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- ▶ **Research paper:**  
Study of the impact of intermediaries on environmental and social outcomes and worker vulnerability in small-scale fishing and aquaculture in Indonesia and Viet Nam

Jointly funded by Monterey Bay Aquarium



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## ▶ Executive summary

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Seafood plays a key role supporting food security, economic opportunities and livelihoods around in the world, especially in coastal communities. There is increasing recognition of the connections between environmental health, livelihoods and labour conditions, as well as the need for inclusive strategies to make progress on the United Nations Sustainable Development Goals (SDGs). With the growing global demand for seafood, it is important to recognize the role of key actors within the supply chain, and how their actions may impact social, economic and environmental outcomes.

Small-scale operators engaged in fishing and aquaculture account for a significant portion of global seafood production and employ over 90% of global fisheries workers, half of which are woman. These small-scale fishing activities support over 100 million livelihoods, primarily in Asia, and have wide-ranging

social and economic implications on communities. The United Nations explicitly recognizes the importance of small-scale fisheries and established voluntary guidelines<sup>1</sup> to support poverty eradication, food security, and other related SDGs.

Working conditions in the seafood industry have come under increased scrutiny in recent years, primarily in relation to the exploitation of migrant workers employed in fishing and fish processing. Much of this attention has focused on working conditions on board large, long-distance industrial fishing vessels. However, small-scale seafood production constitutes a significant part of the industry in South-East Asia and ensuring decent work and sustainable livelihoods in this sector is particularly important for countries recognized as key countries of origin for migrant workers.

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<sup>1</sup> See <http://www.fao.org/3/i4356en/I4356EN.pdf>

Within Southeast Asia, several countries are in the process of governance reforms to improve the sustainability of fisheries and aquaculture, including emphasis on addressing the needs of small-scale operators. In addition, there are efforts to improve working conditions in the region's seafood industry, primarily in relation to the exploitation of migrant workers employed in fishing and fish processing. However, many efforts to improve small-scale fisheries and aquaculture do not address informal elements and actors within the supply chain that may have a significant impact on environmental and social outcomes.

Intermediaries, also known as middlemen or traders, are common within small-scale fisheries and aquaculture supply chains in Southeast Asia. They provide a range of services from purchasing the harvest to financing many different needs— in many cases they play a wide range of roles. However, there are uncertainties over whether intermediaries and their financial arrangements undermine social and environmental goals.

This study examines the specific role and impact of intermediaries through four case studies of small-scale seafood production in Southeast Asia. Specifically, this study conducted research and developed four case studies to better characterize the financial relationships and potential impacts of intermediaries on the livelihoods of small-scale blue swimming crab (BSC) fishers and shrimp farmers in Indonesia and Viet Nam. The study was developed to improve our understanding of the role of intermediaries, the types of financial relationships that exist, key drivers and the impacts on social and environmental outcomes.

Researchers identified Lampung and East Java, Indonesia, as well as Cà Mau and Kien Giang, Vietnam, as the four case study locations. Research focused on interviews with small-scale BSC fishers and shrimp farmers, intermediaries, processors, and other industry actors within the supply chain in late 2019 and early 2020. Key stakeholders, such as local government, industry associations, non-governmental organizations (NGOs) and academics, were consulted before and after the research for validation.

The results indicate that intermediaries serve many important roles in support of the small-scale fisheries and aquaculture sectors in both countries but also present long-term risks to livelihoods

and environmental sustainability. In many cases, intermediaries are a necessary part of the trading network that provide financing and other forms of support that cushion small-scale fishers and farmers from economic shocks, low seasons and other variability that is common within this sector. However, the study also finds that there is poor oversight over intermediaries and they may not adhere to regulations, further exacerbating the likelihood of long-term negative impacts to livelihoods and environmental sustainability. Moreover, the results indicate higher risks of debt bondage<sup>2</sup> within the small-scale fisheries sector, particularly in Indonesia. The findings suggest that the higher risk of debt bondage is due to the fact that small scale fishers often exist on the edge of poverty and are highly vulnerable without social safety nets, they cannot access transparent financing and they operate in an industry with poor oversight.

