Food and Agriculture Organization of the United Nations

FAO FISHERIES AND AQUACULTURE TECHNICAL PAPER

652

ISSN 2070-7010

Securing sustainable small-scale fisheries

Showcasing applied practices in value chains, post-harvest operations and trade

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Edited by

Joseph Zelasney
Fishery Officer
FAO Fisheries and Aquaculture Department
Rome, Italy

Alexander Ford
Small-scale Fisheries Consultant
FAO Fisheries and Aquaculture Department
Rome, Italy

Lena Westlund
International Fisheries Analyst
FAO Fisheries and Aquaculture Department
Rome, Italy

Ansen Ward
Post-harvest loss and fish value specialist
FAO Fisheries and Aquaculture Department
Rome, Italy

and

Omar Riego Peñarubia
Fishery Officer
FAO Fisheries and Aquaculture Department
Rome, Italy

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome, 2020

Required citation:
Zelasney, J., Ford, A., Westlund, L., Ward, A. and Riego Peñarubia, O. eds. 2020. *Securing sustainable small-scale fisheries: Showcasing applied practices in value chains, post-harvest operations and trade.* FAO Fisheries and Aquaculture Technical Paper No. 652. Rome, FAO.
https://doi.org/10.4060/ca8402en

ISSN 2070-7010 (Print)
ISSN 2664-5408 (Online)
ISBN 978-92-5-132350-2

Preparation of this document

This FAO technical paper on *Securing sustainable small-scale fisheries: showcasing applied practices in value chains, post-harvest operations and trade* was prepared under the auspices of the FAO Umbrella Programme for the Promotion and Application of the SSF Guidelines – Enhancing the Contribution of Small-Scale Fisheries to Food Security and Sustainable Livelihoods (SSF Umbrella Programme), which was established following endorsement of the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines) by the FAO Committee on Fisheries (COFI) in 2014.

The SSF Umbrella Programme supports the development of policies to achieve implementation of the SSF Guidelines by promoting knowledge sharing and exchange of experiences. This technical paper supports that objective by showcasing a diverse selection (both topically and geographically) of initiatives designed to promote and improve market access by enhancing value chains, post-harvest operations and trade in small-scale fisheries, based on the recommendations contained in Chapter 7 of the SSF Guidelines.

Further impetus for this technical paper comes from recommendations of FAO governing bodies, including COFI, the COFI Sub-Committee on Fish Trade (COFI:FT) and the Committee on World Food Security. COFI and COFI:FT have requested guidance on how to overcome challenges in complying with public and private requirements in small-scale fisheries, including certification and traceability. Likewise, they have recommended that FAO provide guidance for achieving equitable market access and distribution of benefits for small-scale fishers, including for products from inland fisheries. In addition, the two governing bodies have called for further work to strengthen capacity of post-harvest operators and their organizations in order to reduce post-harvest losses and improve processing techniques.

In June 2015, the Committee on World Food Security held a High-Level Forum on Connecting Smallholders to Markets[1] to discuss challenges and consider lessons learned from examples of smallholders that have built sustainable linkages to markets. This meeting led to the endorsement of a set of policy recommendations, *Connecting Smallholders to Markets*,[2] at the Committee's 43rd Session in 2016. The recommendations focus on the reduction of inequalities by addressing the challenges behind unequal access to markets, land and other natural resources. This document seeks to reinforce those recommendations by providing examples from a fisheries-specific context.

Finally, the technical paper seeks to support achievement of the 2030 Agenda for Sustainable Development – specifically SDG Target 14.b: "Provide access for small-scale artisanal fishers to marine resources and markets"; and SDG Target 2.3: "By 2030 double the agricultural productivity and the incomes of small-scale food producers, particularly women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment".

[1] http://www.fao.org/3/a-mo212e.pdf.
[2] http://www.fao.org/3/a-bq853e.pdf.

Abstract

The Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines) recognize the rights of fishers and fishworkers, acting both individually and collectively, to improve their livelihoods through enhanced value chains, post-harvest operations and trade. To achieve this, Chapter 7 of the SSF Guidelines recommends building capacity of individuals, strengthening organizations and empowering women; reducing post-harvest losses and adding value to small-scale fisheries production; and facilitating sustainable trade and equitable market access. This document includes nine case studies that showcase applied practices and successful initiatives to enhance small-scale fisheries value chains, post-harvest operations and trade, illustrating the recommendations contained in the SSF Guidelines. The case studies constitute a rich selection of experiences that are diverse, not only with regard to their geographical setting, but also in the topics covered and approaches employed. Each case study presents critical analysis of the relevant enabling conditions and discusses the challenges and opportunities in relation to replicating the respective initiative in other fisheries and development contexts. The studies were chosen for their potential to inform an international audience of development and fisheries professionals and stakeholders, with the intention of supporting national and international policies and policy processes to enhance small-scale fisheries value chains, post-harvest operations and trade.

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Acknowledgements

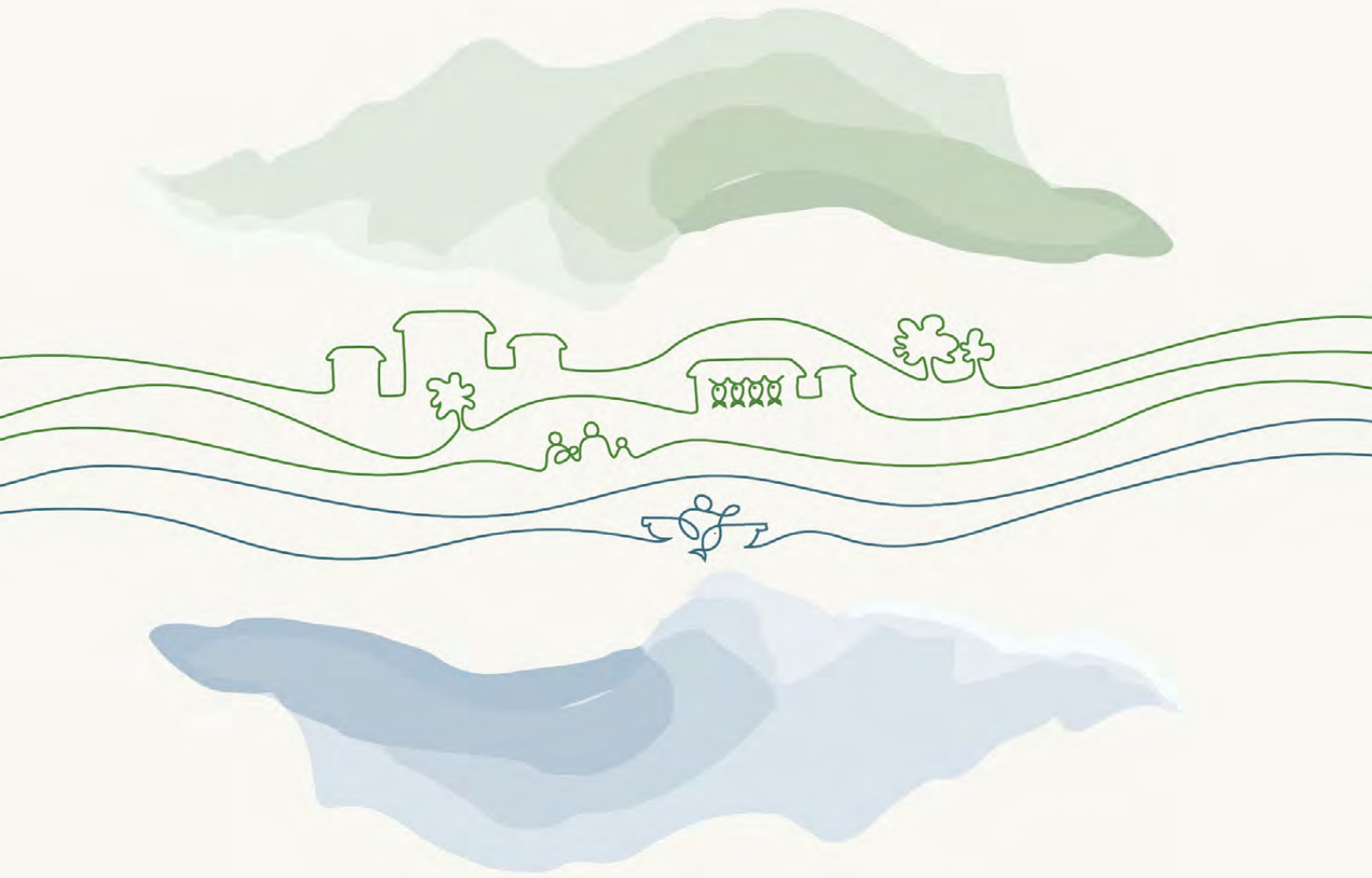
This technical paper on *Securing sustainable small-scale fisheries: showcasing applied practices in value chains, post-harvest operations and trade* has been prepared by the FAO Fisheries and Aquaculture Department. The case studies have been technically edited by Joseph Zelasney, Alexander Ford, Lena Westlund, Ansen Ward and Omar Riego Peñarubia.

FAO would like to extend its appreciation to all of the authors for their contributions to this document. We would also like to thank Nicole Franz and John Ryder for their input into the planning and design of the publication as well as the members of the FAO Technical Network on Small-Scale Fisheries for their support. We are grateful to Andrew Park for editing the text, to José Luis Castilla Civit for the publishing layout, and to Marianne Guyonnet, Romina Toscano, Rubén Sánchez Daroqui and Asa Ljusenius for facilitating publication of the document.

Finally, FAO and all the authors wish to acknowledge the Governments of Norway and Sweden, whose generous support to the SSF Umbrella Programme made this publication possible.

Abbreviations and acronyms

ACP	African, Caribbean and Pacific Group of States
ADCCED	Alaska Department of Commerce, Community and Economic Development
aFAD	Anchored fish aggregating device
AJA	Alaska Jig Association (USA)
AMCC	Alaska Marine Conservation Council (USA)
AU	African Union
AU-IBAR	Interafrican Bureau for Animal Resources (African Union)
BARNUFO	Barbados National Union of Fisherfolk Organisations
BFC	Bridgetown Fisheries Complex
BFD	Barbados Fisheries Division
CARICOM	Caribbean Community and Common Market
CASS	Conservation Alliance for Seafood Solutions
CBI	Centre for the Promotion of Imports (the Netherlands)
CEA	California Environmental Associates
CERMES	Centre for Resource Management and Environmental Studies
CFFA	Coalition for Fair Fisheries Arrangements
CFPA	Central Fish Processors Association (Barbados)
CFS	Capture Fisheries Standard
CMATPHA	Women Fish Traders and Processors Cooperative of Abidjan
CNFO	Caribbean Network of Fisherfolk Organisations
COAPA	African Confederation of Professional Artisanal Fisheries Organizations
COFI	Committee on Fisheries (FAO)
COFI:FT	COFI Sub-Committee on Fish Trade
CSF	Community-supported fishery
CSO	Civil society organization
ECOWAS	Economic Community of Western African States
EEZ	Exclusive economic zone
ETP	Endangered, threatened and protected (species)
FAC	Fisheries Advisory Committee (Barbados)
FAO	Food and Agriculture Organization of the United Nations
FCWC	Fishery Committee for the West Central Gulf of Guinea
FIP	Fishery Improvement Project
FIS	Fishery Information System (Maldives)
FishNET	Fish Traders and Processors Network (FCWC)
FLE	Fisheries Learning Exchange
FMM	Flexible Multi-Partner Mechanism
FODP	Fisherfolk Organization Development Project (Barbados)
FTP	Fish Trade Project
FTT	FAO-Thiaroye processing technique
FUI	Fuel use intensity
GHL	Guideline harvest level
GIFT	Gender in Fisheries Team
HCR	Harvest Control Rules
IFAD	International Fund for Agricultural Development
IPNLF	International Pole and Line Foundation
ITC	International Trade Centre
IOTC	Indian Ocean Tuna Commission
IUU	Illegal, unreported and unregulated (fishing)
KJS	Kodiak Jig Seafoods
MAP	Alaska Sea Grant Marine Advisory Program
MDPI	Masyarakat dan Perikanan Indonesia
MIFCO	Maldives Industrial Fisheries Company
MRHP	Ministry of Fishery Resources (*Ministère des Ressources Halieutiques et de la Pêche*, Madagascar)
MSC	Marine Stewardship Council
MSY	Maximum sustainable yield
NEPAD	New Partnership for Africa's Development
NGO	Non-governmental Organization
NOAA	National Oceanic and Atmospheric Administration
NPFMC	North Pacific Fishery Management Council
NSGCP	National Sea Grant College Program
PAH	Polycyclic aromatic hydrocarbons
PFRS	Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa
PHL	Post-harvest losses
RASFF	Rapid Alert System for Food and Feed
RFMO	Regional fisheries management organization
SDGs	Sustainable Development Goals
SDM	Seafood direct marketing
SGEP	Sea Grant Extension Program
SSF Guidelines	Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication
TAC	Total allowable catch
UNDP	United Nations Development Programme
UWI	University of the West Indies
VMS	Vessel monitoring system



Showcasing applied practices in value chains, post-harvest operations and trade

The objective of this technical paper is to showcase applied practices and initiatives in support of enhancing small-scale fisheries value chains, post-harvest operations and trade, thus illustrating the relevant recommendations made in Chapter 7 of the SSF Guidelines. The case studies presented here have been chosen on the basis of their potential to be emulated elsewhere by small-scale fisheries proponents including, but not limited to, national administrations, Non-governmental Organizations (NGOs), civil society organizations (CSOs), private enterprises, development agencies and intergovernmental bodies. An analysis of the enabling conditions, as well as related challenges and opportunities, are discussed in each case.

BACKGROUND

Small-scale fisheries, encompassing all activities along the value chain in both marine and inland waters, play an essential role in food security and nutrition. According to estimates, small-scale fisheries employ more than 90 percent of the approximately 120 million people employed in fisheries. An estimated 97 percent of these fishworkers live in developing countries. In addition, about half of those working in small-scale fisheries are women, mostly engaged in post-harvest activities, especially marketing and processing. Small-scale fisheries are increasingly being recognized, especially in developing countries, for their contribution to sustainable food systems and the opportunities they present for sustainable development and poverty eradication (World Bank, 2012).

Small-scale fishing communities are often overlooked, and their actors tend not to be involved in the decision-making processes that influence their lives and future (FAO, 2018). Where this type of neglect exists in small-scale fisheries value chains, it is vital that efforts be made to enable social organization among fishworkers to strengthen their voice. Failing to do so impedes the full extension of their human rights, including their civil, political, economic, social and cultural rights. Equally important, fishworkers must be provided with the capacity and facilities to optimize the quantity and quality of the product being traded, as this is also crucial for reducing resource pressure and preserving marine ecosystems for future generations.

There is an evident connection between the challenges faced by small-scale fishing communities and the objectives of the Sustainable Development Goals (SDGs). Indeed, the importance of addressing the inherent challenges faced by small-scale fisheries in producing high-quality, safe food and reaching markets is explicitly recognized by SDG Target 14.b: "Provide access for small-scale artisanal fishers to marine resources and markets"; and SDG Target 2.3: "By 2030 double the agricultural productivity and the incomes of small-scale food producers, particularly women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment".

Governments, private enterprises, NGOs, development agencies and civil society all have an essential role to play in enhancing value chains, post-harvest operations and trade to facilitate market access for small-scale fishers and fishworkers. These efforts contribute to enhancing food security and poverty reduction in fishing communities and, more generally, to achieving the 2030 Agenda for Sustainable Development.

THE SSF GUIDELINES

The Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines), endorsed by the 31st Session of the FAO Committee on Fisheries (COFI) in 2014, were developed to support the visibility, recognition and enhancement of small-scale fisheries, thus contributing to global and national efforts towards the eradication of hunger and poverty (FAO, 2015). The SSF Guidelines are unique in that they represent the first international instrument dedicated entirely to small-scale fisheries; their development was informed by more than four thousand small-scale fisheries representatives and other stakeholders in over 120 countries. The objectives of the SSF Guidelines – to contribute to equitable development and a sustainable future – are to be achieved using a human rights-based approach. They are organized into three sections:

- Part 1: Introduction (Chapters 1–4). This section specifies the objectives, nature, scope, and guiding principles of the SSF Guidelines as well as their relationship with other international instruments.
- Part 2: Responsible fisheries and sustainable development (Chapters 5–9). These chapters address key thematic areas including responsible fisheries and governance of tenure, but also other crucial intersectoral topics.
- Part 3: Ensuring an enabling environment and supporting implementation (Chapters 10–13). This last section provides implementation guidance and recommendations for how to create an enabling environment.

CHAPTER 7 OF THE SSF GUIDELINES: VALUE CHAINS, POST-HARVEST AND TRADE

Chapter 7 of the SSF Guidelines is dedicated to value chains, post-harvest operations and trade. In particular, it recognizes the rights of fishers and fishworkers, acting both individually and collectively, to improve their livelihoods through trade at global, regional and national levels, and by enhancing value chains and post-harvest operations.

The recommendations contained in Chapter 7 include building capacity of small-scale fishers, strengthening organizations and empowering women; reducing post-harvest losses and adding value to small-scale fisheries production; and facilitating sustainable trade and equitable market access. The following subsections present key challenges faced by small-scale fishers and fishworkers in obtaining market access and enhancing value chains and post-harvest operations, and highlight potential solutions based on recommendations in the SSF Guidelines.

Build capacity of individuals, strengthen organizations and empower women

The small-scale fisheries post-harvest sector and its actors play a central role in the value chain, but they are not always included in relevant decision-making processes. In particular, women are frequently excluded from such processes despite their considerable contribution to the post-harvest sector. The participation of small-scale fishworkers in decision-making processes is often hampered by limited organizational capacity and unequal access to usable assets, technology, finance, education and services.

Gender-sensitive development of small and medium-sized enterprises, cooperatives and other forms of social organization is required, along with appropriate infrastructure and capacity development at all stages of the value chain. This can improve both access to markets and participation in relevant decision-making processes, thus contributing to fair distribution of benefits, enhanced livelihoods and food security.

Reduce post-harvest losses and add value to small-scale fisheries production

Post-harvest fish losses occur in value chains throughout the world. Not only do these losses result in lost income to fishers, processors and traders, they also contribute to food insecurity by reducing the amount of fish available for the consumer. Accurate

assessments of post-harvest losses in small-scale fisheries are difficult to obtain, as much of the catch is unrecorded and trade is often informal. Nonetheless, it has been estimated by FAO that 10 percent of the world fish catch (in live weight equivalent) is lost due to poor handling, processing, storage and distribution. Food quality loss, because of poor handling, is the most pervasive form of loss in small-scale fisheries (FAO, 2011).

Sustainable practices along the value chain can help avoid losses and waste by combining traditional, cost-efficient methods with innovation and new technology. Where appropriate, value addition should be promoted, alongside robust fisheries management systems, to improve livelihoods and prevent overfishing. Value addition techniques can lead to, inter alia, increased income and diversification in the range of products available. Not only does value addition enable greater financial planning and security, it also reduces negative impacts on marine ecosystems. To achieve this goal, small-scale fisheries actors need access to financial services, including credit and microfinance, savings services, and payment and remittance services.

Facilitate sustainable trade and equitable market access

Trade in fishery products can have a positive effect on food security, both through the higher availability of fish for human consumption and the higher income generated for fishers and fishworkers. However, sustainable trade is conditional on there being sustainable resource and food security management practices in place (FAO, 2005). If export demand is left to dominate trade flows from a fishery, this can undermine both local food security and sustainability of the resource.

Markets, be they national, regional or global, present particular opportunities and challenges for small-scale fisheries. Opportunities include the potential to earn a higher value per unit, and the possibility to engage with actors who can facilitate access to financial resources, capacity building and training as part of their investment in the value chain. Complex frameworks of rules and regulations govern fisheries value chains. The wide variety of trade policies implemented by countries, including tariffs, subsidies and non-tariff measures, can have a significant influence on fisheries production and trade, particularly in relation to market access. It can be challenging to meet these regulations and standards, especially when considering the capacity and knowledge constraints of small-scale fisheries actors in developing countries. In addition, unequal power relations often exist between different actors along the value chain, leaving some vulnerable to disadvantageous contracts and unfair conditions and practices. Training and capacity development of individuals and organizations on market functions, literacy and numeracy should be offered to facilitate and better prepare small-scale fisheries actors to engage with and compete in formal markets.

OVERVIEW OF CASE STUDIES

BOX 1
Case study selection

The case studies presented in this document were selected by the FAO Small-Scale Fisheries Task Force through a competitive selection process. Case studies were selected based on the perceived replicability of initiatives by relevant actors, including national administrations, NGOs, CSOs, private enterprises, development agencies, intergovernmental bodies, and others. To facilitate this universal applicability, it was important to ensure geographic diversity and broad coverage of the recommendations in Chapter 7 of the SSF Guidelines.

The work presented here focuses on ongoing and recently concluded activities by various actors including FAO, NGOs, CSOs, universities and regional organizations. The case studies provide an opportunity to examine and analyse specific issues in more detail with a view to creating new insights and informing new activities moving forward.

TABLE 1
Summary matrix: FAO Fisheries and Aquaculture Technical Paper No. 652

FAO Fisheries and Aquaculture Technical Paper No. 652 case studies	SSF Guidelines paragraphs on value chains, post-harvest and trade			
	7.1 ...ensure that post-harvest actors are part of relevant decision making processes (a), recognizing that there are sometimes unequal power relationships between value chain actors... and marginalized groups may require special support (b)	7.2 ...facilitate women's participation (c) ...ensure that amenities and services appropriate for women are available as required (d) ...enable women to retain and enhance their livelihoods in the postharvest subsector (e)	7.3 ...provide and enable investments in appropriate infrastructures (f), organizational structures (g) and capacity development (h) to support the small-scale fisheries post-harvest subsector	7.4 ...recognize... associations of fishers and fish workers (i) and promote their adequate organizational and capacity development (j) in all stages of the value chain... and support marketing mechanisms (k)
1. The Central Fish Processors Association: Collective action by women in the Barbados flyingfish fishery	a, b	c, d, e	g, h	I, j
2. The Kodiak Jig Initiative: Ensuring viability of the small-boat jig fleet through market and policy solutions	a, b		f, g	j, k
3. The FAO-Thiaroye processing technique: Facilitating social organization, empowering women, and creating market access opportunities in West Africa		d, e		i, j
4. Fish traders and processors network: Enhancing trade and market access for small-scale fisheries in the West Central Gulf of Guinea			g, h	
5. Seafood direct marketing: Supporting critical decision-making in Alaska and California			f, g, h	j, k
6. Fair Trade: Certification of a yellowfin tuna handline fishery in Indonesia				i, j, k
7. Madagascar's mud crab fishery: how fishers can earn more while catching less				
8. State-led fisheries development: Enabling access to resources and markets in the Maldives pole-and-line skipjack tuna fishery				
9. Fishery Improvement Projects: In the context of small-scale fisheries value chains, post-harvest operations and trade	a			

7.5 ...avoid post-harvest losses and waste (l) and seek ways to create value addition (m), building also on existing traditional and local cost-efficient technologies, local innovations and culturally appropriate technology transfers	7.6 ...facilitate access to local, national, regional and international markets (n) and promote equitable and non-discriminatory trade (o) for small-scale fisheries products... support regional trade (p) in products from small-scale fisheries	7.7...ensure that promotion of international fish trade and export production do not adversely affect the nutritional needs of people (q)	7.8 ...recognize that benefits from international trade should be fairly distributed (r) ...ensure that effective fisheries management systems are in place to prevent overexploitation driven by market demand (s)	7.9 ...ensure that adverse impacts by international trade on the environment, small-scale fisheries culture, livelihoods and special needs related to food security are equitably addressed (t)	7.10 ...enable access to all relevant market and trade information for stakeholders in the small-scale fisheries value chain (u) ...Capacity development is also required so that all small-scale fisheries stakeholders... can ...benefit equitably from, opportunities (v)
l, m	n				
	n, o, p				u, v
	n, o				u, v
			r, s	t	
l, m	n, o	q			
	n, o	q	r, s	t	
			s		

Case study 1: Pena *et al*. tell the story of ***The central fish processors association: collective action by women in the Barbados flyingfish fishery***. Collective action consists primarily of enhancing cohesion and cooperation on important issues, building or restoring a sense of relevance or significance among marginalized groups, getting "a seat at the table" to develop pragmatic solutions, seeking greater accountability and transparency, and managing conflict. This method is fundamental for organizations seeking to effect positive change. Given the prominent role of women in the post-harvest segment of the flyingfish value chain in Barbados, the collective action of the women-led Central Fish Processors Association (CFPA) is particularly worthy of consideration. The case study analyses the formation and development of the CFPA and the benefits it has provided to its members in terms of their livelihoods and domestic lives, as well as to the flyingfish fishery more generally. It then highlights valuable lessons to inform others in fisheries post-harvest organizations.

Case study 2: Peterson *et al*. present ***The Kodiak Jig Initiative: Ensuring viability of the small-boat jig fleet through market and policy solutions***. This case study outlines how jig fishers and partners successfully secured quota set-asides as a means to provide affordable entry-level opportunities for new and young fishers as well as those seeking more diversified access. The study further details efforts to establish niche markets for the quota set-asides, which resulted in significant increases in the dockside value of Pacific cod and rockfish for the small-boat fleet, and ultimately the establishment of the Kodiak Jig Seafoods brand. Combined, these policy and market-based efforts helped to ensure viable access and livelihood opportunities for the Kodiak jig fleet. The challenges and solutions presented can inform the development of approaches to ensure social, cultural and economic viability of fishing communities, and provide a textbook example of SDG Target 14.b – "Provide access for small-scale artisanal fishers to marine resources and markets" – in action at the local level.

Case study 3: Ford *et al*. provide an overview of ***The FAO-Thiaroye processing technique: Facilitating social organization, empowering women, and creating market access opportunities in West Africa***. The FAO-Thiaroye processing technique (FTT) is healthier and more efficient than other traditional methods of smoking fish. It produces products with an extended shelf life that meet international food safety standards, and helps reduce post-harvest losses during bumper harvests. This case study discusses challenges and opportunities related to deploying the FTT to improve smoked fish value chains in West Africa. Further, it explores the important and necessary role of the FTT in facilitating the social organization of fish processors, and in improving gender equality and empowering women. The study underlines the need to support social organization and provide capacity development training in order to realize the benefits of improved infrastructure and overcome barriers to reaching new markets.

Case study 4: Ayilu *et al*. present the ***Fish traders and processors network: Enhancing trade and market access for small-scale fisheries in the West Central Gulf of Guinea***. From 2014 to 2018, the Fish Trade Project supported trade and market-driven initiatives for small-scale fisheries in the Fisheries Committee for the West Central Gulf of Guinea (FCWC). A key initiative of this project was the establishment of the FCWC Fish Traders and Processors Network (FCWC FishNET), a platform composed of small-scale traders and processors, with the objective of informing policy gaps and designing market-driven incentives to leverage the collective power of its members to facilitate regional trade. This case study reviews the activities of FCWC FishNET and reflects on the socio-economic role played by trade networks in small-scale fisheries. It also provides an example of how networks can foster knowledge sharing, cooperation and trust among members in support of enhancing value chains, post-harvest operations and trade.

Case study 5: Pomeroy *et al.* examine ***Seafood direct marketing: Supporting critical decision-making in Alaska and California***. Seafood direct marketing (SDM) arrangements involve fishers selling their catch directly to consumers or beyond the first receiver of the catch. The authors consider a variety of SDM arrangements in terms of the business skills, time and resources required, as well as types of products that can readily be sold, among other factors. Fishers have been drawn to SDM as a means of adapting to regulatory, operational, environmental, social and economic challenges. These marketing arrangements, however, may not be feasible or suitable for all individuals, fisheries or communities. Recognizing this, the case study presents efforts by Sea Grant Extension Programs to assist small-scale fishers and communities in Alaska and California to evaluate and make well-informed decisions about utilizing SDM in their particular context. It provides valuable insights to enable fishers to improve price-per-pound sales and reduce vulnerability to market variability and pricing.

Case study 6: Zheng *et al.* report on ***Fair Trade: Certification of a yellowfin tuna handline fishery in Indonesia***. Fair Trade USA is a non-profit organization founded in 1998 to help small-scale actors achieve better trading conditions as well as improved social and environmental standards. The organization has reached nearly one million producers globally and delivered USD 551 million in additional profits to farmers, workers and fishers. This case study presents an overview of Fair Trade's Capture Fisheries Standard, with its core objectives of fisher and worker empowerment, economic development of communities, social responsibility and environmental stewardship. It then reviews the process to certify the yellowfin tuna handline fishery in Indonesia, and details how Fair Trade seeks to enable greater equity in value chains and ensure the benefits of trade and export are spread among producers and processors. The study provides a great example of a market-driven blueprint for developing socially, economically and environmentally sustainable value chains.

Case study 7: Kasprzyk *et al.* present ***Madagascar's mud crab fishery: How fishers can earn more while catching less***. Mangrove mud crab is Madagascar's third most valuable seafood export, with approximately 30 000 small-scale fishers relying on it for income. Since the late 2000s, mangrove mud crab fishing effort has increased significantly due to high international demand, leading to overexploitation. Additionally, post-harvest losses along the value chain due to poor handling, transport and storage have further reduced the earnings and food security of the coastal communities who depend on the mud crab fishery. This case study presents the work undertaken through the SmartFish Programme, in collaboration with the Government of Madagascar and locally based NGOs, to assess and develop methods for reducing overexploitation of mangrove mud crab and increasing benefits to fishers and value chain actors. It provides an excellent example of how practical and low-cost changes in behaviour, logistics and techniques can reduce post-harvest losses, helping fishers to earn more while catching less.

Case study 8: Edwards *et al.* describe ***State-led fisheries development: Enabling access to resources and markets in the Maldives pole-and-line skipjack tuna fishery***. The fisheries sector is a cornerstone of the Maldives economy, contributing significantly to national employment, foreign exchange and food security. The Pole-And-Line Skipjack Tuna Fishery is the oldest and largest fishery in the country. This case study examines the role of the Maldivian Government in developing a well-managed and sustainable fishery able to compete in the global tuna marketplace: namely, by ensuring preferential access to and benefit from skipjack tuna resources for its own citizens; and by adapting the country's tuna sector to global market conditions. The study pinpoints

actions that can be emulated by governments whose fisheries are affected by globalized market demands, thus providing another example of SDG Target 14.b – "Provide access for small-scale artisanal fishers to marine resources and markets" – in action at the national level.

Case study 9: Ford *et al.* review ***Fishery Improvement Projects: In the context of small-scale fisheries value chains, post-harvest operations and trade***. Improving the environmental sustainability of large-scale seafood production using market-based approaches has been a focus of the sustainable seafood movement since the 1990s. One outcome of these efforts has been the development of Fishery Improvement Projects (FIPs), which are multistakeholder partnerships designed to encourage value chain actors to improve fisheries sustainability. This case study provides an overview of FIPs and their role in meeting demand for sustainable seafood, and considers their application to small-scale fisheries. It then analyses the strengths and weaknesses of FIPs in the context of the SSF Guidelines.

DISCUSSION

Since the endorsement of the SSF Guidelines by COFI in 2014, recognition of the importance of small-scale fisheries has increased, as has awareness of the recommendations contained in the Guidelines. These are now reflected in various regional and national policies and strategies. Moreover, as demonstrated by the case studies presented here, the principles and provisions of the SSF Guideline are being applied by a broad range of actors and in diverse contexts.

This technical paper presents efforts from around the world to develop sustainable small-scale fisheries value chains and improve post-harvest operations and trade. The case studies constitute a rich selection of experiences and are diverse, not only with regard to their geographical setting, but also in the topics covered and approaches employed. In each case, certain practices have been implemented that can be emulated by other small-scale fisheries value chain actors operating under similar conditions. Furthermore, a defining trait shared by all the case studies is the diligence with which each have unlocked value chain potential without undermining sustainable development or resource management.

In this conclusion, we summarize and discuss key interventions highlighted by the different authors in relation to each paragraph in Chapter 7 of the SSF Guidelines. The discussion is not exhaustive, but rather focuses on key findings as they relate to the implementation of the Guidelines. The reader is encouraged to read the full paper to learn more and fully appreciate all of the initiatives described herein.

7.1 All parties should recognize the central role that the small-scale fisheries post-harvest subsector and its actors play in the value chain. All parties should ensure that post-harvest actors are part of relevant decision making processes, recognizing that there are sometimes unequal power relationships between value chain actors and that vulnerable and marginalized groups may require special support.

Guiding Principle 6 of the SSF Guidelines recognizes the importance of consultation and participation. Paragraph 7.1 emphasizes this explicitly, calling for all post-harvest small-scale fisheries actors to be included in decision-making processes. Case studies 1, 2 and 9 provide concrete examples of how these actors can be empowered to engage in decision-making.

Case study 1: The CFPA is a fisherfolk organization composed entirely of women, operating in the post-harvest value chain of the flyingfish fishery in Barbados. Its functioning illustrates the practice of representing post-harvest actors through a democratic system, whereby one individual is elected to represent the needs of all members in national, regional and international processes. The CFPA has kept a strong focus on capacity development of its members as a way to promote the equitable participation of women. In addition, the organization has earned respect and recognition from a variety of players within the fisheries sector, due in part to its cohesion when dealing with issues affecting flyingfish processors, and maintains an effective working relationship with the government authority responsible for management and development of Barbados fisheries.

Case study 2: Not being able to attend management meetings where decisions are made is a common challenge for small-scale fishers and fishworkers. The experience of the Kodiak Jig Initiative demonstrates the efforts of fishers and community advocates to influence decision-making to achieve policy changes that enabled access to resources, ensuring opportunities for current and future small-boat fishers. The effort subsequently supported a marketing initiative designed to ensure that the benefits of access to resources could be fully realized. To accomplish this, a partnership between Kodiak-based jig fishers, the Alaska Jig Association (AJA) and the Alaska Marine Conservation Council (AMCC) was formed to ensure a strong presence was maintained by fishers and community representatives in relevant meetings and processes throughout the State of Alaska.

Case study 9: FIPs are premised on a multistakeholder approach for enhancing sustainable fisheries management, with products derived from FIPs being used to fulfil sustainable seafood sourcing quotas among value chain actors in high-value markets. The FIP model is increasingly being applied to small-scale fisheries, allowing post-harvest actors at different points in the value chain to participate in decision-making processes. However, studies have found that power is often unequally distributed, and fishers and fishworkers do not always play a central role in the management of FIPs; hence the need to evolve the model to be more inclusive of fishers and fishworkers.

7.2 All parties should recognize the role women often play in the post-harvest subsector and support improvements to facilitate women's participation in such work. States should ensure that amenities and services appropriate for women are available as required in order to enable women to retain and enhance their livelihoods in the post-harvest subsector.

Gender equality and equity is Guiding Principle 4 of the SSF Guidelines, and is addressed in Chapter 8. In relation to value chains, post-harvest and trade, paragraph 7.2 underlines the need to facilitate women's participation and ensure that appropriate amenities and services are available for women, so that they may retain and enhance their livelihoods in the post-harvest subsector. Case studies 1 and 3 highlight efforts to ensure equal rights and opportunities for women in the post-harvest subsector.

Case Study 1: The Bridgetown Fisheries Complex (BFC) is operated by the Markets Division of the Government of Barbados. The women members of the CFPA make their living working in this facility. The CFPA provides women with a united front, which has enabled them to pursue better conditions in the government-run facility where they work, while at the same time engendering a form of ownership within the public facility. Working conditions in the processing hall have been improved to ensure the provision of satisfactory amenities and facilities for the pursuit of their livelihoods.

Case study 3: FAO-Thiaroye processing technique (FTT) kilns have been shown to benefit women by reducing hazardous working conditions and providing them additional social autonomy (due to faster processing times). As a result, women have more time to focus on family obligations and pursue other income-generating and self-improvement activities, such a marketing their products and furthering their education. Hence, the FTT creates an opportunity for women to assert themselves in the value chain in new ways that enhance their livelihoods.

7.3 States should foster, provide and enable investments in appropriate infrastructures, organizational structures and capacity development to support the small-scale fisheries post-harvest subsector in producing good quality and safe fish and fishery products, for both export and domestic markets, in a responsible and sustainable manner.

Social and economic viability is Guiding Principle 13 of the SSF Guidelines. Paragraph 7.3 recognizes that appropriate organizational structures, capacity development and access to infrastructures can enable fishworkers to improve their livelihoods by producing safe, high-quality products. Case studies 1, 2, 4 and 5 focus on aspects of how investments in appropriate infrastructure as well as associated organizational structures and capacity development can improve product quality and livelihoods.

Case study 1: The BFC processing hall, assigned with input and at the urging of CFPA members, is a spacious facility built to meet international standards. Having this dedicated space has allowed the CFPA processors to collectively benefit from improved hygiene conditions. Furthermore, the members have benefited from training to implement food handling standards, which in turn has improved the profitability and marketability of their products. Securing access to facilities in the BFC procession hall is noted by members as one of the main successes of the CFPA.

Case study 2: In order to realize the marketing strategy of the Kodiak Jig Initiative, it was necessary to secure infrastructure and organizational support. Although Kodiak is one of the largest fishing ports in the United States of America, with year-round seafood processing, local fishing infrastructure is primarily geared toward large-scale, high-volume fisheries. Challenges included access to ice and use of a crane to offload product. Ultimately, an arrangement was formed with a custom processor that focused primarily on smoking salmon, which provided additional processing opportunities to its fishworkers in the spring – a slow time for salmon processing. Key to operational success was having AMCC Kodiak-based staff follow the product throughout the entire process, from offloading to market delivery. Separately, jig fishers also lobbied the city council for a working waterfront with infrastructure for independent small-scale harvesters, resulting in the construction of a public use crane at a multi-use dock in the main harbour.

Case study 4: The FCWC Fish Traders and Processors Network (FCWC FishNET) was established to inform the design of market-driven incentives to leverage the collective power of its members to facilitate regional trade. Working with partners, FCWC FishNET refurbished a cross-border fish trading and processing centre (the Manhean Fish Processors and Traders hub) in Tema, Ghana. This centre now attracts fish traders and processors from neighbouring countries and distributes a substantial quantity of processed small-scale fisheries products to fish markets in Benin, Burkina Faso, Côte d'Ivoire, Ghana and Togo. With the addition of a water supply system and washroom facilities, the upgraded facility can now guarantee clean and safe processed fish products for trade. The improvements also make it easier for processors and

traders to work efficiently during bumper harvests, as the new amenities include bath and toilet facilities as well as rooms for changing and nursing babies.

Case study 5: The Sea Grant Extension Programs (SGEPs) in Alaska and California facilitate evaluation of seafood direct marketing (SDM) options and provide tools and capacity development through business education for fishers seeking greater control over the value chains they are engaged with. The SGEP model – based on principles of non-advocacy, trust, effective communication and using a science-based approach – supports sound decision-making and increased understanding of the practicalities and limitations of SDM. Engagement by SGEP staff with fishing communities includes consultations, workshops and collaborative research, with materials developed from these efforts in turn useful for building capacity for the post-harvest sector. This approach is unique compared to other case studies presented, as the SGEP provides guidance for fishworkers seeking a more entrepreneurial approach to trade.

7.4 States and development partners should recognize the traditional forms of associations of fishers and fish workers and promote their adequate organizational and capacity development in all stages of the value chain in order to enhance their income and livelihood security in accordance with national legislation. Accordingly, there should be support for the setting up and the development of cooperatives, professional organizations of the small-scale fisheries sector and other organizational structures, as well as marketing mechanisms, e.g. auctions, as appropriate.

Paragraph 7.4 of the SSF Guidelines echoes the importance of consultation and participation. It calls for recognition of traditional forms of association of fishers and fishworkers, and stresses the need to promote their organizational and capacity development all along the value chain. Case studies 1, 2, 3, 5 and 6 consider the role of associations in enhancing incomes and livelihood security of small-scale fishers.

Case study 1: Between 1997 and 1999, the Barbados Government implemented an externally funded Fisherfolk Organization Development Project (FODP). The project's long-term objectives were to work closely with formal and informal fisherfolk organizations to sustainably improve the livelihoods and well-being of fisherfolk, and to establish fisherfolk organizations capable of active participation in fisheries management and development. A notable outcome was the establishment of the CFPA, which was supported by the Barbados Fisheries Division (BFD) through the FODP. The BFD continues to provide in-kind support to the CFPA. This support has been key in allowing the CFPA to engage in collective action, as discussed in the preceding sections.

Case study 2: The Kodiak Jig Initiative highlights the power of cooperation in achieving common objectives. Formed in the late 2000s, the Alaskan Jig Association (AJA) worked closely with AMCC in order to develop an engagement strategy to reduce the barriers to entry for young fishers. It also endeavoured to ensure that any policy changes by the fishery management council concerning rockfish and cod in the Gulf of Alaska included clear, entry-level opportunities and access for small-scale fisheries. Likewise, AMCC worked closely with AJA to support organizational capacity so that written comments and verbal testimony could be regularly submitted at council meetings. In addition, AMCC provided financial support to cover airfare and lodging, enabling fishers to participate in key meetings.

Case study 3: The FAO-Thiaroye processing technique study found that the FTT kiln can act as a platform for social organization, but noted that the most successful examples of FTT deployment involved a cooperative or association that could take responsibility for the kiln's management and maintenance. Critically, the study recognized that the FTT in and of itself does not overcome barriers to forming effective associations, but rather recognized the importance of providing adequate organizational and capacity development training among processors to achieve a sustainable outcome.

Case study 5: The SGEPs have supported SDM capacity development through classes, workshops, websites and other outreach efforts, for fishers in California and Alaska. SDM entails fishers selling their catch via fewer intermediaries. SDM arrangements can provide outlets for lower-volume, higher-value (price-per-pound) fisheries, thus reducing their vulnerability to the variability and uncertainty of pricing that often characterize long supply chains, especially those tied to global markets. The capacity building and outreach materials provided by the SGEPs address the various types of SDM arrangements, practical considerations for each type, and guidance on topics such as maintaining product safety and quality, business administration and, for specific fisheries and geographies, summary permitting requirements. These combined efforts have enabled entrepreneurial fishers in suitable contexts to start, and enhance, small businesses.

Case study 6: Fair Trade USA's Capture Fisheries Standard (CFS) requires registered fishers to form at least one democratically run Fishers' Association, unless they already belong to a legal cooperative. The cooperative or association then facilitates coordination of responsibilities on resource management, vessel safety and trade relationships. It also represents the fishers on any matters affecting their fishing activities, including the CFS, laws, fisheries regulations, and fisheries-related infrastructure. Individual members are elected to one or more Fair Trade Committees to manage the use of the Fair Trade Premium funds received for product sold on Fair Trade USA's terms. These committees are then responsible for managing and spending the funds on behalf of the participants, and for tracking and reporting their use. It is interesting to note that in 2015, Fair Trade USA's household survey in Indonesia revealed that 68 percent of participants indicated that the "Premium fund" was the most important benefit of Fair Trade USA's programme. However, in 2016, this figure shrank by 20 percent, while "Formation of a Fishers' Association" grew by 8 percent. This may indicate that while the material benefits of the programme are appreciated, having a platform through which to discuss the management of the value chain is also highly valued.

7.5 All parties should avoid post-harvest losses and waste and seek ways to create value addition, building also on existing traditional and local cost-efficient technologies, local innovations and culturally appropriate technology transfers. Environmentally sustainable practices within an ecosystem approach should be promoted, deterring, for example, waste of inputs (water, fuelwood, etc.) in small-scale fish handling and processing.

Economic, social and environmental sustainability is Guiding Principle 10 of the SSF Guidelines. Paragraph 7.5 encourages avoidance of post-harvest losses and searching for ways to add value through improved handling and processing. Case studies 3 and 7 emphasize tools, low-cost techniques and changes in behaviour to minimize post-harvest losses and add value.

Case study 3: The FTT kiln is a safer, more economic and environmentally sustainable method of smoking fish. The kiln reduces fuelwood consumption by way of an ember

furnace tray, a feature that dually conserves the heat – and therefore the quantity of fuel needed – in a separate compartment from the fish, while also concentrating the heat on the fish and allowing for greater control over the smoking process. The kiln has also been shown to reduce fish losses and waste, particularly during peak harvest times; in contrast, the low capacity of traditional smoking devices invariably translates into high post-harvest losses during bumper seasons. The practice is being disseminated through peer-to-peer knowledge exchanges and trained "change agents", who provide FTT training and demonstrations in culturally appropriate ways.

Case study 7: The SmartFish Programme's crab project culminated in the production of SmartFish Manual No. 35, entitled, "Enhancing the value of mangrove crab through reduction of post-harvest losses". The manual details ten improved practices for catching and handling mud crabs that were developed, tested and optimized, in collaboration with small-scale fishers and fishworkers, to improve crab quality across all links in the value chain. To implement the improved handling practices, eight culturally appropriate methods of communication were developed in French and Malagasy, in both written and radio format. This included posters, a number of workshops, and three mobile demonstration units on small boats to reach fishing communities in remote locations.

7.6 States should facilitate access to local, national, regional and international markets and promote equitable and non-discriminatory trade for small-scale fisheries products. States should work together to introduce trade regulations and procedures that in particular support regional trade in products from small-scale fisheries and taking into account the agreements under the World Trade Organization (WTO), bearing in mind the rights and obligations of WTO members where appropriate.

Guiding Principle 3 of the SSF Guidelines calls for the elimination of discriminatory policies and practices in small-scale fisheries. Paragraph 7.6 underscores the need to facilitate access to markets and support regional trade for products from small-scale fisheries. Case studies 3, 4, 5, 7 and 8 detail efforts to achieve and maintain market access for products from small-scale fisheries in an equitable and non-discriminatory fashion.

Case study 3: The FTT facilitates access to international markets by producing products that meet international food safety standards and has the potential to catalyse further international trade. Traditional methods of smoking fish result in elevated levels of carcinogenic compounds that often fail to meet international standards. The FTT kiln is used in more than a dozen African countries by companies that process and export fish to the EU and the United States of America. It is also being piloted in small-scale fishing communities in Sri Lanka, the Federated States of Micronesia and the Philippines. In addition to accessing international markets, FTT products can fetch a higher price in local and regional markets, though in practice the results have been mixed: many consumers may not be able to afford the FTT-smoked fish, or prefer the appearance and texture of fish smoked using traditional techniques.

Case study 4: The FCWC FishNET study discusses efforts to enhance informal trade linkages and partnerships to promote regional trade in West Africa. Fish traders and processors are able to leverage these trade networks to address two major constraints for small-scale fisheries in the region: transportation costs and access to credit. For instance, using their established networks, Togolese fish importers in Ghana combine consignments to fill bulk cargo trucks. This "bulk transport" has several advantages:

it allows the importers to negotiate reduced transport rates, and border inspection post formalities are simplified by bulk inspections of the fish consignments, thus expediting the delivery of fish products. To address the issue of access to formal credit, microfinance institutions have been set up to support small-scale fisheries organizations by providing loans that are the collective responsibility of those party to the respective organization. This affords traders and processors access to credit that they might normally have difficulty obtaining, due to lack of collateral or inexperience with bookkeeping or bureaucratic credit procedures. Bulk transport and microfinance allow fish traders to increase the volume of fish imported, thus ensuring an abundant fish supply for rural communities at cheaper prices, while also playing a crucial role in improving income and livelihood security and facilitating fish trade in domestic and regional markets.

Case study 5: The *Fisherman's Direct Marketing Manual* was developed by the Alaska SGEP at the request of the Alaska Department of Commerce, in response to a precipitous drop in salmon prices in the early 1990s, to provide guidance to fishers wishing to pursue SDM as a form of livelihood diversification. Now in its fifth edition, the manual covers business planning, e-commerce, packaging and shipping, custom processing, the seafood distribution system and seafood handling. It also provides a tool for fishers to assess their own capacities for pursuing SDM as a business diversification strategy. The "Market Your Catch" website developed by California SGEP builds on the manual and provides a web-based resource for those interested in SDM. Both the manual and the website describe the challenges involved and the characteristics and skills needed to succeed with SDM arrangements. These resources ultimately help small-scale fishers evaluate options and plan for accessing new markets locally, regionally and/or nationally.

Case study 7: In 2013, as part of a strategy to increase export earnings, the Malagasy Government ministry responsible for fisheries resources began granting permits for collection and export of live crabs. This reorientation of the fishery from frozen to live exports sought to capitalize on their higher value: the average live weight price per kilogram is 1.7 times higher than that of frozen crabs. In concert with the crab project to reduce mortality and post-harvest losses described above (paragraph 7.5), Madagascar has since capitalized on the export of live crabs. Survey results show that the national average price more than doubled between 2012 and the end of 2015. For fishers in one region, income increased by 26 percent, despite their catch decreasing by 33 percent over the same period. Increase in sales price was the primary reason for the increase in income; reduction in post-harvest losses also contributed, but to a lesser extent.

Case study 8: The Maldivian Government has played a key role in promoting the pole-and-line skipjack tuna fishery internationally, while also ensuring national citizens are able to share in the benefits derived from this value chain. The Government has also been proactive in adapting the fishery to global market conditions. By spearheading market-oriented sustainability innovations like achieving Marine Stewardship Council (MSC) certification and implementing transparency systems to distinguish Maldivian tuna exports as sustainable – which are increasingly important criteria in high-value markets – the Government has created an enabling environment where the Maldives tuna fleet and its citizens are well placed to thrive in the global seafood marketplace.

7.7 States should give due consideration to the impact of international trade in fish and fishery products and of vertical integration on local small-scale fishers, fish workers and their communities. States should ensure that promotion of international fish trade and export production do not adversely affect the nutritional needs of people for whom fish is critical to a nutritious diet, their health and well-being and for whom other comparable sources of food are not readily available or affordable.

Enhancing the contribution of small-scale fisheries to food security is a key objective of the SSF Guidelines, while holistic and integrated approaches are recognized in Guiding Principle 11. Paragraph 7.7 cautions against adversely affecting the food security and nutrition needs of people who depend on fish in their diet through the promotion of export-oriented trade. Case studies 7 and 8 review examples of export-oriented fisheries that enhance food security and livelihoods.

Case study 7: The opening of the Malagasy mud crab fishery to the export of live crabs led to fears that the amount of crab available for local consumption might decrease. In fact, the opposite has been observed, with local consumption and sales increasing between 2012 and 2017. Fishers selling into the frozen crab market have to choose between selling and consuming their catch, as the majority of crabs destined for this market are accepted at the point of sale. By contrast, exporters of live crab reject on average between 40 and 45 percent of the crabs supplied to them, due to the crabs being weak, injured, or otherwise unsuitable for live export. A significant portion of these rejected crabs are then diverted into the local market. Some are even eaten by the fishers themselves: in one community surveyed, the estimated amount of catch eaten by fishworkers increased from 5 percent to 9 percent. In this way, the reorientation of the fishery toward live export has both increased earnings (due to the higher prices for live crab) and improved food security.

Case study 8: Maldivian citizens depend on tuna for food and nutrition: they consume an average of 94 kg of skipjack tuna each year, and this consumption is growing. In recognition of this demand, the Government of Maldives has put in place measures to ensure the domestic market continues to receive a steady supply of affordable tuna products, thus safeguarding national food security from impacts of international trade. The Government has encouraged the development of a robust domestic processing industry, including small-scale processors that serve remote island communities, which guarantees that large volumes of tuna are landed in Maldives. Additionally, the Government has ensured the sector provides employment all along the pole-and-line tuna fishery value chain, thus providing sustained income for its citizens.

7.8 States, small-scale fisheries actors and other value chain actors should recognize that benefits from international trade should be fairly distributed. States should ensure that effective fisheries management systems are in place to prevent overexploitation driven by market demand that can threaten the sustainability of fisheries resources, food security and nutrition. Such fisheries management systems should include responsible post-harvest practices, policies and actions to enable export income to benefit small-scale fishers and others in an equitable manner throughout the value chain.

Equity and equality is Guiding Principle 5 of the SSF Guidelines. Paragraph 7.8 calls for fair distribution of benefits from international trade and appeals to ensuring effective fisheries management systems are in place to prevent overexploitation driven

by market demand. Case studies 6, 8 and 9 present examples of initiatives designed to address these priorities.

Case study 6: The case of Fair Trade USA demonstrates how equitable distribution of benefits as well as measures to mitigate overexploitation can complement fisheries management systems. Fair Trade Certified products earn a price premium, which ensures that benefits from international trade are fairly distributed – between 2014 and 2019 participating Indonesian small-scale fishers earned over a quarter of a million United States dollars in Fair Trade premium, on top of the landing price. With these funds, fishers are able to identify investments through the Fair Trade Fishers' Association, described above (paragraph 7.4), to improve their livelihoods and the marine environment. Registered fishers are required to adopt responsible fishing practices and work to protect fishing resources and biodiversity. This includes data collection and monitoring to provide better information on the state of fish stocks. For fisheries facing difficulties with data availability and management, the programme helps build the capacity of fishers so they can meet the resource management criteria over time. Notably, although the demand for certified handline tuna is increasing, there are safeguards in place to ensure the tuna is not overfished by registered fishers such as limiting fishing activity via "no fishing Fridays."

Case study 8: The efforts of the Government of Maldives concerning the skipjack tuna fishery demonstrate how national policies can promote fair distribution of benefits and guarantee effective fisheries management systems are in place to prevent overexploitation driven by market demand. The pole-and-line tuna fishery is a key source of income in the country, supporting an estimated 30 000 livelihoods, or 8 percent of the population. The Maldivian Government has taken many steps to facilitate preferential access to and benefits from skipjack tuna resources for its own citizens. For instance, only national one-by-one tuna vessels are licensed to fish in the country's waters, ensuring citizens and the domestic industry are the beneficiaries of its tuna resources. Further to this, by setting a price premium on top of the Bangkok base price for tuna exports and a minimum base price for domestic tuna sales, the Government of Maldives has enabled the fishing sector to maintain a high and stable income. Concerning overexploitation, the Government has also been instrumental in the establishment of a precautionary management framework for skipjack tuna in the Indian Ocean.

