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The challenge of upgrading white shrimp production in central Vietnam and the potential of farming cooperatives

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Abstract

Aquaculture in Vietnam expanded significantly over the past two decades and contributed to poverty alleviation among smallholders. Upstream value chains of shrimp farming in Vietnam are characterized by a high degree of informality, a high number of intermediate layers in trade and power asymmetries between farmers, suppliers and buyers. Input supply such as feed and fingerlings for shrimps account for 60% to 80% of overall cost in white shrimp production. Reducing the cost of input supply would therefore significantly improve income and welfare of farmers. Hence, this study focuses on the characteristics of business relationships between farmers and input suppliers and explores the possibilities of farmers to improve their bargaining position. In particular, the potential of horizontal coordination in the form of cooperatives is evaluated. Characteristics of business relationships and possibilities to (individually and collectively) improve their bargaining positions of farmers are evaluated within the conceptual frame of global value chains and upgrading. The paper argues that despite previous unsuccessful attempts to establish cooperatives, horizontal coordination is an important measure in order to counter high dependencies from supply agents. However, in order to be successful, attempts to coordinate need a clear value proposition for farmers, engagement and communication among farmers and government support in funding the necessary infrastructure.

Zusammenfassung

Die Aquakultur in Vietnam expandierte in den letzten zwei Jahrzehnten erheblich und trug zur Armutsbekämpfung unter den Kleinbauern bei. Wertschöpfungsketten der Garnelenzucht in Vietnam sind durch einen hohen Grad an Informalität, eine hohe Anzahl von Intermediären im Handel sowie Machtasymmetrien zwischen Produzenten, Lieferanten und Einkaufsagenten gekennzeichnet. Die Versorgung mit Inputs wie Futter machen 60% bis 80% der Gesamtkosten in der Produktion von weißen Garnelen aus. Eine Senkung der Inputkosten würde folglich das Einkommen der Produzenten deutlich verbessern. Diese Studie untersucht die Charakteristika der Geschäftsbeziehungen zwischen Produzenten und Inputlieferanten sowie die Möglichkeiten für Produzenten, ihre Verhandlungsposition gegenüber Inputlieferanten zu verbessern. Insbesondere wird das Potenzial der horizontalen Organisation in Form von Kooperativen untersucht. Die Charakteristika der Geschäftsbeziehungen und die Möglichkeiten zur (individuellen und kollektiven) Verbesserung der Verhandlungsposition von Produ-

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zenten werden im konzeptionellen Rahmen der *globalen Wertschöpfungsketten* und insbesondere des *upgrading* bewertet. Der Beitrag argumentiert, dass trotz bisheriger erfolgloser Versuche, Kooperativen zu gründen, die horizontale Koordination eine wichtige Maßnahme ist, um die hohen Abhängigkeiten seitens der Produzenten zu verringern. Um erfolgreich zu sein, benötigen horizontale Organisationsansätze jedoch einen klar erkennbaren Nutzen, Engagement und Kommunikation unter den Produzenten sowie staatliche Unterstützung bei der Finanzierung der notwendigen Infrastruktur.

Keywords agri-food networks, cooperatives, global value chains, upgrading, aquaculture

1. Introduction

Shrimp farming in Vietnam has developed significant volumes over the past two decades. The rapid development of aquaculture is the result of increased international and domestic demand and also depleted fish resources (Van Duijn et al. 2012: 10ff.). It is in particular the black tiger shrimp and the white shrimp which are cultured in aquacultural ponds. White shrimp farming is particularly common in the Mekong Delta, where production for international markets is located, but it has also developed dynamically in central Vietnam, where shrimp farmers produce for the domestic and predominantly the Chinese market and small-scale farmers are the main producers. Development of white shrimp production has also been supported by political initiatives in order to provide alternative income sources for farmers and thus contribute to poverty reduction (Tran et al. 2013; Lan 2013; Suzuki and Nam 2018: 472; Quyen et al. 2020: 2).

Value chains of white shrimp production in Vietnam are characterized by a high degree of informality of interrelationships and transactions as well as a prominent role of middlemen who act as purchasing agents, brokers of information and also as loan providers. Transactions are typically not conducted through formal contracts and rely strongly on personal relationships and trust. The informality of transactions has enabled smallholders to establish shrimp production in an uncomplicated manner as capital could be acquired simply from informal loans of middlemen. Higher value production by quality standards for international markets however is difficult to achieve with the current level of informality because quality of shrimp produce cannot be reliably tracked by international wholesalers (Tran et al. 2013: 7ff.). Such patterns are, in fact, typical also for other regions in the Global South, for example in the case of shrimp production in Bangladesh (Dannenberg et al. 2016: 180). Furthermore, farmers have developed high dependen-

cy from middlemen as well as input agents regarding market price, feed and aquaculture techniques (Joffre et al. 2020: 7); as a result, farmers have no room to bargain and depend on their capital and information.

Hence, the question arises how farmers can improve their position with regards to other actors along the value chain and enable themselves to enter higher value development paths by consistently complying to international standards. The relationship of farmers and input suppliers is particularly important in this regard because commercial feed input for shrimp production accounts for 60% to 80% of aquacultural production cost (Hasan 2017: 48). The manner how farmers can access feed input not only determines their economic position but also the quality of shrimp they are able to produce.

