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SEAFOOD CERTIFICATION AND DEVELOPING COUNTRIES: FOCUS ON ASIA

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Small-scale fishers, Vinh City, Viet Nam. © K. Tsantiris

SEAFOOD CERTIFICATION AND DEVELOPING COUNTRIES: FOCUS ON ASIA

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ABSTRACT

Third party certification of fish and seafood products (ecolabels) have expanded rapidly since the first seafood ecolabel appeared on the market in the late 1990s. Developing country producers and exporters have raised concerns about ecolabel requirements acting as technical barriers to trade for access to international markets, while consumers in their own domestic markets have not shown much appetite for certified seafood. This research provides a review of recent literature on seafood ecolabels, focusing on Asian markets where uptake by consumers and retailers has not been as prolific as in European and North American markets. Analysis of selected third party certification schemes identifies key requirements that may act as barriers for small-scale producers in developing countries to obtain certification. Case studies provide examples to support the theoretical analysis. Recommendations based on the findings can guide developing country governments in supporting their fisheries and aquaculture sector to achieve certification and thus improve access to markets.

CONTENTS

ABBREVIATIONS AND ACRONYMS

ASC	Aquaculture Stewardship Council
BAP	Best Aquaculture Practices
CoC	Chain of custody
COFI	FAO Committee on Fisheries
COFI:AQ	COFI Sub Committee on Aquaculture
COFI:FT	COFI Sub Committee on Fish Trade
FAO	Food and Agriculture Organization of the United Nations
FIP	Fisheries Improvement Programme
FOS	Friend of the Sea
GAA	Global Aquaculture Alliance
GLOBAL GAP	Good Aquaculture Practices
GSSI	Global Sustainable Seafood Initiative
IFFO	Marine Ingredients Organization
IPSARD	Institute of Policy and Strategy for Agriculture and Rural Development
IUCN	International Union for Conservation of Nature
JSC	Hiep Thanh Joint Seafood Stock
MAFF	Ministry of Agriculture, Forestry and Fisheries of Japan
MCD	Centre for Marine Life Conservation and Community Development
MSC	Marine Stewardship Council
NGOs	Non-governmental Organizations
RFB	Risk-based framework
RSCIP	Responsible Shrimp Culture Improvement Programme
SOFIA	State of World Fisheries and Aquaculture
VietGAP	Vietnam Good Aquaculture Practices
WTO	World Trade Organization

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CHAPTER 1. OVERVIEW OF SEAFOOD CERTIFICATION

Background

Voluntary third-party certification for fish and seafood products was developed in the 1990s as a market-based incentive to promote sustainable capture fisheries. Since the establishment of the first fisheries certification scheme,[1] seafood certification – ecolabelling – has grown dramatically in terms of numbers and the range of criteria. This growth responds to concerns about inadequate fishery management practices, unsustainable depletion of stocks and ecological degradation. Largely driven by non-governmental organizations (NGOs) and the private sector, seafood certification schemes are supported by consumers who are encouraged to purchase ecolabelled products through awareness-raising programmes, primarily in the markets of the industrialized countries of North America and Europe. Ecolabelled fish products are perceived to have smaller environmental effects than similar products without labels, and the labels enable consumers to make informed choices about the food they purchase.

The fact that fish are one of the most commonly traded food commodities in the world (SOFIA [State of World Fisheries and Aquaculture], 2016) drives the potential for the beneficial effects of voluntary certification on global fishery management. Given that more than half of fish exports originate in developing countries, there is potential for promoting sustainable use of resources and enhancing the livelihoods of small-scale fishers.[2] The patterns of the global fish trade are constantly evolving in accordance with international trade rules, import requirements and trade agreements. In recent years they have also been affected by voluntary certification schemes that are based on environmental and social responsibility criteria but that are unregulated and not covered by existing World Trade Organization (WTO) agreements.[3]

The implications of voluntary certification, especially for developing country producers, is not fully understood, and lack of data has hindered research. There is, however, real concern among governments that fishers and fish farmers could be denied access to lucrative international markets because of existing trade barriers if they lack the capacity and funding to support third-party certification of their fisheries.[4] Market access issues are likely to increase with the growing number of voluntary ecolabels because such labelling is becoming a required part of business transactions among major producers and purchasers – brand owners, supermarket chains and other seafood retailers such as restaurants. The development of ecolabels as a prerequisite for obtaining importation contracts in North America and Europe affects market access for products from uncertified fisheries, whether they are sustainably managed or not. The negative effects are likely to be felt most by developing countries and small-scale fishers who may not be able to afford ecolabel certification or who do not operate in a capture fishery that is otherwise data-rich and hence documented as sustainably managed according to the requirements of certification schemes. In this regard the FAO Sub-Committee on Fish Trade (COFI: FT): i) agreed that: "... it would be useful to assess the effect of various ecolabelling schemes on fisheries management and economic returns ..." (para. 35);[5] ii) expressed concerns about "... a range of issues relating to ecolabelling schemes, including their potential to create trade restrictions and generate increased costs ..." (Para. 41);[6] and iii) agreed that "... more research is needed on the impact of eco-labels on the sustainability of fisheries and economic returns to producers ..." (Para. 45).[7]

[1] For historical details see: Washington and Ababouch (2011).
[2] FAO, 2016. SOFIA p. ii.
[3] FAO, 2016. SOFIA, p. 55.
[4] FAO, 2014.
[5] COFI:FT. 2012. Report of the 13th session of the Sub-Committee on Fish Trade. Hyderabad, India, 20–24 February. FIPM/R996 (Tri).
[6] COFI:FT. 2014. Report of the 14th session of the Sub-Committee on Fish Trade. Bergen, Norway, 24–28 February. FIPM/R1070 (Tri).
[7] Ibid.

The purpose of this research paper is threefold: i) to investigate the markets for certified products, focusing primarily on Asian markets; ii) to examine some of the most common certification schemes to determine which of their criteria may constitute market barriers in developing country fisheries; and iii) to illustrate through case studies from Asia how some developing countries have overcome the challenges to obtain certification and hence market access. The paper contributes to Strategic Objectives 2 and 4 of the Food and Agriculture Organization of the United Nations (FAO) and to Sustainable Development Goals 1, 2, 12 and 14. The consultancies for preparing this circular were co-financed by Globefish and GCP/JPN/228.[8]

Introduction

FAO was tasked with preparing guidelines on voluntary certification for marine and inland capture fisheries and aquaculture at the request of the Member States. These guidelines for marine capture fisheries were adopted by the 26th session of COFI in March 2005, and a revised version was adopted by the 28th session in March 2009. Inland fishery certification guidelines were adopted by the 29th session in February 2011, as were the aquaculture technical guidelines. The work was requested by the Committee on Fisheries Sub-Committee on Fish Trade (COFI:FT) and the Sub-Committee on Aquaculture (COFI:AQ); it was developed through expert and technical consultations. The resulting FAO guidelines on voluntary certification are:: i) *Guidelines for the ecolabelling of fish and fishery products from marine capture fisheries*, rev. 1, 2009; ii) *Guidelines for the ecolabelling of fish and fishery products from inland capture fisheries*, 2011; and iii) *Technical guidelines on aquaculture certification*, 2011.

These FAO documents are available in the public domain to guide governments and other actors in the voluntary certification of fish and seafood products. There was, however, concern that the guidelines were normative and difficult to implement, and that some private schemes claimed compliance with the FAO guidelines, which could not be easily validated by affected parties. Through COFI:FT and COFI:AQ, FAO was again requested to develop and Evaluation Framework that could be used to benchmark the certification schemes against the FAO certification guidelines by a third party, a government, or the schemes themselves, although FAO itself has no mandate to evaluate certification schemes, public or private. The draft Evaluation Framework for aquaculture was approved by COFI. The draft Evaluation Framework developed for capture fisheries was deemed too complicated by Member States in that it had 151 indicators, six of which applied only to inland fisheries, covering scope, principles, minimum substantive requirements and procedural and institutional aspects; it was not approved by COFI.

In view of the growing costs relating to seafood certification and the problem of duplication of auditing and other requirements facing industry actors in various markets, a group of private companies, NGOs and the Government of Germany formed a multi-stakeholder initiative called the Global Sustainable Seafood Initiative (GSSI), which funded a three-year project to develop a benchmarking tool for seafood certification based on the FAO certification guidelines. The overall goal was to ensure confidence in the supply and promotion of certified seafood products and to promote improvements in seafood certification schemes. This was to be achieved by benchmarking the schemes on a voluntary basis. The aim of GSSI is to reduce duplication costs and inefficiency in the industry caused when several schemes operate in the same markets, to improve transparency and to drive change in seafood certification that would increase consumer confidence and hence promote demand for fish and seafood products. As of August 2017, a number of public and private schemes have been benchmarked and have achieved GSSI minimum requirements. FAO supported the development of the GSSI benchmarking tool by providing technical expertise for the capture fisheries, aquaculture and processes working groups that developed the tool. FAO also sat on the steering committee as an associate non-paying member to represent the interests of Member States, to ensure geographic representation and to prevent the tool from becoming

[8] Globefish internships provided the initial research prepared by K. Tsantaris and L. Zheng. The research paper was further developed with support from JPN/228 for a consultancy under the guidance of the Senior Fisheries and Aquaculture Officer, FAO.

a technical barrier to trade for developing countries. The GSSI benchmarking tool was launched at the FAO conference in Vigo, Spain, in October 2015.