Case study 9: Fishery Improvement Projects (FIPs) aim to address unsustainable fishing practices through continuous, stepwise and time-bound improvements within fisheries. The projects are multistakeholder partnerships that may include fishers/producers, NGOs, fisheries managers, governments, researchers, and other members of the fisheries supply chain. FIPs facilitate access to international markets. Measures to improve sustainability are set out in an agreed work plan, and progress is monitored to ensure it stays on track. FIPs have been criticized for not achieving long-term results, exacerbated by incidents of "greenwashing" or facilitating market access while failing to improve fisheries sustainability, and not sufficiently engaging governments, fishers and fishworkers in their planning and execution. Nevertheless, FIPs generally have proved effective in providing a platform for dialogue and strategic direction involving various stakeholders.

7.9 States should adopt policies and procedures, including environmental, social and other relevant assessments, to ensure that adverse impacts by international trade on the environment, small-scale fisheries culture, livelihoods and special needs related to food security are equitably addressed. Consultation with concerned stakeholders should be part of these policies and procedures.

Social responsibility is Guiding Principle 12 of the SSF Guidelines. Paragraph 7.9 suggests adopting policies and procedures, in consultation with relevant stakeholders, to address adverse impacts of international trade on small-scale fishing communities. Case studies 6 and 8 explore the practical application of this recommendation.

Case study 6: While Fair Trade USA is a market-based initiative that does not set policy, its Capture Fisheries Standard (CFS) does put in place procedures designed to ensure that adverse impacts of international trade are equitably addressed. The CFS establishes resource management criteria for achieving sustainable, responsible fisheries, and social responsibility criteria to protect the fundamental human rights of fisheries workers, including wages, working conditions and access to services. The CFS further supports fishers in developing the necessary skills to effectively negotiate with supply chain actors regarding the purchase, processing and marketing of their products. Last but not least, the CFS aims to improve the stability of fishers' incomes by ensuring a transparent and stable trading relationship with buyers. Fair Trade USA and its partners have been able to replicate the successes seen in Indonesia in other fisheries and countries, specifically in Mexico, Maldives, Mozambique, the United States of America and the Solomon Islands.

Case study 8: For the pole-and-line skipjack tuna fishery in Maldives, one of the biggest threats is losing access to key international markets by not keeping pace with the changing sustainability demands for tuna. In this regard, Maldives has kept pace with increased sustainability demands not only through its national fisheries management measures, but also through its leadership within the Indian Ocean Tuna Commission (IOTC) – and its efforts to obtain and retain MSC certification for the skipjack tuna fishery in the Indian Ocean. Developing the sector has been vital in increasing the equitability of the fishery, allowing businesses in Maldives to derive more value from the products that are exported, as well as allowing fishers to receive a higher price for the fish that they land. As a result of government efforts the pole-and-line skipjack tuna fishery has continued to play an important economic role in Maldives, both in terms of foreign exchange earnings and its contribution to the incomes of those working in the sector. Fishers are well paid compared to other professions in the country, earning twice the national per capita average monthly income. Overall, the fishers' high income reflects the cultural value placed on the pole-and-line fishery, making it an increasingly attractive sector to work in.

7.10 States should enable access to all relevant market and trade information for stakeholders in the small-scale fisheries value chain. Small-scale fisheries stakeholders must be able to access timely and accurate market information to help them adjust to changing market conditions. Capacity development is also required so that all small-scale fisheries stakeholders and especially women and vulnerable and marginalized groups can adapt to, and benefit equitably from, opportunities of global market trends and local situations while minimizing any potential negative impacts.

Transparency is Guiding Principle 8 of the SSF Guidelines. Paragraph 7.10 reinforces this core tenet through its recommendation that market and trade information be made available to stakeholders in the small-scale fisheries value chain. Case studies 4 and 5 present examples of efforts to develop capacity and enable access to relevant market information.

Case study 4: FCWC FishNET members have been involved in the organization of Fisheries Learning Exchanges (FLEs) on such topics as smoking methods, hygiene,

processing, packaging and trading techniques. FLEs bring together representatives from different communities to share knowledge and expertise in fisheries, thus facilitating their empowerment. The free and equal flow of information keeps actors along the value chain informed and allows them to benefit from market trends. FLEs have been shown to foster cooperation and trust, and provide a common platform for trade partnerships and linkages in small-scale fisheries value chains in the FCWC subregion.

Case study 5: The experience of SGEPs regarding SDM arrangements highlights efforts to build capacity by providing information and resources to enable small-scale fishers to participate in local food movements and other marketing opportunities occurring on different scales. In addition to supporting market feasibility studies, the SGEPs provide information to help fishers navigate complex permit requirements, seafood handling, safety and commerce. To ensure that accurate information is provided for the various options that may be explored by fishers, the SGEPs engage relevant regulatory agencies in the development of resources. In both Alaska and California, personnel from these agencies have reviewed SDM materials, co-authored publications on requirements for SDM, worked extensively on quality handling efforts, and attended SDM workshops to field questions from fishers. The information gathered and provided by the SGEPs has increased awareness and understanding among small-scale fishers, communities and agency personnel, thus allowing them to make informed decisions on whether or not to pursue SDM.

CONCLUSION

Small-scale fisheries actors engage in global, regional and national value chains, but face challenges in securing market access and a fair distribution of the resulting benefits. Fisheries value chains are part of broader food systems. These food systems encompass all aspects of – and activities related to – food production, processing, distribution, sale and consumption, as well as their socio-economic and environmental impacts (HLPE, 2017). In a food system, factors such as climate, environment, infrastructure and institutions are linked to the value chain. For this reason, developing and improving value chains requires a comprehensive approach.

The SSF Guidelines provide a framework for such a comprehensive approach, and they recognize that sharing of knowledge is essential to overcome challenges and make progress towards securing sustainable small-scale fisheries. This technical paper was developed to mobilize action in this regard by documenting encouraging initiatives to implement the principles and provisions of the SSF Guidelines, in particular those contained in Chapter 7 concerning value chains, post-harvest and trade. The case studies explore key issues and challenges faced by small-scale fishers and fishworkers in obtaining market access, and showcase initiatives to promote and improve such access. The case studies were chosen for their potential to inform an international audience of development and fisheries professionals and stakeholders, with the intention of supporting national and international policies and policy processes to enhance small-scale fisheries value chains, post-harvest operations and trade, and ultimately inspiring further uptake and implementation of the SSF Guidelines.

It is hoped that the findings in this technical paper will support efforts to advance the 2030 Agenda for Sustainable Development – in particular Sustainable Development Goal (SDG) Target 14.b: “Provide access for small-scale artisanal fishers to marine resources and markets”; and Target 2.3: “By 2030 double the agricultural productivity and the incomes of small-scale food producers, particularly women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment”.

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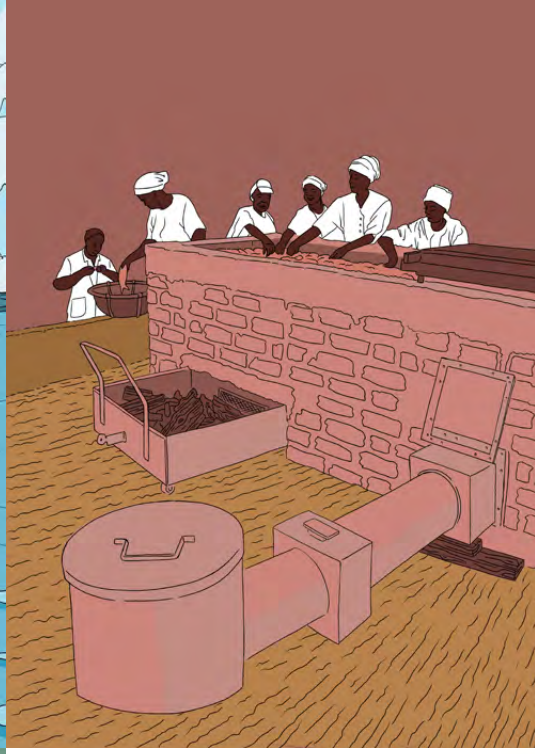
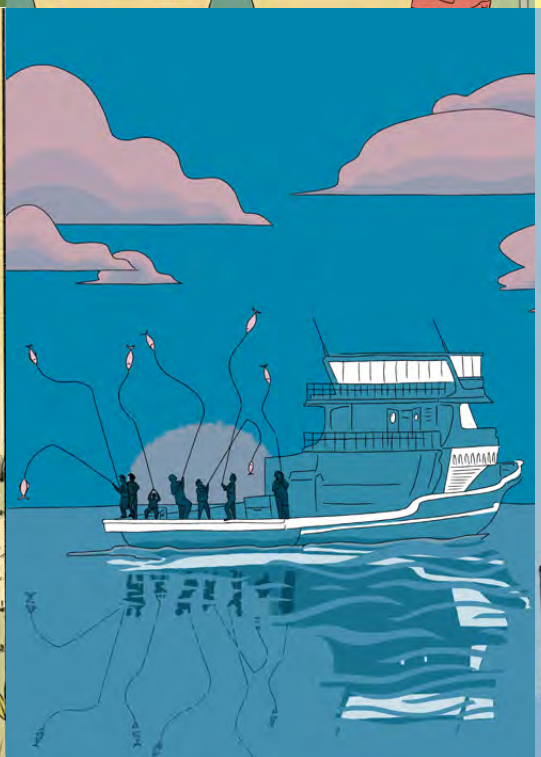



Seafood
Direct from Producers
to
Consumers




PROJECT STATUS

CASE STUDIES

1. The Central Fish Processors Association: Collective action by women in the Barbados flyingfish fishery

Maria Pena
Janice Cumberbatch
Patrick McConney
Neetha Selliah
Centre for Resource Management and Environmental Studies (CERMES), Barbados

Bertha Simmons
Independent consultant

ABSTRACT

Women are prominent in the post-harvest segment of the flyingfish value chain in Barbados, but this is not reflected in their participation in fisherfolk organizations. The Central Fish Processors Association (CFPA) offers a unique example of an organization that currently comprises only women and has been woman-led from its inception. Unable to individually voice their concerns about working spaces at the fish market, the women formed the only fisheries post-harvest association in Barbados. This case study analyses the process of formation of the CFPA, its development and the benefits it has provided to its members in terms of their livelihoods and domestic lives, as well as to the flyingfish fishery more generally. Although challenges persist, it illustrates existing and emerging good practices consistent with the principles of the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication.

Keywords: Collective action, fisherfolk organization, value chain, post-harvest, flyingfish, SSF Guidelines.

1.1 INTRODUCTION

The implementation of the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines) with support from FAO has resulted in increasing global and local attention being given to fisherfolk organizations: in particular, their strengthening and governance, as well as women's participation as both members and leaders (see for example Alonso-Población and Siar, 2018; Frangoudes, Pascual-Fernández and Marguán-Pintos, 2014; McConney, 2007; McConney *et al.*, 2017a). Women in small-scale fisheries organizations can play a critical and useful role in bringing new perspectives to fisheries value chains (Frangoudes, 2013). In this context, the collective action of women actively engaged in the post-harvest sector in the Barbados flyingfish fishery may facilitate and support the implementation of the SSF Guidelines provisions on value chains and gender equality. To illustrate this, this case study examines how women are leading by example

through their daily actions and operations in fish processing along the fisheries value chain (e.g. product standards and quality, capacity building, professionalization of the industry). They have gained respect and recognition by functioning as a group, and via promotion and reinforcement of their peers, with lessons that are applicable globally.

Collective action is primarily about enhancing cohesion and cooperation on important issues, building or restoring a sense of relevance or significance among marginalized groups, getting "a seat at the table" to develop pragmatic solutions, seeking greater accountability and transparency, and managing conflict. Collective action has been employed in fisheries globally to defend shared interests, deal with threats to fisheries management, secure rights and benefits for the industry, or to enable fisherfolk to catch or sell fish (McConney, 2007; Jentoft and Chuenpagdee, 2009; FAO, 2016; Alonso-Población and Siar, 2018). This case study examines the Central Fish Processors Association (CFPA), a women's fisherfolk organization operating in the post-harvest sector of the Barbados flyingfish fishery. The organization's collective action approach aims to improve fishery product quality as well as women's livelihoods and well-being in the industry. This is relevant to the concepts of responsible fisheries and sustainable development, and to the SSF Guidelines, particularly Chapter 7 on value chains, post-harvest and trade (paragraphs 7.1–7.4). The CFPA's actions can also be examined in relation to five guiding principles of the SSF Guidelines: respect of cultures, gender equality and equity, consultation and participation, transparency, and accountability (FAO, 2015a).

1.1.1 Barbados flyingfish fishery

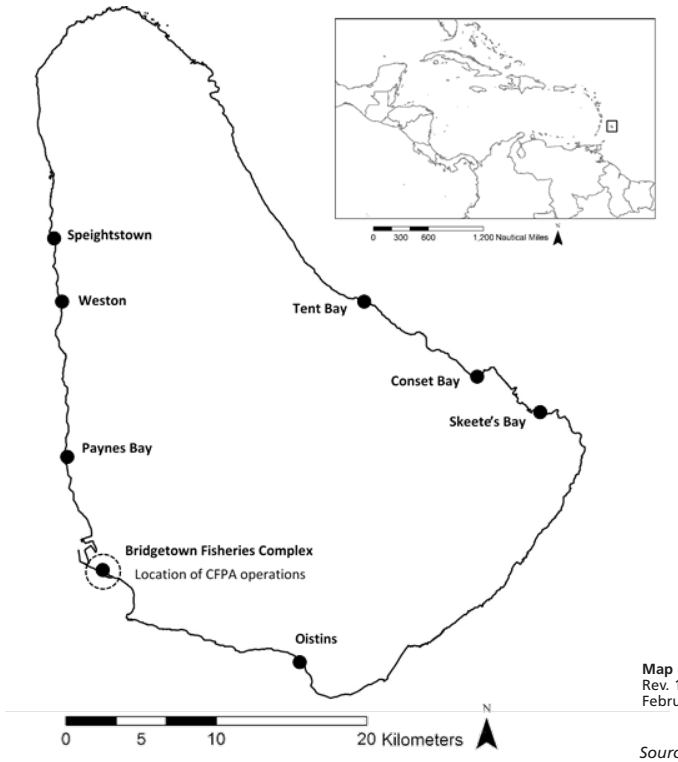
Barbados is the most eastern Caribbean island (Figure 1.1), with an exclusive economic zone nearly 400 times larger than its 430 km^2 land area. The four-winged flyingfish (*Hirundichthys affinis*) is a small pelagic species, often fished 5–150 kilometres from shore in the open sea. The Barbados fishery targets the shared eastern Caribbean stock of flyingfish.

Flyingfish is of significant commercial value to Barbados (Barbados Fisheries Division, 2004; Willoughby, 2007), comprising nearly two-thirds of annual landings by volume in most years (Mahon *et al*., 2007). A 2007 value chain analysis found the fishery had an estimated ex-vessel value of USD 1.8 million and an estimated overall value of USD 18.7 million (Mahon *et al*., 2007). It is used primarily for domestic consumption by local residents and tourists, and constitutes less than 1 percent of the annual gross domestic product. As for most migratory pelagics, the fishery is seasonal, with the main fishing season from November to June. Later starts to the season (for a shorter season) and reduced harvests are now becoming the norm due to a range of social and ecological reasons. For example, risk-averse or poor fishers are less likely to borrow money or invest their own in early harvesting of flyingfish after a poor season until the fish are clearly abundant. Poor weather conditions stemming from the annual hurricane season, which extends to November, coupled with Sargassum influxes, which negatively affect flyingfish abundance and availability (Ramlogan *et al*., 2017; Oxenford *et al*., 2019), also affect the duration and starting date of the season. Despite reduced landings, the flyingfish fishery remains the main contributor to the island's fish catch (FAO, 2016, http://www.fao.org/fishery/facp/BRB/en).

It is estimated that more than 2 000 fishers (almost all men) and 500 small-scale fish processors (men and women who use several helpers) or fish vendors (mainly women who work mostly alone) are seasonally employed in the fishery. Additionally, more than 200 women and some men find work as fish scalers and de-boners at government fish markets, while a further 125 (mostly women) work seasonally at private sector fish processing plants. Some women, and many men, are found in support services such as boat-building, ice and fuel supply, gear sales, and engine and hull repair (Barbados Fisheries Division, 2004; FAO, 2016; Pena *et al.,* 2019; Figure 1.2). Overall, around

FIGURE 1.1

Map of Barbados highlighting the primary landing site from which the CFPA operates – the Bridgetown Fisheries Complex – and other primary fish landing sites

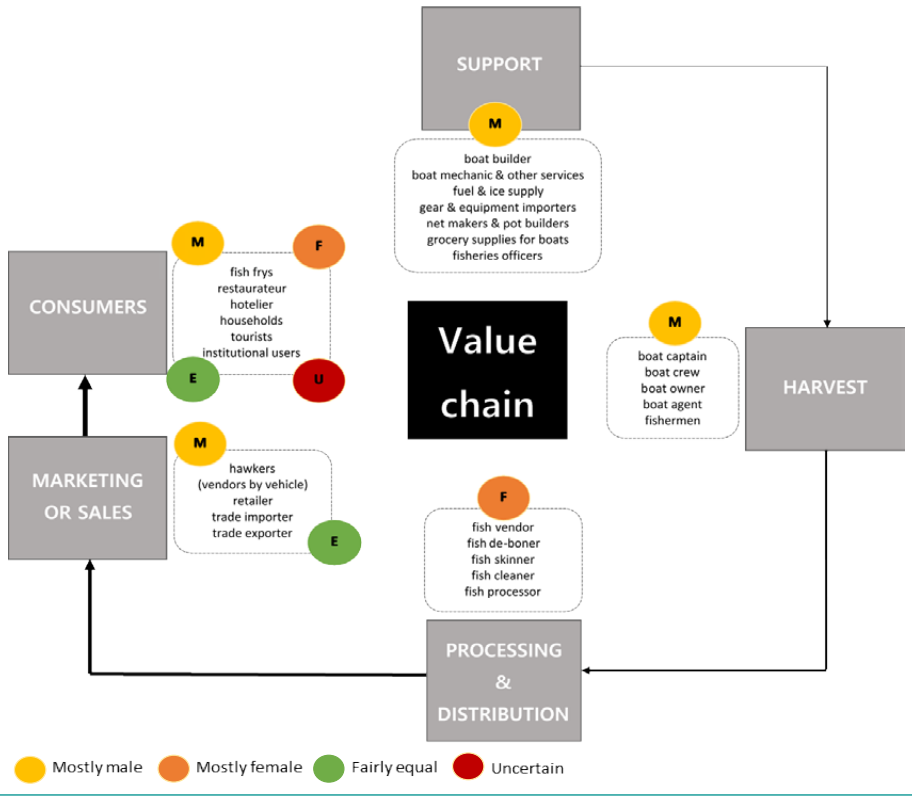


Map conforms to: Map No. 4170 Rev. 18.1 UNITED NATIONS, February 2020.

Source: BIOPAMA Programme.

FIGURE 1.2

Occupations by gender along a typical Barbados fisheries value chain



6 000 people – 2 000 directly and perhaps over 4 000 indirectly – make a seasonal living from the flyingfish fishery depending on fish abundance (Barbados Fisheries Division, 2004; FAO, 2016). Since flyingfish are available for harvest for only seven to nine months of the year, fishers and processors have to make full use of their time and effort to reap maximum economic benefits from the fishery. In abundant years, small-scale processors store flyingfish for sale in the off-season.

Flyingfish are normally harvested primarily by dayboats or launches[1] and iceboats[2] (Figure 1.3), but may also be taken by longliners that target tuna. The fish are caught with surface handlines and dipnets after being lured to boats with bait baskets and tethered temporary fish-attracting devices (Barbados Fisheries Division, 2004; Willoughby, 2007). Small-scale processors, like the women in the CFPA, may scale and de-bone around 500 flyingfish in a 10-hour period per day during the busy season (Figure 1.3). Filleted flyingfish are packaged in plastic bags in sets of ten (Figure 1.3), which sell for USD 7.50–12.50 depending on season and abundance. Flyingfish are typically sold by count (number) and not weight, as unit weight is fairly uniform.

FIGURE 1.3

The flyingfish fishery value chain: (a) iceboat and (b) dayboat/launch used to harvest flyingfish; (c) whole flyingfish stored on ice in wharf box; (d) processed filleted flyingfish; and (e) packaged fillets in sets of ten

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[1] Dayboat or launch: wooden vessels 6–12 m long with a cabin, and propelled by 10–180 hp inboard diesel engines. Used primarily for harvesting flyingfish and large pelagics on day trips (Barbados Fisheries Division, 2004).

[2] Iceboats: vessels greater than 12 m in length with a cabin and insulated ice holds, and propelled by inboard diesel engines. Used primarily for harvesting flyingfish and large pelagics during trips of five to ten days (Barbados Fisheries Division, 2004).

Apart from direct employment and job creation in the fisheries sector, the flyingfish fishery makes a considerable socio-economic impact on fishing industry support services and tourism, the country's primary foreign exchange earner (Sobers, 2010). Hence, with the new phenomenon of Sargassum influxes and the resulting decreases in fish catch, persons throughout the flyingfish value chain are growing increasingly concerned for their livelihoods (Ramlogan *et al*., 2017; Oxenford *et al*., 2019).

1.2 METHODS

This case study builds on participatory action research conducted with the CFPA by the Centre for Resource Management and Environmental Studies (CERMES) Gender in Fisheries Team (GIFT) at the University of the West Indies (UWI), Cave Hill Campus, Barbados. The case comprises a secondary data review, CFPA document analysis, group interviews and interactive workshops conducted with CFPA members between 2017 and 2019. Research began with a livelihood analysis and investigation into women's collective action in 2017 and 2018 (Pena *et al*., 2018). In 2019, the authors and other GIFT members organized the first Women in Fisheries forum in Barbados (Pena *et al*., 2019). The event was linked to this case study on gender in local fisheries value chains and the CFPA. Table 1.1 outlines the participatory research. Document analysis reviewed CFPA hardcopy files, primarily meeting agendas, meeting minutes (notes), correspondence, etc. The research is the first of its kind on organized women in the Barbados flyingfish fishery. Convenience samples of the CFPA membership were used based on the availability of women within their work schedule to participate in arranged events. The following discussion is based on these findings. Further investigation with more in-depth gender and value chain analysis is planned for another phase.

TABLE 1.1
Participatory research conducted with CFPA members

Gender-focused institutional analysis	Objective(s)	Methods	Sample size
Livelihood analysis Sept, Oct 2017 August 2018	• Understand the diverse ways women in the CFPA make a living • Understand the livelihood and financial issues they face • Determine what the opportunities and challenges are for improving their situation • Build capacity and skills for enhancing domestic and work life through the CFPA	• Seasonal calendar • Daily time-use analysis (annual main and off seasons) • Short survey questionnaire	12
Women's organization September 2018	• Understand and document the benefits to women from participation in the organization, and the challenges they face	• Key informant questions • Group semi-structured interview	6*
Value chain analysis March 2019	• Understand the differences between women's and men's work and how this applies to Barbados fisheries • Determine fixes to remedy the differences in fisheries occupations that disadvantage men and women	• Semi-structured and informal individual interviews • Visualization of the fisheries value chain with card-sorting of livelihoods and dot-voting for gender analysis and prioritization	8*

* Subsets of the larger livelihood analysis sample.

1.3 RESULTS AND DISCUSSION

In this section we compare the characteristics and operation of the CFPA against Chapter 7 of the SSF Guidelines (paragraphs 7.4 to 7.1, in reverse order) to highlight how the association's collective action supports their implementation. In each subsection, the good practices are highlighted as well.

1.3.1 Central fish processors association profile

Established in 2005, the CFPA is the only fisheries post-harvest association in Barbados focused primarily on processing flyingfish, which typically comprises over 50 percent of total annual fish landings. Post-harvest processing is typically women's work, although men's involvement has recently increased.[3]

The CFPA began with 20 members, mostly women, and has always had women leaders. Today the association has 26 members – all women, as no men have expressed sustained interest to join (Pena *et al.*, 2018), despite membership being "open to any fisherfolk residing in the area of operation without restriction to race, sex or religion" (CFPA, 2005, p. 2).

Despite not being a formal organization[4] (established under law), participation is high, especially in times of crisis. Both institutionalized regular meetings and ad hoc or "spot" meetings have proven partially successful at addressing problems and the development of the CFPA, although more needs to be done.

The age range of small-scale women fish processors sampled in the CFPA is from 31 to 71 years, with an average of 53 years. Most CFPA members have at least one immediate relative (mother, daughter, sister, cousin) in the organization. Membership has been relatively long-term, with most women sampled having been involved with the CFPA since its formation, now 14 years ago.[5]

These women have invested most, if not all of their working lives (from 25 to 40 years), in the fishing industry. Dependency on the fishing sector is high among women in the CFPA, with substantial portions of their income – from half to all – derived directly from fish processing, selling fish, sale of fish supplies (e.g. processing equipment) and fishing during the flyingfish season (November to June). Even during the off-season (July to October), most women earn most of their money from fish sales. They sell flyingfish that have been frozen during the busy season as well as other species of fish such as potfish (reef fish).

1.3.2 Support associations of fishers and fishworkers and promote their capacity for enhanced income and livelihood security (paragraph 7.4): Development of fisherfolk organizations in Barbados

External and internal factors nurture collective action and participation in formal and informal fisherfolk organizations. One such external factor relevant to the formation of the CFPA is what Alonso-Población and Siar (2018) characterize as *support by state institutions*. Globally it is acknowledged that state institutions play a critical role in promoting women's participation in fisherfolk organizations. In the late 1990s, the Barbados Fisheries Division (BFD) played a major role in supporting the activities of these organizations.

Similar to the rest of the Caribbean, fisherfolk organizations were introduced to Barbados in the 1960s and 1970s through cooperatives, the main aim of which was to encourage financial empowerment, rather than social or political empowerment (McConney, Atapattu and Leslie, 2000; McConney, 2001). Within a decade of their introduction, however, these early organization were plagued by inactivity and failure, for various reasons (McConney, 2007). During the 1980s and 1990s, a few of these organizations still existed, but McConney, Atapattu and Leslie (2000, p. 299) note they "…maintained low levels of activity and organization."

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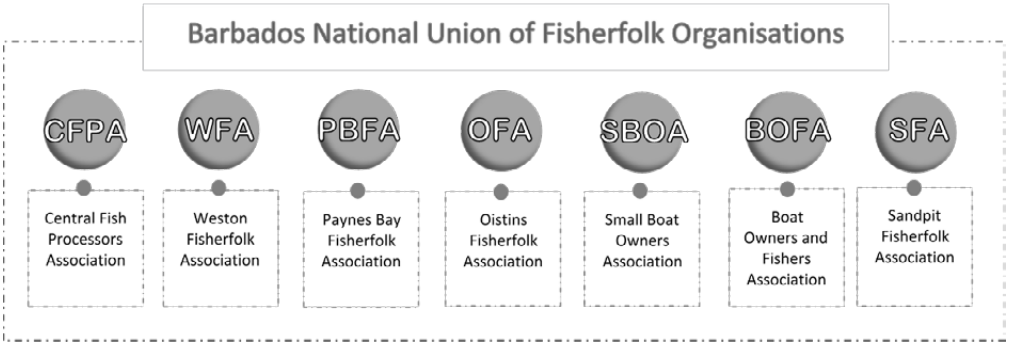
[3] Men are mainly engaged in deboning and filleting but not as much for flyingfish as compared with other species (dolphinfish and amberfish), and not comparable in number to women (S. White, CFPA member, personal communication, 2019).

[4] An association is one type of organization that may or may not be formalized. Most informal organizations have a written constitution (McConney, 2007).

[5] The membership profile based on the results of a short survey administered during three small group meetings with 12 CFPA members in between 2017 and 2018 (Table 1.1).

Following failed attempts at fisherfolk organizing, the government implemented the two-year (1997–1999) externally funded Fisherfolk Organization Development Project (FODP), the long-term objectives of which were to work closely with formal and informal fisherfolk organizations to sustainably improve the livelihoods and well-being of fisherfolk, and to establish fisherfolk organizations capable of active participation in fishery management and development (Atapattu, 1997; McConney, 1999; McConney, 2001; McConney, Mahon and Oxenford, 2003; McConney *et al.*, 2017b). The main result was strengthening and developing new and existing primary fisherfolk organizations and the formation of the Barbados National Union of Fisherfolk Organisations (BARNUFO). Currently, seven fisherfolk organizations exist under this national umbrella organization; the CFPA is one of the active constituent organizations (Figure 1.4).

FIGURE 1.4
Constituent primary fisherfolk organizations of BARNUFO



Following the completion of the FODP, the Fisheries Division continued to encourage fisherfolk to organize themselves to improve and secure their livelihoods and to participate meaningfully in fisheries management and development within the fishing industry (J. Leslie, Deputy Chief Fisheries Officer, personal communication, 2019). In the early 2000s, during a discussion on the experiences of small-scale processors working in the processing hall at the Bridgetown Fisheries Complex (BFC), the Deputy Chief Fisheries Officer encouraged the women to lobby for changes within their work environment. Shortly after, the CFPA was formed.

The CFPA continues to receive additional support from the Fisheries Division in terms of financial sponsorship of activities such as Fisherfolk Week (each June), hosting of training workshops, and allowing the division's training room to be used for CFPA meetings, workshops, events, etc. when needed (the frequency and value of which is not publicly reported). Continued support and guidance for the strengthening and development of the CFPA (and other fisherfolk organizations) is crucial in order to equip fisherfolk to better understand and adopt the SSF Guidelines throughout the fisheries value chain.

1.3.3 Provision of appropriate infrastructure, organizational structures and capacity development support to small-scale fisheries post-harvest sector (paragraph 7.3): Public sector goods for private sector progress

Livelihood analysis is a useful tool to conduct gender analysis in fisheries (Weeratunge, Synder, and Choo, 2010), as it describes the relationship between livelihood strategies and livelihood capital (assets) within the sustainable livelihoods framework. For women in the CFPA, physical capital is one of their major livelihood assets. For most women in the association, market space and personal storage lockers – which they must rent – are necessary for them to pursue their livelihoods. Hence they have benefited

from the use of a working area, the BFC processing hall, designated specifically for them. Use of the hall has allowed them to process fish more efficiently and has been indicated as one of the benefits of membership in the association.

Built in 1989, the BFC is the largest of three primary landing sites on the island, catering to a range of users. The aim in its construction was to contribute to an increase in fish production and to improve the standard of living of persons involved in the fishing industry (McConney, 1999). The BFC processing hall (Figure 1.5) is situated within the fish market, where small processors employ typically women to process fish into fillets and steaks. CFPA members are either self-employed or work for these small-scale processors.

The processing hall is a spacious facility built to meet international standards. Having this dedicated space has allowed the CFPA processors to collectively benefit from improved hygiene conditions. Furthermore, implementation and adherence to food handling standards have led to improved profitability and marketability of products, which has been noted by members as one of the main successes of the CFPA.

The space within the market at the BFC is in such high demand that the recent opening of three new spaces within the processing hall on a "first come, first served" basis, and to include vendors from outside the hall as well, created tension between the CFPA and management, as CFPA members now had to compete for space with outside vendors. The CFPA had to lobby and pressure management to ensure that the processing hall remained theirs for their fish handling needs. Their organization within the CFPA helped to resolve this issue.[6]

1.3.4 Enabling and enhancing women's participation in the post-harvest sector (paragraph 7.2): Driven to collective action to achieve change

Alonso-Población and Siar (2018) categorize drivers for fisherfolk organizing into two types: *reaction to specific phenomena* and *the result of efforts promoted by external entities*. The former – specifically labour conditions and economic drivers – were what prompted the mobilization of women in the flyingfish post-harvest segment of the value chain. Unable to voice their concerns about challenges small-scale processors and vendors were experiencing with their work environment at the BFC, this group of mainly women worked together to form the CFPA. Their issues and concerns included storage conditions (infrequently available cold storage, inadequate ice storage facilities), hygiene and overall cleanliness of the processing hall, lack of bathrooms and toilet facilities, lack of a lunchroom, the need for a service room to store processing equipment and office supplies, poor communication and lack of response to problems on the part of management, and compromised infrastructure. Workers also felt they were under threat of losing their working spaces due to unfair management practices.

Direct responsibility for operational activities at the BFC is that of the Markets Division of the Government of Barbados. This division operates all government-owned markets where agricultural[7] produce is sold to the public, and is charged with ensuring that all markets are run adequately. The managers of the Markets Division and BFC are the primary decision makers on day-to-day operational and management matters. The various BFC users, including small-scale processors, therefore address their concerns to these managers unless a fisheries officer is encountered at the time of need (McConney, 1999).

In its 30-year history, disagreements between users, and between users and BFC management, have been the norm due to differing perspectives on appropriate operational practices in the harbour and in processing and retail facilities. McConney (1999, p. 7) noted that in the 1980s and 1990s, "BFC users rarely took it upon

[6] Women's organization research with CERMES GIFT, September 2018.
[7] In the Caribbean, fisheries are included in agriculture.

themselves to approach management collectively or invite management to meetings they convened." The CFPA from its inception has taken a different path. The CFPA has approached management collectively on several occasions from the very month of formation (January 2005) to address their issues and concerns with the BFC facility, and on other occasions has invited management to meet to discuss new operations within the processing hall that have included business propositions.

The issues at the BFC that women in the CFPA were experiencing with their working environment have been well documented in reports (e.g. European Commission, 2008; FAC, 2007; McConney, Mahon and Oxenford, 2003) and in CFPA correspondence, meeting agendas and notes. Working conditions in the processing hall were improved as a result of the persistence of this group of women to ensure the provision of satisfactory amenities and facilities for the pursuit of their livelihoods.

Indeed, CFPA members cite their collective action as one of the benefits of membership. As they note, "We are stronger as an association to interface with management" and are "…better equipped to take on or lobby management". Furthermore, "Management doesn't have manners if you are not in a group."[8] The CFPA is recognized as such a driving force at the BFC that any member can approach management about issues without the president's presence. This is not difficult to believe, given the indication of McConney (1999, p. 5) that, "…to a large extent, small processors control the operations in the processing hall and the Markets Division [and BFC] merely facilitate." Therefore, in order to mainstream gender equality and equity, the CFPA should continue to use this collective power to improve and broaden the participation not only of its members in the post-harvest sector of the flyingfish fishery but also that of other women throughout the entire fisheries value chain in the Barbados fishing industry.

FIGURE 1.5
CFPA members at work in the processing hall at the BFC

[8] Women's organization research with CERMES GIFT, September 2018.

1.3.5 Post-harvest actors are part of the decision-making process (paragraph 7.1): Power, perspectives and networks

Since its inception, the elected head of the CFPA has been strategically positioned to ensure that women in the post-harvest sector of the flyingfish fishery, and fisherfolk throughout the entire Barbados fisheries value chain, are involved in the decision-making process. The CFPA head holds two additional influential positions within the fisheries sector both nationally and regionally. She has been president of the national fisherfolk organization, BARNUFO, since 2009, and was recently elected Chairperson to the Executive of the Caribbean Network of Fisherfolk Organisations (CNFO) in 2016. The CNFO is a network of formal and informal national fisherfolk organizations within the Caribbean Community and Common Market (CARICOM[9]) and the Caribbean Regional Fishery Mechanism (CRFM[10]). Through its engagement in regional fisheries initiatives and projects, the CNFO is in a key position to influence regional fisheries policy (GIFT, 2017).

The CFPA head's position as president of the local and national organizations facilitates a close relationship between the two and with the CNFO. These positions have enabled her to represent these organizations at local, regional and international meetings to contribute to decision-making on local and Caribbean fisheries. The content of these meetings is shared with members of the CFPA and BARNUFO during designated events, primarily formal and informal or ad hoc meetings with organization members, which serve to keep fisherfolk engaged and informed on new directions for fisheries. Occasionally, some CFPA members have also benefited from participation in similar conferences via nomination, either by the president or by vote through the membership.

The women in the CFPA possess impressively high fisheries-related skills,[11] which is partly attributable to their exposure to diverse training in *inter alia* Hazard Analysis and Critical Control Points (HACCP), advanced computer training, record keeping, first aid, navigation, safety at sea, and small business and financial management. These skills have enabled them to enhance their livelihoods. The CFPA head has made an effort to provide members of the CFPA (and fisherfolk nationally) with the majority of opportunities for capacity development via continued annual training series hosted by BARNUFO, usually during the flyingfish off-season. CFPA members are typically eager to participate in these free training opportunities.

The president's over 35-year involvement in the fisheries industry provides her with keen insight into the needs of fisherfolk, from which women in the CFPA have benefited. She previously approached UWI-CERMES for her research needs on women and fisherfolk organizations in the Barbados fishing industry (McConney, Nicholls and Simmons, 2013) and for assistance in evaluating the CFPA to inform its refocusing. Additionally, through her collaboration with institutions such as UWI, she has sought opportunities for participation in numerous workshops, for example on strengthening fisherfolk participation in governance and on developing leadership skills.

The women of the CFPA are articulate, vocal and clearly dedicated to the success of the organization. They believe strongly in the value of the CFPA in the post-harvest sector. Some identify themselves as leaders or initiators in the CFPA and are eager to take on leadership roles to assist the president in further strengthening the association in order to improve its governance and overall functioning,[12] and in turn its contribution to policy- and decision-making in fisheries. Such contributions have included formal and informal engagement over time with government on many matters.

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[9] CARICOM is a geopolitical body comprising 20 small island developing States (www.caricom.org).

[10] CRFM, an intergovernmental organization, is the regional fisheries advisory body for CARICOM (www.crfm.int).

[11] Livelihood analysis with the CFPA by CERMES GIFT: September/October 2017 and August 2018.

[12] Women's organization research with CERMES GIFT: September 2018.

In addition to these individual and group assets within the CFPA, the organization's membership in BARNUFO provides another avenue for its participation in decision-making in the fisheries industry. BARNUFO sits on the Barbados Fisheries Advisory Committee (FAC), therefore providing all fisherfolk with a pathway to contribute to national fisheries policy. The FAC is a formal, national co-management arrangement via a multistakeholder body – of which the fishing industry holds five of nine positions – set up to advise the minister responsible for fisheries management, conservation and development (McConney, Mahon and Oxenford, 2003). The fishing industry can therefore be privy to FAC decisions (not easily accessible from government) via BARNUFO. Thus the CFPA is well positioned to be part of the decision-making process within the post-harvest sector (and fishing industry in general) due to its individual and group power, perspectives and networks.

1.3.6 CFPA good practices built on SSF Guidelines principles

There is increasing evidence of the "women's way" in the CFPA being respected by men involved in the harvest and post-harvest activities at Bridgetown as well as by those in management. This is linked closely to gender equality and equity in that there have been relatively few instances of the CFPA being discriminated against purely on the basis of gender. While gender equality and equity are still issues given the relative absence of women among the larger processors and in the harvest sector (apart from some boat owners), the female fish vendors both in the CFPA and outside of it are able to compete well with the male fish vendors. Women in the CFPA say men in the fishing industry naturally respect them because of who they are as individuals, irrespective of CFPA membership. As one small-scale processor said during group interviews held by GIFT on women's organization, "Men respect women because they know we work hard." Still, more detailed gender analysis is required to investigate this perception of gender equality.

Consultation and participation are evident, promoted to varying extents by both state and non-state actors. Internally however, biases towards certain members and the inclination to form cliques are beginning to discourage participation in CFPA activities, both formal and informal. Similarly, transparency and accountability are variable: some practices are good, but others require improvement. Infrequent top-down communication has led to an overall perception among some members of a lack of transparency. These challenges need to be addressed to improve the functioning of the CFPA. Solutions can be simple, practical and come from within the organization. An internal understanding among CFPA members of these issues and their resolution is itself a good practice for strengthening CFPA governance.

Social responsibility is more prominent within the CFPA than in the state apparatus. For the state, social protection is largely confined to the national insurance scheme. This is not sufficient, and does not adequately respond to the seasonal, unpredictable nature of work in the industry. The CFPA encourages and assists its members to contribute to the national insurance scheme, but it also goes further, recognizing that the livelihoods of vendors are quite complex. Members are provided with various financial instruments for saving or investing money, such as a credit union, savings accounts and "meeting turns".[13] The CFPA's commitment to social responsibility is evident in the enduring decent working conditions it has helped establish for its members.

1.4 CONCLUSIONS

The CFPA, a fisherfolk organization in the post-harvest value chain of the flyingfish fishery in Barbados comprised entirely of women, illustrates both existing and

[13] Savings arrangement where a group of people each pool an equal amount of money for a period of time, after which one person in the group receives all the money. The process is repeated until everyone gets their turn and receives the full lump sum at least once.

emerging good practices consistent with the principles of the SSF Guidelines. Not everything is perfect, but the case study found evidence of respect of cultures, gender equality and equity, consultation and participation, transparency and accountability, and social responsibility, as summarized in Table 1.2.

The case of the CFPA should provide valuable lessons for fisheries post-harvest organizations, regionally and globally. The collective action within the CFPA can be utilized as a driving force to facilitate and support the implementation of the SSF Guidelines. The association has already earned respect and recognition from a variety of players within the fisheries sector due in part to its cohesion when dealing with issues affecting its operation in the post-harvest sector and resulting action. This group of women therefore has the potential to champion the implementation of the SSF Guidelines and their principles – similar principles that guide their functioning – among their colleagues in the post-harvest sector and indeed throughout the fisheries value chain. Additionally, the CFPA has developed strong partnerships with the Barbados Fisheries Division, the government authority responsible for management and development of Barbados fisheries, as well as the University of the West Indies, Cave Hill Campus, both of which are built on the principles of the SSF Guidelines and on common interests.

Through these partnerships, capacity development of the CFPA has been a strong focus and can be further addressed to promote the equitable participation of women

TABLE 1.2
Summary of good practices for SSF Guidelines implementation

SSF Guidelines section	Existing and emerging good practices
Support associations of fishers and fishworkers and promote their capacity for enhanced income and livelihood security (paragraph 7.4)	• The collective action exhibited by the CFPA was fostered by the BFD. • The BFD has been instrumental to developing and strengthening fisherfolk organizations, in part through the FODP. • The BFD provides support (in-kind and financial) to the CFPA.
Provision of appropriate infrastructure, organizational structures and capacity development support to small-scale fisheries post-harvest sector (paragraph 7.3)	• CFPA members benefit from having access to a dedicated working space – the BFC processing hall – since 2005. • CFPA members maintain control of the processing hall through collective action. • Recommendations for improvements to BFC infrastructure were advanced by the CFPA. • Small-scale women processors collectively benefit from improved hygiene and implementation of food handling standards. • The improved profitability and marketability of small-scale processors can be attributed to CFPA membership.
Enabling and enhancing women's participation in the post-harvest sector (paragraph 7.2)	• Issues with working conditions drove women in the post-harvest sector of the flyingfish fishery to organize for improved livelihoods. • Issues causing discord are well documented, and their management is transparent. • The CFPA proactively engaged the Markets Division from its inception as a means of resolving issues and concerns, reflecting bottom-up participation. • The CFPA intends to use its collective power to improve and broaden women's participation in the fishing industry, thus mainstreaming gender equality and equity.
Post-harvest actors are part of the decision-making process (paragraph 7.1)	• The CFPA, through BARNUFO's membership on the national FAC, has a channel to influence fisheries policy. • The CFPA, via BARNUFO, sits on the FAC alongside processing companies and harvest sector representatives. • FAC decisions, while not very easily accessible from government, are potentially available to the fishing industry via BARNUFO. • The CFPA has been openly consulted by the Fisheries and Markets Divisions on many matters both formally and informally; their input is reflected in follow-up actions taken. • The link between current CFPA and CNFO leadership should ensure that women (and fisherfolk) can influence regional policy.

and men in the adoption and implementation of the SSF Guidelines in the Barbados fishing industry (FAO, 2015b). With the recent change in political administration, the Government of Barbados is looking beyond its traditional industries (sugar and tourism) to the sea to develop its economy. The newly formed Ministry of Maritime Affairs and the Blue Economy has engaged with fisherfolk to revitalize the fishing industry. Since assuming office, the Minister has already met with the president of BARNUFO, who also heads the CFPA, to discuss this revitalization effort. The president, and by extension the CFPA, has the opportunity to promote the implementation of the SSF Guidelines in the development of Barbados' Blue Economy and its improved fishing industry.

McConney (2007) emphasizes that in order for organizations to form, function and have a long lifespan, the incentives for collective action must work at the levels of both the individual and the group. Collective action cannot be sustained if group incentives are inadequate and each person tries to benefit without contributing or contributing as little as possible (free-ride) . The CFPA has lasted longer than other primary fisherfolk organizations, which is a testimony to the benefits of collective action in fisheries management and development, one that warrants documentation for improvement and replication. Understanding the challenges of, and lessons learned in, the collective action of these working women in the post-harvest sector is important to informing and improving this good practice.

Regarding next steps, while gender concerns not only women, the CFPA aims to collaborate closely with GIFT in the further practical empowerment of women in the post-harvest sector and the mainstreaming of gender in national and regional fisheries policy. For the women of the CFPA this includes much more detailed gender and livelihood analyses that can inform appropriate interventions for socio-economic improvements both in the workplace and in the household.

ACKNOWLEDGEMENTS

The authors would like to thank the ladies of the Central Fish Processors Association (CFPA) for their strong engagement in this research. Our work with them over the past few years has revealed dedication and commitment to the Barbados fishing industry and our efforts to mainstream gender that is second to none. Thank you to Vernel, Sylvia, Sheena, Margaret (Diane), Lisa, Marion, Delores, Angie, Judy, Kathy Ann, Pat, Velma, Monica, Kerry Ann and Melissa for sharing your experiences, challenges and visions with us. The Gender in Fisheries Team (GIFT) looks forward to our continued work with the CFPA towards building a greater understanding of women's issues in fisheries and assisting in the development of practical solutions for improving women's fisheries occupation and domestic lives.

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2. The Kodiak Jig Initiative: Ensuring viability of the small-boat jig fleet through market and policy solutions

Theresa Peterson
Fisheries Policy Director, Alaska Marine Conservation Council

Rachel Donkersloot
Coastal Cultures Research

ABSTRACT

The social, cultural and economic sustainability of fishing towns and villages in Alaska are dependent on the success of their fisheries. This case study presents the Kodiak Jig Initiative as an example of a highly collaborative fishermen-led effort to create and maintain small-scale fishing opportunities in the Gulf of Alaska. It discusses specific policy and market-based challenges and solutions to ensuring the viability of the small-boat Kodiak jig fleet. The case study describes marketing initiatives, mechanisms and partnerships resulting in the establishment of niche markets and the Kodiak Jig Seafoods brand. These efforts have resulted in significant increases in the dockside value of Pacific cod and rockfish for the small-boat fleet. Also discussed are important policy provisions advanced by jig fishermen and partners to successfully secure quota set-asides that have served as an important foundation for the marketing initiatives presented herein. These set-asides provide affordable entry-level opportunities for new and young fishermen as well as those seeking more diversified access. Combined, these policy- and market-based efforts have helped to ensure viable access and livelihood opportunities for Kodiak's small-boat jig fleet. The successes and challenges of the Kodiak Jig Initiative serve as examples that can assist other fishing communities and fleets in developing approaches that fit their specific needs.

Keywords: Small-boat jig fishing, Alaska, direct marketing, value chain policies, entry level opportunity, set aside, diversified access.

2.1 INTRODUCTION

Alaska is the site of world-renowned fisheries that contribute to the social, cultural and economic sustainability of the region. More than 6 billion pounds (2.7 million metric kg) of seafood was pulled from Alaskan waters in 2015, the largest harvest ever recorded (ASMI, 2017). The commercial fishing fleet is made up of roughly 9 000 vessels, the bulk of which are under 58 feet (17.7 metres) in length. Nearly two-thirds of these vessels (roughly 5 700) are under 32 feet (9.6 metres) in length (ASMI, 2017). In supplying wild seafood to local and global markets, these vessels also serve as stewards of small business and local resources, providing vital economic opportunities and fostering intergenerational connection to place, culture and identity. At the same time, Alaskan fisheries and fishing communities are impacted greatly by climate change

and climate variability, global seafood markets, fisheries policy and regulatory changes. Disconcerting shifts in recent decades, such as fleet consolidation, increased entry costs, aging trends (commonly referred to as the "greying of the fleet") and loss of fishing rights, have reduced opportunities and diminished rural and local fishing livelihoods in coastal Alaska (Donkersloot and Carothers, 2016; Ringer *et al.*, 2018; Kamali, 1984; Beaudreau *et al.*, 2019). Fishery management systems that restrict and privatize access have been identified as a major driver of these trends (Carothers, 2010; Carothers and Chambers, 2012; Pinkerton and Davis, 2016; Davis and Ruddle, 2012).

Alaskan fishery policymakers have developed a number of programmes and provisions to address declining access and support small-scale fishing opportunities in the North Pacific (Cullenberg *et al.*, 2017). Some of these have been more successful than others in providing for community-based fishery access and benefits (Apgar-Kurtz, 2015; Carothers, 2011). One of these is the Kodiak Jig Initiative, a highly collaborative effort to create and maintain small-scale fishing opportunities in the Gulf of Alaska. This case study highlights effective partnerships and synergistic policy and market-based initiatives that have been fundamental to ensuring the viability of the small-boat Kodiak jig fleet.

The experience of the Kodiak Jig Initiative illustrates multiple provisions from Chapter 7 of the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines), including ensuring post-harvest actors are part of relevant decision-making process (paragraph 7.1); supporting efforts to enable investments in appropriate infrastructure, organizational structures and capacity development to support the small-scale fisheries post-harvest subsector in producing quality seafood (paragraph 7.3); and supporting fishermen' associations to promote their capacity to enhance their income and livelihood security and marketing mechanisms (paragraph 7.4).

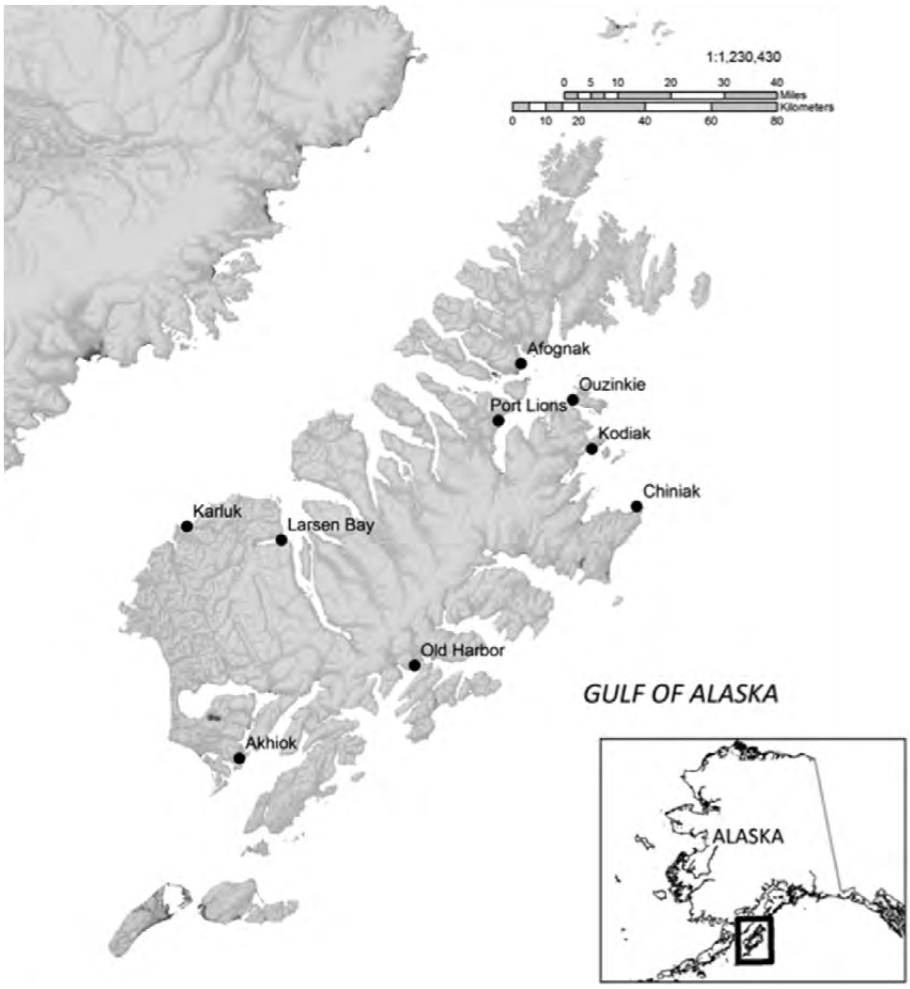
2.1.1 Kodiak Archipelago fisheries and communities

Located in the Central Gulf of Alaska, the Kodiak Archipelago is made up of Kodiak Island and several surrounding islands (Figure 2.1). The city of Kodiak is located on the North Eastern edge of Kodiak Island. With a population of just over 6 000, it is the region's largest community.[1] Kodiak is home to one of the most diverse commercial fishing ports in the state and the United States of America in general, representing several species – including salmon, halibut, sablefish, crab, cod and pollock – and many gear types (trawl, setnet, seine, pot, longline, jig, etc.).

