

# **A value-chain analysis of international fish trade and food security with an impact assessment of the small-scale sector**

## **Summary Article**

**NORAD-FAO Project**

**January 2013**

### **Abstract**

The purpose of this article is to present an overview of the value-chain analysis project on international fish trade and food security with an impact assessment of the small-scale sector. Outlining the project's importance, approach, results and conclusions, the summary article serves as an initial background document to portray an overall picture of the work conducted. It has been based on numerous country reports, as well as the background and price synthesis reports. Further reading with more specific details can be found on the project's website ([www.fao.org/valuechaininsmallscalefisheries](http://www.fao.org/valuechaininsmallscalefisheries)) where all of the country reports, presentations and additional documents that were completed as part of the analysis have been posted.

The article is organised as follows. The first section presents the rationale for why this study was undertaken, and includes sub-sections on the importance of the small-scale sector to livelihoods, fish's direct contribution to food security, the importance of trade to food security and conclusions on the importance of the study. The second section then focuses on the value-chain concept and how it differs from the more traditional supply-chain approach, with examples of value-chains in fisheries and aquaculture presented. The fourth section represents the conclusions from the project, with general themes found between case studies discussed and technical, organisational and policy recommendations presented. The final section concludes the article and outlines areas for further research and analysis.

### **INTRODUCTION**

The Food and Agricultural Organisation of the United Nations (FAO)<sup>1</sup> conducted a comprehensive value chain analysis of international fish trade with an impact assessment for the small-scale fisheries sector in developing countries. The analysis was a follow-up to a FAO study in 2004<sup>2</sup> on the impact of

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<sup>1</sup> With funding from The Norwegian Agency for Development Cooperation (Norad),

<sup>2</sup> Published as FAO Fisheries Technical Paper 456

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. Additionally, the analysis aimed to recognize opportunities for the small-scale sector to obtain more value for their products. Comparisons were then made between domestic, regional and international value-chains with the view to more clearly understand how developing countries can increase the value derived from their fishery resources and improve their national food security.

This analysis attempts to contribute to value-chain research in developing countries as there is currently limited knowledge available, primarily due to unavailability of price data across species, markets, and along relevant value-chains. Findings from the analysis conclude in policy recommendations that safeguard the interests of small-scale producers, not only by enabling them to access international markets, but to obtain prices and margins that let them achieve long-term sustainability from an economic, social and biological resource perspective. Findings and recommendations made in this article build off of and add to work already conducted in examining and addressing inequities in the small-scale fisheries and aquaculture sector (FAO, 2004, 2012d, 2012e; FAO and WorldFish Center, 2008, 2010; Jacquet and Pauly, 2008; WorldFish Center, 2011).

The overall project involved value-chain case studies of both domestic and international markets in fourteen countries, in which nine of the chosen are developing countries and the remaining five are developed. The developing countries are Bangladesh, Cambodia, Ghana, Honduras, Kenya, Maldives, Peru, Thailand and Uganda. The developed countries include Japan, Canada, Iceland, Norway and Spain. All developed countries besides Canada contributed their own funding to the project. Developed countries were chosen to serve as a reference of comparison with value-chains in developing countries. All countries were chosen to achieve geographical balance, with representation from Asia, Africa, Europe, North America, and South America.

The purpose of this summary article is to present an overview of the entire project, outlining its importance, approach, results and conclusions. The article serves as an initial background document to portray an overall picture of the work conducted and can also be used to guide presentations and/or discussions on the project. Further reading<sup>3</sup> with more specific details can be found on the Fisheries and Aquaculture Value Chain Website, where all of the country reports, presentations and additional documents that were completed as part of the analysis have been posted. This summary article is based on numerous country reports, as well as the Background Synthesis Report and Final Report. In particular, the conclusions from the project drew from findings presented in the different country reports (full citations can be found in the end reference section).

The article is organised as follows. The first section presents the rationale for why this study was undertaken, and includes sub-sections on the importance of the small-scale sector to livelihoods, fish's direct contribution to food security, the importance of trade to food security with a brief literature review on past findings and conclusions on the importance of the study. The second section then focuses on the value-chain concept and how it differs from the more traditional supply-chain approach, with examples of value-chains in fisheries and aquaculture presented. The third section outlines the overall methodology of the project and indicates some of the data limitations encountered. The final section presents the conclusions from the project, with general themes found between case studies discussed and policy recommendations presented. Additionally, this last section outlines areas for further research and analysis.

