Linkages and Trust in the Value Chain for Small Scale Aquaculture in Asia

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Abstract
The small-scale aquaculture (SSA) sector is recognized as making an important contribution to food security, poverty alleviation and socioeconomic development. A value chain analysis can uncover insights into the linkages and trust within a value chain and constraints and challenges that face the sector. This paper examines the linkages and trust between small-scale aquaculture producers and traders in Asia in order to better understand the constraints and opportunities faced by small-scale producers. The perspective revealed by the value chain analysis provides response strategies that can enhance the sustainability and competitiveness of the entire value chain and the actors that comprise it.

Keywords
Value chain analysis, Asia, small-scale aquaculture

~~1. Introduction~~

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The small-scale aquaculture (SSA) sector is recognized as making an important contribution to food security, poverty alleviation and socioeconomic development. While a definition of small-scale aquaculture is not universally accepted, a definition of SSA was agreed upon at a 2009 FAO workshop held in Nha Trang, Vietnam (Bondad-Reantaso and Prein 2009):

1) systems involving limited investment in assets, some small investment in operational costs, including largely family labor and in which aquaculture is just one of several enterprises (known in earlier classifications as Type 1 or rural aquaculture); and
2) systems in which aquaculture is the principal source of livelihood, in which the operator has invested substantial livelihood assets in terms of time, labor, infrastructure and capital (this was labeled as Type II SSA system).

Common elements characterizing this SSA definition are ownership of, or access to, an aquatic resource; ownership by family or community; and relatively small size of landholding.

Small-scale producers face a variety of constraints including information, fragmentation, technological, market and others (Subasinghe and Philips 2010; Edwards 2013; Bondad-Reantaso and Subasinghe 2013). These constraints cause problems for the small-scale producer to raise productivity and income and move up the value chain to become more competitive enterprises. Small-scale producers often find it increasingly difficult to participate in the more formal value chains due to regulatory requirements (certification and food safety and quality) and find themselves disadvantaged due to their weak linkages with other actors in the value chain and weak bargaining position. The linkages between two actors in the value chain can be beneficial or not to the small-scale producer. An examination of the linkages between the small-scale producer and the trader (primary buyer, processor, wholesaler) can help to identify and understand many of the constraints facing the actors in the value chain.

A value chain analysis can uncover insights into the linkages and trust within a value chain and constraints and challenges that face the sector. Value chain analysis helps effectively to isolate the binding constraints that affect the sector in a systematic manner. The set of issues that emerge from such a detailed analysis at a sector level has implications for both the public and private sectors alike. Some of the issues are sector-specific, and others are relevant across an economy and apply to many sectors and firms in a country. It also provides an opportunity to find policy positions that can be supported by the sector's different actors and important stakeholders.

The purpose of this paper is to examine the linkages and trust between small-scale aquaculture producers and traders in Asia in order to better understand the constraints and opportunities faced by small-scale producers. The perspective revealed by the value chain analysis provides response strategies that can enhance the sustainability and competitiveness of the entire value chain and the actors that comprise it.

~~2.~~ Linkages and Trust in the Value Chain

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The value chain describes the full range of activities required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers and final disposal after use (Kaplinsky and Morris, 2001). A broad approach to value chain analysis starts from the production system of the raw materials and moves along the linkages with other actors and enterprises engaged in trading, processing, assembling, transporting, etc. This broad approach examines all of the activities of a single enterprise, as well as all of the backward and

forward linkages from the raw materials to final consumer (M4P 2008). The concept of value chain includes issues of governance (rules operating in a value chain) and coordination (formal and informal arrangements between actors) and the strategies for linkages and trust between actors in the chain. The conduct of a value chain analysis involves an examination of how the individual actors operate, what is going on between the actors in the chain, what keeps the actors together, what information is shared, what power relationships exist, and how the relationships evolve.

The value chain approach is flexible and mainly a descriptive tool to look at the interactions between different economic agents. Value chain analysis allows for different entry points depending upon the objective of the analysis. As a descriptive tool it has various advantages in so far as it forces the analyst to consider both the micro and macro aspects involved in the production and exchange activities. Commodity-based analysis can provide better insights into the organizational structures and strategies of different actors and an understanding of economic processes often studied only at the global level (often ignoring local differentiation of processes) or at the national/local level (often downplaying the larger forces that shape socio-economic change and policy making). At the heart of the analysis is the mapping of actors and key linkages. The value added of the value chain approach, however, comes from assessing these intra-and interactor linkages through the lens of issues of governance and distributional considerations. By systematically understanding these linkages within a network, one can better prescribe policy recommendations and, moreover, further understand their reverberations throughout the chain.

Value chain coordination is a process in which producers, buyers, service providers, and other actors in the value chain structure their business relationships. Linkages are the specific business relationships between two actors in the value chain (M4P 2008). The linkages can be both formal and informal arrangements between the actors. The informal linkages are usually based on trust between the actors. There may be several different types of linkages operating in a single value chain which have evolved over time to better benefit (or not benefit) the actors. Linkages can be classified as either vertical (relationships between actors along the chain) or horizontal (relationships between actors at the same level of the value chain) (M4P 2008). Understanding the linkages can lead to improvements or upgrading within the value chain.

A toolbook on value chain analysis identified a number of dimensions for analyzing linkages and trust in the value chain (M4P 2008):

1. Do linkages exist?
2. How important are linkages?
3. How many different actors are involved?
4. What is the frequency of contact?
5. What is the level of formality?
6. What are the reasons for having or not having linkages?
7. What are the relative benefits/costs of linkage?
8. What is the level of trust?
9. How long have these linkages existed?
10. How has the formality of the linkages changed or evolved?
11. What is the rate of expansion of linkages over time?

~~3.~~1.Linkages between Small-scale Aquaculture Produces and Traders

The principal linkage for small-scale aquaculture producers in the value chain is with fish traders (market intermediaries, middlemen). Traders can be differentiated according to the services they perform, such as buying, transport, processing, money lending, risk bearing and market information. They can be distinguished by the function they perform such as primary buyer, processor, wholesaler or retailer. The productive role of the trader in providing services advantageous to the producer and in reducing the producer's market risks is often not fully understood. They provide small-scale producers with incentives and access to markets, but they also provide a variety of services to the producers. Traders play necessary roles in the functioning of value chains, such as helping to develop consumer markets, providing financial services and adding value to fishery products. On oc~~e~~casion they bear risks even more so than do the farmers - spoilage, low prices in consumer markers, non-payment of loans - and in the course of trading operations devise means to manage and mitigate such events. This is not to say that there are no unscrupulous traders, for many studies have shown there are those who profit disproportionately and unjustly from the disadvantaged position of small-scale producers in value chains. The margins that they obtain in the markets should be appraised in the light of these risks, as well as the costs they incur and the services they provide.

Linkages between producers and fish traders are well documented in small agricultural production systems, and reciprocal agreement and credit arrangements between the two have been examined for small-scale fisheries (Smith, 1979; Smith *et al., 1980;* Scheid and Sutinen, 1981; Ishak, 1988; Pomeroy, 1989; Bjorndal, Child and Lem 2014). The *suki* relationship in the Philippines, a credit/marketing linkage, is one example. The *suki* relationship exists in agriculture, aquaculture and fishing systems in the country. In its simplest form, it provides the producer with a guaranteed outlet for his fish and access to capital, while providing the trader with a steady supply of fish. When a producer enters into a *suki* relationship, he must sell his fish exclusively to that trader, the purchase price being established by the trader. The trader provides the producer with a wide range of services and the majority of the producers are in debt to the trader. It has been argued by some that the *suki* relationship is exploitive of producers. In cases where credit is extended and a lower purchase price is given, it is felt that oligopolistic control (an imperfect competitive market situation where relatively few buyers handle a large percentage of the fish produced by and purchased from producers and thus can influence the price paid to producers) over the producer exists. Others feel, however, that the potentially large number of traders with whom a producer could establish a *suki* relationship and social and kinship ties within the community exert a modifying influence over oligopolistic tendencies. In a study in the Philippines of small-scale fishers, Pomeroy (1989) found that traders did not exploit *suki* fishers, and that the lower price paid to the *suki* fishers reflected a competitive charge for the services provided. Factors that were found to inhibit or reduce the level of fisher exploitation included social and kinship ties, the beneficial nature of the relationship to both parties, fear of entry of new traders and the existence of a relatively large number of non-*suki* fishers in the area.

However, traders can be the source of many of the constraints faced by small-scale aquaculture producers, such as weak bargaining power and poor marketing strategies, monopolies among traders, poor product-holding infrastructure, difficulties meeting quality standards, and lack of market information. With specialized traders, producers often have little, if any, control over

marketing outlets and the prices that they receive. Women producers face additional gender-related barriers including lack of access to credit and technology, increased dependence as well as a lack of representation in local decision-making related to aquaculture and other livelihood opportunities. Low incomes create a situation of potential dependence that influences decisions about production and marketing by the producer. This dependency may become a motive to undermine compliance with formal resource governance institutions. Relations and potential inequalities between producers and traders point to the need to find ways to address these issues in order to increase the return received by producers. This requires a better understanding of farmer-trader linkages and how these linkages affect decisions about production, resource use, markets and ecological outcomes.

