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Value chain dynamics and the small-scale sector

Policy recommendations for small-scale fisheries and aquaculture trade

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Preparation of this document

Consultants prepared and carried out case studies in Africa, Asia, Central and South America, Europe and North America from 2009 to 2012. Using these, the lead consultant and project coordinator prepared this publication, highlighting the importance of the small-scale sector and value chain analysis, and concluding in general policy recommendations across all countries studied.

The document is the final price synthesis and policy recommendations report for the following countries: Bangladesh, Cambodia, Canada, Ghana, Honduras, Iceland, Japan, Kenya, Maldives, Norway, Peru, Spain, Thailand and Uganda. All the information in it is based on extensive country reports (available on the Fisheries and Aquaculture Value Chain web page (www.fao.org/valuechaininsmallscalefisheries/background1/en/). These contain information on the background of each country's fishery and aquaculture sector, methodology of analysis, price data used, findings, policy implications, and other information.

The following individuals led the analysis, provided inputs and wrote the 14 national case studies and brief on women's involvement used to create this report:

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- Professor D.V. Gordon (Canada),
- Mr Theodore-Oboo Antwi-Asare (Ghana),
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- Dr Madan Dey (Bangladesh, Cambodia and Thailand),
- Dr Achini De Silva (Women in global fishery and aquaculture value chains).

Abstract

This technical paper focuses primarily on price transmissions in small-scale and large-scale fishery and aquaculture value chains in 14 developed and developing countries. Although the study is focused on the small-scale sector, both the small-scale and large-scale sectors were analysed in order to demonstrate differences between the two. The document begins with an overview of the entire project and its global implications, reviewing the importance of fisheries and aquaculture to livelihoods, food security and trade as well as the rationale for value chain analysis. It then presents detailed and summarized country-specific information on the research and analysis conducted, presenting analysis methodology, findings and policy recommendations within each country. An additional section focuses on women, summarizing their significant role in fishery and aquaculture value chains in selected countries. Finally, the document outlines the general findings and policy recommendations that emerged as key themes across all value chains analysed.

The main findings across case studies are that, relative to other players in the value chain, small-scale fishers and fish farmers are receiving the smallest economic benefits for their products. Processors and retail markets were found to be receiving more of the distributional benefits of the value chain owing to their stronger bargaining power. Following this, the policy recommendations made aim to safeguard the interests of small-scale fishers and fish farmers by enabling them to obtain prices and margins that let them achieve long-term sustainability from an economic, social and biological resource perspective.

The policy recommendations presented generally relate to increased governmental, NGO and private-sector support, improved organization, consistent pricing methods and making pricing more transparent, the sustainable expansion of small-scale fish farming, an increased focus on promotion and marketing, and the exploration of new markets. However, the report cautions that sustainable resource management and better regulatory framework practices are a necessary condition for small-scale value chains to be sustained. It also highlights the crucial need to always consider and safeguard the impact that increasing trade will have on local food security.

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Artisan fishing near Tombouctou, Mali. ©FAO/J.C. Henry.

Acknowledgements

The main sponsors of the project were the Norwegian Agency for Development Cooperation (Norad) and FAO. Norad provided most of the funding for the project, and FAO provided the professional expertise of its staff, which facilitated its organization and completion. Both organizations maintained sustained participation in the study, coordinated its numerous reviews and provided inputs to its draft and finalization. Iceland, Japan, Norway and Spain provided their own funding for the project at a later stage in order for more developed countries to be included.

The FAO Project Focal Point, Dr Audun Lem and members of the international steering committee (among the leading professionals in fisheries and aquaculture around the world) provided guidance and support in launching the project. They followed its progress and provided helpful inputs throughout.

The team of national consultants undertook the case studies within a limited time frame and budget. The core of this document is based on the information provided by their significant and dedicated work.

The final draft report was reviewed by members of the international steering committee, individuals within the FAO Fisheries and Aquaculture Department, the Norwegian Institute of Food, Fishery and Aquaculture (Nofima) and an independent, anonymous peer reviewer. Their work on reviewing the report to ultimately make it stronger is sincerely appreciated.

At FAO, special thanks are due to Turan Rahimzadeh for creating and maintaining the project's website, to Gloria Loriente for the layout design of this publication and to Anna Child for her ongoing work on the report. Much appreciation also goes to Professor Dey and Professor Gordon for their consistent aid in providing numerous rounds of inputs to the report.

Finally, many thanks go all the agents in the fisheries and aquaculture value chains, including the fishers and fish farmers, processors, retailers, wholesalers, exporters and importers, for taking time out of their demanding work to allow the national consultants to collect many of the data needed to generate this analysis and final document.