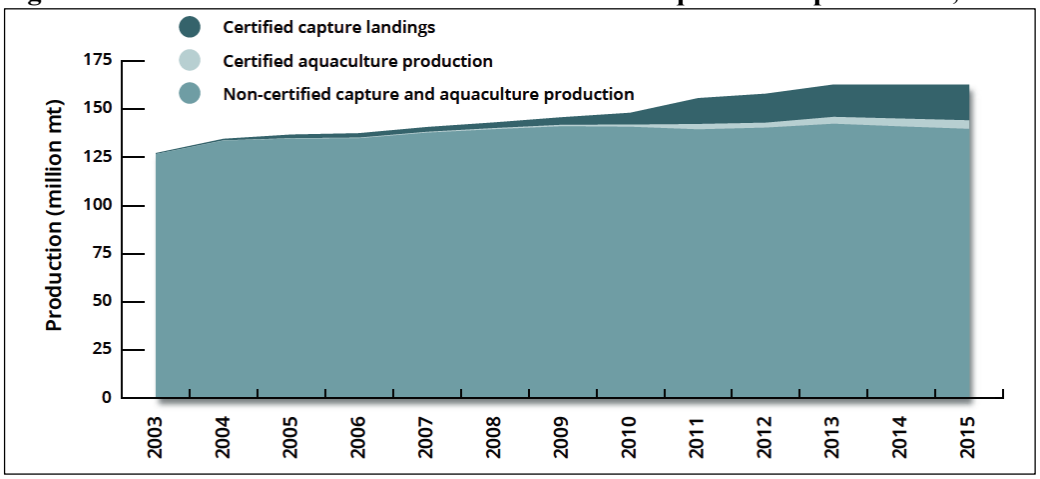
Another emerging aspect of voluntary certification for the fish and seafood sector is the increased interest among WTO member countries in the effects of voluntary certification and standards on fish trade, and in the potential for more settlement cases presented to the WTO in connection with seafood ecolabelling. An example is the recent settlement in favour of the complainant Mexico against the United States "Dolphin Safe" label: this was based on the decision that the voluntary standard crossed the line into regulation, which falls within the mandate of the WTO agreements. This aspect of ecolabelling is beyond the scope of this paper, and is identified as an important area for future research in view of the rising number of public certification schemes and the potential for more disputes in WTO.

This paper aims to: i) provide a literature review of studies of the effects ecolabels on fish and seafood markets, with a focus on the Asian region (Chapter 2); and ii) investigate the criteria of several major certification schemes on the basis of market share in relation to the ability of developing country fisheries and aquaculture producers to meet the requirements and hence access international markets that require ecolabels (Chapter 3). Case studies illustrate the difficulties faced by developing countries in meeting the requirements of the major certification schemes. Recommendations are provided in Chapter 4 on the best ways for developing countries to address these issues and facilitate market access for their fish products.

CHAPTER 2. LITERATURE REVIEW

Most of the world's fish producers do not participate in these ecolabelling schemes. As of 2015, 23 million mt of seafood production was certified with voluntary standards or ecolabels (see Figure 1) accounting for 14.2 percent of total production; of the certified production, 80 percent are wild-caught seafood. Even though it only accounts for a small proportion of fisheries production, certified aquaculture is currently growing twice as fast as wild catches.

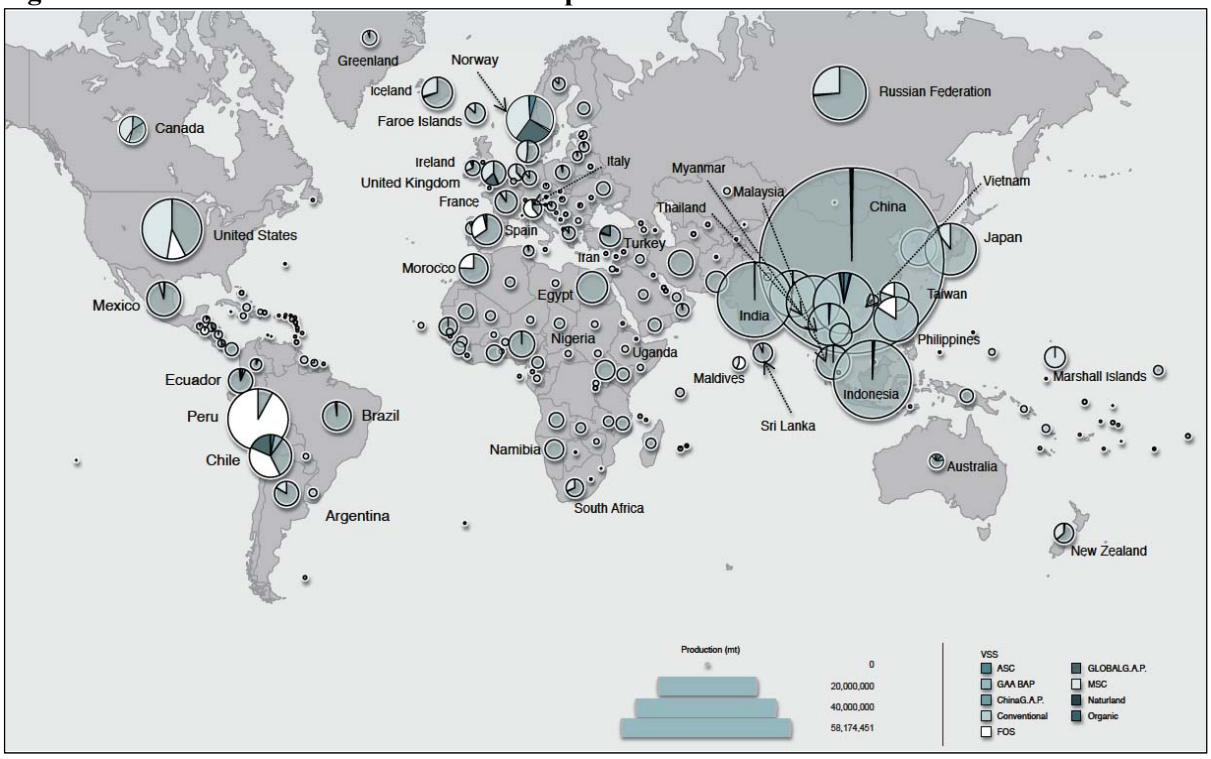
Figure 1. Certified and non-certified wild catch and aquaculture production, 2003–2015



Source: Potts *et al.*, 2016.

Asia accounts for 69 percent of seafood production worldwide, but for only 11 percent of certified production, including certified wild catch and certified aquaculture (Potts *et al*., 2016). Ecolabelling is still in the early stages of adoption by major seafood exporters and importers in Asia – China, India, Indonesia and Japan – and hence its market share is comparatively low (see Figure 2).

Figure 2. Certified and conventional seafood production



Source: Potts *et al*., 2016.

Although seafood certification can promote and enhance sustainable seafood production and environmental sustainability, there is notable evidence that factors such as cost of certification, barriers to market access and lack of awareness may limit its potential to generate substantial changes in seafood production and management, particularly in developing countries where such changes are most needed.

The author of this chapter reviewed the literature to investigate the latest findings on aspects of seafood ecolabelling such as price premiums, the bearers of certification costs and consumers' perceptions and preferences with regard to ecolabels. Because Asian countries – and particularly the developing countries in the region – dominate global seafood production and consumption, this report focuses largely on the Asian market and analysis of its potential.

Who bears the cost of certification?

Compliance with different regulations and voluntary standards would probably lead to significant costs for seafood producers and exporters. The question is – who bears these costs? The costs of certification by the Marine Stewardship Council (MSC), for example, range from USD 2 000 to USD 20 000 for a pre-assessment, and from USD 10 000 to USD 500 000 for a full assessment and certification, depending on the type of fishery. The average audit cost for Friend of the Sea (FOS) certification USD 5 800 for wild capture and USD 3 500 for aquaculture (Macfadyen and Huntington, 2007; FOS, 2017a). There is, however, some literature and public sources that address the costs of certification of different types of ecolabels. It is possible that the vastly different sizes and complexities of fisheries supply chains makes analysis and generalization of the potential cost of certification particularly difficult.

The costs of pre-assessment, fishery assessment and periodic re-assessment are typically paid by producers (Macfadyen and Huntington, 2007). Certified fisheries undergo annual audits and make improvements accordingly, and are re-assessed every five years (Peacey, 2001). For many fisheries, especially small-scale fisheries, certification is dependent on governments and other funding sources such as NGOs, charitable funds and retailers. MSC certification of the Waterhen Lake Walleye and Northern Pike Commercial Gillnet Fishery in Canada, for example, and of the Juan Fernandez Rock Lobster Fishery in Chile was fully subsidized by local governments (Wakamatsu and Wakamatsu, 2017).

In some regional ecolabelling schemes, governments help to reduce overall fishery certification costs in order to promote sustainable local fisheries. The Government of Viet Nam, for example, issued funds to support most of the VietGAP pre-assessment procedures in 2012; the certification costs of VietGAP will hence be much lower than the previous standards (Nabeshima *et al*., 2015). There is also criticism that government funding is generally biased in favour of industrial-scale concerns, but not small-scale fisheries: large fishing vessels, for example, are built by heavy industry companies that enjoy substantial funding, whereas small-scale boat construction usually favours local craftsmanship but receives little public financing (Jacquet and Pauly, 2008).

For some certifiers such as MSC, all companies in the supply chain that take ownership of a product – distributers, wholesalers, manufacturers, packing houses, traders, retailers, catering organizations and restaurants – must acquire the Chain of Custody Certification to be able to use the MSC logo on their products (SGS, 2016). For FOS, customers, suppliers and retailers can all apply for and obtain certificates (FOS, 2017b).

The cost of certification varies from one stakeholder to another. Companies wanting to use the MSC logo must enter into an agreement with MSC International, the trading arm of MSC. The royalties for use of the logo on products was initially set at 0.1 percent of product value and later increased to 0.5 percent. The royalties are only collected once during the entire product supply chain (Ward and Phillips, 2008; MSC, 2016). The fee for off-product use of the logo is set at a level that covers the administrative costs of the license system (Macfadyen and Huntington, 2007). FOS charges an annual fee starting at USD 1 000 for each approved product to cover audit costs, logo licensing and promotion

of products during FOS events (FOS, 2017a). Schemes such as VietGAP have no fixed cost for application for or extension of their compliance, hence the fee varies for different farms and businesses, and even for different provinces (Nabeshima *et al*., 2015).