## **WHY STUDY VALUE-CHAINS OF SMALL-SCALE FISHERIES & AQUACULTURE?**

### **The Importance of the Small-scale Sector to Livelihoods**

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<sup>3</sup> <http://www.fao.org/valuechainin-small-scale-fisheries/background1/en/>

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 sector. 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 (FAO, 2012). While no definitive statistics exist, it is thought that the small-scale sector employs 90% of the world's fishers, producing nearly half of world fish production and supplying most of the fish consumed in the developing world. The sector predominates in developing countries, where most fishing-related employment resides (World Bank, FAO and WorldFish Center, 2010).

Whereas 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 Centre, 2008). Other significant differences between the large-scale and small-scale sector have been documented by Pauly (2006). Pauly demonstrated that not only are small-scale fisheries contributing to significantly more livelihoods, but also showed how the sector is keeping more value in our 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; with the large-scale sector catching one to two tonnes of fish per tonne consumed as opposed to the small-scale sector catching four to eight. Pauly also demonstrated the marked contrast in terms of the amount of subsidies received, with the large-scale sector estimated to receive between 25 and 27 billion US dollars whereas the small-scale sector receives about five to seven billion. This last point demonstrates innate barriers facing the small-scale sector and its value-chain that will be discussed further.

Despite small-scale fisheries and aquaculture's important contribution to livelihoods and fish production/supply, it is often obscured in national statistics due to underreporting, particularly in developing countries. For instance, 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, 2012). Food insecurity can cause under nutrition, which results in mortality, morbidity, stunting and wasting but can also cause micronutrient deficiencies, which result in impaired immune functions, cognitive development, growth, reproductive performance and work productivity. The distinction between under nutrition 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.

The absolute number of people in the world suffering from undernourishment was estimated to be about 870 million people in the period 2010-2012, 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, though much of the progress was achieved before 2007-2008. Since then, global progress in reducing hunger has slowed and leveled 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, 2012). Clearly, 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, vitamin A and others. These micronutrients are particularly rich in smaller sized fish that are often more readily available to low income, at risk populations due to cheap cost and abundant availability. Fish are an especially important source of food

and nutrients due to the fact their seasonal availability is often different from crops, meaning that fish can help to reduce seasonal vulnerability, particularly in rural communities (Kawarazuka, 2010).

The most recent data available shows that the world per capita fish consumption reached 18.4 kg in 2009, demonstrating an average growth of more than three percent annually. However, significant regional differences exist. In low-income food-deficit countries (excluding China), per capita fish consumption stands at around 10 kg, compared to approximately 29 kg in industrialized countries. Africa has the lowest per capita fish consumption of all continents, at 9.1 kg (FAO, 2010 & 2012). 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. 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 roughly one billion people worldwide rely on fish as their primary source of animal protein (FAO, 2000). Regardless, though 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 utilised 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 close to 50% of global fish exports with their annual net export revenues exceeding US\$ 25 billion (FAO, 2012). These exports can generate foreign exchange as well as create employment and income in the primary and secondary sectors. Yet on the other hand, fish exports can also decrease the availability of the traded species for domestic consumption and raise its local price due to reduced availability. Overall, the 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 products. Thus, countries can be both large exporters and importers of fish, as is the case in Thailand, China, and increasingly Vietnam. 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 volume, and is therefore dependent on lower cost fish imports to aid in local food security (FAO, 2012).

The issue of trade's contribution to food security is clearly 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. A FAO study led by Dr. John Kurien (FAO, 2004), examined how trade impacted food security based on evidence from a global assessment as well as from 11 national case studies (in Brazil, Chile, Nicaragua, Senegal, Ghana, Namibia, Kenya, Sri Lanka, Thailand, Philippines and Fiji). 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. Additionally, 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 insured 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 the Western World to purchase sustainably produced products (FAO, 2004).

## **VALUE-CHAINS VS. SUPPLY CHAINS**

### **What is the Difference?**

To further discuss value-chains in the small-scale fisheries and aquaculture sector, it is beneficial to explore what is meant by the term value-chain and how it differs from the oft interchangeably used term, supply chain. Though there is not one standardized definition for either term, general characteristics and definitions have been applied to each that can be discussed here. It is important to note that establishing a good supply chain is essential to be able to develop a value-chain, as without a supply of products, adding value would never be able to occur.

