EU of employing 'coercive diplomacy' when pursuing new SFPAs. More recently Failler has called into question the future of EU SFPAs, particularly the mixed-fish agreements [26], given that their importance is declining in

Table 1
Sustainable[7] Fisheries Partnership[8] Agreements[9] operative during the period 2016–2020 (those currently active shown in bold).

Country	First signed	Current SFPA expiry	Tuna tonnage and agreement type		Tuna vessel types			Tuna catches 2019	EU Contribution p.a. (1000 Eur)
					Purse Seine	Long-Line	Pole/ Line		
Senegal	1979	17–11–24	14,000	TFA+	28	5	10	6573 *	918–1058(A), 750(SS)
Guinea-Bissau	1980	14–06–24	None	Mixed	28	–	13	12 *	11,600(A), 4000(SS)
Seychelles	1984	23–02–26	50,000	TFA	40	6	–	51,996	2500–2930(A), 2500–2600(SS)
Greenland	1985	22–04–25	None	Mixed	–	–	–	N/A	21,600 (A), 2900(SS)
Sao Tome and Principe	1986	18–12–24	8000	TFA	28	6	–	0	400(A), 440(SS)
Madagascar	1987	31–12–18	15,750	TFA	40	54		N/A.	1488–1566(A), 700 (SS)
Gambia	1988	30–07–25	3300	TFA+	28	–	10	2	275(A), 275(SS)
Mauritania	1988	15–11–21	20,000	Mixed	25	–	15	25,740	57,500(A), 4125(SS)
Morocco	1989	17–07–23	None	Mixed			27	13	19,100–21,000(A), 17,900–20,500(SS)
Cote d'Ivoire	1991	31–07–24	5500	TFA	28	8	–	2493	330 (A), 352–407 (SS)
Mauritius	1991	07–12–21	4000	TFA	40	45	–	4236	220(A), 355(SS)
Cabo Verde	1992	19–05–24	8000	TFA	28	27	14	7895	400(A), 350(SS)
Gabon	1998	23–07–16	20,000	TFA	27	–	8	N/A	900 (A), 450 (SS)
Comoros	2006	31–12–16	6000	TFA	42	20	–	N/A	300(A), 300(SS)
Liberia	2015	08–12–20	6500	TFA	28	6	–	4485	585–715 (A), 292.5–357.5 (SS)
Cook Islands	2016	13–10–21	7000	TFA	4	–	–	2933	350–385(A), 350(SS)

TFA = Tuna Fishery Agreement, A = Access agreement payment, SS = Sectorial Support payment
* In addition, 229 tonnes were reported as being caught in the joint Senegal-Guinea-Bissau zone, but these catches are recorded separately and are not reported under either of the country SFPAs.

[7] Primarily a TFA, the protocol also allows for the extraction of 750 tonnes of hake p.a. (max. 3 vessels).
[8] Re-negotiation hampered by COVID crisis, so previous agreement simply extended by one year. The agreement grants access to eight different fisheries, two of which are tuna.
[9] Currently inoperative as Liberia was used with a 'yellow card' by the EU in 2017 for not fully cooperating in the fight against IUU fishing [60].

[10] While the Morocco and Guinea Bissau SFPAs do authorize vessels to fish for tuna in their waters, no reference tonnage for tuna and tuna like species is set and, as SFPA tuna landings are low in each case we have excluded these catches in these calculations.

terms of both catches [25] and value [26].[11]

Given its exclusive control over access to EU seafood markets, the EU compels all exporting countries to provide transparency in the value chain through the introduction of a EU catch certification (CC) scheme (CCS). The EU scheme requires the recording of a set number of variables in a unified/harmonized manner if the product is to be traded and such transparency was seen as necessary to combat IUU fishing in the EU's eyes, by 'guaranteeing the traceability of fishing activities'. For instance, Ghana was sanctioned by the EU in 2013 for not complying with the EU traceability scheme which severely affected its exports to European countries for almost 4 years [6].

Yet traceability and transparency across fish value chains in operational terms is critically dependent not just upon the introduction of CCs at the point of harvest, but also on the regulatory framework of the territories through which the products travel post-harvest. The EU presently operates a unilateral CC which covers all wild-caught marine finfish (such as tuna) traded into the union, and this became embedded in SFPAs as of 2010. This system currently expects CC to be raised by the exporter in relation to any consignment of fish for export to an EU member country. The completed CC is then submitted to the 'competent authority' for validation along with any supporting ancillary documentation. In the case of the Seychelles, for example, the CC is validated by the Monitoring Unit of the Monitoring, Control and Surveillance Division of the Seychelles Fisheries Authority (in Senegal the task is performed by la Direction de la Protection et de la Surveillance des Pêches (DPSP). Additional documentation is required in the case of transit or processing in third countries. The EU scheme was, however, critiqued by Clarke and Hosch, [13] and [50] due to the absence of a central register (or recording system) through which all certificates are issued and linked along the value chains. An electronic logbook information system (ERS – electronic recording system) was also introduced by the EU from 2010 for vessels over 24 m length[12] allowing for more effective traceability through greater harmonization in the verification and cross-national checking of data.[13]The following sections examine how tuna passes along the EU SFPA value chain – and just how effective these transparency and traceability processes are.

3. Tracking the tuna value chain – From catch to market

The global catch of the seven most important tuna species was roughly 5.2 million tonnes in 2018 [70]. Tuna and tuna-like fish are the most consumed marine group of species, followed by cod, salmon and Alaska pollock, consumed in Europe [24]. While the majority of tuna are caught in the Pacific (66%), catches in the Indian (23%) and Atlantic Oceans (11%) also provide important sources of both food and livelihoods in several countries.