With regard to the certification processes of most of these schemes, assessment and certification costs are paid directly to the independent third party certifier. But this also attracts criticism in that fisheries can choose their own certifiers – and they prefer certifiers who favour their interests – the certification of fisheries leads to future cooperation for the certifier in terms of annual monitoring and final re-assessment (Ward and Phillips, 2008; Gulbrandsen, 2006; Jacquet *et al*., 2010). Christian *et al*. (2013) also suggest that certifiers have the incentive to be generous in the assessment procedure.

Price premium

With regard to ecolabelling schemes, it is commonly hypothesized that some consumers will "vote with their wallets" and pay a premium for sustainable seafood, thereby incentivizing the supply from sustainable fisheries or aquaculture facilities using the best practices (Ward and Philips, 2008).

Empirical analyses to confirm the theoretical foundations set out above have been conducted in several countries and regions in recent years.

The price premium of ecolabelled fish over non-ecolabelled fish ranges from 10 percent to 20 percent according to various researchers. One study found that in London there was higher demand for MSC-labelled products than for non-labelled products. Roheim *et al*. (2011) showed that there was a 14.2 percent price premium for MSC-labelled frozen Alaskan pollock after controls of the brand, product form, package size and process form. Sogn-Grundvåg *et al*. (2013) found that the MSC ecolabel added a 10 percent price premium on haddock products for processers and wholesalers; this was based on data from seven supermarkets in the United Kingdom. MSC certification of the Viet Nam Ben Tre clam fishery increased prices by 30 percent to 50 percent in new markets, such as Europe and North America (MSC, 2014a). Numerous studies are conducted with regard to price premiums at the consumer and retailer levels, but relatively few are conducted at the producer level. And some studies show that producers do not obtain much premium or benefit from ecolabelling schemes (Blomquist *et al*., 2015).

Approaches to price premiums and producer revenues varied among the standards studied. Some initiatives such as the farm assurance programme that translates consumer requirements into good agricultural practice (GLOBALG.A.P) actually aim to avoid premiums throughout the value chain with a view to supporting producers by reducing input costs through bulk purchasing and improving quality management (Potts *et al*., 2016).

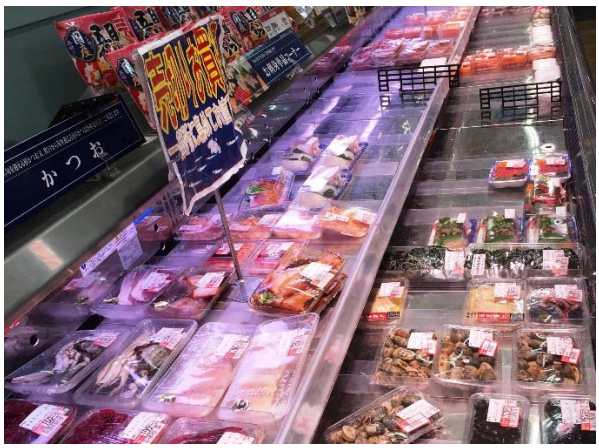
Chang (2012) examined the extent to which ecolabels affected the incomes of aquaculture producers in Taiwan, and found that producers participating in the Taiwan Good Aquaculture Practices had significantly higher incomes than other producers. Wakamatsu (2014) examined ex-vessel prices for MSC-certified and non-certified flounder in three Japanese fish markets, and found no evidence of price premiums. Both studies had limitations: in Chang's research, for example, it was not clear that the higher incomes were a result of price premiums or larger quantities sold, or both; and Wakamatsu's results were obtained from a small pool of just three major markets in Tokyo.

Some studies have not revealed the price premium on certified fish, but there is evidence that certified products have certain advantages in the market over non-certified products: examples include attracting long-term supply contracts, hence providing more stable revenue for suppliers, processors and certified fisheries. Wakamatsu (2014) used a structural break test to show that certified flounder in Kyoto was decoupled from conventional markets and hence faced less competition and achieved more stable revenues. In one case of a fish market that was being influenced by two larger markets, it was observed that their influence declined after MSC certification. Bellchambers *et al*. (2016) concluded that Australian and Mexican lobster producers benefited in various ways from the MSC programme, for example in terms of increased access to European markets, reduced European tariffs on Australian

seafood, public investment in the MSC programme and infrastructure, and increased representation of certified fisheries on national committees.

Consumers' perceptions

Since ecolabelled seafood only accounts for 14.2 percent of global production (Potts *et al*., 2016), most research into consumers' perceptions has hitherto been based on questioning consumers as to their hypothetical demand for ecolabelled seafood and how much they would be willing to pay for a certified product. This is because very little ecolabelling of seafood by MSC or GLOBALG.A.P had appeared in the market when these empirical studies were being carried out. Most case studies focus on markets in developed countries.



Supermarket, Kashiwa, Japan. © FAO/L. Zheng.

Previous studies have shown that consumers generally have favourable views of ecolabelled seafood. In a consumer choice experiment in the United Kingdom, Jaffry *et al*. (2004) obtained results showing that people preferred labelling that emphasized the sustainability and quality of products rather than any other labels, but potential price differences between certified and non-certified products were not taken into account. Johnston *et al*. (2001) compared consumer preferences in Norway and the United States: the results revealed that American consumers with a preference for fresh rather than frozen seafood were more likely to prefer ecolabelled products, but this pattern was not apparent among Norwegian consumers. In France the maximum premium consumers were willing to pay was approximately 10 percent of the product price; willingness to pay correlated positively with income, environmental concerns and trust in the NGOs implementing ecolabelling (Salladarré *et al*., 2016).

Another important issue related to seafood ecolabelling is consumer awareness. Some consumers do not relate seafood ecolabels with sustainability, or have little knowledge of the current status of marine stocks. Adding an ecolabel may not, therefore, provide any additional value to the seafood products concerned. This may explain why ecolabelling schemes are underdeveloped in Asian countries. Uchida *et al*. (2014a) found that consumers in Japan were willing to pay a statistically significant premium for certified seafood products of about 20 percent of the bid price for non-labelled products; their willingness to pay increased when information about sustainability was provided and understood (Uchida *et al*., 2014b). With regard to the providers of information, Japanese consumers placed most trust in the Government of Japan, followed by international organizations such as FAO, but had less faith in NGOs such as MSC (Onozaka *et al*., 2010).

It is often assumed that consumers in developing countries have little knowledge about sustainability and hence have no preference for ecolabelled products (Ward and Phillips, 2008). But a study in Thailand revealed that three quarters of interviewed consumers supported local sustainable seafood, and were willing to pay a premium for it. Although they valued health and safety as the most important factors, they were also motivated by "support for responsible fishing" and "ensuring that fishers use only big nets and do not catch small fish" (Kehoe *et al*., 2016).

Market access barriers

Although seafood ecolabelling initiatives have developed a great deal in recent decades, criticism has emerged that ecolabelling schemes are biased towards developed countries and industrial fisheries. In developing countries the proportion of certified fisheries is low because they face challenges in meeting the requirements of ecolabelling. There are four major barriers impeding their access to the ecolabelled fisheries market:

i. In the western system certifications are mostly led by large retailers such as Walmart and Unilever, whereas distributions in some developing countries, especially in Asia, occur through a multitude of middle-sized domestic or regional retail companies. The required certification of whole supply chains is hence unrealistic and costly for developing countries, especially at the retail level (Wakamatsu, 2014).

ii. Fisheries in developing countries are mostly small-scale and data-deficient. Most certified fisheries are based in developed countries with strong central government authorities, sophisticated fisheries management and a wealth of data (Gutiérrez *et al.*, 2012). Although small-scale fisheries receive a lower level of funding and produce lower yields, the lack of infrastructure, technical and surveillance information are disadvantageous for them when competing with large industrial fisheries. Small-scale fisheries lack the budgets and incentives required for certification, and are unable to provide well-managed data for assessment.

iii. Local markets in developing countries usually have little or no interest in ecolabelled seafood. Their consumers' perceptions and preferences for ecolabelled seafood are explained in the section on consumers' perceptions. In Asia, one of the world's largest consumers of fish and fisheries products, only Japan has shown an interest in ecolabels and certified products in general (Ministry of Agriculture, Forestry and Fisheries of Japan, 2011).

iv. Changing the management of fishing and adopting a new scheme could be difficult for some developing countries, in most of which there are legal frameworks and institutions to regulate fisheries. Traditional and conventional management practices based on the intervention of central governments and co-management arrangements have been dominant and successful (Pérez-Ramírez *et al.*, 2012). Case studies on coffee and timber have shown that sustainability certifications can indeed marginalize small-scale producers and producers in poor countries (Ponte, 2008). Vandergeest and Unno (2012) even perceived transnational eco-certification as an encroachment on national sovereignty in Thailand.

Market potential

There is still a paucity of seafood ecolabelling schemes in Asian markets, even though the countries in the region have huge potential in terms of marketing of sustainable seafood. Fisheries and aquaculture employ 58 million people in Asia, 84 percent of global employment in the sector (FAO, 2014). And Asian developing countries have a much higher supply of food fish and per capita fish consumption (see Table 1).

Consumers in Asian countries may have different perception of sustainability or concerns about ecolabelled products, with greater emphasis on food security, local employment and wealth generation (Gardiner and Viswanathan, 2004). Several studies have suggested that Asian consumers show concern about the health and safety aspects of food products. Surveys of consumers in Thailand showed a significant market for organic foods and pesticide-safe labels (Posri *et al.*, 2006; Roitner-Schobesberger *et al.*, 2008). Japanese consumers prioritize freshness and food safety when purchasing seafood, and seldom consider sustainability in the context of seafood purchases (Onozaka *et al.*, 2010). Questions remain as to whether these health and safety concerns can possibly be extended to the sustainable seafood market.