A supply chain is a network of product-related business enterprises through which products move from the point of production to consumption, including pre-production and post-consumption activities. In supply chains, production is focused on efficient logistics using upstream and downstream businesses aimed mostly at pushing products to market. Supply chains are mostly concerned with costs and how long it takes to present the product for sale. The main objectives of supply chain management is to maximize profits by reducing the number of links in the chain and keeping issues such as bottlenecks in supply, costs incurred, and time to market to a minimum. Typically, supply chains are made up of multiple companies who coordinate activities to set themselves apart from the competition. A supply chain has three key parts, including: supplying raw materials to manufacturing units, manufacturing raw materials into semi-finished or finished products and distribution to ensure products reach consumers. (De Silva, 2011)

A value-chain on the other hand, can be seen as a step further in evolution, as it moves beyond just getting the product to market and aims at providing a more mutually beneficially environment for all stakeholders. Like supply chains, the main objectives of value-chain management is to maximize net revenue. However, the method in which value-chains seek to maximize net revenue is inherently different. As the name suggests, value-chains add incremental value to the product in the nodes of a chain either by value addition or value creation. This value is then realized from higher prices and/or the development of new (niche) or expanded markets. For instance, within fisheries and aquaculture, the term value-addition is used to characterize adding value in products through some type of processing methods; essentially converting raw fish to a resulting finished or semi-finished product that has more value in the market place. Value creation, on the other hand, is used to characterize fish and fishery products that have incremental value in the marketplace by differentiating them from similar products based on product attributes such as: geographical location (Mediterranean tuna, Norway salmon, Thailand Black Tiger shrimp, etc.); environmental stewardship (MSC label, Eco-labeling, fair trade), organic products; and food safety (HACCP, Free from antibiotics and heavy metals, etc) (De Silva, 2011).

The final value-added or value created product can be a new product in the marketplace that has a competitive advantage over generic products as it fits a specific consumer demand and attracts a higher price. Therefore, value-chains can be viewed as empowering to the various, usually fragmented stakeholders as they recognize innovative opportunities to contribute and increase their product value.

### **Value-chains in Fisheries and Aquaculture**

For the price analysis portion of the project, value-chains for fisheries and aquaculture in thirteen countries were divided into international and domestic markets. For the domestic markets, the following prices were analysed: first hand (for capture fisheries), farm gate (for aquaculture), wholesale and retail. For the international markets, prices analysed included: first hand, farm gate, wholesale, processor,

exporter, importer and retailer. Value-chains were also differentiated by small-scale (artisanal) and large-scale (industrial). These value-chains studied in the price analysis are summarized in the below Summary Table, which indicates species studied, whether they were cultured or captured, the value-chain data analysed and the time series of price data used. This information was gathered from many of the country reports as well as the background and price synthesis reports. Full citations for reports used to make up the Summary Table can be found in the end reference section.

## LESSONS FROM THE VALUE-CHAIN PROJECT

In this section, overall reoccurring themes and examples of findings from the various case studies will be presented. Policy recommendations from these themes and findings will be highlighted and discussed. Differences between developed and developing countries are also included for general discussion.

As 14 countries were included in the overall project, with geographic locations ranging from Bangladesh to Uganda, each value-chain obviously differed significantly. While some value-chains were solely export driven, others were only for domestic consumption and still others targeted both. Additionally, production methods were on a wide spectrum of scales and employed a range of gears, from traditional canoes to modern, industrial trawlers. Though there was some overlap in terms of species analysed, most species were unique to their country. Lastly, each country had its own data limitations, which led the depth of findings to vary.

Despite these innate differences in the value-chains themselves and the distinct datasets available between countries, reoccurring themes related to distributional benefits in the small-scale value-chain emerged. First and foremost, the case studies found that for international trade, most fish suppliers in developing countries are acting as raw material suppliers to industrial nations, regardless of their production size. This finding echoes other research that has been done and demonstrates that the small-scale fish and aquaculture sector are earning limited profit from their valuable natural resources (FAO, 2004; WorldFish Center, 2011). In the same vein, the case studies were also in consensus that relative to other players in the value-chain, small-scale fishers and fish farmers are receiving the least economic benefits in terms of amount of money earned for their products. Processors and retail markets were found to be receiving more of the distributional benefits of the value-chain due to their stronger bargaining power. In some cases, the disparities in terms of earnings were noteworthy. In Kenya for instance, the average earnings for exporters of Nile perch was found to be an average of 250% more than the fishers' earnings. This difference is significant relative to the average mark up prices in most enterprises, which usually ranges between 25 to 40 percent, regardless of the market structure.