Tunas display large-scale migration patterns both in the Atlantic [28] and in the Indian Ocean [34]. Strong seasonal variations in catch per unit effort and catches result from this in the WIO, while seasonality is somewhat less important in the CEA [71]. Fishing in the WIO generally takes place off the Somali coast, south towards the Mozambique channel, around the Seychelles, off the coast of South Africa and the Arabian Peninsula. In the CEA, fishing primarily occurs in the Gulf of Guinea and northwards towards the Azores.

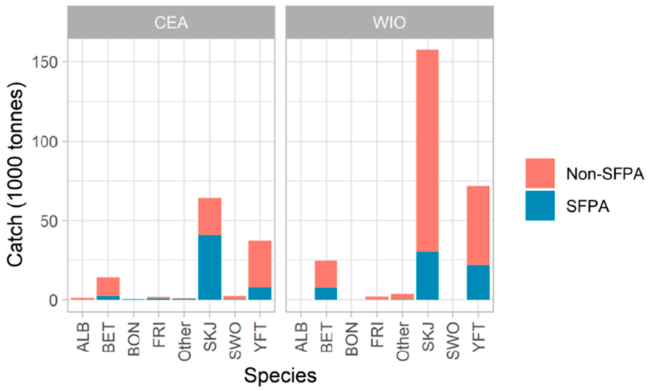

Fig. 1. EU Tuna Catches (by species) in Central East Atlantic and Western Indian Ocean, 2019. ALB = albacore, BET = bigeye, BON = bonito, SKJ = skipjack, SWO = swordfish, YFT = yellowfin, FRI = frigate.
Source: DG-MARE dataset for SFPA catches and data from ICCAT, IOTC (Indian Ocean Tuna Commission) and FAO Fishstat for total catches.

3.1. Tracking where SFPA-tuna is caught

The total reported tuna catches by the EU fleet in the CEA and WIO areas in 2019 are shown in Fig. 1. Catches from vessels under SFPAs are shown in green and non-SFPA catches in red.[14] In the CEA area, catches from vessels under SFPAs account for about 40% of the total tuna catch of 113,000 tonnes, compared to 23% of the 260,000 tonnes harvest in the WIO.

Skipjack and yellowfin account for the vast majority of catches, with some smaller catches of bigeye, both within and outside of SFPAs. Skipjack is more important in CEA SFPA catches, while yellowfin and skipjack are more closely matched in SFPAs in WIO. With respect to these species, the total EU SFPA tuna catches in the CEA and WIO respectively were around 46,300 and 56,100 tonnes in 2019. EU SFPA catches thus accounted for about 12% and 7% of the total bigeye, skipjack and yellowfin catches in these oceanic areas.

In light of the migratory behavior exhibited by the target tuna species, SFPAs were signed with most of the coastal states along the different migration routes, allowing the EU fleet to follow the stocks over large distances and across several FAO fishing areas (Table 2). The anonymized DG-MARE data-set for example indicates that a purse seiner ('Vessel 26') recorded SFPA catches taken in seven different fishing areas, as it tracked tuna up the western coast of Africa. In contrast, the pole and liner ('Vessel 116') limited its efforts to primarily fishing off the coast of Cabo Verde (fishing area 3.12).

Transparency at the point of harvest in the tuna value chain has been defined as a priority by the EU Long Distance Advisory Council, and tuna producer organizations (OPAGAC, ANABAC, Orthogel), and DG-MARE worked for two years to define transparency standards [29]. It's work was aided immeasurably by the development and growing adoption of electronic monitoring systems (EMS – often a central computer connected to onboard video camera and gear sensors) and standards across the five tuna Regional Fisheries Management Organizations (RFMO). Coughlin [15], for example, notes that four of the five RFMOs were on track to approve the use of EMS at their annual Commission meetings in either late 2021 or 2022. The IOTC and ICCAT schemes oblige vessels to record and report tuna catches [not in terms of EEZs, but with reference to in 1° squares case of purse seiners and pole and line vessels, 5° squares for long-liners]. The RFMO then uses the data for management purposes

[11] Failler et al. [30] note that in the case of the EU/Mauritania agreements the return on such investment has been below one in the case of the last two Protocol agreements.

[12] Commission regulation 1077/2008. For vessels between 15 and 24 m the start date was 1st July 2011.

[13] ERS could potentially facilitate CC-related transactions and verification routines if the CC faults identified by [50] could be resolved.

[14] The non-SFPA catch data refers to catches by (i) EU vessels operating outside SFPAs, (ii) EU SFPA registered vessels fishing in areas beyond national jurisdiction [ABNJ] in these oceanic regions. It does not include data for non-EU fleets.

Table 2
Examples of individual vessel's catches (tonnes) of tuna in FAO area 34 (by fishing area and month).

Vessel no.	Gear type	1.32 (Sahara coastal)	3.11 (Cape Verde coastal)	3.12 (Cape Verde coastal)	3.13 (Cape Verde coastal)	3.2 (Southern coastal)	3.3 (Sherbro)	3.4 (W. Gulf of Guinea)
116	PL	12 Jul	314 Mar-Jul					
22	PS	591 Aug-Oct	851 Aug-Oct	189 Jun,Sep,Oct		215 Oct-Nov		6 Feb
26	PS	431 Aug-Oct	472 Aug-Nov	81 Oct	42 Nov	345 Jun-Nov	250 Nov-Dec	91 Dec
28	PL	2	314 Jan-Oct	233 Jan-Oct		58 Aug, Nov		
214	PS	733 Aug-Sep	825 Aug-Sep	134 Sep		1156 Aug-Sep	122 Sep-Nov	433 Nov

Source: DG-MARE dataset.

such as for quota definition and other effort control measures (fish aggregation devices [FADs], closing zone and season, etc.).