A more nuanced approach needs to be applied in terms of analyzing the benefits and costs of confronting or collaborating with particular traders and in developing linkages where traders can be partners rather than adversaries in the value chain. One way of differentiating between 'good' and 'bad' traders is to look at their behavior in relation to other chain actors (especially small producers) - are they working towards the development of long-term relationships with both suppliers and buyers? Do they refrain from short-term speculative activities that tend to 'degrade' value chains, i.e. reduce stability and profitability over the long term? Do they facilitate the flow and sharing of market information to the benefit of their partners in the value chain?
One of the main challenges in value chain intervention is to facilitate the transformation of 'bad' traders into 'good' traders by generating respect among chain actors sufficient for the emergence of mutually beneficial chain partnerships.

~~4.~~ Country Case Studies

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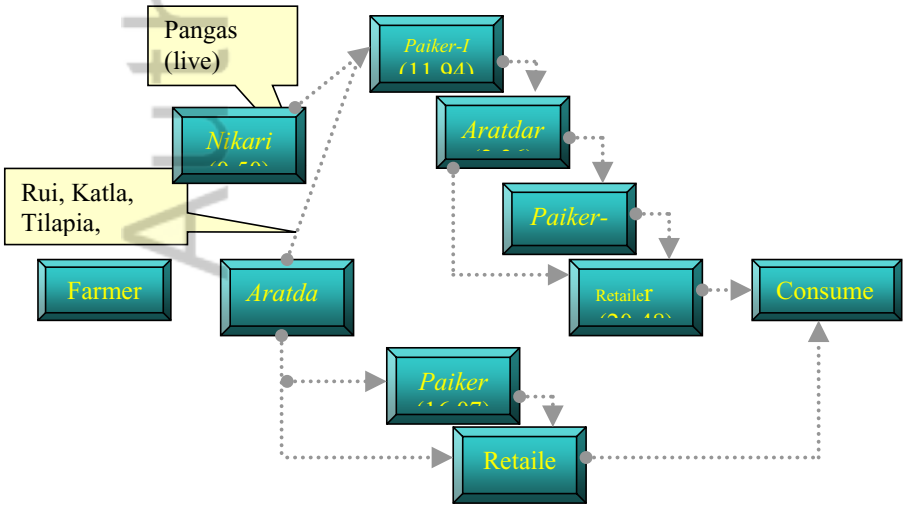
~~4.1~~ Bangladesh

The value chain of major carps, pangas, and tilapia in Bangladesh are generally long and complex with many intermediaries between producers and final consumers of fish products (Figure 1). The involvement of many intermediaries keeps producers and markets separated not allowing them to be market responsive (Alam et al. 2012). Fish sold in a particular market may originate through more than one channel. Fish purchased by consumers in Bangladesh mostly consists of the primary product, with limited value added marketing services. The bulk of the fish sold in the markets is unprocessed.

Figure 1: Value chains of major carps, pangas and tilapia in Bangladesh



Source: Alam et al. 2012

Fish farmers are the suppliers of fish to the market. *Nikari* (informer) is a middleman who does not have the ownership of the product but establishes a bridge between buyers and sellers and receives a commission from the farmer. *Paiker* handles large volumes of fish. They purchase fish from fish farmers at the farm or through the *aratdar* in the local market and sell them to the retailers through the *aratdar* or commission agent in the secondary market. *Aratdars* negotiate sales of fish on behalf of the producers/seller. *Aratdars* arrange selling of fish through an auctioning system and receive a commission. Retailers, the last intermediaries of the fish marketing channel, do not have any permanent establishment but they have fixed places to sit in the market places or wander with *hari* (aluminium pot) on their head from door to door. The longest aquaculture value chain involves seven intermediaries for live Pangas (input suppliers, fish farmer, *nikari*, *paiker*, *aratdar*, retailer and consumer). Two value chains identified for carps and tilapia involve six intermediaries (input suppliers, fish farmer, *aratdar*, *paiker*, retailer and consumer) and five intermediaries (input suppliers, fish farmer, *aratdar*, retailer and consumer), respectively (Alam et al. 2012).

These actors in the value chain are interrelated and cooperate with each other. The life-force of the cooperation is the flow of informal money through moneylending (*dadan*). *Aratdars* often act as a supplier of *dadan,* cash as loans to farmers, in return for buying the fish at a pre-fixed price, which may be well below the market level. Who provides credit to whom and the contract between them operates on the principle of 'advance purchase or sale' of the product. Other issues such as rate of the product, seasonal price variation, or interest rate of moneylending depends on the relationship between the parties, their level of trust and how long the different actors have worked together.

Farmers sell 5-12% of rohu, catla, and tilapia directly to *paikers* and 85-95% is passed on to the *aratdar* and subsequently purchased by the *paiker*. Only a small portion is sold directly to retailers. For pangas, farmers sell 54% to the *paiker* directly, 46% indirectly to *paiker* via *aratdar,* and only 3% to retailers. Marketing functions include grading, storage, transport, financing, market information and packaging. Farmers, *aratdar*, and *paiker* practice open bargaining, auction and going market prices methods for fixing the price of their products in varying degree. Retailers follow open bargaining for selling their fish to consumers.

Fish seed trading is an important value-added function, especially for small-scale tilapia farmers in the southern region of Bangladesh. Fry traders (locally called *patilwalas*) play an important role in providing information to the producers on farming of tilapia. These traders buy from the hatcheries in bulk and sell to the producers (Apu 2014).

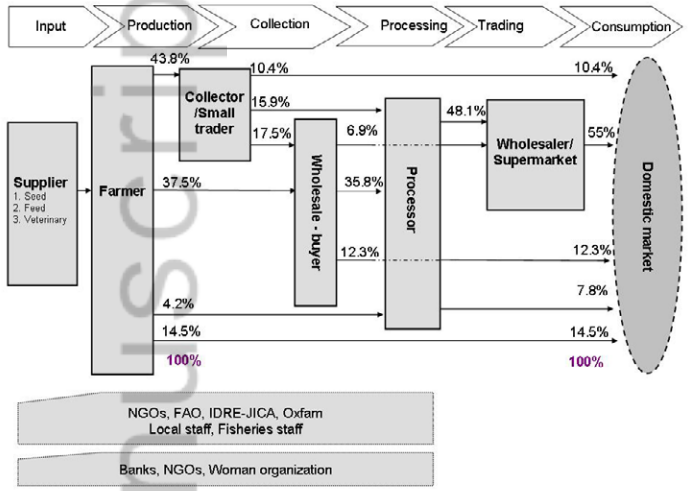
4.2 Cambodia

Aquaculture contributes about 10 percent of the total inland fish catch in Cambodia. A The aquaculture is considered to have the great potential for increasing fish production in Cambodia. Small-scale aquaculture is undertaken in floating cages and ponds. Fish culture in floating cages is believed to be an age--old practice in the Lower Mekong basin and it originated in and around the Great Lake Tonle Sap area of Cambodia. Cage culture is a unique system, in which fish are cultured in cages during the dry season, when water levels are low, and transferred to floating cages when the water level rises during the wet season. Cage culture is practiced in floating villages in the Mekong river system: in the Great Lake Tonle Sap, the Tonle Sap Rriver, the Mekong Rriver and Bassac Rriver. Most cage culture involves the culture of indigenous species; the major species being *Pangasius* cCatfish, in particular *Pangasius sSutchi,* and the Giant Snakehead *Chana mMicropeltes* (Vo et al. 2009; Hap 2011).

Six actors in the value chain for aquaculture include a general group of input suppliers (feed, hatchery farmers and veterinary supplies);; both -grow out and hatchery farmers;; traders such as collectors, wholesalers and retailers; processing actors, responsible for processing fish into marketable products and trading them to retail markets (Vo et al. 2009; Hap 2011) (Figure 2). There is some variation in the role of the actors depending on whether fish were destined for domestic or international markets. There are small- and medium-scale fish collectors/traders who collect fish from producers and fishers and sell it to wholesalers who distribute it to different places. The wholesalers/distributors are the main traders. Small--scale fish processors process the fish into such forms as fish paste, fish sauce, dried salted fish, and smoked fish primarily for domestic consumption. The retailers are sell ing fish directly to the consumers. The producers, collectors and local fish processors operated without any organized information system regarding prices, market demand or annual catch volumes.

Fish collectors buy fish, directly or through their network, from aquaculture producers and fishers. Collectors set prices for the fish depending on fish quality, the supply situation and daily fish market demand. Fish collectors have capital for immediate cash payment to producers and fishers; however, they often provide credit in the form of cash and in kind (e.g. equipment and gear). Producers receive informal support from traders with preservation technologies, including ice and cool-boxes. In return these traders bought all of their fish and did not permit the producers and fishers to sell to other buyers. The quasi-credit schemes that underlie the value chains in Cambodia may restrict bargaining power of producers, but it can also enable access to credit that is largely unattainable for landless and poor producers. Some collectors also obtainget loans from wholesalers, middlemen and exporters. Wholesalers tend to represent an important part of the marketing chain, in which often major quantities of fish are often channeled through them. In the case of Cambodia, they are best compared with fish distributors who have a permanent fish stall at a fish-landing site, a floating village or at a distribution center. They may buy fish from aquaculture producers, fishers, lot owners, collectors or middlemen and re-sell it to exporters, retailers or restaurant owners. Semi-wholesalers are those fish traders who have a permanent stall inside/outside a market, whereby fish is brought by middlemen or wholesalers and sold to them at the market. Semi-wholesalers act sometime as retailers, but they usually have an additional function in distributing fish to small retailers who sell fish at local markets directly to consumers and processors.