Following this overall finding, policy recommendations focused on how to provide more support for the small-scale fisher/fish farmer and how to help them obtain more value for their product. Several policy recommendations were similar across a number of countries and are presented below. For more country specific policy recommendations, please visit the Fisheries and Aquaculture Value Chain Website to download more in-depth country reports.

**Policy Recommendation 1: Increased governmental, NGO and private-sector support is a prerequisite for the small-scale fisheries and aquaculture sector to achieve more equitable distribution of benefits.** Though general, this recommendation is a requirement for all other policy recommendations to be feasible and should be targeted in four main areas, including: technical trainings, infrastructure needs, financing, and research and development. In terms of the training and infrastructure area, some examples of needs can be seen in both Ghana and Thailand. In Ghana, it was recommended that national and local government as well as NGOs provide support for educational trainings on international market requirements and certification, hygienic practices and reduced post-harvest losses. Appropriate storage facilities were also noted as being needed. In Thailand, this need for better storage facilities was highlighted as well, particularly for rural markets. With this lack of storage, fish farmers in rural Thailand often have to sell their products in an unfavourable market due to the inability to keep fish preserved until conditions become more favourable.

In terms of financing, the case study in Peru found the need to increase financial support for small-scale fish farmers to help deal with cash-flow constraints and support the development of a comprehensive cold chain distribution as well as a marketing agenda. Though there is currently some governmental training and financial support available there, it was found to be a modest size of public funds that coupled with the bureaucracy involved, limited its accessibility. Research and development for new value added/created products was also an important need, especially in countries where growing economies are opening up new opportunities for seafood products. For instance, in Honduras, the analysis found that producing more value-added products with high quality standards would be key to keep its sector growing and creating new livelihoods. Part of governmental support may also lie in limiting or reducing unnecessary fee systems. In Cambodia, the analysis found that usually all chain actors incur some type of fee during a business transactions, which reduces profit margins and restrict access to the most vulnerable.

**Policy Recommendation 2: Organizational models and agreements should be introduced and supported to help the small-scale sector increase their price negotiation power and share resources.** This recommendation should be led by national governments and international agencies, governments could also be supportive by enacting legislation to incentivize processors and wholesalers to buy from an established and organized model of small-scale fishers or fish farmers. Previous research has confirmed that an organizational model can increase price negotiation power with market intermediaries and help stabilize markets (FAO, 2012b). The case studies presented a range of models that could be used for the sector to become more organized, including: cooperatives, single seller desks and cooperation between actors in the value-chain. The type of model to be adopted was seen as dependent on what would be most beneficial and adaptable to the local context, and it should be noted that organizational models may not be feasible in all environments.

For instance, in the Maldives, the existing structure of the tuna fishery is such that many small-scale fishers are selling to only two processors, which gives the buying power to the latter and allows them to increase their share of profits at the expense of the fishers. It was recommended that they create a single seller operation where all fish are harvested and marketed through a single desk, with prices set in a cooperative manner to benefit both parties. Similarly, in Uganda's small-scale perch sector, the small number of processing firms makes it possible for a single selling desk to represent the interests of the fishers. Even when fish prices were expected to increase due to growing market demand, case studies predicted that fishers/farmers would remain receiving the least benefits, due in part to this disorganisation. One example of this was in Bangladesh, where one analysis projected that the retail price of a local fish (hilsa) was expected to increase by about 5 to 6% annually (Dey *et al.* 2008). However, though fishers were projected to receive some increase in price, retailers were the ones most likely to benefit. Again, it was recommended that hilsa fishers become organised in order to more equally receive their rightful share of expected price increase. In Kenya, where a notable disparity was found for income received from Nile perch when comparing first-hand to export prices, it was recommended that Fish Action Centres be developed, which could provide organizational training for fishers to help them increase their bargaining power as well as provide necessary infrastructure for them, so they are not reliant on a third party. The Kenyan case study also had a unique recommendation in regards to organization; that is, all actors in the value-chain should be engaged in order to address the concept of benefit sharing, which is central to the concept of value-chains themselves. What this engagement would look like remains to be seen, but the concept of bringing all actors together may be an important prerequisite in obtaining fairer pricing for fishers and fish farmers.