Table 1. Fish supply and per capita fish consumption by region, 2013–2015 and 2025

	PRODUCTION			OF WHICH AQUACULTURE		
	AVERAGE 2013–15	2025	GROWTH OF 2025 VS 2013–15	AVERAGE 2013–15	2025	GROWTH OF 2025 VS 2013–15
	(Thousand tonnes)		*(%)*	*(Thousand tonnes)*		*(%)*
WORLD	166 889	195 911	17.4	73 305	101 768	38.8
DEVELOPED COUNTRIES	29 018	29 305	1.0	4 393	5 521	25.7
North America	**6 582**	**6 617**	**0.5**	**584**	**717**	**22.9**
Canada	1 020	1 011	–0.9	159	211	32.8
United States of America	5 562	5 606	0.8	425	506	19.1
Europe	**16 637**	**17 362**	**4.4**	**2 911**	**3 737**	**28.4**
European Union	6 654	6 810	2.3	1 273	1 385	8.9
Norway	3 586	4 263	18.9	1 325	1 963	48.1
Russian Federation	4 419	4 516	2.2	161	216	34.5
Oceania developed	**778**	**815**	**4.8**	**183**	**237**	**29.5**
Australia	228	229	0.4	76	91	20.6
New Zealand	550	586	6.5	108	146	35.8
Other developed	**5 022**	**4 510**	**–10.2**	**716**	**830**	**15.9**
Japan	4 318	3 728	–13.7	651	743	14.1
South Africa	549	601	9.5	4	4	–1.5
DEVELOPING COUNTRIES	137 871	166 606	20.8	68 911	96 247	39.7
Africa	**9 699**	**11 208**	**15.6**	**1 696**	**2 287**	**34.8**
North Africa	*3 071*	*3 192*	*3.9*	*1 153*	*1 284*	*11.3*
Egypt	1 498	1 646	9.9	1 138	1 268	11.4
Sub-Saharan Africa	*6 628*	*8 015*	*20.9*	*543*	*1 002*	*84.6*
Ghana	332	365	9.9	38	75	97.0
Nigeria	1 055	1 394	32.1	306	579	89.3
Latin America and Caribbean	**14 424**	**16 245**	**12.6**	**2 702**	**3 780**	**39.9**
Argentina	840	906	7.9	4	6	53.9
Brazil	1 327	1 972	48.6	560	1 145	104.4
Chile	3 084	3 514	13.9	1 138	1 314	15.5
Mexico	1 730	1 876	8.4	193	297	54.2
Peru	4 914	5 111	4.0	117	111	–5.1
Asia and other Oceania	**113 748**	**139 154**	**22.3**	**64 513**	**90 180**	**39.8**
China	62 094	78 717	26.8	45 263	62 962	39.1
India	9 434	11 570	22.6	4 830	6 880	42.4
Indonesia	10 543	12 411	17.7	4 211	5 761	36.8
Philippines	3 142	3 429	9.1	795	982	23.5
Republic of Korea	2 039	1 980	–2.9	470	536	14.1
Thailand	2 719	2 965	9.0	942	1 191	26.4
Viet Nam	6 257	7 816	24.9	3 361	4 802	42.9
LEAST-DEVELOPED COUNTRIES	13 950	17 181	23.2	3 328	5 470	64.4
OECD[1]	31 135	31 842	2.3	6 165	7 628	23.7

Source: FAO, 2016.

An example in Thailand shows that it is possible to develop ecolabelled seafood schemes in developing countries. In June 2014, a seafood shop called the Fisherfolk Shop was established jointly by the Thai Sea Watch Association and seven fishing groups. The shop aims to initiate an alternative market by supplying seafood directly from small-scale fishers using non-destructive fishing gear, and to disseminate information about marine conservation. Because 92 percent of its products are obtained directly from the fishers rather than through middlemen, a price premium for the fishers is guaranteed.

Consumers are motivated to purchase healthy and safe seafood and support small-scale fishers, and they appreciate the environmental benefits (Kehoe *et al*., 2016).

Although there are recognized difficulties in certification and low public awareness of ecolabels in Asian countries, Wennberg and Bjerner (2006) identified two major advantages that Asia holds over many other countries: i) compared with the depletion of many global and some local fish populations, stocks of aquatic organisms in the Asia region remain strong; and ii) Asian fisheries have a smaller input of fossil fuels, chemicals and antibiotics because of the large share of small-scale fisheries.

To implement ecolabelling initiatives in Asia, consideration should be given to the uniqueness and limitations of fisheries in Asia. It is suggested that multi-species fisheries in Asia can apply for eco-certification as a single unit of assessment, and that fisheries can cooperate with neighbouring fisheries that target the same fish stocks to share assessment costs (Wakamatsu and Wakamatsu, 2017). Regional certifying bodies, criteria and standards must be established to support the development of effective seafood ecolabelling in Asia.

CHAPTER 3. VOLUNTARY CERTIFICATION AND MARKET ACCESS FOR DEVELOPING COUNTRIES

The author of this chapter aims to improve understanding of the main challenges for developing country producers relating to voluntary certification standards. The author analysed four third-party certification schemes: MSC, FOS, the Best Aquaculture Practices (BAP) of the Global Aquaculture Alliance (GAA) and the Aquaculture Stewardship Council (ASC), which were selected on the basis of their international scope and representation of fisheries and aquaculture producers. The MSC certifies capture fisheries, and has recently developed a certification scheme for enhanced fisheries – those that require human interventions such as providing rope for shellfish to grow on (MSC, 2017a). The BAP and ASC certify only aquaculture operations; FOS certifies both. This chapter identifies: i) the factors in ecolabelling standards that could constitute barriers for fisheries and aquaculture operations in developing countries, particularly small-scale operations; and ii) lessons that can be learned from fisheries and aquaculture operations in developing countries that have achieved certification.

Between October 2015 and October 2017, four third party certification schemes have successfully completed benchmarking and are recognized by the Global Sustainable Seafood Initiative (GSSI): Alaska Responsible Fisheries Management (RFM) Certification Program (12 July 2016); Iceland Responsible Fisheries (IRF) Management Certification (8 November 2016); Marine Stewardship Council (MSC) Certification (14 March 2017); and Best Aquaculture Practices (BAP) Certification of the Global Aquaculture Alliance (4 October 2017). These schemes have been verified as credible third party certification schemes consistent with minimum requirements of the FAO Code of Conduct for Responsible Fisheries and the FAO Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries.

Overview of standards

The Marine Stewardship Council

The MSC, which is based in the United Kingdom, is a wild-capture seafood certification scheme that is consistent with international codes defining parameters for credible certification processes and standards, responsible fishing and prevention of trade obstacles (MSC, 2017b):

- Global Sustainable Seafood Initiative benchmarking;
- the International Social and Environmental Accreditation and Labelling Alliance (ISEAL); and
- the WTO Technical Barriers to Trade Agreement.

The MSC label was developed to ensure consistency, confidence and improvements in seafood certification (MSC, 2017b). MSC is the oldest private certification scheme and is recognized as a leader in seafood certification.

Certification standards

The MSC assesses seafood products against two sets of standards – sustainable fishing standards, and seafood traceability or chain-of-custody (CoC) standards (MSC, 2017c). The fisheries standards are based on three principles: i) sustainable fish stocks; ii) minimal environmental impact; and iii) effective management (MSC, 2015). Each of these principles is supported by a set of specific performance indicators and scoring guidelines. Third-party auditors score each performance indicator on a scale of 1 to 100: for a fishery to be certified the average score for each principle must be at least 80, and the score for each performance indicator must be at least 60 (MSC, 2015).

For a fishery product to carry its blue label, the MSC requires the related CoC standards. Given the complexity of seafood supply chains, traceability is a concern for certifying bodies and there is a need to verify that products are correctly labelled and that they have not been cross-contaminated with uncertified products. Each company in the supply chain that handles or sells an MSC-certified product

must have a valid CoC certificate, which guarantees that: i) the supplier is certified; ii) the certified products are identified and segregated; iii) products are traceable and volumes are recorded; and iv) the organization has management systems in place to train employees and ensure that subcontractors are compliant (MSC, 2017c).

Certification procedures and cost

The MSC establishes certification guidelines, but assessments are carried out by independent certification parties; audit costs are negotiated between the producers and auditors. The MSC does not receive funds from assessments; in fact its income is generated through donations, investments and licensing of its logo (MSC, 2017d). Because MSC does not receive payment for assessments, there are few data on the aggregate costs of certification. Anecdotal evidence, however, suggests that they range from USD 15 000 to USD 120 000 depending on the complexity of the fishery, availability of information and level of stakeholder involvement (MSC, 2015).

The assessment process can take a considerable amount of time: MSC estimates that the assessment phase alone can take from 6 to 18 months, including mandatory peer and public review (MSC, 2015). If a fishery obtains MSC certification, it remains valid for up to five years, subject to an annual audit to determine continued compliance with standards. The certification process involves (MSC, 2015):

i. Optional pre-assessment to identify potential challenges for certification: if the outcome is positive a fishery may decide to proceed directly to a full assessment or to address any issues identified as needing improvement before full assessment.
ii. Full assessment: this takes between 6 and 18 months and requires formal consultations with stakeholders, a detailed and publicly accessible assessment report, peer review of the assessment report and public comment.
iii. Certification: during this phase, the fishery makes any improvements required as conditions of certification, which lasts for up to 5 years.
iv. Annual audits: these are carried out by an independent auditor to ensure continued compliance.
v. Reassessment: fisheries must demonstrate that they have addressed areas identified as needing improvement within 5 years of the last certification granted to obtain re-certification.

The Marine Stewardship Council and fisheries in the developing world

The MSC has a non-discrimination policy, and promotes equal access to its certification programme regardless of the scale or location of the fishery. But when the global distribution of MSC-certified fisheries is examined, it becomes clear that they are concentrated in Europe and the United States rather than in developing regions.