In 2015, Kodiak ranked third among American commercial fishing ports in terms of monetary value of seafood landed (USD 137.5 million) and second in terms of volume landed (513.9 million pounds, or 233 million kg) (NMFS, 2017). Roughly one-third of all jobs in Kodiak are directly connected to fishing (Kodiak Chamber of Commerce, 2014). Local fishing infrastructure for Kodiak City includes seven shore-based seafood processors that operate year-round and two boat harbours. More than 700 vessels are homeported in Kodiak, but the port is largely scaled towards industrial fishing operations and a trawl fleet that emerged in the mid-1970s following the creation of the American 200-mile exclusive economic zone (EEZ) and subsequent phasing out of foreign fishing off the coast. For example, roughly 488 million pounds (221 million kg) of seafood was delivered to Kodiak processors in 2014. Of this, over 300 million pounds (136 million kg) was harvested by 40 trawl vessels (McDowell Group, 2016). Fishery infrastructure that can benefit Kodiak's small-scale fleet, including the addition of a small crane and ice machine, have been identified as key community development targets by local fishermen and city officials.

[1] The Kodiak Island Borough encompasses all communities within the Archipelago and has an estimated population of 13 732 (US Census Bureau, 2017).

FIGURE 2.1
Map of Kodiak Archipelago



Source: Kodiak Island Borough.

Kodiak Archipelago communities include six rural Alutiiq fishing villages that are not connected by road. These communities have persisted for more than 7 500 years (Knecht and Jordan, 1985) despite disruptive waves of Russian and American colonization (Pullar, 2009). Recent research demonstrates the devastating impacts of privatizing fisheries access on these small Alaska Native villages (Coleman *et al.*, 2018; Carothers, 2010). Ringer *et al.* (2018) note an 84 percent decline in the number of young salmon fishermen (under 40 years of age) in the rural fishing villages of the Kodiak Archipelago compared to historic levels.[2]

The city of Kodiak has also experienced notable declines in fishery access and participation in recent decades. The impacts of the rationalization of Bering Sea and Aleutian Islands crab fisheries and the introduction of individual fishing quotas in the halibut and sablefish fisheries have been identified as having particularly detrimental impacts on Kodiak (Knapp, 2006; Carothers, 2010). Increasing barriers to entry and

[2] This study uses the conventional term "fisherman" to refer to a commercial fish harvester of any gender. Both men and women participate in Alaska fisheries as harvesters but there is strong preference for the term fisherman, over fisher or fisherwoman.

privatized access has been described as an "intrinsic" quality of these programmes (NPFMC, 2017, cited in Ringer *et al.*, 2018). Fishery managers, legislators and community members and leaders increasingly identify local loss of fishery access rights as a pressing issue for the state at large (State of Alaska, 2012). These trends and concerns provide an important frame of reference for understanding the importance of the Kodiak Jig Initiative in securing small-scale, diversified and entry-level fishing opportunities in the Gulf of Alaska.

2.2 METHODS

This case study details the successes and challenges of a multiyear seafood marketing initiative undertaken by Kodiak jig fishermen and partners, including staff from the Alaska Marine Conservation Council (AMCC). AMCC is an Alaska-based non-profit whose mission is to protect the integrity of Alaska's marine ecosystems and promote healthy, ocean-dependent coastal communities. The authors of this study are current and former AMCC staff who were engaged in developing and supporting market-based strategies and policy advocacy work discussed in this study.

The case study follows the general timeline of key events and project activities, beginning with vital policy successes at the North Pacific Fishery Management Council (NPFMC). This policy work helped to secure access to local fisheries for the small-boat jig fleet and laid the foundation for seafood marketing initiatives aiming to increase the value paid to fishermen for their catch, and ensure continued fishery access and benefits for fishing communities. All fishery data included in this study comes from data requests to the Alaska Department of Fish and Game and the National Oceanic and Atmospheric Administration (NOAA), unless otherwise noted. The authors also reviewed relevant fishery policy documents and reports pertaining to the creation of small-scale fishery access provisions. Discussion of market-based strategies, including development of niche markets, seafood branding efforts, and working with seafood processors is informed in part by eight semi-structured interviews with jig fishermen, seafood processors and other project partners (e.g. staff from Alaska Sea Grant, Sitka Salmon Shares, etc.).

3. RESULTS AND DISCUSSION

3.1 The Kodiak Jig Initiative: securing small-scale access and achieving policy success

The jig fishery operates in the Central Gulf of Alaska around Kodiak Island. The fleet targets primarily Pacific cod, black rockfish and dusky rockfish.[3] Black rockfish is harvested using jig gear only. Other groundfish (including pollock, sablefish, shallow and deepwater flatfish, rex sole, flathead sole, arrowtooth flounder and Pacific ocean perch, among others) are targeted commercially in the Central Gulf of Alaska using other gear types, including trawl, longline and pot.[4]

The jig fleet is primarily community-based, with the bulk of the fleet living in Kodiak. Jigging is a hand-tended hook-and-line method that involves weighted vertical lines suspended by rail-mounted bottom reels or computerized jigging machines (Figure 2.2). J-hooks or circle hooks are baited with squid, herring and Atka mackerel or dressed with colourful rubber tubing. Jig vessels use between two and five machines with a maximum of 30 hooks set per machine (Figure 2.3).[5]

[3] The jig sector also harvests dark rockfish, yellowtail rockfish and others as incidental catch.

[4] Additional target species for the Gulf of Alaska groundfish fishery include: shortraker/rougheye rockfish, northern rockfish, "other slope" rockfish, pelagic shelf rockfish, demersal shelf rockfish, thornyhead rockfish, Atka mackerel, squid, sculpin, shark, octopus and skate.

[5] The maximum number of machines that can be used per vessel is five, with limited exceptions in federal fisheries.

FIGURE 2.2
Kodiak jig fisherman with baited circle hooks and jig machine in background

FIGURE 2.3
F/V Marona, a 46-foot community-based jig vessel owned and operated by Darius Kasprzak

Jigging is carried out in both state (0–3 nautical miles from shore) and federal waters (3–200 nautical miles from shore). The NPFMC develops regulations for federally-managed fisheries while the Alaska Board of Fisheries develops regulations for state-managed fisheries.[6] Management of cod and rockfish in state and federal waters is complex and involves multiple entities and management plans, but overall the harvest amount for each gear sector is apportioned and distributed annually based on catch limits set for each groundfish stock.

In the late 2000s, the NPFMC began considering potential management changes to rockfish and cod in the Gulf of Alaska. The impending change kick-started a multiyear strategy led in partnership by Kodiak-based jig fishermen, the Alaska Jig Association (AJA) and AMCC. Between 2009 and 2012, fishermen and community advocates maintained a strong presence at NPFMC meetings and lobbied the NPFMC to ensure that any new management structure under consideration included clear entry-level opportunities and small-scale fishery access. The team regularly submitted written comments and verbal testimony at NPFMC meetings. They also requested several meetings with NPFMC members, staff and decision makers outside of formal NPFMC meetings, including meetings with key representatives from the State of Alaska. (The State of Alaska holds a voting seat on the NPFMC). The NPFMC meets five times per year in various locations in Alaska and in Washington and Oregon in the Pacific Northwest. Travel to and participation in these meetings is expensive and time consuming. For rural fishermen in particular, it requires airfare, lodging and time away from work. At critical decision points throughout the NPFMC process, AMCC and AJA helped to ensure representation of the small-boat jig fleet by providing financial support to local jig fishermen to cover travel and meeting participation costs.

Jig sector set-asides: Pacific cod and rockfish in the Gulf of Alaska

Direct engagement in the NPFMC process paid off in 2012 with passage of new fishery management plans that included set-asides of Pacific cod and rockfish for the jig fleet.

Amendment 83 of the Gulf of Alaska Fishery Management Plan authorized gear sector allocations that effectively limit the amount of Pacific cod that each sector is allowed to harvest. Allocations were based on historical participation by larger-scale operations fishing in the winter. The jig sector held little catch history (less than 1 percent) and would have received little quota under an allocation process based solely on recorded catch history.

Under the new plan, the jig sector receives an initial allocation of 1 percent of the total allowable catch (TAC), which comes off the top (i.e. prior to allocating to other gear groups). If the jig fleet catches 90 percent or more of the 1 percent set-aside, the sector receives an additional 1 percent of the TAC for the following year. If the jig sector does not harvest 90 percent of the allocation for two consecutive years, the quota allocation to the jig sector drops by 1 percent and the quota is harvested by other gear groups. Under this "stairstep" provision, the jig fleet's allocation cannot fall below the initial 1 percent allocation. The total allocation to the jig sector is capped at 6 percent of the TAC. This is significant: it represents an unprecedented allocation in the North Pacific, as it provides the jig sector the opportunity to harvest a portion of the overall catch far greater than the fleet's recorded catch history.

In addition to the Pacific cod jig sector set-aside, the new management plan severely limits the number of licenses in the trawl and fixed-gear fleets for harvesting cod.[7] Jig vessels are exempt from the requirement of holding a limited license to participate in the fishery. The jig exemption was created in response to stakeholder input, and

[6] The NPFMC is one of eight regional councils established by the Magnuson-Stevens Fishery Conservation and Management Act in 1976 to manage fisheries in the 200-mile EEZ.

[7] See Amendment 86 at https://www.federalregister.gov/documents/2011/03/22/2011-6723/fisheries-of-the-exclusive-economic-zone-off-alaska-gulf-of-alaska-license-limitation-program.

ensures the jig fishery remains entry-level and affordable. In an industry marked by rising barriers to entry, new participants and young fishermen can gain access to the jig fishery by purchasing a USD 75 license. There are additional provisions for harvesting Pacific cod in state waters, including gear restrictions that limit the cod harvest in state waters to jig and pot cod sectors.[8] These restrictions represent a clear policy choice by the State of Alaska to limit nearshore harvesting to gear types associated with low bycatch and habitat impacts.[9]

Rockfish set-asides

The rockfish set-aside for the jig sector is part of a larger management shift toward privatizing the fishery. The Rockfish Program allocates exclusive harvesting privileges to trawler and catcher-processor vessels for all primary and secondary rockfish species.[10] The programme includes an annual set-aside of the TAC for the entry-level longline fishery, which includes jig gear. Similar to the cod quota set-aside, the rockfish quota set-aside increases annually to a predetermined cap by species. For example, if the jig fleet harvests 90 percent of its allocation of a species in the previous year, the set-aside allocation increases by a fixed amount for each species.[11] Table 2.1 shows the 2012 initial allocations for each rockfish primary species, the incremental increase for future seasons, and the cap for the entry-level longline fishery.

TABLE 2.1
Entry level longline fishery allocation

Rockfish Primary Species	Initial Allocation	Incremental Increase per Season if ≥ 90% of Allocation is	Up to Maximum % of TAC
Pacific ocean perch	5 metric tonnes	5 metric tonnes	1%
Northern rockfish	5 metric tonnes	5 metric tonnes	2%
Pelagic shelf rockfish	30 metric tonnes	5 metric tonnes	5%

Source: NOAA Central Gulf of Alaska Rockfish Program Informational Guide 2015.

In state waters, the harvest of black rockfish is limited to jig gear. This measure was implemented to minimize depletion of the stock, which are a long-living species subject to overfishing. The black rockfish fishery in state waters also has a permit holder (owner) onboard provision and a cap on the amount that can be harvested in any five-day period.[12] These restrictions further mitigate impacts on the stock by intentionally spreading out the harvest time period, a provision which also favours small-scale, community-based fishermen.

Summary of set-asides: policy success, practical challenges

The inclusion of quota set-asides for the jig sector in new management plans for Pacific cod and rockfish in the Gulf of Alaska was the result of sustained and direct engagement in the decision-making process by jig fishermen themselves. This engagement was supported by a key partnership with AMCC which provided

[8] The guideline harvest level (GHL) for Pacific cod in state waters in the Kodiak Area is 12.5 percent of the estimated total allowable harvest of Pacific cod for the federal Central Gulf of Alaska Area. This is split between the jig and pot cod sectors.

[9] See page 49 at www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2019_2020_cf_groundfish_regs.pdf.

[10] Primary species consist of northern rockfish, Pacific ocean perch and pelagic shelf rockfish (changed to dusky rockfish in 2012). Secondary species consist of Pacific cod, rougheye rockfish, shortraker rockfish, sablefish and thornyhead rockfish.

[11] https://alaskafisheries.noaa.gov/sites/default/files/rockfish-faq.pdf and https://alaskafisheries.noaa.gov/fisheries/central-goa-rockfish-program.

[12] Fishermen may not have on board or sell more than 5 000 pounds (round weight) of black rockfish within a five-day period.

necessary funding, capacity and expertise to ensure local stakeholder participation in the decision-making process. Equally important was support from the State of Alaska, which was instrumental in advancing the provisions to provide for small-scale fisheries access throughout the decision-making process.

Jigging does not require a high capital investment and is thus a good opportunity for young and community-based fishermen to earn income for entry into other fisheries (thereby diversifying their portfolios). In 2012, there were 145 jig vessels participating in the state waters cod fishery (Table 2.2), up from 81 vessels in 2010. In some cases, the set-asides are working as envisioned. They are providing new and young fishermen with a low-cost opportunity that facilitates entry into other fisheries, primarily salmon. But the jig fishery is not without its challenges. By the time the set-asides were put in place in 2012, low dock prices for Pacific cod and rockfish species were clear hurdles for small-scale fishermen unable to mitigate low prices with higher volumes. In short, the set-asides provided access, ensuring opportunities for current and future small-boat fishermen, but the market made the opportunities marginal. The ex-vessel price was insufficient in providing a viable income for fishermen harvesting small volumes. Between 2011 and 2018, the average price per pound for black rockfish was USD 0.45. For Pacific cod and dusky rockfish, the average price for these years was USD 0.37 and USD 0.30, respectively.

Participation in the jig fishery varies widely from year to year (Table 2.2). This variability is tied to both price per pound and nearshore availability of stocks. To address market challenges, jig fishermen in partnership with AMCC refocused their efforts, inspired initially by access challenges. This time the partnership focused on developing market-based initiatives aiming to increase the profitability of the jig fishery and generate greater social, economic and environmental impact, by leveraging its key

TABLE 2.2
State-water Pacific cod jig effort, harvest level and harvest, 2002–2018

Kodiak Area state-waters Pacific cod jig gear effort, guideline harvest level (GHL), and harvest, by year, 2002–2018					
Year	**Vessels**	**Landings**	**GHL (pounds)**	**Harvest (pounds)**	**% of GHL harvested**
2002	51	340	4 365 153	1 389 838	31.8
2003	100	688	3 995 878	3 195 605	80.0
2004	120	961	4 932 843	4 210 284	85.4
2005	117	849	4 563 155	4 570 327	100.2
2006	77	477	5 218 480	1 446 881	27.7
2007	63	457	5 218 480	1 249 753	23.9
2008	76	647	5 222 338	2 042 082	39.1
2009	94	833	4 343 244	4 450 423	102.5
2010	81	707	6 757 444	6 504 733	96.3
2011	132	980	7 415 248	7 135 466	96.2
2012	145	1 160	7 845 701	7 938 727	101.2
2013	55	199	6 791 340	587 942	8.7
2014	77	520	7 316 583	3 170 713	43.3
2015	100	810	8 449 216	3 879 537	45.9
2016	108	747	6 794 647	3 327 887	49.0
2017	23	50	6 087 452	101 991	1.7
2018	10	21	1 118 559	29 016	2.6
1997–2018 average	87	638	5 542 274	2 985 772	52.0
2014–2018 average	64	430	5 953 291	2 101 829	28.5

Source: Alaska Department of Fish and Game.

assets: a community-based fleet of owner-operators, low-impact gear, and harvesting techniques (i.e. hand-tended hook and line) that deliver the highest quality seafood.

2.3.2 Marketing small-scale access and social and environmental value

The creation of Kodiak Jig Seafoods

In 2012, AMCC received a two-year grant in the amount of USD 90 000 from the National Fish and Wildlife Foundation. The grant provided crucial funding to support a marketing initiative designed to ensure that the benefits of the hard-fought policy provisions achieved at the NPFMC could be fully realized. The primary goal was to create a brand based on differentiating cod and rockfish products harvested by jigging from products harvested by the industrial fleet, which uses gear with a higher environmental impact. (The hand-tended, vertical lines used in jigging result in low bycatch and minimal impact on seafloor habitat). The ultimate goal was to enhance entry-level fishing opportunities for local, conservation-minded fishermen in Kodiak through a market-based approach that increases the profitability of jig fisheries. For two years, jig fishermen partnered with AMCC and other knowledgeable entities (identified below) to advance a multipronged strategy to achieve this goal. Key project activities included: identifying market potential, improving product quality, enhancing conservation performance, effectively telling the story through branding and outreach, and creating a fishermen-led business.

To begin, AMCC and jig fishermen worked with chefs, restaurants and seafood distributors in Alaska and along the West Coast of the United States of America to identify and develop niche markets, while emphasizing the fishery's social and environmental qualities. Jig fishermen also collaborated with seafood quality experts from Alaska Sea Grant to define good practices and alter fishing behaviour when needed. Jig fishermen modified their fishing decks (e.g. adding live-immersion bleeding containers and ramps into the fish hold to minimize bruising) and implemented quality control measures to ensure delivery of high-quality seafood to market. For example, jig vessels now make short trips (three days maximum), and all fish are gill-bled and immersed in slush ice for rapid chilling. More generally, fishermen adhere to specific handling standards from the moment the fish come out of the water. Fishermen gently bring each fish over the rail without dropping it more than 15.24 cm. Fishermen immediately slice gill plates and place the fish in slush ice for a minimum of 15 minutes before transferring it to the fish hold where each fish is packed in ice. Local jig fishermen also worked with AMCC and Alaska Sea Grant to develop conservation guidelines and improve conservation performance. Examples include avoiding hotspots of non-target species by sharing information, and releasing fish to be discarded with minimal injury.

A key goal of the project was to communicate the social and environmental values of the fishery in a manner that connected consumers with fishermen. The team partnered with downtown Anchorage restaurants and chefs to host "Meet Your Fishermen" dinners, presented at conferences, and developed multiple print and online materials (including a website: www.kodiakjig.org).

The Alaska Sea Grant Marine Advisory Program (MAP) served as a key partner in many of these efforts. The Kodiak-based Seafood Marketing Specialist met with AMCC and AJA many times over the course of the project, providing insights and recommendations ranging from business planning to seafood marketing to seafood quality and handling. In 2012, MAP also hosted a workshop, "Differentiating Your Seafood Product from Your Competitors," and helped finalize the quality and handling guidelines adopted by Kodiak Jig Seafoods fishermen.

From the outset, the team had envisioned a fishermen-led business as a key outcome. Project partners hosted several meetings to discuss forming a cooperative or a limited liability company (LLC) as the business structure needed to bring

FIGURE 2.4
Kodiak Jig Seafoods Logo

seafood products to market and greater benefits to the fishermen themselves. Over the course of the project it became clear that most jig fishermen wanted to remain fishermen, and had little interest in staying onshore to manage that side of the business. To account for this, the team shifted course with AMCC providing a leadership role in managing the onshore business. AMCC operates a Community Supported Fishery (CSF) in Alaska and brought valuable experience and capacity in managing key aspects of the seafood business including working with processors, shipping and storage, seafood marketing and distribution, and customer service and sales.

At the end of the two-year National Fish and Wildlife Foundation (NFWF)-funded project, jig fishermen and AMCC staff had developed a marketing plan; a seafood brand, logo and website; and sustainability standards and quality and handling guidelines for participating jig fishermen to adhere to. This was the beginning of Kodiak Jig Seafoods (KJS; Figure 2.4).

Securing small-scale processor partners in a large-scale port

One of the most important and challenging aspects of the marketing effort was finding a Kodiak processor to partner with that had both the capacity and interest to custom process small deliveries of seafood. Although Kodiak is one of the largest fishing ports in the nation with year-round seafood processing, local fishing infrastructure is primarily geared toward large-scale, high-volume fisheries. Finding a processor willing and interested in labour-intensive, custom processing remains a key challenge for small-scale seafood marketing in Kodiak.

Based on market research and customer demand, KJS focused on 1–2 pound (0.45–0.90 kg) vacuum-packed, skinless, boneless fillets. Each fillet was labelled with the KJS logo, along with the vessel name and other required product information.[13] Initial discussions with a small processor with waterfront access started out well, resulting in a verbal contract for the upcoming season. Prior to the start of the season, however, this processor was purchased by a large processor with a business model built on larger volumes and sending product to China for secondary processing. The new owners were unwilling to take on the custom processing needs of KJS. Jig fishermen then met with every large-scale processor along the Kodiak waterfront, always with the same request, but none was able to meet its custom processing needs. A way forward was eventually found with two small processors. Neither had been involved in custom processing for the jig sector before (focusing instead on smoked and pickled fish), but both were interested and supportive of the initiative. With processing secured, KJS launched sales in 2014.

Working with two small processors created its own set of challenges. For example, one of the processors was not located on the waterfront, so arrangements had to be made to offload and fillet the fish at one processer, and then bring the iced bags of fillets in insulated totes across the street with a forklift to the other for custom processing. Key to operational success was having AMCC Kodiak-based staff provide vital

[13] Product information required by the Food and Drug Administration is included to inform consumers about the contents of the product, and to prevent fraud, misrepresentation and unfair competition. All processors follow the same set of rules in labelling. All must be in compliance with the Department of Environmental Conservation processing regulations and must contain a Hazard Analysis Critical Control Point system. All KJS custom processing has been done with established processors compliant with all regulations due to the cost and complexity of navigating the processing business.

capacity in following the product from the moment it was offloaded from a jig vessel, through processing, into freezers and eventually onto planes headed to market.

The arrangement with the two small processors worked well until the same large processor that had bought out the initial KJS processing partner also bought out the processor that was offloading and filleting KJS product prior to custom processing. This and other factors contributed to the end of this processing arrangement. During this period, KJS began working with another custom processor, Kodiak Island WildSource. WildSource is owned by the Sun'aq Tribe of Kodiak. Despite some challenges (for example, the plant had no ice and was located on the third floor of a warehouse), the new arrangement worked well. KJS was able to purchase ice and pay for use of a crane on a private dock. The bulk of the jig fishery work occurs in the spring – a slow time for WildSource, which focuses primarily on smoking salmon. Jig deliveries provided for increased processing opportunities for resident workers at the small processor. This arrangement worked well until a fire swept through the warehouse and the entire structure was deemed a total loss. Fortunately, during this period WildSource was under negotiations to buy a small piece of waterfront. Rebuilding a dilapidated dock and structure on this site are part of their long-term business plan.

Despite processing challenges stemming from limited access to a waterfront dominated by large-scale processors, the market for KJS products continues to grow. Since its inception in 2014, AMCC has paid between 30 and 200 percent over dock price to Kodiak jig fishermen. This range in price increase depends on the year, target species and recovery rates, as well as market demand. For example, AMCC paid USD 0.20 to USD 0.25 per pound over dock price for cod. For black rockfish, AMCC has increased the value to fishermen from USD 0.30 over dock price in the past to USD 0.55 per pound in 2018. For dusky rockfish, AMCC pays jig fishermen USD 0.70 over dock price.

Product from KJS was initially sold to restaurants and lodges in Alaska, and direct to consumers through Catch 49, AMCC's Community Supported Fishery.[14] Catch 49 is structured as a social enterprise aimed at helping local Alaskan fishermen increase profitability, rewarding environmental performance, and sustaining local fishing opportunities. The CSF builds on important connections in Alaska's food systems by linking chefs and consumers more directly with community-based, conservation-minded fishermen.[15] Catch 49 serves Alaskan markets only. Proceeds from Catch 49 benefit the work of AMCC while also providing fishermen a better price for their catch. Fishermen that participate in the Catch 49 programme get 30 to 200 percent more for their catch than they would otherwise. To date, they have sold roughly 75 000 round pounds (roughly 34 000 kg) of rockfish and 57 000 round pounds (25 854 kg) of Pacific cod to CSF subscribers and Alaska restaurants.

2.3.3 New challenges, new solutions: the future of the Kodiak jig fleet

In 2017, a biennial stock assessment survey conducted by the National Marine Fisheries Service showed an unexpected finding. Gulf of Alaska cod abundance was in sharp decline. This decline was linked to warmer waters in the Gulf of Alaska referred to as the "warm blob". The survey showed the lowest biomass since the survey started in 1984. This decline was sudden, unexpected and sufficient to warrant an 80 percent reduction in Pacific cod catch limits.

The cod collapse in the Gulf of Alaska has contributed to a notable decline in active jig vessels harvesting cod, from 108 vessels in 2016 to 10 in 2018 (Table 2.2). As nearshore fishermen, the jig fleet was the first to draw attention to the cod decline in the

[14] Before 2017, the CSF was formally named Catch of the Season.

[15] With the tagline "Seafood caught by Alaskans for Alaskans", the CSF offers its subscribers other seafood products harvested by Alaskan fishermen, such as salmon, crab, halibut and spot prawns.

Gulf of Alaska, as they were unable to harvest enough cod to make the fishery viable. For example, in 2012, the jig fleet harvested just over 100 percent of the harvest level in state waters (Table 2.2). The following year, in 2013, the fleet harvested only 9 percent. In 2017 and 2018, the fleet harvested less than 3 percent of the harvest level set. The cod decline compelled some jig fishermen to sell their vessels; others moved off island, and still others sought to offset the loss with additional employment in land-based jobs, or by targeting other species with jig gear (e.g. rockfish). For those remaining, the cod decline underlined the importance of diversified access for the small-boat fleet. It also made the rockfish set-aside increasingly vital to small-boat fishermen.

In 2017, a new buyer began working with Kodiak jig fishermen to expand the market and offer jig-caught seafood products to its customer base in the Midwest. Founded in 2012, Sitka Salmon Shares is an integrated, "boat to doorstep," values-driven business. The company specializes in delivering premium-quality sustainable seafood from small-scale fishermen in Southeast and other parts of Alaska to customers via a CSF model. Sitka Salmon Shares has taken an early leadership position in the home-delivered seafood marketplace, and in 2019 the company is projected to have around 9 000 customers in the Midwest and other parts of the country. Kodiak-jig caught rockfish species have been heavily incorporated in the company's CSF shares, creating a strong market opportunity for this small-scale fishery. The company is now the largest buyer of Kodiak jig-caught rockfish, and has consistently paid 30 to 100 percent over dock price for various jig-caught rockfish species. This has created a substantial financial benefit for local fishermen, who have seen increases to their bottom line of USD 8 000 to USD 11 000 in a given season.[16]

2019 has seen the highest price per pound ever paid to jig fishermen in Kodiak for rockfish. A significant percentage of the rockfish jig harvest is now being landed at a higher dock price destined for markets developed by Catch 49 and Sitka Salmon Shares. The market is growing and helping bolster local fishermen, particularly against hardship stemming from the loss of cod fishing opportunities.

In addition to the policy and market-based approaches discussed above, Kodiak jig fishermen are also at the forefront of other community-based measures to provide infrastructure, stability and market opportunity for small-scale fishermen in Kodiak.

First, jig fishermen led efforts to revise a long-standing Kodiak City ordinance that prevented fishermen from conducting business off of their vessels in the harbour. They circulated a petition asking for a modification in the ordinance which would allow them to sell fish off their boats following all state and federal requirements. If the petition were successful it would provide an opportunity for community members to purchase affordable, fresh fish in the harbour and have the chance to talk to fishermen; raise the dockside value to increase profit margins; and also serve as a means of selling small amounts of fish directly when coming into port with a small load. Jig fishermen organized and regularly attended meetings with the Ports and Harbours Committee and the City Council to explain the intent and positive outcomes envisioned for the community. The revised ordinance passed in 2018. For the first time in decades, fishermen can now legally sell fish off their boats in Kodiak.

Jig fishermen were also actively engaged in a community initiative to improve local fishery infrastructure through the addition of a community crane. This discussion had been underway in the Kodiak community for many years as fishermen sought an independent method to offload their catch. With most of the small jig vessels also participating in higher volume salmon fisheries with an established processor relationship, the ability to request use of a crane from the large processors was rarely

[16] Sitka Salmon Shares also offers equity positions in the company to fishermen, and currently has one Kodiak jig fisherman as an owner. Fishermen owners also have the opportunity to participate in the management of the company and are eligible for distributions of company profits.

an issue, but was asked as a favour. Fishermen advocated for a working waterfront that included infrastructure needed to provide for independent small-scale harvesters. Again, jig fishermen were engaged at every point in the decision-making process. In 2018, a public use crane was erected at a multi-use dock in the main harbour.

A third initiative currently underway stems from a one-day planning session in 2015 during which community members identified and voted on two ideas that would improve quality of life in Kodiak. A local food co-op won one of the votes. Community members wanted a co-op to serve as a gathering place as well as a location to purchase local produce and seafood. The Kodiak Harvest Co-op has been established, and work is underway to open a storefront. Many jig fishermen are members of the co-op and involved in the seafood marketing plan. While funds are being raised for the storefront, weekly farmers' markets in spring, summer and fall serve as a means for fishermen and farmers to sell directly to local consumers, providing an opportunity for consumers and harvesters to meet in person and build relationships.

2.4 CONCLUSIONS AND GOOD PRACTICES

The success of the Kodiak Jig Initiative demonstrates the strength of community- and fishermen-led initiatives aimed at improving access and market opportunities for small-scale fishermen. Central to these efforts has been a marketing approach that emphasizes not only where the fish was harvested and by whom, but how it was harvested. Differentiating jig-caught seafood products from higher volume, lower value fisheries, such as trawling, has been core to the development of niche markets that value community and environmental sustainability, and can be considered a good practice. That said, basing a seafood marketing plan on small-scale and custom processed products in places like Kodiak creates a number of challenges. High-volume landings from other gear types dominate the market and processing schedules, and the jig fleet is marginalized in its ability to compete. Establishing trusted relationships with local seafood processors, ensuring public access to the working waterfront, and supporting investments in infrastructure that benefit small-scale fisheries are critical to the success of these kinds of marketing initiatives.

As a case study, the Kodiak Jig Initiative illustrates several aspects of the SSF Guidelines. Among the most central: ensuring post-harvest actors are part of relevant decision-making processes (paragraph 7.1); supporting efforts to enable investments in appropriate infrastructure, organizational structures and capacity development (paragraph 7.3); and supporting fishermen' associations to promote their capacity to enhance their income and livelihood security and marketing mechanisms (paragraph 7.4). This study illustrates the power of partnerships and direct engagement in decision-making processes that affect local fishing livelihoods – another good practice, which serves as an example that can assist other fishing communities and fleets in developing approaches that fit their specific needs. Equally so, this case study demonstrates the very real challenges and changes that small-scale fishermen will continue to face in light of environmental and economic factors that are beyond their control. The warmer waters in the Gulf of Alaska currently contributing to the cod decline will continue to create uncertainty in fisheries, stressing the importance of diversified access when adapting to changing conditions. This and other challenges described above will require collaborative and creative solutions. The Kodiak Jig Initiative makes clear that the solutions to small-scale fishery sustainability must be as diverse as the challenges. There is a growing market demand for products with clear economic, community/cultural and environmental benefits, and small-scale fisheries are well positioned to meet it.

ACKNOWLEDGEMENTS

We thank the Kodiak jig fleet for sharing their time, knowledge and vision to this project, especially Darius Kasprzak, Ryan Horwath, Leonard Carpenter, Shawn Dochtermann, Alexus Kwachka and Dave Kubiak. A huge thanks goes to Kelly Harrell, former Executive Director of the Alaska Marine Conservation Council, whose leadership guided development of both Kodiak Jig Seafoods and Catch 49. We also thank Alaska Sea Grant staff Quentin Fong, Chris Sannito, and Julie Matweyou for sharing their expertise on quality assurance, seafood handling, and seafood business development. Stephanie Webb and the Community Fisheries Network founded by Ecotrust and Island Institute also provided invaluable support in the early stages of this work. The Alaska Department of Fish and Game and the National Marine Fisheries Service provided data drawn on in this paper. Finally, we thank our processing partners, especially Barb Hughes and Bill Alwert, who helped custom process our first product under the brand name Kodiak Jig Seafoods.

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3. The FAO-Thiaroye processing technique: Facilitating social organization, empowering women, and creating market access opportunities in West Africa

Alexander Ford
Policy, Economics and Institutions Branch
FAO Fisheries and Aquaculture Department
Rome, Italy

Aina Randrianantoandro
Omar Riego Peñarubia
Product, Trade and Marketing
FAO Fisheries and Aquaculture Department
Rome, Italy

ABSTRACT

Over the past decade the FAO-Thiaroye processing technique (FTT), a healthier, more economic and environmentally sustainable method of fish smoking, has been introduced in fishing communities throughout Africa, Asia and the Pacific. This case study examines the role of the FTT in West Africa, focusing on its function as a technology that reduces human health impacts and fish losses, improves fuel efficiency, increases product quality and facilitates access to international markets. The study also examines the role the FTT has played in enabling the social organization of the processors who use it and in advancing gender equality and women's empowerment in West Africa. Further, it highlights elements of the FTT that support the value chains of small-scale fisheries reliant on the smoked fish trade, and also their limitations and areas where further study is needed to understand the impact on the value chain and those involved. Finally, the case study presents recommendations to ensure management of the FTT is effective.

Keywords: FTT-Thiaroye kiln, smoked fish trade, organisational structures, capacity development, PAHs, value addition, cost-efficient technologies, gender inclusion.

3.1 INTRODUCTION

In 2011, the fisheries sector in West Africa was worth USD 24 billion – equivalent to 1.26 percent of the GDP of all African countries. People in West Africa depend on fish as a source of nutrition, protein and critical micronutrients. Around 12.3 million people in the region are employed in the fisheries sector; of these, an estimated 45 percent are women occupying post-harvest roles. In the informal seafood trade between states, dried or smoked fish accounts for 90 percent of the trade. However, fish processors sometimes struggle to produce good-quality and longer-lasting products. Challenges concerning fish processing include lack of access to credit for working capital,

poor hygienic conditions of processing facilities, and the use of obsolete processing equipment (Ayilu *et al.*, 2016).

Smoking is a traditional method for preserving fish commonly seen in West Africa that contributes to food security and livelihoods in the region (Table 3.1). In recent history, fish smoking has predominantly relied on the metal drum kiln and the Chorkor kiln (Brownell, 1983; Gordon, Pulis and Owusu-Adjei, 2011). The drum kiln (a kiln made from an oil drum) has a number of drawbacks: it is low in both capacity and fuel efficiency, and requires excessive product handling during processing, which exposes processors to the risk of burn injuries (Brownell, 1983). The low capacity invariably translates into high post-harvest losses during bumper seasons. To address these disadvantages, the Chorkor kiln was developed in the late 1960s through the collaborative efforts of the Food Research Institute of Ghana, FAO, and fish processors in Chorkor (a fishing community in Accra). It currently enjoys widespread use across Africa. However, the Chorkor kiln has its own deficiencies: it requires large quantities of fuel in order to be effective and does not filter smoke away from the processors.

TABLE 3.1
Top ten regionally traded fish species

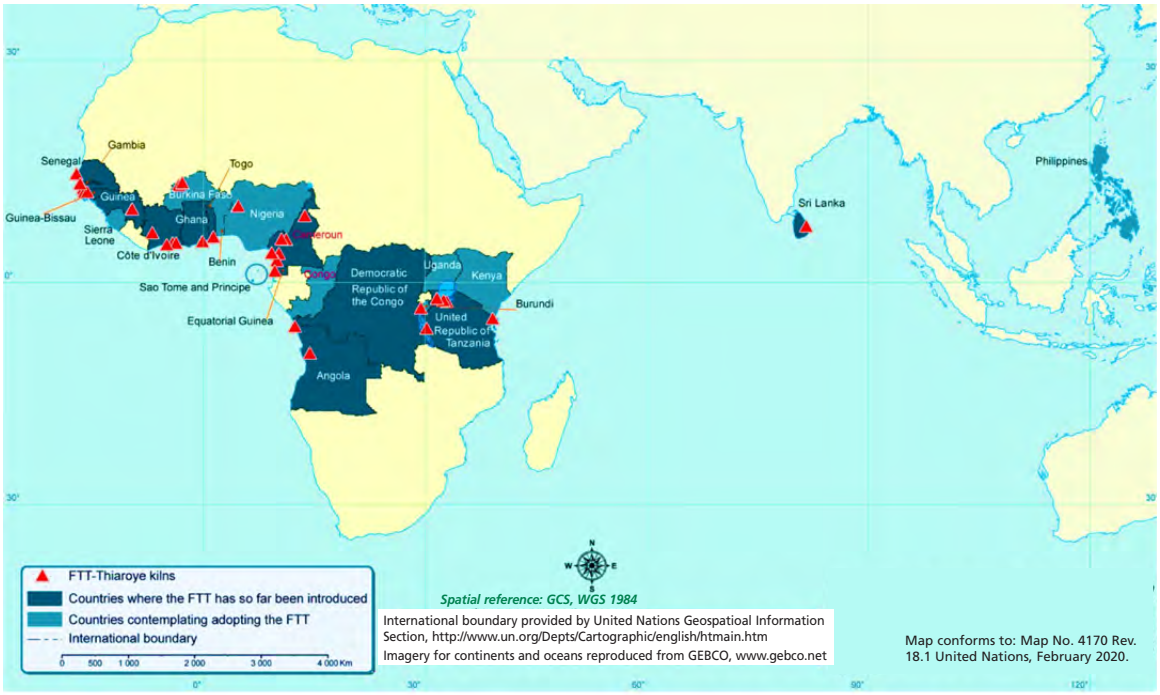
English name	Scientific name	Traded form in trade
Shad, bonga	*Ethmalosa fimbriata*	Smoked
Round sardinella	*Sardinella aurita*	Smoked
Anchovy	*Engraulis encrasicolus*	Dried and smoked
Atlantic bumper	*Chloroscombrus chrysurus*	Dried and smoked
Chub mackerel	*Scomber japonicas*	Smoked
Pink shrimps	*Penaeus notialis*	Smoked
Deepwater rose shrimp	*Parapaeneus longirostris*	Smoked
Black-chinned tilapia	*Sarotherodon molanotheron*	Salt dried and smoked

Burning wood results in the production of four carcinogenic polycyclic aromatic hydrocarbons (PAH): benzo(a)pyrene, chrysene, benz(a)anthracene and benzo(b) fluoranthene, together referred to as PAH4 in the context of fish smoking. During the fish smoking process, smoke from the wood coupled with high processing temperatures results in PAH4 deposits on the fish (Stolyhwo and Sikorski, 2005). These PAH4 compounds are known to incite pulmonary, integumentary and ocular complications among fish smokers. Many women fish smokers carry young children on their backs while working, making their infants susceptible to these risks as well. Moreover, the PAH4 residue on the smoked fish is thought to increase the risk of cancer among those who consume it, with diet accounting for 88–98 percent of human exposure to PAH (Farhadian *et al.*, 2011).

PAH4 compounds in food have long been considered a risk by the European Union and in 2011 the European Commission updated its maximum levels to 12 µg/kg per kilo of smoked fish (European Commission, 2011). Partly in response to the EU's Rapid Alert System for Food and Feed (RASFF)[1] checks resulting in shipments of smoked fish being detained, and sometimes rejected, due to elevated PAH4 levels, and partly in response to the outcry from fish processors (the majority of whom are women) regarding the health complications associated with the Chorkor and metal drum kilns, in 2013 FAO and the National Training Centre for Fish and Aquaculture Technicians (CNFTPA) in Senegal started developing the FAO-Thiaroye processing technique (FTT) for small-scale fish smoking operations (FAO, 2017) – though the FTT had first been introduced to medium-scale, export-oriented fish processing units in Togo

[1] The Rapid Alert System for Food and Feed (RASFF) is a system for reporting food safety issues within the European Union.

FIGURE 3.1
Map showing the locations where the FTT is being used, according to (FAO, 2019b)



Note: this map is not representative of all kilns, but only those known to FAO.
Source: GEBCO.

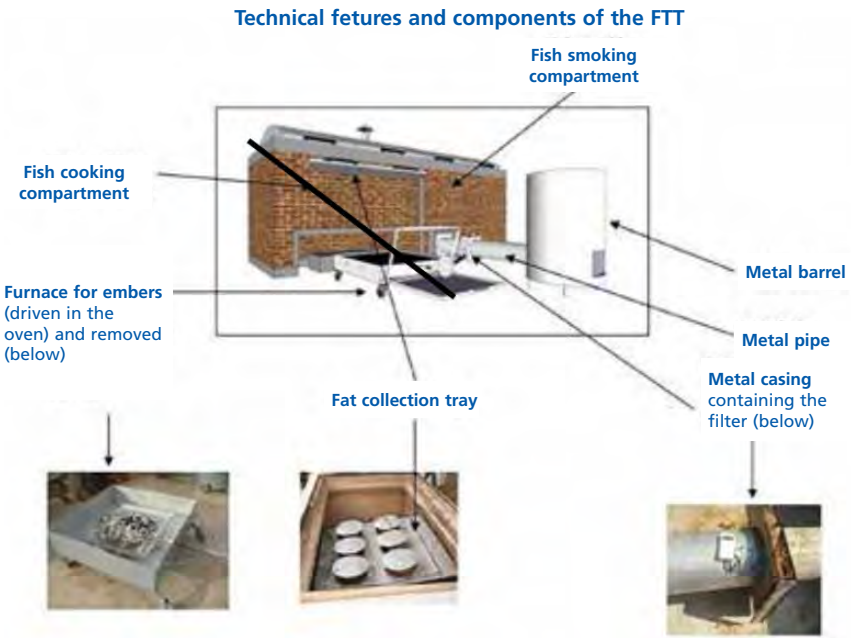
and Côte d'Ivoire in 2008. The technology is owned and licensed by FAO. As of today, the FTT is being used in more than a dozen African countries (Figure 3.1). It is used by at least four companies that process and export fish to the European Union and the United States of America and is currently being piloted in small-scale fishing communities in Sri Lanka, Micronesia (Federated States of) and the Philippines.

The design of the FTT kilns builds on that of the Chorkor kiln, and the kiln can even use component parts from the Chorkor (Figure 3.2). The FTT allows several processing steps to be combined into one: the smoking of the fish, plus the additional drying and storing of the final product (FAO, 2017; FAO 2019). The lid of the kiln not only covers the product during smoking and drying, but also protects it afterwards (Figure 3.3). The drying/smoking racks are removable and easy to clean, and made of heat-resistant materials, thereby ensuring a longer lifespan. One feature that is unique to the FTT is that the fuel is held in an ember furnace, which concentrates the heat on the product, thus reducing heat loss (which increases fuel efficiency) and also protecting those operating the kiln by containing the smoke. Another feature is the fat-collection tray. Finally, the FTT features an indirect smoke generator system consisting of two main components: (1) a barrel and metal pipe that can be shaped into a spiral or circular tube; and (2) a filter system, which includes a metal casing in which the filter is inserted.

In relation to Chapter 7 of the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines), this case study discusses the impact of the FTT on value chains and communities, focusing first on the technology itself and its contribution to fish loss reduction, value addition and cost efficiency (paragraph 7.5); then examining its impact on trade and market access (paragraph 7.6); and then discussing gender, livelihoods and social organization (paragraphs 7.2 and 7.4). Then follows a discussion of the limitations and lessons learned, and finally conclusions and recommendations for the future.

FIGURE 3.2
In clockwise order, the drum kiln, the Chorkor kiln, the FTT kiln in Ghana and the FTT kiln in Equatorial Guinea

FIGURE 3.3
The FTT-Thiaroye kiln with apparatus



3.2 METHODS

The case study was designed to provide an overview of the impact the FTT has had to date in the context of Chapter 7 of the SSF Guidelines. The aim in particular was to synthesize the key findings that pertain to paragraphs 7.2, 7.4, 7.5 and 7.6, with additional insights from experts in order to provide guidance for the future.

The first stage of the research involved a systematic review of all publicly available literature. This served a dual function, in that it primarily allowed for gaining an understanding of the FTT, while also identifying key stakeholders to interview in the second stage of the study. FAO is currently the predominant author in the FTT literature. However, other authors have also examined the fish smoking industry and its associated value chains in general, which has been helpful in providing recommendations for the FTT.

The second stage of the research involved discussing the FTT with experts, including people who have experience with fish processing technologies generally, or people who have been involved with the FTT directly. An interview guide was adopted to streamline this process and help focus the investigation (Appendix 1). The interview questions were adjusted according to the persons being interviewed and where their professional expertise lay, and also to eliminate questions that were eliciting the same responses. The range of people selected included representatives from development agencies, research/academia and community representatives. Interviewees were sourced from the literature review. Furthermore, the authors used their own networks to identify other professionals to interview. Again, this served a dual function in that it strengthened or corrected our understanding gained from the literature review, while also providing insights into the history of the FTT. This latter point was critical as it provided much of the basis for our policy recommendations.

One limitation to this method was the limited number of fishworkers interviewed, although we made up for this by interviewing the Coalition for Fair Fisheries Arrangements (CFFA), which has been directly involved in the installation of the kilns and has firsthand experience with the FTT. CFFA is a platform of NGOs based in Brussels that documents the development and environmental impacts of European Union fisheries relations on small-scale fishing communities in African, Caribbean and Pacific (ACP) states. The core objective of CFFA is to promote the livelihoods and food security of coastal fishing communities, through information sharing, advocacy and dialogue between organizations in ACP countries, the private sector and European Union decision makers.

3.3 RESULTS AND DISCUSSION OF GOOD PRACTICES

3.3.1 Loss reduction, value addition and cost efficiency

Since the 2011 change in the European Union regulations on PAH4 levels, certain research institutes have explored ways to adapt or develop technology to meet the new standards. However, the PAH4 levels remained too high, as was presented at the fourth session of the Workshop on Fish Technology, Utilization and Quality Assurance held in Elmina, Ghana in 2017 (FAO, 2018). Studies show that the FTT model meets the European Union regulatory levels, which are presently considered to be the global market regulatory benchmark (FAO, 2018). Data obtained from comparative fish smoking tests conducted by FAO (2018) show that products from the Chorkor kiln had PAH4 levels up to 33 times the European Union maximum limit (ML), whereas the PAH4 levels for FTT products were considerably lower than the maximum (Figure 3.4).

The type of fuel used greatly influences PAH4 deposits during combustion (Figure 3.5) (Bomfeh *et al.*, 2016). For example, in Côte d'Ivoire, softwoods like the relatively abundant rubberwood should be avoided due to their very high PAH4 content. Other fuel types, such as hardwoods and coconut shells, are recommended instead. Although burning mangrove wood generates low levels of PAH4, its use should be limited and controlled given the ecological and economical importance of mangroves, especially in terms of aquatic and fishery resources, where they play a vital role as a spawning and nursery habitat for many aquatic species; and in terms of the

FIGURE 3.4
Bar graph comparing the level of PAH4 emitted by the FTT and Chorkor kilns with the European Union maximum

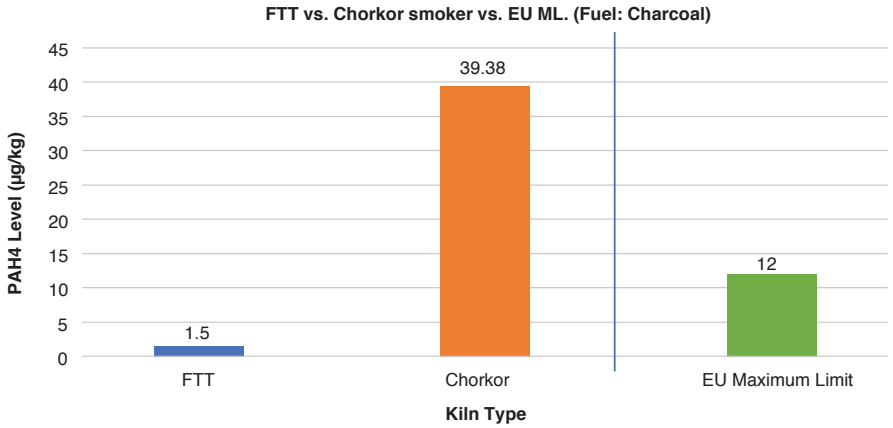
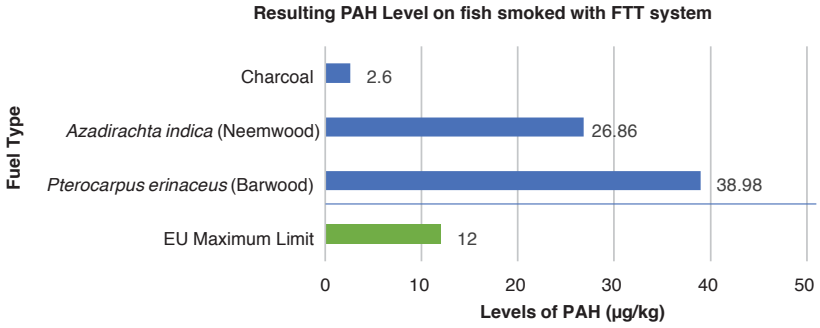


FIGURE 3.5
Bar graph comparing the different levels of PAH4 produced through the combustion if different fuel types in the FTT-Thiaroye kiln



ecosystem service they play in coastal protection. When charcoal is used, fuelwood consumption is significantly reduced. Further, because charcoal gives off very little smoke, it is easier to obtain smoked products that meet PAH safety standards. Likewise, adding stones such as siporex or pieces of baked earth retains heat in the kilns, thus reducing the amount of charcoal required by about 50 percent (FAO, 2015a).

The FTT's installation costs vary between USD 800 and USD 1 600 (Table 3.2). In addition to this upfront cost, there are other variables to be taken into account. These include the three tonnes of fresh fish required to meet the kiln's maximum daily capacity, as well as purchasing fuel, water and other raw materials; transport; communication; and distribution or marketing costs. Importantly, in order for the FTT to operate efficiently and fulfil its expected lifespan (> 15 years for the frame and 3–12 years for the components), routine care is essential. This entails cleaning inside and around the kilns and removing the ashes and the waste from the lids and from the mesh of the removable racks (FAO, 2017; FAO, 2019a). Notably, using the FTT cuts smoking time in half compared to other kilns, thus providing processors with an opportunity to pursue other activities.

The FTT makes it possible to market safer and higher-quality products than previous systems (FAO, 2019a). Additionally, it significantly reduces post-harvest losses (PHL) and fuelwood consumption (FAO, 2016). To give some context, in Côte d'Ivoire it is estimated that PHL from Chorkor and drum kilns amount to 23 317 tonnes per year

TABLE 3.2
Comparative analysis of different fish smoking systems

	Type of system		
TECHNICAL CRITERIA	**Metal drum**	**Chorkor**	**FTT**
Type of construction	Rudimentary	Improved	Based on existing kiln models while addressing their shortcomings
Smoking time	Up to 3 days	1 day	3–6 hours
Fire and smoke control	Very limited	Limited	Very high
Smoking technique	Simultaneous smoking and drying	Separate smoking and drying	Separate smoking and drying
Fish fat collection device	None	None	Included
Smoke filtering device	None	None	Included
ECONOMIC CRITERIA			
Cost of kiln (USD)	26	345	1 600
Smoking capacity (kg of fish per day)	150–200	200–300	3 000
Amount of wood used (kg) per 1 kg of fish	3–5	> 0.8	0.8
Lifespan	2 years	3–15 years	> 15 years
Earnings	Average	Average	High
Ancillary jobs	Limited	Medium	Very high
SOCIAL CRITERIA			
Exposure to heat/smoke	Frequent	Frequent	Very low
Safety and quality of smoked fish	Lesser quality	Lesser quality	Safer and higher quality

Source: Mindjimba, 2019.

for a value of approximately USD 11.6 million, to which must be added 112 000 tonnes of wasted wood worth USD 3.7 million (FAO, 2016). In terms of public health, the processors who use the Chorkor kiln have reported unpleasant symptoms for the past 25 years, and they agree that these have been greatly reduced through the use of the FTT (CFFA, personal communication, 2019). Studies support this claim, showing that FTT users are less exposed to smoke-related pathologies than those who use traditional systems. Inherent health costs, which are estimated at USD 1 247 a year for medical consultations and hospitalizations, can be considered as opportunity costs in the economic evaluation. In summary, the safety, environmental, food, sanitary and socio-economic benefits of the FTT are well-established (Mindjimba, 2019).

In terms of the value added or retained through better handling, using the FTT has yielded mixed results. FAO (2019) reported that although there were differences in the appearance and texture of FTT and Chorkor products, these differences did not affect consumer preference. Other studies not specifically related to the FTT have found that better-quality smoked fish can fetch up to 25 percent more at the market (Gordon, Pulis and Owusu-Adjei, 2011), but that consumer taste preferences take time to change (Asiedu, Failler and Beygens, 2018). FAO (2019) proposes that if consumers were educated on the safety of FTT-smoked products and the carcinogenic risks inherent in the older kilns, their preference might shift to FTT-smoked products, especially given that the preparation required for smoking fish in the FTT kilns is the same in terms of ingredients and flavourings used (Bomfeh *et al.*, 2019).

Nevertheless, examples exist where the FTT has been fully adopted by processors and where value addition can be seen both in terms of the finished product and in other income-generating activities. The Women Fish Traders and Processors Cooperative of Abidjan (CMATPHA), a processors organization operating in Côte d'Ivoire, has started expanding into other areas of the smoked fish value chain such as the sale of food packaging items and basins, as well as diversifying their product range (e.g. sausages,

croquettes, stuffed fillets, and fish fat-based products). CMATPHA members have also initiated various marketing strategies in their efforts to expand their customer base to boost their sales and income.