Figure 2: Value chain for catfish and snakehead in Cambodia

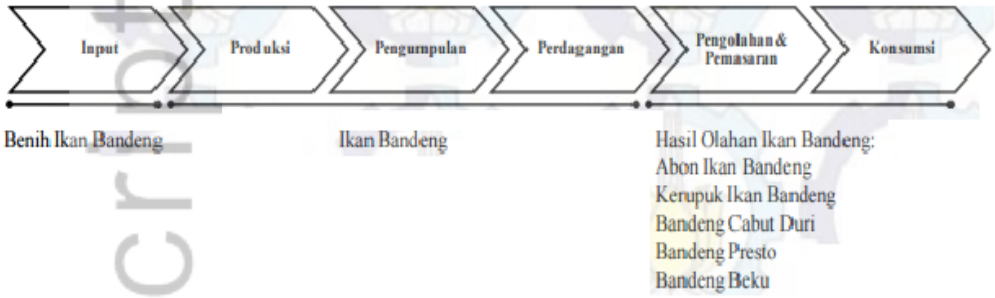


Source: Hap 2011

~~4.3~~ Indonesia

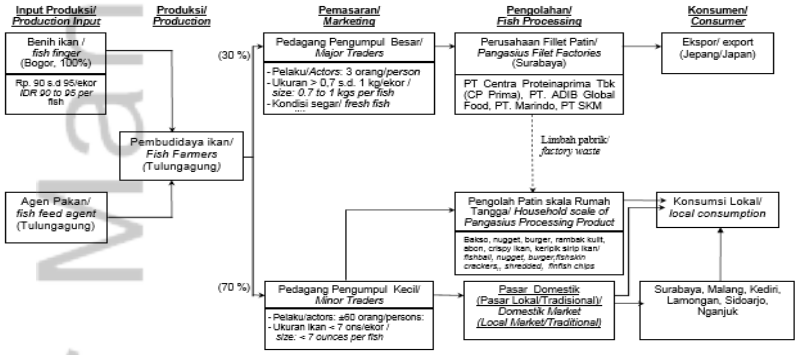
Small-scale producers in Indonesia usually have a single buyer for their fish, while larger scale producers usually target more varied buyers~~;~~ hence they have more diverse value chains (Antarbangsa, 2014; Ardjosudiro & Goetz, 2007; Judi et al, 2014; Katalis, 2015; Khotimastuti, 2012; Maharani & Hafsaridewi, 2014; Muliono et al, 2015, Sari et al, 2014; Warela, 2015; Wibowo, 2014; Widodo et al, 2013; Yulisti & Maharani, 2013; Yulisti et al, 2012). The common traders in the value chains are input suppliers, fish farmers (aquaculture producer), first middlemen (*pengepul*), second middlemen (*juragan*), retailers (*penjaja / papalele / jibu-jibu*), consumers and exporters (Figs.~~gure~~ 3 and 4) (Judi et al, 2014; Katalis, 2015; Khotimastuti, 2012; Maharani & Hafsaridewi, 2014; Warela, 2015; Wibowo, 2014; Yulisti et al, 2012). Cultured carp, milkfish, catfish (*clarias*), tilapia and pangasius are primarily marketed domestically (Antarbangsa, 2014; Muliono et al, 2015, Sari et al, 2014; Wibowo, 2014; Yulisti & Maharani, 2013; Yulisti et al, 2012).

Figure 3: Value chain for milkfish in Indonesia



Source: Kresnawati 2012

Figure 4: Value chain for *Pangasius* in Indonesia



Gambar 2. Rantai Pasok *(Supply Chain)* Ikan Patin di Kabupaten Tulungagung
Figure 2. Pangasius Supply Chain at Tulungagung District

175

Source: Putri 2013

For small-scale producers in Indonesia, aquaculture inputs are, in most cases, dominated by those who have a strong financial capacity, i.e., *juragan*. A *juragan* lends cash or input materials and buys the product from producers, all of which are priced in favor of the *juragan* (Widodo, 2013; Wibowo, 2014; Yulisti & Maharani, 2013). The j*uragan,* in most cases, also provides producers with the necessary seeds; but instead of quality seeds, the ones delivered by a *juragan* usually are low quality products. This problem is often related to the fact that raising, rearing, and farming locations are located far away from the breeding and hatching centers. The juragan is also reported to be able to gain large profit through control of market information on price and demand in various markets and uses this knowledge to control the prices paid to producers (Katalis, 2015; Yulisti et al, 2012). Information on prices of different grades or quality classes of

fish are usually known only by a few market players, such as the first middlemen (*pengepul*) and second middlemen (*juragan*) (Katalis, 2015; Yulisti et al, 2012). Additional profits from a piece of fish can also be earned by traders through selling fish by parts. In Indonesia, some 'normally inedible parts' have economic value; the per-kilo price of such parts as fish head, fins, skin or even fish offal are often higher than that of the meat.

Exclusive linkages exist and can prevent products from entering the market. A common form of linkage is where a *juragan* establishes outlets, called 'freezer points', through which products affiliated with the *juragan* are sold. This linkage is usually so rigid that no external product has a chance to participate in the market. Supermarkets are another market channel that exists for selling fish and fish products in Indonesia, but again, due to linkages of the *juragan*, the products of small-scale producers have a difficult time to enter these markets (Katalis, 2015; Yulisti et al, 2012).

~~4.4~~ Myanmar

Inland (freshwater) fish farming is responsible for 95% of Myanmar's reported aquaculture. The greatest concentrations of ponds are reportedly found in an area of floodplain located approximately 25-50 km west of Myanmar's largest city, Yangon, the primary market for much of the cultured fish produced (Belton et al. 2015). Freshwater aquaculture is concentrated in a single type of fish, the indigenous carp, *rohu*, which constitutes roughly 70% of all farmed fish. Other species, such as pangasius catfish and tilapia, are only produced in small quantities. The aquaculture sector in Myanmar tends to be split between small farms, primarily family managed and owned catering to family and local demands; and large farms, often vertically integrated, catering to the export markets, and accounting for well over half of the total pond area (Driel and Nauta, 2013; Edwards et al. 2005; Johnstone et al. 2012; FAO & NACA, 2003). The distribution of aquaculture farm sizes in Myanmar ranges from one in which~~in which~~ 42% of the farm area is accounted for by farms under 20 acres (comprising 90% of all farms), 23% by medium-~~-~~sized farms of 20-100 acres, and 35% is occupied by just 1.2% of farms over 100 acres in size.

Marketing segments of the aquaculture value chain have few actors, and are geographically moderate or long. The vast majority of farmed fish produced is traded through San Pya wholesale market. A second fish wholesale market, Shwe Padauk, recently opened further from San Pya. There are four major categories of buyer from wholesale markets in Yangon: 1) wholesalers in distant urban markets; 2) retailers and semi-wholesalers located in and around Yangon; 3) cold storages/processors/exporters in Yangon; and 4) small-scale processors based around at San Pya (these are by far the smallest group in terms of the volume of trade they account for).

Producers sell fish to Yangon in one of two ways: 1) through local collectors; and 2) directly to traders at San Pya or Shwe Padauk. Most of the farmed fish traded through Yangon markets is sold without the involvement of an intermediary. Producers who have taken advances from fish traders are bound to sell all their fish through those traders. Those who are not indebted to traders are free to choose to whom they wish to sell, but often opt to work with one or a small number of trusted individuals. Local collectors provide harvesting services or purchase fish already harvested, and may either buy fish to resell to larger traders in Yangon or earn a commission through brokering sales on the farmer's~~'~~ behalf. Collectors tend to provide this service to smaller

farms, because large traders in Yangon will only arrange collections of fish from farms if the quantity harvested exceeds 16 tons (the capacity of a small collecting boat). Some small producers choose to sell direct to wholesalers in Yangon using their own or hired transport, receiving a better price than if selling through collectors, but incurring transport costs.

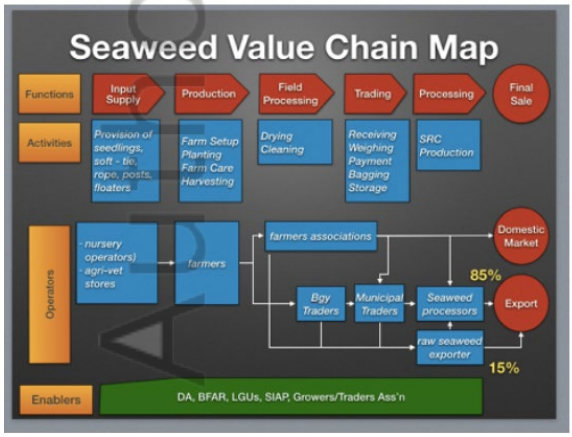
The availability of formal credit in general, and of formal agricultural credit in particular, has been extremely limited in Myanmar historically, and the rates of interest paid on informal loans, utilized by small farmers, are consequently extremely high. Small-scale producers are usually financed from a combination of their own savings, informal loans from relatives (both with and without interest) and informal moneylenders (at between 3-6% per month, depending on terms). Small-scale producers reported receiving fingerlings on credit from traders.