The MSC acknowledges that fisheries in developing countries often need financial and technical assistance when seeking certification, and they have taken several steps in recent years to establish initiatives that help developing country fisheries. They recently conducted a review of their certification standards with a focus on reducing the time, cost and complexity of the fishery assessment process while maintaining the environmental integrity (MSC, 2014b). In July of 2015, they also launched their Global Fisheries Sustainability Fund, which provided USD 400 000 to be used between 2015 and 2017 to assist small-scale and developing world fisheries through critical research, capacity building projects and management interventions (MSC, 2017e). So far, six projects have been funded (MSC, 2017e). The MSC has also worked to develop a programme that recognizes fisheries that are transitioning to MSC certification and they have a Risk-Based Framework (RBF) assessment process, which provides a set of precautionary indicators for the assessment of data-deficient fisheries (MSC, 2017f). The MSC also has a formal programme for fisheries to prepare for certification through fisheries improvement projects, which are multi-stakeholder programmes that provide capacity building support to improve the sustainability of fisheries. The aim of the fishery improvement programme is to provide targeted assistance that enables the fishery to become certified within five years (MSC, 2017g).

Friend of the Sea

FOS is a non-profit NGO committed to the conservation of marine and coastal habitats through responsible fishing and aquaculture (FOS, 2017c). The scheme evolved from the Earth Island Institute's well known Dolphin Safe certification label, which originally certified tuna fisheries that minimized or eliminated dolphin by-catch (FOS, 2017c). FOS has certified products on all continents: these include most of the highly traded seafood species and fishmeal, fish feed and Omega-3 fish oil (FOS, 2017c). FOS follows the FAO *Guidelines for the ecolabelling of fish and fishery products from marine capture fisheries*, and only certifies products from stocks that are not over-exploited (FOS, 2017d). The social accountability standards of FOS include a ban on child labour and forced labour and worker's health and safety requirements.

Certification requirements

The FOS criteria for capture fisheries require evidence of the following (FOS, 2017e):

- the target stock is not over-exploited according to FAO, regional fishery bodies and national marine authorities;
- the fishing methods do not affect the seabed;
- the fishery employs a selective method that results in a maximum of 8 percent discard;
- there is no bycatch of species in the International Union for Conservation of Nature (IUCN) Red List;
- the fishery complies with applicable laws and regulations;
- social accountability standards are met; and
- there is an annual improvement in fuel efficiency.

The criteria for FOS certification of aquaculture requires evidence that (FOS, 2017e):

- an environmental impact assessment has been completed showing that the operation has no impact on critical habitat such as wetlands or mangroves;
- there are no fish escapes or bycatch of marine mammals or birds;
- no growth hormones or toxic antifouling paints are used;
- feeds must be certified by FOS or an equivalent body;
- there is an effective control method covering waste, energy and feed management;
- the operation meets social accountability standards; and
- there is an annual improvement in fuel efficiency.

To obtain certification, capture fisheries and aquaculture operations must also meet traceability requirements that ensure that the company seeking certification has a system that prevents certified products from mixing with other products (FOS, 2016a).

There are three categories of FOS requirement: i) essential requirements; ii) important requirements; and iii) recommended indicator (FOS, 2017f). Essential requirements mandate 100 percent compliance: any shortfall requires corrective action within three months; six months are allowed for complex issues that require additional time for correction (FOS, 2017f). Compliance with important requirements is also mandatory, but the organization seeking certification must propose an action plan to the certification body rather than take immediate action (FOS, 2017f). The plan must include an implementation timeline for each corrective measure (FOS, 2017f). A recommended indicator is not a strict requirement, but it will appear in the audit report (FOS, 2017f).

Scope of certified products

Over 500 companies dealing with farmed and wild-caught species and 88 capture fisheries in 45 countries have obtained FOS certification (FOS, 2017d). The FOS wild-caught fisheries capture a

variety of species such as tuna, sardines, anchovies, mackerel, salmon, sole, shrimp, squid, cuttlefish, krill, scallops and clams. FOS certifies 23.7 percent of the global tuna catch, and is currently the largest certifier of sustainable tuna in the world; it has also certified 15 percent of the global krill catch (FOS, 2017d). Most FOS certificates for fishery products are in the fish-oil and fish-feed markets (FOS, 2017d).

FOS has certified 100 aquaculture operations (FOS, 2017g) in 30 countries (FOS, 2017d). Its aquaculture standards cover large-scale and small-scale productions and a range of species. Over 50 percent of products certified by FOS originate from producers in developing countries (FOS, 2017d). When compared with MSC, the higher representation of developing countries in the FOS system could result from the lower costs and time commitments. The auditing costs for FOS range from USD 3 500 to USD 5 800, and the time taken to complete an audit ranges from two days to two weeks (FOS, 2017c).

Best aquaculture practices of the Global Aquaculture Alliance

The BAP standards established by the GAA are only applicable to farmed species, but they cover various sectors of the supply chain such as hatcheries, farms, processing facilities and feed mills (GAA, 2017a). The specific certification standards vary according to the type of operation: BAP has separate standards for the following categories: i) finfish and crustaceans; ii) molluscs; iii) salmon hatcheries and nurseries; iv) feed mills; and v) seafood processing and repacking facilities (GAA, 2017a). Although the specific standards vary to reflect the qualities of different types of operations – mangrove and wetland conservation, for example, is only applicable to inland and land-based pond systems – all standards are based on the GAA guiding principles for responsible aquaculture addressing environmental integrity, social responsibility, animal welfare, food safety, traceability and community relations. The nine guiding principles listed below require aquaculture companies to (GAA, 2017b):

i. collaborate with governing bodies in the development and implementation of policies, regulations and procedures that achieve environmental, economic and social sustainability in aquaculture operations;
ii. use only sites with characteristics that are compatible with long-term sustainable operation, and avoid unnecessary destruction of mangroves and other environmentally significant flora and fauna;
iii. design and operate aquaculture facilities in a manner that conserves water resources;
iv. design and operate aquaculture facilities in a way that minimizes the effects of effluent on water quality and ecological diversity;
v. strive for continuous improvements in feed and judicious use of therapeutic agents in accordance with appropriate regulations as needed on the basis of common sense and scientific judgement;
vi. take all reasonable measures to prevent disease outbreaks;
vii. take all reasonable steps to ensure that introductions of exotic species are managed responsibly and in accordance with appropriate regulations;
viii. cooperate with other industry operators and participate in research and technological and educational activities with a view to improving the sustainability of aquaculture; and
ix. strive to benefit local economies and communities.

These principles are the basis of the specific standards used to assess aquaculture operations. The standards are developed and updated by a standards coordinator and a standards oversight committee of 12 members (GAA, 2017a). The BAP guide contains justification for each standard and detailed conditions for implementation and compliance. Inland and pond finfish and crustacean farms, for example, require adequate effluent management: the BAP guide for this section includes a detailed justification of the standard, explaining the negative effects that nutrients, suspended solids and organic matter can have on water quality and wildlife in recipient water bodies (GAA, 2016a). The implementation guide for the effluent management standard gives instructions for obtaining and analysing water samples, and establishes specific effluent limits (GAA, 2016a).

Procedures and processes

All certifications require an independent audit from an accredited certification body. Audits consist of a site assessment, sample collection and analysis, and a review of management records and procedures; any instance of non-compliance is recorded in a formal report as critical, major or minor. A case of critical non-compliance involves failure to adhere to legal requirements or concerns about food safety, and could lead to failure or suspension of certification. A case of major non-compliance involves substantial failure to meet requirements, but with no food safety risk or immediate risk to the integrity of the programme; immediate corrective action is required within four weeks of the evaluation. Minor non-compliance occurs when the full requirements of standards have not been met (GAA, 2016a).

Geographic Scope and BAP

There are currently 700 certified BAP facilities worldwide (GAA, 2017b).

There are several operations in developing regions that are certified through BAP, many of which are large-scale operations or facilities owned by multi-national companies. The GAA recognizes that their BAP standards can pose challenges for aquaculture operations, and has accordingly launched the "improver" BAP programme (iBAP). This programme, which is similar in many ways to the MSC fisheries improvement programme, provides an opportunity for aquaculture facilities to be recognized for their work on improving the sustainability of their production practices. Facilities that enrol in the programme receive technical support and a deadline-driven plan that helps them to prepare for full BAP certification (GAA, 2017c).

The Aquaculture Stewardship Council

The ASC was founded in 2010 through a partnership between the World Wildlife Fund and the Dutch Sustainable Trade Initiative (ASC, 2017a). Its standards were developed through the World Wildlife Fund aquaculture roundtable dialogues on aquaculture best practices, which started in 2004: they included fish farmers, seafood processors, retailers, food service operators, NGOs, government agencies and research institutions (ASC, 2017a). The roundtables focused on methods to minimize the environmental and social effects of major farmed species; so far 2 000 people have participated (ASC, 2017a).

Like the GAA BAP standards, ASC has separate standards for different types of aquaculture facilities: the current seven are for: i) abalone; ii) bivalves; iii) freshwater trout; iv) pangasius; v) salmon; vi) seriola and cobia; and vii) shrimp and tilapia. There are four new sets of standards in development: i) core standards; ii) feed standards; and iii) seaweed standards, which are being drafted in partnership with MSC; and iv) marine finfish standards (ASC 2017a).

The Aquaculture Stewardship Council standards

The ASC standards are governed by seven principles:

i. obey the law and comply with all applicable legal requirements and regulations;
ii. avoid, remedy and mitigate significant adverse effects on habitats, biodiversity and ecological processes;
iii. avoid adverse effects on the health and genetic diversity of wild populations;
iv. manage disease and pests in an environmentally responsible manner;
v. use resources efficiently;
vi. be a “good neighbour” and interact positively with surrounding communities; and
vii. develop and operate farms in a socially and culturally responsible manner.