3.3.2 Trade and market access

The majority of smoked fish originating from West Africa is destined for regional or national markets such as the Tuesday, Denu, or Dambai markets in Ghana, the Maiduguri market in Nigeria and the Chicago market in Cote d'Ivoire. Due to its strong trading networks, Ghana provides a good example of how trade and markets operate in West Africa, with supply chains extending into neighbouring countries such as Burkina Faso, Togo and onward shipment to Nigeria (Figure 3.6) (CFFA, personal communication, 2019; Gordon, Pulis and Owusu-Adjei, 2011). FTT-smoked fish still competes with the more common Chorkor-smoked fish due to the differences in taste. As Asiedu, Failler and Beygens (2018) explain, this is because "fish consumers' taste is difficult to change … irrespective of the quality and nutritional value of the fish species". Nevertheless, many of the processors in West Africa want to tap into the growing tourist, expatriate and middle-class markets typically found in urban areas like Accra and Kumasi.

FAO's Flexible Multi-Partner Mechanism (FMM) has focused on enabling this market expansion. The FMM's third strategic objective in 2016 was to "reduce rural poverty", and part of this included enabling young aspiring entrepreneurs to set up their own businesses and create links with supermarket chains interested in adding FTT-processed fish to their inventory. The strategy proposes that fish processors (and, when applicable, the professional groups they are members of) benefit from the partnerships and know-how of in-country technical and financial partners in terms of: (i) management of microfinance services and mobile transfer and mobile banking; (ii) coaching young male and female entrepreneurs, particularly in local transport services, ice supplying and packaging inputs, chopper and unloading jobs, and in

FIGURE 3.6
Map showing the trade flows of frozen and smoked fish in West Africa

Legend
Flow of frozen fish
Flow of smoked fish

Source: GEBCO.

Map conforms to: Map No. 4170 Rev. 18.1
United Nations, February 2020.

training and professionalization initiatives; (iii) partnerships with the private sector; and (iv) regional and national projects (FAO, 2019a; FAO, 2016). One of the policy outcomes of this project is awareness of the benefits of smoking fish using the FTT, which might in turn incentivize its procurement and use.

According to the International Trade Centre (ITC), the European Union imported 55 368 tonnes of fisheries products from the Economic Community of Western African States (ECOWAS) in 2016, making the European Union the third largest market for West Africa in terms of quantity after other ECOWAS countries and other African countries (Ayilu *et al*., 2016). Nevertheless, this trade is sometimes disrupted due to technical barriers, often involving the quality of the product when inspected on arrival in the EU. In 2003, it was estimated that approximately one in four airfreight consignments of smoked fish were detained at port of entry to the United Kingdom of Great Britain and Northern Ireland, and 70 percent of these were subsequently destroyed[2]. This represents approximately 17.5 percent of airfreight consignments and is equivalent to 20 tonnes of product per annum, with a retail value of USD 460 000 to USD 753 000 at current prices (FAO, 2003). The value chain in Côte d'Ivoire lost about USD 2 million as a result of a self-imposed ban on smoked fish exports between 2006 and 2012 following failed checks by the Rapid Alert System for Food and Feed (RASFF). PAH4 being the subject of notifications is not common, with countries from the ECOWAS region recording 33 notifications between 2006 and 2019, of which 8 suffered border rejections (RASFF Portal, 2020).

As a result, attempts have been bolstered to improve quality control and to adopt international standards at the point of origin in order to meet European demand. Demand for what the Centre for the Promotion of Imports (CBI, an affiliation of the Netherland's Ministry of Foreign Affairs) calls "ethnic foods" is growing, with 60 percent of consumers being indigenous to Europe – perhaps suggesting that prices for smoked fish are not likely to stagnate or decrease (Netherlands Ministry for Foreign Affairs, 2018). Adherence to international standards is benefitting FTT smoking processors indirectly as well: for example, in Ghana, fishers must be registered by the Fisheries Commission in order to sell through international supply chains, which can be a mechanism of ensuring good fishing practices as well as checking illegal, unreported and unregulated (IUU) fishing practices that affect the sustainability and biodiversity of the fishery resources (Pauly *et al*., 2002). It is estimated that IUU fishing costs about USD 2.3 billion in revenue annually to West African countries (Doumbouya et al., 2017), which in turn has a negative effect on domestic processors, who sometimes struggle to land a sufficient quantity of fish for smoking (CFFA, personal communication, 2019). This also poses threats to food security and the health of fish stocks, as well as having socio-economic consequences such as increases in poverty, organized crime, unemployment and financial insecurity (Daniels *et al*., 2016).

In the context of paragraph 7.6 of the SSF Guidelines, it is clear that the FTT can help facilitate access to international markets and catalyse further international trade. Government agencies tasked with standardization and regulation could prove critical by introducing "trade regulations and procedures that … support regional trade products from" processors working in a small-scale context (FAO, 2015b, p. 11). Whether the FTT stimulates regional or national trade is still undetermined, given the fact that many of the consumers in West Africa prefer the taste of fish smoked using other kilns. However, as the class distribution in West Africa changes and health awareness builds, this could change. To stimulate this trade, West African governments and development

[2] Not all of the product detained was due to prohibited levels of PAH4. The main reasons why smoked fish consignments are detained are smoked fish is smuggled in among other goods; packaging is inadequate; insect infestation; establishment number stapled on the box rather than written on; health certificates not filled in correctly.

agencies must be receptive to programmes designed to support young people, spreading awareness by directly engaging with small-scale processors and traders.

3.3.3 Gender, livelihoods and social organization

The design of the FTT enables women to better manage their lives in safer, healthier surroundings. By reducing the smoking time from 12 hours, with the Chokor kiln, to 6 hours with the FTT and producing a product that sells more readily, the new technology increases the time available to women for other pursuits, including caring for the household and children, as well as undertaking literacy and numeracy classes. Furthermore, a more marketable product has allowed for greater quantities of fish to be sold at premium prices, meaning that processors are seeing a greater return on their efforts (World Bank, FAO and IFAD, 2015). In the context of health, a recent study involving 635 women and three pilot sites showed how using the FTT instead of Chorkor kilns improves processors' health and overall well-being. The study revealed that fish processors using the FTT had fewer detrimental health issues than those using the Chorkor kiln. Additionally, the study found instances of domestic violence were more frequent in households where women used Chorkor kilns compared to those using FTT kilns. The reasons indicated by the study suggest that the higher rate of violence is "due to processors returning home late and getting up early due to the long time it takes to undertake processing activities" and therefore not having sufficient time to attend to domestic activities (FAO, 2019a; Anoh *et al*., 2017).

In addition to its functional benefits, the FTT has in some countries enabled greater social organization, both among the processors and in the society as a whole. From a top-down perspective, the African Union has played a role in financially supporting the coordination activities of socioprofessional groups of processors and traders from across the West African region in promoting the benefits of the FTT. FAO has also enabled dialogue between stakeholders, organizing and conducting trainings and workshops throughout West Africa.

From a bottom-up perspective, local organizations have been crucial for both the management of the processing sites and for raising awareness about the FTT. A comprehensive report of the FTT recommends that "only well-structured and organized socioprofessional groups [are advised] to run the FTT infrastructure in communal settings" (FAO, 2019a, p. 92). The report also recommends that before commencing an FTT implementation project, "identifying existing socioprofessional groups, women's groups, cooperatives and providing support to render them more cohesive and efficient, or setting up groups around existing income-generating activities that will then be able to manage the FTT platform, along with training in good handling, storage and packaging practices" is essential (FAO, 2019a, p. 87).

As an example, in 2013, four pilot platforms were carried out in Abobo-Doume, Braffedon, Guessabo and Abidjan (Côte d'Ivoire) involving 3 807 actors, including artisans, fish processors and producers. A holistic and participatory approach was used in working with the existing cooperatives as a basis for implementation and exchanges. Cooperatives were asked to designate members within their association to manage each of the four platforms (FAO, 2019a). The platforms were officially inaugurated and entrusted to beneficiary professional associations in March 2016. Examples such as these are increasingly common, and demonstrate the importance of having socioprofessional groups to manage the FTT. In a workshop at an Abidjan processing site, Mindjimba (2019) notes teamwork, leadership, good hygienic practices and maintenance of the general infrastructure, as attributes due to the organizational capacity of the cooperatives managing the FTT kilns. However, the report also notes that "there is a need to create [other incoming-generating activities] based on local potentials and market needs". There has been some increased job creation for local artisans in installing and maintaining the kilns. Still, the women present at the

workshop identified "lack of organizational capacity" as a factor hindering them from further developing marketable goods.

Another example is seen in the African Confederation of Professional Artisanal Fisheries Organizations (COAPA[3]), which recently signed the Conakry Declaration at a workshop in Conakry, Guinea. The workshop was specifically designed to increase the valorization and marketing of FTT-smoked fish. The Declaration helps coordinate the aims of COAPA members advocating for better access to fish as raw material, the improvement of women fish operators' working conditions, the improvement of processing and commercialization activities, and the establishment of appropriate financing systems.

As with paragraph 7.6 of the SSF Guidelines, the FTT does not achieve gender equality and social organization in and of itself, but rather is a tool that can help bring people together to acheive these common goals. The introduction of FTT has "supported improvements to facilitate women's participation" in the value chain, which enables them to "enhance their livelihoods in the post-harvest sector" (paragraph 7.2). Equally, the employment opportunities and health benefits of the kiln can arguably been seen to contribute to the strengthening of local organizations (paragraph 7.4).

3.3.4 Limitations and lessons learned

Despite the good practices enabled through the use of the FTT, there are still a number of issues surrounding its installation and uptake in West African small-scale fisheries. In terms of limitations, FAO (2016) estimates the cost of FTT installation at between USD 800 and USD 1 600, which is much too high for the budgets of small-scale processors. Mindjimba (2019) does stipulate that this cost can be recuperated within 1–5 years; however, this is conditional on running the kilns at their 3-tonne daily capacity. One detail to bear in mind is that processors are not obliged to purchase a full FTT kiln, but can opt instead for specific features (e.g. the smoke filtration component or fat collection tray) that are compatible with the Chorkor kiln. Nevertheless, the FTT kiln's large capacity can be a challenge, and further contributing to the problem is the lack of access to fish some processors are experiencing. In Côte d'Ivoire, there are instances where fish prices are too high for processors to afford. A similar issue has arisen in Senegal, where the activities of foreign industrial fleets are reducing the amount of small pelagics available for capture by small-scale fishers and consequently the processors (CFFA, personal communication, 2019). Although this is not a limitation of the FTT itself, it does make uptake difficult. This review recommends that governments support policy measures that would ensure processors have access to fish and at a price that is affordable.

Likewise there is a necessity to involve local authorities in order to make the installation of an FTT processing site successful, especially when deciding its location. For example, in 2017 the governments of Morocco and Côte d'Ivoire cofunded a processing site in Abidjan. Built at a cost of USD 4.5 million, the facility included cold storage, a children's play area and various commercial and administrative offices. It was designed to employ 5 000 people, with a total annual processing production of 20 000 tonnes (Abidjan.net, 2019). However, the facility was located at an inconvenient distance from the actual market, and the local authorities were not able to relocate the market. Consequently, many of the processors returned to their previous processing site located near the market (CFFA, personal communication, 2019). A similar instance has occurred in Braffedon, Côte d'Ivoire, where a smaller facility has been neglected by its intended users from Grand-Lahou, due to the increased distance (20 kilometres from their homes) and the low rate of collective use of the FTT. Contrary to this, but

[3] COAPA Member States: Cote d'Ivoire, Cameroon, Guinea-Bissau, Guinea, Liberia, Mali, Morocco, Uganda, Senegal, Sierra Leone and Togo.

equally serious, the facilities in Abobo-Doumé are reported to be overcrowded, with some 300 processors wanting to use the facility. All three of these examples point to the fundamental necessity of consulting all post-harvest actors (as stipulated in paragraph 7.1 of the SSF Guidelines) in order to determine a location that suits the intended users.

Lastly, there are examples of kiln mismanagement, typically in places where there was no social organization (e.g. socioprofessional organizations, cooperatives) beforehand. The lack of this organization has led to in-fighting and divisions within the community, as the responsibilities and benefits were not clearly delineated beforehand. A cooperative or association helps to mitigate such conflicts, as these ensure training of artisans in kiln maintenance, adequate distribution of fish to be smoked, and other managerial tasks. FTT kilns require trained artisans to ensure they are properly maintained (FAO, 2019a). The need for artisans has been highlighted in Côte d'Ivoire, specifically for manufacturing and assembling the kilns (FAO, 2019b). CFFA noted that social organizations are in a position to ensure that all members of the community that use the kilns have equal access to the fish procured from the fishers. Hence, it is key to establish an entity recognized by all parties to be responsible for the daily use of the kiln.

Aside from the cost, there are no drawbacks intrinsic to the actual kiln. The negative experiences with the kiln are attributable to problems with its management. Thus in order to make the adoption of the FTT successful and sustainable in a given context, it is important that all the relevant actors are consulted before installation, and that those responsible for its management have clearly identified roles and responsibilities.

3.4 CONCLUSIONS

The results of this case study support those of previous studies extolling the superiority of the FTT. The study examined the paragraphs of Chapter 7 of the SSF Guidelines most relevant to deployment of the FTT. Though the kilns address all of the provisions to varying degrees, it is through paragraphs 7.2, 7.4, 7.5 and 7.6 that we are able to comprehensively assess the impact of the kiln.

As a technology that both accommodates the needs of female processors and adds value to the final product, the FTT facilitates overcoming two challenges severely hindering fish smoking value chains in West Africa – namely, the hazardous working conditions of the women smoking the fish, and the high levels of PAH4 deposits that prevent export to higher-value markets. Critically, it must be recognised that the FTT in and of itself does not overcome these barriers, relevant training and organisation among the processors is also key to overcoming these barriers. As for its limitations, the FTT is an expensive investment for low-income processors, and uptake depends on consistent access to raw materials and fish. This is an issue that states can address with policies that ensure small-scale fish producers, and the processors that depend on them, have access to sufficient fish (equivalent to 3 tonnes per kiln, per day). For the long-term sustainability of the FTT, social organizations need to play a central role in managing of the kilns. The impact the FTT will have on small-scale fish smoking value chains is not yet fully understood, but given the strengths the kilns exhibits (Table 3.2) it may be considered a disruptive technology. As such one aspect to consider in future studies will be the kiln's contribution to the restructuring of power dynamics in the value chain.

3.4.1 Recommendations

In order to encourage the uptake of FTT in West Africa and other regions of the world, this case study provides a series of recommendations, drawing on those made in Mindjimba (2019), FAO (2016), FAO (2017), FAO (2019) and by CFFA during the research for this case study.

Recommendations for loss reduction, value addition and cost efficiency

- Adapt the equipment to each site's specificities, including user needs and the main target fish species (i.e. large trays for small fish).
- Strengthen good hygienic practices in general, and systematically treat well-water and rainwater used to wash utensils and raw fish prior to smoking, according to prevailing standards.
- Achieve initial consensus among the processors regarding those responsible for the maintenance and running of the kiln. Prior training and demonstration surrounding the use of the kiln should be provided to the processors and the artisans tasked with its maintenance.
- Strengthen the capacity of fish smokers, artisans and government staff responsible for providing monitoring and support (e.g. smoking techniques, FTT kiln use and maintenance, bookkeeping and income statements, monitoring and commercial strategies).

Recommendations for trade and market access

- Place increased emphasis on data collection. A sound, consistent system for recording transactions should be introduced alongside the FTT kilns, one that takes into account characteristics such as volume processed and finances.
- Target more rewarding markets for FTT products (e.g. supermarkets, diplomatic representatives and international organizations, resident expatriates, tourists, restaurants, and external markets) by meeting their requirements in terms of quality assurance and control, traceability and supply dependability.
- Strengthen awareness among authorities, the local community and other stakeholders concerning the trade and health benefits of the kilns.
- Update national regulations regarding PAH with a view to guaranteeing fishery products' traceability and quality control.
- States need to ensure that industrial fleets operating in their waters are managed in view of the needs of small-scale fishers and their associated value chains, to ensure that the processors and other small-scale fishery actors have access to sufficient fish.

Recommendations for gender, livelihoods and social organization

- Promote the role of women in the value chain.
- Raise awareness among processors, consumers, decision makers, competent authorities and local media outlets about the comparative advantages of the FTT, in particular the fact that healthy and higher-quality products are the result of using this new technique.
- Choose processing facility implementation sites carefully – usually as a compromise between several considerations (e.g. accessibility, distance, viability, security) – in order to reach the largest number of potential users.
- The involvement of local (administrative, municipal, traditional and territorial agencies) authorities alongside the processors and other value chain actors is essential to ensuring the success and sustainability of the processing facilities (e.g. raising stakeholders' awareness and organizing producers). These authorities are also key to building the processing sites, including creating or rehabilitating access roads and partially financing the infrastructure.
- Set up child-care facilities to facilitate and encourage women's participation.
- Social change interventions as a transformative approach in raising awareness on gender is recommended in order to change perceived attitudes on roles of men and women, especially among men.

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Appendix 1

Interview Guide for FTT-Thiaroye Kiln Interviews

- What is your experience with the FTT-Thiaroye kiln and/or other fishing smoking technologies?
- What aspects about the FTT-Thiaroye kiln do you think set it apart from other fish smoking technologies?
- Would you agree that the FTT-Thiaroye kiln is a gender sensitive technology? Why?
- Is the FTT-Thiaroye kiln helping West African fishing smoking populations access new markets?
- Do you think it will continue to grow in popularity? Why?
- What do you think are the major challenges to the FTT-Thiaroye kiln's uptake?
- Has the FTT-Thiaroye kiln helped create strong social organisation? Why?
- What recommendations would you make to policy makers to increase the benefits promised by the FTT-Thiaroye kiln?

4. Fish traders and processors network: Enhancing trade and market access for small-scale fisheries in the West Central Gulf of Guinea

Raymond Kwojori Ayilu
Faculty of Arts and Social Sciences, University of Technology, Sydney, Australia

Sarah Appiah
Department of Economics, University of Ghana, Accra

ABSTRACT

From 2014 to 2018, the Fish Trade Project (a joint project of the WorldFish Center, the African Union Interafrican Bureau for Animal Resources, and the New Partnership for Africa's Development) implemented trade and market-driven initiatives to support small-scale fisheries in the subregion of the Fishery Committee for the West Central Gulf of Guinea (FCWC). One initiative was the establishment of the FCWC Fish Traders and Processors Network (FCWC FishNET), a platform composed of small-scale traders and processors, with the objective of informing policy gaps and designing market-driven incentives to leverage the collective power of its members to facilitate regional trade. This case study reviews FCWC FishNET activities to reflect on the role of socio-economic trade networks in small-scale fisheries, in line with specific recommendations of Chapter 7 of the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication. Secondary data supplemented by primary survey were used. The study emphasizes FCWC FishNET's activities in promoting quality smoked fish products, reducing post-harvest losses, and popularizing the FAO-Thiaroye processing technique to eliminate the health threats posed by the Chorkor kiln. Also discussed is the use of Fisheries Learning Exchanges to promote better fish handling, processing and packaging techniques as a means of adding value and diversifying trading channels for fish products. The study finds that FCWC FishNET has engendered greater trust among network members, allowing traders to conduct business with each other on a credit basis and improving the overall communication and business experience. Similarly, it has facilitated initiatives to reduce post-harvest losses by improving processing and trading facilities. Finally, the case study emphasizes the compelling role of trade networking in small-scale fisheries discourse while providing lessons to practitioners and policymakers in fisheries.

Keywords: Fish trade, market access, trade networking, small-scale fisheries, FCWC subregion.

4.1 INTRODUCTION

The Fishery Committee for the West Central Gulf of Guinea (FCWC)[1] subregion stretches from Liberia to Nigeria with a total coastline of 2 633 km^2 and an exclusive

[1] The FCWC is an intergovernmental fishery body that comprises six countries of the Gulf of Guinea: Benin, Côte d'Ivoire, Ghana, Liberia, Nigeria and Togo.

FIGURE 4.1
FCWC contracting parties and member states of the FCWC Fish Traders and Processors Committee

Source: FAO Fisheries and Aquaculture Department, 2020.
Credits: Created with mapchart.net ©

Map conforms to: Map No. 4170 Rev. 18.1 UNITED NATIONS, February 2020.

economic zone of 923 916 km² (Figure 4.1). In the majority of coastal communities in the subregion, fishery activities are mostly small-scale. Low-value pelagic species are harvested mainly using canoes. Fish products constitute an important food commodity, and are marketed and distributed widely across the FCWC subregion. The fishery sector employs over 3 million people both directly and indirectly in West Africa (WARFP, 2017); the annual catch is estimated at around USD 3.5 billion (Belhabib, Sumaila and Pauly, 2015), with 6.7 million people deriving their livelihood from the sector. The percentage of fish as part of the total animal protein intake and the average annual fish consumption in FCWC member countries range between 40–60 percent and 18–20 kg, respectively (FAO, 2016). The small-scale fishing activity is dominated by men, while processing, marketing and trading activities are mostly controlled by women. Despite the predominant role of small-scale fisheries in the FCWC subregion, the sector is currently experiencing overexploitation and a decline in fish stocks, exposing coastal communities to livelihood vulnerabilities.

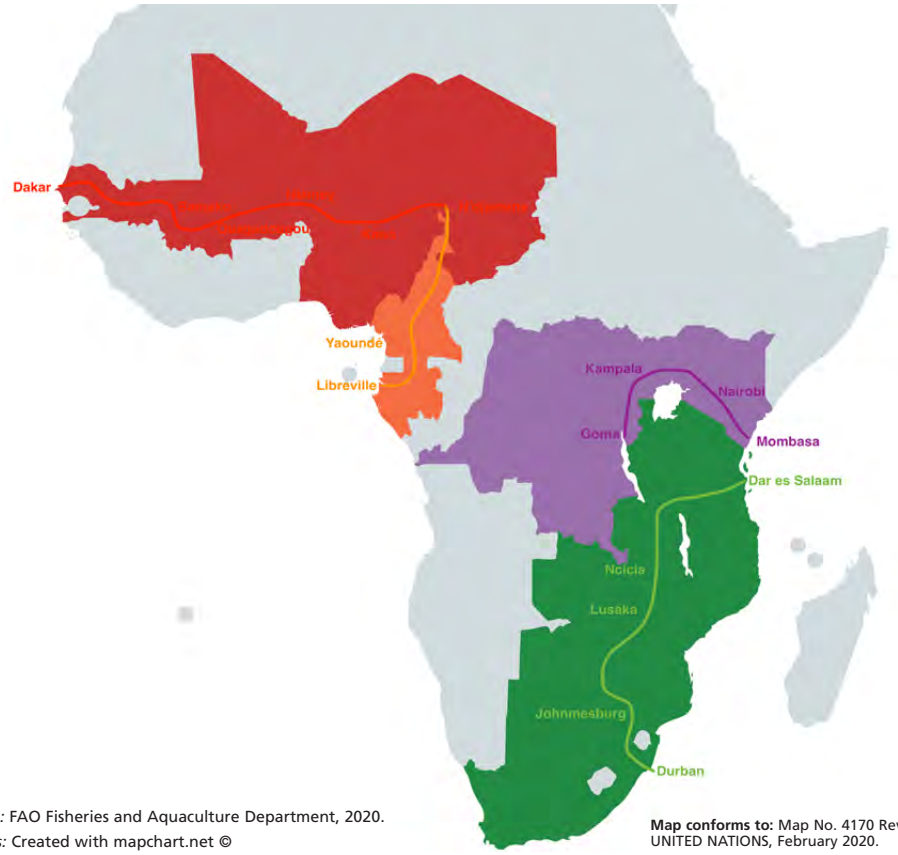
Trade routes for small-scale fisheries remain informal and intertwined within the FCWC subregion. There are currently two main types of fish marketing channels for small-scale fisheries: domestic and intraregional markets. The domestic markets cater to local demand and supply needs while the intraregional markets attract fish traders and processors from neighbouring countries. Fish products from Ghana are informally exported and imported to neighbouring Benin, Côte D'Ivoire, Nigeria and Togo. Estimates by Ayilu *et al.* (2016) for selected markets (Tuesday, Denu and Dambai) in Ghana revealed that about 6 000 tonnes of fish products worth USD 18.6 million are exported annually through informal routes to Togo and Benin. In addition, countries in the FCWC subregion import significant quantities of fish products from Senegal, again through informal routes. Formal small-scale fisheries trade,[2] on the other hand, is not predominant in the subregion; very few fish caught by small-scale fisheries are exported. Conversely, FCWC countries annually export significant tonnage of fishery products via formal channels to Europe, the United States of America, and Asia. These exports are mostly derived from industrial fisheries and include species such as frozen tuna, canned tuna (tuna flakes, tuna chunks and tuna mash), dried or smoked fish,

[2] Formal trade in this study refers to fish trading activities that are captured in official national statistics and are mostly taxable. Formal traders mainly use recognized border entry points and declare their products appropriately. Informal trade activities, on the other hand, are mostly not included in official statistics and are thus not subject to being taxed. Informal traders mainly use channels that are not recognized border entry points.

and other assorted demersal fish such as cuttlefish, crab and lobster, along with other small pelagics. In Ghana, for instance, a total of 57 000 tonnes (USD 210 million) was exported in 2013 (Failler, Beyens and Asiedu, 2014).

Boosting intraregional commodity trade has become important on the African regional integration agenda. Among other things, these efforts seek to address issues of poor product quality and to improve trade-related infrastructure on the continent. In this regard, the Africa Union (AU), Regional Economic Communities and the New Partnership for Africa's Development (NEPAD) have prioritized efforts to strengthen regional trade. Among the key commodities identified for investment and policy support are fish and fishery products. Therefore the Fish Trade Project (FTP) was created to support trade and market-driven initiatives in small-scale fisheries. The FTP was designed by the WorldFish Center, the AU Interafrican Bureau for Animal Resources (AU-IBAR) and NEPAD, and funded by the European Union. The project ran from 2014 to 2018, working in four different trade corridors in Africa: Western, Southern, Eastern and Central (Figure 4.2). The FTP's central aim was to improve nutrition and reduce poverty in sub-Saharan Africa by (i) gathering information on the structure, products and value of intraregional fish trade concerning food security in sub-Saharan Africa and making it available to stakeholders; (ii) coming up with a set of recommendations on policies, certification procedures, standards and regulations, and embedding them in national and regional fisheries, as well as agricultural, trade and food security policy frameworks; (iii) enhancing trade capacity among private sector associations, in particular that of women fish processors and traders and aquaculture producers, to make better use of expanding trade opportunities through competitive small and medium enterprises; and (iv) facilitating adoption and implementation of

FIGURE 4.2
Identified fish trade corridors in the Fish Trade Project in Africa (Western, Southern, Eastern and Central Africa)



Source: FAO Fisheries and Aquaculture Department, 2020.
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Map conforms to: Map No. 4170 Rev. 18.1 UNITED NATIONS, February 2020.

appropriate policies, certification procedures, standards and regulations in Africa by key stakeholders participating in intraregional trade. Importantly, the FTP aligned with broader international small-scale fishery policy objectives. First, at the global level, the FTP contributed to implementation of the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines) (FAO, 2015) through better integration of small-scale fisheries trade into national food security strategies and agendas. Second, at the continental level, it contributed to the AU Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa (PFRS), which seeks to promote responsible and equitable fish trade and marketing by significantly harnessing the benefits of Africa's fisheries and aquaculture endowments.

The challenges confronting domestic and cross-border trade in small-scale fisheries in the FCWC subregion are varied (UNCTAD, 2017; ICSF, 2002). These include inappropriate market infrastructure, poor quality and short shelf life of processed fish products, unfavourable and restrictive border regulations and standards, and lack of credit support due to the informal nature of small-scale fisheries (Ayilu *et al.*, 2016). Fish markets and trade systems do function, albeit under difficult circumstances; most markets are unhygienic, lack proper infrastructure, and offer little to no vending space or storage systems. Similarly, processing sites lack basic facilities like running water, electricity, ice, and storage or refrigeration facilities. Moreover, small-scale fishery workers have insufficient knowledge of proper fish handling, preservation, processing and packaging. At the policy level, lack of harmonious trade policies and regulations among countries results in complex cross-border trade processes, with harassment at check-points and product confiscations. Finally, formal funding is challenging to secure, as small-scale fisheries do not meet the required repayment conditions.

To tackle these challenges, the FTP established the FCWC Fish Traders and Processors Network (FCWC FishNET), a platform composed of small-scale traders and processors. Its objective is to a) help inform policy gaps and design market-driven incentives, and b) leverage the collective power of its members to facilitate regional trade. This case study offers insights on the role socio-economic and trade networking can play in advancing value chain initiatives in small-scale fisheries.

FCWC FishNET activities align closely with the provisions made in Chapter 7 of the SSF Guidelines, in particular paragraphs 7.3, 7.6 and 7.10. In relation to 7.3, this study highlights the activities of FCWC FishNET in promoting quality smoked fish products, reducing post-harvest losses, and reducing the health threats posed to fish processors by advocating for the FAO-Thiaroye processing technique (FTT) over the Chorkor kiln. These align with paragraph 7.3 of the SSF Guidelines to support the small-scale fisheries post-harvest subsector in producing good quality, safe fish and fishery products, for both export and domestic markets. The study also discusses the use of Fisheries Learning Exchanges (FLEs) in promoting better fish handling, processing and packaging techniques as a means of adding value and diversifying trading channels for fish products. In addition to FLEs, its presence as a community platform has helped FCWC FishNET generate trust, allowing traders to conduct cross-border business with each other on a credit basis, thus improving the communication and business experience. This echoes recommendation 7.10, which advocates for enabling small-scale fisheries to adjust to changing conditions and trends in global and local markets. Finally, in relation to paragraph 7.6, FCWC FishNET supports regional efforts to harmonize and facilitate easier cross-border trade, making markets more accessible.

The remainder of the study is organized as follows. We first present the methods, highlighting the data gathering processes. Next we present the results, with discussion and analysis. This entails an overview of FCWC FishNET, followed by the initiatives embarked upon to enhance trade in small-scale fisheries. Finally, we wrap up the study with a conclusion highlighting good practices revealed during the case study.

4.2 METHODS

The case study drew information and data mainly from secondary sources, supplemented by a primary survey in the course of the study.

4.2.1 Secondary data review

The preliminary stages involved a review of FTP activities conducted in the FCWC subregion (Chimatiro, 2018; Abbey *et al.*, 2018; FCWC, 2018; Ayilu *et al.*, 2016; Chimatiro, Banda and Tall, 2015). These reports provided a pool of information and data on the FTP and insights on FCWC FishNET. The secondary review approach allowed for synthesizing the different reports while still guaranteeing a broader understanding of the central focus of the study.

4.2.2 Primary data collection

Semi-structured questionnaires were presented to 20 processors and traders who deal in small-scale fisheries; these were selected from the Tuesday Market, a major cross-border fish market in Ghana. A focus group discussion with the Manhean Fish Processors and Traders hub (located in the city of Tema) comprising eight attendees was also conducted. Two consultants from the FTP implementation team in the region and the FCWC secretariat were selected specifically for interviews. This approach aided in illustrating the achievements and challenges of FCWC FishNET and the overarching lessons learned. The multiple interviews with different stakeholders broadened the understanding of the policy and institutional processes and the linkage to FCWC FishNET activities.

4.3 RESULTS AND DISCUSSION

4.3.1 Overview of FCWC FishNET

FCWC FishNET was formed as part of the FTP with the goal of enhancing economic opportunities through trade and market-centred initiatives. It aims to create a unified platform for small-scale fisheries, with members primarily comprised of traders and processors at the national and regional level. It was developed through cooperation between the FCWC and representatives from fish traders and processors associations. FCWC FishNET feeds into the African Union's efforts to mobilize various non-state fisheries actors to support the implementation of the SSF Guidelines and the PFRS. It aligns with the PFRS strategic small-scale fisheries objective to "improve and strengthen the contribution of small-scale fisheries to poverty alleviation, food and nutrition security and socio-economic benefits of fishing communities" (NEPAD, 2014, p. 17).

4.3.2 Promoting the FAO-Thiaroye processing technique[3]

In the small-scale fishing communities of West Africa, Chorkor smoking kilns are popular among processors. However, these kilns produce a harmful concentration of polycyclic aromatic hydrocarbons (PAH), some of which are carcinogenic and can lead to pulmonary, integumentary and ocular health complications (Stolyhwo and Sikorski, 2005). PAH are deposited as a residue on fish during smoking, thus lowering the quality of the fish and subsequently its value to European markets. Using this method to process fish takes an average of 12 hours a day. It is often one of the only forms of employment available to coastal women, and – due to the health risks – frequently forces processors into early retirement. A further disadvantage associated with Chorkor kilns is the inefficient combustion rate, leading to unsustainable levels of deforestation.

[3] For an in-depth examination of the FAO-Thiaroye processing technique, please refer to the case study, "An Overview of the FAO-Thiaroye Processing Technique within the Context of Value Chains, Post-Harvest and Trade", found in this Technical Paper.

The precarious situation faced by traders and processors relying on Chorkor kilns has led FCWC FishNET to support the development and adoption of the FAO-Thiaroye processing technique (FTT) in the FCWC subregion. The FTT kiln is an improved fish smoking technology pioneered by the Food and Agriculture Organization of the United Nations (FAO) over the past decade. Initially intended for medium-size enterprises, since 2014 it has also been promoted for small-scale processors. The advantages of the FTT kiln include more efficient combustion, leading to a reduction in deforestation; improved working conditions for the processors, meaning reduced health risks and time spent operating the kilns; and an improved product with an improved taste (Table 4.1).

TABLE 4.1
Comparative analysis of different fish smoking systems

	Type of system	
TECHNICAL CRITERIA	**Chorkor**	**FTT**
Smoking time	1 day	3–6 hours
Fire and smoke control	Limited	Very high
Smoking technique	Separate smoking and drying	Separate smoking and drying
Fish fat collection device	None	Included
Smoke filtering device	None	Included
ECONOMIC CRITERIA		
Cost of kiln (USD)	345	1 600
Smoking capacity (kg of fish per day)	200–300	3 000
Amount of wood used (kg) per 1 kg of fish	> 0.8	0.8
Lifespan	3–15 years	> 15 years
Earnings	Average	High
Ancillary jobs	Medium	Very high
SOCIAL CRITERIA		
Exposure to heat/smoke	Frequent	Very low
Safety and quality of smoked fish	Lesser quality	Safer and higher quality

Source: Mindjimba, 2019.

After first piloting the FTT in Abidjan, Côte D'Ivoire, FAO began working with FCWC FishNET and other socio-economic networks to popularize the kiln throughout the FCWC subregion. FAO has supported the introduction of the FTT kiln, which costs between USD 800 and USD 1 600. The high cost of the FTT kiln is a major concern for traders and processors (Mindjimba, 2019). Moreover, some consumers still indicate a preference for fish smoked by the Chorkor kiln, in spite of the health risks associated with it. Forecasts project that this market force will change as demand for FTT-smoked fish increases among Africa's burgeoning middle classes.

In order to catalyse this process, FCWC FishNET is using its leverage as a platform to encourage small-scale fishing communities to adopt the FTT as their preferred smoking method. The advocacy channels for popularizing FTT include training of "change agents", peer-to-peer learning, and practical field demonstrations. The role of a change agent is to encourage people to recognize and take an interest in solving local problems, and to guide them if necessary, so that ultimately a sustainable plan of action is achieved (FAO, 2011). In the context of the FTT kiln, change agents train selected fish traders and processors who act as ambassadors for the new technique. These ambassadors, in turn, train other traders and processors in small-scale fishing communities. These training sessions compare the Chorkor kiln with the FTT kiln on issues of fuel efficiency, health, and opportunities in domestic and export

markets. To date, at least 45 individuals in Ghana have benefited from this training, including youth from coastal communities. The peer-to-peer learning and practical field demonstrations are an effective strategy for FTT dissemination. For instance, with support from the FCWC, five traders and processors from Liberia were trained in Ghana on the construction, usage and maintenance of the FTT kiln. This learning trajectory is improving the quality of smoked fish products, and is expected to support efforts to harmonize fish smoking standards, improve trade and add value to the smoked fish value chain.

There are already indications that the FTT is establishing itself within the market. Due to the improved quality it offers, smoked fish products are being marketed in major supermarkets and commercial outlets in Abidjan and Accra. Overall, there is no doubt that the advocacy and popularization orchestrated by FCWC FishNET has and will continue to reduce post-harvest losses and create additional value through good quality smoked fish products for both export and domestic markets.

4.3.3 Enhancing Fisheries Learning Exchanges in small-scale fisheries in the FCWC subregion

FAO (2019) estimates that the annual discards from global marine capture fisheries between 2010 and 2014 were 9.1 million tonnes. These discards are often a result of poor post-harvest storage, handling and processing practices. These practices can be improved with the help of Fisheries Learning Exchanges (FLEs), which bring together representatives from different communities to share knowledge and expertise in fisheries management, encompassing subjects like handling techniques (Rocliffe, 2018).

FLEs help enhance the capacity of fish traders and processors by sharing good practices within the FCWC. To date, FCWC FishNET members have been involved in the organization of FLEs on smoking techniques, hygiene, and processing, packaging and trading techniques. These FLEs have included field visits, on-site demonstrations, one-to-one dialogue and workshops.

Particular instances include an FLE on improved fish handling, processing and packaging at the King Mohammed IV Fish Landing and Processing Centre in Abidjan for FCWC traders and processors. Another FLE, hosted at the Felix Houphouet-Boigny University, focused on different forms of packaging available to small-scale fisheries. The key topic was the contamination associated with plastic and cement papers, especially when compared to traditional and green packaging such as *atieke*[4] leaves and weaved baskets. As an extension of the Felix Houphouet-Boigny University FLE, FCWC FishNET organized further discussions orientated around new and emerging value chains in West Africa and how small and medium enterprises can access them. The discussions included value chains supplying the growing hospitality industry and the expatriate community in West Africa.

FLEs are proving to be a highly effective channel through which to communicate relevant market and trade information and share good post-harvest practices relating to processing, hygiene and packaging, thus fulfilling the criteria outlined under paragraph 7.10 of the SSF Guidelines.

4.3.4 Promoting informal trade linkages and partnerships

Access to credit and cost of transportation constitute major constraints for small-scale fisheries in the region. Access to credit in particular is more limiting and bureaucratic for small-scale fishery traders and processors. Consequently, they either avoid completely or are refused access to formal credit options. Reasons for this include the inability of traders and processors to offer collateral, inappropriate and poor bookkeeping practices, and/or they are unable to navigate the complexities and bureaucratic

[4] The Atieke plant is found in West Africa.

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Woman fish trader at the Tuesday Market in Accra selling processed fish to a customer.

procedures associated with assessing formal credit. Previous negative experiences with Ponzi[5] schemes have further discouraged fish traders and processors from dealing with financial institutions. More importantly, banks and credit institutions consider fish trading and processing as an informal activity, which is associated with high loan default. Therefore the interest rates offered to small-scale fisheries are higher than those offered to formal sectors, thus constricting their financial flexibility. Adding to this, the cost of transporting fish consignments has greatly hindered both domestic and cross-border trade activities in small-scale fisheries. According to Ayilu *et al.* (2016), the cost of transportation constitutes about a third of the total marketing costs for fish traders and processors in the FCWC.

Financial institutions have started exploring the option of providing small loans to traders through trade associations and networks, although this innovation is still nascent. A microfinance institution in Ghana is currently piloting this option using a small network of fish traders and processors in Tema. Village Savings and Loans Association mechanisms are also being piloted as a channel to support fish processors and traders. These associations bring together traders and processors to pool their savings for mutually agreed objectives, like expanding their businesses. In FCWC countries, non-contractual relations are an important feature of informal economic transactions. As a result, informal economic transactions and trade partnerships are dependent on social trust and historical knowledge. The prevailing social trust in the FCWC subregion owes its existence to the trade networks FCWC FishNET has fostered through national and subregional fora, trade activations and exhibitions. This trust allows fish merchants and retailers to deal with one another without immediate cash payments, usually on a credit basis. Retailers at various fish markets are able to obtain fish from merchants and wholesalers on credit and repay at a later date to qualify for new consignment and supply. Social trust guarantees that traders and processors with minimal capital can gradually expand their trading activities once they establish good relationships with their creditors. Because community relationships, kinship and trust are an integral part of trade in small-scale fisheries, these partnerships are very resilient. For instance, Ghanaian fish processors supply fish products on credit to their Togolese counterparts as a result of the history between them.

With regards to transport, fish traders and processors are leveraging their trade networks to reduce costs. For instance, using their established networks, Togolese fish importers in Ghana have obtained bulk cargo trucks for their fish consignments. Bulk transport has several advantages: it allows the importers to negotiate reduced transport rates, and it helps ensure consignments arrive with less damage and fewer defects. In addition, border inspection post formalities are simplified by bulk inspections of the fish consignments, thus expediting the timely and safe delivery of fish products. Moreover, traders note these partnerships allow them to rely on agents to order specific fish consignments from wholesalers and merchants, eliminating the need for the traders to travel themselves. All these strategies minimize transportation costs and promote trade

[5] A Ponzi scheme is a fraudulent financial scheme which presents itself as a credible financial institution at the initial stages of operation and later defrauds customers of their investments.

in small-scale fisheries. Consequently, fish traders are able to increase the volume of fish imported, thus ensuring an abundant fish supply for rural communities at cheaper prices, while also playing a crucial role in improving income and livelihood security and facilitating fish trade in domestic and regional markets.

The development of these trade partnerships and linkages through networking has proven robust in the face of credit and transport constraints. These actions contribute towards improving access to markets and facilitating cross-border trade, as recommended in paragraph 7.6 of the SSF Guidelines.

4.3.5 Facilitating marketing, information sharing and communication

The growth in urban markets and consumption of fish has provided an incentive for fish trade in West Africa. However, information bottlenecks remain a barrier to the smooth operations of small-scale fish enterprises and other food commodities such as grains, tubers and livestock. Access to technology and information enable fish traders to respond appropriately to price, demand and supply dynamics as well as other market conditions (Ayilu *et al.*, 2016). To some extent, trade networking has facilitated the flow of price and market information among small-scale fisheries in the region, in particular through improved business-to-business and business-to-customer interactions in fish markets. So-called "market queens" (group leaders) from various markets share information on price changes and on demand and supply volatilities via WhatsApp, SMS and Direct calling. Fish traders and processors then use this information to avoid "empty trips" – i.e. undertaking a market trip only to be met with product shortages. The price change information also allows fish traders and processors to communicate any catch volatility to sponsored fishers onshore so they can prepare the necessary logistics to avoid losses. Furthermore, the market queens achieve a certain "cooperative power", allowing them to influence prices as well as manage supply volumes in the fish market. FCWC FishNET members are also working with the Intergovernmental Organization for Marketing Information and Cooperation Services for Fishery Products in Africa (Infopeche)[6] to test whether monitoring prices through an online platform could improve their trade activities. In this regard, market queens in selected markets have been trained in reporting weekly fish price information.

Facilitating the flow of price and market information can have effects on cross-border trade as well. Indeed, it is observed that fish traders involved in trade networking activities are more likely to participate in cross-border fish trade, due to the first-hand information on cross-border market dynamics offered by their colleagues, especially concerning price fluctuations and exchange rate volatilities.

The abovementioned activities align with recommendation 7.10 of the SSF Guidelines, whereby small-scale fisheries should be able to access timely and accurate market information to help them adjust to changing market conditions.

4.3.6 Improving trade and processing infrastructure

According to Ayilu *et al.* (2016, p. 13), "Many West African countries have adopted the WTO agreement on the Application of Sanitary and Phytosanitary Measures, which sets out the basic rules for food safety, animal and plant health standards". As it concerns fish and fishery products, this requires infrastructure improvements on board vessels, at landing and processing sites, and in trading establishments, as many fish traders and processors are currently unable to meet these standards. Major challenges include poor hygienic conditions at processing centres and inappropriate handling and packaging of fish. Post-harvest fish handling and packaging systems are necessary to ensure fish quality and guarantee a longer storage period for fish products.

[6] Infopeche is a 15-country intergovernmental organization whose mandate includes providing marketing information and cooperation services for fishery products in Africa.

To address these limitations, FCWC FishNET has refurbished a cross-border fish trading and processing centre (the Manhean Fish Processors and Traders hub) in Tema (Ghana), working through the FTP and with support from WorldFish. The processing hub attracts fish traders and processors from neighbouring countries, and distributes a substantial quantity of processed small-scale fisheries products to fish markets in Benin, Burkina Faso, Côte d'Ivoire, Ghana and Togo. The FCWC FishNET refurbishment included the addition of a water supply system and washroom facilities. Traders and processors report that the upgraded facility can now guarantee clean and safe processed fish products for trade. The improvements also make it easier for them to work longer and more efficiently during bumper harvests. During these bumper periods, extra working hours are required to process higher volumes of fish from various landing sites along the coast. The new amenities offered at the centre spare traders and processors the need for commuting to alternative locations to bathe, use toilet facilities, and change working apparel and baby nappies. Anecdotally, the traders further argue that the high volumes of post-harvest losses usually associated with bumper harvests have been significantly reduced at the processing facility. This has increased the volume of processed fish available for both the domestic and regional markets.

It is important to emphasize that enhancing the activities of fish traders and processors through improved market-related infrastructure in fishing communities supports the small-scale fisheries post-harvest subsector in producing good quality, safe fish and fishery products, for both export and domestic markets, in a responsible and sustainable manner. These initiatives tie directly into recommendation 7.3 of the SSF Guidelines by contributing towards improving income and food security through reduction in post-harvest losses and waste and improvements in fish quality and nutrition.

4.3.7 Strengthening research and dialogue in small-scale fisheries

Policymakers at different levels of fisheries governance require succinct research evidence and data to properly manage post-harvest fisheries and make informed decisions concerning trading, processing and marketing of fishery products. However, research in small-scale fisheries in West Africa is inadequate due to lack of data. Official data do not exist, and collecting primary data remains daunting due to a lack of cooperation from small-scale fisheries actors, who are mostly informal. Fish traders and processors are reluctant to divulge information on their trade because they view researchers as a means of government tax collection. A solution was found to have FTP researchers use the FCWC FishNET trade networks to collect comprehensive data on different dimensions of small-scale fisheries from member countries. This underscores the importance of FCWC FishNET as a channel for determining relevant qualitative and quantitative data; indeed, FCWC FishNET members were the primary actors validating the FTP research findings and outcomes.

These research findings and evidence formed the basis for the policy dialogue of the Ninth Conference of Fisheries Ministers of the FCWC secretariat. As a result of this dialogue, the FCWC secretariat then declared 2018 the year for promoting trade in small-scale fisheries at local, national and regional markets. In recognition of the important role of trade in small-scale fisheries as well as the challenges and constraints involved, the Conference further recommended policies to assist and facilitate fish trade among FCWC member countries. This policy direction constituted a major shift in small-scale fisheries governance and strategy. Moreover, the concept of one-stop border posts also began to be explored in the FCWC jurisdiction to simplify cross-border trade. As part of these efforts, a fish trade caravan was led by WorldFish from Dakar, Senegal to Bamako, Mali, with selected traders interacting with small-scale fisheries actors to ascertain firsthand the constraints to cross-border trade.

4.4 CONCLUSIONS AND GOOD PRACTICES

This study has offered insights on the role of trade networking in enhancing trade in small-scale fisheries, showcasing the activities conducted by FCWC FishNET as a prime example. The study explored trade and market-centred activities which are connected to specific recommendations of Chapter 7 of the SSF Guidelines. This includes popularizing the FTT kiln within small-scale fishing communities, developing Fisheries Learning Exchanges, and stimulating trade partnerships and supporting simplified cross-border trade measures.

Governments and stakeholders in developing countries need to recognize the economic, social and cultural importance of fish processing and trading to small-scale fisheries. Bearing this in mind, we highlight below several good practices from this case study for governments and development partners to pursue.

1. Knowledge sharing has facilitated the adoption of new innovations in small-scale fisheries such as the FTT kiln. Continuous promotion of the FTT along with infrastructure upgrades (e.g. basic sanitary and water supply systems) at processing and trading centres would significantly contribute to trade in small-scale fisheries through reduction in post-harvest losses and waste and through improved fish safety and quality. To effectively deploy the FTT innovation in the FCWC subregion, construction subsidies to assist small-scale fisheries are highly recommended. Dwindling marine fisheries stocks coupled with post-harvest losses are threatening available fish for human consumption. This phenomena raises food security and livelihood vulnerability concerns for small-scale fisheries. Therefore, it is recommended that government and non-government players provide the necessary technical and financial support to effectively promote FTT usage and enable investments in appropriate infrastructure upgrades for small-scale fisheries. These initiatives tie into paragraph 7.3 of the SSF Guidelines which supports measures to improve good quality, safe fish and fishery products, for both export and domestic markets. Also, government change agents should educate fish processors and traders on proper fish processing and handling techniques to ensure their products maintain good quality when they reach their markets.
2. FLEs foster cooperation and trust and provide a common platform for trade partnerships and linkages in small-scale fisheries value chains. FLE activities are effective for exchanging relevant knowledge on market-driven innovations such as new processing, handling and packaging techniques. However, the activities of small-scale fisheries processors and traders are constrained by access to capital for expanding their businesses. Formal credit channels are cumbersome, and not tailored to their requirements. Thus trade networking is vital for facilitating effective and stronger trade partnerships. Through trade networking platforms, traders and processors are able to leverage their kinship networks to make informal credit arrangements based on mutual "social" trust. Advocacy for FLEs and stronger trade networks and partnership initiatives will enable access to all relevant market and trade information for the small-scale fisheries value chain, allowing traders and processors to benefit from fisheries market opportunities while minimizing potential livelihood impacts.
3. FCWC FishNET has played a critical role in gathering data, despite the lack of trust, on the part of small-scale fisheries communities and actors, displayed towards researchers. Fisheries trade networking groups like FCWC FishNET form an important node for gathering relevant, quality data and information on small-scale fishworkers value chains. This approach encourages active participation of small-scale fishworkers in data collection, in identifying gaps and in policy dialogue. Integration of fisheries trading networks into data collection and validation processes facilitates robust research outcomes. This is particularly

important in developing country contexts where small-scale fisheries are mostly informal and diverse. The FCWC FishNET experience shows the importance of enhanced cross-sectoral relations and improved communication between fishers, researchers and policymakers. Therefore, states and development partners should recognize the importance of trade networks and cooperatives and promote their organizational and capacity development in all stages of the value chain.

In conclusion, small-scale fisheries governance requires holistic and integrated consideration of the post-harvest value chain to identify the diverse challenges and requirements involved. To some extent, promoting the concept of trade networking and cooperatives is an innovative and effective way of ensuring inclusiveness in small-scale fisheries in developing countries. Although local-, national- and subregional-level trade networking or cooperatives constitute an economic burden and require a considerable length of time to evolve and thrive, the concept remains essential in enabling access to relevant marketing and trading information on small-scale fisheries. It is therefore recommended that national and subregional fisheries bodies with a mandate for fisheries development and cooperation spearhead the formation of small-scale fisheries trade networks and cooperatives to guarantee their success and sustainability.

ACKNOWLEDGEMENTS

We acknowledge the WorldFish Centre, AU-IBAR and the FCWC for their contribution towards improving small-scale fisheries in West Africa. Many thanks to the women fish processors and traders at the Tema Manhean Fish Processors and Traders Association and Tuesday Market in Accra for their numerous assistance during the survey. Lastly, we are grateful to the FAO for providing the funding for this study.

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Seafood
Direct from Producers
to
Consumers

5. Seafood direct marketing: Supporting critical decision-making in Alaska and California

Caroline Pomeroy
California Sea Grant, Scripps Institution of Oceanography, University of California, San Diego Institute of Marine Sciences, University of California, Santa Cruz

Sunny Rice
Alaska Sea Grant Marine Advisory Program
College of Fisheries and Ocean Sciences, University of Alaska Fairbanks

Carolynn Culver
California Sea Grant, Scripps Institution of Oceanography, University of California, San Diego
Marine Science Institute, University of California, Santa Barbara

Victoria Baker
Alaska Sea Grant Marine Advisory Program
College of Fisheries and Ocean Sciences, University of Alaska Fairbanks

ABSTRACT

Seafood direct marketing (SDM) allows fishermen to sell their catch directly to consumers or via fewer intermediaries than in the dominant supply chain. In the United States of America, fishermen are drawn to SDM arrangements as a means of adapting to regulatory, operational, environmental, social and economic challenges. However, SDM is not always feasible or suitable for individuals, fisheries or communities. Recognizing this, university-trained advisors affiliated with Sea Grant Extension Programs (SGEPs) have developed a good practice for assisting small-scale fishermen and communities in evaluating and utilizing SDM in their particular context. Guided by the SGEP model, the practice uses a science-based approach grounded in principles of non-advocacy, trust, collaboration and effective communication. This case study describes the development and application of the good practice by SGEPs advisors in the American states of Alaska and California to help fishermen and others make well-informed decisions about SDM. To implement use of this practice they recommend: recognizing and working with fishing community members as experts and co-educators (partners); collaborating to identify and address needs by sharing and building information; refraining from advocacy; recognizing that SDM is not an "all or nothing" strategy; developing contextually grounded outreach materials; and using multiple information delivery methods and dissemination channels. Use of the good practice consistent with these recommendations can contribute to further implementation of the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication.

Keywords: Seafood marketing, California fisheries, Alaska fisheries, seafood production, collaborative research, non-advocacy, extension, Sea Grant, fishing communities, outreach.