~~4.5~~ Philippines

Seaweed production in the Philippines is carried out primarily by small-scale producers. A large production area is located in the Central Visayas region of the Philippines, in the provinces of Bohol and Guimaras, with the processors in Cebu (Department of Agriculture 2015). Figure 5 shows the value chain map for seaweed in the study sites.

The key actors in the value chain are the input suppliers (source of seedlings and soft tie), the seaweed producers (grow seaweed~~s~~ and dry it~~them~~ before selling), the traders, the processors, and the exporters. Small traders purchase the dried seaweed from the producers and consolidate the raw dried seaweed (RDS) at the village level. The traders have their regular suppliers and buyers of RDS and own drying platforms and storage facilities. The traders provide financing to seaweed producers and allow them to use their drying platforms for free. The traders ship the RDS to processors in Cebu. The processors do not buy directly from seaweed producers as there are many consolidators operating in the area, and they want to avoid disruption of relations. Processors have buying stations where they buy the RDS from traders. The processors process it into alkali chips and semi-refined and refined carrageenan that is exported mainly to Europe. The RDS is exported to China and Korea.

Figure 5: Value chain for seaweed in Philippines

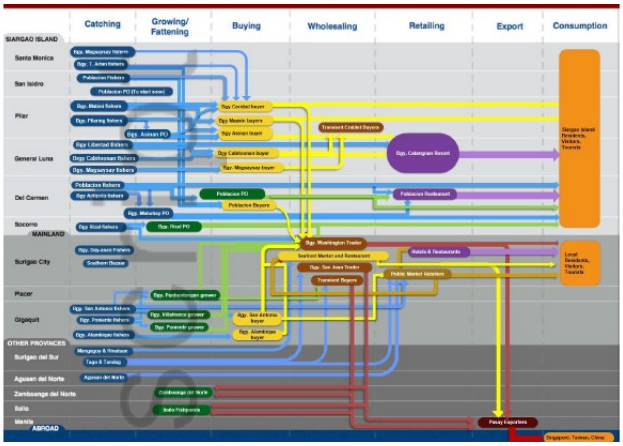


Source: Department of Agriculture 2015

The mud crabs from the province of Surigao del Norte are of high quality due to the natural environment from where the mud crabs are caught and harvested (ECOFISH 2015). Mud crabs are utilized not only for the export-sized adult mud crabs, but the crablets are used for rearing in fishponds outside of the province as well. There are six actors in the value chain: catching (catchers), growing/fattening (producer/fattener), buying (buyers), wholesaling (wholesaler), retailing (retailer), and exporting (exporter) (Figure 6). Adult mud crabs of export quality are harvested by catchers from the wild, sold to buyers, then sold to wholesalers, and when the wholesaler has accumulated enough volume of mud crabs required by exporters, they are shipped to Manila to be exported to neighboring Asian countries such as Singapore, Taiwan and China. Crablets, undersized and thin mud crabs, however, are sold to produ~~c~~ers/fatteners for rearing in ponds to reach export size and quality, before they are sold to buyers or wholesalers, to be sold to exporters eventually. The mud crabs from Surigao del Norte are generally exported, and very small volume of crabs are left for local consumption.

Transactions within the chain are based only on trust and with no formal or written agreement between or among the actors. Catchers regularly supply mud crabs to producers/fatteners, buyers, wholesalers and retailers based on trust and long-running business relationships. A buyer in Pilar, in Siargao Island, provides bait to local catchers while the catchers turn their harvested mud crabs over to the buyer, with no formal agreement or written contract. They have been under such business arrangements for years based only on trust. Buyers provide emergency loans to catchers and growers/fatteners, and in some cases supply bait to catchers, to ensure the commitment of catchers to supply mud crabs. For the "transient" buyers, catchers and growers/fatteners transact business with them primarily because "transient" buyers offer very competitive prices. Their alleged direct links to exporters in Manila give them more flexibility in transacting with local suppliers of live mud crabs. Their connection with exporters allegedly is also based on trust and with no formal or written agreement.

Figure 6. Value chain for mudcrab in Philippines



Source: ECOFISH 2015

~~5.~~ Discussion

As the case studies illustrate, linkages, both formal and informal, exist and are an important aspect of the business relationship between actors in the small-scale aquaculture value chain in Asia. The majority of these linkages are vertical linkages between actors in the value chain. The linkages are primarily with actors in the next stage of the value chain (for example, producers with primary buyers or collectors) and there is limited interaction with actors farther up the value chain (for example, producers with wholesalers). Some of the producer linkages were horizontal linkages through producer group/organizations/cooperatives, such as the mud crab association in the Philippines. Most of the value chains are relatively short with few actors, anywhere between four and six actors. While small-scale producers may have infrequent contact with a buyer, only during a few harvests during the year, the other actors higher in the value chain have more frequent contact with each other as they purchase fish from multiple producers and at different times. In almost all cases, the level of formality of the linkage is informal, although there seems to be some to complete level of trust between the actors in the cases, leading to a more efficient linkage. Most of the linkages seemed to be based on an oral agreement between the actors rather than a formal contract. However, trust of producers with a buyer may be limited due to limited price information and bargaining power. None of the case studies provided information on the length of time of the linkages, as this information can allow for a better understanding of trust between actors, or on the dynamics of the linkage in terms of how it may have changed or evolved or the rate of expansion over time. The reason for and benefit of the linkage is primarily financial in terms of access to capital for investment and operation or for family needs. Other reasons for the linkage are to obtain a regular supply of fish, market information and knowledge and/or services (ice, transportation, inputs) needed for the business. In most cases, power in the value chain is held by those further up the chain, such as wholesalers, who have key assets such as capital, market information, knowledge and personal relationships with other traders. None of the case studies provided information on indexes of concentration (share of purchase or sale volume, share of total producers) of actors, which can serve as an important indicator of power distribution in the value chain. The number and size of the competitors at a particular stage of the value chain can have important consequences for other actors in the chain. A dominant actor at one stage in the chain can place many demands on smaller actors with many competitors.

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~~6.~~ Conclusions

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Strengthening the linkages between the different actors in the value chain will allow for addressing the constraints facing the actors and upgrading the value chain. Value chain analysis can highlight the role of governance in the value-chain, that is, the structure of relationships and coordination mechanisms, linkages and trust, which exist between actors. By focusing on these linkages, it is possible to identify the mechanisms that may need to be targeted to improve capabilities in the value-chain, remedy distributional distortions, and increase value-added in the sector. Value chain analysis can also be used to examine the role of upgrading within the chain. Upgrading can involve (i) process upgrading of the efficiency of production, (ii) product upgrading of new or improved products, such as improvements in quality to gain higher-value or through diversification in the product, and (iii) functional upgrading of activities and linkages. Governance issues play a key role in any upgrading possibilities occurs. The structure of linkages in the value chain can shape and influence the environment in which upgrading can take place. In examining any upgrading option, it will be important to look at the impact of the upgrade throughout the whole value chain.

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Linkages and Trust in the Value Chain for Small Scale Aquaculture in Asia

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Abstract
The small-scale aquaculture (SSA) sector is recognized as making an important contribution to food security, poverty alleviation and socioeconomic development. A value chain analysis can uncover insights into the linkages and trust within a value chain and constraints and challenges that face the sector. This paper examines the linkages and trust between small-scale aquaculture producers and traders in Asia in order to better understand the constraints and opportunities faced by small-scale producers. The perspective revealed by the value chain analysis provides response strategies can enhance the sustainability and competitiveness of the entire value chain and the actors that comprise it.

Keywords
Value chain analysis, Asia, small-scale aquaculture

1. Introduction

The small-scale aquaculture (SSA) sector is recognized as making an important contribution to food security, poverty alleviation and socioeconomic development. While a definition of small-scale aquaculture is not universally accepted, a definition of SSA was agreed upon at a 2009 FAO workshop held in Nha Trang, Vietnam (Bondad-Reantaso and Prein 2009):

1) systems involving limited investment in assets, some small investment in operational costs, including largely family labor and in which aquaculture is just one of several enterprises (known in earlier classifications as Type 1 or rural aquaculture); and
2) systems in which aquaculture is the principal source of livelihood, in which the operator has invested substantial livelihood assets in terms of time, labor, infrastructure and capital (this was labeled as Type II SSA system).

Common elements characterizing this SSA definition are ownership of, or access to, an aquatic resource; ownership by family or community; and relatively small size of landholding.