Hence, this study explores the relationship of input agents and farmers and its role in attempts to upgrade. While various studies have explored the governance of value chains in aquaculture in Vietnam (such as Tran et al. 2013; Ha et al. 2013; Lan 2013; Ponte et al. 2014; Quyen et al. 2020), thus far, the relationships of input suppliers and farmers in aquaculture in Vietnam have rarely been explicit focus of investigation. Given the high cost of input supply in relation to total production cost of farmers, the reduction of input cost could significantly contribute to higher incomes for farmers. Also, since the establishment of cooperatives has been attempted at multiple locations with mixed success, this study puts a particular focus on the manner in which cooperatives could successfully contribute to improving farmers' bargaining positions vis-à-vis input suppliers. This study focuses on shrimp production in central Vietnam which has developed dynamically over the past years has received relatively little attention thus far. The concept of global value chains is used as a theoretical framework. The study is structured as follows: first, the development of Vietnamese shrimp farming in the context of agri-

food networks is briefly outlined. In these sections, a particular focus is put on the theoretical framework and the role of feed supply. Second, empirical material based on stakeholder interviews and complementary data and documents is presented and discussed. The article concludes with a summary of the main points and a brief outline for further research potential.

2. Conceptual frame: agri-food networks, power disparities and upgrading

Global production networks in agri- and aquacultural products are characterized by high fragmentation, internationalization and a high disparity of power and value capture among the various actors (including input suppliers, producers, agents, wholesalers and retailers) involved (*Dicken* 2015: 424ff.; *Ponte et al.* 2014: 54f.). Agri-food networks tend to be dominated by a relatively small number of globally active retail firms originating from North America and Europe who shape food value chains with disproportionately high purchasing power and the formulation of quality standards to which producers need to comply in order to be considered as a vendor (*Dicken* 2015: 440f.; *Rodrik* 2018: 9f.). While there has been a strong emphasis in related research on the disparities between producers of the Global South who produce for export to developed markets mainly in North America and Europe (and the whole range of socioeconomic implications this dichotomy encompasses), the north-south dichotomy has become increasingly blurred with the convergence of lifestyles and consumer behaviour in urban centers in developing as well as developed countries (*Maertens and Swinnen* 2006; *Dicken* 2015: 424ff.; *Beghin et al.* 2015: 3).

An important barrier of smallholders in low-income countries to deliver to international markets has been the implementation of private quality standards by large wholesalers who have put increasingly stringent processes in place to monitor compliance (*Maertens and Swinnen* 2006). Due to the large purchasing power of wholesalers and intense competition among smallholders, international wholesalers are in disproportionately strong positions of power and can almost unilaterally determine the conditions of the business relationships between producer and wholesaler (*Maertens and Swinnen* 2006: 11ff.; *Dicken* 2015: 440f.). The pressure of smallholders to adhere to international quality requirements also influences their relationship with input suppliers (such as for seeds, fertiliz-

ers or, in the case of aquaculture, feed). The input side of the relationship mirrors the characteristics of farmer-wholesaler relations: as smallholders rely on high quality supply in order to produce according to international standards, the relatively low number of internationally active input suppliers have high bargaining power over prices and business conditions (*Dicken* 2015: 440f.). Nevertheless, smallholders in the Global South are generally incentivized to produce for international markets. Despite the high power disparities in international agri-food networks, the formalized production processes and business relationships in the context of export-oriented production tends to generate higher incomes for smallholders in the Global South compared to the highly informal nature of relationships which frequently occur in production for domestic demand (*Maertens and Swinnen* 2006: 2, 24f.; *Beghin et al.* 2015: 16).

The interaction patterns and disparities among different actors along the value chain have been conceptually described within the literature stream of global value chains, which has evolved to be a major stream of discussion in economic geography (*De Marchi et al.* 2020: 3ff.). This relational perspective on sequences of value creation generally seeks to describe and explain disparities in power and value capture among actors which participate in specific value chains (*Gereffi et al.* 1994; *Henderson et al.* 2002; *Gereffi et al.* 2005; *Coe and Yeung* 2015; *De Marchi et al.* 2020). The literature stream on global value chains has put a strong emphasis on the influence of lead firms (such as brand assemblers of retail brands) on the organizational configuration of subsequent layers of the value chain (*Gereffi et al.* 2005; *Coe and Yeung* 2015). Disparities of power and value capture among actors along the value chain have been described in conceptual contributions as determinants for organizational and regional development outcomes. In a much acclaimed typology outlined by *Gereffi et al.* (2005), five types of actor relationships were distinguished which featured different degrees of hierarchy, integration and power asymmetry among actors. These types of relationships are determined by the codifiability of a specific input, the capabilities of the supply base and the complexity of the transaction. Actors compete vertically and horizontally for value (such as in the form of profit, knowledge, access to technology etc.) which they seek to capture. Within the concept outlined by *Gereffi et al.* (2005), the governance types 'captive' and 'market' are particularly relevant for this article: a captive supplier-buyer relationship describes high

power asymmetries in which a large number of lowly-skilled suppliers compete for sales shares among a relatively small number of buyers with high purchasing power. In such patterns, buyers are typically in a position to basically dictate the conditions of transaction and they consequently result in high dependence and low profit margins for suppliers. In contrast, a market-based relationship is characterized by a relatively level number of suppliers and buyers and more equal power-relationships. Transactions in such an environment are determined mainly by prices, which are constant matter of negotiation (Gereffi et al. 2005: 86; Ponte and Sturgeon 2014: 203). Hence, from the perspective of smallholders, engaging in the market-type of transaction is more desirable than captive relationships with buyers (this aspect will be elaborated in section 7, discussion and conclusion).