Underlying each principle are various criteria with associated indicators and specific requirements: an example is shown in Table 2 (ASC, 2012a).

Table 2. Principle 2: Avoid, remedy or mitigate significant adverse effects on habitats, biodiversity and ecological processes

Criterion 2.1: Critical habitat and species interactions	
Indicator	**Requirement**
2.1.1. Where not otherwise mandated by local law or covered by recognized environmental impact assessments permitting the farming activity, evidence proving no significant adverse effects on threatened/endangered species (as defined by national law or as found in the IUCN List of Threatened Species) or the habitat on which they depend.	Yes

The criteria and requirements can also be more specific, for example:

Criterion 2.2: Benthic impacts of sea-based farming on depositional substrate	
Indicator	**Requirement**
2.2.1 Acceptable levels of total "free" sulfide in surficial sediment (0-2 cm from the surface) measured beneath sea-based farms.	Greater than or equal to 1 500 micrometres – monitoring every five years is required. Between 1 500 and 3 000 micrometres – monitoring every year is required.

The ASC also has CoC standards, which are incorporated with the MSC CoC requirements. All companies in the supply chain of ASC products are assessed against this MSC standard (MSC, 2017h). This is a collaborative process, but it is important to note that ASC and MSC are separate organizations.

Analysis of Requirements

The share of seafood products from developing countries has risen substantially in recent decades. In 1976 total fishery exports from developing countries accounted for only 37 percent of global trade, but by 2014 this share had climbed to 54 percent by value and 60 percent by quantity (FAO, 2016). As seafood exports from developing countries have grown, so has demand for certified products. In North America 80 percent of major retailers have sustainable seafood commitments that involve limiting procurement to specific certification schemes or NGO-endorsed products (Ethier, 2015). Because developing country producers and ecolabelling have increasing roles in the global seafood trade, it is important to ensure that producers do not face barriers to compliance with certification requirements caused by lack of funding or capacity.

Cost

Cost is one of the more obvious barriers to certification for fisheries and fish farms in developing countries. The costs go beyond payments for third-party audits during the assessment process: fisheries and fish farms must also pay for required upgrades and devote working hours to training and additional monitoring and administration. Once certification is obtained, there are also licensing fees associated with certification labels. The costs of assessments and upgrades could be prohibitive for fisheries and fish farms in developing countries, especially small-scale enterprises, that do not generate enough revenue to afford even baseline certification costs.

Marine Stewardship Council

MSC certification requires producers to pay the costs of certification assessments, audits and required upgrades (MSC, 2017i). It is estimated that these can range from a few thousand dollars to USD 20 000 for the pre-assessment phase alone (Ponte, 2006). Full assessment has been estimated to cost anywhere

between USD 10 000 and USD 500 000 (Ponte, 2006). The MSC reports that most fisheries incur costs ranging from USD 15 000 to USD 120 000 for the entire certification process (MSC, 2015). Because these estimates are largely anecdotal, it is not clear whether the costs include required upgrades or extra working hours spent on activities associated with certification. Once certified, a fishery must also pay for an annual audit and must undergo a re-assessment every five years to retain the certificate.

Friend of the Sea

The FOS has estimated the average cost of certification at USD 5 800 for capture fisheries and USD 3 500 for aquaculture enterprises (FOS, 2017a). As in the other certification schemes, audit costs depend on the size and complexity of the operation. Upgrade costs depend on any changes required to obtain certification.

Best Aquaculture Practices and Aquaculture Stewardship Council

Neither BAP nor ASC report estimated certification costs. The ASC notes that the cost of certification is determined by the certification bodies and depends on their estimate of time required for audit, travel costs and laboratory costs for analysis of water samples, as required by the standards. Given that fish farms must cover auditors' travel expenses, certification costs could become particularly high for fish farms in remote areas.

Collaborative capacity

Obtaining certification requires an ability to collaborate with government officials, research institutions and other sectors in the seafood supply chain such as feed mills, processors and refrigerated transport services. Many fish farms and fisheries in developing countries, especially small-scale rural enterprises have limited access to communications technology, institutional support or other sectors in the value chain.

Collaboration with research institutions

Certification standards for fisheries and aquaculture require research and data-gathering, which are facilitated if there are institutions that can be called upon to provide technical assistance, research equipment and laboratory access. The MSC has addressed research and data-gathering barriers facing small-scale and developing country producers through their risk-based framework (RBF), which provides structured protocols to assess the risk of negative impact on a target species, habitats and ecosystems (MSC, 2017j). Even though the RBF is an integral part of assessment, assessors rely on information such as technical papers, reports and current data when scoring a fishery (MSC, 2015). Without some degree of collaboration with a research institution, obtaining certification could be much more challenging for fisheries that do not have extensive research networks.

Unlike MSC, the FOS fisheries standards do not use a risk-based assessment framework when fisheries lack adequate data: they specify that "... the stock under consideration shall not be data-deficient ..." (FOS, 2016b, p. 10) and require that the organization seeking certification requests or carries out a thorough assessment of the impact of fishing on the target stock and its habitat (FOS, 2016b). Without collaboration with research institutions with the required survey equipment and experience in environmental assessment, this requirement would be difficult to fulfil.

Collaborating with research institutions to achieve certification is important in the aquaculture sector because of the need for laboratory facilities and equipment for accurate analysis of water and sediment samples. The ASC and BAP standards require that water samples be sent to a remote laboratory if there is no onsite laboratory certified by the International Organization for Standardization.[9] Aquaculture

[9] The world's largest developer of voluntary standards; it is an NGO.

operations in developing countries may be remote from laboratory facilities, and small-scale producers are unlikely to be able to set up the necessary infrastructure.

In addition to sampling, aquaculture standards involve impact assessments and other peer-reviewed studies that are difficult to carry out without access to research institutions, scientists and equipment. The aquaculture certification standards reviewed in this paper require environmental impact assessments: if a company has not completed such an assessment in accordance with national requirements, FOS requires it to arrange for a third-party organization to carry it out (FOS, 2016c). The ASC and BAP also require environmental impact assessments if not already completed.

In many cases other background reports and peer-reviewed studies are required as well. Aquaculture facilities seeking BAP certification for mollusc cultivation, for example, must produce a background report on hydrographic and benthic conditions at the cultivation site (GAA, 2016b). The ASC standards require that water-allocation limits meet the requirements set by a competent institution through a peer-reviewed study if a local authority has not set such limits (ASC, 2012b). The ASC also requires evidence that non-native cultured species cannot establish themselves in the waters where cultivation takes place: to demonstrate that this is not a risk, the ASC requires "peer-reviewed publication in a reputable journal…as evidence" (ASC, 2012b, p. 26). These indicators require – if peer-reviewed studies are not complete – that the farm concerned has the capacity to commission studies to address information gaps that could preclude certification.

Collaboration with governments

Voluntary certification requires an understanding of national, regional and local laws and regulations and the ability to collaborate with government agencies and officials. The certification standards reviewed in this paper do not evaluate legislative frameworks, but they do require proof that a given fishery or aquaculture operation is, as a baseline, compliant with government standards and regulations regarding registrations, taxation, environmental regulations, use rights and development agendas. Seeking certification therefore requires a degree of government collaboration and knowledge of applicable laws and regulations. The BAP standards state that "... individual auditors cannot know all laws that apply to aquaculture farms in all nations…farms have the responsibility to obtain all necessary documentation for siting, constructing and operating their facilities." (GAA, 2016b, p. 3).

The ASC standards also require government documentation to prove parameters such as compliance with water discharge regulations and verification that aquaculture development is limited to land that has been used for agriculture for the preceding ten years (ASC, 2012b). This can seem straightforward, but such requirements could pose a challenge to small-scale operations in rural areas whose record-keeping capacity, communications with government officials, and knowledge of requirements and procedures are limited. The BAP standards specify that if an operation does not know what permits or documentation are required "... assistance...can be sought from government agencies" (GAA, 2016b, p. 3). But an aquaculture facility that lacks understanding of government regulations and documentation requirements may also have difficulty in contacting government agencies for assistance.

The ASC and BAP standards also require fish farms to offset ecosystem degradation such as mangrove removal through restoration. Both sets of standards allow for compensation for restoration in lieu of work, but the assumptions are that: i) farmers are able to acquire land from the government to offset their use of mangroves; and ii) if farmers are not able to acquire land for restoration, they could instead provide additional compensation.

This paper is not suggesting that voluntary certification schemes or audits should bypass verification of compliance with government regulations. When seeking a certification framework that covers seafood producers of all scales and regions, however, it is important to understand basic obstacles so that impediments can be overcome through capacity-building efforts wherever possible.

Collaboration with other supply chain sectors

Certification often necessitates collaboration with other sectors of the seafood supply chain. This is especially important for aquaculture operations that rely on externally sourced feed. The GAA requires that feed for such operations be sourced from a BAP-certified mill. When there is no BAP certified supplier in the region, or if such suppliers are too expensive, an organization may use an alternative feed supplier – which must provide documents verifying compliance with the standards listed in Table 3 (GAA, 2016a).

Table 3. Requirements for best aquaculture practices in fish feed certification

Standard	Requirement
3.1	Obtain declarations from suppliers on the species and fishery origins of each batch of fishmeal and fish oil.
3.2	Indicate a feed fish inclusion factor on product labels, packaging, shipping documents, invoices or written declarations for all feeds produced.
3.3	Develop a clear written plan of action defining policies for responsible sourcing of fishmeal and fish oil.

Source: BAP 2014 Feed Mill Standard.

Hence when a farm is seeking certification and does not have access to or cannot afford to buy from a BAP-certified feed mill, the owner must have the capacity to collaborate with their feed provider. The feed mill must in turn have the capacity to collaborate with the fisheries that purchase its fishmeal, and must provide documentation of its origin. Although this is an important aspect of traceability, this level of collaborative capacity could be difficult in supply chains that lack vertical integration.