Small-scale producers face a variety of constraints including information, fragmentation, technological, market and others (Subasinghe and Philips 2010; Edwards 2013; Bondad-Reantaso and Subasinghe 2013). These constraints cause problems for the small-scale producer to raise productivity and income and move up the value chain to become more competitive enterprises. Small-scale producers often find it increasingly difficult to participate in the more formal value chains due to regulatory requirements (certification and food safety and quality) and find themselves disadvantaged due to their weak linkages with other actors in the value chain and weak bargaining position. The linkages between two actors in the value chain can be beneficial or not to the small-scale producer. An examination of the linkages between the small-scale producer and the trader (primary buyer, processor, wholesaler) can help to identify and understand many of the constraints facing the actors in the value chain.

A value chain analysis can uncover insights into the linkages and trust within a value chain and constraints and challenges that face the sector. Value chain analysis helps effectively to isolate the binding constraints that affect the sector in a systematic manner. The set of issues that emerge from such a detailed analysis at a sector level has implications for both the public and private sectors alike. Some of the issues are sector-specific, and others are relevant across an economy and apply to many sectors and firms in a country. It also provides an opportunity to find policy positions that can be supported by the sector's different actors and important stakeholders.

The purpose of this paper is to examine the linkages and trust between small-scale aquaculture producers and traders in Asia in order to better understand the constraints and opportunities faced by small-scale producers. The perspective revealed by the value chain analysis provides response strategies can enhance the sustainability and competitiveness of the entire value chain and the actors that comprise it.

2. Linkages and Trust in the Value Chain

The value chain describes the full range of activities required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers and final disposal after use (Kaplinsky and Morris, 2001). A broad approach to value chain analysis starts from the production system of the raw materials and moves along the linkages with other actors and enterprises engaged in trading, processing, assembling, transporting, etc. This broad approach examines all of the activities of a single enterprise, as well as all of the backward and

forward linkages from the raw materials to final consumer (M4P 2008). The concept of value chain includes issues of governance (rules operating in a value chain) and coordination (formal and informal arrangements between actors) and the strategies for linkages and trust between actors in the chain. The conduct of a value chain analysis involves an examination of how the individual actors operate, what is going on between the actors in the chain, what keeps the actors together, what information is shared, what power relationships exist, and how the relationships evolve.

The value chain approach is flexible and mainly a descriptive tool to look at the interactions between different economic agents. Value chain analysis allows for different entry points depending upon the objective of the analysis. As a descriptive tool it has various advantages in so far as it forces the analyst to consider both the micro and macro aspects involved in the production and exchange activities. Commodity-based analysis can provide better insights into the organizational structures and strategies of different actors and an understanding of economic processes often studied only at the global level (often ignoring local differentiation of processes) or at the national/local level (often downplaying the larger forces that shape socio-economic change and policy making). At the heart of the analysis is the mapping of actors and key linkages. The value added of the value chain approach, however, comes from assessing these intra-and interactor linkages through the lens of issues of governance and distributional considerations. By systematically understanding these linkages within a network, one can better prescribe policy recommendations and, moreover, further understand their reverberations throughout the chain.

Value chain coordination is a process in which producers, buyers, service providers, and other actors in the value chain structure their business relationships. Linkages are the specific business relationships between two actors in the value chain (M4P 2008). The linkages can be both formal and informal arrangements between the actors. The informal linkages are usually based on trust between the actors. There may be several different types of linkages operating in a single value chain which have evolved over time to better benefit (or not benefit) the actors. Linkages can be classified as either vertical (relationships between actors along the chain) or horizontal (relationships between actors at the same level of the value chain) (M4P 2008). Understanding the linkages can lead to improvements or upgrading within the value chain.

A toolbook on value chain analysis identified a number of dimensions for analyzing linkages and trust in the value chain (M4P 2008):

1. Do linkages exist?
2. How important are linkages?
3. How many different actors are involved?
4. What is the frequency of contact?
5. What is the level of formality?
6. What are the reasons for having or not having linkages?
7. What are the relative benefits/costs of linkage?
8. What is the level of trust?
9. How long have these linkages existed?
10. How has the formality of the linkages changed or evolved?
11. What is the rate of expansion of linkages over time?

3. Linkages between Small-scale Aquaculture Produces and Traders

The principal linkage for small-scale aquaculture producers in the value chain is with fish traders (market intermediaries, middlemen). Traders can be differentiated according to the services they perform, such as buying, transport, processing, money lending, risk bearing and market information. They can be distinguished by the function they perform such as primary buyer, processor, wholesaler or retailer. The productive role of the trader in providing services advantageous to the producer and in reducing the producer's market risks is often not fully understood. They provide small-scale producers with incentives and access to markets, but they also provide a variety of services to the producers. Traders play necessary roles in the functioning of value chains, such as helping to develop consumer markets, providing financial services and adding value to fishery products. On occasion they bear risks even more so than do the farmers - spoilage, low prices in consumer markers, non-payment of loans - and in the course of trading operations devise means to manage and mitigate such events. This is not to say that there are no unscrupulous traders, for many studies have shown there are those who profit disproportionately and unjustly from the disadvantaged position of small-scale producers in value chains. The margins that they obtain in the markets should be appraised in the light of these risks, as well as the costs they incur and the services they provide.

Linkages between producers and fish traders are well documented in small agricultural production systems, and reciprocal agreement and credit arrangements between the two have been examined for small-scale fisheries (Smith, 1979; Smith *et al., 1980;* Scheid and Sutinen, 1981; Ishak, 1988; Pomeroy, 1989; Bjorndal, Child and Lem 2014). The *suki* relationship in the Philippines, a credit/marketing linkage, is one example. The *suki* relationship exists in agriculture, aquaculture and fishing systems in the country. In its simplest form, it provides the producer with a guaranteed outlet for his fish and access to capital, while providing the trader with a steady supply of fish. When a producer enters into a *suki* relationship, he must sell his fish exclusively to that trader, the purchase price being established by the trader. The trader provides the producer with a wide range of services and the majority of the producers are in debt to the trader. It has been argued by some that the *suki* relationship is exploitive of producers. In cases where credit is extended and a lower purchase price is given, it is felt that oligopolistic control (an imperfect competitive market situation where relatively few buyers handle a large percentage of the fish produced by and purchased from producers and thus can influence the price paid to producers) over the producer exists. Others feel, however, that the potentially large number of traders with whom a producer could establish a *suki* relationship and social and kinship ties within the community exert a modifying influence over oligopolistic tendencies. In a study in the Philippines of small-scale fishers, Pomeroy (1989) found that traders did not exploit *suki* fishers, and that the lower price paid to the *suki* fishers reflected a competitive charge for the services provided. Factors that were found to inhibit or reduce the level of fisher exploitation included social and kinship ties, the beneficial nature of the relationship to both parties, fear of entry of new traders and the existence of a relatively large number of non-*suki* fishers in the area.

However, traders can be the source of many of the constraints faced by small-scale aquaculture producers, such as weak bargaining power and poor marketing strategies, monopolies among traders, poor product-holding infrastructure, difficulties meeting quality standards, and lack of market information. With specialized traders, producers often have little, if any, control over

marketing outlets and the prices that they receive. Women producers face additional gender-related barriers including lack of access to credit and technology, increased dependence as well as a lack of representation in local decision-making related to aquaculture and other livelihood opportunities. Low incomes create a situation of potential dependence that influences decisions about production and marketing by the producer. This dependency may become a motive to undermine compliance with formal resource governance institutions. Relations and potential inequalities between producers and traders point to the need to find ways to address these issues in order to increase the return received by producers. This requires a better understanding of farmer-trader linkages and how these linkages affect decisions about production, resource use, markets and ecological outcomes.

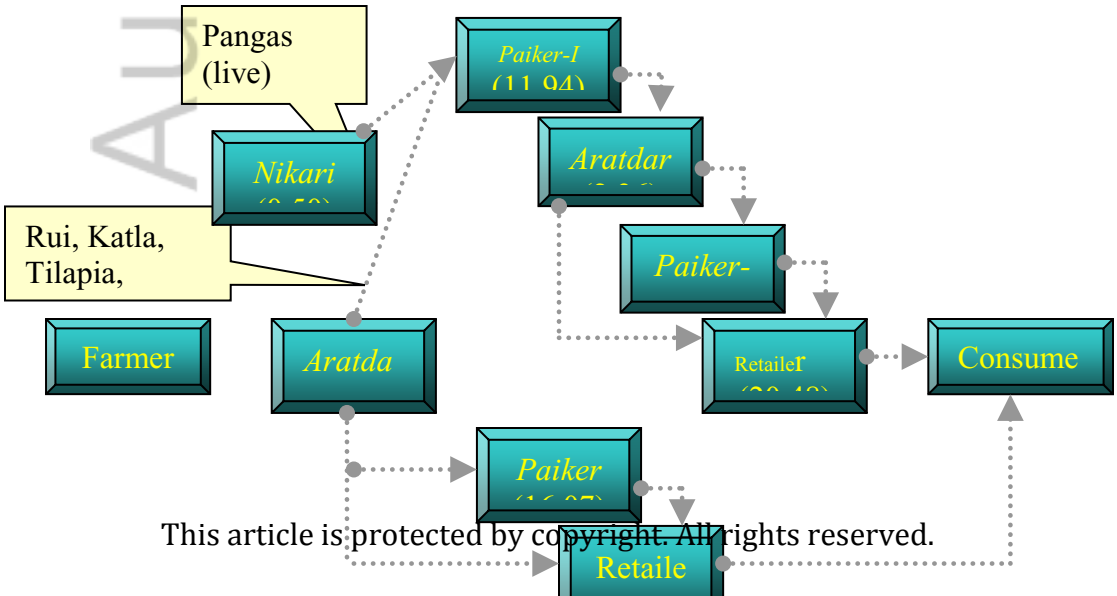
A more nuanced approach needs to be applied in terms of analyzing the benefits and costs of confronting or collaborating with particular traders and in developing linkages where traders can be partners rather than adversaries in the value chain. One way of differentiating between 'good' and 'bad' traders is to look at their behavior in relation to other chain actors (especially small producers) - are they working towards the development of long-term relationships with both suppliers and buyers? Do they refrain from short-term speculative activities that tend to 'degrade' value chains, i.e. reduce stability and profitability over the long term? Do they facilitate the flow and sharing of market information to the benefit of their partners in the value chain?
One of the main challenges in value chain intervention is to facilitate the transformation of 'bad' traders into 'good' traders by generating respect among chain actors sufficient for the emergence of mutually beneficial chain partnerships.