This leads to the question of how an actor can improve their position vis-à-vis others for maximizing value capture. Conceptually, such a question can be framed within the context of different kinds of economic *upgrading*, originally outlined by Humphrey and Schmitz (2002: 6), who distinguished between four kinds though which actors and regions can improve their competitive position. These include:

- *process upgrading*: transforming inputs into outputs more efficiently by re-organizing the production system or introducing superior technology;
- *product upgrading*: moving into more sophisticated product lines (which can be defined in terms of increased unit values);
- *functional upgrading*: acquiring new functions (or abandoning existing functions) to increase the overall skill content of activities;
- *inter-sectoral upgrading*: firms of clusters move into new productive activities.

While these types of upgrading refer to strategies with regards to product offering and production, it is important to point out that actor-specific contexts such as institutional environments, the types of relationships with other actors along the value chain (especially with regards to mutual dependencies and informality) as well as resources available to the actor (such as capital or skillset) are critical determinants of the type of upgrading which an actor *can* engage in (Pickles et al. 2006: 2319f.; Dannenberg et al. 2016: 183f.). Further perspectives of upgrading, relating to the environmental and social dimensions of offshored value creation activities are provided (among others)

by Poulsen et al. 2016, Lund-Thomsen and Lindgreen 2014 and Barrientos et al. 2011, however, given this article's perspective of smallholders, this study focuses on the economic dimension of upgrading as outlined above.

In the context of the aquaculture sectors in Asian countries, Ponte et al. (2014) explored upgrading trajectories of farmers and food processors in four Asian countries (Bangladesh, China, Thailand and Vietnam). In their study, the relationships of Vietnamese farmers with input suppliers and food processors were described as 'relational', pointing to the informality and personal nature of relationships as well as 'captive', meaning that they are in a weak bargaining position for business conditions as they face a relatively narrow choice of sales channels on the downstream and input suppliers on the upstream side, while being easily replaceable themselves (Ponte et al. 2014: 56). From the perspective of actors who find themselves in a captive relationship, the most viable forms of upgrading are process- and product upgrading while a change towards higher value functions within the value chain is typically discouraged by lead firms and oftentimes not possible due to lack of available resources (Ponte et al. 2014: 53f.; De Marchi et al. 2020: 7). Using the case example of shrimp farming in Bangladesh, Dannenberg et al. (2016) pointed out that the high degree of informality among actor relationships in the global south hinders their opportunities of upgrading (Dannenberg et al. 2016: 183f.). The development of cooperatives among smallholders has been discussed in various contributions as a measure to organize input-supply, increase access of farmers to high-value markets, reduce external transaction cost and thereby improve their bargaining position (Fischer and Qaim 2012: 1256f.; Herrmann et al. 2018: 827f.). Cooperatives take various forms in attempting to support smallholders, including a top-down approach of local governments to establish market niches and protect smallholder markets and prices (Kurakin and Visser 2017: 166ff.), or a bottom-up approach of self-organization of members, democratic control and voluntary participation (Kalogiannidis 2020: 459). Often, agricultural cooperatives fail due to various factors including lack of trust and managerial capacity among potential members, lack of adequate funding mechanisms, lack of government support and lack of cooperative culture (Kalogiannidis 2020; Francesconi and Wouterse 2018).

From this conceptual backdrop, this article examines the research questions of 1) how shrimp farmers in central Vietnam access feed input, 2) how current interrelationships between farmers and input suppliers in Thue Thien Hue can be characterized, 3) how farmers attempt to improve their bargaining positions and, 4) with particular focus on the potential of cooperatives, which factors determine the success or failure of horizontal organization among farmers.

Applying the concept of upgrading as a potential to improve the position of Vietnamese smallholders in shrimp production by moving beyond their status as 'captive' suppliers, this article adopts a bottom-up-perspective as outlined by *De Marchi* et al. (2020: 7). The methodology of this study is outlined in the following section.

3. Methodology

This study follows a qualitative approach. The research question is addressed using the methodology of the semi-structured interview. For this study, 24 interviews were conducted with a variety of actors including farmers, middlemen, input suppliers and local policy makers in the central Vietnamese Thua Thien Hue province, which was complemented by secondary information from reports and statistical data. The expert interview is the method of choice in this case as this research seeks to characterize the power relationships among actors and their implications on existing disparities and path dependencies as well as strategic possibilities to change the power asymmetries in given relationships. As such, this study is explorative in character and aims to develop an in-depth understanding of a subject matter rather than a large, highly representative sample of cases which could be examined quantitatively. The interview partners were chosen based on their relevance for the research question through direct contacting and through the snowball method in which interview partners introduced further potential interviewees with whom they have either business relationships or who were deemed qualified in addressing the subject. Thua Thien Hue province was selected as the place of study, because (as will be shown in the next chapter) in recent years the white shrimp industry there has developed rapidly and has led to increases in income, but also to new dependencies. Thus far, to the knowledge of the authors, white shrimp farming in Thua Thien Hue province has not yet been focus of

geographical research. The field work was conducted in 2018. The interviews were conducted in Vietnamese language by Chung van Nguyen, who approached interview partners directly and also using the snowball-method of finding interview partners through existing contacts. The interviews were conducted as a field study on-site and took about one hour in average. The interviews were recorded and scripted according to the guidelines outlined by *Dresing and Pehl* (2011) meaning that they were polished for language and readability (such as removal of colloquial language) without altering the contents (see also *Azevedo et al.* 2017). Based on the research question outlined in the conceptual framework, the interviews were designed to address the following broad questions:

- How is the interaction between farmers and their business partners characterized?
- How can farmers improve their bargaining positions?
- What is the potential of cooperatives to support farmers in their transactions with suppliers?