ASC and FOS also have requirements regarding the sourcing of feed for aquaculture. FOS requires that aquaculture facilities use FOS-certified feed if it is available; if not, they must use mills that have other types of certification such as the Marine Ingredients Organization (IFFO)[10] Responsible Sourcing and Responsible Production (FOS, 2016c). ASC recognizes the challenges associated with feed standards, especially in operations that do not have vertically integrated supply chains: "Marine ingredient sourcing for feed is a key off-farm issue requiring special consideration, as traceability and fisheries certification are still in their infancy, making the process of creating auditable standards very challenging" (ASC, 2014, p. 93). ASC also recognizes the need for traceability and accountability of certified seafood products, and therefore requires demonstration of the traceability of fishery products in feed: this includes documentation from feed suppliers listing the ingredients and affirming personal accountability for its veracity (ASC, 2014).

An accountable certification scheme that requires traceability will invariably require collaboration along the supply chain. It is important to recognize that this type of collaborative capacity can create challenges, especially for small-scale producers and developing countries. It is only through an understanding of these challenges that more targeted initiatives can be created to help seafood producers to achieve the standards that voluntary certification bodies require.

Data-gathering and record keeping

Lack of data-gathering and record-keeping capability is related to the challenges of collaboration with research institutions discussed previously. It is important to emphasize, however, that this challenge is unlikely to be remedied solely through increased collaboration with research institutions because the requirement to collect data and maintain records falls to the producer. As previously discussed, the RBF standards of the MSC address the data-gathering challenges facing fisheries in developing regions. It is, however, more challenging to assess the impacts of fishing on fish stocks when the available data are insufficient.

[10] IFFO helps producers of marine ingredients to demonstrate commitment to responsible practices in raw material procurement and feed safety.

To obtain a full score for standards requiring information on stock structure, density and productivity, a fishery must have the ability to collect comprehensive data and maintain catch records. The MSC, for example, requires information sufficient to determine the level of risk posed by fishing and the effectiveness of harvest strategies. For a full score of 100 on this indicator, the MSC requires the quantitative information to be available. With the addition of the RBF standards, the MSC now allows qualitative data to be used if it is sufficient. If the qualitative data are deemed insufficient and the fishery cannot take corrective action, it will have to collect biological data for stock assessment (MSC, 2014c). Other MSC indicators that employ RBF would also require empirical data to replace qualitative assessments if the information available is insufficient.

The ASC and BAP standards require records and frequent data collection to track indicators such as nutrient concentrations in the surrounding environment. For BAP certification at least three months of consistent effluent data are required for certification: each effluent variable must initially be measured monthly, and if any variable is not compliant with standards, the farm must rectify the issues within 90 days (GAA, 2016a).

Having sufficient data to determine sustainable operation is central to a viable ecolabelling scheme. It is important, however, to understand the difficulties for producers of data collection and record-keeping, especially small-scale operators, so that sustainable producers are not denied certification because empirical data or records are lacking.

Case studies: Certification of small-scale farms in Viet Nam

The previous section analysed aspects of certification guidelines that could be prohibitive for fisheries in developing countries. Many of the challenges are compounded in the small-scale sector. This section will build on the discussion by providing specific case studies of small-scale pangasius and shrimp farms in the Mekong delta.

Small scale fishers, Viet Nam. © FAO /K. Tsantiris.

Certification of pangasius farming in Viet Nam

Seafood exports from Viet Nam have risen dramatically in the past decade, with pangasius accounting for a large share of the value (MCD and IPSARD, 2012). Recognizing the rise in demand for environmentally friendly and socially responsible products, the Government of Viet Nam established goals for the certification of a greater percentage of pangasius exports (MCD and IPSARD, 2012). There is concern, however, that small-scale farms will have difficulty in obtaining certification and could consequently be barred from trade partnerships. There are no official statistics on the number of small-scale pangasius farms in Viet Nam, but it has been estimated that between 30 percent and 40 percent of the output of pangasius comes from small-scale producers (MCD and IPSARD, 2012).

A study commissioned by Oxfam entitled *Social and environmental aspects of good aquaculture practices applied to pangasius farming in the context of small-scale households in Viet Nam (using PAD as reference)* assessed of the capacity of small-scale pangasius farmers to achieve certification standards (MCD and IPSARD, 2012). The research was conducted by MCD and Viet Nam's Institute of Policy and Strategy for Agriculture and Rural Development (IPSARD) over six months in 2012 in two provinces in southern Vietnam: it included literature reviews, field surveys and meetings with labourers and pond owners (MCD and IPSARD, 2012).

The study determined that small-scale pangasius farmers faced overwhelming challenges with respect to achieving certification standards. Cost was one of the major barriers: although annual income varies greatly, the average annual income for pangasius farmers in An Giang, for example, was USD 1 700 in 2012 (MCD and IPSARD, 2012). The scale of funds needed merely to pay for auditors' travel costs constituted a major barrier for a single farm.

The study also highlighted lack of access to government resources and information about government requirements and procedures. As discussed previously, the ecolabelling schemes reviewed in this paper all require that a fishery or fish farm comply with the regional legal and regulatory frameworks. One of the most basic requirements in Viet Nam is registration of fishing vessels and fish farms with a central authority. In the pangasius farming provinces surveyed in this study, however, fewer than half of the survey participants were aware of the existence of regulations regarding farm registration, and only 25 percent of the farmers surveyed understood taxation regulations. And although 75 percent of the survey participants knew that there were waste regulations, none indicated an understanding of the details (MCD and IPSARD, 2012).

Another barrier discussed in the previous section involved the standards for monitoring water quality. In the southern provinces of Viet Nam, 93 percent of those surveyed indicated that they had never carried out a test for environmental quality, and only 15 percent even knew a basic definition of total phosphorus and total nitrogen; 35 percent had heard of the concept of dissolved oxygen, but few were able to explain it (MCD and IPSARD, 2012). Even where respondents had heard of the indicators, not a single person knew how to take measurements or collect samples. None of the surveyed areas of small-scale farms possessed the testing and monitoring equipment for collecting or analysing water samples. The lack of monitoring equipment and knowledge about water quality indicators suggests an absence of collaboration with government bodies and research institutions. The small-scale farms surveyed would need targeted capacity-building, government support and technical assistance to comply with certification standards.

Costs of shrimp certification in Viet Nam

The Responsible Shrimp Culture Improvement Programme (RSCIP) improves supply chain linkages between Viet Nam and Europe. As in the pangasius sector, the shrimp sector is seeking to augment the number of facilities with voluntary certification in response to demand from lucrative markets. To improve understanding of the accessibility of certification schemes for small-scale producers, RSCIP and MCD researchers carried out 121 key-informant interviews, nine focus-group discussions, two workshops and several surveys of small-scale shrimp farms. It was estimated that in the Mekong delta,

which accounts for most shrimp production, 95 percent of producers were small-scale (RSCIP and MCD, 2012).

The study focused on the financial incentives associated with certification for small-scale, medium-scale and large-scale producers. It was observed that: i) large farms producing more than 50 mt of shrimp annually would have net profits three years after certification; ii) small-scale producers with an output between 10 mt and 49 mt had the potential to benefit, contingent on loans of USD 30 000 per farm over two years; and iii) small-scale producers with an output of less than 10 mt would have very little benefit from ASC certification because the annual costs would exceed their net benefits (RSCIP and MCD, 2012). Results from the household surveys suggested that small-scale farms do not reach a point where net profits with certification exceed the benchmark profits, even five years after certification. On the other hand, it was found that intensified production generates profits that exceed the benchmark level only two years after certification (RSCIP and MCD, 2012).

The study did not discuss other barriers to certification, but it was clear that there was a lack of financial ability and incentives for small-scale producers to seek certification individually. Group certification is a viable option for reducing individual transaction costs, but without management support from the government or NGOs it could be challenging to create internal linkages with other farmers to seek group certification. It is important to highlight that most of the small-scale shrimp farms surveyed were integrated shrimp-mangrove systems, a method of cultivation that integrates shrimp ponds into mangrove systems rather than clear-cutting. These small-scale farms often operate more sustainably than the large intensive systems, which remove surrounding mangroves (RSCIP and MCD, 2012).

Case Studies: Successful Certifications in Developing Countries

This section provides case studies of fisheries and farms in developing countries that have obtained certification; they are not meant to be exhaustive. They were selected as examples that provide insights regarding the characteristics of fishery and aquaculture operations that make certification accessible in developing countries.

Case 1: The Ben Tre clam fishery, Viet Nam

The Ben Tre fishery, which harvests the Asiatic hard clam, is in Ben Tre province in southern Viet Nam. In 2009, it became the first fishery in southeast Asia to achieve MSC certification, and in 2016 it passed its first reassessment.

The use of machines is banned in this fishery: only hand rakes are used, whose width is strictly regulated so that juveniles can pass through without being harvested (MSC, 2017k). The fishery has a well-defined management structure with distinct roles at various levels of government: from national oversight to provincial government to the 11 cooperatives that protect the clam resources and sand flats in their management areas (Gascoigne *et al.,* 2016). The fishery has formal communication channels with government officials and relationships with research institutions. Local government officials regularly provide information and updates on new policies, regulations and development decisions; the national Fisheries Law even sets aside a portion of the sandflats in Ben Tre specifically for clam production. Several academic institutions such as Can Tho University, Nong Lam University and Nha Trang Oceanography Institute supply scientific information on request (Gascoigne *et al.,* 2016).

Although the operation is an artisanal fishery because of the lack of machinery, the Ben Tre fishery is extensive: the area managed by the 11 cooperatives is 7 000 hectares, and the area used for commercial production is 2 500 hectares (Gascoigne *et al.,* 2016). The clams are consumed in Viet Nam, but they are increasingly exported to markets such as the European Union, Japan, Taiwan and the United States (Gascoigne *et al.,* 2016).