Trond Bjorndal
Lead Consultant

Abbreviations and acronyms

APT	asymmetric price transmission
ARIMA	autoregressive integrated moving average
CAD	Canadian dollar
CIF	cost, insurance and freight
CPI	Consumer Price Index
DAM	Department of Agricultural Marketing (Bangladesh)
DHC	direct human consumption
ESP	Economic Stimulus Programme (Kenya)
EUR	Euro
FOB	free on board
GHC	Ghanaian cedi
IHC	indirect human consumption
IUU	illegal, unreported and unregulated (fishing)
ITQ	individual transferable quota
JPY	Japanese yen
KES	Kenyan shilling
MCS	monitoring, control and surveillance
MVR	Maldivian rufiyaa
NGO	non-governmental organization
NOK	Norwegian krone
SO	sales organization
TAC	total allowable catch
THB	Thai baht
UGX	Ugandan shilling
USD	United States dollar

Contents

1. Introduction and background

FAO[1] conducted a comprehensive value chain analysis of international fish trade with an impact assessment for the small-scale fisheries and aquaculture sector in developing countries. The analysis was a follow-up to an FAO study in 2004[2] on the impact of international fish trade on local food security, with the objective to now achieve a better understanding of the dynamics of small-scale value chains by identifying the current distributional benefits; essentially, how the benefits were being distributed and the linkages between the relative benefits obtained and the design of the chain. In addition, the analysis aimed to recognize opportunities for the small-scale sector to obtain more value for their products.

Findings from the analysis conclude in country-specific as well as general policy recommendations that safeguard the interests of small-scale fishers and fish farmers by enabling them to obtain prices and margins that let them achieve long-term sustainability from an economic, social and biological resource perspective. As value chain research is limited, primarily owing to the unavailability of price data, it is hoped that this nascent research and the findings that have emerged will help to fill a knowledge gap in identifying and addressing existing inequities. Moreover, the policy recommendations presented aim to serve as entry points for national governments and institutions, international governmental bodies and non-governmental organizations (NGOs) to advocate for the rights of small-scale fisheries and fish farms worldwide.

The overall project involved value chains within aquaculture and capture fisheries in both domestic and international markets in 14 countries, of which 9 are developing countries and the remaining 5 are developed countries. The developing countries are Bangladesh, Cambodia, Ghana, Honduras, Kenya, Maldives, Peru, Thailand and Uganda, and they were chosen by the steering committee in consultation with the national consultant advisors and the FAO Focal Point. The developed countries are Japan, Canada, Iceland, Norway and Spain, with consultants from these countries asking to join the project once the analysis had already been initiated, most with their own funding and resources. It was agreed to bring them into the project to serve as a reference of comparison to the developing countries. Furthermore, it was expected that data availability would be better in developed countries. In some cases, lessons learned from developed countries in terms of management systems, regulatory framework and market structure were identified as being of potential use to developing countries, but this was not the focus of the project.

Countries were chosen to achieve global representation, with countries from Asia, Africa, Europe, North America and South America being included. Factors for selecting species as part of certain value chains in each country are discussed further in Section 4 on the general methodology of the project. Although the study is focused on the small-scale sector, both the small-scale and large-scale sectors were analysed in order to demonstrate differences between the two. It is important to note that there is great diversity in the small-scale fisheries and aquaculture sector and no universal definition can be prescribed. Indeed, there is no globally agreed-upon definition for small-scale versus large-scale and, instead, meanings for each term vary widely by country and region. Generally, countries included in this project did not have concrete

[1] With funding from the Norwegian Agency for Development Cooperation (Norad).

[2] Kurien, J. 2005. *Responsible fish trade and food security.* FAO Fisheries Technical Paper No. 456. Rome, FAO. 77 pp.

definitions for their small-scale capture and aquaculture sector, so instead a number of criteria were used when defining what would constitute each sector's size.

For capture fisheries, FAO's discussion document "Towards voluntary guidelines on securing sustainable small-scale fisheries" outlines important criteria to define small scale, including: size of fishing craft/vessel/engine, type of craft/vessel, fishing unit, ownership, time commitment, fishing grounds, disposal of catch, utilization of catch, knowledge and technology and integration into the economy (FAO, 2011). Table 1 provides an overview of these general criteria in both small- and large-scale fisheries.