4. Country Case Studies

4.1 Bangladesh

The value chain of major carps, pangas, and tilapia in Bangladesh are generally long and complex with many intermediaries between producers and final consumers of fish products (Figure 1). The involvement of many intermediaries keeps producers and markets separated not allowing them to be market responsive (Alam et al. 2012). Fish sold in a particular market may originate through more than one channel. Fish purchased by consumers in Bangladesh mostly consists of the primary product, with limited value added marketing services. The bulk of the fish sold in the markets is unprocessed.

Figure 1: Value chains of major carps, pangas and tilapia in Bangladesh



Source: Alam et al. 2012

Fish farmers are the supplier of fish to the market. *Nikari* (informer) is a middleman who does not have the ownership of the product but establishes a bridge between buyers and sellers and receives a commission from the farmer. *Paiker* handles large volumes of fish. They purchase fish from fish farmers at the farm or through the *aratdar* in the local market and sell them to the retailers through the *aratdar* or commission agent in the secondary market. *Aratdars* negotiate sales of fish on behalf of the producers/seller. *Aratdars* arrange selling of fish through an auctioning system and receive a commission. Retailers, the last intermediaries of the fish marketing channel, do not have any permanent establishment but they have fixed places to sit in the market places or wander with *hari* (aluminium pot) on their head from door to door. The longest aquaculture value chain involves seven intermediaries for live Pangas (input suppliers, fish farmer, *nikari*, *paiker*, *aratdar*, retailer and consumer). Two value chains identified for carps and tilapia involve six intermediaries (input suppliers, fish farmer, *aratdar*, *paiker*, retailer and consumer) and five intermediaries (input suppliers, fish farmer, *aratdar*, retailer and consumer), respectively (Alam et al. 2012).

These actors in the value chain are interrelated and cooperate with each other. The life-force of the cooperation is the flow of informal money through moneylending (*dadan*). *Aratdars* often act as a supplier of *dadan,* cash as loans to farmers, in return for buying the fish at a pre-fixed price, which may be well below the market level. Who provides credit to who and the contract between them operates on the principle of 'advance purchase or sale' of the product. Other issues such as rate of the product, seasonal price variation, or interest rate of moneylending depends on the relationship between the parties, their level of trust and how long the different actors have worked together.

Farmers sell 5-12% of rohu, catla, and tilapia directly to *paikers* and 85-95% is passed on to the *aratdar* and subsequently purchased by the *paiker*. Only a small portion is sold directly to retailers. For pangas, farmers sell 54% to the *paiker* directly, 46% indirectly to *paiker* via *aratdar,* and only 3% to retailers. Marketing functions include grading, storage, transport, financing, market information and packaging. Farmers, *aratdar*, and *paiker* practice open bargaining, auction and going market prices methods for fixing the price of their products in varying degree. Retailers follow open bargaining for selling their fish to consumers.

Fish seed trading is an important value-added function, especially for small-scale tilapia farmers in the southern region of Bangladesh. Fry traders (locally called *patilwalas*) play an important role in providing information to the producers on farming of tilapia. These traders buy from the hatcheries in bulk and sell to the producers (Apu 2014).

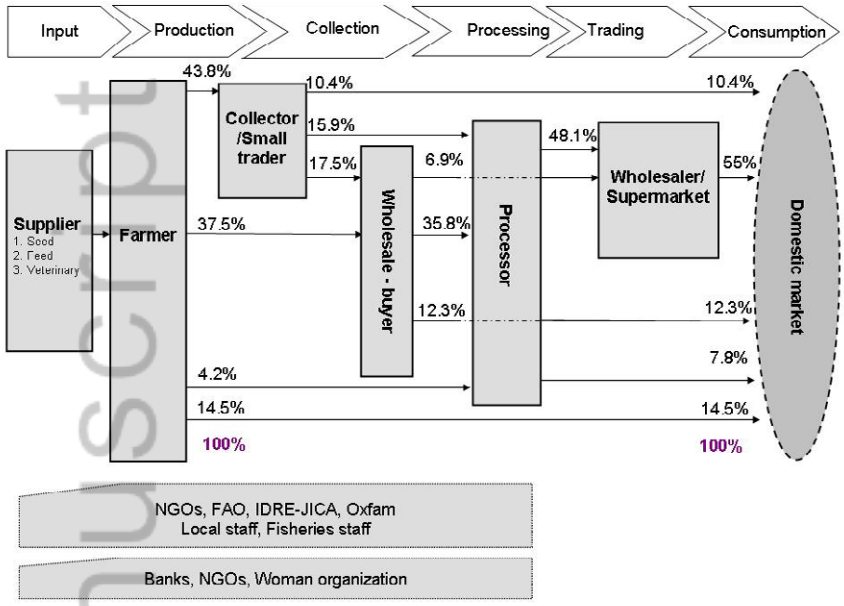
4.2 Cambodia

Aquaculture contributes about 10 percent of the total inland fish catch in Cambodia. The aquaculture is considered to have the great potential for increasing fish production in Cambodia. Small-scale aquaculture undertaken in floating cages and ponds. Fish culture in floating cages is believed to be an age old practice in Lower Mekong basin and it originated in and around the Great Lake Tonle Sap area of Cambodia. Cage culture is a unique system, in which fish are cultured in cages during the dry season, when water levels are low, and transferred to floating cages when the water level rises during the wet season. Cage culture is practiced in floating villages in the Mekong river system: in the Great Lake Tonle Sap, the Tonle Sap river, the Mekong river and Bassac river. Most cage culture involves the culture of indigenous species; the major species being *Pangasius* Catfish, in particular *Pangasius Sutchi,* and the Giant Snakehead *Chana Micropeltes* (Vo et al. 2009; Hap 2011).

Six actors in the value chain for aquaculture include a general group of input suppliers (feed, hatchery farmers and veterinary supplies); both grow out and hatchery farmers; traders such as collectors, wholesalers and retailers; processing actors, responsible for processing fish into marketable products and trading them to retail markets (Vo et al. 2009; Hap 2011) (Figure 2). There is some variation in the role of the actors depending on whether fish were destined for domestic or international markets. There are small- and medium-scale fish collectors/traders who collect fish from producers and fishers and sell it to wholesalers who distribute it to different places. The wholesalers/distributors are the main traders. Small scale fish processors process the fish into such forms as fish paste, fish sauce, dried salted fish, and smoked fish primarily for domestic consumption. The retailers are selling fish directly to the consumers. The producers, collectors and local fish processors operated without any organized information system regarding prices, market demand or annual catch volumes.

Fish collectors buy fish, directly or through their network, from aquaculture producers and fishers. Collectors set prices for the fish depending on fish quality, supply situation and daily fish market demand. Fish collectors have capital for immediate cash payment to producers and fishers; however, they often provide credit in the form of cash and in kind (e.g. equipment and gear). Producers receive informal support from traders with preservation technologies, including ice and cool-boxes. In return these traders bought all of their fish and did not permit the producers and fishers to sell to other buyers. The quasi-credit schemes that underlie the value chains in Cambodia may restrict bargaining power of producers, but it can also enable access to credit that is largely unattainable for landless and poor producers. Some collectors also get loans from wholesalers, middlemen and exporters. Wholesalers tend to represent an important part of the marketing chain, in which often major quantities of fish are channeled through them. In the case of Cambodia, they are best compared with fish distributors who have a permanent fish stall at a fish-landing site, a floating village or at a distribution center. They may buy fish from aquaculture producers, fishers, lot owners, collectors or middlemen and re-sell it to exporters, retailers or restaurant owners. Semi-wholesalers are those fish traders who have a permanent stall inside/outside a market, whereby fish is brought by middlemen or wholesalers and sold to them at the market. Semi-wholesalers act sometime as retailers, but they usually have an additional function in distributing fish to small retailers who sell fish at local markets directly to consumers and processors.