In both countries, the study found differences in aquaculture versus the fisheries sectors regarding the level of risk due to the reliance on intermediaries. It appears that although small-scale shrimp farmers often lack access to capital and operate under less-than-ideal economic scenarios, they have a lower risk of debt bondage than the small-scale fishers. Shrimp farmers in both countries borrow money from distributors or intermediaries, but they generally retain their freedom to sell the harvest to the highest bidding buyers. The main risk factor that leads shrimp farmers into an unsustainable debt situation is through farming failures due to disease outbreaks or other lost harvest events. Shrimp farmers in Indonesia and Viet Nam generally lack up-front capital and insurance or other measures to cushion them against economic shocks, but there is no evidence of structurally ingrained debt-bonding cycles.

Small-scale fishers also struggle with access to capital and are often dependent on intermediaries to provide supplies and equipment in advance of a fishing trip. Intermediaries usually deduct payment from the value of the catch after the trip. However, in contrast to the farming situation, the fishers lose their ability to freely sell their catch to the highest bidder and are often debt-bonded to sell the catch to the intermediaries who provided them with finance.

In BSC fishing in Indonesia, the study also found a strong system of binding loans. These are larger personal loans for non-fishing purposes that fishers

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2 Debt bonding, or debt bondage, is commonly understood to be a situation where a person is coerced into working to pay off a debt, including an inherited debt. Often the debt and the conditions for its repayment are not clearly defined and the debt is used to keep the person indebted in order to continue to extract their labour. This study uses a combination of the ILO indicators of forced labour and the social indicators of Conservation International's Fisheries Improvement Project to define coercion. More information can be found in Section 2.3 and Appendix II.

are required to take in order to establish their relationship with the intermediaries. While the capital provided by the intermediaries is officially “interest free”, in practice the fishers pay a high price through the reduction of catch value. In some of the examples identified, the reduction in catch value was equivalent to a 76 per cent de facto annual interest on the capital provided.

The study also indicates that intermediaries directly impact environmental performance and sustainability outcomes. In particular, intermediaries often employ “buy-all” practices that involve the purchase of all of the harvest from fishermen or farmers, regardless of whether the harvest is in compliance with regulations (e.g. minimum catch/ harvest size limits or other conservation measures). These practices can be beneficial for shrimp farmers who want to sell their entire shrimp harvest (not just certain sizes), and this does not necessarily cause additional environmental impact. Within BSC fisheries, the “buy-all” practice of intermediaries incentivizes catching BSC of all sizes, including juveniles and/or gravid females, undermining conservation measures and the sustainability of the resource. These “buy-all” practices generally support the economic stability of fishing and farming communities during low seasons but concurrently pose risks that may undermine the environmental sustainability of the resource. Over time, environmental degradation due to poor management and/or climate change is likely to increase fishers’ and farmers’ reliance on intermediaries for financing and the risk of falling into debt-bonding cycles.

These results reinforce the notion that intermediaries can influence positive and negative social and environmental outcomes, so practitioners must identify appropriate strategies for stakeholders

to minimize the likelihood of negative impacts. In particular, any reforms must consider the social and environmental impacts of their supply network, not just the efficiency and profitability of the trading network. A more holistic approach is needed, including alternative financing mechanisms to cushion small-scale fishers and farmers from economic shocks, unexpected events and low seasons.

The study concludes with a discussion of potential reforms to improve social and environmental outcomes related to intermediaries in the BSC fishery and farmed shrimp sectors in Indonesia and Viet Nam. Several potential actions are considered, including proposals to establish alternative financing mechanisms, increase access to social protection programs and insurance, and policies to regulate intermediaries. It also highlights some successful approaches in small-scale aquaculture to address finance and related issues through cooperative models.

Further research is needed to understand if the trends identified in this study apply more broadly to BSC or farmed shrimp supply chains in Southeast Asia. Specifically, future studies could assist in understanding if intermediaries are willing to provide alternative financing and buying terms that would not undermine social development and environmental conservation goals. In addition, the study recognizes the need for more research to fully comprehend the underlying causes and the different forms of debt bondage that may exist in different communities, supply chains and sectors. Further dialogue with key stakeholders and additional study of these topics will help to further articulate priority actions and accelerate efforts to achieve sustainable inclusive growth and decent work the in the region.