5.1 INTRODUCTION

Seafood direct marketing (SDM) is defined as "selling a [seafood] product to a user at a point on the distribution chain [beyond] the primary processor" (Johnson, 2007). Also referred to as "seafood alternative marketing" to more accurately reflect the range of options, it involves fishermen[1] selling their catch to the final consumer or working via fewer intermediaries than in the dominant supply chain. Culver et al. (2015) have highlighted eight types of SDM arrangements, which vary in terms of the business skills, time and resources required, types of products that can readily be sold, and other factors (Appendix 1, Figure 5.1). SDM arrangements can provide outlets for lower-volume, higher-value (price-per-pound) fisheries, reducing vulnerability to the variability and uncertainty of pricing that often characterize long supply chains, especially those tied to global markets. SDM can also enhance connections between fishermen and consumers, providing fishermen with social, economic and political support to sustain their activities, and communities and consumers with more direct access to nutritious, local food products.

SDM is not new to West Coast fisheries of the United States of America. Off-the-boat sales, local farmers'/fishermen' markets, and direct sales to restaurants have long been used by a small proportion of fishermen to sell their catch. However, as fishermen have faced challenges maintaining economically and socially viable businesses, interest in SDM as an option for claiming more of the total value of their catch, and in some cases for improving their connection with consumers and communities, has grown.

For more than 25 years, Sea Grant Extension Programs (SGEPs) (Box 5.1) in the United States of America have assisted small-scale seafood producers and fishing communities in the identification, evaluation and utilization of alternative marketing strategies appropriate for their particular context.[2] The SGEP model is a strategy that builds understanding of local needs and facilitates collaborative exploration of options for addressing those needs through research, education and outreach. It also builds partnerships to achieve shared goals. Community members may request assistance or SGEP advisors may identify needs through conversations with them. SGEP advisors often provide assistance to fishermen and others at no charge, but may pursue

BOX 5.1

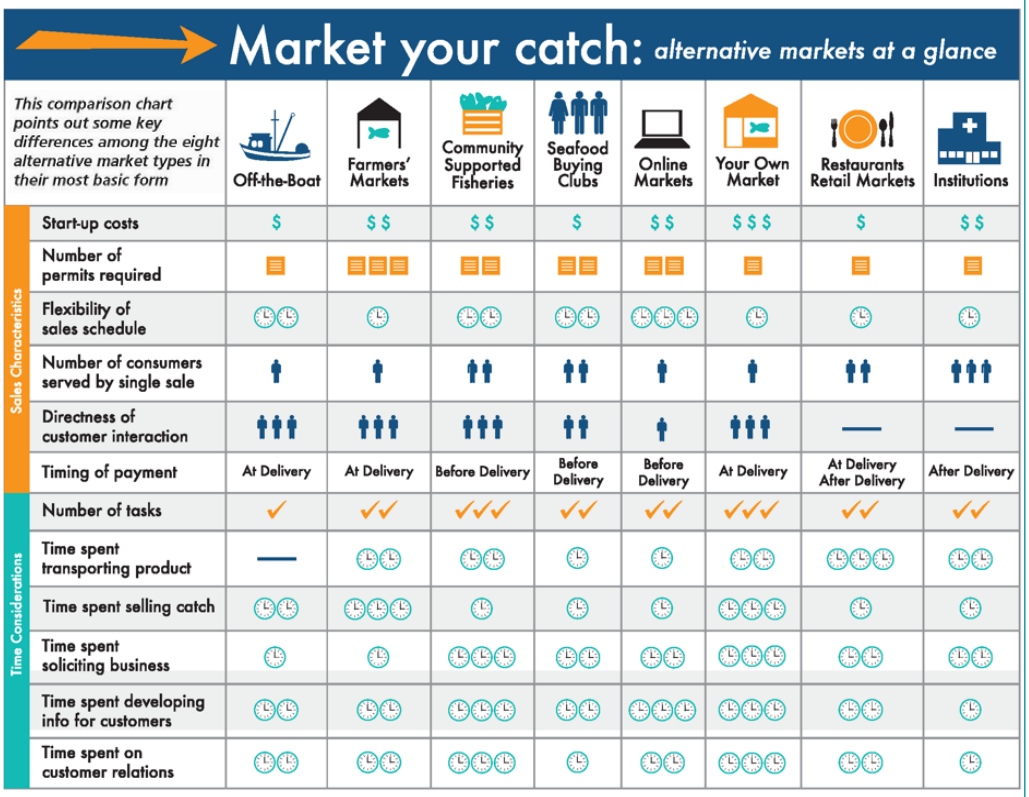
National Sea Grant College Program

The National Sea Grant College Program (NSGCP) is a non-regulatory federal programme within the National Oceanic and Atmospheric Administration (NOAA) of the Department of Commerce of the United States of America. It is a network of 34 programmes based at colleges and universities in American coastal states and territories. Each Sea Grant programme features an extension programme with local advisors (also known as agents or specialists). These advisors are typically university-trained, with expertise in specific areas such as biological or social science, economics or marketing. The advisors engage in applied research, education and outreach projects to further NSGCP's mission of enhancing the practical use and conservation of coastal and marine resources to support a sustainable economy and environment. Their work entails collaboration with communities to help identify and address information needs. The SGEPs are partially funded by the federal government, with matching support provided by state government and non-governmental entities.

[1] We use the term 'fisherman(men)' as it is accepted and typically preferred by men and women who fish off the United States West Coast.

[2] For more information on the SDM and other activities of the individual SGEPs: https://seagrant.noaa.gov/extension.

FIGURE 5.1
Alternative markets at a glance



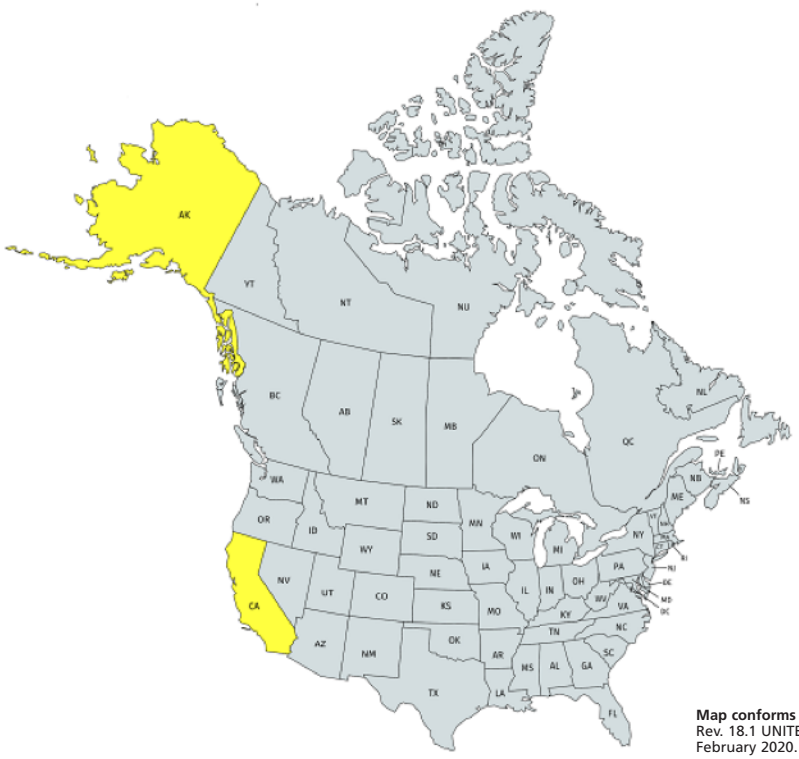
Source: Culver *et al.*, 2015.

additional funding (e.g. grants) to cover costs and/or provide stipends to collaborators (including fishermen).

Key tenets of the SGEP model are non-advocacy, trust, effective communication and a science-based approach (Dewees, Sortais and Leet, 2004). Consistent with the principles of the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines), the SGEP model promotes the inclusion of diverse individuals and groups, meaningful and respectful participation, and consideration of environmental, social and economic viability. Several SGEPs have used this model to provide SDM assistance to fishermen (i.e. the SDM good practice), encouraging and facilitating careful consideration of business options based on the unique circumstances of the fishermen, their community and consumers.

This case study describes the application of the SGEP model for providing SDM assistance in the American states of Alaska and California. Following a brief overview of the two states' commercial fisheries (Figure 5.2), we describe how the model was used to address challenges faced by fishermen and fishing communities in each context as a good practice. Next, we highlight the outcomes and impacts and future steps for building on accomplishments to date. We then discuss implications for small-scale fishermen, communities and policies in the United States of America and elsewhere. We conclude with recommendations for applying this good practice in other contexts, consistent with Chapter 7 of the SSF Guidelines.

FIGURE 5.2
Map of the North American West Coast highlighting the American states of Alaska (AK) and California (CA), where the SGEP model has been applied for seafood direct marketing



Map conforms to: Map No. 4170 Rev. 18.1 UNITED NATIONS, February 2020.

Source: **FAO Fisheries and Aquaculture Department, 2020.**

Credits: Created with mapchart.net ©

5.1.1 Background

Fishermen have been drawn to SDM as an alternative or complement to long seafood supply chain arrangements in an effort to adapt to various challenges. In the 1990s and early 2000s, complex shifts in American regulatory systems, global markets, and socio-economic and environmental conditions led to fundamental changes in American fisheries, posing challenges and opportunities for fishing communities. In some cases, increased competition from farmed products and wild-caught seafood from other countries led to stagnant or declining ex-vessel prices, while operating costs continued to increase (Sumaila *et al.*, 2007; Pomeroy, Thomson and Stevens, 2010; Henry, Rhodes and Eades, 2008). In other cases, in an effort to ensure resource sustainability, state and federal fisheries management authorities implemented measures to limit or reduce fishery access, capacity and effort. This resulted in reduced domestic production of many species and increased reliance on imported seafood, creating marketing challenges for fishery participants (Ahmed and Anderson, 1994).

Alaska and California support a great diversity of commercial fisheries. Species commonly caught in the two states include salmon, herring, groundfish, halibut, shrimp and crab, with fishermen in Alaska also targeting cod, scallops and clams, and fishermen in California targeting lobster, squid and albacore. Gear types are similarly diverse: pot/trap, dive, drift and set gillnet, purse seine, trawl, longline, troll, jig and (specific to Alaska) dredge. Each state has a range of commercial fishing operations. The smallest include one-person hook-and-line operations such as 18-foot (5.5 m) salmon hand trollers in Alaska and 12-foot (4 m) skiffs in California.[3] Larger fishing

[3] For descriptions of the gear types described, https://caseagrant.ucsd.edu/project/discover-california-commercial-fisheries.

operations include groundfish trawlers, longliners and coastal pelagic species seiners (most under 80 feet [25 m], with three to six crew members); Alaska also has large, corporate-owned pollock factory trawlers (e.g. 340 feet [104 m], with up to 140 crew members).

Commercial fisheries are important to both states. Commercial fishing and seafood processing are a major part of Alaska's economy and cultural heritage. Together they represent the largest source of non-government employment in the state, providing 70 000 seasonal and year-round jobs (Alaska Sea Grant College Program, 2018). In California, commercial fishing and seafood production have long contributed to the state's – and many coastal communities' – economy and cultural heritage (Pomeroy, Thomson, and Stevens, 2010). However, the two states' fishing communities and processing operations differ in various ways. For example, less than 10 percent of Alaska's 240 coastal communities along 40 000 miles of shoreline are connected by road; most are accessible only by boat or airplane (Alaska Sea Grant College Program, 2018). By contrast, California's coastal fishing communities, while varying in population and distance from major transportation and population centres, have access to secondary roads, if not highways. The two states also differ in terms of the nature and provision of shoreside infrastructure, goods and services. For example, while ice is publicly available at most harbours in California, in Alaska it is generally only provided by seafood processors. Further, while seafood landed in remote communities in Alaska typically requires processing before being transported to out-of-state markets, many fisheries in California, with nearby infrastructure and buyers, support local seafood markets.

Some women also fish, although more commonly they are involved in shoreside support: provisioning fishing operations, bookkeeping, participating in business and fishery management processes and, especially in the case of SDM, handling the catch "from dock to dish." Many small-scale fishermen come from families with a multigenerational history of working in fisheries and seafood production. Many, especially in Alaska and northern California, live and work in coastal communities that are substantially engaged in and dependent on fisheries (Norman *et al.*, 2007; Pomeroy, Thomson and Stevens, 2010). In other cases, primarily in central and southern California, small-scale fishermen are located in larger, more diversified urban communities such as San Francisco and Los Angeles. Here they play a smaller role relative to the urban whole, but remain important to the fisheries system and the particular places where they live and work.

5.2 METHODS

This case study presents a review and synthesis of the SDM research, education and outreach efforts of the Alaska and California SGEPs since the mid-1990s. Sources of information include grey and peer-reviewed literature; materials developed by the two SGEPs; periodic impact and outcome reporting; observation; and interviews and other communications with fishermen, those in the larger seafood value chain, port managers, agency personnel, and Sea Grant extension colleagues throughout the United States of America.

The definition of small-scale fisheries varies depending on the context (FAO, 2015). For this case study, we define small-scale fisheries as those involving primarily owner-operated, relatively small vessels (under 58 feet [18 m] in Alaska, under 35 feet [11 m] in California), run solely by a captain or by a captain and a small crew (4 or fewer crew members in Alaska, 2 or fewer in California), with social and economic ties to particular coastal communities. While most fishermen in both states sell their catch to traditional "first receivers" and long supply chain buyers, others sell some or all of their catch directly to restaurants, retailers and/or consumers. Depending on the species, customer needs and preferences, and logistics, the resulting seafood products may be sold live, fresh, frozen or in various processed forms.

5.3 RESULTS AND DISCUSSION

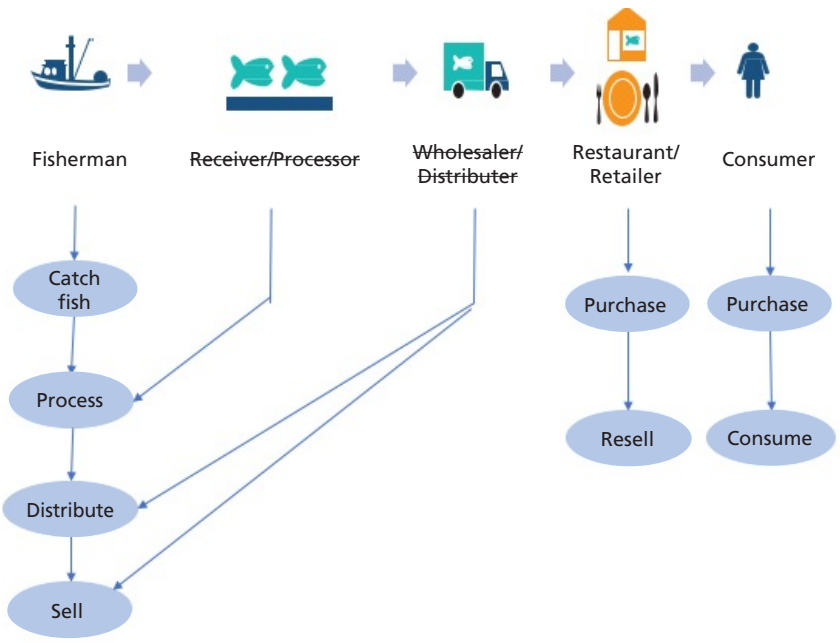
SGEP advisors provide fishermen and communities with practical information about SDM options and associated opportunities, challenges and other key considerations. If fishermen decide to pursue SDM, the advisors also provide them with regulatory, logistic and marketing guidance. SGEP advisors use a variety of dissemination methods: one-on-one consultations, informal conversations, workshops, public presentations, feasibility studies, print and online publications, and dedicated websites. Finally, they refine and adapt these efforts and materials in an iterative process based on feedback from users. Notably, SGEP advisors do not advocate for SDM; they view dissuading those who are not well suited to SDM as equally important to assisting those with the capacity and desire to pursue it. The following examples illustrate how the SGEPs in Alaska and California have applied the SGEP model to address local needs associated with SDM.

5.3.1 Alaska Sea Grant SDM assistance programme

In the mid-1990s, global market forces – primarily competition from the rapid increase in world production of farmed salmon and consolidation of the American seafood processing industry – prompted Alaskan commercial fishermen to look for ways to earn more revenue from their catch. Some sought to capture more of the final value of their product for themselves by becoming seafood direct marketers. This choice is complex and not without additional costs (Figure 5.3). As part of their business relationship with fishermen, many seafood processors in Alaska offer services such as loans for vessels and gear, free access to ice and gear storage, bonus payments once the "pack" is sold or, in some cases, shares in the seafood processing business itself. In some fisheries, processors offer price-per-pound quality bonuses to fishermen who use refrigerated seawater systems. In more remote areas, processors also provide tender services, whereby contracted vessels transport the catch from offshore or remote fishing grounds to shore-based processing plants.

Given Alaska's small population, large size and vast distance from major market centres, most seafood must be processed and/or frozen for transport to customers. As

FIGURE 5.3
Functions assumed by fishers under SDM



such, seafood direct marketers face many of the same challenges larger processors in Alaska face: high costs for transporting the catch from coastal communities due to lack of road networks and limited air-freight space; state and federal regulations that are not always well coordinated; and financial risks related to high up-front and operational costs of fishing and processing. In addition, direct marketers must contend with limited processing capacity suitable for small-scale operations in coastal communities and the challenges of producing a high-quality product on board vessels of limited size.[4] They also often struggle to balance the need to be fishing when the season is open with the SDM imperative of timely shoreside marketing and delivery.

To help address these challenges and opportunities, the Alaska SGEP has conducted a range of activities related to SDM with the broad goals of:

- Building fishermen's capacity to operate consistently with management, taxation and seafood safety regulations that govern the processing, transport and sale of seafood products;
- Preventing potential losses to small-scale fishermen by making them aware of the challenges and pitfalls before they begin SDM;
- Increasing fishermen's understanding of proper seafood handling and food safety to ensure high product quality and enhance the reputations of both direct marketers and Alaska seafood in general; and
- Facilitating conversations among direct marketers to better enable them to advocate for themselves and learn from each other's mistakes and successes.

When salmon prices dropped markedly in the early 1990s due to competition from farmed salmon, fishermen became increasingly interested in SDM, a practice that was first identified and regulated in Alaska in 1984.[5] In response, the Alaska Department of Commerce, Community and Economic Development (ADCCED) asked the Alaska SGEP to develop and publish information on advantages and disadvantages of SDM to help fishermen make sound decisions about whether to invest their time and resources pursuing it. The result was the *Alaska Fisherman's Direct Marketing Manual* (Johnson, 1997). Initially geared toward fishermen in Alaska, this publication is still considered the go-to SDM resource for the region, and subsequent editions have been expanded to include information for fishermen operating in Washington and Oregon. Since 2004, Alaska Sea Grant has distributed more than 5 700 copies of the manual in print and online. The fifth edition of the manual (Johnson, 2018) covers business planning, e-commerce, packaging and shipping, custom processing, the seafood distribution system, handling to maintain seafood quality, and more. An appendix, "Is Direct Marketing for Me?", describes the challenges involved and the characteristics and skills needed to succeed in SDM, and provides a tool fishermen can use to assess their own capacities for pursuing it. (See Appendix 2 for additional SDM tools and resources.)

Since 2002, the Alaska SGEP has offered SDM workshops and courses based on the manual and other needs identified by SDM practitioners.[6] Initially conducted in person, in 2017 the SGEP began conducting online webinars for a fee. This format has enabled more fishermen from around the state to participate, facilitating cross-fertilization of ideas and eliminating travel costs for instructors and fishermen. The five-session course is offered in the fall when most fisheries are idle, with up to 20 participants attending at a time. Homework assignments lead participants through the

[4] In Alaska, with the emergence of SDM, small processors specialized in smoking, canning and handling small-volume fishery products have expanded to become "custom processors" for seafood direct marketers. They often accept small orders and charge a per-pound fee for specialty processing, labelling, freezing and/or storing product.

[5] https://www.adfg.alaska.gov/static/license/fishing/pdfs/allowable_activities.pdf.

[6] For information, https://alaskaseagrant.org/event/introduction-to-starting-and-operating-a-seafood-direct-marketing-business-2018/.

development of an action plan for their SDM business. For the final session, fishermen with established direct markets help teach the class by sharing their experiences and answering students' questions.

In 2008, the Alaska SGEP conducted a statewide survey to assess fishermen's training needs and identified a high level of interest in SDM. In response, the SGEP developed the *Fish Entrepreneur* newsletter (Haight and Rice, 2008) to facilitate communication and information sharing among direct marketers so they could advocate for themselves. The newsletter addressed topics including pricing strategies, methods for improving salmon quality with onboard "pressure bleeding," preparing for regulatory inspections, upcoming events, and interviews with existing direct marketers.

The Alaska SGEP also has produced technical information on seafood quality, handling and food safety. Examples include *Care and Handling of Salmon: The Key to Quality* (Doyle, 1992) and videos specific to setnet and drift gillnet fishermen working from small open skiffs. In addition, in partnership with the Alaska Department of Environmental Conservation, SGEP advisors have developed and led workshops on seafood handling for fishermen.

Corollary to these efforts, the SGEP launched the Alaska Fisheries Business Assistance Project, "*FishBiz*"[7] in 2006, also with financial support from ADCCED. The goal of this effort was to "professionalize" Alaska's small-scale fishermen by encouraging them to understand and analyse their operations as bona fide businesses and providing business management tools to help them succeed. Focused more broadly, the *FishBiz* website provides business planning templates, information on minimizing risk, sources of information for new entrants into fisheries, and an Excel workbook to help fishermen analyse projected expenses and income under different fishing scenarios, with a version designed specifically for direct marketers.[8]

Finally, Alaska SGEP advisors have participated in local infrastructure initiatives. In one instance, an advisor led two community surveys to ascertain interest in supporting a community-owned, certified processing facility for seafood direct marketers. In another case, the SGEP provided leadership to establish initial operating policies for the Petersburg Community Cold Storage, a publicly owned facility built with state grant funds on public land. Specific policies were set and equipment purchased to ensure small-scale operators had access to the facility and were not crowded out by large processors or "anchor tenants".[9] As other communities have considered similar projects, the SGEP has provided information and insights on the advantages and challenges of building and managing these types of facilities (Knapp, 2008). The Petersburg facility continues to serve both larger anchor tenants and smaller direct marketers, with all operating costs covered by user fees.

5.3.2 California Sea Grant SDM assistance programme

The California SGEP's efforts to assist small-scale fisheries with SDM began in earnest in 2005.[10] Several factors motivated these efforts, including the substantial downsizing of the state's fisheries through increasingly stringent restricted access programmes, catch limits and other measures; provisions for expanded stakeholder and broader public involvement in state and federal fishery management[11]; and expanded capacity

[7] http://fishbiz.seagrant.uaf.edu/.

[8] http://fishbiz.seagrant.uaf.edu/and-diversify/direct-marketing.html.

[9] https://www.ci.petersburg.ak.us/index.asp?SEC=A38C27BF-CFA9-40BF-921E-CB487EE33FFF&Type=B_BASIC.

[10] California SGEP advisors have provided seafood processing and marketing assistance since 1974, albeit not specific to SDM.

[11] California Marine Life Management Act of 1998 and Magnuson-Stevens Fishery Conservation and Management Act, US Public Law 94-265 et seq.

of the Sea Grant extension network nationwide, including the hiring of additional fisheries extension personnel.

In the mid-2000s, California SGEP advisors conducted informal discussions with community members to assess local needs to help inform development of their research, education and outreach activities. They identified challenges facing California's small-scale fisheries including substantial and problematic misunderstanding about fisheries at many levels. In particular, they learned that residents of California lacked accurate information and knowledge about local commercial fisheries. Some did not even realize they existed, while others had misperceptions about their operations, environmental impacts, socio-economic relevance and management. California's fishery participants and associated communities were struggling to maintain economically viable businesses amid increasing operating costs, stagnating or declining ex-vessel prices, and reduced production associated with regulatory downsizing. These factors made it difficult to maintain links to markets that required larger and more consistent catches than fishermen could provide. At the same time, the rapid expansion of the local food movement, consumers' growing interest in locally produced food, and the proliferation of alternative marketing strategies for agricultural products increased fishermen's interest in SDM.

Recognizing the potential for SDM to help address some of the challenges facing the state's small-scale fisheries, California SGEP advisors began to expand their work in this area. To increase awareness and understanding about local commercial fisheries, they developed the *Discover California Commercial Fisheries* website,[12] synthesizing biological, oceanographic, regulatory and socio-economic information related to the state's fisheries including region- and port-specific information. They also developed a series of regional seafood posters (Figure 5.4).[13] The posters did not advocate buying locally caught seafood, but instead provided information about when and how species are fished.

California SGEP advisors also began to explore ways to improve the economic and social viability of small-scale fisheries, conducting two studies to investigate the feasibility of SDM. The first was a 2011 feasibility study for a community-supported fishery (CSF). The SGEP advisor was inspired by the experience of community-supported agriculture programmes, in which consumers invest in a farm by paying for a share of the season's production up front. Given the differences between agricultural and fishery products (e.g. perishability, handling requirements, consumption patterns), it was unclear whether such a marketing arrangement would work for seafood. To address this question, a SGEP advisor worked with others to conduct a feasibility study.

The feasibility study included two surveys. The first survey targeted fishermen to identify what and how much product they would be willing and able to provide. The second survey targeted consumers to assess demand for and flexibility in being offered lesser-known products – i.e. what they would be willing to buy. A seafood tasting event also was held to bring the two groups together, with demonstrations to educate consumers on how to handle and prepare various products. Based on the positive results of the feasibility study, a CSF was developed. A programme evaluation after the first two years found that it was meeting its objectives of increasing consumer understanding, improving attitudes toward local fishing, and providing improved financial and social support for fishermen. Although the experiences of the participating fishermen have not been evaluated formally, early comments indicated that they were obtaining a higher price per pound for the small portion of the catch they were selling through the CSF, and that they valued the increased education of and connection with the community.

[12] https://caseagrant.ucsd.edu/project/discover-california-commercial-fisheries.
[13] https://caseagrant.ucsd.edu/project/discover-california-commercial-fisheries/regional-seafood-posters.

FIGURE 5.4
Example of a regional seafood poster created by California SGEP advisors and colleagues to educate consumers and the broader public about California wild-caught and cultured seafood

The second study was initiated in 2013 by California SGEP advisors in collaboration with colleagues from the University of California Santa Barbara and SGEPs in other states. The goal of the project was to expand understanding of the diversity of SDM arrangements fishermen were using in a range of settings on the country's east and west coasts, and how they could help address the regulatory, economic and social challenges facing West Coast fishermen. Through interviews, the project team identified the key characteristics of each type of SDM, the conditions required for establishing and maintaining each type, and the impacts and implications of SDM for fishermen's operations as well as the well-being of both fishermen and local fishing communities. Integral to the project was working with several other states' SGEPs to learn how they had been assisting fishermen and communities with SDM.

The project team used the study findings to develop the Market Your Catch website, expanding on the substantial foundation provided by Alaska SGEP's *Fishermen's Direct Marketing Manual* (Johnson 1997, 2007, 2018). The website provides a clearinghouse for information resources and tools developed by many SGEPs and others.[14] Like the manual, the Market Your Catch website does not connect fishermen with customers, but provides information about different types of markets and customers and key considerations for evaluating the feasibility and utility of SDM given their situation (i.e. what they fish for, their actual or potential customer base, their skills, the logistical resources available, and their social and economic support system). The website also provides information on how to get started in or to expand SDM. This information was disseminated further through workshops in California, Oregon and Washington and through a web-based presentation to SGEP advisors throughout the nation. It continues to be used during one-on-one consultations with fishermen.

While working on these projects, it became evident that the regulations related to selling one's catch were a major constraint for fishermen seeking to participate in SDM. Permit requirements are complex; they vary from state to state and even from county to county. The permit process was further complicated because there was a critical disconnect between natural resource and food systems management (Olsen, Clay and Pinto Da Silva, 2014), with the relationship between fisheries and SDM not well understood by resource management agencies or those with food handling and distribution oversight. For example, natural resource agencies oversee fishing and the

[14] http://marketyourcatch.msi.ucsb.edu/.

landing of the catch (from boat to dock or beach), and issue the licenses and permits required for fishermen and fish buyers, respectively, to sell and receive the catch. Food system management agencies (e.g. public health, food and agriculture, weights and measures) oversee transport, handling, processing and storage of seafood once it has been landed dockside. For fishermen interested in selling their catch "off-the-boat" – a site not considered within the purview of food system authorities – it was unclear whom they should talk to, what rules they needed to follow, and what permits they needed.

As a result, to assist potential seafood direct marketers, the California SGEP developed and posted general information online about permits potentially required for SDM and the local and state agencies with authority to issue them. More specific permit guidance was not provided, as this depends on the type and location of the SDM and the products sold, and thus is best provided by the regulatory agencies themselves. Nonetheless, providing the agency contact and associated permit information in a central location has been useful. Others have recognized the permit pages as a template for organizing this type of information and California SGEP advisors are working with SGEP colleagues throughout the network to generate similar information for other coastal states.

In addition, the California SGEP has engaged with county environmental health departments through seminars and one-on-one discussions to educate them about California's fisheries and the range of SDM types that might be of interest to fishermen and fishing communities. They have developed outreach materials to inform the public about safe seafood handling and consumption during harmful algal blooms. They also have helped to inform and encourage the development of local and state policy to streamline SDM permitting processes, which are not as well established for seafood products as they are for agricultural products. One policy success has been the enactment of the "Pacific to Plate" legislation (AB- 226, 2015) facilitating the establishment and operation of dockside seafood markets. Dockside markets have long been an important outlet for a few small-scale fisheries such as the Newport Dory Fishing Fleet, which has been selling directly to the public for more than 125 years.[15] This legislation paved the way for others to more readily develop such seafood direct markets, and resulted in the establishment of a new market (the Tuna Harbor Dockside Market[16]) involving several fishermen in San Diego. It also has made it easier for established dockside markets to process product on site, whereas fishermen previously had to rely on nearby seafood retailers with government-approved facilities and permits for this function.

5.3.3 Outcomes and impacts of the SDM good practice

Taken together, the efforts of the Alaska and California SGEPs to promote SDM demonstrate practical implementation of several recommendations presented in Chapter 7 of the SSF Guidelines, as follows (Appendix 2). First, the SGEP advisors' engagement of fishing communities in research (the CSF and SDM studies and training needs assessments described above) has built understanding of needs, options and considerations for SDM, with materials developed from these efforts in turn building capacity for the post-harvest sector (paragraph 7.3 of the SSF Guidelines). Further, information provided through classes, workshops, websites and other outreach efforts has helped seafood direct marketers maintain product safety and quality, which is critical for the seafood industry, consumers and the state. Second, feasibility studies that consider sustainability in terms of both supply and demand have supported

[15] For more information: https://doryfleet.com/ and http://www.newportbeachca.gov/PLN/General_Plan/07_Ch6_HistoricalResources_web.pdf

[16] http://thdocksidemarket.com/new/

development of marketing mechanisms that have enhanced the income and thus the overall security of small-scale fisheries (paragraph 7.4). The information about various SDM arrangements and associated regulations that the SGEPs have gathered and provided has increased awareness and understanding among small-scale fishermen, communities and agency personnel, thus allowing them to make informed decisions on whether to invest in SDM infrastructure. Third, small-scale fishermen are evaluating new options (e.g. selling to institutions, via CSFs and via buying clubs) and accessing new markets locally, regionally and/or nationally (paragraph 7.6). Some of these markets also have supported sales of under-utilized species, as fishermen have been able to directly explore consumers' interest in new products. Last, the SGEP efforts have helped to build capacity by providing resources, facilitating development of infrastructure and informing policy, all of which have enabled small-scale fishermen to participate in local food movements and other marketing opportunities occurring on different scales (paragraph 7.10).

Despite these successes, the Alaska and California SGEPs still face several challenges. For instance, the web-based resources produced are not accessible to the full range of individuals and groups that would benefit from them. Many fishermen are not frequent users and/or readers of websites, although this is changing with the entry of new, younger participants. And while the majority of fishermen speak and read English, some small-scale fishermen do not, or they only speak English as a second language. More effort is required to reach them, both linguistically and culturally. Furthermore, while Alaska Sea Grant's *Fish Entrepreneur* newsletter has fulfilled its function as an information resource, it has not generated the anticipated engagement or collaboration among direct marketers to pursue common needs and interests. This may stem from seafood direct marketers' reluctance to share details about their business strategy with potential competitors.

Similarly, while the policy change in California has highlighted the need for improved SDM permit processes, its impact has been limited. It has institutionalized and streamlined this process for a single type of SDM, one already established in some places. This has led many policymakers and the public to believe that all of the challenges associated with securing government approval for implementing SDM have been addressed, when in fact challenges facing other types of SDM persist. Adapting permit processes for direct sales of agriculture products to fisheries products would help to expand SDM options.

Not all types of SDM are logistically or politically feasible, or suitable for all fishermen, communities and contexts. For example, while dockside sales have long been permitted and widely used in Alaska, they are not permitted at some harbours in California due to concerns about visitor safety on the docks. In other cases, off-the-boat sales have been encouraged while dockside markets have not, due to logistical considerations such as the needs of other harbour users for access to those areas. For individual fishermen, some are not willing or able to spend the time waiting for customers as required for off-the-boat sales and dockside markets. And in some communities, up-front payments required of CSF customers are not economically feasible.

While interest in SDM is high, participation in both states appears to be steady but limited. In 2018, of the 8 697 permit holders who fished in Alaska, 259 participated in SDM and another 380 registered as dockside "catcher/sellers."[17] SDM requires interpersonal and business skills, access to a reliable and flexible customer base, and appropriate infrastructure to support the handling of the catch from the dock to the customer. Moreover, each of the steps in the supply chain – even the small ones – requires time. For a fisherman, this can mean foregoing time fishing unless someone

[17] For data on Alaska, see https://www.cfec.state.ak.us/gpbycen/2018/MenuStat.htm. Analogous data for California are not readily available.

else fulfils these shoreside functions. In fact, a decision to not engage in SDM after evaluating ones' circumstances and options also is valuable, as it saves time and money that would have gone toward something that likely would not have worked.

Those who do engage in SDM tend to be motivated by factors beyond obtaining a higher price for their catch. These include dissatisfaction with processor quality practices, interest in the marketing aspects of SDM, having a family (or other) connection to the end market, and a desire to improve connections within the community. In some cases, families engage in SDM out of a shared desire from both spouses to participate in the family business. Other SDM participants are motivated by a commitment to environmental stewardship to more carefully target their fishing effort (e.g. to minimize bycatch and habitat impacts).

Based on outcomes to date, the next steps for the two SGEPs include:

- **Further evaluation and updates of SDM information.** It is important to continue to evaluate the utility and efficacy of written products and classes/workshops, including where, how and in what format they have been provided/disseminated. These likely will need to be updated given rapid changes in communication methods and small-scale fisheries demographics. In particular, younger fishery participants typically use different means for communicating and sharing information, notably social media, as compared to older participants.
- **More directed outreach with a broader range of cultural and social groups.** Consistent with the states' sociocultural and ethnic diversity, small-scale fisheries participants come from a diversity of backgrounds, and they would be better served if the materials were translated into other languages, and classes/workshops were adapted to ensure cultural appropriateness.
- **Working with government agencies to expand their capacity to support SDM.** There is a persistent need in the United States of America to coordinate regulatory processes for establishing and operating SDM arrangements. Adapting existing policy for agricultural direct marketing to SDM may help address this need. Education of resource and public health agencies about fisheries and seafood safety also is essential for ensuring that fishermen can readily sell their catch and consumers can access properly handled and safe local seafood.
- **More explicit integration with climate change considerations.** Changing environmental conditions are contributing to changes in the distribution of fish (e.g. Perry *et al.*, 2005; Link *et al.*, 2009; Pinsky *et al.*, 2019). To enable small-scale fishermen and fishing communities to adapt to changing resource availability, more flexible rules to enable both catching and marketing available species may be needed. In addition, climate change is expected to increase the frequency and severity of harmful algal blooms with negative consequences for small-scale fisheries.[18] Investigations of how SDM efforts can continue to operate while addressing emerging health-related concerns from biotoxins will undoubtedly be needed.

5.3.4 Implications

The good practice of assisting with SDM evaluation and development as described here has implications for small-scale fishermen, communities and policy in the United States of America and elsewhere. For fishermen considering SDM, it can reduce the risk of making choices that may not be suitable for them given their personal, fishery and community context. The information provided increases their ability to design SDM arrangements that are tailored to their particular circumstances. Broader community engagement through SDM can help build shared understanding of those involved in the local seafood supply chain, from fishermen to consumers. That engagement

[18] For more information: https://www.fisheries.noaa.gov/webdam/download/65032821.

also can facilitate access to and sharing of social and financial capital necessary to assist in the establishment and operation of SDM. This can be done informally and opportunistically or through more formal arrangements such as cooperatives, marketing associations or broader community organizations.

In many contexts, SDM is a complement rather than an alternative to existing marketing arrangements. For those involved in long supply chain marketing, it can have negative or positive effects. The amount of seafood sold via SDM typically is quite small, and the particular products may be the same as or similar to those that long supply chain buyers handle. As such, direct marketers are rarely able to compete on price; however, they often place added emphasis on quality to gain a market advantage. This in turn encourages other harvesters and processors to improve their own handling practices, which can lead to enhanced product quality and safety, positively affecting the reputation of the fishery and its products overall.

Further, SDM can benefit the larger supply chain by highlighting the positive attributes of local products. Many traditional seafood buyers and processors, even some initially concerned about reduced deliveries from fishermen who pursue SDM, have indicated that the small amounts of product used for SDM efforts have not negatively affected their operations. Moreover, they have benefited from the increased consumer knowledge of local products resulting from SDM and from the SGEPs' outreach efforts. Similarly, small-scale fish buyers have tended to benefit from SDM because it provides them with access to product that otherwise would be purchased by larger, vertically integrated seafood businesses (i.e. their competitors).

Because permit requirements for SDM can be complex, engagement of agencies responsible for overseeing seafood handling, safety and commerce also is essential. Their participation ensures that accurate information is provided for the various options that may be explored. In both Alaska and California, agency personnel have reviewed SDM materials, co-authored publications on requirements for SDM, worked extensively on quality handling efforts, and attended SDM workshops to answer fishermen's questions.

To those seeking to assist fishermen and communities with identifying and assessing SDM options, the following also are recommended:

- **Work with the experts.** Engage existing direct marketers to help write, teach and evaluate the efforts.
- **Remain neutral.** Emphasize that SDM is not for everyone. Dissuading someone from SDM where it is impractical or risky is as important as assisting someone in integrating SDM into their fishing business.
- **Recognize that SDM is not an "all or nothing" strategy.** Interest in SDM, and its suitability for a given context, may vary over time. Interest in – and arguably the need for – direct marketing tends to ebb and flow as dockside prices and other conditions fluctuate.
- **Use multiple delivery methods, and adjust them depending on the context and the assistance needed.** Couple the provision of information materials and workshops with ongoing one-on-one consultations with existing and potential direct marketers. This is particularly important when small-scale fishermen begin to explore and try actual markets and marketing techniques.
- **Develop suitable materials and disseminate them through appropriate channels.** In developing SDM materials, focus on practical considerations, present the information in culturally appropriate and user-friendly ways, and distribute it through diverse avenues accessible to the range of potential users. The materials should address questions raised during ongoing engagement (e.g. individual consultations, previous workshops, collaborative research) and be tailored to seafood direct marketers' community and policy context. For example, developing brief topical pamphlets and distributing them online and through community-based groups or public facilities can be done at little or no cost.

5.3.5 Potential for application in other contexts

While SDM may not be applicable in all countries and communities, the SDM good practice described here can be applied in many contexts. Trusted individuals or groups can assist fishermen and communities with assessing their needs and evaluating SDM opportunities while refraining from advocating particular actions. They should have a sufficient understanding of the community context and the skills to navigate complex relationships between fishermen and others in the seafood supply chain. This requires a sustained commitment over time. Ongoing efforts to extend the SGEP model to other countries as, for example in Indonesia with the Sea Partnership Program[19], provide opportunities to expand use of the practice there and elsewhere.

The expanded use of SDM in other countries may be more feasible today than it has been in the past. Improvements in communication, including widespread use of social media, transportation infrastructure and seafood handling technology, provide new opportunities for connecting fishermen with consumers locally and further afield and facilitate the production and distribution of safe, high-quality seafood. SDM in turn can contribute to poverty eradication by potentially maintaining or enhancing access to a local, nutritious food source for communities where it is produced, and by enabling fishermen to retain more of the value of their catch than they would through long supply chains. However, the increased revenue comes at the cost of additional time, effort and, in some cases, possible loss of logistical and other assistance from traditional buyers. In addition, seafood direct marketers typically do not have access to a diversity of product sources that can help buffer against variability in catches, and they depend on their customers being willing and able to accommodate this uncertainty. Domestic and international tourism can be part of this customer base, with seafood marketed directly by fishermen through restaurants, hotels, and other venues. While evidence suggests that SDM in the United States of America has improved economic outcomes for some small-scale fishermen, many fishermen involved in SDM cite non-monetary social benefits such as increased independence, control over how their product is handled, and connections with their communities and seafood consumers as indicators of success and enhanced well-being (Culver *et al.*, 2015; Haig-Brown, 2012).

5.4 CONCLUSION

Fishermen and communities on the West Coast of the United States of America perennially face challenges to their livelihoods, be they regulatory, operational, environmental or economic. Recognizing these dynamics, Alaska and California SGEP advisors have conducted research, education and outreach to assist fishermen and their communities in the careful consideration and, where appropriate, adoption, of SDM as a way to address these challenges. Using the place-based SGEP model, SGEP advisors have developed a good practice and assisted individuals and communities in building capacity to produce and market safe seafood products through SDM.

Efforts to date have helped to support sound decision-making, build SDM capacity, and expand understanding – on the part of fishermen,

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Selling the catch at the Ventura Harbor Saturday market in California.

[19] For more information: https://www.slideshare.net/OregonSeaGrant/development-of-an-indonesian-sea-grant-partnership-program.

community members and policymakers – of the practicalities, considerations and limitations of SDM. With advances in communication technologies, increased understanding of the nutritional benefits of seafood, desire for locally sourced products and persistent uncertainty in global trade, opportunities to use SDM likely will grow. Yet this growth undoubtedly will continue to be slow, as establishing and maintaining SDM poses its own challenges, and depends on the individuals and the context.

Individually and collectively, the efforts described in this case study illustrate how the SDM good practice can inform implementation of the recommendations of Chapter 7 of the SSF Guidelines (FAO, 2015). Specifically, it enhances capacity by supporting the small-scale fisheries post-harvest sector through SDM (paragraph 7.3). This good practice not only helps enable enhanced financial security for small-scale fishermen by providing access to additional markets (paragraph 7.6) and market information (paragraph 7.10), it also helps prevent them from pursuing SDM when it would not be financially advantageous (paragraph 7.4).

The Alaska and California SGEPs, individually and in collaboration with others, will continue to apply and improve this good practice to facilitate small-scale fishermen's consideration of SDM. In doing so, they will contribute further to the implementation of the SSF Guidelines recommendations related to value chains, post-harvest and trade, while reinforcing the principles of respect of cultures, consultation and participation, feasibility, and social and economic viability.

ACKNOWLEDGEMENTS

We gratefully acknowledge seafood direct marketers and other fishing community members in Alaska, California and elsewhere in the US for sharing their stories, knowledge, insight and expertise; Quentin Fong, Pete Granger, Glenn Haight, Terry Johnson and Cynthia Wallesz for their extensive input and helpful review; Joseph Zelasney, Alexander Ford and Lena Westlund at FAO for thoughtful review, guidance and support; and our colleagues in the larger US Sea Extension Network. We also acknowledge support from the Alaska and California Sea Grant programs and the National Sea Grant College Program, NOAA, US Department of Commerce.

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Appendix 1

Types of seafood direct marketing arrangements

Type of market	Description
Off-the-boat/over-the-bank sales	Catch sold directly from boats at the docks, a beach or a riverbank
Fishers'/farmers' markets	Catch sold directly to consumers as part of an established community market
Community-supported fisheries	Catch sold directly to consumers who buy a certain amount of seafood up front ("subscriptions" or "shares"), with deliveries to a predetermined location on a set schedule for a fixed period of time
Seafood buying clubs	Catch sold directly to a coordinator of a food buying club
Online markets	Catch sold by communicating with or accepting direct orders from customers using electronic technologies, such as eLists, eServices and online sales
Restaurants or retail market sales	Catch sold directly to restaurants and retail markets
Institutional sales	Catch sold directly to food service operators such as schools, hospitals, private and government organizations, who then prepare and serve the product to consumers
"Your Own Market" or restaurant	Catch sold directly to consumers at a fisher-operated structure such as a fully outfitted building, roadside stand or food truck

Source: Culver *et al*., 2015

Appendix 2

Alaska and California Sea Grant good practice elements addressing the SSF Guidelines Chapter 7 recommendations related to value chains, post-harvest and trade

	7.3 Provide appropriate infrastructure (a), organizational structures (b), and capacity development (c) for producing quality and safe fish products	7.4 Support associations and individual fishers to promote their capacity to enhance their income and livelihood security (d), and marketing mechanisms (e)	7.6 Facilitate access to local (f), national (g), and international (h) markets and introduce trade regulations and procedures to support trade in markets (i)	7.10 Facilitate access to relevant market and trade information (j)
Alaska				
Fishermen's Direct Marketing Manual	C	d, e	f, g	
Community cold storage project	A	d, e	f, g, h	
Individual consultations: business information and assessment	C	d, e	f, g, h	j
Fish Entrepreneur and attempts to get direct marketers organized	b, c	d, e		
Workshops: direct marketing, quality handling	C	d, e	f, g	
California				
Community-supported fishery feasibility study		d, e	f	j
Seafood direct marketing arrangements study	C	d, e	f, g	j
Market Your Catch website	C	d, e	f, g	j
Workshops: direct marketing, seafood safety and quality, commercial fisheries	C	d, e	f, g	j
"Pacific to Plate" legislation/dockside markets		e	f, i	

6. Fair Trade: Certification of a yellowfin tuna handline fishery in Indonesia

Rui Bing Zheng
Ashley Apel
Sven Blankenhorn
Fair Trade USA

Deirdre Elizabeth Duggan
Jaz Simbolon
Yayasan Masyarakat dan Perikanan Indonesia (MDPI)

Helen Packer
Anova Food

ABSTRACT

Fair Trade enables greater equity in value chains and ensures the benefits of trade and export are spread among producers. For a fishery to receive Fair Trade Certification, it must first comply with the Capture Fisheries Standard and its core objectives of fisher and worker empowerment, economic development of communities, social responsibility, and environmental stewardship. This case study outlines the ways in which the Fair Trade model aligns with several provisions laid out in the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the context of Food Security and Poverty Eradication. The recommendations pertain particularly to Chapter 7 of the SSF Guidelines on value chains, post-harvest, and trade, through the case of the certified Indonesia Western and Central Pacific Ocean yellowfin tuna handline fishery.

Keywords: Small-scale fisheries, Indonesia, yellowfin tuna, handline, Fair Trade, social responsibility, community development, empowerment, fisheries management, certification.

6.1 INTRODUCTION

In 2014, Fair Trade USA adapted its model of certification and market-based incentives to support small- and medium-scale capture fisheries, as well as shift the seafood industry toward more socially and environmentally sound practices. For a fishery to achieve Fair Trade Certification, it must comply with the Capture Fisheries Standard, a progressive socio-economic and environmental standard for wild capture fisheries. The standard is aligned with several of the provisions laid out in Chapter 7 of the SSF Guidelines regarding value chains, post-harvest and trade. This case study documents how Fair Trade's intervention has affected the Indonesia Western and Central Pacific Ocean yellowfin tuna handline fishery (Fishery Progress, 2018), and the relevance these interventions have to Chapter 7 of the SSF Guidelines.

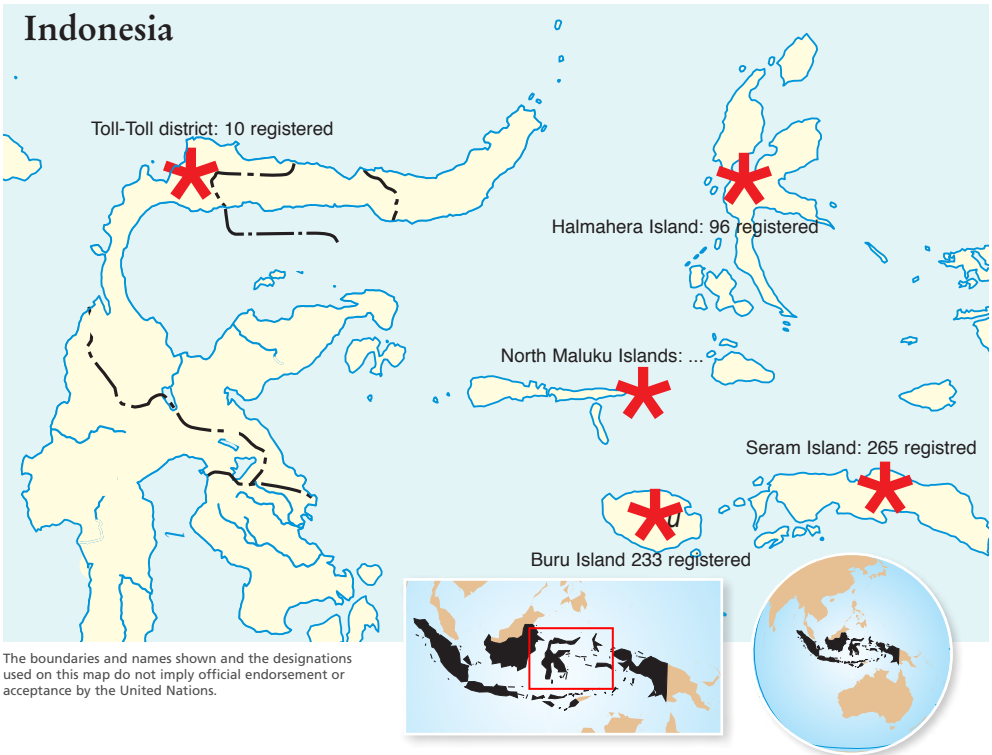
6.1.1 Fishery context

Indonesia is the world's largest island nation with over 17 000 islands and 54 000 km of coastline. Its fisheries play an important role in providing employment and income. According to the Food and Agriculture Organization of the United Nations (FAO), over six million people are involved in the Indonesian seafood sector, and an estimated 95 percent of fishery production comes from small-scale fisheries. Indonesia is also one of the main producers of tuna globally. The approximate annual volume of yellowfin tuna (*Thunnus albacares*) produced is 200 000 tonnes, with over 30 percent (61 000 tonnes) caught by handline. Highly graded raw material is exported, with the rest destined for local markets such as food service and hospitality.

Eastern Indonesian archipelagic waters are an important region for yellowfin tuna fishing. For many coastal communities in the region, tuna fishing is a major source of income and one of the few economic opportunities available. Small-scale tuna fishery operations are often carried out in remote communities, where accessibility, education and socio-economic conditions range from variable to poor (Duggan and Kochen, 2016, p. 31). As yellowfin tuna is a highly sought-after export commodity, sourcing from Indonesian handline fisheries for export markets has been established for many years and the number of buyers sourcing and volume of fish being exported from the area are steadily increasing.

Handline fishing is the dominant method in Eastern Indonesian archipelagic waters. Due to the nature of the fishery, handline fishing generates more jobs per volume of fish landed, compared to other, more mechanized methods. Handline fishers use homemade kites attached to their fishing lines, which cause the bait to move erratically, a characteristic which adult yellowfin find alluring. The amount of fish caught depends on the equipment the fishers can afford (e.g. small boats with 15-horsepower engines) and the distance from anchored fish aggregating devices, which act as a secondary

FIGURE 6.1
A total of 38 Fisher Associations are located on Buru Island, Seram Island, North Maluku Islands, Halmahera Island, and in the Toli-Toli district



Source: United Nations. Map conforms to: Map No. 4110 Rev. 4 United Nations January 2004.

option if no free-swimming schools are found during a fishing trip. While the chances of catching fish are higher near these devices, the tuna caught are often smaller in size and there is a higher risk of harvesting juveniles.

The Fair Trade Certified supply chain is located between the Maluku and North Maluku Islands as well as in Central Sulawesi in Eastern Indonesia. Approximately 100 handline fishers in Assilulu and Waepure villages on Ambon and Buru islands were engaged in 2013 to field test the Capture Fisheries Standard. The group achieved certification in 2014. There are now over 800 small-scale fishers registered in 38 Fair Trade Fishers' Associations across multiple islands and districts. Fishers harvest yellowfin tuna on daily fishing trips from small vessels with a maximum crew of two people. They target large yellowfin tuna by following dolphins, which indicate the presence of tuna, and may catch the fish at the surface or further below. The fish is landed and then hand-processed into clean loins at designated stations, before delivery to a central processor in the city of Ambon or Bitung.

SOURCE: FAIR TRADE USA.

Hayunan Wangse of Waepure Village in Buru flies a kite with a fishing lure that mimics a flying fish on the surface.

BOX 6.1
FAIR TRADE USA

Fair Trade USA, a non-profit organization, was founded in 1998 and is the leading certifier of Fair Trade goods in North America. The organization reaches nearly one million producers globally and has delivered USD 551 million in additional profits to farmers, workers, and fishers since its inception, through its market-driven model.