Figure 2: Value chain for catfish and snakehead in Cambodia

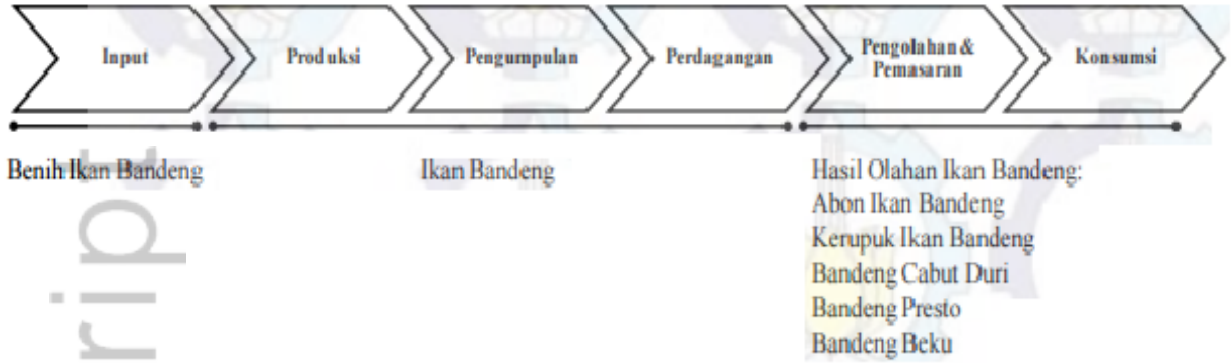


Source: Hap 2011

4.3 Indonesia

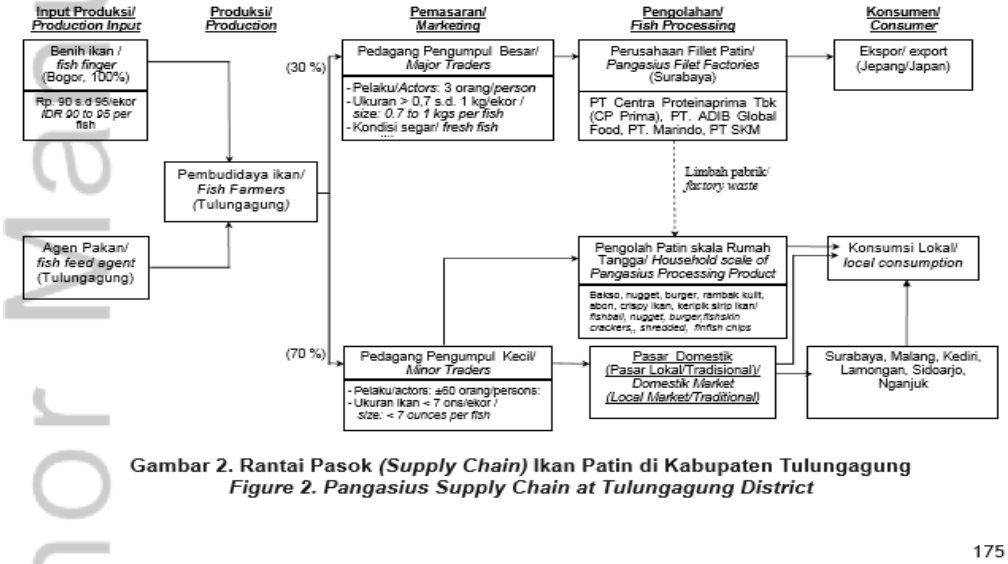
Small-scale producers in Indonesia usually have a single buyer for their fish, while larger scale producers usually target more varied buyers, hence they have more diverse value chains (Antarbangsa, 2014; Ardjosudiro & Goetz, 2007; Judi et al, 2014; Katalis, 2015; Khotimastuti, 2012; Maharani & Hafsaridewi, 2014; Muliono et al, 2015, Sari et al, 2014; Warela, 2015; Wibowo, 2014; Widodo et al, 2013; Yulisti & Maharani, 2013; Yulisti et al, 2012). The common traders in the value chains are input suppliers, fish farmer (aquaculture producer), first middlemen (*pengepul*), second middlemen (*juragan*), retailer (*penjaja / papalele / jibu-jibu*), consumers and exporter (Figure 3 and 4) (Judi et al, 2014; Katalis, 2015; Khotimastuti, 2012; Maharani & Hafsaridewi, 2014; Warela, 2015; Wibowo, 2014; Yulisti et al, 2012). Cultured carp, milkfish, catfish (*clarias*), tilapia and pangasius are primarily marketed domestically (Antarbangsa, 2014; Muliono et al, 2015, Sari et al, 2014; Wibowo, 2014; Yulisti & Maharani, 2013; Yulisti et al, 2012).

Figure 3: Value chain for milkfish in Indonesia



Source: Kresnawati 2012

Figure 4: Value chain for *Pangasius* in Indonesia



Gambar 2. Rantai Pasok *(Supply Chain)* Ikan Patin di Kabupaten Tulungagung
Figure 2. Pangasius Supply Chain at Tulungagung District

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Source: Putri 2013

For small-scale producers in Indonesia, aquaculture inputs are, in most cases, dominated by those who have a strong financial capacity, i.e., *juragan*. A *juragan* lends cash or input materials and buys the product from producers, all of which are priced in favor of the *juragan* (Widodo, 2013; Wibowo, 2014; Yulisti & Maharani, 2013). The j*uragan,* in most cases, also provides producers with the necessary seeds; but instead of quality seeds, the ones delivered by a *juragan* usually are low quality products. This problem is often related to the fact that raising, rearing, and farming locations are located far away from the breeding and hatching centers. The juragan is also reported to be able to gain large profit through control of market information on price and demand in various markets and using this knowledge to control the prices paid to producers (Katalis, 2015; Yulisti et al, 2012). Information on prices of different grades or quality classes of

fish are usually known only by few market players, such as the first middlemen (*pengepul*) and second middlemen (*juragan*) (Katalis, 2015; Yulisti et al, 2012). Additional profits from a piece of fish can also be earned by traders through selling fish by parts. In Indonesia, some 'normally inedible parts' have economic value; the per-kilo price of such parts as fish head, fins, skin or even fish offal are often higher than that of the meat.

Exclusive linkages exist and can prevent products from entering the market. A common form of linkage is where a *juragan* establishes outlets, called 'freezer points', through which products affiliated with the *juragan* are sold. This linkage is usually so rigid that no external product has a chance to participate in the market. Supermarkets are another market channel that exists for selling fish and fish products in Indonesia, but again, due to linkages of the *juragan*, the products of small-scale producers have a difficult time to enter these markets (Katalis, 2015; Yulisti et al, 2012).

4.4 Myanmar

Inland (freshwater) fish farming is responsible for 95% of Myanmar's reported aquaculture. The greatest concentrations of ponds are reportedly found in an area of floodplain located approximately 25-50 km west of Myanmar's largest city, Yangon, the primary market for much of the cultured fish produced (Belton et al. 2015). Freshwater aquaculture is concentrated in a single type of fish, the indigenous carp, *rohu*, which constitutes roughly 70% of all farmed fish. Other species, such as pangasius catfish and tilapia, are only produced in small quantities. The aquaculture sector in Myanmar tends to be split between small farms, primarily family managed and owned catering to family and local demands; and large farms, often vertically integrated, catering to the export markets, and accounting for well over half of total pond area (Driel and Nauta, 2013; Edwards et al. 2005; Johnstone et al. 2012; FAO & NACA, 2003). The distribution of aquaculture farm sizes in Myanmar ranges in which 42% of farm area is accounted for by farms under 20 acres (comprising 90% of all farms), 23% by medium sized farms of 20-100 acres, and 35% is occupied by just 1.2% of farms over 100 acres in size.

Marketing segments of the aquaculture value chain have few actors, and are geographically moderate or long. The vast majority of farmed fish produced is traded through San Pya wholesale market. A second fish wholesale market, Shwe Padauk, recently opened further from San Pya. There are four major categories of buyer from wholesale markets in Yangon: 1) wholesalers in distant urban markets; 2) retailers and semi-wholesalers located in and around Yangon; 3) cold storages/processors/exporters in Yangon; 4) small-scale processors based around at San Pya (these are by far the smallest group in terms of the volume of trade they account for).

Producers sell fish to Yangon in one of two ways: 1) through local collectors; and 2) directly to traders at San Pya or Shwe Padauk. Most of the farmed fish traded through Yangon markets is sold without the involvement of an intermediary. Producers who have taken advances from fish traders are bound to sell all their fish through those traders. Those who are not indebted to traders are free to choose to whom they wish to sell, but often opt to work with one or a small number of trusted individuals. Local collectors provide harvesting services or purchase fish already harvested, and may either buy fish to resell to larger traders in Yangon or earn a commission through brokering sales on farmers' behalf. Collectors tend to provide this service to smaller

farms, because large traders in Yangon will only arrange collection of fish from farms if the quantity harvested exceeds 16 tons (the capacity of a small collecting boat). Some small producers choose to sell direct to wholesalers in Yangon using their own or hired transport, receiving a better price than if selling through collectors, but incurring transport costs.