Several monitoring systems are also embedded within the SFPA agreements, but here the purpose is to ensure that fishing activity is taking place within the terms of the agreements, and that no IUU fishing takes place [= traceability]. Observer coverage on all vessels is stipulated in the SFPA agreements, but this is not always implemented in practice. Vessel Monitoring and Automatic Identification Systems[15] (VMS/AIS) are employed to identify the location of the vessel with reference to coastal state's EEZs and ABNJs. Catch data is reported to the flag state through logbooks (historically) or, more recently, electronic reporting systems (ERS), although ERS are not currently operational in most SFPA countries. Vessels are required to maintain logs with daily records of activities and catches by species and size. A summary of the activities is expected to be transmitted to the coastal state in whose EEZ fishing has taken place. When entering or exiting coastal state waters, the quantities in the cargo hold (by species) are declared to the coastal state. Vessels landing (or transhipping) catches in port must also submit this catch data to the coastal state no later than 24 h after leaving the port.

This is critical as, in practice (as Table 2 has shown), the tuna catch for one vessel may be taken from various fishing areas and so, by extension, needs to be recorded under different SFPAs. In the case of the West African agreements (Fig. 2) the problem is complicated as FAO sub-areas do not map neatly onto national EEZs, while in the case of Guinea Bissau and Senegal there is a common fishing zone. In the case of the WIO, the scenario is simpler. There are only two SFPAs (with the Seychelles and Mauritius, though the agreed SFPA tonnage for the latter is dwarfed by the former – see Table 1) and catches are reported from just two sub-areas (FAO 54.5 and 54.6), both of which are of substantive size and traverse both national and international waters.

The practice of vessels fishing for several tuna species and across multiple SFPAs (as well as in non-SFPA coastal state waters, and in ABNJ) poses clear challenges for the traceability of the products along the value chain in terms of where the catch originates from. It also enhances the opportunities for intentional or unintentional misreporting. There is a strong pecuniary incentive, for example, to misreport the catch volumes (where they exceed the agreed SFPA tonnage), the species composition, and/or the provenance of the catch. In the first instance, as excess tonnage attracts a higher premium. In the second case, as quotas have been introduced for yellowfin tuna by the IOTC from January 2017, there is an incentive to misreport over-quota catches as alternate species. In the third instance, as tuna harvested under SFPAs oblige the vessel operator to make a fixed per tonnage payment to the coastal state, whereas tuna reported as caught outside waters covered by SFPAs (ie: in ABNJ say) are exempt from such fees.

3.2. *Where do SFPA-registered vessels land tuna – And who processes it?*

As vessels follow the migrating tuna across a vast area operating costs can be reduced by offloading ('transhipping') at sea. While purse seiners can theoretically tranship at sea, such activity is prohibited (albeit with some exceptions) by both ICCAT and the IOTC ([92], Table 1), and almost all transhipping at sea is undertaken by long-liners (the 13 currently active SFPAs allow for a maximum of 103 long-liners, as opposed to 305 purse seiners and 97 pole and line vessels to fish in SFPA waters – Table 2[16]).

Transhipping at sea allows the fishing vessel to remain at sea for longer periods of time, thus saving on fuel costs and on the time needed to return to ports [87]. However, this has the potential to reduce the coastal state's port revenues and taxes, as well as further complicating traceability of the products as the potential for mis-reporting is increased. SFPA agreements, which require transhipment to only take place in ports, represent a unilateral tightening of rules and strengthens traceability considerations. Our research confirms that 'transhipment[17]' (in the form of offloading to a conventional reefer) in port is very common in both Mindelo and Port Victoria. Unloading to shore, transfer to coldstore/containers and then onto container ships is also common and becoming increasingly popular [72].

It is common practice, particularly for products destined for the European market, to undergo semi-processing (up to tuna loin production) in developing country Port States, before exporting the frozen pre-cooked tuna loins to canneries in developed countries.[18] Yet, despite the intentions embodied in most SFPA, namely that EU vessels' SFPA catch should support the development of the seafood industry in the host countries, market forces determine the choices made on where to land – and whether batches will be swiftly re-exported or semi-processed in the country of landing. Moreover, in addition to the EU vessels delivering catches under SFPAs, processors also receive supply from other fleets, both local and international. While ensuring traceability in such an environment is surely challenging, internal corporate traceability systems function to keep all lots strictly separated all the way from reception through to final production (the main driver here would appear to

[15] AIS and VMS are mandatory on all EU fishing vessels above 15 m. However, while only flag states are able to continuously monitor vessels on VMS (which must be switched on all the time), AIS - which is 'for the world to see' - may be switched off for various reasons (most notably the fear it will attract pirates, a particular problem in both ECA and WIO waters). This is one explanation perhaps explaining why Rattle, [78] found French (68%) and Spanish (80%) flagged tuna vessels failed to transmit AIS data over a two-year period.

[16] Few EU long-liners have reported SFPA tuna catches over the period 2014–9; just 9 in the Atlantic and 14 in the Indian Ocean. In all cases, low catches of tuna were reported.

[17] There is some confusion as to whether transhipment can take place in port or not. [32] are equally unclear ". direct offloads of fish product to refrigerated containers should be clearly considered as either a landing or a trans-shipment. [the emphasis is ours]. Here we use inverted commas to distinguish land transhipment from transhipment in ABNJ.

[18] The rationale for this is based on two factors. First, labor costs for gutting and cleaning the fish, are usually higher in Europe than elsewhere. Second, if tuna is canned almost half the fish by body weight is lost (most notably in deboning and cleaning), so initially processing overseas reduces the loss exposure of European-based canneries (CBI, [12]).