## ► Abbreviations

APRI	<i>Asosiasi Pengelolaan Rajungan Indonesia</i>
BSC	Blue swimming crab
EDF	Environmental Defence Fund
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FIP	Fisheries Improvement Project
GT	Gross Tonnage
hp	horsepower
ICAFIS	International Collaborating Centre for Aquaculture and Fisheries Sustainability
ILO	International Labour Organization
IDR	Indonesian rupiah
kg	Kilogram
MMAF	Ministry of Marine Affairs and Fisheries of Indonesia
mT	Metric tonne
NGO	non-governmental organization
nm	nautical mile
RT	<i>Rukun Tetangga</i> (a smaller unit of a village)
SDGs	UN Sustainable Development Goals
UB	<i>Usaha Bersama</i> (a collective farm financing body)
USA	United States of America
USD	US dollars
USDOL	US Department of labour
VND	Vietnamese dong
WWF	World WideLife Fund for Nature

## ► Introduction

Demand for fish and seafood is increasing globally, as a result of both growing populations and per capita consumption.<sup>3</sup> Seafood plays a key role in global food security, especially in coastal communities. As demand continues to rise, the need to ensure environmental sustainability, in order to protect food security, livelihoods as well as biodiversity and ocean health, is also increasingly apparent. Sustainable seafood production is thus a key element in realizing the UN Sustainable Development Goals (SDGs) in general, and in particular in relation to poverty eradication (SDG1), addressing hunger and food insecurity (SDG 2), ensuring decent work for all (SDG 8) and ensuring conservation and sustainable use of marine resources (SDG 14).

The Global Hunger Index for 2019<sup>4</sup> scores Viet Nam at moderate risk of food insecurity, and Indonesia at serious risk. Ensuring sustainable seafood production is an essential component in preventing food insecurity and achieving the SDGs in both countries.

In addition, the seafood industry in both countries includes a significant segment that produces food for export. The environmental and social sustainability of seafood, not least from South-East Asia, has become an increasing concern in the main export markets since 2014, when cases of slavery on board Thai flagged fishing vessels were documented.<sup>5</sup> Therefore, ensuring social sustainability and compliance with national legislation and international conventions is an increasingly important market driver.

Seafood production is the primary livelihood for millions of people around the world and working conditions in the seafood industry have come under increased scrutiny, primarily in relation to the exploitation of migrant workers employed in fishing and fish processing. In Indonesia, 2,602,000 people work in capture fisheries, mostly on smaller vessels, with another 3,344,000 people engaged in aquaculture production.<sup>6</sup> In addition, up to twice as many people in Indonesia work in related industries, including processing.<sup>7</sup> Seafood production thus provides employment and livelihoods for a substantial number of Indonesians. Capture fisheries have a predominantly male workforce, while women predominate in processing and marketing; in aquaculture the picture is a little more mixed as women are directly involved in farming certain species (such as milkfish) as well.<sup>8</sup>

Similar data is not available for Viet Nam. However, in 2017, more than 5 million people were employed as skilled workers in agriculture, forestry, and fishery, including aquaculture, and a total of 7,313,400 tonnes of seafood was produced.<sup>9</sup> As in Indonesia, work tends to be organized along clearly defined gender roles, especially in fisheries where men are most likely responsible for fishing activities, while women support this through gear maintenance and marketing. Children in the family may also help with all types of activities, according to their gender. This does not appear to significantly impact schooling as primary education participation rates are high in both

3 United Nations Food and Agriculture Organization (FAO): *State of World Fisheries and Aquaculture 2018* – Meeting the Sustainable Development Goals (Rome, Italy, 2018), <http://www.fao.org/3/19540EN/i9540en.pdf>

4 Global Hunger Index, Concern Worldwide and Welthungerhilfe: 2019 Global Hunger Index by Severity (Global Hunger Index, Concern Worldwide and Welthungerhilfe (2020) <https://www.globalhungerindex.org/results.html>

5 The 2014 investigative media reports on slavery in the Thai seafood industry in the Guardian was the first of a series of investigative journalism pieces on slavery in the Thai and wider Asian seafood industry, <https://www.theguardian.com/global-development/2014/jun/10/sp-migrant-workers-new-life-enslaved-thai-fishing>