The interview scripts were broadly structured according to the main questions. These structured scripts then formed the basis for the content analysis and the outline and discussion of the empirical results. In addition to the interviews, complementary documents, statistics and media reports were used for this study to provide context and additional information.

4. Vietnamese shrimp farming and the role of input suppliers

Aquaculture is among the most dynamic growth sectors within meat production systems globally (*Aklakur* 2018: 385) and in Vietnam, the sector has also developed dynamically over the past decades. Countrywide, shrimp production grew from 93,503 tons in 2000 to 747,333 tons in 2017 (*General statistics of fice of Vietnam* 2018). With over 330,000 smallholders producing shrimp, the sector is highly fragmented as farming households are dispersed among areas which are often difficult to access (*Tran et al.* 2013: 330). Shrimp produce is mostly sold through several (up to five) layers of middlemen who deliver to food processors and wholesalers (*Tran et al.* 2013: 330). An estimated 55% of Vietnamese shrimp produce is for export, with the EU, Japan, the USA and (more recently) China being the main export destinations (*Lan* 2013: 2). The organization of upstream production systems

for white shrimp in Vietnam are largely conditioned by the institutional environment, the quality requirements of wholesalers and also the local geographic conditions. Transactions between farmers and middlemen are largely informal which contributes to making them more flexible and less complex, however due to the high informality of transactions in general, quality standards (which higher value production for international markets usually requires) are almost impossible to implement consistently and at scale (Van Duijn et al. 2012: 35ff.).

An important layer of shrimp value chains in Vietnam is the sourcing of input supply which farmers need for production. The supply of commercial feeds allows farmers to control growth and produce predictable quality. While traditionally, inconsistent inputs like trash fish or rice bran have been used as feeds, the use of customized industrial feed has been increasingly common among smallholders in aquaculture globally and in Vietnam. As a result, the average annual growth rate of global aquafeed production was 5.9% between 2006 and 2015 and it has been predicted to be at 3.3% in the period from 2016 to 2025 (Salin et al. 2018: 129). Overall revenues of the aquafeeds sector reached 107.82 billion US \$ in 2017 (Giri 2017: 8).

Vietnam has 130 aquafeed factories with production at 3.77 million tons that respond 85.6% of domestic aquafeed demand. Of these, 96 manufacturers produce pangasius feed, and 68 and 38 manufacturers produce black tiger shrimp feed and white shrimp feed respectively. Thus, the rate of import for aquafeed has been decreasing in recent years, but the market for aquafeed is dominated by international companies. This applies in particular to the shrimp sector, where 100% of the feed market is covered by international enterprises (VASEP 2018). The demand of aquafeeds in Vietnam is increasing and manufacturers are mainly focusing their production on the main aquafeeds for shrimp and pangasius. Aquafeed production in Vietnam could be described as an oligopolistic structure, in which five multinational companies occupy the market of shrimp feed production, each one with a capacity of 20,000 to 40,000 tons per year (Hung and Huy 2007: 343). The locations of input supply factories as well as the locations of interviewed farmers and input agents are shown in Figure 1.

Using industrial feed is a high cost burden for shrimp farmers as it accounts for 60% to 80% of production cost. The trading between aquafeed manufactures and farmers is facilitated by intermediate agents.