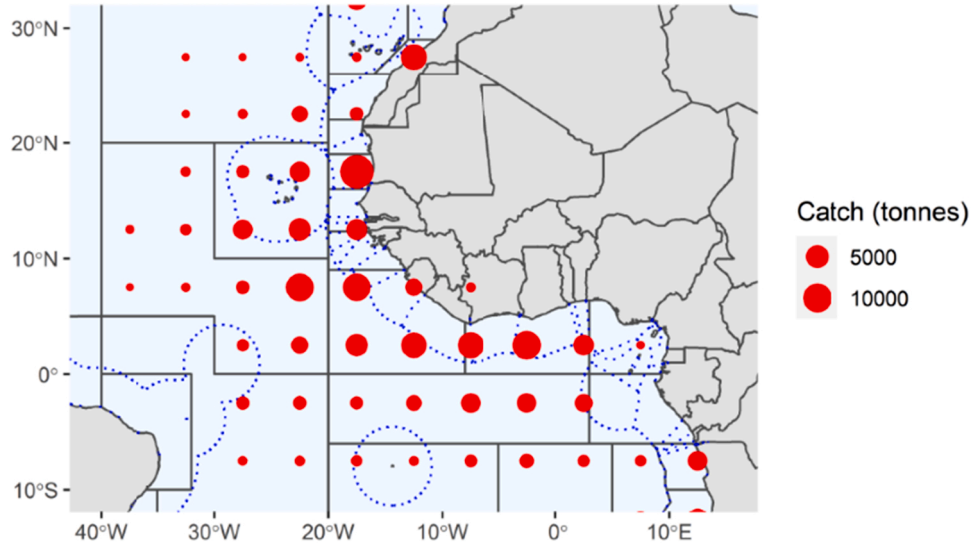

Fig. 2. Distribution of EU total tuna catches (tonnes) in West Africa in 2019 (by 5-degree gridcells) Dotted lines highlight the extent of national EEZs.
Source: Data from ICCAT.

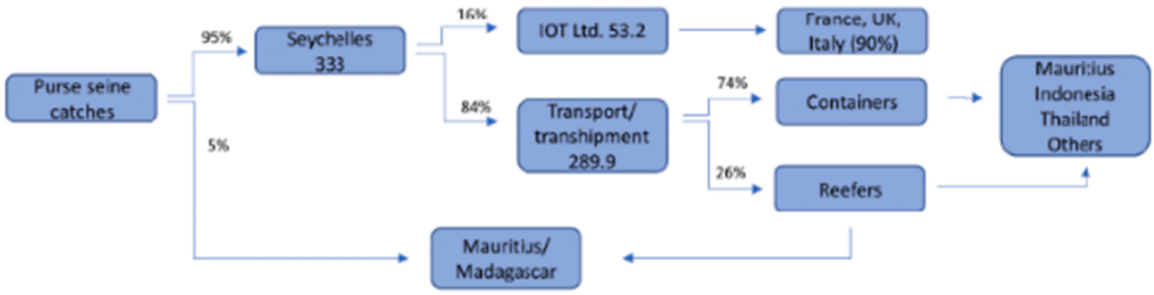

Fig. 3. Value chain for SFPA tuna caught in the Seychelles (2019). Numbers given in the boxes are 1000 tonnes of tuna.
Source: Seychelles Fisheries Authority.

be in case product recall is subsequently required).

Fig. 3 illustrates the flow of tuna caught in the WIO. Port Victoria (Seychelles) is currently the dominant port, receiving 95% of SFPA landings in 2019. However, just 16% is processed in-country by *Indian Ocean Tuna Ltd* (IOT), with the majority of the catch (84%) being channeled into reefers and container shipping for processing elsewhere. A smaller fraction (5%) is directly landed in Mauritius and Madagascar, where it is processed and then exported.

In the CEA, Mindelo (Cabo Verde), Dakar (Senegal), and Abidjan (Ivory Coast) accounted for 99% of SFPA landings of the three main tuna species (skipjack, yellowfin and bigeye) in 2019 (Table 3). These ports serve as hubs in their respective waters for different vessel groupings, where more services than landing or 'transhipment' of tuna takes place.

The 2015–19 period saw a sharp rise in SFPA landings in Mindelo (up from 3% to 31% of West African SFPA catches) due in part to the more northernly tuna migratory patterns as location of the tuna in unusual northern areas compared to previous decades. In 2019, Mindelo received 14,544 tonnes of tuna from EU vessels' SFPA catch despite the Cabo Verdean SFPA reference tonnage being 8000 tonnes, This 'above-reference' catch originates from EU purse seiners operating in Senegalese and Mauritanian waters.[19] In Mindelo two companies process the bulk of tuna landings. *Atunlo CV* processes and distributes whole and elaborated (loins, raw and pre-cooked) tuna products, while its partner plant *Frescomar* produces pre-cooked loins and canned tuna and other small pelagics. Production levels (raw material weight) were around 15,000 tonnes (*Atunlo*) and 22,000 tonnes (*Frescomar*) in 2019. In Dakar, the absence of a SFPA with the EU between 2006 and 2014 led to a sharp concentration in tuna processing operations. Just three canneries survived (Sourcing Transparency Platform, [83]). The largest, SCA SA (*Société de Conserverie en Afrique*, formerly SNCDS – *Société d'exploitation*

Table 3
2019 Landings of bigeye, skipjack and yellowfin tuna from EU vessels under SFPAs (tonnes).