One example of this type of engagement that could possibly be replicated is in Peru, where success has been documented in engaging small-scale and industrial actors in the shrimp, scallop and trout farming sectors. A few large trout companies have provided technical assistance and credit to small trout producers, with the small companies then selling their harvest to the large companies for a higher price than they would have been able to obtain otherwise. Agreements observed between them have not been based on formal contracts, but rather on long-term relationships between a buyer (integrated trout

producer) and seller (small-scale trout farmer). As demonstrated in this case of Peru, becoming more organized could also help fishers and fish farmers access new markets. Additionally, cooperatives and single seller desks could help the sector aggregate their catch regularly, allowing them to sell to supermarket chains and institutional markets with a consistent supply of product. Of course, for organization to be feasible and successful goes back to governance; governments must be supportive by enacting legislation to incentivize processors and wholesalers to buy from an established and organized model of small-scale fishers or fish farmers

Many other themes related to achieving fairer pricing for small-scale fishers and fish farmers emerged from the analysis. Some of the main themes included: adopting standard pricing methods, improving technology capabilities and marketing.

**Policy Recommendation 3: Fishers, fish farmers and small-scale traders should be assisted in adopting more consistent pricing methods. Additionally, prices need to be made more transparent and accessible to all chain actors.** This recommendation could be driven by national governments and institutions such as agricultural extension, as well as NGOs, international organizations and development agencies. In many of the developing country case studies, it was found that fish price is dependent on a wide range of variables somewhat out of the control of fishers, such as fish size and bargaining power. This is especially problematic as the most vulnerable populations have the least control over these variables and are left feeling disempowered by their livelihoods. Adopting standard pricing methods locally or even regionally could help producers know what a fair price for their products, help establish more consistency in profits over time and restrict the negotiation power of buyers. Pricing methods could be by weight, bags, hands, or whatever measurement was most accessible to local stakeholders. Trainings in consistent pricing methods and supplies such as weight-scales or other measurement devices could help provide an initial first step. Furthermore, more transparent pricing could lead to a better functioning market with reduced price fluctuations as this information can be used as leverage for actors in their price negotiations. One example of a method for disseminating information on prices is through the radio, as there has been success documented in Mozambique, where the local radio station broadcast fish prices every Friday (GLOBEFISH, 2011).

**Policy Recommendation 4: Provide a policy and financial environment conducive for establishing new small-scale fish farms and adopting appropriate and sustainable farming methods.** Case studies found that this will be crucial to the small-scale aquaculture sector's long term sustainability and should be provided by national governments and international governmental bodies such as FAO. For instance, in Cambodia, it was recommended that appropriate aquaculture technologies for raising snakehead and pangasius be adopted. It was also found that fish farmers need to move towards using pellet feed for fish food instead of low-value fish, deemed "trash" fish. Adopting these practices would reduce fish mortality rates, improve the quality of fish and avoid the depletion of low-value fish, which are highly nutrition and should be promoted for direct human consumption use instead. Additionally, the case study pointed out that more opportunities to establish start up farms are needed. Indeed, it is vital that aquaculture not only support highly consolidated industry, but maintains room for small-scale, diversified fish farms. This recommendation could be partially enabled by providing low-interest loans, access to credit and/or micro-grants to foster investment and start-up farms while encouraging sustainable farming methods by providing funds to help supplement the cost. Of course, careful research is needed when deciding to establish new fish farms. Clearly, land and water availability must be ensured and diligent thought must be given to analyse how the proposed increased competition will impact existing aquaculture farms.