For aquaculture, defining small-scale is dependent on a range of variables such as geography, socio-economics and level of technological innovation (Shrestha and Pant, 2012). Generally, small-scale aquaculture is characterized by low-input and low-output fish farming (Martinez-Espinosa, 1997; Edwards, 1999). Large-scale aquaculture might target profitability, business and employment with usually longer value chains, while small-scale farming is a complex blend of food security, income generation, livelihood strengthening and poverty alleviation (Martinez-Espinosa, 1997). Several definitions of small-scale aquaculture have been proposed based on the level of aquaculture technology and socio-economics of the specific areas, focusing on the capacity of the farmers and families involved to operate the technology. WorldFish Center proposes the following general definition: "small-scale aquaculture is a family-based enterprise, where fish are produced with the involvement of family members of the farm owner in common, leased, private or self-owned property, regardless of the farm size, species reared and volume produced" (Shrestha and Pant, 2012).

TABLE 1
Categories and characteristics of small-scale and large-scale fisheries

Characteristics	Categories of fisheries		
	Small-scale		Large-scale
	Subsistence	Other small-scale	
Size of fishing craft/vessel and engine	None or small (< 12 m), with low-power engine or non-motorized	Small (< 24 m) usually with low-power engine (< 375 kW)	Large (≥ 24 m) with high-power engine (≥ 375 kW)
Type of craft/ vessel	Undecked wooden boat, such as a canoe or dinghy	Decked or undecked vessel of wood, fibreglass, aluminium or steel	Steel-hull vessel, trawler, factory vessel
Fishing unit	Individuals, or family or community groups	Small groups, some specialization and division of labour; importance of household and community	Smaller and larger groups; specialization and division of labour
Ownership	Craft/gear owner-operated	Usually owned and operated by senior operator; some absentee ownership	Concentration of ownership, often by non-operators; cooperative ownership
Time commitment	Mostly part-time/ occasional	Full-time or part-time	Usually full-time
Fishing grounds	On or adjacent to shore; inland or marine	Inshore/coastal; inland or marine	All marine areas
Disposal of catch	Primarily household consumption but some local barter and sale	Sales to local, national and international markets; household consumption	Primarily sale to organized markets
Utilization of catch	Fresh or traditionally processed for human consumption	Fresh or processed – generally traditionally – for human consumption	Mostly processed; large share for reduction for non-food products
Knowledge and technology	Premium on skills and local knowledge; manual gear	High skills and knowledge needs; manual and mechanized gear; some electronic equipment	Skills and experience important but supported by technology; mechanized gear; automation and electronic equipment
Integration into economy	Informal, not integrated	Partially integrated	Formal, fully integrated

Sources: World Bank, FAO and WorldFish Center (2010), adapted from studies by Berkes *et al.* (2001), Chuenpagdee *et al.* (2006) and Johnson (2006).

The purpose of this technical paper is twofold. First, it aims to present detailed and summarized country-specific information on the research and analysis conducted, presenting analysis methodology, findings and policy recommendations within each country. Second, it provides an overview of the entire project and its global implications, outlining the overall approach taken as well as the general findings and policy recommendations that emerged as key themes across all the value chains analysed. These policy recommendations generally relate to increased governmental, NGO and private-sector support, improved organization, consistent pricing methods and making pricing more transparent, the sustainable expansion of small-scale fish farming, an increased focus on promotion and marketing, the exploration of new markets, improved fisheries comanagement and better regulatory frameworks for aquaculture. Finally, with these recommendations, it is crucial to always consider the impact on, and to safeguard as much as possible, local food security.

The document is organized as follows: after the introduction and background, Section 2 provides a rationale for the project, outlining the importance of fisheries and aquaculture to livelihoods, food security and trade. Section 3 discusses the difference between value chains and supply chains, with Section 4 providing a general overview of the overall methodology of the project and indicating some of the data limitations encountered. The subsequent sections (5–8) present a summary of the analysis undertaken in each developing and developed country. Each country subsection includes the following: a background on the country's fishery and/or aquaculture value chain, the country-specific methodology undertaken for the analysis, key results found, and the subsequent conclusions and policy implications. Section 9 presents a summary on women in global fisheries and aquaculture value chains, highlighting the important role women play. Section 10 provides a brief overview summary by country of the species analysed, findings and policy recommendations. The final section presents the conclusions from the project, with general themes found among the case studies discussed and policy recommendations presented. In addition, this last section outlines areas for further research and analysis. Further reading on the project can be found on the Fisheries and Aquaculture Value Chain web page,[3] where all of the country case study reports, presentations and additional documents that were completed as part of the analysis have been posted.