Fair Trade as a movement emerged as a response to the adverse conditions faced by small-scale producers in developing countries, such as lack of market access, price volatility, and poor bargaining power. The model improves the conditions of these producers through three main interventions:

1) Certification using a comprehensive social, economic and environmental standard;
2) Delivery of Fair Trade Premium funds into the hands of producers for product sold on Fair Trade terms; and
3) Increased market access and product differentiation through the Fair Trade label.

Capture Fisheries Standard

Since its inception, Fair Trade's Seafood Program has delivered over USD 1.5 million in Premium funds to fishing communities on top of the price of their catch. The Capture Fisheries Standard has benefited over 5 000 fishers and fishworkers in eight fisheries globally through adherence to stronger standards, greater organization, and collective action.

6.1.3 Fair Trade Capture Fisheries Standard

Given the success and replicability of Fair Trade's Agriculture Program, which certifies fresh produce, coffee, tea and other consumer goods globally, the organization began research on the seafood sector, resulting in the development of the Capture Fisheries Standard (CFS) in 2014 to test its model in fisheries. The CFS provides the opportunity

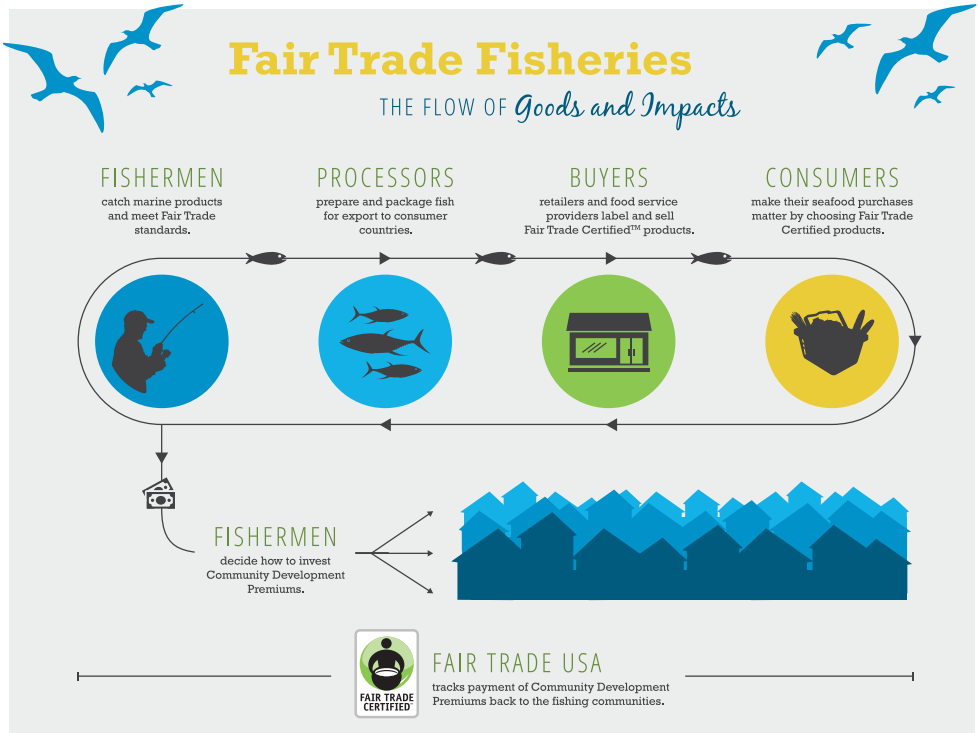
for fishers to incorporate core elements of Fair Trade in their practices, while receiving support to further commercialize their product.

Fair Trade USA and partnering Conformity Assessment Bodies audit and certify supply chains to help ensure that fishers and processing workers are paid fair prices and wages, work in safe conditions, protect the environment, and receive Fair Trade Premium funds to improve their livelihoods. The CFS framework follows the Fair Trade agricultural standards closely, specifically the requirements concerning basic human rights, wages, working conditions and access to services. Several criteria have been modified to apply to a marine setting, but the tenets and model remain the same. A number of technical documents including the International Labour Organization's Core Conventions and the FAO Code of Conduct for Responsible Fisheries were referenced in the development of the standard.

The CFS is a progressive standard beginning at Year 0 and extending to Year 6. The criteria become more rigorous annually, leading to comprehensive socio-economic and environmental improvements over time. After Year 6, the fishery is audited against the same Year 6 criteria to ensure improvements are maintained. In-person, third-party audits are held on an annual basis. Upon certification, all traders of the certified product are also required to abide by Fair Trade USA's Trade Standard, the chain of custody standard ensuring traceability and fair trading practices. The main organizational objectives of the CFS are as follows.

- **Empowerment:** The CFS supports fishers in developing the necessary skills to effectively negotiate with supply chain actors regarding the purchase, processing and marketing of their products. The empowerment process includes organizing a Fair Trade Fishers' Association, electing a Fair Trade Committee, creating a Fair Trade Premium Plan, and determining how to spend the premium in the community (as further detailed in section 6.1.4).
- **Economic development:** The CFS aims to improve the stability of fishers' incomes by ensuring a transparent and stable trading relationship with their buyer(s) and

FIGURE 6.2
Capture fisheries standard infographic



Source: Fair Trade USA.

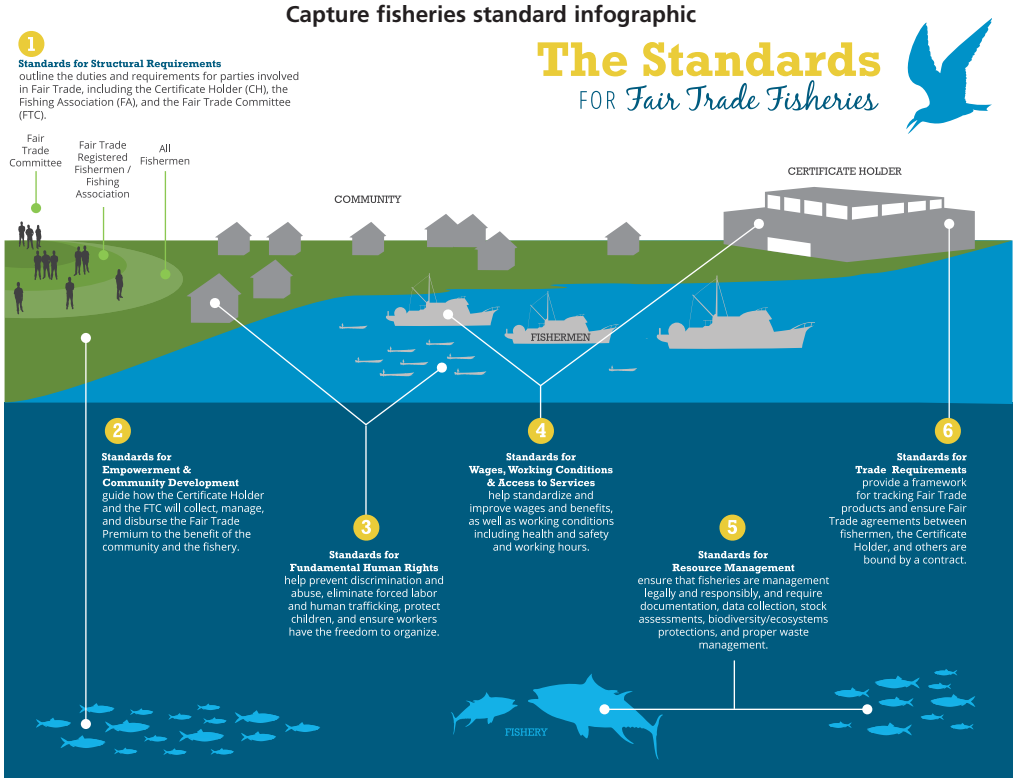
by requiring payment of a Fair Trade Premium on every Fair Trade Certified product sale. The standard also establishes requirements to ensure adequate wages and wage growth for workers. For instance, by Year 3, employers are required to meet with waged crew members and worker representatives annually to discuss how wages and productivity can be improved, including ideas for how to move toward living wages over time. Additionally, the resource management section of the CFS aims to strengthen and stabilize fish stocks to ensure that local communities can continue to depend on them for their livelihoods.

- **Social responsibility:** The CFS protects the fundamental human rights of those involved in the fishery. Health and safety measures are established to protect fishers and processing workers from work-related injuries. Fishers are encouraged to use the Fair Trade Premium to improve access to and quality of health care and education in their communities.
- **Environmental stewardship:** Registered fishers must adopt responsible fishing practices and work to protect fishing resources and biodiversity. This includes data collection and monitoring to provide better information on the state of fish stocks and to mitigate the impacts of fishing. For small- and medium-scale fisheries that face challenges with data availability and management, the CFS builds the capacity of fishers to meet the resource management criteria over time.

With these main objectives in mind, the CFS is organized into six sections addressing different aspects of fishing, processing and facility management, and group administration (Figure 6.3).

The requirements under each section apply to the Certificate Holder (the entity responsible for the implementation of the CFS), fishers and crew members on fishing vessels, and/or workers in processing plants. The standard may be viewed in its entirety on Fair Trade USA's website: https://www.fairtradecertified.org/business/seafood.

FIGURE 6.3
Capture fisheries standard infographic



Source: Fair Trade USA.

6.1.4 Fair Trade Fishers' Association and Fair Trade Premium

The development of Fair Trade Associations and Committees, and the management of the Fair Trade Premium led by fishers, embodies the SSF Guidelines recommendations 7.4 ("efforts to support associations of fisher and fish workers and to promote their capacity to enhance their income and livelihood security, as well as marketing mechanisms") and 7.9 ("efforts to ensure adverse impacts by international trade on the environment, small-scale fisheries culture, livelihoods, and food security are equitably addressed").

To participate in Fair Trade, fishers who are registered must form at least one democratically run Fishers' Association (unless they already belong to a legal cooperative, in which case the cooperative serves as the association). Through the cooperative or association, they coordinate responsibilities on resource management, vessel safety, and trade relationships with buyers. The association represents the fishers on any matters affecting their fishing activities, including CFS requirements, laws, fishery regulations, and fishery-related infrastructure.

SOURCE: MDPI

Fishers attending a Fair Trade Committee meeting.

From the associations, individuals are elected into one or more Fair Trade Committees to manage the use of the Fair Trade Premium funds. These committees are then responsible for managing and spending the funds on behalf of the participants, and for tracking and reporting their use.

For every kilogram of product sold on Fair Trade terms, a Fair Trade Premium is paid by the local processor (often the Certificate Holder), or the importer within the country of the product's final destination. The premium rate is set per species and, if necessary, per region; all rates are publicly available online.[1] The premium is paid directly into an account managed by the Fair Trade Committee for the realization of common community goals. A spending plan (Fair Trade Premium Plan) must be developed in accordance with the CFS, and is based on a needs assessment outlining community gaps and priorities, which is conducted in the first year. The committee may choose to fund activities that its members agree are relevant for their priorities. Long-term projects are encouraged, and not all Fair Trade Premium funds must be spent each year.

At least 30 percent of the Fair Trade Premium funds must be used toward environmental projects that contribute to the sustainability of the fishery and/or marine ecosystem, such as developing or improving waste management systems and facilities, creating or enforcing a marine or terrestrial protected area, developing an environmental education programme, or fisher training and data collection efforts.

6.2 METHODS

Collated primary and secondary evidence was used to create the case study. In 2018, Fair Trade USA contracted the Charmelian consulting group (based in the United Kingdom of Great Britain and Northern Ireland) to conduct an independent evaluation of the programme's socio-economic and environmental impact from 2014 to 2018. The methods and findings for this case study draw heavily from that report, with additional follow-up and research focused on the tuna fishery in Indonesia. The data sources used in reference to both the evaluation and in this case study include:

[1] Available at https://www.fairtradecertified.org/sites/default/files/filemanager/documents/Standards/FTUSA_STD_PricePremiumDatabase_EN_1.11.0.pdf.

- **Audit reports and applications:** Data from audits were collated to show the change in the number of fishers, vessels, and workers over time, from the time of certification.
- **Household surveys:** Surveys with fishers were carried out in 2015, 2016 and 2018. Survey questions covered income sustainability, environmental sustainability, individual and community development, and empowerment. (Appendix 1 for a list of survey questions.)
- **Transaction data:** Transaction data sourced from purchase and sales reports of certified fish included product information, price per unit, volume, species, transaction date, and type of contract.
- **Interviews with programme participants:** Interviews were conducted with key supply chain and Non-governmental Organization (NGO) stakeholders to collect qualitative information on experiences with the Fair Trade Seafood Program in Indonesia.

Fair Trade USA conducted an analysis of the Capture Fisheries Standard to compare how it overlaps with the SSF Guidelines recommendations on value chains, post-harvest and trade. Other published articles and secondary evidence were also reviewed to analyse the impacts in Indonesia, such as Borland and Bailey's 2019 article "A tale of two standards: A case study of the Fair Trade USA certified Maluku handline yellowfin tuna (*Thunnus albacares*) fishery" and Duggan and Kochen's "Small in scale but big in potential: Opportunities and challenges for fisheries certification of Indonesian small-scale tuna fisheries", published in 2016.

6.3 RESULTS AND DISCUSSION OF GOOD PRACTICES

Prior to sharing the results of the Fair Trade Seafood Program analysis, it is important to identify two partners who played critical roles: Yayasan Masyarakat dan Perikanan Indonesia (MDPI) and Anova Food.

MDPI is an NGO that works with small-scale fishers in Indonesia to support responsible and sustainable fisheries. At the inception of the CFS project, MDPI was an extension of Anova's Fishing & Living Initiative and was thus a natural partner to handle the CFS aspects involving producers. Today, MDPI is an independently registered organization, partnering with multiple industry stakeholders in tuna fisheries to implement traceability and sustainability-focused initiatives. It remains the main implementation partner for the Fair Trade programme in Indonesia.

Anova was an early market partner and supporter of Fair Trade. Participation in the programme enabled it to be a "prime mover" in product differentiation and in fulfilling its social and environmental commitments (Pollard *et al.*, 2018, p. 41). As a result, Anova has been able to sustain relationships with its current buyers and double its supply volumes with others (Pollard *et al.*, 2018, p. 45).

6.3.1 Producer impact

The fisher-led management of the Premium funds is a tangible example of Fair Trade's alignment with SSF Guidelines recommendation 7.4 to support fishers' associations and build their capacity to enhance their income and livelihood security. Sales of certified product have earned Indonesian fishers USD 280 000 (as of December 2018) in cumulative Fair Trade Premium funds on top of the price paid for their catch**.** Funds have been applied at a community level toward a variety of social and environmental projects, such as:

- Savings accounts for children's education;
- School supplies;
- Illness and bereavement funds;
- Donations to local community centres and mosques;

- Education on endangered, threatened and protected (ETP) species;
- Waste management facilities;
- Improvements to landing sites and gear;
- Trainings on topics such as post-harvest handling to improve product quality.

BOX 6.2
Fair trade fisher spotlight

SOURCE: MDPIREGISTERED FISHERS

La Tohia and other Fair Trade registered fishers.

There are numerous Fair Trade Fishers' Associations in South Seram. It is an important fishing area given the proximity to central processors in Ambon. Following participation in the Fair Trade programme, fishers report higher rates of engagement with other fishers and in negotiations with buyers.

La Tohia (in yellow) is a 38-year-old fisher from South Seram and the head of the Fair Trade Committee. He spends his time assisting the associations in various ways, including negotiating with the National Electric Company, installing lights at the landing sites, and training fishers to record fishing trips and interactions with ETP species in their logbooks (data collection is a requirement of the CFS).

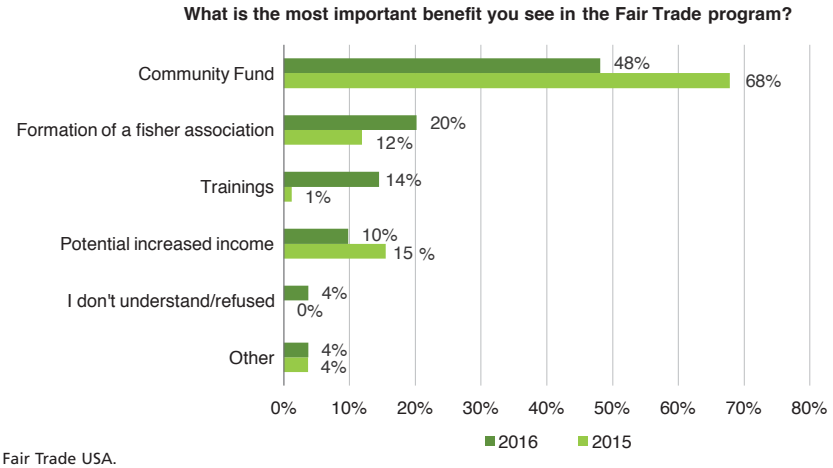
His local association, Tuna Yapana, have used Fair Trade Premium funds to pay for fishing gear, school supplies for children, and renovations to the local mosque. They have also used funds to purchase meal containers and thermoses for fishing trips to reduce plastic waste (a requirement of the CFS). In the future, La Tohia hopes the group will develop Fair Trade Premium projects with mid- to long-term impact, such as registering fishers with the government health care and labour pension plan, and the creation of a children's fund that supports education up to the university level.

In this way, Premium funds are also increasing fishers' status as contributors to society and lessening the extractive effects of international trade on small-scale fisheries. This is a conditional stipulation of paragraph 7.9, which states that "assessments ... [should] ensure that adverse impacts by international trade on the environment, small-scale fisheries culture, livelihoods and special needs related to food security are equitably addressed."

In a household survey of participants conducted in 2016, 63 percent of respondents knew how the Fair Trade Premium was spent and 73 percent were satisfied with the results. In compliance with the CFS, fishers have also been given safety-at-sea and first aid training, with first aid kits now available at all landing sites – a small but measurable change in isolated villages that are often far removed from health care facilities.

The structural community components of the Fair Trade model, such as the creation of fishers' associations and committees, have also become increasingly important to fishers, as demonstrated by the findings of the survey conducted in 2015 and again in 2016 (Figure 6.4). In 2015, 68 percent of respondents rated the Fair Trade Premium as

FIGURE 6.4
2015 and 2016 household survey results

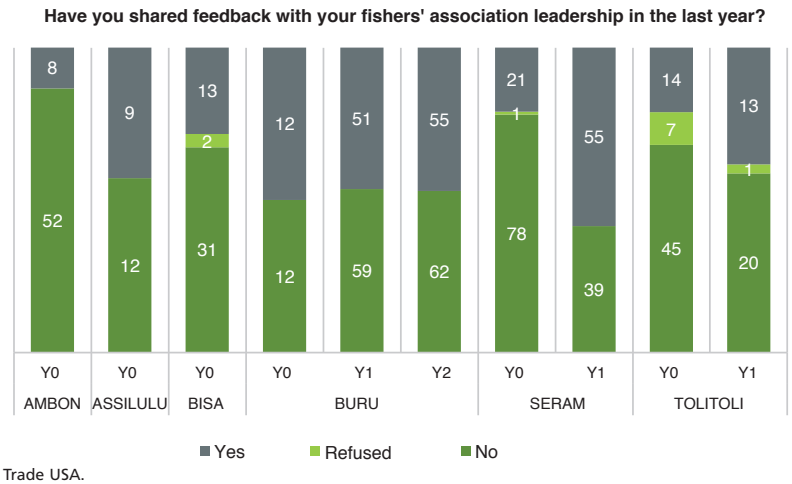


Source: Fair Trade USA.

the most important benefit of the Fair Trade model. In 2016, that rating decreased to 48 percent, while the fishers' perception of the benefits of having a Fair Trade Fishers' Association increased from 12 percent to 20 percent.

Prior to certification, all fishers operated independently. With the introduction of Fair Trade Associations, fishers were now formed into groups based on geography. In addition to Fair Trade Premium management, the associations began meeting regularly to exchange information, assess community needs and communicate with their intermediaries. This platform allowed fishers to engage in broader community and political issues, which they found valuable. The survey data in Figure 6.5 also shows an increase in fishers raising their concerns with association leadership year on year, pointing to greater levels of producer engagement and agency.

FIGURE 6.5
Household survey results with Y0–Y2 representing the survey year



Source: Fair Trade USA.

6.3.2 Worker impact

Fair Trade Certification also covers workers in the processing plants, with annual audits to ensure CFS requirements on human rights and working conditions are met, such as:

- Discrimination and abuse prevention;
- Freedom from forced labour;
- Protection of minors;
- Freedom of association;
- Wage protection and transparency on conditions of employment;
- Occupational health and safety;
- Access to health care and other services.

6.3.3 Environmental impact

CFS resource management criteria detail the requirements for data collection, stock health, governance structure and proper waste management, which are key components to achieve a sustainable, responsible fishery. The implementation of Fair Trade's resource management requirements bring SSF Guidelines recommendation 7.8 into practice by ensuring "that effective fisheries management systems are in place to prevent overexploitation driven by market demand that can threaten the sustainability of fisheries resources, food security and nutrition."

The Indonesian supply chain, led by Anova with fisher programmes implemented by MDPI, was already part of a Fishery Improvement Project (FIP) when it entered the Fair Trade assessment. Both FIP and Fair Trade requirements have led to improvements in data collection and product traceability, with increasingly higher numbers of fishers completing logbooks as mandated by the CFS. This has contributed to a wider understanding of fishers' impact on the yellowfin tuna stock as well as secondary and bycatch species. According to the CFS, a data collection system must be in place by Year 1, with increasingly rigorous documentation on catch data required by Years 3 and 6. In addition, by Year 1, logbooks of registered fishers must reflect an estimated catch of primary species of at least 50 percent of total fishing trips. That number increases to 75 percent by Year 3 and 90 percent by Year 6. Notably, although the demand for certified handline tuna is increasing, there are CFS safeguards in place to ensure the tuna is not overfished by registered fishers.

Fishers have also received training on ETP species status and conservation needs, in particular dolphins and seabirds, which they encounter regularly. Moreover, several groups have taken it upon themselves to promote knowledge and protection of ETP species within the wider community, using Fair Trade Premium funds. Although not a direct outcome of the trainings, Fair Trade registered fishers have uniformly abandoned the widespread practice of turtle egg consumption and are actively educating family and friends to follow their example. The enhanced awareness of marine sustainability among fishers has prompted direct actions to protect natural resources, as supported by Fair Trade seafood sales (SSF Guidelines recommendation 7.9*).*

For producers, it is an ongoing challenge to meet the rigorous environmental standards required by Fair Trade, which includes developing a fisheries management plan. This is especially difficult due to the limited scientific understanding communities have of the impact created by different management measures. Furthermore, the governance structure places handline fisheries outside of international quotas, and there is limited historical data on catch. To meet this challenge, MDPI staff are utilizing a simplified method to train fishers in basic stock management measures and assist them in articulating basic approaches, such as limiting fishing activity via "no fishing Fridays." Such actions could be acknowledged by local government and enshrined in a simple harvest control rule (Pollard *et al.*, 2018, p. 49). In addition, Fair Trade requires that 30 percent of the Fair Trade Premium be spent on environmental projects – a criterion that helps ensure stock health and environmental sustainability.

In 2019, the North Buru and Maluku Fair Trade Fishers' Associations of the handline yellowfin tuna fishery became the first of its kind in Indonesia to undergo a Marine Stewardship Council (MSC) full assessment. The Fair Trade Committee on

North Buru Island was selected to coordinate with MDPI and other stakeholders to compile the documentation required. As remarked by Blane Olson, managing director of Anova Technical Services, "Years of data collection and sustainable fishery practices by Fair Trade fishers have set the stage for fulfilling the rigorous demands of MSC certification for this handline fishery, and we couldn't be more thrilled" (Kearns, 2019).

The implementation of the CFS provided a pathway for the fishery to work toward the MSC assessment. "It is extremely difficult to meet the MSC standard for a small-scale fishery, composed of thousands of independent one-manned vessels that operate on remote islands," added Saut Tampubolon, Executive Director of MDPI. "The Fair Trade Committee (FTC) and Fair Trade Associations, which have been in place in North Buru for five years, give an organized structure for the MSC Unit of Assessment. This major advantage of utilizing an existing FTC makes MSC potentially possible" (Kearns, 2019).

6.3.4 Enabling conditions

A key factor in Fair Trade's success in Indonesia has been its partnership with MDPI. The country's environment, which includes the world's second-longest coastline, is logistically complex. Implementation of the CFS required on-the-ground expertise, local knowledge, and a network of trained community organizers responsible for replicating the model in multiple islands and communities. MDPI has been responsible for introducing Fair Trade concepts and requirements to local communities since the beginning of the programme in Indonesia. MDPI staff train Fair Trade Committee members (using outside training bodies when necessary) in organization, financial literacy and bookkeeping. The organization also collaborates closely with the committee to ensure that fishers understand their roles and responsibilities and have the tools and acumen to successfully use the Fair Trade Premium to its maximum advantage. Furthermore, MDPI's knowledgeable and dedicated staff provide the necessary local personnel to ensure both initial and ongoing certification of this supply chain. The cooperation and partnership of the local processors PT. Harta Samudra and Blue Ocean Grace International have also been essential in the implementation of the programme, as both entities abide by the CFS.

Finally, Anova Food has been a critical partner in Indonesia and within the American retail market. As the Certificate Holder and importer of the certified tuna, Anova is responsible for annual fiscal audits and on-the-ground programme implementation. Its staff and sales teams have fully supported Fair Trade Certification since its adoption in 2013 and played a significant role in delivering the product on retail shelves. Between 2015 and 2016, sales volume increased over 280 percent, and demand for the certified product has steadily increased through its marketing efforts, as well as those of Fair Trade USA (Business Wire, 2019). Anova's ongoing support of the FIP for yellowfin tuna in Eastern Indonesia has also been an important factor in its success, allowing for synergies between the FIP and the Fair Trade programme under MDPI, such as data collection, bycatch documentation and community participation in fisheries governance.

6.4 CHALLENGES AND LESSONS LEARNED

6.4.1 Implementation cost

As with many certification and/or improvement programmes, one of the most significant challenges is the ongoing cost. In this case, the Certificate Holder bears the cost of certification. Fair Trade audits are conducted annually, and those in Indonesia require several weeks to complete. This fact, coupled with the difficult geography of Eastern Indonesia and the remote location of several of the fishing villages, keep audit costs high. The demand for the product, the visibility of the Fair Trade programme,

and the aggregation of fishers into organized clusters also increase the presence of opportunistic buyers. These buyers increase local competition and decrease the potential volume of Fair Trade product sold, while bypassing investment in long-term socio-economic and environmental improvements.

Significant financial resources are also needed to support MDPI and capacity building on the ground. Landing sites and processing locations have had to undergo improvements to product traceability and worker safety systems. These costs are borne by the processor and are difficult to pass on to buyers. Regarding product traceability, currently yellowfin tuna loins are tagged as Fair Trade and coded with landing site details after they have been landed. Upon delivery to central processing plants, this information is entered into a tracking system and then, in the case of the Anova supply chain, uploaded onto a blockchain platform.

In Indonesia, Anova has partnered with MDPI and USAID to implement full chain traceability by working with all actors in the supply chain including fishers, intermediaries and processors/exporters (Fishing & Living, 2019). At the fisher level, electronic vessel monitoring systems such as Spot Trace and Pelagic Data Systems are being utilized to gather more accurate catch data. At the intermediary level, a mobile application called Trafiz developed by USAID OCEANS is progressively being deployed to contribute to traceability at landing sites by recording transactions electronically and uploading them into an online database. Finally, at the processor/exporter level, an electronic tally system (Trace Tales) developed by MDPI and funded by USAID OCEANS has been installed in multiple processing plants. The blockchain platform will integrate a number of existing traceability tools to move toward continuous, tamper-proof traceability all along the value chain.

Blane Olson, Managing Director of Anova Technical Services, explains that "with the addition of our new blockchain technology programme, we're able to easily access and share powerful information about the fish-to-market journey with customers and consumers, while ensuring that fish is caught from clean ocean waters by fisher[s] who operate under Fair Trade standards, which are certified by MDPI and Fair Trade USA to ensure fair wages and safe working conditions."

6.4.2 Navigating intermediaries and inclusion in Fair Trade

Intermediaries play an integral social and economic role in these fishing communities. They facilitate production, support post-harvest processing and grading, act as money lenders, and collect and transport raw product to processors. Gaining the trust and cooperation of intermediaries as leaders of these communities has been essential in implementing the CFS and in the formation of associations (Bailey *et al.*, 2016).

This process of building trust and cooperation with the intermediaries across all Fair Trade Certified sites was a multiyear process enabled by MDPI staff. At times, community building was challenging, as some intermediaries viewed fishers' associations and committees as a threat to their operations and methods. MDPI worked closely with cooperative intermediaries at the beginning of the programme, in particular those who were also fishers and who had close ties to the local community, and then expanded outward. As the Fair Trade programme has adapted to the Indonesian context to involve intermediaries, likewise intermediaries have evolved to run their businesses within the bounds of fishers' associations and involving greater levels of communication and transparency with fishers. Intermediaries who are also fishers are part of fishers' associations. For those who do not fish, the local association has the option of including them in meetings as non-voting members.

The associations help resolve issues between intermediaries and fishers, as in a recent case involving price transparency. In a number of villages, fishers were being quoted different prices for similar products, and there was confusion about how grading affected price. In addition, certain intermediaries were claiming non-certified fish as

certified to achieve higher commercial prices. Many of the fishers raised these concerns with their associations and with MDPI. Through conversations with intermediaries and with coaching and training efforts by MDPI staff, these issues were ultimately resolved.

6.4.3 Market pull

Additional challenges occur at the American market level. While Fair Trade brand recognition is high with 60 percent of American consumers reporting they recognize the logo, Fair Trade Certified seafood is not as well known. Thus it is critical to work with Fair Trade's brand partners and to equip their sales and marketing teams with the tools they need to grow sales and recognition of Fair Trade Certified seafood. The sustainable seafood movement has been successful over the past 20 years with American and European retailers, the majority of whom have sustainable seafood commitments for wild caught seafood (CEA, 2017). However, most of these commitments are centred on environmental sustainability. Hence Fair Trade and other NGOs involved with addressing social issues in seafood production are working diligently to modify current retailer commitments to adopt social criteria in seafood sourcing, including a commitment to Fair Trade.

A dedicated buyer willing to pay a higher price for a certified product is essential to the success of any Fair Trade Certification, as well as similar interventions. Fair Trade's model is marketdriven, and its effectiveness hinges upon demand from an end buyer. Without sales on Fair Trade terms, there is no producer impact or price incentive that compels supply chain actors to adhere to higher levels of compliance and more equitable trade practices.

6.5 CONCLUSIONS

The Fair Trade Seafood Program in Indonesia is a story of continuous improvement, beginning with four Fair Trade Fishers' Associations in Ambon and Buru and expanding to 38 Fair Trade Associations with over 800 fishers on multiple islands, each with its own logistics, cultural dynamics and local politics.

The model has brought positive changes to communities in Indonesia through group organization, adherence to rigorous standards, and additional income for producers. Fair Trade is the only certification that guarantees a price premium. Since the Seafood Program's beginning, over a quarter of a million United States dollars have been delivered to participating Indonesian small-scale fishers. With ongoing support from MDPI, these fishers are identifying a range of projects and investments to improve their livelihoods and the marine environment.

Additionally, the development of Fair Trade associations and committees have strengthened fishers' capacity, enhanced their income and livelihood security, and supported data collection and fisheries management systems to prevent overexploitation of natural resources. Organized fishers' associations, built on community input and collaboration, have provided the necessary social structure to enable stronger data collection and traceability, as well as advance progress for FIPs and toward a full MSC assessment.

Fair Trade USA and its partners have been able to replicate the successes seen in Indonesia in other fisheries and countries, specifically in Mexico, the Maldives, the United States of America and the Solomon Islands. The types of certified species and associated fishing gear have also grown, with Pacific shrimp (suripera net), Atlantic scallops (scallop dredge), Alaskan salmon (drift net and setnet), and skipjack tuna (pole and line) all certified between 2015 and 2017.

In 2020, the CFS will undergo a major revision. As part of that process, Fair Trade USA will update its standards to increase its impact on small- to medium-scale producers worldwide.

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Appendix 1

List of fisher survey questions

Gender
Birth year
Fishers' association name
How many children (age 18 or younger) live in your household?
In the last year was there a time that you or someone in your household skipped a meal or ate a smaller meal because you did not have enough money to buy food?
No
No answer
Yes
In the last year, how often did that happen?
1–2 months
Don't know
Every month
Many months
No answer
Have you attended a safety-at-sea training in the last 12 months?
I don't remember
No
No answer
Yes
During the last month, how often did you take a life jacket to sea?
Always
Don't know
Never
No answer
Sometimes
During the last month, have you had an accident while fishing?
Don't know
No
No answer
Yes
How many years have you been a fisher?
Which of the following best describes you?
Don't know
I am a captain and I do not own the boat
I am a captain and I own the boat
I am a crew member
No answer
How much did you earn from fishing in the last month?
In comparing this month with the same month last year, has the income from fishing changed?
Don't know
I didn't catch fish during the prior season
It has decreased
It has increased
It has not changed
No answer
Other than fishing, what other sources of income are there for your household? Please select all that apply.
Agriculture
Business
Manufacturing

List of fisher survey questions (Continued)

No other sources of income
Other employment (for example, construction)
Remittance
Seafood processing
Tourism
How much of your income comes from fishing?
All
Don't know
Less than half
Most
No answer
When you have an unexpected need for money (e.g. boat damages, illness/death in family), how do you get it?
Borrow money
Government assistance
I don't know what to do
Insurance policies
Other
No answer
Remittance
Savings
Who do you borrow money from?
Bank
Boat owner/supplier
Don't know
Family/friend
Microfinance Institution
Other
Other informal lender
No answer
Do you know how the Fair Trade Premium is being spent?
Don't know
No
No answer
Yes
Are you satisfied with the way the Fair Trade Premium is being spent?
Dissatisfied
Don't know
Neutral
No answer
Satisfied
Have you shared a complaint or recommendation with your fishers' association leadership in the last year?
Don't know
No
No answer
Yes
Were you satisfied with the way leadership addressed your complaint or recommendation?
Don't know
Not satisfied
No answer
Satisfied

List of fisher survey questions (Continued)

Why didn't you share complaints or recommendations?
I did not know how to share my opinion
I did not think my opinion would make a difference
I have been satisfied with operations
I was afraid to share my opinion
Other
No answer
What is the most important benefit you see in the Fair Trade programme?
Don't know
Formation of a fishers' association
I don't see any potential benefits
Other
Potential increase in income
Premium funds
No answer
Trainings
Since you've joined the Fair Trade programme, what has been the biggest challenge in participating?
Changes in fisheries management
Don't know
Finishing trainings
Fishers' association membership rules
Having to collect data
No challenges
Other
No answer
Taking part in meetings and gatherings

7. Madagascar's mud crab fishery: How fishers can earn more while catching less

Zbigniew Kasprzyk
Independent fisheries consultant
Antananarivo, Madagascar

Adrian Levrel
Blue Ventures
London, UK

ABSTRACT

Madagascar, one of the poorest countries in the world, has large coastal communities who rely heavily on various small-scale fisheries, such as mangrove mud crab (Scylla serrata), for income. There has been a marked increase in mangrove mud crab fishing due to high international demand, and it is now the country's third most valuable seafood export. This has led to overfishing, with documented decreases in quantity and average size of catches. Additionally, post-harvest losses along the value chain lead to lost value, due to poor handling, transport and storage. This lost value further reduces the earnings and food security of the coastal communities who depend on this fishery. The Smartfish Programme, jointly implemented by the Indian Ocean Commission and the Food and Agriculture Organization of the United Nations and funded by the European Union, worked with the Government of Madagascar's ministry responsible for fisheries resources and locally-based NGOs including Blue Ventures and WWF, to assess methods of reducing exploitation of the fishery and increasing benefits to fishers and the wider supply chain. This case study reviews practical approaches to recover lost value in the mangrove mud crab fishery, highlighting low cost interventions that can increase yields even in the face of falling catches. The value of catches were augmented by obtaining higher prices for export crabs (around half of the annual harvest) and reducing post-harvest losses, providing a practical example of how low-cost changes in behaviour, logistics and technique can reduce post-harvest losses, helping fishers to earn more while catching less.

Keywords: Mud crab, Scylla serrata, Madagascar, mangroves, mangrove fisheries, value chain improvement, post-capture losses, small-scale fisheries, traditional fisheries.

7.1 INTRODUCTION

Approximately 30 000 traditional fishers work in Madagascar's mangrove mud crab fishery, mostly in areas of the West coast exhibiting mangrove forests in proximity to seafood buyers. Fishers fish on foot or from non-motorised wooden pirogues (sailing or paddled outrigger canoes) using simple equipment. Market demand has increased significantly since the late 2000s, particularly for live crabs, leading to overexploitation in all but the remotest regions, with a marked trend of reductions in fishing yields and the average size of crabs harvested. At the same time, population growth and economic

migration to the coast have led to more people exploiting mangroves, in particular for charcoal production and construction timber, as well as harvesting fish and crustaceans for local and foreign markets. Small-scale fishers who live in the mangroves typically have no farmland and rely heavily on mud crab fisheries for their livelihoods.

In the early 2000s, it became clear that mangrove forests and crab stocks were being overexploited. Subsequently, Madagascar's government ministry responsible for fisheries resources (*Ministère des Ressources Halieutiques et de la Pêche* - MRHP, merged into the Ministère de l'Agriculture de l'Elevage et de la Pêche in 2019) decided to develop a new policy for the sector. The SmartFish Programme[1], jointly implemented by FAO and the Indian Ocean Commission, began working with MRHP in 2011 with the aim of making the mud crab fishery more sustainable by:

- Enhancing the value of the crab sector by reorienting exports to live crabs, which are more lucrative than frozen crabs and can be sold for twice the price;
- Reducing post-harvest mortality to under 20 percent by the end of 2015, compared to 32 percent in 2013 (with peak losses of 50 percent in the rainy season).

The challenge for fishers could be summed up as: "Can you earn more while catching less?" Ten improved practices for catching and handling crabs were developed with the aim of improving the quality of live crabs handled across all links in the value chain. These good practices were tested and disseminated directly to fishers, wholesalers and collectors. The result has been that the crabs are now healthier and more robust, with a better meat yield, and are more able to survive both domestic transport and export.

These good practices align with the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines; FAO, 2015), particularly: reducing post-harvest losses throughout the sector (paragraph 7.5), facilitating access to the international market through the export of live crabs (paragraph 7.6), and increasing the quantity of crabs sold on the local market and thereby contributing to food security (paragraph 7.7). Identifying simple innovations together with fishers and collectors, and involving them in development, testing and skills transfer to spread the good practices, has been at the heart of the intervention strategy (paragraph 12.3).

The MRHP achieved widespread adoption of post-harvest handling practices by using a participatory process linking decentralized departments, actors in the sector, and fisheries experts. This case study details the process the SmartFish Programme followed for identifying, testing and disseminating good practices on the ground in all five of the coastal regions of Western Madagascar that contain mangroves. It also provides recommendations on how to replicate this positive experience in other mangrove areas of Madagascar, as well as other African countries with mangroves and mangrove crab fisheries.

7.1.1 The mangrove crab sector in Madagascar

The mangrove crab, *Scylla serrata* (Forskal, 1755), also known as the mud crab, is one of the largest and most sought-after crab species in the *Portunidae* family. It is found in the intertidal zones of estuaries and mangroves in the Indian and Pacific Oceans. It is adapted to subtidal (constantly submerged) zones and can tolerate significant variations in salinity – from 1 to 30 percent (Ali *et al.*, 2004).

According to remote sensing carried out in 2010, Madagascar has around 2 000 km² of mangroves (Jones et al., 2016). In 1997, this represented 20 percent and 2 percent

[1] The SmartFish Programme is a European Commission funded initiative to develop and support the implementation of the Eastern and Southern Africa and Indian Ocean (ESA-IO) fisheries strategy for sustainable management of the fisheries sector.

of the total in Africa and the world, respectively (ONE and ANGAP, 1997). The vast majority of Madagascar's mangroves are located on the country's West coast (Figure 7.1).

Official figures from MRHP state that the national maximum sustainable yield (MSY) for mangrove crab is 7 500 tonnes a year (Ralison, 1987). This estimate is based on a hypothetical production level of 2.5 tonnes/km² for 3 000 km² of mangroves.

Sustainable exploitation of both mangrove fisheries and forests has become critical, and not just for the sake of crab fisheries. The mangrove forests provide a habitat for many other crustaceans and fish, as well as a host of other valuable ecosystem benefits, such as protection against storm surges and sequestration of carbon dioxide.

Mangrove crab fishing in Madagascar is exclusively traditional: it is carried out in inaccessible mangrove areas on foot or in small non-motorized pirogues, using very simple and inexpensive fishing techniques (e.g. hooks, crab hoop nets, keepnets and lines). A national survey carried out in 2013 showed there are about 30 000 mangrove crab fishers in Madagascar, of which 21 percent are women (MRHP and PASP, 2014). Women processors generally handle storage and sale, often assisted by their children.

Crabs are generally handled live, covered in mud. Collectors, wholesalers and local market vendors have collection permits and wholesaler or vendor cards. The proportion of informal actors in the sector is shrinking and both formal and informal operators use few employees and little capital. With almost no access to credit, they have little funds of their own to invest in collection resources. In stark contrast, export companies have processing plants that typically meet international standards (Kasprzyk, 2014).

Previously, crab fishing was considered by fishers, collectors and fishery authorities to be of lower importance than fishing for shrimp and fish. Indeed, catches from 1985 to 2008 were well below MRHP's hypothesised MSY of 7 500 tonnes. However, in 2009, crab fishing increased significantly when shrimp companies adapted some of their processing infrastructure to crab to compensate for falling shrimp production. Traditional fisher production has increased from 4 052 tonnes in 2012 to 6 018 tonnes in 2017 (Figure 7.2), with its value increasing in parallel.

The mangrove crab, Scylla serrata (Forskal, 1755).

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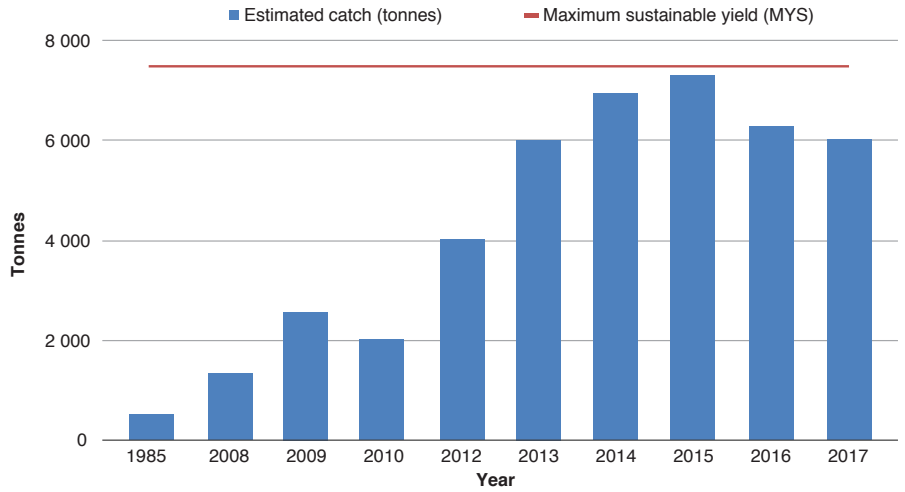
Female mud crab fishers launching pirogue among mangroves.

FIGURE 7.1
Simplified map of the mangrove zones in Madagascar

Source: Kasprzyk and Levrel, 2018.

Map conforms to: Map No. 4170 Rev. 18.1 United Nations, February 2020.

FIGURE 7.2
Growth of mangrove crab catches in Madagascar since 1985



2012: improvement in estimation method; 2016: new estimate by Z. Kasprzyk.

Source: MRHP statistical services*.

* https://docs.google.com/spreadsheets/d/1jFLw4UQFvh99ww71FEKJedg0Oq627J8E0aVKHQ1LUW8/edit?usp=sharing

7.2 REDUCING POST-HARVEST MORTALITY

This part of the study is directly linked to paragraph 7.5 of the SSF Guidelines.

Methods

The SmartFish Programme implemented the "crab project", which actively engaged actors from each step in the supply chain with the aim of addressing post-harvest mortality and identifying good practices to reduce post-harvest losses (Table 7.1). The project began by mobilizing dynamic and innovative local supply chain actors and identifying a range of technical solutions with them. These were then tested, optimized and presented to actors and partners for their approval. These same actors and partners were also involved in the awareness-raising and dissemination stages.

TABLE 7.1
Process of identifying post-harvest good practices

Phase	Mobilizing actors and resources	Outputs
1. Introduction on the ground, baseline survey and preliminary analysis	In-depth study and analysis of the situation on the ground Engagement and awareness raising of technical services and local authorities Recruiting local agents that know the terrain well to act as facilitators Identifying dynamic individual actors	Estimation of post-harvest losses and causes at each link in the chain Identification of innovative local practices that could be optimized or improved A range of technical solutions proposed for each link in the sectoral chain
2. Testing a range of technical solutions	Setting up a testing mechanism for technical solutions with the actors identified Training of operators with follow up by facilitators Broad geographical coverage and sufficient duration to observe clear results	Evaluation of the technical solutions using survey data and opinions gathered in workshops List of good practices for approval
3. Approval of good practices	All the identified sector actors engaged to approve the selected good practices	List of approved good practices to disseminate List of actors and facilitators to mobilize for demonstration and training on the ground
4. Dissemination of good practices	Producing a teaching toolkit for training and communication Organizing awareness-raising and dissemination campaigns	Follow-up evaluation of adoption of good practice and the impact on post-harvest losses

Post-harvest mortality diagnostics

To reduce cold-chain investments, mangrove crabs are handled live at each link in the supply chain. Mortality rates are significant between the moment of capture and the arrival at final destination (i.e. factory/market).

The SmartFish crab project conducted numerous field surveys in 2012 and 2013 assessing mortality at each link in the supply chain (Table 7.2).

TABLE 7.2
Post-harvest mortality in the crab sector in Madagascar

Link	Mortality rate*
Fishing and storage in villages (with fishers)	7%
Storage in villages and transport to collectors (with wholesalers)	7%
Storage at collection points including transport and delivery to the factory/market located on the coast (with collectors)	16%
Transport between coastal villages and Antananarivo for crabs exported live by air or sold in the capital (with collectors)	5%
Sale at local market/bazaar (with vendors)	6%

* Outside of cyclone season.

Source: Surveys conducted by the SmartFish Programme crab project in 11 of the 17 administrative districts in the country that contain mangroves. FANOITRA NGO & Kasprzyk, 2016

The mortality rate varies significantly depending on the remoteness and accessibility of the fishing villages or camps, the way that collection is organized, and the final destination of the crabs. Mortality also increases significantly in cyclone season (values presented in Table 7.2 are for outside of cyclone season only).

Annual losses in 2013 were estimated at 1 300 tonnes – a commercial loss of USD 4.5 million (Kasprzyk, 2016). These are total losses, as the dead crabs are not fit for human consumption or use in animal feed, due to toxins that quickly develop after death.

The main causes of this elevated mortality, some of which are illustrated in Figure 7.3, are:

a) The way the collection is organized and the extended period of time during which crabs are handled, from when they are caught to final delivery (up to a week or more for remote villages);
b) Use of inadequate storage and transport, leading to crabs being crushed;
c) Crab suffocation due to the inadequate quantity and quality of mud and the lack of watering;
d) Late tying of crabs' claws, which encourages injuries (as they are carnivorous and cannibalistic);
e) Sale of crabs without claws in certain regions of Madagascar (if claws are removed, crabs are injured and therefore more vulnerable).

Phases 1–3: Identification, testing and approval of good practices

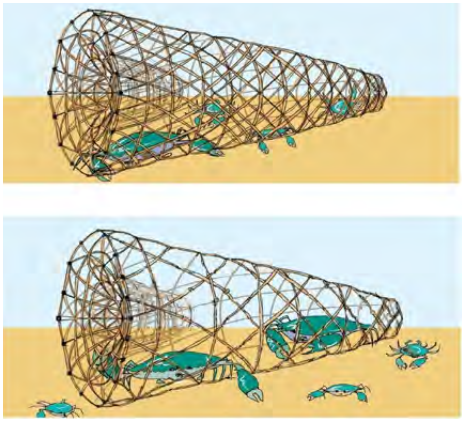
Once the losses had been quantified, the MRHP set a goal of reducing the estimated mortality of 32 percent by a third. With the support of SmartFish, it implemented a programme with sector stakeholders based on two principles:

- Identifying simple, low-cost technical solutions using locally available skills and materials, and promoting local good practices;
- Achieving broad geographical coverage, with numerous pilot sites for demonstration.

Between November 2012 and January 2014, practices were identified, tested and approved. Consultants carried out several visits to villages, allowing them to identify the actors (fishers, wholesalers and collectors) who reported lower mortality than

FIGURE 7.3
Practices associated with a high level of post-harvest mortality

Hook fishing at low tide (injured crabs)



Too fine a mesh in keepnets
(catching undersized crabs)

Unloading baskets that people carry on their heads

Outdoor storage

Transport in large overloaded baskets

Transport without protection against the sun and rain

Transport in lorries without shelves

Placing crabs for sale on the ground

others. After analysing techniques, these methods were individually tested over several months by the leaders of other villages.

In collaboration with the World Wildlife Fund, SmartFish carried out 716 tests and demonstrations in 33 villages in four of Madagascar's six mangrove regions. This involved providing fishing materials as well as training to 205 fishers while approximately 2 500 fishers had access to the demonstrations in their villages.

At each demonstration site, the project monitored and evaluated post-harvest losses in comparison with the baseline established during the initial surveys. This made it possible to quantify the reduction in mortality, and to also analyse the adaptability of the innovations as well as their profitability (i.e. additional revenue and amortization period). Importantly, a fisheries expert regularly supported the local consultants, spending more than 75 days working in coastal villages and towns between November 2011 and September 2015.

This work was ultimately used to produce SmartFish Manual No. 35, entitled "Enhancing the value of mangrove crab through reduction of post-harvest losses", which was published in French and Malagasy by SmartFish, the European Union and FAO in 2014, detailed in the next section - dissemination.

TABLE 7.3
Brief description of the ten good practices published by SmartFish

Point in sector value chain	Good practice	Principles
Fishing	1. Crab hoop net	Catching larger specimens, in deeper water
Storage (fisher)	2. Storage hut 3. Live-crab storage cage	Sheltering crabs awaiting collection Keeping the crabs in their natural environment (no losses)
Storage (collector)	4. Storage hangar 5. Live-crab storage enclosure	Limiting losses through appropriate storage Keeping the crabs in their natural environment (no losses)
Transport (collector)	6. Adapted carts (shelves)	Reducing crab crushing, protecting them against the sun and rain
Transport (collector/wholesaler)	7. Wooden box for transport	Reducing crab crushing, maintaining favourable transport conditions
Transport (collector/wholesaler)	8. Improved shelves for transport by pirogue	Reducing crab crushing, maintaining favourable transport conditions
Transport (collector/wholesaler)	9. Improved shelves for transport by lorry	Reducing crab crushing, maintaining favourable transport conditions
Transport (collector/wholesaler)	10. On-board motor for transport by pirogue	Reducing transport time

Phase 4: Dissemination of good practices

The second phase of the project involved broader awareness raising and dissemination activities, consisting of the following elements:

- Producing a detailed technical manual in French and Malagasy for all actors in the sector;
- Producing an awareness-raising/dissemination toolkit (again in French and Malagasy) based on the manual, presenting the various tools to different target audiences;
- Broadcasting on local radio stations in local dialects, so as to reach as wide an audience as possible;
- Organizing regional and interregional workshops for training and demonstration;
- Setting up three mobile demonstration units in the villages to show training videos, make practical demonstrations, and distribute the different tools or dissemination kits.

The programme specifically targeted each of the actors in the sector (fishers, wholesalers and collectors) as well as those around them – i.e. their spouses and children (who participate in crab handling) and the broader public that uses mangrove resources. Children attending school are often the only literate members of the household, and are thus more inclined than adults to take on the good practices and innovate. Technical services, local authorities and development partners in coastal zones were involved at each stage.

TABLE 7.4
Description of the awareness-raising toolkit

Tools	Content	Target audience and use
Technical manual, format 17x25 cm (80 pages)	Code of conduct for operators and detailed description (photos, drawings) of ten good practices for strengthening crabs and reducing post-harvest losses	Actors in the sector (collection businesses, individual collectors), fishing and coastal environment authorities, Non-governmental Organizations (NGOs) and projects
Information posters (five) in A2 format, coated	Instructions for assembling and using the tools for fishing, transporting and storing crabs recommended in the technical manual	All actors in the sector. Display: village billboards, markets, village and community schools, administration offices, local offices of NGOs and projects.
Fact sheets (ten) in A4 format, double-sided and laminated	Concise fact sheets on the ten good practices described in the technical manual	All actors in the sector. Distributed by mobile demonstrations units to people interested in a particular technique.
Radio programmes (three)	Code of conduct and good practices, in the form of a sketch or a short play in different coastal dialects	General public (radio is the only media accessible for the majority of remote villages)
Training video (43 minutes)	Manufacture and use of the tools recommended in the good practices	All actors in the sector and the general public. Disseminated in the villages by mobile demonstration units.
Comic, format 21x30 cm (15 pages), bilingual, in Malagasy and French	Raising awareness among the young about the benefits of mangroves, the importance of protecting them, and the existence of post-harvest good practices.	Children aged 10–14 years and their families in mangrove areas. Distributed in village schools.
Illustrated cloth wrap (lambahoany), format 170x112 cm, fabric with four-colour screen printing	Illustrations showing the good practices and reminding people of the minimum catch size	Women. Distributed by the mobile demonstration units and during regional workshops.
Illustrated mats in A3 format, double-sided and laminated	Illustrations showing the good practices and reminding people of the minimum catch size	Local restaurants (*gargotes*), fishers' families. Distributed by the mobile demonstration units and during regional workshops.