**Policy Recommendation 5: There is a need for an increased focus on promotion and marketing of fish and fishery products, especially in countries that currently have low domestic consumption rates.** Again, national governments could play an important role here as well as local universities, NGOs and FAO. This recommendation stems from a major case study finding indicating that marketing is crucial to not only develop a domestic market for small-scale producers but also to help countries achieve improved food security and nutrition. For many developing countries, marketing is

something that has not been developed at all and has been difficult given the lack of perceived buying power in the domestic market. This perception may be false however; in Honduras, the case study found the local market to have significant potential, and as such recommended that fish be domestically promoted. The study found that the lack of marketing may be one of the major reasons why the domestic market has been unable to expand and explains why a majority of their snapper fish is exported. Some marketing and promotion techniques should be employed by the fishers and fish farmers themselves, such as labelling strategies to denote quality and origin, yet other larger campaigns to increase local consumption is needed by governments as well. Careful research on successful marketing strategies and the costs and benefits to fishers and fish farmers must be conducted.

**Policy Recommendation 6: New markets for the small-scale sector should be researched and developed. In particular, domestic markets in developing countries need to be explored.** Though the analysis demonstrated that international market prices for export products are usually higher than domestic market prices for local consumption, the difference was often substantially less significant than the authors presupposed. In fact, in some cases, the domestic market price was equal to or more lucrative than the international market price. This finding underlies the significant expense of transportation costs when exporting to international markets, making domestic markets at times more profitable. For instance in Honduras, wholesale prices for shrimp were 20% higher than export prices to the European Union from January 2007 to December 2008. This was also found with tilapia fillets, as the domestic market gave an 11% higher price than the US import price. The finding was likely due to the fact that domestic buyers in the country are dominated by restaurants and hotels, which are willing to pay prices similar to the international market prices. The analysis concluded that this finding should be interpreted with caution as the small size of the domestic market somewhat limits the potential for increased sales in the short-term. However, it is a vital finding for the future, as growth in fish consumption is expected to largely be driven by domestic markets in developing countries.

In the analysis in Peru, findings demonstrated that though domestic prices are generally less than export prices, it varies widely within the country. The analysis reported that export prices for anchovies, scallops shrimp and trout were sometimes 50% higher for export prices than domestic wholesale price, however, this difference was found for rural, domestic markets close to aquaculture production centres or fishing ports. Further research found that domestic markets in large cities can actually pay significantly higher prices compared to these rural markets, prices that are much closer to the export price. Nonetheless, a great deal of the production is currently sold in these rural areas as fishers and fish farmers face distributional barriers and thus cannot reap the greatest profit for their catch. Therefore, developing and improving distribution channels is vital in supporting the development of a domestic market. In Kenya, where it was found that small-scale fishers of Nile perch and lobster receive a small fraction of the cost compared to what exporters received, the development of a non-export value-chain was also encouraged as a way to enhance income for small-scale fishers and traders. It was noted that the potential for a domestic and regional fish market is largely unexploited and could also offer an opportunity for new product development. Overall, the potential for producers to better penetrate domestic markets also highlights the need to market and promote local fish consumption.

**Policy Recommendation 7: Better fisheries and aquaculture co-management by national governments must be in place in order to sustain the small-scale value-chain in the long term.** Compared to utilizing a top down management approach, co-management was suggested as including fishers has been an indicator of success in numerous countries. In Cambodia, it was recommended that wild fish stock and other aquatic resources be managed effectively by prohibiting and putting high pressure on all IUU fishing or any activity that harms natural resources in an unsustainable manner. In Uganda, the analysis clearly showed that an open access fisheries policy is not an efficient instrument for governance and is dissipating rent and making the sustainability of the fishery doubtful. Management recommendations also included subsidy reduction and exploring the potential for complimentary livelihood activities. In the Maldives, the analysis found that subsidies for fuel may need to be reduced or avoided as they are currently distorting the economic incentives facing fishers and results in increased

fishing effort above the efficient level of harvesting. Instead, the analysis suggested that it may be prudent to investigate possible complimentary livelihood activities there in order to take pressure off the fishery and sustain its resources for the long-term. Complimentary activities were also suggested in Honduras by promoting fisheries tourism, which could provide diversified income streams and help fisheries where growth is constrained by overfishing. Similar considerations apply to aquaculture in terms of ensuring a sustainable development of the industry and it is important to include fish farmers as stakeholders in this development.