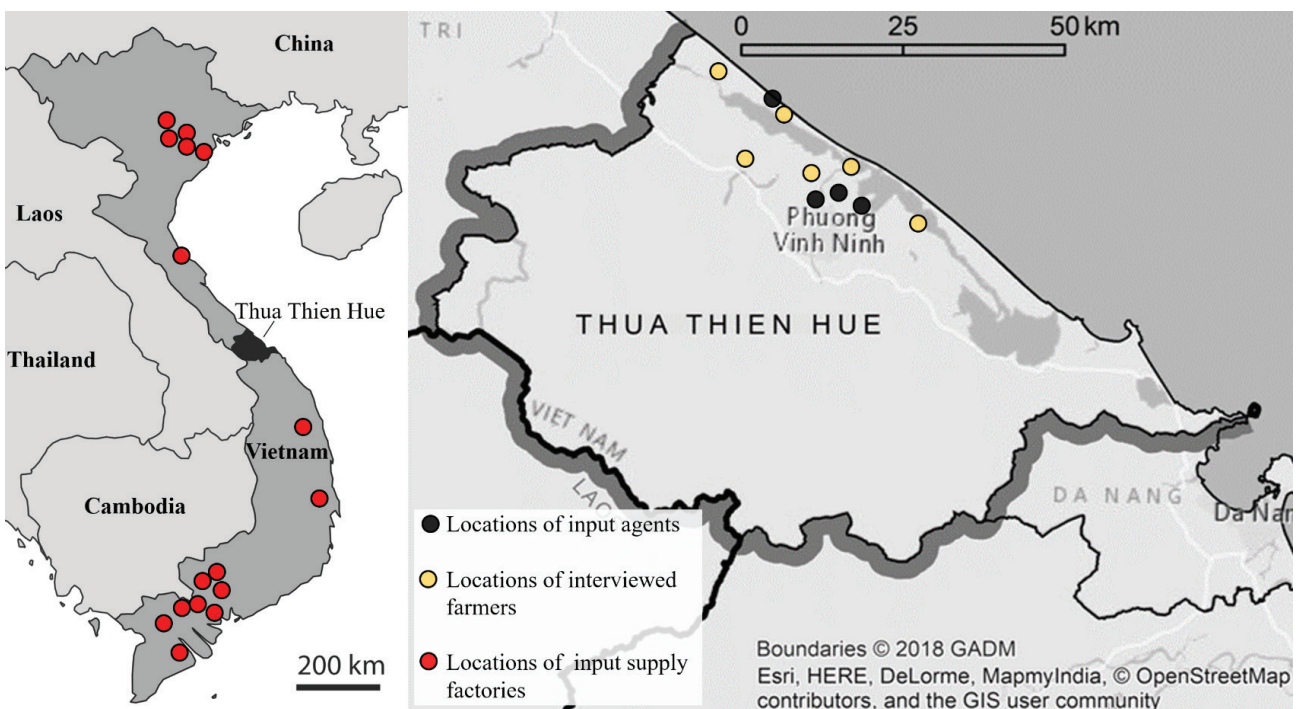


Fig. 1 Location of interviewed farmers, input agents and input supply factories. Source: cartography: C. Enderle, J. Schwabe and C. v. Nguyen; map data: GADM 2018, Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

Each manufacturer operates their own networks of sub-dealers and agents who link manufacturers with farmers. The relationship of agents and farmers tends to be informal, based on personal trust and payments in cash, as well as frequent informal loan provision by dealers to farmers (*Hung and Huy 2007: 344*). As farmers typically produce small scale and lack capital, they do not directly link with the input suppliers for feed and medicine. Accessibility of farmers to such inputs depends on the network of dealers. Usually, farmers have only one source for their inputs and therefore almost no room to negotiate prices and ensure consistent quality of the supply (*Sang and Thao 2015: 34*). In order to improve their position, farmers typically attempt to increase quality and volume of their output by improving management practices, using higher quality supply and maintaining higher water quality. These practices can be broadly described as process- and product upgrading, while functional upgrading among farmers (besides isolated efforts to self-produce fingerlings) remains almost non-existent. Typical barriers of upgrading for farmers are lack of capital, lack of appropriate skills and limited economic incentives to invest in upgrading (*Ponte et al. 2014: 57, 59f.*).

Another important (government supported) measure of farmers to improve their bargaining position and profitability is the foundation of cooperatives. Horizontal coordination of cooperatives can contribute to the diffusion of expertise regarding production processes, ensure higher quality production and quality monitoring by adhering to common standards and improve bargaining power towards suppliers and wholesalers by aggregating volumes of input purchase and produce (*Ha et al. 2013: 89*). *Ha et al. (2013)* however have shown that the establishment of aquacultural cooperatives in Vietnam has met with mixed success. Intensive farming cooperatives have generally been more effective in improving farmers' positions as they more clearly contribute to reducing risk, are spatially less dispersed, engage in more advanced and more standardized production techniques and have a higher chance of successfully closing contracts with input suppliers and wholesalers (leading to a stronger vertical integration of value chains). Extensive farming cooperatives however have thus far not shown to be successful in closing contracts with commercial partners and feature little proactive support from the farmers. Government involvement has shown to be important in supporting cooperatives with infrastructure funding (*Ha et al. 2013: 95f.*).

Based on stakeholder interviews, the interrelationships and strategies of farmers and dealers of input supplies as well as efforts to establish cooperatives in Thua Thien Hue province are outlined in the following sections.

5. Relationships between shrimp feed suppliers and white shrimp farmers in Thua Thien Hue province

White shrimp farming in the Thua Thien Hue province expanded during the last two decades from 258 tons in 1998 to 4,925 tons in 2017. The introduction of white shrimp production contributed to the increase in overall volumes as the white shrimp produces higher revenue and uses less space compared to the black tiger shrimp (*Penaeus Monodon*), the previously dominant type in shrimp production (*General statistics of Viet Nam 2018*). The Thua Thien Hue province however features several disadvantages compared to locations in southern Vietnam, where shrimp production is concentrated as it has a smaller domestic market, relatively small farming area, a higher frequency of extreme weather events (which can destroy shrimp produce) and high distance to input suppliers and wholesalers (who are mostly located in the southern and northern part of the country).

The quantity of feed used in white shrimp farming depends on the culture season, the stocking density, the growth of white shrimp and the investment capacity of each farmer. In winter season, farmers will use approximately 10 to 15 tons for a pond area of 2,500 m² to 3,000 m². In the summer season, white shrimp farmers will reduce the quantity of feed. Generally, farmers are inclined to buy as much feed as their economic situation allows because shrimps grow larger the more commercial feed they receive, which will in turn increase revenues of farmers.

Shrimp feed is provided by agencies that are located throughout Thua Thien Hue province. However, almost all farmers buy their feed from the agency which is located closest to them which is not only due to higher convenience of spatial proximity but also due to the established relationships between the agency and the local community. Agents of input suppliers sell their feed usually by providing a capital loan which the farmers typically pay back after harvest and in some cases (if the harvest was not profitable) even later. The possibility to obtain capital from agents and pay back flexibly is essential for most farmers in

order to operate. A farmer who can pay for the input up-front will get a significant discount in this context. An interviewed agent commented on the trust-based relationship with farmers as follows:

My industrial feed agency was established seven years ago. Before that farmers bought feed from agencies in Hue city. After my business was established, almost all farmers in my community came to my agency to buy feed. This is because we live in the same community, so it is more convenient for them to transport the feed from my agency to their ponds, than if they had bought from agencies in Hue city. Farmers can immediately get feed whenever they order and they can pay me the money when they have it. We are neighbours, or we have known each other and lived together in the same community for a long time. The price of feed is usually the same across agencies and my agency provides a lot of support to producers during the culturing process. As a result, 90% of the producers in my community are buying feed from my agency. The rest are buying feed from agencies in Hue City. (Industrial feed agent in Phong Hai commune, Thua Thien Hue province)