	Landing country					
Origin of catches	Senegal	Cabo Verde	Cote d'Ivoire	Ghana	Spain	West Africa
Mauritania	14,542	8975	1485			25,003
Cabo Verde	1956	4064	1754		1	7772
Senegal	5198	1171	137			6506
Liberia	407	317	3660	20		4405
Cote d'Ivoire	108	7	2015	270		2399
GNB/SEN Joint EEZ	229					229
Guinea-Bissau	2	8				10
Gambia	2					2
Total	22,443	14,544	9048	290	1	46,326
Percent	48%	31%	20%	1%	0%	100%

Source: DG-MARE dataset.

[19] According to our Frescomar informant, this can be attributed to the town/port's popularity due to its low local crime rates and high processing standards. Hosch (personal communique) suggests proximity to Las Palmas (vessel maintenance/repair considerations) and the relative administrative simplicity of landing in Cabo Verde may also be factors.

de Nouvelles Conserveries du Sénégal), with an annual production capacity of 50,000 tonnes has been owned by the Korean enterprise Dongwon since 2011. The EU seining fleet off Senegal has historically also landed part of their catch in Abidjan, and more recently in Mindelo. In Abidjan EU vessels provided around two-thirds of total tuna inputs (57,678 tonnes) to three locally owned processing companies whose finished tuna products were almost exclusively exported to Europe [1,14,17,37,38].

3.3. SFPA Tuna – From processor to market

Processed tuna output[20] is almost exclusively destined for export markets [1,38], and Tables 4a 4b depict recent exports from Cabo Verde and the Seychelles.[21]

Annual Seychellois tuna exports are higher by a factor of ten than Cabo Verde exports,[22] and are dominated by the export of frozen skipjack/bonito (18–46% total tuna exports, yellowfin (25–29%), and canned tuna (24–40%). In contrast, Cabo Verde exports are recorded principally as other frozen tuna (37–80% exports), with canned tuna (8–35%) the other main contributor.

Table 4a
Exports of tuna from the Seychelles (mt, product weight).

	2015	2016	2017	2018	2019
Skipjack tuna, frozen	19,000	56,173	57,174	69,755	59,910
Yellowfin tuna, frozen	29,097	45,214	36,103	39,343	37,150
Bigeye tuna, frozen	6100	12,174	13,340	0	401
Albacore tuna, frozen	270	2135	2793	3	
Tunas nei, frozen	8000	1081	2599	5544	4312
Bigeye tuna, fresh or chilled				5	15
Atlantic and Pacific bluefin tuna, frozen			22		
Tunas, fresh or chilled	291	55			3
Albacore tuna, fresh or chilled				6	
Yellowfin tuna, fresh or chilled	1	6		49	60
Tunas prepared or preserved, not minced, nei	43,180	37,835	34,701	35,468	35,040
Total	105,867	154,673	146,732	150,173	136,891

Source: FAO FishStatJ

Table 4b
Exports of tuna from the Seychelles (tonnes, product weight).

	2015	2016	2017	2018	2019
Yellowfin tuna, frozen	4000	4586	86		50
Skipjack tuna, frozen	4973	4089			
Bigeye tuna, frozen	1687	545	5		398
Tunas nei, frozen	13,485	7885	6962	11,589	9589
Tuna loins and fillets, frozen			113	21	362
Tunas prepared or preserved, not minced, nei	2240	4215	3786	2643	2479
Total	26,385	21,320	10,952	14,253	12,878

Source: FAO FishStatJ

In the case of the Seychelles, the tuna value chain through which SFPA catches are processed is in the hands of *Indian Ocean Tuna Ltd (*part of the Thai Union group), which dominates tuna processing in the country.[23] The Thai Union group, in turn, control two of the principal brand names (*John West* – UK, Petit *Navire* – France) under which tuna is imported and/or retailed in Europe since 2010. Spanish interests dominate in the case of Cabo Verde. Here both tuna processors (*Frescomar* and *Atunlo*) are fully owned Spanish subsidiaries, and Spain is the key export market.

The end market is the final piece in the traceability mosaic. Since 2014, Thai Union has engaged the WWF to independently assess and advise on the 'environmental sustainability of its seafood' (TU, [89]), an activity that, of necessity, demands reliable data on species, capture method, and capture location, among other things. This data is made available to all interested parties who can, upon input of can-code details upon the *John West* or *Petit Navire* websites, discover exactly where and by whom (vessel name) their tuna entered the Thai Union corporate supply chain ([58]:53). Similarly, the two tuna processors located on Cabo Verde, both underline their ability to trace all end products – whether canned tuna (*Frescomar*) or fresh, frozen whole, or elaborated tuna, from the dish back to the vessel (zone and date of capture).[24] Moreover, for all seafood products (like SFPA tuna) exported into the EU from third (non-EU) countries, a catch certificate [CC] is required. These are issued and validated by the exporting country, and certify that the exported product was caught in a manner that complied with both national and international fishing regulations. National authorities in the EU country of final destination are responsible for verifying the presented CC, rejecting any seafood imports which are not accompanied by a valid CC.

4. Traceability and transparency at the coastal state level: The case of Cabo Verde and the Seychelles

In order to understand more concretely the shortcomings in the current tuna value chain we devised a semi-structured questionnaire (copy in Appendix) seeking information around how, in practice, the catch (and its composition) was verified at the point of harvest and at the point of [port] transfer, and what accompanying documentation provided the audit trail that is so integral to traceability concerns. Our original intention was to supplement direct observation with a series of in-country interviews based around this questionnaire, but these plans were scuppered by the COVID pandemic. Instead, key value chain personnel were offered the option of either offering a written response to our questions or participating in an online interview. In the case of the Cabo Verde tuna chain we interviewed two representatives from the

[20] At this juncture, SFPA caught tuna becomes subsumed into the aggregate data and destinations reported.