Key elements of training and dissemination

Regional and interregional workshops in the coastal towns of West Madagascar were key to the success of the project. From 2014, these brought together a total of 270 people, of which 52 were fishers and 140 were actors elsewhere in the value chain. During the workshops:

- The MRHP services demonstrated their engagement and raised awareness about new legislation being prepared.
- The operators and partners had the opportunity to approve the good practices selected for dissemination, and so were fully involved in the dissemination.
- The participants had the opportunity to engage in debate and exchange opinions on sustainable use of crabs and mangroves, while gaining technical training and expertise.
- An innovation contest was launched to identify new practices or improvements to those that had already been disseminated.

What set these workshops apart was that they included practical training and demonstrations, in addition to the presentations and debates. This was important in that it allowed the operators to participate and demonstrate their expertise. The

fishers and wholesalers, who were generally quite passive during the presentations and debates, were very active during the sessions on assembling and optimizing better gear, such as crab hoop nets, live-crab cages or other wooden boxes.

The main challenge for the dissemination campaign was the remoteness of the mangrove areas. Reaching the fishing villages is difficult and time-consuming, as they are accessible only by sea. For this reason, SmartFish set up three mobile demonstration campaigns in April and May 2015, each lasting six weeks and travelling around in motorized boats. Each mobile unit consisted of three or four people, including at least one practitioner capable of demonstrating how to make and use the different innovations. The mobile unit was equipped to show training videos and had a dissemination kit. It adapted to the life and work schedule of the fishers and their families in order to reach as many people as possible.

Importantly, the people demonstrating the good practices in the villages were the best fishers, intermediaries and collectors. After they themselves had been trained, their new knowledge and evident professionalism enabled them to train other village actors (Box 7.1 and Figure 7.4).

BOX 7.1

A typical day for a mobile demonstration unit

In the morning, while the fishers were at sea, the demonstration unit met the younger pupils (10–14 years) at school and gave them the comic with explanations and discussions. At the same time, a member of the unit did a brief survey with the local operators on fishing and post-harvest losses, to understand the local context before the afternoon session.

In the afternoon, a meeting was held with the fishers and other supply chain actors. The fishers were first given the floor to express their opinions. Then the discussion broadened to the causes of crab mortality and how the villagers themselves could reduce their losses.

Next, the unit showed the training video on good practices (43 minutes), and then demonstrated specific good practices (crab hoop nets, live-crab cages, etc.). The fishers, wholesalers and collectors were invited to participate and the most active and interested people received laminated fact sheets, the technical manual and other items from the dissemination kit.

At the end of the day, the unit put up displays in public places (offices, markets and schools) and the headquarters of local groups, NGOs and projects active on the ground.

The results of the mobile demonstration units were as follows:

- 46 *fokontany* (village-level administrative unit) visited involving nearly 9 800 fishers, of whom 4 000 were specialized in crab fishing;
- 2 060 fishers trained, 1 090 children received a comic;
- 140 technical manuals, 1 430 laminated sheets, 225 posters, 90 placemats and illustrated cloth wraps;
- Participation of mayors, village chiefs, knowledgeable elders, presidents of grassroots community organisations, head teachers and teachers.

Radio broadcasts were translated into official Malagasy and the two coastal dialects, and broadcasted 74 times by eight local radio stations in five large coastal towns. Radio was also used to inform the public of the aims of the mobile demonstration units. Radio broadcasting was a low-cost way of spreading the key messages to fishers, wholesalers and collectors who had had no direct contact with the government or project trainers. Even where collectors had easier access to the authorities or the project, radio still served to advise and update them.

FIGURE 7.4
Demonstration in the village and distribution of the comic

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Reduction in post-harvest losses

TABLE 7.5
Mortality rates: progression between 2013 and 2015

Stage in the value chain (actor)	Mortality rate (%)	
	2013	2015
Fishing and storage in villages (fishers)	7.0	2.5
Storage in villages and transport to collectors (wholesalers)	7.0	2.5
Storage at collection points including delivery to factory/market located on the coast (collectors)	16.0	6.5
Transport between coastal towns and Antananarivo (collectors)	5.0	5.5
Sale at local market/bazaar (vendors)	6.0	6.5
Cumulative mortality: • Coastal town delivery	23.0–36.0	11.5–18.0
• Antananarivo delivery	28.0–41.0	17.0–23.5

Source: Fanoitra and Kasprzyk, 2016.

Over the duration of the project, the results obtained were satisfactory:

- In two years, the mortality rate dropped from 32 percent to 17.5 percent.
- This represents a gain of 600 tonnes of crabs with a market value of USD 2.1 million.
- The objective of reducing the mortality rate by a third was exceeded.
- Each kg of crab "saved" translates into an additional USD 1 for the fisher.

Mortality was successfully reduced in the supply chain mainly where the fishers, village intermediaries and collectors were active. This was achieved thanks to the improved practices being broadly disseminated and taken up with the strong involvement of local supply chain actors. Collectors and traders working together in the fishing areas were able to reduce the length of time the crabs were stored. In 2012, collection happened once a week or less; in 2015, storage did not last longer than three days, and collection took place two or three times a week.

However, mortality did not drop among the collectors that transport live crabs to Antananarivo. This is explained by the increase in distance between the coastal towns where collection takes place and the capital: in 2013, crabs sent to Antananarivo came from Mahajanga and Morombe (a distance of 570–700 km), but now an increasing number come from Antsohihy, Ambanja and even Toliara (a distance of 750–1 000 km). Longer routes cause higher crab mortality.

7.3 ENHANCING MARKET ACCESS

This part of the study relates to paragraph 7.6 of the SSF Guidelines.

7.3.1 Increasing the sale price

Reorientation and growth of exports

TABLE 7.6
Production and exports of crabs between 2012 and 2017

Description	2012		2013		2014		2015		2016*		2017	
	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V
Catches	4 052	-	6 014	-	6 946	-	7 306	-	6 300	-	6 018	-
Exports (in live weight)	2 454	-	3 221	-	4 465	-	3 594	-	3 156	-	3 008	-
Exports (in finished products)	1 100	4.92	1 966	12.19	3 401	20.80	2 836	16.61	2 345	11.85	2 317	10.73
Live	29	0.16	881	8.07	2 476	17.17	2 205	14.49	1 668	9.27	1 715	8.13
Frozen	1 040	3.82	1 084	4.06	925	3.63	632	2.12	677	2.58	602	2.60
Semi-preserved	31	0.94	1.4	0.06	-	-	-	-	-	-	-	-

Q – quantity (tonnes); V – value (USD millions); *2016: new estimate by consultant;
Conversion coefficient in live weight: live crab (1.0), frozen whole crab (1.1), frozen crab in pieces (2.2), raw crab meat (6.1), pasteurized crab meat (10.0).

Source: MRHP statistics service.

Until 2012, crabs frozen in pieces made up 93 percent of the tonnage and 73 percent of the value of exports; small amounts of live crab were sold to neighbouring Mauritius and Réunion. Frozen crab was primarily sold to Europe, in particular to France (Kasprzyk, 2014). Then in 2013 the MRHP began granting various permits for collection and export of live crabs, which was quickly reflected in exports (Table 7.6). There was a 49 percent increase in total crab production in 2017 compared to 2012 (Figure 7.2); over the same period, the tonnage of live weight exports increased by only 23 percent, while the value of exports increased by a multiple of 2.2.

This large increase in export value is essentially explained by the significant increase in the proportion of live crabs exported (3 percent in 2012, more than 70 percent from 2014 onwards) and their higher value: the average live weight price per kilogram is 1.7 times higher than that of frozen crabs. Europe, the main importers of frozen crab before 2012, has now been overtaken by Asia (in particular China).

Impact on sale price and fishers' income

Surveys were carried out to quantify the reduction of losses and improvement in incomes achieved by the crab project, 191 people - fishers, intermediaries and collectors were surveyed in September and October 2015 in 38 villages and 8 Western coastal towns (Ambanja, Antsohihy, Mahajanga, Namakia, Soalala, Belo-sur-Tsiribihina, Morondava and Morombe) in 11 districts. The results showed that the price went from a national average of less than USD 0.5 per kg at the start of 2012 to over USD 1.1 per kg at the end of 2015. For pirogue fishers in Boeny region, their income increased by 26 percent between 2011 and 2015, despite their catch decreasing by 33 percent over the same period (Table 7.7). This is mainly attributable to the increase in sales price. Reduction in post-harvest losses also contributed, but to a lesser extent.

The national average however hid significant price disparities between regions: USD 1.88 per kg for the regions of Sofia and Diana, USD 0.74 per kg for Boeny and Menabe, and just USD 0.38 per kg for Atsimo-Andrefana. These disparities are explained by the differences in quality of crabs collected and the higher costs of

TABLE 7.7
Average catches and earnings of pirogue fishers in 2011 and 2015 – Boeny region

Description	2011	2015
Monthly catch (kg)	261	196
Sale price (USD/kg)	0.47	0.74
Gross monthly income (USD)	114	144

Sources: Kasprzyk, 2012; Fanoitra *et al*., 2016.

transport in more remote regions. Moreover, the average price increase across all these regions has since incentivized all actors in the sector to adopt the new practices.

The additional income gained by reducing losses is substantial among collectors and wholesalers (Table 7.8). Fierce competition has pushed these actors to take up the techniques disseminated by the project. Income generated then sometimes helps to finance the materials needed to make further improvements in fishing and storage equipment. The collectors and wholesalers are currently continuing the work of the project by applying and disseminating the good practices, and stand to earn more by doing so.

TABLE 7.8
Additional monthly income earned thanks to the reduction in mortality (national average)

Actor	Monthly production (kg)	Unit sale price (USD/kg)	Reduction in losses		Additional monthly income due to the reduction in losses (USD)
			%	kg	
Fisher	194	1.00	4.5 (7.0–2.5 = 4.5)	9	9.54
Intermediary	2 221	1.40	4.5 (7.0–2.5 = 4.5)	100	140
Collector	3 939	2.20	9.5 (16.0–6.5 = 9.5)	374	823

Source: Fanoitra *et al*., 2016.

Impact on local market

Opening the market for exports of live crabs led to fears that it might decrease the amount available for local consumption. In fact, the opposite has been observed: local consumption and sales have more than tripled, from 628 tonnes in 2012 to 1 964 tonnes in 2017 (Table 7.9).

TABLE 7.9
Distribution of crab catches in 2012 and 2017 (in tonnes)

Description	2012	2017
Total catches	4 052	6 018
Distribution		
• post-harvest losses	970	1 050
• exports	2 454	3 008
• local consumption	628	1 964

Source: Kasprzyk and Levrel, 2018a.

The relatively weak growth in quantity of crab exports may be because of the significant tonnage rejected by collectors/exporters of live crabs, due to the crabs being weak, injured, low meat yield and, above all, below the standard size. On average, exporters reject between 40 and 45 percent of the crabs supplied to them. These are sold immediately to local traders and, to a lesser extent, to frozen crab exporters. Some of the crabs that are not sold are eaten by the fishers themselves. The estimated amount of catch eaten by fishworkers has increased from 5 percent to 9 percent in Mahajamba Bay (Kasprzyk, 2012; Kasprzyk and Levrel, 2018b).

Management measures

In 2006 an initial attempt to put in place a management plan was met with resistance among actors in the sector. The only rules accepted were a minimum carapace size of 100 mm, which only protected 10 percent of mature females (Rafalimanana, 2006), and a ban on catching egg-bearing females and soft-shell crabs.

Subsequently the increase in fisher income made it more feasible to introduce new management measures in the sector. In addition, catches increased significantly, exceeding 90 percent of the MSY in 2014–2015. From 2015 on, the MRHP took several important decisions to better regulate crab harvesting:

- Capping the annual catch at 5 000 tonnes;
- Fixing the total authorized export quota to 4 250 tonnes a year (in 2015, the export quota had been set to 3 600 tonnes and was distributed between nine operators located in five regions);
- Increasing the minimum carapace size for crabs caught from 100 to 110 mm;
- Closing the fishery for four months each year (the closure law also prohibited the collection, sale, purchase, transportation, storing and export of live and processed crabs). As the majority of fishers target multiple species, they are able to continue earning from fish, shrimp or other catch during the closure;
- Banning the harvest of soft-shell crabs or egg-bearing females, and of fishers and wholesalers handling crabs without legs or claws before sale;
- Banning the cutting, collection, transport and sale of mangrove wood.

7.3 CONCLUSIONS

7.3.1 Lessons from the SmartFish Programme crab project

The fishers of Madagascar's West Coast are already among the poorest and most marginalized people in the country. Rapid population growth and coastal migration are causing pressures on nearshore fisheries and mangroves. In this context, work to reduce post-capture losses and so enhance the value of crab harvests both reduces poverty and facilitates better natural resource management.

The Madagascar experience shows that even when catching less crab, the fishers, wholesalers and individual collectors were able to maintain or even increase their income. This became possible thanks to a) the higher price of high-quality crab (healthy, with a higher meat yield) suitable for live export, and b) the reduction in post-harvest losses through broad uptake of good practices. The price incentive, along with the involvement of all the actors in the sector in co-designing improvements and promoting their adoption, helped the MRHP to enhance the value of the crab sector and encourage sustainable management.

Alongside the development and implementation of fisheries or ecosystem management measures, maintaining or improving the income of fishers should have a positive impact on fisheries resources, and also protection of the mangrove forests. When fishers earn a better living thanks to the mangroves, we expect them to be less inclined to cut and sell mangrove wood, and also show greater interest in fighting timber trafficking and cutting mangroves for charcoal.

The success of this project has been possible due to certain conditions:

- The strong international demand for wild crab, at a higher price, has facilitated improvements in fishing and post-harvest practices.
- The MRHP has been willing to collaborate actively with the SmartFish Programme and to quickly enact the recommendations of inclusive national and regional workshops.
- Actors in the sector co-designed improvements and tested them out in actual operations. This meant that the good practices used technical innovations that were inexpensive and could be readily made with local materials.

- These same actors promoted the use of good practices and helped their widespread uptake. Above all, action on the ground was key to the project's success.

7.3.2 Sustaining the achievements of the project in Madagascar

The challenges of joint management

The national workshop held on 21 March 2006 recommended a participatory approach to possible changes to the crab fishery management plan and its effective application on the ground (MAEP, JICA and Océan Consultant, 2006). For administrative and political reasons, the next workshop did not take place until March 2012. This national workshop initiated the shift of exports to the live-crab market and committed to reduce post-harvest mortality by a third. Following this, the MRHP used five regional workshops between November and December 2014 to publicize the proposed management measures that would be introduced in 2015. The SmartFish technical manual on enhancing the value of mangrove crab by reducing post-harvest losses was disseminated during these workshops.

In November 2015, the national workshop on the results of the SmartFish crab project concluded that the 2012 objective of reducing estimated losses of 32 percent by a third had been achieved (losses dropped to 17.5 percent of catch). The workshop's recommendations included:

- Further reducing post-harvest mortality to 12.5 percent;
- Extending awareness raising and demonstrations to new areas, including the Melaky region and the Mangoky delta;
- Mobilizing the resources necessary for effective implementation of the management measures specified in the regulations.

However, when the project ended in June 2016, the question of continuity arose, particularly of how to inclusively bring together all fishery actors to maintain dialogue and improve the fishery. Following this, in 2017, the MRHP called off the seasonal closure for crab fishing which caused concern amongst many stakeholders that this would place the resource in danger, given the real risks of overfishing. Closed seasons are often applied in other countries; they are easy to control, and effective at restoring stocks (Razafindrainibe, 2006).

Regulation enforcement challenges

In a study carried out by Blue Ventures entitled "Summary of recent events that have influenced the crab sector and its management", it was shown that fishers, wholesalers and vendors on local markets often do not respect the minimum catch size or the protection of egg-bearing females and soft-shell crabs. The limited number of inspectors in the national fisheries monitoring service, the Centre de Surveillance des Pêches, makes it difficult to monitor on the ground. The annual catch quota has also been exceeded. Furthermore, a ban on cutting mangrove wood encountered many challenges due to overlapping jurisdictions; use of mangrove wood is governed by the ministry responsible for environment and forests.

Based on these events and on field observation, the MIHARI network (a national small-scale fisheries platform) prepared and organized two interregional workshops, as well as a national feedback workshop entitled "Enhancing the value of production and responsible management of the mangrove crab" (*Meilleure valorisation de la production et gestion responsable du crabe de mangrove*) in the second half of 2018. During the workshop, the participants prioritized the following actions:

- Restoring a national closed season lasting three months (September to November) beginning in 2019;
- Modifying the maximum authorized quantity of crabs exported to match the current production quota;

- Strengthening communication of all crab sector regulations using innovative, adaptable approaches;
- Training fishers and distributing the good practice guide to all other actors in the crab value chain.

In the presence of MRHP officials, the participants formulated and approved 15 recommendations for 2019/2020. These concerned re-evaluating crab stocks; preserving and restoring mangroves; enhancing the value of crab production; and improving and promoting systems (particularly community-based) for follow-up, control and monitoring. These recommendations will be implemented by the fishery authorities and various projects, NGOs and fishers' organizations.

Ensuring the continuity of the technical innovation process

It is crucial that the MRHP maintain the process of working with the crab sector to identify, co-design and disseminate new good practices that will enhance the value of crab catches. Such an approach has been at the heart of the project's success to date. The MIHARI network could play a key role in engaging fishing communities and facilitating dialogue. In 2018 Blue Ventures published a new guide for good practices in the crab sector. The 16 solutions it proposed, together with the 10 proposals in Technical Manual No. 35 published by SmartFish in 2014, should enable operators to learn how to earn more while catching less (Figure 7.5).

The 2018 Blue Ventures guide details innovative ways to keep crabs alive and support the management of the fishery. It was produced as part of a competition launched by SmartFish in 2015. Two years later, in December 2017 and January 2018, experts met with 35 competition participants to observe and test on site how viable their proposed technical solutions were. Ultimately, 16 innovations were judged effective and worth including in the guide. The 50-page guide, in French and in two local Malagasy dialects, was given to MRHP staff, exporters, collectors, wholesalers and fishers in 2018 during workshops organized by MRHP with MIHARI and Blue Ventures.

7.3.3 Replicability in other Indian Ocean nations

Madagascar's experience could be shared with many countries in the Western Indian Ocean that have mangroves. Specific experience in managing the crab fishery and its supply chains has been developed in these countries alongside this, making exchanges of experience potentially very fruitful.

Regional collaboration could be accelerated by organizing an international forum in Madagascar to exchange experiences, involving the economic operators and fishery authorities of the countries concerned. Irrespective of the technical solutions that are ultimately applied, the Madagascar experience tells us that their success depends on certain preconditions, including: i) a firm resolve on the part of the national government to develop the crab sector in the interests of small-scale operators (fishers, wholesalers, collectors); and ii) the existence already of a relatively well-developed crab fishery, with experienced collectors and exporters, particularly of live seafood.

FIGURE 7.5
Examples of good practices


Crab hoop net with bait bags


Double crab hoop net


Live-crab storage cage


Storage hut


Improved storage hangar


Transporting crabs by bicycle


Adapted cart


Removable shelves/transportation pirogue


Rapid transportation van


Covered market for live crabs (Ambanja)

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8. State-led fisheries development: Enabling access to resources and markets in the Maldives pole-and-line skipjack tuna fishery

Zacari Edwards
International Pole and Line Foundation
London, United Kingdom

Hussain Sinan
Marine Affairs Program
Dalhousie University
Halifax, Nova Scotia
B3H 4R2, Canada

M. Shiham Adam
International Pole and Line Foundation
Malé, the Republic of the Maldives

Alice Miller
International Pole and Line Foundation
London, United Kingdom

ABSTRACT

The Maldives is a nation heavily reliant on its marine resources, none more so than the skipjack tuna caught in its pole-and-line fishery. Maldivian citizens derive huge benefits from the fishery as a result of effective State stewardship of the resource. This paper presents key actions along the value chain of the Pole-and-Line Skipjack Tuna Fishery Maldivian Government has taken to support and facilitate improvements along the value chain of the Pole-and-Line Skipjack Tuna Fishery and by extension demonstrates how these many government actions have resulted in an alignment with the recommendations set out in Chapter 7 of the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication, particularly paragraphs 7.6-7.9. By highlighting the good practices of the Maldivian Government, this paper pinpoints the key lessons that can be learned from the case of the Maldives as well as the actions that can be replicated by other governments from countries highly dependent on fisheries affected by globalized market demands.

Keywords: The Maldives, pole-and-line tuna fishing, government engagement, market access, international trade, environmental ecolabelling, social protection.

8.1 INTRODUCTION

8.1.1 Implementation of the SSF Guidelines in the context of the Maldives skipjack tuna value chain

This paper examines the Maldives pole-and-line skipjack tuna value chain to highlight good practices and successful initiatives consistent with the recommendations in Chapter 7 of the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines), specifically those pertaining to paragraphs 7.6–7.9 (FAO, 2015) for enhancing small-scale fisheries value chains, post-harvest and trade in the context of food security and poverty eradication.

The paper is structured as follows: Sections 8.1.2–8.1.3 offer an overview of the pole-and-line skipjack tuna harvest and post-harvest sectors in the Maldives. Section 8.2 outlines the methods used in the case study analysis. Section 8.3 examines the activities concerning post-harvest and trade in the context of state-led interventions for enabling market access (paragraph 7.6); safeguarding local food security from the impacts of international trade (paragraph 7.7); supporting equitable distribution of benefits (paragraph 7.8); and mitigating adverse impacts from international trade (paragraph 7.9). Finally, Section 8.4 discusses the replicability of the approach taken in the Maldives to other fisheries, and by extension outlines the scope for applying that approach elsewhere.

8.1.2 Overview of the Maldives Pole-and-Line Skipjack Tuna Fishery

As an archipelagic nation located in the central Indian Ocean, and with an exclusive economic zone (EEZ) covering an area of 900 000 km^2 (3 000 times its land mass), the Maldives has historically been heavily dependent on its marine resources (Hemmings, Harper and Zeller, 2011). The pole-and-line tuna fishery is both the oldest and largest fishery in the Maldives, and has been a mainstay in the country for centuries (Gray, 1889; Anderson and Hafiz, 1996). As a result, the tuna sector is one of the most important sectors of the national economy, accounting for 67 percent of total exports (National Bureau of Statistics, 2018); 4–12 percent of gross domestic product in the last ten years (National Bureau of Statistics, 2018); around 11 percent of the labour force (National Bureau of Statistics, 2014); and 85 percent of the total protein consumed by Maldivians (FAO, 2003).

The target species of the pole-and-line fishery is skipjack tuna (*Katsuwonus pelamis*), with yellowfin tuna (*Thunnus albacares*) caught as a secondary species due to their conspecific schooling behaviour[1]. The Maldives is the third largest producer of pole-and-line tuna in the world, behind Japan and Indonesia. The fishery can land over 68 000 tonnes of skipjack per year, representing over one-fifth of the total global supply of pole-and-line caught tuna and 18–20 percent of the total catch of skipjack from the Indian Ocean (Figure 8.1) (Hohne-Sparborth, Adam and Ziyad, 2015; Gillett, 2016). Finally, crucially for the domestic market, the pole-and-line fishery also currently accounts for 60–70 percent of all the tuna caught in the Maldives (Ahusan *et al.*, 2018).

There are approximately 677 licensed commercial pole-and-line vessels employing 7 981 registered fishers in the Maldives. However, using average crew number estimates from Miller *et al.* (2017) and the total number of vessels registered in the country (including licensed commercial vessels and vessels fishing for subsitance), the number of fishers could be as high as 10 832. Typically, these pole-and-line vessels will fish for 1–2 days per fishing trip, employing both free-school fishing and anchored fish aggregating devices (aFADs) within a single trip.

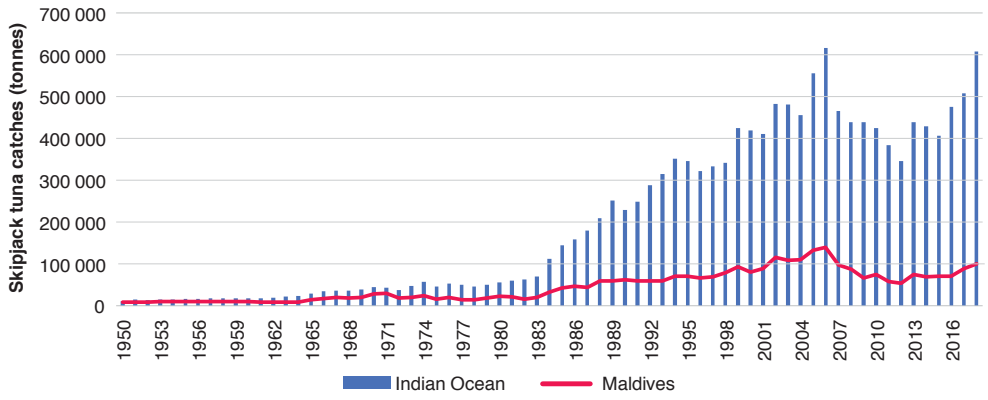
[1] Yellowfin tuna at its infant stage school together with skipjack tuna.

Pole-and-Line fishing vessels (*Masdhonis*) are built within the country by private companies and are owned and operated by Maldivian citizens. Ownership is kept within families and close relatives are often selected as captains of the vessels. The crew members are selected by the captain based on their locality, often inhabiting the same island as the captain. Every licensed pole-and-line vessel is also licensed to conduct handline fishing; however only a select few vessels, mostly from the northern atolls, switch from pole-and-line (targeting skipjack tuna) to handline gear (targeting adult yellowfin tuna for the fresh/frozen tuna market).

As a highly selective form of fishing, the pole-and-line fishery exhibits extremely low rates of bycatch, discards, and catches of (or interactions with) endangered, threatened and protected (ETP) species (Ahusan *et al.*, 2018). This is supported by Miller *et al.* (2017), who observed 161 pole-and-line fishing events and reported that the total bycatch was only 0.65 percent of the total tuna catch by weight. Furthermore, there is very little waste associated with the retained bycatch, including juveniles and/or unsold lower-quality fish, with the large majority consumed by the fishers, their families and/or distributed among local communities (Lecomte, 2017).

There are a number of additional environmental benefits associated with pole-and-line fishing in the Maldives. In terms of marine plastic pollution, the rate of gear loss is extremely low, and therefore the ghost fishing impacts of lost monofilament fishing lines is low to zero. The fishery also performs strongly with regard to reducing its carbon footprint: its fuel use intensity (FUI), ranging between 197 and 328 litres of fuel use per tonne of tuna caught (l/t) (Miller, Adam and Baske, 2017), is one of the lowest in the world for a commercial fishery targeting skipjack tuna. This figure is less than 80 percent of the FUI of other tuna pole-and-line fisheries (e.g. Atlantic bluefin), and under half the global average FUI for all vessels with fuel records (600–639 l/t) (Parker and Tyedmers, 2015; Parker, Vázquez-Rowe and Tyedmers, 2015). This has been achieved in part through the use of collector vessels gathering catch out at sea, as well as the use of the heavily regulated, state-deployed aFADs.

FIGURE 8.1
Total catch of skipjack tuna in the Indian Ocean compared to the catch of skipjack tuna from pole-and-line vessels in the Maldives, 1950–2017

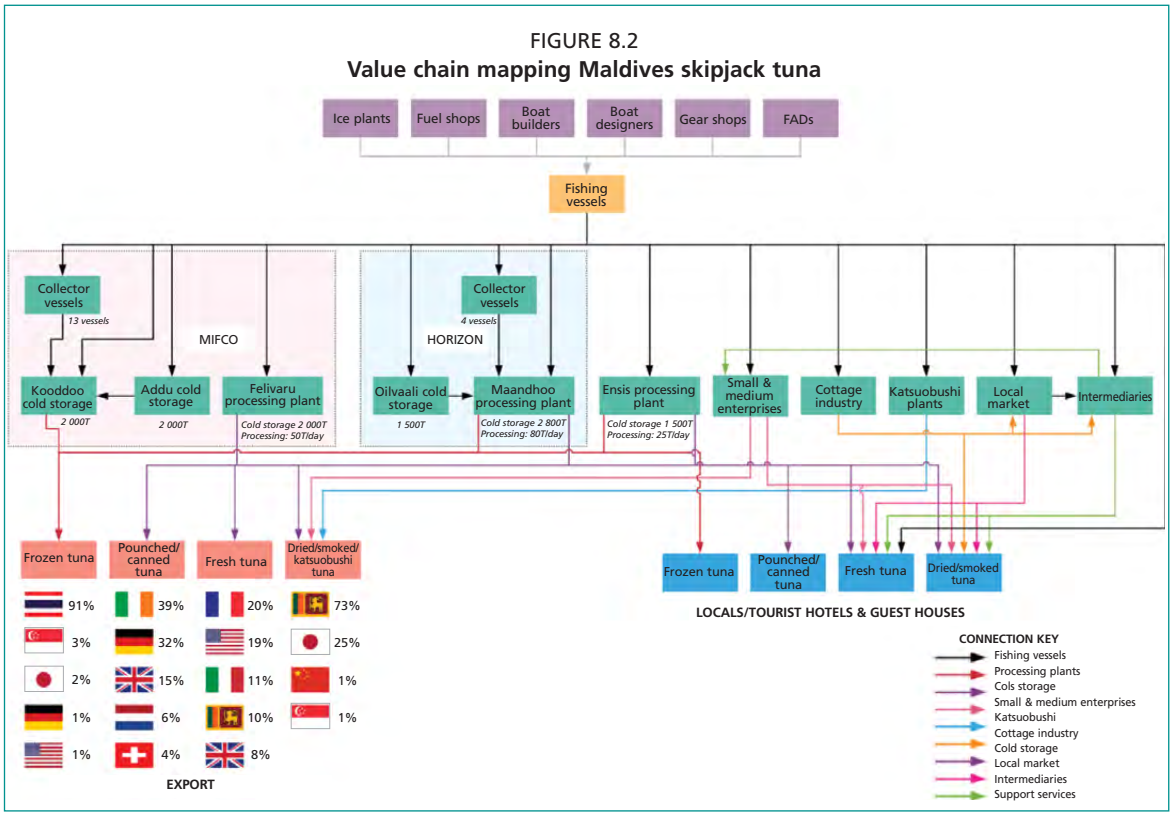


Source: IOTC, 2019.

8.1.3 Post-harvest sector overview

The skipjack tuna value chain is complex, with tuna sometimes going through numerous routes before reaching consumers. Overall, pole-and-line fishers are able to directly sell their skipjack tuna to at least eight distinct actor groups along the value chain (Figure 8.2). These include fresh/frozen tuna processing companies, canning processing companies, collector vessels out in the ocean, port-based patrons that act

FIGURE 8.2
Value chain mapping Maldives skipjack tuna



as intermediaries, dry processing businesses, dry processing cottage industry workers, market stall owners at local fish markets, and consumers.

There are three broad categories of consumers that skipjack can reach from the Maldives. There are premium export markets such as Germany, Ireland, the Netherlands, Switzerland, the United Kingdom of Great Britain and Northern Ireland, and the United States of America who purchase tuna primarily as canned and/or pouched products. The Maldives also exports around USD 28 million in frozen skipjack tuna to Thailand, where it is canned and re-exported to the premium markets. There is only a small market for fresh or chilled skipjack tuna. There are also regional and international markets like Sri Lanka and Japan, respectively, who predominantly purchase dry processed skipjack from the Maldives. Finally, there are domestic consumers, including locals and tourists.

Canned tuna is sold by two skipjack tuna processing companies: the state-owned Maldives Industrial Fisheries Company (MIFCO) and the privately owned Horizon Fisheries. Salted and dried/smoked tuna are also part of the local diet, with the cottage industry and processing companies catering to this market (which includes tuna that might not have reached export quality standards). Domestic consumers can also purchase unprocessed tuna directly from fishers, from food stall traders at local fish markets, and from individuals working in the cottage industry.

Normally, the pole-and-line fishing and processing sectors in the Maldives operate independently from each other. Fishers own fishing vessels and supply both the industrial processors and the local community with skipjack tuna. The industrial processors receive fish either from one of their collector vessels or directly from the vessel at the processing facility (Gordon and Sinan, 2015). The remainder of the catch can be sold to the small-scale processors processing dried fish or to the island communities, through local markets or directly to consumers (Sinan, 2011). Intermediaries also operate as a liaison between resorts and hotel chains, buying tuna from fishing vessels or local markets and selling it on.

8.2 METHODS

In order to examine the good practices of the Maldivian Government within the country's pole-and-line skipjack tuna value chain, this paper employed a case study research strategy. This was based primarily on a desk-based data analysis of accessible and relevant data sets, and on a literature review of academic reports and/or other literature within the public domain concerning the Maldivian Pole-and-Line Skipjack Tuna Fishery and value chain. Once the available data was collated, it was validated with in-country experts to ensure that the findings were representative and fully reflective of the data available in the Maldives.

Small-scale fisheries such as the pole-and-line fishery in the Maldives are typically comprised of complex and extensive trade networks, and contain a diverse range of employment roles throughout the chain (Jacinto and Pomeroy, 2011). As such, this paper also drew upon theoretical literature analysing small-scale fisheries value chains to support its examination of the practices of the Maldivian skipjack tuna pole-and-line fishery in the context of SSF Guidelines 7.6–7.9.

8.3 RESULTS AND DISCUSSION OF GOOD PRACTICES

8.3.1 Overview

In order to assess how the practices of the Maldivian Government are consistent with SSF Guidelines paragraphs 7.6–7.9, it is important to understand the wider context of the global tuna market. The tuna sector is a globalized marketplace in part due to the highly migratory nature of tuna, but also due to the extensive demand for it across the globe. Over the last 20 years, with the emergence of the sustainable seafood movement, there has been a growth in market-based approaches to address the sustainability of tuna fisheries. The effect of this has been an increase in sustainability and traceability requirements being placed on both government institutions and seafood industry stakeholders.

However, the process of trying to meet increasingly stringent standards and/or competing with other fisheries' sustainability claims can place a financial burden on producers, and can act as a barrier to trade, particularly for small-scale fisheries. In the case of the Maldivian pole-and-line skipjack fishery, state intervention has played a critical role in meeting the sustainability requirements of international markets to ensure sustained economic prosperity of its fishery sector.

8.3.2 State-led enabling of market access

Due to its long history of fisheries regulation, the Maldives has been well placed to meet the changing market requirements for transparency and data provision highlighted above. The Maldivian Government has been producing complete time series of tuna catches from as early as 1954. Both the Fisheries Law No. 5/87 of the Republic of Maldives and the corresponding General Fisheries Regulation 1987 established the institutions responsible for implementing fisheries management regulations. These government actions not only provided a strong basis for future regulations to build upon, but also have acted as a basis for ensuring the country is in a strong position to meet the market demands for demonstrably well-managed, transparent fisheries.

For example, in response to the requirements of the European Union Regulation to prevent, deter and eliminate illegal, unreported and unregulated fishing (IUU) in 2010, the government in consultation with fishers and the processing industry brought significant changes to the fisheries management system to ensure the Maldives could continue exporting to European Union Member States. Commercial fishing vessels were obliged to obtain fishing licenses and were mandated to report catch and effort data via logbooks, which slowly superseded the itemized reporting from island/atoll administrative offices. Moreover, retailers and wholesalers who purchased sustainably

caught pole-and-line tuna pressed local processors to obtain third party certification for the Maldivian pole-and-line fishery to ensure continued access to the global market.

Following pressure from the domestic processing sector, the Maldivian Government agreed to support the Marine Stewardship Council (MSC) certification process through financial assistance and technical support to the Maldives Seafood Processors and Exporters Association (MSPEA). This support was vital in terms of eventually achieving certification for skipjack tuna in the Maldives, and since 2012, all canned pole-and-line caught tuna that is exported to international markets is now MSC certified. As such, the role of the government in facilitating this process helped to guarantee Maldivian market actors sustained access to export markets, which by extension also helped to ensure that the pole-and-line fishery could continue to provide a vital and sustainable source of income for those involved in the value chain.

In order to meet the growing traceability requirements of the market, the government also established and implemented a vessel monitoring system (VMS) in 2013 via the 1st Amendment to the Regulation on licensing for fishing, processing and aquaculture targeted for export (2013/R-60). This amendment made it mandatory for all licensed fishing vessels to be tracked via VMS in order to obtain and keep fishing licenses. A review of the VMS in 2018 identified key areas of improvement that the Maldivian Government has since been working to resolve in collaboration with the World Bank and the Food and Agriculture Organization of the United Nations (FAO).

The implementation of traceability technologies increased further in the Maldives with the government's introduction of the Fishery Information System (FIS) in 2016. FIS is a web-enabled database developed to maintain and capture fishery data. The system allows the maintenance of fishing vessel information, tracking and issuing of fishing licenses, compiling of fish purchase data from commercial buyers (processors), and compiling logbook data reported by fishing vessels. FIS was developed based on different processing flows used by different companies after extensive consultations and testing. Since its implementation, the database has been the centre of operations for the processing companies. Because FIS provides a direct document verification portal for European Union authorities to verify the catch documents, it functions as a traceability tool enabling the fishery to meet the ever-increasing traceability demands being placed on the sector.

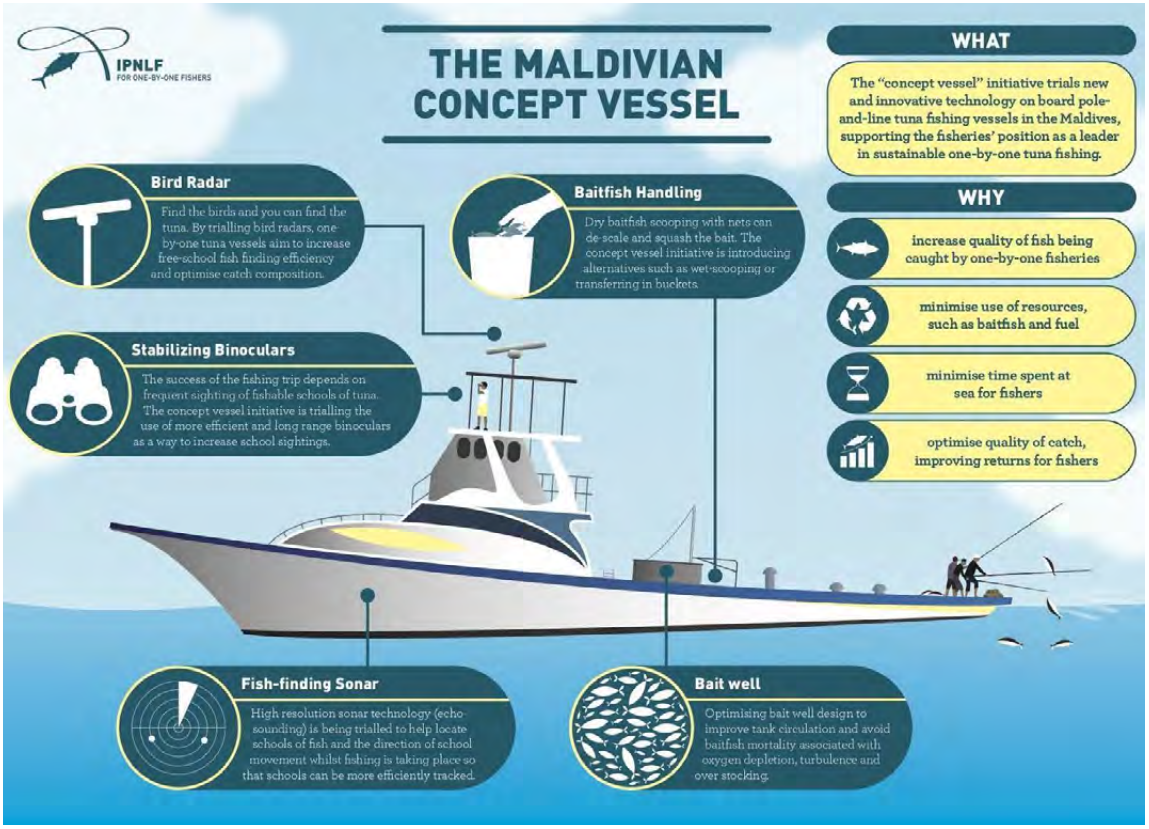
In response to sustainability concerns being raised in the market around the tuna industry's reliance on aFADs, the government has also been encouraging fishers to increase their free-school fishing[2] activities, with the aim of meeting bycatch mitigation targets set at the national level. A key example of this is the government's work, in partnership with the International Pole and Line Foundation (IPNLF), trialing "concept vessels" that introduce bird radar and fish sonar onto pole-and-line vessels to help with free-school location (Figure 8.3). To date, two vessels have begun to use these systems, with a view to encouraging other fishing vessels to follow suit. Through the concept vessels, the Maldivian Government is iteratively modifying tuna vessel design to increase the quality of the product and the economic efficiency of fishing operations.

Finally, in response to publicized concerns of market actors regarding the impact of live bait fishing on the ecosystem, the Maldivian Government developed a live bait fishery management plan in 2013 in consultation with fishers and stakeholders (Gillet, Jauharee and Adam, 2013). The plan was centred on the facilitation of strengthened data collection, monitoring and compliance, and also outlined a number of prospective legal stipulations to help meet these goals.

At a national level, the prospective stipulations included the expansion of exclusion zones in the Maldives for bait fishing activities, i.e. around tourist resorts (1500 m),

[2] Free-school fishing means fishing on a free-swimming school of tuna – i.e. without the use of (or association with) aFADs.

FIGURE 8.3
Infographic for the Maldivian Pole-and-Line concept vessel



Source: IPNLF, 2019.

within designated dive sites and marine protected areas. The plan also proposed, if necessary and in consultation with the stakeholders, a ban on the sale of bait fish species for food and recommended the requirement that the Maldives Research Centre should pre-approve new types of bait fishing methods. In addition, a number of regulatory responsibilities were proposed at the atoll level whereby at their own discretion local authorities could potentially: restrict the use of bait fish attracting lights; restrict the size of bait fishing nets; introduce bans on the use of scuba gear for bait fishing; ban any bait fishing-related activities that are shown to disrupt coral reefs; and introduce any temporary area closures for bait fishing activities.

Overall, the Government of the Maldives has been extremely proactive in supporting and promoting the pole-and-line tuna fishery. Moreover, it has actively created a policy environment whereby members of the value chain can optimize the benefits they derive from the fishery.

8.3.3 State-led safeguarding of local food security from impacts of international trade

The domestic demand for and consumption of skipjack tuna is growing in the Maldives, with the state-owned processing company MIFCO now making the majority of its sales to domestic consumers. Maldivian citizens consume an average of 94 kg of skipjack tuna each year (Lecomte, 2017), and allocate approximately one-fifth of total household food expenditure to seafood, with skipjack tuna being the most widely consumed fish within this group (National Bureau of Statistics, 2016). The historical abundance of tuna supply in the Maldives has meant that no laws have

been required to date to ensure continued access to skipjack tuna products. Domestic skipjack consumption mostly consists of fresh fish; however, the domestic market also includes low-grade canned skipjack tuna processed in the Maldives.

Recognizing this dependence on tuna for food and nutrition, the government has worked to ensure that skipjack tuna continues to be landed in high volumes within the country, and to ensure the domestic market continues to receive a steady supply of tuna products. This has been achieved in part by introducing a number of protective policies that limit the competition the subsector faces when it comes to fishing tuna within the Maldivian EEZ.

Foreign fishing activities have principally involved longline fishing, and have been regulated within the Maldives since the introduction of the Fisheries Law in 1987. This regulation partitioned the EEZ, with Maldivian-owned fishing vessels allowed to fish throughout the EEZ, and foreign fishing vessels only permitted to fish beyond the first 75 nautical miles. Over time, subsequent government administrations have introduced regulatory measures under the Fisheries Law 5/87 that have partitioned further areas of the EEZ for different types of fishing. Through this gradual prohibition of foreign fishing activities within Maldivian waters, the government has helped to ensure that a majority of the fish caught within the Maldivian EEZ is landed in the country, increasing the availability of tuna for domestic production and consumption.

In 2008, in response to pressure from Maldivian pole-and-line and handline fishers, the government decided not to renew any foreign licenses to longline vessels, which ensured that all foreign licenses expired by the end of 2010. In 2011, the government began to issue licenses to longline vessels again but only if they were locally owned and operated. In addition, the Longline Fishery Regulation in 2014 offered further protection to pole-and-line vessels by restricting Maldivian longline vessels from fishing within the first 100 nautical miles of the EEZ, in effect creating a new fishing area for the exclusive use of commercial one-by-one fishing vessels[3].

In 2014, the Maldivian Government further refined the regulation (2014/R-388) with better monitoring of the fishery, including the local crew. In addition, the amendment to the General Fisheries Regulation 1987 (2011/R-21) offered further protection to Maldivian fishers as it prohibited any foreign crews from working on fishing vessels that operate in common fishing areas designated for exclusive use by Maldivians (i.e. within the first 75 nautical miles). The government actions described above have contributed to improved food security in two ways. Directly, they have allowed for a sustained amount of tuna to enter the domestic market, with over half of the landed fish consumed locally. Indirectly, they have helped facilitate the continued rates of employment within the pole-and-line fishery and ancillary sectors, thus helping to ensure a sustained income for Maldivian citizens working in these sectors.

8.3.4 Equitable distribution of benefits from international trade

Harvesting sector

As a result of ongoing government efforts to develop the sector, the Pole-and-Line Skipjack Tuna Fishery has continued to play an important economic role in the Maldives, both in terms of the foreign exchange earnings it generates and its contribution to the incomes of those working in the sector. The fishery generates an approximate annual value of USD 104 000 000 in exports, encompassing over half of the total export of fishery products by weight (51.2 percent) and representing 37.7 percent of the total value of fishery exports in the country, second only to yellowfin tuna (JICA *et al.*, 2018). Roughly 8 percent of the local population work in the primary fishery sector in the Maldives, with around 40 percent of the total workforce aged 18–24 years (HIES, 2016). In total, the fishery is a key source of income for many people, both directly

[3] One-by-one fishing refers collectively to pole-and-line, handline or trolling fishing methods.

and indirectly supporting around 30 000 livelihoods (Howgate and Leadbitter, 2016).

Pole-and-line fishing in the Maldives.

Developing the sector has been vital in facilitating the increased equitability of the fishery, allowing businesses in the Maldives to derive more value from the products that are exported, as well as allowing fishers in the Maldives to receive a higher price for the fish that they land. Two of the most significant developments have been the mechanization of fishing vessels and the introduction of aFADs, locally called *Oivaali Kandhufathi.*

In 1987, the government introduced a vessel mechanization programme, providing finance and design expertise to kick-start the introduction of a new generation of vessels. Together with FAO and the United Nations Development Programme (UNDP), the Maldivian Government started to establish the aFAD installation programme mainly to provide a means for vessels to fish during low fishing season (Naeem and Latheefa, 1995). To date, only the government is permitted to install FADs, which are reserved for use by pole-and-line fishers only; the private sector is not permitted to install them.

Owing to the fishery improvements implemented by the government, pole-and-line fishers are extremely well paid compared to other professions in the Maldives, earning an average monthly income at least twice as high as the national per capita average of USD 1 500. However, the fishery is seasonal, and therefore this figure can fluctuate between USD 400 and USD 3 000 per month throughout the year (Lecomte, 2017). Fishing vessels in the Maldives also employ a catch share system, in this case meaning that two-thirds of the profit generated by these fishing vessels is distributed evenly among the general crew, with an extra share to the captain and the bait master. Overall the high income received by the fishers reflects the value placed on the pole-and-line fishery, making it an increasingly attractive sector to work in.

Post-harvest sector

In 2003, the Maldivian Government partially privatized the post-harvest sector, which had until then been wholly controlled by the state-owned MIFCO. The government divided the country into four different zones and allowed private parties to purchase and process fish in each zone. Initially, four private companies invested in the process. However, due to declining skipjack landings since 2006 (Figure 8.1), three of the companies have ceased operating, leaving Horizon as the only private pole-and-line skipjack tuna processor in the Maldives (Sinan, 2011). These closures have also meant MIFCO remains the dominant processor for pole-and-line skipjack tuna in the country. As a result, MIFCO has worked to improve its network of cold storage infrastructure on remote atolls and its canneries, which in turn has been integral to the fishing industry and enabling Maldivian fishers' access to export markets.

In response to political pressure to maintain price parity between Maldivian skipjack and the skipjack landed in Bangkok, the government has also begun setting the price of skipjack tuna destined for export markets (Hohne-Sparborth, Adam and Ziyad, 2015). The price is based on the international price of skipjack tuna in Bangkok, but includes a fixed price premium (not connected to any certification schemes) that is applied on top of the variable Bangkok base price (Lecomte, 2017). The price set by the Maldivian Government also factors in the costs and earnings of the vessels and the operating costs of companies. Bangkok frozen skipjack prices fluctuate significantly, and companies in the Maldives balance this out using annual earnings and profits earned from value addition and export to high-value markets. The Maldivian Government also provides

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Female processor preparing Skipjack tuna for canned product.

financial assistance through loans and grants to MIFCO when the cash flow is low. In this way, the government helps guarantee a stable income for pole-and-line vessels supplying export markets (although this price does not apply to pole-and-line vessels that supply local markets).

Domestically, the government enforces a minimum base price under Section 12 of the Skipjack Tuna Purchase and Export Regulation 2001, designed to protect the livelihoods of fishing communities. As a result, the tuna processing sector plays an important role throughout the country in terms of supporting the livelihoods of Maldivians, particularly in the remote islands and atolls where employment opportunities are limited. The income of those working in fish processing is between USD 238 and USD 1 736 per month depending on catch volumes and season (Hohne-Sparborth, Adam and Ziyad, 2015). One key processing activity is dry processing to produce "Maldives Fish", a speciality made by boiling tuna in salt water after which it is dried. This sector accounts for 10 000 tonnes of fish annually, with a large bulk of dried processing activities being predominantly carried out by women (Macfadyen *et al.*, 2016; Wessels, 2017).

There are very few women employed in the primary fishing industry in the Maldives. Women do, however, have a much stronger presence in the secondary industry – in processing factories (Table 8.1), local markets and the cottage industry. Although census data indicates that only 3 percent of the population are employed by the secondary industry, this figure is not representative of the real level of participation of women in terms of processing activities. For example, of the 3 356 women documented as being unemployed by 2014 census data, up to 22 percent of this number likely engage in entrepreneurial and/or cottage industry activities such as dry processing of Maldives Fish (Hohne-Sparborth, Adam and Ziyad, 2015).

TABLE 8.1
Formal sector post-harvest employment

Formal post-harvest sector employment	Male	Female	Total
Total	1 757	593	2 350

Note: Employment data principally for industrial processing plants.

The government has begun creating cooperatives for island communities to improve the quality of these dry processed products and to increase market access through improved quality. Two cooperatives in particular, Gemanafushi Cooperative Society and Naifaru Cooperative Society were set up with government and International Fund for Agricultural Development (IFAD) funding and technical expertise. Both have excelled and notably the majority of their members are women. For example, the Naifaru Cooperative Society (formerly the Fisherman's Association of Naifaru) has a membership composition of 91 percent women and 9 percent men (Wessels, 2017). This indicates positive steps taken on the part of the government to support value chain activities where women in particular are involved. Ensuring gathering and analysis of sex-disaggregated value chain data would provide further opportunities to understand and amplify their role and involvement.

8.3.5 State-led mitigation of adverse impacts from international trade

As highlighted in previous sections, in the case of the Pole-and-Line Skipjack Tuna Fishery in the Maldives, many adverse impacts of international trade stem from losing traction through not keeping pace with the changing sustainability demands

of international markets for tuna. The Maldives have kept pace with these changing demands not only through their national fisheries management measures, but also through their leadership within the regional fisheries management organization (RFMO) – the Indian Ocean Tuna Commission (IOTC) – during efforts to obtain and retain MSC certification for their skipjack tuna fishery.

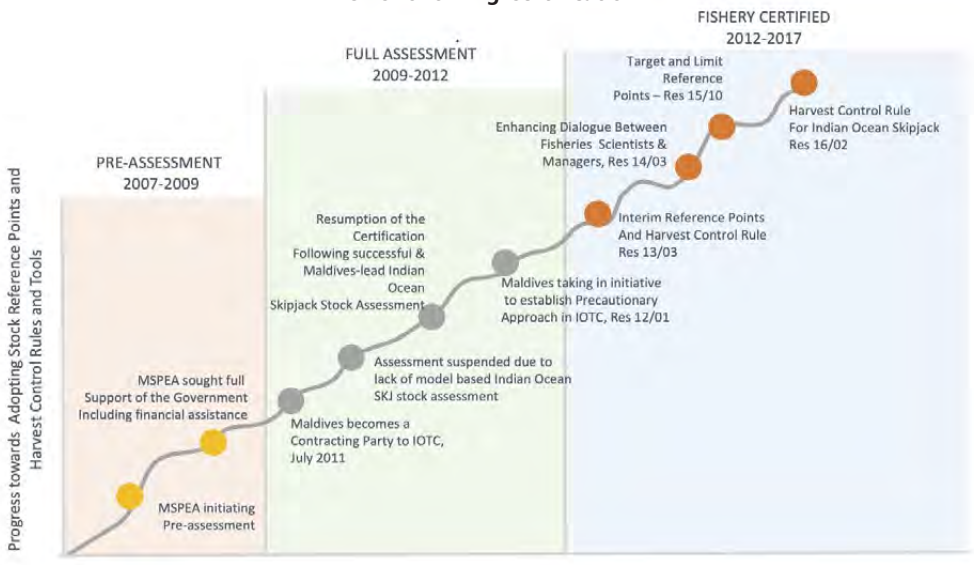
Due to the highly migratory nature of tuna stocks, five distinct RFMOs across the globe are tasked with their management: the IOTC; the Commission for the Conservation of Southern Bluefin Tuna (CCSBT); the International Commission for the Conservation of Atlantic Tunas (ICCAT); the Inter-American Tropical Tuna Commission (IATTC); and the Western and Central Pacific Fisheries Commission (WCPFC) (Ásmundsson, 2016).