Farmers who take loans from an agent are bound to use the same agent until they have paid back the loan even if their prices exceed those of other agents. This can result in farmers taking loans elsewhere (such as middlemen) in order to pay back the agent, resulting in strong one-sided dependencies. Also, using different feed from another agent may be incompatible with the production methods and technology which a farmer uses at a given time. An interviewed farmer explained the conditions as follows:

The price of shrimp feed is listed by each agency. Farmers cannot negotiate on the price. The price only varies if the farmer pays back the money when they buy the feed or after they harvest and sell the shrimp. Agencies will give generous discounts if farmers pay money when they buy. For instance, if I buy one 10kg bag of shrimp feed, the price will be 14.08 US \$ per bag if I pay immediately, and the price will increase by 0.22 US \$ per bag if I pay after harvesting. (Farmer from Phong Hai community, Thua Thien Hue province)

Risk management strategies of agents towards insolvent farmers include flexible repayment times, requirements for deposits and also the liquidation of

farmers' ponds in case they cannot pay back. As an agent described the conditions of payment:

Only 2% or 3% of farmers can pay cash when they buy the feed. The rest always pay after harvesting. I allow farmers to buy on credit. If I did not do it this way I would not sell my feed. The farmers in my community are very kind and we have good relationships. I keep a record book and have their signatures in the book. Thus, I can get them to pay money. If they are not able to pay me back long-term, then they can sell their shrimp ponds to me to settle their debts. (Industrial feed agent, Phong Hai commune, Thua Thien Hue province)

Summing up these statements, trust between agents for feed input and shrimp farmers is based on the implicit commitment of farmers to pay their debts and the willingness of agents to provide loans based on flexible conditions. These relationships are based on previous track record and personal connections (rather than formalized processes) and tend to be stable in the long term. However, the characteristics of these relationships result in high asymmetry of risk as well as high dependence of farmers on agents: because most farmers pay their input only after harvest, they are bound to be in a long-term relationship with one single agent as farmers can change agents only after paying back all loans (not paying back at all will result in farmers not obtaining loans in the future). This also applies if the quality of feed input is insufficient (which may result in low-profit yields). Hence, farmers with low capital at their disposal are entrenched in a position as permanent debtors, facing disproportionate risk and dependence. At the same time, farmers with enough capital to purchase relatively large amounts of feed and pay up-front are in a self-reinforcing competitive advantage. In general, however, dependence of farmers on agents is high, while agents outsource economic risk to farmers.

Besides lacking capital, another important reason of current dependencies of farmers lies in the current setup of infrastructure for delivery and transport. Farmers usually require the delivery of input in small quantities (one ton for about ten days for a pond area of about 3,000 m²) and keep on purchasing input several times per season rather than purchasing input once for the whole season. This is because farmers usually have insufficient storage capacity. Hence, they can only transact with agents in close proximity to farmers, who are able to permanently deliver feed input,

otherwise transport costs would be too high for small quantities. This in particular disconnects farmers in central Vietnam (such as the Thua Thien Hue province) from input manufacturers because feed supply is produced in south and north Vietnam. Hence, delivery to central Vietnam is thus far exclusively handled through a network of agents. The one-sided dependency of farmers from agents and the lacking leverage to bargain for lower input costs has detrimental effects on the sustainability of production techniques and quality of produce because in order to reduce production costs, farmers have only the option of increasing the stocking density beyond the government regulation of 100 to 150 white shrimp seeds per m² to densities of up to 350 seeds per m². At such high density farmers may be prompted to illegally use aquatic medicines in order to ensure the health of the shrimps during the production period.

Since their individual capacity of improving their bargaining position is limited, the seemingly obvious option of farmers is to collectively organize. As described above, cooperatives have been founded elsewhere in the country already with mixed success and the question remains if and under which circumstances cooperatives can help improve the position of farmers in the central Vietnamese Thua Thien Hue province under the local conditions.

6. The potential of cooperatives to improve the bargaining position of farmers

The main issue from the perspective of farmers is that in terms of sourcing input for shrimp produce, they are in a position of 'rule takers' as they only have the choice of accepting the conditions which are determined unilaterally by input suppliers and agents. Given the high proportion of input supply among the total production cost, it is especially the possibility of bargaining for lower prices which would improve the conditions for farmers. Manufacturers prefer to sell input supplies through agents and are generally unwilling to directly sell to individual farmers because they lack the capacity to manage such relationships on an individual level. Most importantly, it is difficult for input suppliers to assess the solvency of farmers. Regarding the Thua Thien Hue province, this problem is exacerbated by high geographical distance between farmers in central Vietnam and input factories which are located in south and north Vietnam (cf. Fig. 1).

In an attempt to improve bargaining positions of farmers, the Vietnamese government promoted the foundation of cooperatives since 2012, when the cooperative law was reformed to determine that cooperative decisions are being made by independent members (*National Assembly of the Socialist Republic of Vietnam* 2012). Cooperatives have been established in 61 out of 63 provinces and cities of Vietnam as a measure to centralize resources and bargaining processes (Hoai 2019). Also in the Phong Hai commune in the Thua Thien Hue province, two cooperatives were founded with 56 ha of white shrimp farming area in 2013 (*Doanh Nghiệp và Việt Nam* 2020). These efforts have been part of the "New Rurality" (Nông thôn Mới) programme of the Vietnamese central government. However, participation in cooperatives has thus far been relatively unsuccessful. In the Phong Hai commune of Thua Thien Hue province, only 13 white shrimp farmers have joined a cooperative thus far and the cooperative structure has failed to negotiate better supply prices for the farmers. Several reasons deter aquacultural cooperatives in Thua Thien Hue province from operating effectively.