[21] The 30%+ decline in the first two items in the Table between 2018 and 2019 mirrors the aggregate decline in skipjack landings (down from 473,00 to 406,000 tonnes, a drop of 10%+) in the WIO in the year (FAO FishStatJ, [31]). While total landings of yellowfin in WIO increased slightly from 2018 to 2019 (from 350,000 to 354,000), reduced volumes were landed in the Seychelles. Although regional skipjack stocks are not considered to be under threat (IOTC, [55]), yellowfin stocks are, which prompted calls to introduce tough management measures [77].

[22] Caution should be taken in interpreting this data however, as substantive proportions of the catch are simply re-exported (transhipped) to processing plants in other countries. In the case of the Seychelles, Goulding et al. [38] and Le Comte et al. [66] have estimated that this can be as much as 73% (destined for Mauritius [70%], EU [15%], Madagascar [10%] and Thailand [5%]), while INE, [54] report that approximately 10,250 tonnes of whole or filleted tuna was re-exported from Cabo Verde in 2019.

[23] The main shareholder of IOT is Thai Union (who hold 60% of IOT shares indirectly through MW Brands (of which it is a principal shareholder). The Seychelles government, through *Société Seychelloise D'Investissements* holds the remaining 40% (State House, [84]).

[24] See https://ubagogroup.com/en/trazabilidad/ and https://atunlo.com/en/we-are-tuna/ for details.

fishing authorities and one person from senior management in a major processing firm. We also received written responses to some of our questions from another processing firm representative. For the Seychelles, we interviewed three representatives from the fishing authorities, and obtained written responses from both a major Seychellois processor and a former observer on an EU SFPA vessel. We were also fortunate to be able to interview a representative from a major Spanish vessel owning organization active in both Cabo Verde and the Seychelles, who was able to respond to our questions in relation to the tuna value chain in both countries. All but one informant requested anonymity. The interviews were completed between December 2020 and March 2021.

The central mechanism underpinning verification of the catch at the point of harvest involves the placement of observers (and/or EMS) on board the vessel. RFMO requirements differ. While the IOTC has chosen to set minimum observer coverage requirements encompassing 5% of tuna vessel operations, ICCAT has recently adopted 100% observer coverage for purse seiners, and 10% for other fleets. Fleet operators can also set coverage requirements beyond the RFMO benchmarks.[25] SFPA agreements align with the respective RFMO positions. There is a marked difference between the two regions in terms of reported monitoring at the point of harvest however. The Seychelles authorities report that over half of all tuna vessels (not just EU vessels) landing in Port Victoria carry observers,[26] with an expectation that all vessels will be obligated to either carry observers or install EMS in the near future. In contrast, the Cabo Verde authorities acknowledge that while there is an obligation for all tuna vessels to employ observers when operating in the Cabo Verde EEZ, in practice compliance levels are low. In the Seychelles, the incentive is reported to be the desire to acquire Marine Stewardship Council (MSC) certification of the fishery. It was also emphasized that the role of the Seychelles observer is 'purely scientific' and oriented to reviewing and documenting bycatch (including the capture of sharks and turtles), and vessel interactions with, and use of, FADs. Monitoring of the precise composition of the tuna catch we were informed is not possible for a number of reasons, including; the sheer volume and variety of fish being hauled in at any one time, and the fact – for example – that differentiating between species (the case of small [10 kg and less] yellowfin and bigeye was particularly highlighted) is 'very difficult' at the harvest level.

As for electronic reporting, differences are reported relating to the quality of the ERS data transmitted to the national authorities by vessels prior to entering port. While the Seychelles authorities acknowledge 'reporting done by vessels is quite extensive', only a limited number of catch fields can currently be transmitted under the UN/Flux data format specified in EU ERS protocol 3.1.[27] The Cabo Verde authorities report that EU vessels report when they enter and exit the country's EEZ, and both ERS and VMS systems are 'working OK', although we were unable to directly corroborate this, in terms of reporting catches in national waters.

Verification of the catch at the point of (port) transfer in Mindelo and Port Victoria are validated/tracked directly through port inspection processes. The IOTC and the ICCAT now oblige the Seychelles and Cabo Verde fishery authorities respectively to inspect at least 5% of landing and 'transshipment' operations made by foreign fishing vessels in their designated ports [52,57]. In Cabo Verde, inspections are carried out by fisheries inspection and sanitation authorities at the landing place, and also for 'transshipments' occurring in port. In the Seychelles capacity limitations meant this target was undershot, with COVID further restricting inspection to just 1 in every 100 foreign vessel visits. Inspection, when its takes place, may cover cross-checking the logbook with AIS positional data and catch certificates/landing declaration, and scientific sampling.

Visual verification at the point of transfer is also complemented by accompanying documentation. Ordinarily, the vessel master/owner completes a landing declaration in line with the requirements of the coastal state. In the case of tuna SFPA seafood products destined for the EU a higher level of verification is required. The EU Catch Certificate [CC] ([22], Annex 2) is designed to deter IUU fishing, and demands the flag state of the fishing vessel validate that 'such catches have been made in accordance with applicable laws, regulations and international conservation and management measures' (Article 12.3), The CC provides details regarding, inter alia, the date, the fishing area where caught, the date landed, and transhipment declarations/authorizations (if relevant). The CC then accompanies the tuna as it passes up the processing chain, with both exporter and EU importer (if different) and the respective exporting/importing authorities being required to append their signatures to the certificate. One historic traceability problem, highlighted by interviewees, was in instances where a vessel's catch was split, with 'part of a vessel's landings go to a canning factory and another part of the catch goes to a cargo freezer whose products are destined for different EU countries. As [61] noted, as countries had no centralized means of comparing their CCs, it was possible for unscrupulous operators to purchase a portion of the catch declared on the CC and then 'top up' the legitimately caught tuna with illegally caught tuna so as to equate with the total volumes shown on the certificate.