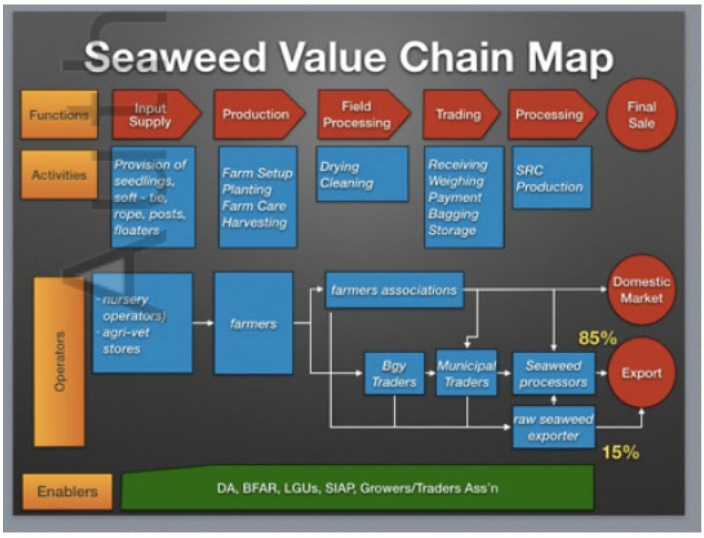
The availability of formal credit in general, and of formal agricultural credit in particular, has been extremely limited in Myanmar historically, and the rates of interest paid on informal loans, utilized by small farmers, are consequently extremely high. Small-scale producers are usually financed from a combination of own savings, informal loans from relatives (both with and without interest) and informal moneylenders (at between 3-6% per month, depending on terms). Small-scale producers reported receiving fingerlings on credit from traders.

4.5 Philippines

Seaweed production in the Philippines is carried out primarily by small-scale producers. A large production area is located in the Central Visayas region of the Philippines, in the provinces of Bohol and Guimaras, with the processors in Cebu (Department of Agriculture 2015). Figure 5 shows the value chain map for seaweed in the study sites.

The key actors in the value chain are the input suppliers (source of seedlings and soft tie), the seaweed producers (grow seaweeds and dry them before selling), the traders, the processors, and the exporters. Small traders purchase the dried seaweed from the producers and consolidate the raw dried seaweed (RDS) at the village level. The traders have their regular suppliers and buyers of RDS and own drying platforms and storage facilities. The traders provide financing to seaweed producers and allow them to use their drying platforms for free. The traders ship the RDS to processors in Cebu. The processors do not buy directly from seaweed producers as there are many consolidators operating in the area and they want to avoid disruption of relations. Processors have buying stations where they buy the RDS from traders. The processors process it into alkali chips and semi-refined and refined carrageenan that is exported mainly to Europe. The RDS is exported to China and Korea.

Figure 5: Value chain for seaweed in Philippines

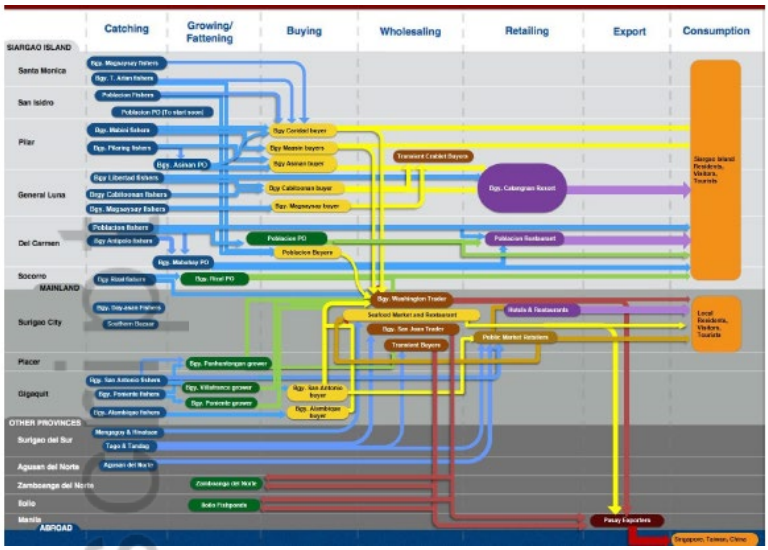


Source: Department of Agriculture 2015

The mud crabs from the province of Surigao del Norte are of high quality due to the natural environment from where the mud crabs are caught and harvested (ECOFISH 2015). Mud crabs are utilized not only for the export-sized adult mud crabs, but the crablets are used for rearing in fishponds outside of the province as well. There are six actors in the value chain: catching (catchers), growing/fattening (producer/fattener), buying (buyers), wholesaling (wholesaler), retailing (retailer), and exporting (exporter) (Figure 6). Adult mud crabs of export quality are harvested by catchers from the wild, sold to buyers, then sold to wholesalers, and when the wholesaler has accumulated enough volume of mud crabs required by exporters, they are shipped to Manila to be exported to neighboring Asian countries such as Singapore, Taiwan and China. Crablets, undersized and thin mud crabs, however, are sold to prodcuers/fatteners for rearing in ponds to reach export size and quality, before they are sold to buyers or wholesalers, to be sold to exporters eventually. The mud crabs from Surigao del Norte are generally exported, and very small volume of crabs are left for local consumption.

Transactions within the chain are based only on trust and with no formal or written agreement between or among the actors. Catchers regularly supply mud crabs to producers/fatteners, buyers, wholesalers and retailers based on trust and long-running business relationships. A buyer in Pilar, in Siargao Island, provides bait to local catchers while the catchers turn their harvested mud crabs over to the buyer, with no formal agreement or written contract. They have been under such business arrangement for years based only on trust. Buyers provide emergency loans to catchers and growers/fatteners, and in some cases supply bait to catchers, to ensure commitment of catchers to supply mud crabs. For the “transient” buyers, catchers and growers/fatteners transact business with them primarily because “transient” buyers offer very competitive prices. Their alleged direct links to exporters in Manila give them more flexibility in transacting with local suppliers of live mud crabs. Their connection with exporters allegedly is also based on trust and with no formal or written agreement.

Figure 6. Value chain for mudcrab in Philippines



Source: ECOFISH 2015

5. Discussion

As the case studies illustrate, linkages, both formal and informal, exist and are an important aspect of the business relationship between actors in the small-scale aquaculture value chain in Asia. The majority of these linkages are vertical linkages between actors in the value chain. The linkages are primarily with actors in the next stage of the value chain (for example, producers with primary buyers or collectors) and there is limited interaction with actors farther up the value chain (for example, producers with wholesalers). Some of the producer linkages were horizontal linkages through producer group/organizations/cooperatives, such as the mud crab association in the Philippines. Most of the value chains are relatively short with few actors, anywhere between four and six actors. While small-scale producers may have infrequent contact with a buyer, only during a few harvests during the year, the other actors higher in the value chain have more frequent contact with each other as they purchase fish from multiple producers and at different times. In almost all cases, the level of formality of the linkage is informal, although there seems to be some to complete level of trust between the actors in the cases, leading to a more efficient linkage. Most of the linkages seemed to be based on an oral agreement between the actors rather than a formal contract. However, trust of producers with a buyer may be limited due to limited price information and bargaining power. None of the case studies provided information on the length of time of the linkages, as this information can allow for a better understanding of trust between actors, or on the dynamics of the linkage in term of how it may have changed or evolved or the rate of expansion over time. The reason for and benefit of the linkage is primarily financial in terms of access to capital for investment and operation or for family needs. Other reasons for the linkage are to obtain a regular supply of fish, market information and knowledge and/or services (ice, transportation, inputs) needed for the business. In most cases, power in the value chain is held by those further up the chain, such as wholesalers, who have key assets such as capital, market information, knowledge and personal relationships with other traders. None of the case studies provided information on indexes of concentration (share of purchase or sale volume, share of total producers) of actors, which can serve as an important indicator of power distribution in the value chain. The number and size of the competitors at a particular stage of the value chain can have important consequences for other actors in the chain. A dominant actor at one stage in the chain can place many demands on smaller actors with many competitors.

6. Conclusions

Strengthening the linkages between the different actors in the value chain will allow for addressing the constraints facing the actors and upgrading the value chain. Value chain analysis can highlight the role of governance in the value-chain, that is, the structure of relationships and coordination mechanisms, linkages and trust, which exist between actors. By focusing on these linkages, it is possible to identify the mechanisms that may need to be targeted to improve capabilities in the value-chain, remedy distributional distortions, and increase value-added in the sector. Value chain analysis can also be used to examine the role of upgrading within the chain. Upgrading can involve (i) process upgrading of the efficiency of production, (ii) product upgrading of new or improved products, such as improvements in quality to gain higher-value or through diversification in the product, and (iii) functional upgrading of activities and linkages. Governance issues play a key role in any upgrading possibilities occurs. The structure of linkages in the value chain can shape and influence the environment in which upgrading can take place. In examining any upgrading option, it will be important to look at the impact of the upgrade throughout the whole value chain.

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