First, their establishment is conducted in a 'top-down' fashion in which the requirements and actual demand of farmers are insufficiently taken into account. The main driver of establishing cooperatives in Thua Thien Hue province was not the initiative of farmers but the performance indicators of the "New Rurality" programme, in which the establishment of cooperatives was one of 19 binding indicators based on which local governments were evaluated in their efforts to achieve "New Rurality" (*Deputy Prime Minister of Vietnam* 2009). The financial and infrastructural resources of cooperatives, such as transportation capacity and storage space, are insufficient to effectively support farmers. The government would determine a pond area of the cooperative but the farmers would need to invest in canvases water pumps and wastewater systems by themselves up-front, which (due to their lacking access to capital) ended up in a mostly idle effort.

Second, and this is connected to the first point, the farmers themselves engage in highly individual production techniques which are based not on (formal) sector standards but based on their own experience, capital and labour available. This results in highly individual needs for farmers regarding volumes and types of feed input. High geographical dispersion of farmers also contributes to a relatively low willing-

ness and capacity of farmers to coordinate their purchasing processes of inputs. The head of Dong Hai village explained the difficulty of newly establishing a local cooperative due to high initial investments:

White shrimp farming cooperatives were planned by the local government. Based on the concept, the farmers will prepare white shrimp ponds by themselves and all members of the cooperative have to contribute money for building a common infrastructure such as wastewater treatment ponds, electricity systems and also for providing basic capital of the cooperative. These investments are high while white shrimp farming is not always successful. Therefore, the farmers were not willing to participate in the cooperative.

An interviewed representative of the Phong Hai commune also pointed out the stability of existing relationships as reason for the difficulties of newly organized cooperatives:

Cooperative establishment is intended to help white shrimp farmers to improve input and output conditions. However, the farmers have had long-term relationships with local input agents and middlemen and these persons are quite reputable.

Contrasting the efforts in Thua Thien Hue province, one relatively successful cooperative is located in the southern Vietnamese Ca Mau province. They managed to negotiate formal agreements directly with input suppliers and wholesalers, circumventing the intermediate layer of agents. As a result, the farmers can buy shrimp seed, shrimp feed, aquatic medicine at lower prices compared with farmers who are not members of the cooperative. In this scheme, input suppliers also support the farmers in capacity building for more effective production and use of their supplies (Tepbac 2020). The cooperative model in Ca Mau province divides the capital payments for input supplies into sequences of 25% which farmers pay up-front from their own capital, 35% which farmers receive as an interest-free loan and 40% which farmers borrow from a bank (Tepbac 2020). This payment scheme, in combination with collective purchasing and circumventing intermediate layers allows for prices which are 10% to 20% lower compared to the currently predominant modes of interaction between farmers and agents of input supply. A representative of the Cai Bat cooperative in Ca Mau province commented the success of the cooperative as follows:

Initially, local shrimp farming was organized individually at everyone's own preference which resulted in low productivity, inconsistent quality and unstable prices. After establishing the cooperative in 2012, members of the cooperative were supported by the local government in installing technical infrastructure. Successfully closing agreements directly with input suppliers and wholesalers were critical in the cooperatives success and allowed farmers to source at relatively lower prices while allowing them to sell at prices above market average.

One important differentiator of success and failure of cooperatives is the initiative of farmers, but also the engagement of local governments in terms of reaching out to farmers and convincing them of the benefits to join the cooperative. Also, the capital expenditure for the necessary infrastructure and brokering an agreement with suppliers and wholesalers are critical areas in which local government engagement can decisively contribute to the successful establishment of a cooperative. The empirical findings are discussed within the concept of *upgrading* in the following section.

7. Discussion and conclusion

As other studies (such as Pickles et al. 2006 and Dannenberg et al. 2016) have pointed out, the options of entering upgrading trajectories are limited when an actor is situated in a 'captive' relationship with suppliers and buyers and this holds true for this study as well. The main option of white shrimp farmers in order to increase profitability is to improve the efficiency of overall production processes, thus, achieve *process* upgrading. Whether farmers can individually succeed in improving processes depends significantly on the capital which they have available (which determines whether they can install their own storage capacities, invest in intensive farming or purchase supplies at a discount). Thus, on an individual level, differences in available capital are also strong determinants whether farmers are positioned to achieve process upgrading, improve their profitability, reduce their economic risks and establish long-term competitive advantage over less affluent farmers in the process (while their relationship with suppliers remains largely unchanged). One focus area in which local and provincial policy makers could more strongly engage in are efforts to reduce the self-reinforcing effects which result from disparities in available capital.

On the collective level, the findings of the empirical material for this study confirm some of the difficulties which have been identified also by *Ha et al. (2013)* for the Mekong Delta. The individual production practices, geographical dispersion of farmers, low access to capital for infrastructure investments and low capacities of farmers to effectively coordinate demand and align production practices are among the most important barriers of successfully operating a cooperative in Thua Thien Hue province. Capacity building among farmers is needed in order to familiarize them with organizational management, finances and strategic development. One other important point is that relationships between farmers and supply agents are trust based and personal. These routines of transaction and choice of business partner are difficult to replace by a formalized contracting structure with which farmers are generally unfamiliar.