At the corporate level product acquisition processes generally involve the issue of sales notes in return for the CC, a certificate of vessel ownership,[28] a captain's statement, along with any other documentary evidence demanded by the processor in order to support product quality claims. However, interviewees agreed that there were generally minimal differences between the quantities disclosed on the CC and the processing statements provided by processors at the time of exportation. *Frescomar* report that their EU marketed products do not currently carry as a matter of course (with the exception of products destined for the German market) details of the vessel making the catch, though this can be supplied upon request. *Frescomar* also append different certifications (Dolphin safe, Friend of the Sea, and environmental management [ISO14001] and social accountability [SA8000] systems) depending on the final destination of the processed product. Interviewees report that tuna entering the *IOT* value chain is assigned a unique code relating to each fishing trip made by each vessel, and a corporate Monitoring and Evaluation System (MES) system then tracks the tuna as it moves through the factory.

5. Conclusion

Tuna traceability is important for companies to be able to demonstrate the attributes (whether for control purposes or transparency purposes) of their products, as we have seen by their eagerness to form alliances and to endorse traceability declarations. In part this is prompted by pressure from NGOs and advocacy campaigns which, rightly, want tuna to be sourced responsibly, and for corporates to report

[25] OPAGAC, for example report that, since 2015 they have introduced – and maintained - a policy of 100% observer coverage (through a combination of human and electronic observers) across all oceans.

[26] Our interviewees report that most purse seine fleets in fact have 100% of their activities covered by observers, while tuna longliners are more poorly covered (one informant suggested that, in general, 5% or less of their activities are 'observed').

[27] Currently ERS is also limited to the European fleet, although plans are in hand to implement a domestic variant with a local company that presently provides VMS services to the Fisheries Authority.

[28] This allows the processor to check vessel details on the consolidated IUU lists published and updated by RFMOs on a regular basis. *Atunlo*, as a member of the International Seafood Sustainability Foundation (ISSF), submits all its catching operations for a quarterly data check (see ISSF, [59]). Thai Union require vessels to meet the corporate-determined Business and Ethical Code of Conduct.

transparently on what they are doing. Traceability is the backbone of control and transparency.

The dichotomy between corporates and environmental NGOs is mirrored at the national level between nations which wish to fish for tuna, and those in whose waters the tuna stocks are located. Corporates are weaker at negotiating access to stocks individually, so national support in negotiating access to tuna stocks is welcome.[29] At the European level, the EU is helping EU-domiciled companies to source tuna via SFPAs as there is very little tuna stock in EU waters, but a large tuna fleet as demand for tuna is high in EU markets. The problem is that SFPAs have the potential to promote overfishing, as EU member states (most notably the French and Spanish) have so much tuna catching capacity. Besides, the coastal states may also wish to expand their domestic harvesting capacity (ie: the Seychelles). Concerns are thus expressed by environmental NGOs, local fisher and civil society organizations that such agreements can generate local food insecurities, undermine local livelihoods, and lead to the unsustainable exploitation of resources ([88]:8).

So, how transparent and traceable is this whole EU SFPA tuna 'mosaic'?

While technology has increased the visibility, and hence accountability, of vessels fishing across the oceans, concerns remain. As Mark Zimring of the Nature Conservancy noted ([94], The Role of EU Markets in Securing Sustainable Tuna Fisheries, webinar 3rd May 2021), 'we need to move from knowing about the vessels and where they are (VMS/AIS), to knowing what they are doing (EMS).' This paper seeks to shed further light in this regard.

As we have shown, traceability already exists. Consumers and other interested parties can trace the contents of a European can of tuna back to the batch received at the factory, and from here back to the point and place at which the tuna was extracted from the sea. Information is available and can (is) be made public. Companies are increasingly opening up their value chain to greater public scrutiny (i.e.,: the Thai Union/WWF 2014 agreement), but not to the extent that some in the NGO community demand – particularly when considerations relating to human rights and broader sustainability concerns are also factored into the traceability mosaic [39,40]. The EU SFPAs support existing traceability and transparency processes, but could they do more?

Despite SFPA agreements insisting on observers being on board this requirement appears not to have been met in the case of some of the West African SFPAs as we report, while the Seychellois authorities report that they previously had problems getting the vessel owners to take observers. While electronic monitoring systems (EMS) may go some way to alleviate these shortcomings, technical challenges in the coastal states have meant the initial uptake has not been as widespread as had been hoped [65]. This is important in the current context as the introduction of yellowfin stock rebuilding programs and quotas in the Indian Ocean after 2016 increases the incentive to mislabel over-quota tuna as alternate species. An analysis of statistical catch data performed by IOTC, for example, indicated that about 13,000 tonnes of yellowfin may have been mis-reported as bigeye by the EU purse seiner fleet in 2018 ([56], para.139). Similarly, the costs of overshooting reference catches (in terms of additional – higher – fees) in West African waters provides an incentive to re-assign catches to either ABNJs, or alternate SFPAs where reference catches have been undershot. The expectation nonetheless is that cross-verification of vessel catches with AIS will reveal where, when and for how long the licensed vessel has fished tuna, and so allow an informed judgment on the veracity and provenance of the claimed catch. Belatedly, the failure to introduce a central register/recording system to link all catch documents as Hosch and others had advocated almost a decade ago was finally addressed when the European Commission published a proposal for the revision of the fisheries control system to address this and other loopholes on 39th May 2018. CATCH. The new scheme makes allowance for a platform where vessel catches are registered digitally. It was introduced in 2019, but use has yet to be made mandatory as the legislative procedure is still ongoing in the EU.[30] Thus, whether it will be successful in reducing the potential for IUU products to still seep into the value chain is still too early to tell.