Similarities and differences between the small-scale sector in developing countries and the large-scale sector in developed countries were found when comparing various case studies. Perhaps surprising, given the innate differences between countries and value-chains, there were many similarities. First and foremost, both developed and developing countries are facing the same basic challenge of providing safe food to people who are able and willing to pay, with standards and regulations increasing over time. Both types of markets are composed of a mixture of local and imported fish and fishery products and are made up of a complex array of agents, enterprises and institutions. Retail chains or supermarkets play an important role in fish and seafood retailing in developed country while direct fishermen markets or individual fish mongers are vital for the developing country markets. Institutional markets (hospitals, the armed forces, schools, etc) and the hospitality sector play an important role in most countries, both developed and developing. Finally, it is vital that fisheries in both developed and developing countries are based on sound resource management. Of course there many differences were found as well, particularly the fact that developing countries have significantly less of a focus on processing and marketing, explaining in part the fact that they are mostly exporting raw commodity products. The domestic market is also often less developed, particularly because restaurant and institutional markets are less developed due to lower disposable income. Further, certification and quality assurance requirements for the domestic markets have been poorly applied in many developing countries.

### **Areas for more research**

Overall, this project provides the international development, research, academic, governmental and NGO sectors with a wealth of information. Data collected and findings are particularly significant for small-scale value chains in developing countries, where previously little to no information on their functional mechanisms or price transmission relationships existed.

Lessons learned from the analysis demonstrate excellent entry points for national governments and organizations such as FAO, The International Fund for Agricultural Development, and The World Bank to provide policy support, technical trainings and/or infrastructure. However, the findings also demonstrate an array of areas where further research and analysis is needed. These areas include: the role of trade in local food security and sovereignty, the viability of domestic markets, possibilities for innovative value-chains, the costs and benefits of certification schemes and other marketing tools, organizational models and lastly, methods of co-management.

First and foremost, though the analysis provided an important look at how the small-scale fisheries and aquaculture sector can improve local food security, more overall research is needed. Literature on international trade's impact on food security certainly exists, however, it would be helpful for future research to focus more specifically on small-scale value chains in fisheries and aquaculture, particularly because seafood is one of the most highly traded food commodities in the world with the small-scale sector providing roughly half of the world fish production (FAO, 2012e).

In terms of other areas, more research is needed to explore the potential profitability of the local market in developing countries as well as the level of investment needed to promote domestic production and consumption. Instead of only focusing on international trade, further analysis could build upon this research to demonstrate specific entry points for fishers and fish farmers in their own domestic markets. Identifying viable domestic opportunities is also highly needed in developed countries, where the small-scale fisheries sector is often portrayed as suffering at the cost of low-value imports, rising fuel prices and

increased regulations. However, it is vital for the small-scale sector to move beyond focusing on the negative and instead recognize ways in which they can bring more value to their products. Research in developed countries then should focus on exploring innovative value-chains, in which fishers could create, add and market a unique value in order to obtain higher prices and thereby protect their livelihood. Currently, some methods that are already being conducted but warrant further research include: labeling strategies, certification schemes, local direct sales and promotion of underutilized species.

Additional research is needed to strengthen three other recommendations made in the analysis. First, though a major finding stated a need for increased focus on marketing in the small-scale sector, it is crucial that further analysis is conducted on its costs, benefits and overall trade offs. This is especially true where developing countries aim to access international markets through certification or using other marketing schemes. If costs of the schemes are unknown, it is difficult to realistically quantify the economic benefits of accessing these markets. Second, though a recommendation focused on the need to introduce more organizational models for small-scale fishers and fish farmers, analysis is needed to determine which types of models would be most effective. This analysis will be needed at the national, regional or even local level, as there is no one size fits all approach. Though cooperatives are often cited as a successful organizational model, other agreements such as cooperation between the large and small-scale sector should be explored as well. Analysis of various models could provide examples of best practices, in which success stories where equitable and win-win relationships were highlighted. Furthermore, these success stories could serve as examples to be replicated elsewhere.

Finally, in terms of the final co-management recommendation to sustain the small-scale sector long term, effective methods of co-management need to be explored at the national level to determine which methods can best manage and protect natural fishery resources while involving local stakeholders as well as ensuring a sustainable development of aquaculture. Co-management is especially essential as working with local communities and stakeholders thereby transfers part of the burden of management, control and enforcement to the communities themselves. These communities have impetus to act as they are dependent on these resources for their livelihoods. Though transitioning from top-down management approaches to a new model will take time, political will and resources, this is crucial for the long-term viability of both domestic and international seafood production and trade, regardless of the size of scale.

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