Unlike other RFMOs, the IOTC coastal state agreement did not explicitly outline the precautionary approach for managing its stocks. As a result, up until 2011, the IOTC targeted optimal utilization for its tuna fish stocks. However, in 2012 the Maldives initiated a proposal calling for a precautionary approach, in part resulting from the country's pursuit of MSC certification for its Pole-and-Line Skipjack Tuna Fishery.

The MSC certification process for the Pole-and-Line Skipjack Tuna Fishery began in 2007, whereby the Maldives government supported the Maldives Seafood Processors and Exporters Association (MSPEA) in initial efforts to enter the fishery into pre-assessment. This MSPEA led initiative was a direct response to market demands, but was dependent on government support to ensure the Maldives became a fully cooperating and contracting party of the IOTC, as per the terms of certification.

The certification process was initially suspended upon recognition that there was no model-based stock assessment of the Indian Ocean skipjack tuna stock. In response, the Maldives government worked closely with the IOTC Secretariat to produce a skipjack catch per unit effort (CPUE) time series required for the stock assessment[4]. The Maldives subsequently hosted the Thirteenth Session of the Working Party on Tropical Tuna (WPTT), where the first ever model-based skipjack stock assessment concluded the stock was in a healthy state.

FIGURE 8.4
Pathway to MSC Certification for Skipjack tuna in the Maldives and Key Milestones in IOTC following Certification



Source: Authors.

4 https://iotc.org/documents/catch-rate-standardization-maldivian-skipjack-pole-and-line-fishery-1970-2007

The fishery was eventually certified in 2012 with eight conditions. The two most important conditions in the context of the IOTC were adoption of stock reference points and requirements for harvest control rules (HCRs) and tools. In response, as part of the MSPEA Client Action Plan, the government worked closely with NGOs, in particular IPNLF, and IOTC member states to address the adoption of stock reference points and HCRs. The Maldives also garnered support from like-minded Coastal States within IOTC for rights-based management proposals that followed the establishment of stock reference points and HCRs.

Adoption of skipjack HCRs was preceded by resolute efforts of the Maldives government during the prior four years to improve the management of tuna stocks in the Indian Ocean. This started with a push for implementation of the precautionary approach under IOTC Resolution 12/01, which for the first time saw the commission implement a Conservation and Management Measure underpinned by a precautionary approach. In 2015, Maldives also led the resolution on Target and Limit Reference Points and an aligned decision framework for IOTC stocks in the Indian Ocean.

The proposal on skipjack HCRs, culminating in adoption of Resolution 16/02 *On harvest control rules for skipjack tuna in the IOTC area of competence*, received an unprecedented level of support from other coastal states in the region, with 14 countries joining as co-sponsors. The newly established HCRs in 2016 aimed to keep the skipjack population at healthy levels, while ensuring the fishery itself was profitable and accessible to all. Given the healthy state of regional skipjack tuna stocks, this measure, unlike most fishery management measures taken at the international level, did not restrict or reduce existing fishing levels. Instead, it established pre-agreed steps to be taken if the fishery breached the agreed management (target) reference point.

8.4 CONCLUSION

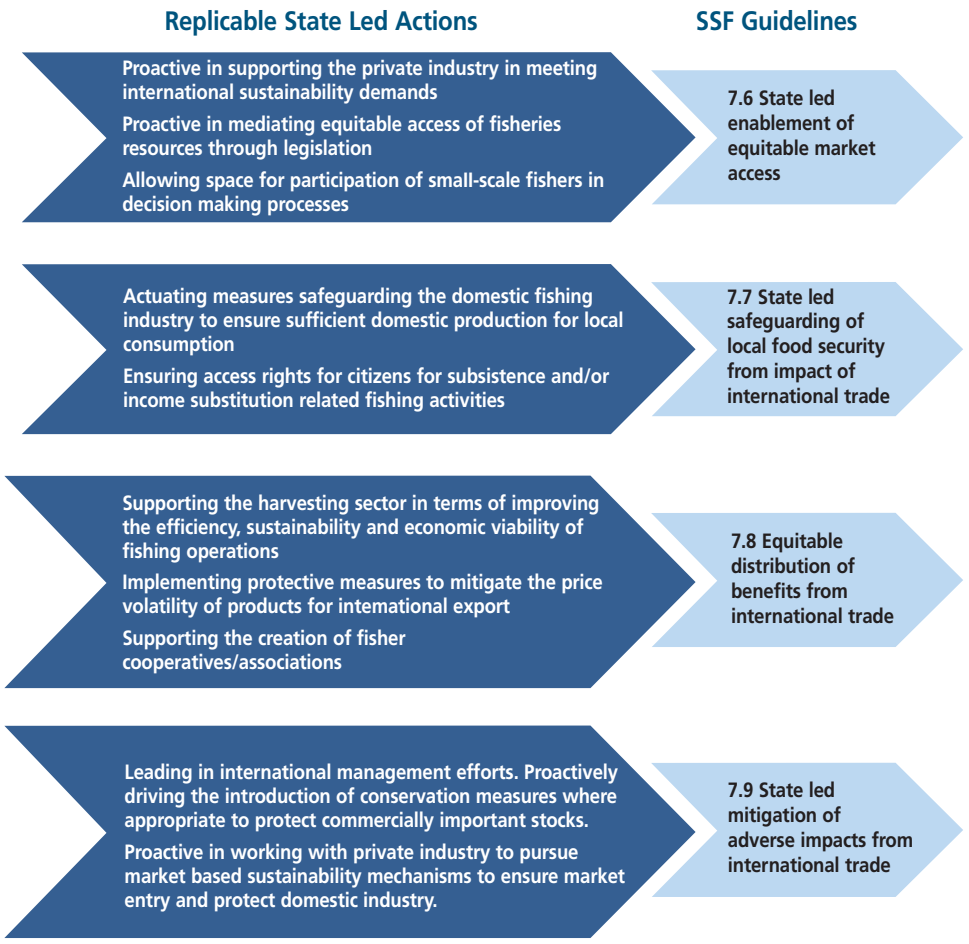
As a Small Island Developing State, the Maldives has overcome geographical and environmental challenges to develop one of the most sustainable fisheries in the world. Its Pole-and-Line Skipjack Tuna Fishery is unique in the sense that fishers are actively involved in safeguarding the resource and the majority of the earnings from the sector are passed on to them, while they continue to play a vital role in the island communities.

Maldivian tuna products are competing with similar products originating from developed countries, or caught by industrial fisheries often connected to vertically integrated companies, that are able to produce them at a reasonably lower cost and in larger quantities. This, coupled with the increasing demands of sustainability initiatives that allow for market access, creates a number of challenges that, if left unmanaged, could undermine the competitiveness of Maldivian tuna in the global marketplace. A key lesson from the case of the Maldives is that government-led development across the value chain – i.e. harvesting, large- and small-scale processing, export, ancillary activities and quality control – can be an essential factor in enabling the fishery sector to maintain market access.

The Maldives Pole-and-Line Skipjack Tuna Fishery therefore provides an excellent example of how the practices of the state can embrace the principles of SSF Guidelines 7.6–7.9. Figure 8.5 illustrates where the good practices of the Maldivian Government align specifically with the Guidelines, and how these practices can be replicated by other coastal states looking to develop and support their domestic small-scale fisheries value chains, post-harvest and trade in the context of food security and poverty eradication.

This paper has illustrates how the Government of the Maldives has acted as a catalyst for innovation and development, and likewise the extent to which state-led strategies can be employed to promote export-based fisheries, while also ensuring national citizens have opportunities to benefit equitably along the value chain. The

FIGURE 8.5
Replicable state-led practices of the Maldives for meeting SSF Guidelines



government's approach can be summarized as providing access for its fishers and fishworkers to marine resources and markets.

The Maldivian Government has taken many steps to facilitate preferential access to and benefits from skipjack tuna resources for its own citizens. In the first instance, partitioning the Maldives EEZ so that only domestic, one-by-one tuna fishing vessels can access tuna within 75 nautical miles of the coast ensures the country's fishing industry can continue to be the sole beneficiaries of its tuna resources. Further to this, through imposing a fixed price premium on top of the Bangkok base price for tuna exports and a minimum base price for domestic tuna sales, the government has enabled the fishing sector to maintain a high and stable income derived from the skipjack fishery. In implementing measures that focus on ensuring that both the primary and secondary sectors of the fishing industry are in a position to derive the maximum economic benefits from the domestic fishing sector, the government is also creating enabling conditions for safeguarding the livelihoods and the food security of its citizens.

The government has also helped to ensure the tuna sector can adapt to global market conditions. By spearheading market-oriented sustainability innovations like achieving MSC certification and implementing national digital transparency systems, the government has created an enabling environment where the Maldives and its citizens are well placed to thrive in global seafood markets. Furthermore, its leadership

in regional fisheries management at the IOTC has also served to influence issues that affect the country's tuna fishing industry and its capacity to thrive domestically and internationally.

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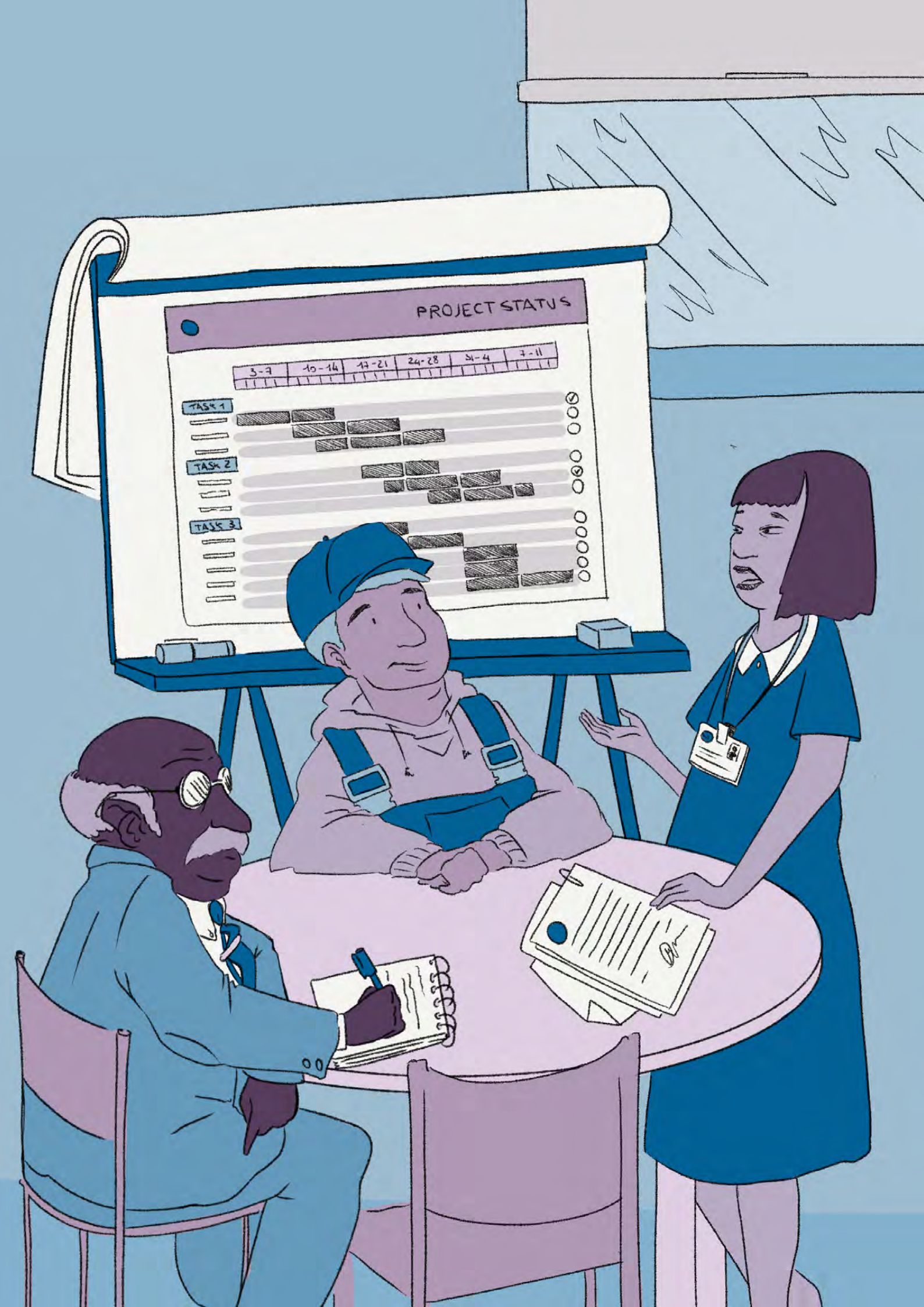
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9. Fishery Improvement Projects: In the context of small-scale fisheries value chains, post-harvest operations and trade

Alexander Ford
Joseph Zelasney
Policy, Economics and Institutions Branch
FAO Fisheries and Aquaculture Department
Rome, Italy

ABSTRACT

Fishery Improvement Projects (FIPs) are multistakeholder partnerships designed to encourage value chain actors to improve fisheries sustainabiliy using market incentives. Initially applied to large-scale fisheries, for the past ten years the FIP model has also been applied in other contexts, including small-scale fisheries. FIPs facilitate coordination between relevant value chain actors and promote multistakeholder dialogue. However, FIPs have been criticized for not engaging governments and small-scale fishery actors or ensuring the fair distribution of benefits for fishing communities. This case study provides a historical overview of FIPs and considers their strenghts and weaknesses as a mechanism to operationalize the recommendations laid out in Chapter 7 of the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication, particularly paragraphs 7.1 and 7.8, which aim to ensure that post-harvest actors are included in decision-making processes and to ensure that effective fisheries management systems are implemented to prevent market-driven overexploitation of the natural resource and those dependent on it, respectively. FIPs have the potential to drive collaborative management in small-scale fisheries, but to do so effectively greater inclusion of fishing communities and government authorities is needed.

Keywords: Fishery Improvement Project, multistakeholder engagement, private governance, certification and ecolabeling schemes.

9.1 INTRODUCTION

Improving the environmental sustainability of seafood production using market-based approaches has been a focus of the sustainable seafood movement since the 1990s. The effect has been an increase in the application of certification and ecolabeling schemes. One model in the market-based approach tool kit is the Fishery Improvement Project (FIP), defined by the Conservation Alliance for Seafood Solutions (CASS)[1] as "a

[1] The Conservation Alliance for Seafood Solutions (CASS) connects leading conservation groups from North America, South America, Europe and Japan that work with businesses throughout the supply chain, from fishers and fish farmers to retailers and restaurants. The definition of FIPs has been agreed upon by CASS's members and collaborators, which include: Conservation International, the David Suzuki Foundation, Ecology Action Centre, EDF, FishChoice, Fish Wise, Gulf of Maine Research Institute, Living Oceans, Monterey Bay Aquarium, New England Aquarium, Ocean Outcomes, Sea Web, Shedd Aquarium, Smart Fish AC, Sustainable Fisheries Partnership (SFP), Ocean Wise, World Wildlife Fund (WWF), Aquaculture Stewardship Council (ASC), Canadian Parks and Wilderness Society (CPAWS), CeDePesca, Client Earth, Comunidad y Biodiversidad A. C. (COBI), Ecotrust, Environmental Justice Foundation (EJF), Fair Trade USA, Future of Fish, Global Aquaculture Alliance, Global GAP, Good Fish Foundation, World Benchmarking Alliance, International Pole and Line Foundation (IPNLF), Marine Conservation Society United Kingdom (MCS UK), Marine Stewardship Council (MSC), National Aquarium, Natural Resources Defense Council (NRDC), Ocean Conservancy, Sea Delight Ocean Fund, Sea Pact, Seafood Legacy, the Nature Conservancy and Virginia Aquarium.

multistakeholder effort to address environmental challenges in a fishery .... utiliz[ing] the power of the private sector to incentivize positive changes toward sustainability in the fishery and seek[ing] to make these changes endure through policy change" (CASS, 2012), and also by the United Nations Development Programme (UNDP) as "a collaboration between relevant stakeholders to influence policies and management practices and to improve the sustainability of fishing operations" (GEF, 2019).

The first FIPs were established in the early 2000s to engage industrial supply chain actors as partners in the management of the fisheries from which they sourced (Cannon *et al.*, 2018). The FIPs were launched in fisheries of high commercial value globally, such as Baltic Sea cod and Russian pollack, with large volumes being traded through international value chains, to ensure long-term supply by improving fisheries management and environmental performance (Table 9.1).

TABLE 9.1
Amount of seafood in FIPs 2015/2019, by tonnage and by percentage of total recorded marine catch

	2015		2019	
Commodity category	**Landings (in thousand tonnes)**	**% of Global Landings**	**Landings (in thousand tonnes)**	**% of Global Landings**
Crab, lobster, crustaceans	157	6.2	201	7.9
Mollusks	0	0	26	1.1
Major tuna species*	1115	22.9	1550	33.5
Miscellaneous fish	29	0.1	127	0.3
Salmon and diadromous fish	10	1	14	1.6
Shrimp	207	5.9	378	10.6
Small pelagics	3397	17.3	4235	21.3
Snapper/Grouper	0	0	4	0
Squid/octopus	227	4.9	371	8
Other tuna, bonitos, billfish	101	3.8	258	8.8
Whitefish	846	8.6	332	3.4
Total	**6089**	**7.7**	**7496**	**10.4**

* Major species include albacore, bigeye, bluefin, little tunny, skipjack and yellowfin.

Note: Landings exclude those associated with Stage 0, Stage 1 and Stage 6 FIPs (see Appendix 1 for FIP stages). In instances where there was overlap between reported FIP landings and Marine Stewardship Council (MSC) certified landings (in the case of Stage 6 FIPs), landed tonnage was counted towards MSC landings (CEA, 2020).

Demand for sustainable seafood has grown markedly in the past 20 years. This demand has been driven in large part by major global seafood value chain actors, who have integrated procurement of certified sustainable seafood into their sourcing policies. Although seafood from FIPs is not certified, most FIPs use the MSC's standard (Box 9.1) as their framework for improvement. Subsequently, FIPs have come to be seen as a viable sourcing option for sustainable seafood among major buyers.

Over the past decade, the FIP approach has been also applied to small-scale fisheries. Globally, out of the 155 active and completed FIPs (Figure 9.1), 31 are small-scale;[2] of these, 4 are in Very Highly Developed countries, 15 are in Highly Developed countries, 11 are in Medium Developed countries, and 1 is in a Low Developed country, according to the UNDP Human Development Index (Sustainable Fisheries UW, 2019; UNDP, 2018; Fishery Progress, 2019). Asia and Latin America have the largest concentration of FIPs, followed by North America.

[2] https://docs.google.com/drawings/d/192tPood_Gv8bAv1s2YYgQmAsQhyD3Zcjhqq7lsIBfuM/edit for a definition of "small-scale".

BOX 9.1

The Marine Stewardship Council (MSC) and FIPs

Since the MSC's foundation in 1996, the organization has managed to create and maintain a market for "sustainable fish" sourced from major fisheries around the world. However, it has struggled to find commercial success with small-scale fisheries (Ponte, 2012). Nevertheless, the MSC has been instrumental in the construction of the FIP concept working in conjunction with other CASS members to use FIPs as a vehicle towards acheiving MSC certification, including in small-scale fisheries.

The aim of the MSC is to secure the sustainability of fishery resources worldwide. The MSC "Theory of Change" involves the certification of fisheries and supply chains for the benefit of consumers looking to purchase environmentally sustainable seafood. In order to be certified, fisheries must adhere to the MSC's standards (MSC, 2019):

1. **Sustainable Fish Stocks**: Fishing must be carried out at a level that ensures it can continue indefinitely while also ensuring the fish population can remain productive and healthy.
2. **Minimizing Environmental Impacts**: Fishing activity must be managed carefully so that other species and habitats within the ecosystem remain healthy.
3. **Effective Fisheries Management**: MSC-certified fisheries must comply with relevant laws and be able to adapt to changing environmental circumstances.

FIPs have been criticized for not providing long-term strategic fisheries governance, exacerbated by incidents of "greenwashing"[3], and not providing for greater government, fisher and fishworker engagement in their planning and management, therefore undermining any positive impacts they may have on value chain development (Sampson *et al*., 2015; Crona, Käll and Van Holt, 2019). Nevertheless, FIPs generally have proved effective in providing a platform for dialogue and strategic direction involving various stakeholders (Cannon *et al*., 2018; Crona, Käll and Van Holt, 2019; Travaille *et al*., 2019).

After a close examination of the FIP model, the case study considers how FIPs are managed and explores their alignment with paragraphs 7.1 and 7.8 of the SSF Guidelines.

9.2 METHODS

This case study provides a picture of the FIP concept, exploring how and where the FIP model has been applied thus far. The first stage of the research involved a systematic review of literature publicly available, including academic, governmental and non-governmental publications. This served a dual function permitting an understanding of the FIP concept, while at the same time identifying key stakeholders to interview in the second stage of the study. This process also helped bring out areas of focus for the study, again informing the interviews in the second stage. A search for the term "Fishery Improvement Projects" using University College London's library database turns up 33 academic research papers, the oldest dating back to 2014, and five academic articles published in 2019. There are many publications originating from NGOs, with organizations party to CASS offering substantial grey literature covering their experiences in FIP implementation and management.

The second stage of the research involved conducting 11 semi-structured interviews on the FIP concept with experts who have been involved in FIPs directly. Interviews

[3] The practice of overstating the environmentally or socially conscious attributes of a firm's offering while understating the negative attributes, to the firm's benefit. Greenwashing can be explicit or implicit and can be expressed in many forms, including pictures, direct claims in text, symbols, labels, or even partnerships or relationships. These claims can be made in press releases, advertisements, on websites and even on the products themselves.

were conducted using an interview guide, which was frequently adapted depending on the identity of the interviewees and where their professional expertise lay (Appendix 2 for a copy of the guide). The range of people selected included representatives from industry, governmental and intergovernmental agencies, research/academia, and NGO representatives. Potential interviewees were sourced from the literature review and organisations identified on the CASS website. In addition, a snowballing approach was applied by tapping into professional networks, with many of the respondents recommending other individuals for interview. Again, this served a dual function in that it reinforced or corrected our understanding gained from the literature review, while also providing insights into the future direction of FIPs.

Last, the primary author attended a FIP Community of Practice workshop in Indonesia, which provided critical insights into the discussions being held among FIP proponents in Southeast Asia. Attendees included fishers; processors; NGOs; representatives from UNDP and FAO; representatives from four Southeast Asian governments; consultancy firms; and a number of other FIP proponents. The event proved important for clarifying details and acquiring additional knowledge pertaining to the unequal distribution of costs and benefits, the need for greater involvement of government and community representatives, and the need to configure the FIP model to achieve long-term, sustainability.

9.3 RESULTS AND DISCUSSION

This section provides an overview of the FIP concept, including the differing types, management styles and reporting method used, followed by a discussion on FIP stakeholder inclusion and sustainability; FIPs and the global market place for sustainable seafood; and lastly, FIPs and the role of government.

9.3.1 FIP type, management and reporting

FIP types

FIPs vary in their type, dictated by design and objectives, but there are conditional criteria set out by CASS that underpin the FIP model. First, value chain actors, which might include suppliers, retailers, food services and fishworkers, must actively participate in the FIP. Participation can take the form of financial or in kind contributions to the project. Second, the FIP's stakeholders must commit to improving the fishery (through a signed memorandum of understanding, published participant list, etc.). Third, the FIP must define the short-term scope of the project with a set of time-bound objectives. Fourth, a workplan must be made publicly available. And last, the FIP management must regularly track and report progress, including: 1) publicly reporting progress on actions and their results, with supporting documentation every six months; and 2) updating indicator scores and providing supporting evidence for score changes every 12 months (CASS, 2019).

These qualities outline the core elements of a FIP. However, due to the MSC's prevailing role in the strategic direction of FIPs, an extra layer of complexity distinguishes MSC-guided FIPs from non-MSC-guided FIPs, which are termed by CASS as Comprehensive and Basic FIPs, respectively.

- A Comprehensive FIP must undergo an independent audit every three years against the MSC standards, and must receive an unconditional pass in order to be awarded MSC certification.[4] The rationale here is that by demonstrating the market value of transitioning to MSC certification, other local stakeholders will engage in sustainability reforms in order to pursue certification and its associated benefits (Roheim and Zhang, 2018).

[4] If a fishery receives a score between 80 and 100, it is awarded an unconditional pass, meaning it is under no obligation to improve aspects of its operation in order to retain its certificate.

- A Basic FIP is narrower in scope, focusing on improving specific environmental challenges within the fishery as opposed to the entire array of MSC performance indicators, and hence it doesn't seek MSC certification. Basic FIPs also tend to address socio-economic issues more broadly, although scoring against the MSC standards remains the de facto form of assessment. While the promise of future market benefits may not be the only or central incentive, Basic FIPs still require strong commitment from stakeholders in order to realize long-term change.

FIP management structure

According to the California Environmental Associates (CEA),[5] ascertaining the management structure of a FIP – i.e. whether it is "top-down" or "bottom-up" – is fundamental to its analysis. In top-down FIPs, seafood value chain actors identify unsustainable fisheries, usually from which they are already sourcing, to which a FIP will be applied. This creates downward pressure through the value chain, incentivizing stakeholders to engage in sustainable management. One of the limitations of this approach is that it effectively "pushes down" the responsibility, with more powerful stakeholders in the value chain passing sustainability responsibilities down to those who are less powerful (personal communication with Blue Ventures, 27/03/19). The advantage of a top-down approach is that by sourcing from a number of fisheries, there is a competitive incentive for fisheries to follow sustainability protocols. Currently, seafood companies now manage more FIPs than any other third party implementer (CEA, 2020).

Bottom-up FIPs are usually intiaited by an NGO and aim to facilitate change where the capacity for management, enforcement and government reforms are weak. They tend to give more space than top-down FIPs to fishers, fishworkers and community representatives in their management. Such FIPs are premised on the participating stakeholders' ability to drive change through fishing practices, often in the absence of effective fisheries management regimes. The risk is that whatever gains are made by participants are undercut by non-participants, and consequently can stall and fail to deliver significant improvements (CEA, 2015).

Reporting progress

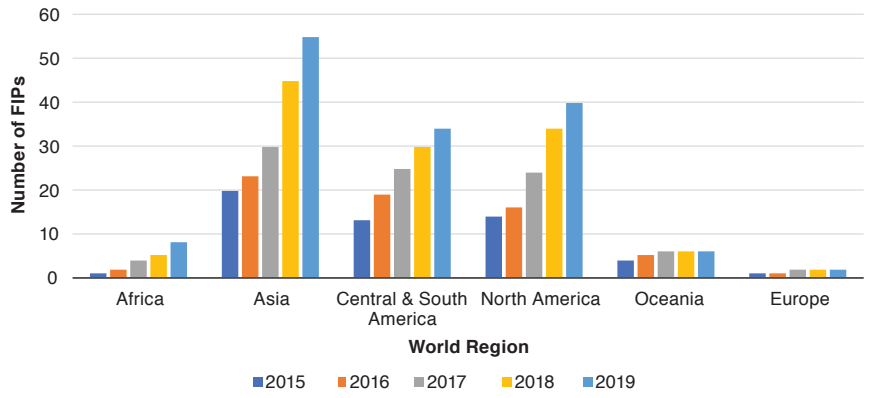
The web based Fishery Progress, managed by the American-based NGO FishChoice, is the platform designed for retailers to make sourcing decisions based on FIP reporting.[6] With the support of corresponding technical and advisory committees,[7] this platform provides a rating of all reviewed and subsequently endorsed FIPs, describing how far each FIP has come in achieving its objectives as well as its alignment with the MSC standards. Based on this, the FIPs are awarded a grade from A to D, A being the best (and only available to Comprehensive FIPs). A significant issue – and perhaps one of contention for Basic FIPs – is that despite not pursuing MSC certification, Fishery Progress still measures the progress of Basic FIPs against the MSC standards, therefore missing or misinterpreting many of the nuances captured by these FIPs' focus on socio-economic issues. As a remedy, Basic FIPs submit reports that include in-depth accounts of their objectives and their progress in achieving these, thus helping to "fill

[5] CEA is a private consultancy firm based in San Francisco, United States of America. The organization supports the work of environmental foundations and non-profits as well as sustainability-oriented businesses, with in-depth research and analysis, programme design and evaluation, and strategic planning.

[6] Another entity, FishSource (itself managed by SFP), has a similar database, but the information and data is collected and managed by the same group of actors who provide the ratings for Fishery Progress.

[7] The Fishery Progress website is used to showcase all FIPs that conform to the criteria set forth by the members of CASS. FIPs are rated by an advisory committee (consisting of FishChoice, WWF, MSC, New England Seafood, CEA, Fish Wise, SFP, Netuna USA, Seafood Ninja and Anova Seafood) and a technical committee (consisting of MSC, ASC, MRAG Asia Pacific, Scaling Blue and MRAG Americas).

FIGURE 9.1
Active and completed FIPs by region



Source: CEA, 2020.

in the blanks" that the Fishery Progress rating misses. This is examined more closely in the following section.

9.3.2 FIPs and social sustainability

Inclusion of post-harvest stakeholders in decision-making processes is the central tenet of paragraph 7.1 of the SSF Guidelines[8] "Post-harvest" refers to all stakeholders and nodes of the supply chain the product passes through from the moment it is taken from its natural environment. Paragraph 7.1 also states that all parties should caution against social exclusion, recognizing "that there are sometimes unequal power relationships between value chain actors" which pertains to a broader call for socially sustainable practices to be enacted throughout small-scale fisheries (FAO, 2015). Social sustainability is defined as "the ability of a food value chain to endure by facilitating equitable distribution of the value created (profits, wages, consumer benefits, fiscal impact) and broader social impacts. This requires attention to the distribution of marketing margins, gender concerns, youth, poverty, vulnerable groups, community development, health and nutrition, sociocultural elements, labour welfare" (FAO, 2015). This section reviews the extent to which "social sustainability" is being integrated into the FIP model.

The discussion on whether, how and to what extent FIPs should incorporate social objectives is one that has been gaining traction among FIP proponents. The discussion includes the scope of social issues a FIP can consider, the appropriate scope of the value chain to be assessed, and whether the definition and goal of FIPs should change. Currently, the active participation of all post-harvest stakeholders is clearly spelled out in CASS's FIP guidelines and according to CEA (2020) 19 per cent of FIPs self-identify as addressing the social dimension of fisheries. However, Crona, Käll and Van Holt (2019) note that "only 7 percent of FIPs in [their] study included fishers as one of the FIP lead actors". They also suggest that fishworkers are excluded from data collection and analysis, indicating a lack of inclusion in decision-making processes. It has been found that, in line with trends and current political motivations (Barr, Bruner and Edwards, 2019; Teh *et al.*, 2019), FIPs should provide assurances that the fishery is not associated with the most egregious human rights abuses like child and forced labour (Kittinger *et al.*, 2017). Beyond this, however, it should be acknowledged that major global value chain players traditionally sourcing from FIPs have been reticent to

[8] Paragraph 7.1 All parties should recognize the central role that the small-scale fisheries post-harvest subsector and its actors play in the value chain. All parties should ensure that postharvest actors are part of relevant decisionmaking processes, recognizing that there are sometimes unequal power relationships between value chain actors and that vulnerable and marginalized groups may require special support.

implemented social improvements beyond social audits for the most egregious issues (personal communication with CEA, 13/03/19). Equally, creating more requirements against which fisheries must be assessed may unduly burden fisheries by increasing the cost and complexity of FIPs. This could be particularly onerous for fishers and fishworkers, who often bear the majority of the cost due to the aforementioned "pushing down" of responsibility. Similar questions are raised in the context of the value chain, with deliberation on whether social responsibility criteria should focus on the vessel level or extend to stakeholders at each node of the value chain. However, if the burden of responsibility becomes too onerous, this could threaten the efficiency or even the existence of the FIP concept (personal communication with Ocean Outcomes, 04/03/19).

There are some efforts of note to expand the scope of FIPs to include socially sustainable practices. First, the "Framework for Social Responsibility in the Seafood Sector" developed in 2018, is a rapid assessment scorecard based on the SSF Guidelines (Opal, 2017) and currently being piloted by various members of CASS. Designed to yield a narrative and score relating to each of the thematic chapters, and structured in terms of performance indicators in much the same way as the MSC assessments, the long-term objective of the scorecard is for the results to be published alongside the ratings currently published on the Fishery Progress website. However, participants at the FIP Community of Practice in Indonesia felt that the scorecard would present yet another technical, time-consuming barrier with no immediate benefits for fishers and fishworkers or explicit recognition of their involvement in undertaking the assessment. Furthermore, the same participants felt the scorecard's interpretation of small-scale fishery issues being assessed does not correspond with the actual challenges of small scale fishing communities in many parts of the world, and that the scorecard misinterprets or obscures problems, therefore misrepresenting the true state of the fisheries.

Second, a potential policy approach is to require retailers to publish information on social criteria as a condition of joining a FIP. In this regard, there is growing pressure for the private sector to adopt the United Nations Global Compact,[9] with almost 10 000 companies globally having done so already. Traditionally, most retailers (usually located in high-value markets) have passed responsibility on to their suppliers; therefore, participating in a FIP that demands social data would essentially deprive the retailer of plausible deniability. Indeed, Teh et al. (2019) argue that this is likely to become an effective means of eliminating the most salient of human rights violations in supply chains. This argument also aligns with CEA's recognition of the need for social audits on the most egregious issues. Nevertheless, the Global Compact only requires companies to tackle "what [they] can reasonably do to address" human rights abuses, limiting accountability (UN, 2014). Teh et al. (2019) suggest that relying on human rights frameworks to protect fishers' and fishworkers' socio-economic well-being may prove to be rather a blunt instrument if national laws do not implement pathways to secure the full range of social rights.

Finally, an approach to ensure greater social autonomy would be to consider how information is collected and distributed. Participatory information collection could support social equity within the small-scale fisheries engaged in FIPs, both in terms of who is collecting the information and the type of information being collected. As Crona, Käll and Van Holt (2019) point out, "fishers are rarely reported to be involved in data collection … which suggests they are not directly involved in conversations around new regulations". However, with regards to driving social sustainability in FIPs, it is important to collect sufficient information on "fishers' (or other market

[9] The United Nations Global Compact is a non-binding pact that encourages businesses worldwide to adopt socially responsible policies and report on their implementation. The Global Compact presents a principle-based framework for businesses, based on ten principles concerning human rights, labour, the environment and anti-corruption.

actors') behaviour, which [would inform and support] more ecosystem based management decisions".

Paragraph 7.1 of the SSF Guidelines highlights the importance of being aware of power imbalances in value chains. While it is questionable whether market-based initatives are the most approporiate mechanism for dealing with broad challenges relating to social dimensions, the involvement of fishers and fishworkers is about equitability, and, if done correctly, would be a step forward in enhancing social sustainability within FIPs and mitigating power imbalances. Indeed, involving and identifying the role of stakeholders is important for ensuring that FIPs are not unintentionally excluding stakeholders or creating power imbalances (Deighan and Jenkins, 2015).

9.3.3 FIPs and the global market for sustainable seafood

The fair distribution of benefits

One of the obstacles to increasing the positive impacts of FIPs worldwide is ensuring that the financial benefits of FIPs are fairly distributed throughout the value chain, as is pronounced by paragraph 7.8 of the SSF Guidelines.[10] This section focuses on the equitable distribution of FIP costs and benefits and prevailing barriers to their realisation. To date there is limited literature examing the costs and benefits of partaking in a FIP from the perspective of fishers and fishworkers, however the study by Tolentino-Zondervan *et al*. (2016) comprehensivly compares the factors small-scale fishers can consider regarding a top-down, industry-led tuna FIP and a bottom-up, NGO-led tuna FIP, both situated in the Philippines . Through interviews with fishers working in each FIP, benefits including increased income were reported, but in both FIP-types the fishers' reliance on their support networks – a fishers' or family firm – played a definitive role in emboldening them to participate in the FIP.

In the industry-led FIP, though the fishers were more likely to obtain satisfactory prices and be paid in a timely manner, the costs of upgrading equipment and handling training were left to the fishers. This requirement was justified by the presence of extended family networks on which individual fishers could rely. Furthermore, the results showed that fishers participating in the industry-led FIP were part-time or focused on other species aside from tuna, and the decision to undergo the strict and costly procedures for the industry-led FIP was motivated by the high probability that they would consistently be rewarded for the short amount of time spent fishing for tuna.

In contrast with these part-time, multi-species fishers, the fishers in the NGO-led FIP had spent their careers specializing in tuna fishing and had acquired their skill for catching and handling tuna over time. This enabled them to comply more easily with the product requirements of the NGO-led FIP, and therefore increasing their chance of earning a good income. Unlike the industry-led FIP training, the training sessions held by the NGO-led FIP were organized and funded completely by the NGO and the government. Furthermore, fishers in this latter category relied on fishers' associations as their support network, which helped fishers to obtain funding and subsidies from the government, thus improving their fishing activities. Tolentino-Zondervan *et al.* (2016) find that both FIP types can and do financially benefit participating fishers, but there are a number of specific and localized factors that influence this result, a great deal of which rests on support networks (family firms or fishers' associations, and sometimes both). To understand whether this is characteristic of all FIPs, further studies are necessary elsewhere.

[10] Paragraph 7.8 States, small-scale fisheries actors and other value chain actors should recognize that benefits from international trade should be fairly distributed. States should ensure that effective fisheries management systems are in place to prevent overexploitation driven by market demand that can threaten the sustainability of fisheries resources, food security and nutrition. Such fisheries management systems should include responsible post-harvest practices, policies and actions to enable export income to benefit small-scale fishers and others in an equitable manner throughout the value chain.

The impacts of international trade

A major factor informing paragraph 7.8 is recognising and accounting for the impacts international trade can have on fisheries and those directly reliant on them. Comprehensive FIPs, and their related management, often presume that the pursuit of MSC certification will guarentee access to high-value markets, whilst keeping the fishery intact. Yet this route is risky especially for small-scale fisheries as the fishery is not likely to achieve certification due to the high costs associated or the high degree of management required. In light of these challenges it is important to appreciate the results of Cannon et al. (2018) who find that "FIPs showed a significantly higher probability of improving 'management' and reducing 'overfishing' than those fisheries without FIPs". This result suggests us that the FIP model provides a structure that can supply international demand for sustainable seafood, without the need for certification to safeguard the natural resource. If the practices implemented during the FIP are maintained, and the natural resource is not undermined, it is conceivable that stakeholders involved in the FIP will have the opportunity to benefit from international trade.

Creating the impression of sustainability

A significant concern around the proper management of FIPs are allegations of "greenwashing" as a way of sourcing seafood as cheaply as possible while still claiming sustainability (Sampson et al., 2015; CEA, 2015, CEA, 2020). FIPs have inadvertently become a form of currency for seafood companies seeking to source sustainable seafood, the incorrect assumption being that, so long as the fishery is part of a FIP, the seafood produced is sustainable. Thus FIPs are being used to meet sustainability requirements of seafood buyers in certain markets, which has the potential to undermine attempts to deliver sustainability improvements and the market's integrity. It would appear that the notion of sustainability as a pre-competitive issue is losing ground against the need to capture market share and meet buyer demands. This undermines the entire reason FIPs were designed in the first place: as a stepwise approach to improving the sustainability of the fisheries and supply markets with sustainable seafood. Instead, the demand for certified seafood is actually feeding a highly competitive market, the fallout of which involves undermining sustainability efforts.

The opportunity for "greenwashing" is perhaps perpetuated by the influence Fishery Progress exerts over the valuation of FIPs. With no third-party auditing system, national fisheries institutions or small-scale fishery actors involved in evaluation of the data presented on the site, vested interests can influence the assessment of a FIP in an overly optimistic way, thus presenting an unrealistic account of the FIP, and by extension the fishery. Such misrepresentation risks undermining the basic rights of fishers and fishworkers, which in turn poses a risk to national and international strategies for sustainable development.

Another opaque area in the value chain that risks devaluing FIPs are where importers source from both successful and unsuccessful FIPs as well as non-FIP fisheries and then distribute an aggregated product to the market without distinction, but under the pretext that it is all a FIP-sourced product. There are examples of FIPs transitioning to Comprehensive FIPs to avoid this, however, to iterate the point made above, small-scale fisheries are rarely in a position to consider such an option.

Ultimately, FIPs have the potential to fulfil many of the nuances of paragraph 7.8 of the SSF Guidelines. Tolentino-Zondervan *et al*. (2016) indicates that the fair distribution of benefits is possible (although further research is required), and Cannon *et al*. (2018) demonstrates that FIPs are beneficial for the natural resource. However the issue of creating false impressions of sustainability needs to be addressed.

9.3.4 FIPs and the role of government

Governments have the potential to influence the direction and objectives of a FIP, encouraging approaches that compliment or reinforce national and regional policies and legislation (Crona, Käll and Van Holt, 2019; Foley and Havrice, 2016). This aspect is also addressed through paragraph 7.8 of the SSF Guidelines.

Governments set and implement national fisheries policy. While governments are often not involved in FIPs, FIPs operate within existing national policy and legal frameworks. NGOs and development entities may be able to alter fishing practices that benefit a portion of the natural resource as well as the local communities reliant on it, but external forces beyond the capacity of such schemes could well undermine efforts (CEA 2015; CEA 2020). CEA (2020) and Melnychuk *et al.* (2017) provide evidence that a country's fisheries management capacity is closely correlated with the success of FIPs active in a given country. FIP implementers and stakeholders, particularly in less developed countries, increasingly recognize the critical role government needs to play to achieve FIP goals and the importance of multi-stakeholder efforts engaging the government.

A commonly cited obstacle to FIPs is moving past Stage 5 – Improvements on the Water – of the FIP process (Appendix 1), which would see FIPs contributing to lasting ecological change. It is generally agreed by FIP proponents that in order to significantly improve fisheries management and secure changes on the water, sustained policy dialogue is required between government and FIP stakeholders to either complement activities or reinforce a particular activity (Crona, Käll and Van Holt, 2019).

Currently, policy dialogue is only prevalent to FIPs applied to crab and lobster fisheries (Crona, Käll and Van Holt, 2019). For example, in the context of many Southeast Asian crab and lobster FIPs, industry and government work in close partnership in order to avert overexploitation as global demand increases. However, in the context of tuna – an important economic resource and significant contributor to food security in many countries – policy dialogue within FIPs is minimal, due to the fact that tuna is managed by regional fisheries management organizations (RFMOs)[11] and accessibility to such bodies is relatively exclusive (Crona, Käll and Van Holt, 2019). In spite of this, Travaille *et al.* (2019) have found that FIP effectiveness is actually higher in fisheries under the jurisdiction of an RFMO compared to those governed solely at the state or local level. This is due to the established regional-level frameworks in place supporting management activities and improvements, including data reporting systems, regular stock assessments and surveillance programs.

CEA (2020) have reported that if FIPs are going to seriously contribute to the management of commercially exploited fisheries, the model is going to have to be adopted to suit nation-wide efforts. Indeed, the next challenge for FIP proponents is to understand how the FIP model can be used as a fisheries management tool in developing countries. It must be acknowledged that whilst much international seafood is sought from fisheries in developing countries, the capacity for effective management is often lacking. The Global Marine Commodities Initiative led by the United Nations Development Programme (UNDP) represents an example of what national-level coordination for FIPs could look like. In partnership with SFP, a Global Environment Facility (GEF)-funded project was launched in Costa Rica, Ecuador, Indonesia and the Philippines with the goal of establishing multi-stakeholder platforms at the national level to drive fisheries improvement.

One potential obstacle to facilitating closer coordination between FIPs and system-wide fisheries management plans could be the long timelines associated with FIPs, estimated to take up to a decade to yield minimum levels of sustainability, and the

[11] RFMOs are intergovernmental bodies that facilitate the management of fish stocks in a particular region, and generally act as the management authority for shared and migratory species (such as highly migratory tuna and billfish) and stocks that extend beyond a single national jurisdiction.

often short timelines associated with election cycles, generally between 2 and 4 years. If FIPs are not fostered or seen as valuable by alternating political administrations, then any monetary or time investments made into a FIP could loose value (Travaille *et al.*, 2019; Cannon *et al.*, 2018). This challenge is particularly acute when considering the longevity of a FIP; participants at the FIP Community of Practice in Indonesia were concerned with how a fishery's management should continue after the relevant FIP had ended, since many FIPs lose their momentum in the absence of any coordinated or perpetual effort to continue sustainable practices. This phenomenon could potentially be reversed, if FIPs were more commonly seen as a tool to implement national fisheries management plans.

FIPs can help national governments ensure that fishers and fishworkers are complying with legislation and support them where capacity is otherwise lacking. On the one hand, they could support legislation by making compliance a prerequisite to entry. On the other hand, as was learned at the FIP Community of Practice workshop in Indonesia, many small-scale fishing communities do not have access to information regarding legislative requirements or changes, and as a result are penalized or excluded in certain circumstances. NGOs operating in a FIP can provide assistance in this regard, as they often have the resources and capacity to channel this information to fishing communities, helping to coordinate administrative procedures between local authorities and communities to ensure legislative compliance.

Participants at the FIP Community of Practice in Indonesia postulated that the collaborative element of FIPs could support cooperation and dialogue between governmental agencies. Lack of effective communication between agencies can result in a delay to achieve national objectives or address the needs of the most disenfranchised. By the same token, FIPs allow government agencies – and stakeholders in general – the opportunity to meet and build trust with fishing communities. The Republic of Ireland's Seafood Development Agency affirms this latter point, observing that its involvement in an Irish Brown Crab FIP has allowed stakeholders who traditionally do not engage in dialogue to exchange ideas, information and planning (personal communication with BIM, 24/04/19). A large part of this FIP's workplan is geared towards deepening the working relationship between science and industry to improve the management of the fishery. On the one hand, fishers are expected to provide catch data (quantities landed, areas fished, gear used, product buyers) to help improve scientific knowledge of stock status or to verify progress towards Maximum Sustainable Yield (MSY). Likewise, processors who are members of the Irish Brown Crab FIP have agreed to supply data on FIP products including vessel details, quantities landed, processed quantities and where the product was sold. At the same time, the FIP aims to improve the management structure of the fishery by increasing input from fishers, processors and other industry players in the decision-making process.

9.4 CONCLUSIONS

FIPs are premised on a multistakeholder approach for enhancing sustainable fisheries management, with products derived from FIPs being used to fulfil sustainable seafood demand in high-value markets. FIPs are being applied to small-scale fisheries. This case study considered the strengths and weaknesses of FIPs as a mechanism to operationalize paragrapahs 7.1 and 7.8 in Chapter 7 of the SSF Guidelines. FIPs demonstrate a degree of alignment with the recommendations in the SSF Guidelines but there is still progress to be made in certain areas.

In the context of paragraph 7.1, FIPs facilitate a certain amount of coordination between relevant value chain players, promoting a multistakeholder system. However, as cited in Crona, Käll and Van Holt (2019), in only 7 percent of the FIPs studied do fishers and fishworkers play a central role in the management of the FIP.

In terms of promoting equitable international trade that benefits all stakeholders, as stipulated by paragraph 7.8, Tolentino-Zondervan *et al*. (2016) found that fishers benefit from being part of FIPs, although it should be noted that this study reflects results from only two FIPs in the Philippines. In terms of preserving the natural resource, Cannon et al. (2018), found that 'management' and 'overfishing' are more adequently addressed in fisheries taking part in FIPs. The biggest issue facing FIPs, in the context of paragraph 7.8, appears to be "greenwashing", which threatens to undermine incentivizing positive change and drive improvements, leading instead to potential overexploitation of the natural resource and an undervaluing of the sustainable seafood market.

Paragraph 7.8 also speaks to fisheries management systems, and it was found that FIPs can contribute towards better fisheries management systems. Travaille et al. (2019) found that FIPs performed better when the fishery is under the jurisdiction of an RFMO, suggesting that collaborative frameworks for managing a resource can be key to ensuring sustainability. Using the FIP model to bring about closer coordination between governments, fishing communities, and FIP stakeholders, has the potential to enhance system-wide management. Existing FIPs and their associated stakeholders could incentivize increased government participation by agreeing to reinforce or complement national fisheries management strategies.

Finally, one challenge not discussed here, but highly relevant to progressing FIPs is the high cost of running a FIP. Though there is a burgeoning demand in high-value markets for sustainable seafood, the majority of FIPs are currently sustained by philanthropic aid and in-kind support from industry and NGOs (CEA, 2015). This is not a sustainable strategy, and it is generally agreed by proponents of FIPs that to scale FIPs and ensure their economic value for all, markets (consumers) need to pay for the improved sustainability. Such a support dynamic could also mean that fishers and fishworkers are relying on a precarious system that might vanish if current sources of funding are stopped. Ultimately, when the financing of FIPs shifts from philanthropists and NGOs to private entities in the seafood value chain, this will signal that the costs of sustainability have been internalized.

One proposal from the interviewees that might help reduce the costs of small-scale FIPs would be to broaden their scale and scope. The economic leveraging power of an individual small-scale fishery is minimal (personal communication with SFP and Scaling Blue, 08/04/19 and 09/04/19, respectively), but if multiple FIPs were bundled or aggregated they could achieve greater economic efficiency. Furthermore, in this way the scope of their activities can be harmonized and more easily monitored. Aggregating FIPs could also help improve data collection and knowledge generation. All value chain players require data to evaluate the efficacy of their decisions and investments; moreover, data collection processes afford fishers and fishworkers the opportunity to take a more engaged role in FIP management (Crona, Käll and Van Holt, 2019). Nevertheless, literature on this topic is still minimal, so further work is encouraged to understand the finer implications of bundling FIPs.

In conclusion, FIPs have the potential to drive collaborative management in small-scale fisheries. In order for FIPs to promote sustainable fisheries management and equitable trade in small-scale fisheries, a reconsideration of the current model is required starting with greater inclusion of fishing communities and government authorities.

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Appendix 1

Process for FIPs

Stage	Activity
0 – FIP Identification	• Identification of a fishery that may benefit from a Fishery Improvement Project • Supply chain analysis conducted to understand who else is involved in the fishery and what market leverage exists
1 – FIP Development	• Assessment of the fishery's environmental performance • Scoping document completed by a consultant • Stakeholder mapping and engagement process
2 – FIP Launch	• Confirmation of project participants • Participant meeting • Development of the workplan - Objectives - List of activities - Delegation of responsibilities - Timeline and milestones committed - Metrics and key performance indicators - Associated budget • Workplan made public
3 – FIP Implementation	• Implementing activities in the workplan • Tracking and reporting on progress • Course correcting if needed
4 – Improvements in Fishing Practices or Management	• Improvements in policy or management or modifications in fishing practices • Increases in scores for MSC performance indicators focused on management or information
5 – Improvements on the Water	• Increases in scores for MSC performance indicators focused on outcomes • Verifiable change on the water
6 – MSC Certification (for Comprehensive FIPs only)	• Validation of the improvements in the fishery through the full MSC assessment process; must be carried out by an accredited certification body

Source: CASS website; for a more detailed version, http://solutionsforseafood.org/wp-content/uploads/2015/03/Alliance-FIP-Guidelines-3.7.15.pdf.

Appendix 2

Interview guide for FIP interviews

What is your experience with FIP and/or other multistakeholder fisheries management schemes?

What aspects of the FIP approach do you think set it apart from other management approaches?

Would you agree that the FIP approach is inclusive of all post-harvest stakeholders? Why?

Is the FIP approach helping small-scale fishers and fishworkers improve their position/standing in fishery value chains?

Do you think it will continue to grow in popularity? Why?

What do you think are the major challenges to the FIP approach?

Has the FIP approach helped create strong social organization? Why?

What recommendations would you make to policymakers to increase the benefits promised by the FIP approach?

The SSF Guidelines recognize the right of fishers and fishworkers, acting both individually and collectively, to improve their livelihoods through value chains, post-harvest operations and trade. To achieve this, the Guidelines recommend building capacity of individuals, strengthening organizations and empowering women; reducing post-harvest losses and adding value to small-scale fisheries production; and facilitating sustainable trade and equitable market access.

This document includes nine studies showcasing applied practices and successful initiatives in support of enhancing small-scale fisheries value chains, post-harvest operations and trade, based on the recommendations contained in the SSF Guidelines. Cases presented have been chosen on the basis that they can be emulated elsewhere by small-scale fishery proponents including, but not limited to, national administrations, non-governmental organizations, civil society organizations, private enterprises, development agencies and intergovernmental bodies. An analysis of enabling conditions as well as related challenges and opportunities are discussed in each case.

The document supports the 2030 Agenda for Sustainable Development – specifically SDG 14.b: "provide access for small-scale artisanal fishers to marine resources and markets"; and SDG 2.3: "by 2030 double the agricultural productivity and the incomes of small-scale food producers, particularly women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment".

ISBN 978-92-5-132350-2 ISSN 2070-7010

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CA8402EN/1/06.20