Nevertheless, downstream traceability does appear to be on a firmer footing. As Louis Bossy (*Ocean Basket* processors, Seychelles) put it: 'When I export a fish bought from a vessel that has not followed all these regulations, it is considered IUU fish. When I export an IUU fish to Europe. and these guys backtrack the shipment, I might lose my licence' (Seychelles News Agency, [81]). Combatting IUU tuna seeping into the value chain is a noteworthy accomplishment of the SFPA accords to date, but such agreements could go further and shine a welcome regulatory light into other sustainability-linked concerns within the fishery (ie: discarding, use/reliance upon FADS). There is also a need, highlighted earlier in the paper, to examine traceability and transparency processes for landings made outside the remit of SFPAs. If, as seems to be the case (García -del Hoyo et al. [36]), European vessel owners are partly re-flagging their fleet to third states, are such non-SFPA catches and landings subject to less scrutiny? Finally, there is a necessity for pursuing continued multi-stakeholder dialog (corporates, RFMOs, costal and flag states, NGOs) with a view to harmonizing transparency requests and traceability mechanisms, and SFPAs can perhaps also be catalytic in this regard.

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CRediT authorship contribution statement

Andy Thorpe, John Isaksen and Pierre Failler: Conceptualization, writing (original and final) **Oystein Hermansen:** Conceptualization, data curation, writing (original and final), visualization. **Iain Pollard and Gregoire Touron-Gardic**: writing (original and final).

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[29] Producer and business organizations such as *ANFACO (Asociación Nacional de Fabricantes de Conservas de Pescados y Mariscos)* and *OPAGAC (Organización Productores Asociados de Grandes Atuneros Congeladores)* too may assist in negotiating SFPAs, as well as promoting the adoption and monitoring of catch and labor standards, and aid in links with the respective RFMOs.

[30] See proposal 2018/0193(COD) at Legislative Observatory for the EU Parliament for updates

Annex 1. Interview guide for FarFish tuna traceability study

Case study leaders, authorities.

Can you briefly describe the activities related to the SFPA with EU?
Is observer coverage required for all tuna vessels or only some (i.e. EU SFPA vessels)? All or some vessels?
Is transshipment more frequent for other fleets than EU-vessels? Why?
Pre-Departure: Is the host nation involved in the process whereby tonnage and advance/catch are determined for each vessel under the SFPA?
Pre-Departure: Do you know how vessels decide processing plant /landing place? Are prices determined by contract or spot?
Catch: As a SFPA host, at what point do you receive catch information, and from whom?
Catch: When and how are the landings reported? And to whom?
Control: How does the relevant port authority control landings – quantity and species? Is there a landing obligation scheme in place?
Catch: Is by-catch brought to shore? To what extent? How is by-catch processed?
Transshipment: How are transshipments recorded, where do they take place, who are notified?
Landings: Are there any regulations on how processors should document landed catch - toward ICCAT/IOTC or domestic authorities?

Vessel owner organizations

Pre-Departure: Can you briefly explain the process whereby vessel quota and advance payment are determined for each vessel under SFPA's?
Catch: Can you briefly describe the tuna fishery for the EU fleet in the Indian Ocean/Atlantic Ocean.Do the vessels only have quota from SFPA or other sources as well?Do they fish only in the EEZ or also in High Seas?
Catch: How is catch exceeding reference tonnage/quota handled? As a vessel owner, what are your options if/when you know you are exceeding? Are there disincentives to exceeding?
Pre-Departure: How and when is the buyer (processing plant/ transshipment) decided? Are prices determined through contracts or spot market?
Catch: At what point are the catches documented? How is quantity estimated (in numbers and average weight)? Continuous in logbook? ERS, VMS, entry/exit of economic zones?
Catch: When and how are the landings reported, and to whom (RFMO, flag state, port state)?
Catch: What is the role of onboard observers? Is this well-functioning? (COVID impact?)
Catch: Are there observers only on SFPA authorised vessels or also by RFMO regulations? All vessels or just some?
Catch: Are species and size classes separated in the cargo hold? Can catches be separated on area/EEZ?
Catch: Is by-catch discarded or brought to shore? Frozen onboard?
Transshipment: How are transshipments recorded? Where do they take place? Who is/are notified?
Landings: What information in terms of documentation does the vessel provide/the processor get?
Catch: How much is caught outside of EEZ? High seas?

Processors

Can you give a short introduction of your firm? Eg. size, employment, capacity, product mix, markets, share of raw material base from SFPA.
Landings: When receiving landings from EU vessels authorised under the SFPA: What information in terms of documentation of catch does the vessel provide/the processor get?
Landings: Do you receive by-catch from EU-vessels? If so, how is this attended to/processed?
Landings: How/when is the sales price determined? Locally? In negotiations with vessel master or owner? Pre-determined contract?
Landings How do you ensure that catches you receive are legally caught?
Landings: Are there any regulations on how processors should document landed catch, toward RFMO or domestic/local authorities?
Processing: Are there any differences in the processes employed to deal with the catch obtained, and the processing of product, when raw materials come from EU vessels and other nation's vessels?
Processing: How do you ensure traceability of product back to the vessel and or fishing area?
Processing: What documentation follows the final products? Do your products carry any certifications (relating to tuna and SFPA catches)?

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