[3] www.fao.org/valuechaininsmallscalefisheries/background1/en/

2. Why study small-scale fisheries and aquaculture value chains

THE IMPORTANCE OF THE SMALL-SCALE SECTOR TO LIVELIHOODS

Globally, 54.8 million people are engaged in capture fisheries and aquaculture, and about three times as many are involved in upstream and downstream activities (e.g. fish processing, selling, net-making and boat building). Women comprise about half of this global fisheries workforce, typically concentrated in the pre-harvest and post-harvest sectors. While employment is stagnating in wild-capture fisheries in most regions, it is increasing in aquaculture, especially in Asia, where employment rose from some 3.7 million people in 1990 to well in excess of 10 million people by the late 2000s. While no definitive statistics exist, it is thought that the small-scale sector employs 90 percent of the world's fishers, producing almost half of world fish production and supplying most of the fish consumed in the developing world (UN General Assembly, 2012). The sector predominates in developing countries, which also account for most fishing-related employment (FAO and WorldFish Center, 2008).

While industrial boats employ some 200 people for every 1 000 tonnes of fish caught, small-scale fishing methods employ some 2 400 people for the same amount of fish (FAO and WorldFish Center, 2008). Other significant differences between the large-scale and small-scale sectors have been documented by Jacquet and Pauly (2008). Using global statistics adapted from 2006, they not only demonstrated that small-scale fisheries are contributing to significantly more livelihoods, but they also showed how the sector is keeping more value in ecosystems when comparing factors such as fish discarded at sea, annual fuel consumption and catch per tonne of fuel consumed. For the latter, the difference was significant; the large-scale sector catches 1–2 tonnes of fish per tonne of fuel consumed as opposed to the small-scale sector, which catches 4–8. Jacquet and Pauly (2008) also demonstrated the marked contrast in terms of the amount of subsidies received; the large-scale sector is estimated to receive between USD25–27 billion, whereas the small-scale sector receives about USD5–7 billion. This last point demonstrates innate barriers facing the small-scale sector and its value chain – this is discussed further in the conclusions section.

Despite the important contribution by the small-scale fisheries and aquaculture sector to livelihoods and fish production/supply, it is often obscured in national statistics owing to under-reporting, particularly in developing countries. For example, a 2010 study in Mozambique found that the actual catch of the small-scale sector was six times greater than that officially reported by the Government to FAO (Jacquet *et al.*, 2010).

FISH AND FISHERY PRODUCTS – DIRECT CONTRIBUTION TO FOOD SECURITY

FAO states that "food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 2012a). Food insecurity can cause undernutrition, which results in mortality, morbidity, stunting and wasting. It can also cause micronutrient deficiencies, which result in impaired immune functions, cognitive development, growth, reproductive performance and work productivity. The distinction between undernutrition and micronutrient deficiencies is important because while undernourishment can be improved by increasing energy

intake, the problem of micronutrient deficiencies is of a different nature as it results from an inadequate quality and diversity in diet.

In the period 2010–12, the number of people in the world suffering from undernourishment was estimated to be about 870 million people, which represents 12.5 percent of the global population, or one in eight people. Improved undernourishment estimates for 1990 and onwards, suggests that progress in reducing hunger has been more pronounced than previously believed, although much of the progress was achieved before 2007–08. Since then, global progress in reducing hunger has slowed and levelled off, demonstrating that the number of people suffering from chronic undernourishment is still unacceptably high, with the bulk of undernourishment in Southern and Eastern Asia as well as sub-Saharan Africa (FAO, 2012a). Thus, the eradication of hunger remains a major global challenge.

Direct consumption of fish for food provides a vital source of protein and a variety of essential fatty acids and micronutrients, such as iron, zinc and vitamin A. These micronutrients are particularly rich in smaller-sized fish, which are often more readily available to low-income, at-risk populations owing to their low cost and abundant availability. Fish are an especially important source of food and nutrients owing to the fact their seasonal availability is often different from crops. This means that fish can help to reduce seasonal vulnerability, particularly in rural communities (Kawarazuka, 2010).

The most recent data available show that world per capita fish consumption reached 18.4 kg in 2009, demonstrating an average growth of more than 3 percent annually (FAO, 2012b). However, significant regional differences exist. In low-income food-deficit countries (excluding China), per capita fish consumption stands at about 10 kg, compared with approximately 29 kg in industrialized countries. Africa has the lowest per capita fish consumption of all continents, at 9.1 kg. However, these aggregate figures do mask variations between and within countries as well as the fact that fish represents a higher proportion of dietary animal protein in developing countries than in developed countries (UN General Assembly, 2012). Indeed, globally, fish represents 15 percent of all animal protein consumed by people, whereas in low-income countries the proportion is significantly higher, at about 20 percent (FAO, 2004). Estimates suggest that about one billion people worldwide rely on fish as their primary source of animal protein (FAO, 2000). Even so, although it is clear that fish is a vital food and nutrient source for many low-income countries, it has the potential to be utilized in local diets even more.