On the supply side, the main use of a collective organization could be to align input demand, provide storage space to allow for high-volume purchases and negotiate contracts directly with supply manufacturers. Achieving these process improvements may require significant and perhaps more proactive moderation and investment by local and provincial governments. This type of government moderation has also been outlined by *Kalogiannidis (2020)* as an important pre-requisite for the successful organization of agricultural cooperatives (*Kalogiannidis 2020: 461*). Initiatives to self-organize should ideally come from proactive farmers themselves and can be supported by the government which can help facilitate contacts and contract negotiations, provide a platform for horizontal coordination and (perhaps most importantly) provide capital in the form of subsidies for infrastructure investments like storage space as well as zero-interest loans which can allow farmers to pay for their input supplies up-front. Such initiatives could (but are not guaranteed to) improve the bargaining power

of farmers compared to input suppliers and middlemen and help farmers move towards more ‘market’-types of supplier-buyer relationships, the benefits of which are summarized in *Figure 2*. Efforts to establish a central fund to finance the up-front investments of cooperative farming are, in fact, currently underway in the Thua Thien Hue province. Also, efforts for stronger vertical integration are underway as the cooperative in the Phong Hai commune attempts to establish linkages with a local food processing company.

Conceptually, the empirical results of this study indicate that the manner of existing relationships constrain the upgrading options available, as farmers do not feature the expertise nor the capital to meaningfully engage in functional upgrading. While collective organization may seem an obvious step forward for farmers to improve their position, they typically cannot achieve this without the significant aid of external resources which would typically need to come from state actors and requires willingness of farmers to engage in horizontal coordination. Hence, the successful establishment of horizontal coordination may need to be preceded by a comprehensive communication process in which the benefits of coordination for the individual farmer are made clear. Also, the provision of capital for infrastructure investments are critical for success. If farmers collectively organize their purchasing process based on competitive bidding, it could initiate competition among suppliers which would potentially improve the farmers’ bargaining position. In such a manner, their relationship with suppliers might no longer be ‘captive’ but it could transition towards a mode described by *Gereffi et al. (2005)* as ‘market’. Such a mode features lower power asymmetries and it would be typical for a relatively even number of buyers and suppliers who negotiate prices based on level competition in a context of low complexity-transactions (*Gereffi et al. 2005: 90; Fig. 2*).

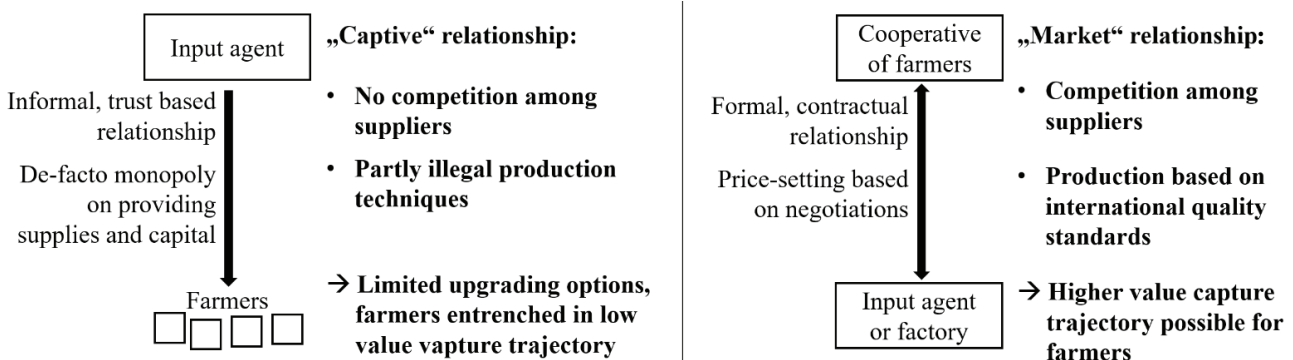


Fig. 2 Upgrading options for farmers and the potential of cooperative farming. Source: own elaboration

This study focused on the relationships of input suppliers and farmers in shrimp production in central Vietnam with the aim to identify the characteristics of those relationships and their role in attempts to improve the competitive situation of farmers. Existing initiatives to upgrade the production processes of farmers by forming cooperatives have thus far not been successful in the Thua Thien Hue province, which is mainly due to lacking capital investments in infrastructure and low willingness of farmers to coordinate more comprehensively. These deficiencies point to a need to engage in a communication process to identify and align production processes and input demand. This is a prerequisite in order to successfully close contracts with input manufacturers, achieve process upgrading and higher vertical integration of the value chain. Formalizing relationships between farmers and input suppliers in stronger vertical integration of value chains will contribute to standardization, higher transparency and quality increase of production processes which in turn could open new (higher value) export markets to farmers, contributing to the overall development of Thua Thien Hue province.

Regarding the upgrading discussion within the GVC-framework, this paper confirms the constraints faced by 'captive' suppliers in engaging in functional upgrading already identified in previous contributions. The article argues that for the successful horizontal organization of smallholders, which would *empower* them to move towards a more 'market'-like type of value chain governance, the simultaneous interplay of socioeconomic and geographic factors as well as institutional framework conditions can be decisive. This refers in particular to social and geographic proximity among smallholders as well as functional government support mechanisms for financing and communication as key requirements for successful horizontal organization. These factors have been absent among smallholders in Thua Thien Hue province, which can partly explain their failure to self-organize. However, since this article is based on an empirical study conducted in one location, the findings cannot be generalized as they are and would benefit from further empirical validation in future studies.

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