Several aspects of this fishery facilitated its certification. The species harvested is not highly mobile, which makes it easier to assess stocks accurately. Several studies of the life-cycle and ecology of the

species have been carried out by research institutions, which provide technical reports and data that can be referred to during an assessment. The fishery maintains strong relationships with research institutions and also receives support from the government.

Case 2: Acuagranjas dos Lagos, Mexico

This Tilapia facility in Chiapas, Mexico includes a hatchery, floating cages and processing facility; it is an ASC and BAP certified aquaculture operation (Control Union Peru S.A.C., 2016). The facility is owned by Regal Springs, a multi-national company with headquarters in Florida in the United States, which has had farms in Honduras and Indonesia for over 20 years (Regal Springs, 2017). The Regal Springs facility in Mexico exports 90–95 percent of its products to the United States (Peet and Gee, 2015).

This case study was selected because it demonstrates that a map of certified farms does not tell the whole story. Regal Springs has certified facilities in developing regions, but it operates on a multi-national scale. A company of this scale has the capacity to invest in upgrades, hire laboratory technicians and pay for auditing costs, whereas a facility owned by a small company in the same region might find this unaffordable. This is not to suggest that the certification at Acuagranjas dos Lagos is not well deserved: the facility has advanced traceability standards in place, does not use any antibiotics and has on-site laboratories for monitoring water quality (Control Union Peru S.A.C., 2016). The company also works to benefit the local community, and when operating at full capacity can employ up to 1 000 people at the production facility alone (Regal Springs, 2017). It is important to include this type of facility as a case study to highlight the fact that many certified farms in developing regions are owned by multi-national companies. Simply looking at a list of the countries with certified farms can be misleading if one is concerned about accessibility for the majority of fisheries and fish farms in developing countries.

Case 3: Hiep Thanh Joint Seafood Stock, Viet Nam

Hiep Thanh Joint Seafood Stock (JSC) is a pangasius farming facility in Can Tho, Viet Nam, 200 km southwest of Ho Chi Minh City. It has 30 hectares of land with 15 ponds, which produce between 4 000 mt and 6 000 mt of pangasius per year. Hiep Thanh JSC is part of a larger company called Hiep Thanh Group, which specializes in the production of pangasius and rice (Hiep Thanh Group, 2017).

The facility received ASC certification in 2014, but several non-conformities were identified in the audit report, requiring rectification. Some of these non-conformities included the following:

i. The farm could not provide evidence that water samples had been collected by a staff member of an independent laboratory accredited by the International Organization for Standardization.
ii. The farm could not provide a statement from local authorities indicating the water allocation limits for the farm, because none had been set by a reputable independent institution.
iii. Water sampling analyses were not in line with specified procedures.
iv. The farm had not taken enough water samples for analysis of total phosphorus or nitrogen.
v. There was antibiotic application without corresponding written justification from an aquatic animal health specialist (Control Union Peru SAC, 2014).

These non-conformities highlight some of the obstacles that impede seafood producers attempting to comply with certification standards, including lack of interaction with government entities, lack of capacity to collect data and difficulty collaborating with reputable research institutions. Hiep Thanh JSC was able to take corrective action, but the certified facilities are part of a large company, the Hiep Thanh Group, that exports pangasius and rice and has offices in two cities in Viet Nam and in the United States. A facility that lacks the resources of a large-scale company might find difficulty in implementing required upgrades within a short time-frame.

Case 4: MSC-certified Atlantic Seabob Shrimp, Suriname

The Suriname Atlantic seabob shrimp fishery was first certified in 2011, and received re-certification in January 2017 (MSC, 2017L). The fishery operates 22 vessels in the shallow waters off Suriname. The gear used for harvesting is a trawl, and all nets are fitted with devices that reduce bycatch and exclude larger fish, rays and sea turtles (Southall *et al.,* 2017).

The initiative for certification came from a large shrimp processor in Europe (MSC, 2017L). Recognizing the lucrative market opportunity, the fishermen in the fleet and the Government collaborated with conservation groups and established a working group to evaluate and improve practices in the fishery. Since 2010, when the fishery was first assessed, the level of fishing has been controlled by a harvest-control rule, which has led to a reduction in landings (Southall *et al.,* 2017). In 2010 the Government adopted the Seabob Fishery Management Plan, which recognizes the objectives of the fishery and lays out its management structure and administrative processes (Southall *et al.*, 2017).

The first MSC assessment led to an interest from research institutions as well as the Government. The 2011 assessment report identified the need for more studies of Seabob; since then several studies have been made to improve understanding of its population biology and the ecology of the Suriname coastal zone in general (Southall *et al.,* 2017).

This fishery obtained certification because it received a high level of institutional support, and benefited from the MSC programme for the developing world and RBF methods. This shows that adequate capacity-building by the Government and NGOs considerably facilitates the certification process.

Analysis

These case studies highlight some characteristics that have facilitated certification for fisheries and aquaculture operations in developing regions, as set out below:

- Certified fisheries and fish farms often have strong operational support from governments and outside organizations. This is illustrated by the Ben Tre fishery and the Suriname Atlantic seabob fishery, both of which have management plans that are recognized by their governments and receive support from research institutions and NGOs.
- Certified seafood is often produced on a large scale. The certified aquaculture farms mainly belong to large and often multi-national corporations. For fisheries there is a greater range of scale. But even artisanal fisheries such as the Ben Tre fishery, which employs no machinery, covers an extensive area and has substantial outputs.
- Certified operations often have a vertically integrated supply chain. This is a characteristic of large-scale operations because large companies with high production capacity will usually have a greater ability to integrate the value chain vertically. In many cases several sectors of the supply chain are run by the same company: Acuagranjas dos Lagos facility, for example, has ponds and a processing facility on-site, which in turn provides greater capacity for traceability – a requirement of all certification schemes.
- Certified aquaculture operations have high technological capacities. Farms need appropriate equipment for adequate laboratory assessments and they often need to incorporate upgrades that require technological capacity. A telling indicator of the high technological capacity of certified fish farms is that nearly all certified operations in the ASC and BAP databases have their own websites, which indicates a level of technological capacity that is uncommon among rural fishing and fish farming communities.
- Demand for certification often precedes capacity-building support. The certification of the Suriname Atlantic seabob, for example, was initiated by a processing facility in Europe in response to consumer demand for certified seafood. This created a lucrative market opportunity, which led to government and institutional support for the fishery. Without the interest of a large-scale seafood processor, it is possible that certification would not have been initiated.

CHAPTER 4. RECOMMENDATIONS

As demand for certified seafood rises, there is a danger that fisheries and fish farms in developing countries will be unnecessarily barred from certain markets because they lack the capacity to comply with or prove compliance with third-party standards. This section considers recommendations to enhance the capabilities of fisheries and fish farms in developing countries, especially small-scale operations, to seek and obtain certification.

Recommendation 1: Enhance government-led capacity-building initiatives

It is difficult for a fishery to meet certification requirements if it lacks a direct relationship with government entities and research institutions. Even at the basic level the certification standards require that fisheries and farms comply with national regulations – but if a fishery or fish farm has so little contact with government officials that it is unaware of the regulations, meeting even the baseline requirements for certification becomes impossible.

It is therefore recommended that governments establish capacity-building initiatives for fishing and fish farming communities that include training and communications to make fisheries aware of regulations governing their activities. Governments should also facilitate the creation of partnerships between fishing communities and research institutions. In their report on shrimp farming in Viet Nam, the RSCIP identified the need for enhanced government support to meet the fundamental need for a "... shift in the role of government from a top-down target setter and regulator to a local-level organizer and facilitator" (RSCIP and MCD, 2012, pg. 19). This recommendation includes facilitating the establishment of communications among communities to establish cooperatives that could promote group certification.

Governments should establish partnerships with certification bodies to facilitate linkages between fishing communities and large-scale certifiers, and implement initiatives to enhance lines of communication in supply chains.

Recommendation 2: Expand geographical uptake of certification programmes by making them more accessible to developing countries

Although governments in developing countries are primarily responsible for enhancing the capacity of fisheries so that they can obtain certification, the certifiers themselves should review and modify their requirements and assessment methods based on operational scale and the overall fishery capacity. The MSC is already working on this, and it is evidently helping producers in developing countries to obtain certification and improve the sustainability of their operations.

Recommendation 3: Focus specifically on needs and capacity of small-scale sector

There is a very wide range of operational scale in the fisheries sector. Large-scale operations often have greater capacity and can contribute more to the value of a country's exports, which can in turn lead to enhanced government support. Small-scale fisheries and fish farms in developing countries often face the largest obstacles in obtaining certification. Initiatives are needed that specifically target certification assistance for small-scale producers, in addition to programmes that target developing countries.

Recommendation 4: Adapt costs to meet the financial constraints of fisheries and fish farms in developing countries, especially small-scale operations

Cost is a major barrier to certification for fisheries and fish farms in developing countries, especially small-scale enterprises. For many seafood producers in developing countries, the cost of certification is unaffordable at individual level, and as illustrated by shrimp farmers in the Mekong delta in Viet Nam, the prohibitive costs of certification take away the financial incentives to seek it. Government funding could be allocated to subsidize the costs of certification in developing countries.

Another way to overcome this barrier could be to establish fishery and fish farm cooperatives that can apply for cluster certification. Establishing cooperatives can help to streamline the certification process for fisheries and fish farms. However, forming cooperatives requires government and institutional support to build capacities and lines of communication within the sector, as discussed in Recommendation 1. Finally, government can develop its own public certification programme, which in some cases has already been successful in gaining market access for fish farmers and fisheries in some countries, both in developed and developing regions.

FAO has assisted governments and relevant actors under all of the above recommendations and will continue to provide support in light of the evolution and expansion of seafood ecolabels in the market place and continuous concerns by developing countries about voluntary certification of fish and seafood products affecting market access and livelihoods for their sustainably managed fisheries and aquaculture sector.

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