IMPORTANCE OF TRADE TO FOOD SECURITY

Indirectly, domestic and international fish trade can increase food security through employment and income generation, which can be utilized to purchase food commodities, including lower-cost staple foods. Domestic trade also makes fish much more available and accessible to local populations for consumption. In terms of international trade, it is known that fish exports are a major source of income for developing countries. Indeed, developing countries now represent almost 50 percent of global fish exports, with annual net export revenues exceeding USD25 billion (FAO, 2012b). These exports can generate foreign exchange as well as create employment and income in the primary and secondary sectors. However, fish exports can also decrease the availability of the traded species for domestic consumption and raise its local price owing to reduced availability. Overall, a society is likely to gain from exports; however, there may be distributional consequences particularly for the most vulnerable populations, as those who gain may not compensate those who lose. With aquaculture, the situation is likely to be different. Exports of farmed products will not have a negative effect on domestic consumers as the product is generally produced with

export markets in mind. Imports of fish will tend to increase domestic food supply and, if anything, keep prices down.

Another important consideration is that, generally, developing countries mainly export high-value products and import low-value ones. Thus, countries can be both large exporters and importers of fish, as is the case in Thailand, China and, increasingly, Viet Nam. In some instances, the proceeds from exporting more-expensive fish can be used to import less-expensive, but equally or more-nutritious, fish. Africa, for example, despite its positive net export value of fish, remains a net importer in terms of volume, and is therefore dependent on lower-cost fish imports to aid in local food security (UN General Assembly, 2012).

The issue of trade's contribution to food security is a complex one, with numerous studies attempting to explore the pathways between the economic driver of trade to its impact on food security and undernourishment in local communities. An FAO study led by Dr John Kurien (FAO, 2004) examined how trade affected food security based on evidence from a global assessment as well as from 11 country case studies.[4] One of the study's main findings was that, in most cases, international trade in fishery products has had a positive effect on local food security. In addition, production and trade statistics indicated that international trade had not had a detrimental effect on food security in terms of the availability of fish for food. Instead, increases in production, coupled with the import and export of fishery products, had ensured the continued availability of fish for domestic supply. However, the study did find that trade has placed increased pressure on natural resources and, therefore, preserving resources through effective fisheries management is a necessary condition to increase food security and sustain international trade in the long term. The study concluded that market demand needs to be coupled with a sustainable resource management policy. This includes incentivizing consumers in developed countries to purchase sustainably produced products (FAO, 2004).

A recent study by the WorldFish Center drew more alarmist conclusions. By examining exports and per capita domestic availability of fish in 14 countries[5] over a 30-year period,[6] it found that increasing trade appears to have compromised domestic fish supplies in countries with high domestic fish consumption, high population growth and persistent poverty. In only half of the countries had fish availability increased along with increases in exports. Moreover, this growth was found to be related to either aquaculture or offshore fisheries, highlighting the important role of aquaculture for future growth. The study also found no data to confirm or deny previous findings related to trade and food security, which claimed that developing countries purchase low-value seafood with export earnings and then had surplus earnings for other uses. Although the study agreed that in general terms, anything that contributes positively to trade balance has the potential to increase food security, it warned that it may also be the case that some fish export revenues are being captured by private-sector and government elites (WorldFish Center, 2011). In turn, these revenues are then spent on luxury imported goods, rather than being used for poverty reduction, as has been suggested for the commercial shrimp export trade in Madagascar (Wilson and Boncoeur, 2008). Some studies (Wilson and Boncoeur, 2008; WorldFish Center, 2011) have recommended that policy options likely to widen inequality in countries with weak governance and poor track records should not be pursued. Rather, they hold it would be better for aquaculture benefits or fisheries rent to be distributed locally instead of revenues increasing but not being effectively spent on national economic development and poverty reduction.

[4] Brazil, Chile, Fiji, Ghana, Kenya, Namibia, Nicaragua, Philippines, Senegal, Sri Lanka and Thailand.

[5] Bangladesh, Cambodia, Gambia, Guyana, Indonesia, Kiribati, Maldives, Myanmar, Philippines, Senegal, Sierra Leone, Sri Lanka, Solomon Islands and Vanuatu.

[6] From 1976 to 2007.