Other journalism on the issue included the 2015 Associated Press investigations and a number of reports from NGOs continuing to document exploitation in fishing and seafood, <https://www.ap.org/explore/seafood-from-slaves/ap-investigation-slaves-may-have-caught-the-fish-you-bought.html>

Recent reports, going beyond the initial focus on Thailand include EJF's 2019 report Blood and Water, <https://ejfoundation.org/reports/blood-and-water>

6 FAO, idem.

7 I. Stobutzki, K. Stephen and K. Mazur: Overview of Indonesia's Capture Fisheries 2013 (ABARES, Canberra, Australia, 2014), [http://aciar.gov.au/files/app5\\_indonesian\\_capture\\_fisheries.pdf](http://aciar.gov.au/files/app5_indonesian_capture_fisheries.pdf)

8 N.R. Loneragan, N. Stacey, C. Warren, E. Gibson, R. Fitriana, D. Adhuri, V.J. Jaiteh, P.L.K. Mustika, D.J. Steenbergen and B. Wiryawan: *Small-Scale Fisheries in Indonesia: Benefits to Households, the Roles of Women, and Opportunities for Improving Livelihoods* (ACIAR Small Research Activity, Project Number FIS/2014/10, 2018), <https://www.aciar.gov.au/project/FIS-2014-104>

9 General Statistics Office (GSO) of Viet Nam: *Agriculture, Forestry and Fishing: Production of Fishery of Viet Nam* (2019), [https://www.gso.gov.vn/default\\_en.aspx?tabid=778](https://www.gso.gov.vn/default_en.aspx?tabid=778)

Indonesia and Viet Nam.<sup>10</sup> However, there are reports that children drop out of school to work full time in seafood production, though the extent is not clear. The US Department of Labor (USDOL) includes fish caught by child labour in their report on Viet Nam and a study of illegal, unreported and unregulated fishing and labour conditions in Viet Nam by the Environmental Justice Foundation (EJF) found a total of 12 children below the age of 18 working full time on board the 41 vessels surveyed, despite the fact that Vietnamese legislation prohibits the employment of children under 18 years of age in distant water fishing.<sup>11</sup>

Although much of the attention on working conditions on board has focused on large, long-distance industrial fishing vessels, small-scale seafood production constitutes a significant part of the production and export in both Viet Nam and Indonesia. Small-scale farms and vessels are often family-operated entities located in relatively remote areas with lower than average access to social services, such as health care and education. This remoteness also means that administrative and financial centers are located some distance from where fishers and farmers live, making it more challenging for them to access insurance, banking services, social protection schemes, and other services that can cushion them and their families against the risk of economic shocks, such as crop disease, storms or illnesses.

Acute poverty rates have been dropping, but nevertheless many small-scale fishing and farming communities, families and individuals, remain in the lower income brackets, hovering just above the poverty line. An economic shock may plunge the

household (back) into acute poverty, forcing fishers and farmers to sell off assets or take loans to survive.<sup>12</sup> This leaves small-scale fishers and farmers vulnerable to exploitation if, for example, they decide to migrate in search of work and income or take loans from local intermediaries in the seafood supply chain. The risks of labour exploitation in connection with migration in the seafood industry in South-East Asia has been researched and documented extensively, but the body of evidence on the risks of exploitation for those who remain at home or migrate internally is comparatively less well understood.<sup>13</sup>

Industrial fishing has come under scrutiny for abusive labour practices, including forced labour and human trafficking, especially of migrant fishers. A recent study in Indonesia revealed that the domestic recruitment of fishers on board Indonesian flagged commercial vessels can also involve deceptive and fraudulent recruitment practices and debt bondage.<sup>14</sup> It is also widely recognized that small-scale fishers are economically vulnerable, although there have been only limited studies on the issue of debt bondage to intermediaries in small-scale fisheries.

Aquaculture is one of the large economic growth areas in Asia and many countries have set ambitious targets for continued expansion of aquaculture production and export. Similar to commercial fishing, most resources go into large commercial operations and intensive production methods run by large corporations and connected to international supply chains and brands. However, most of the production across the region is still undertaken by small-scale fish farmers. Small-scale fish farmers often face similar challenges to small-scale

10 In Indonesia 93 per cent of all primary school age children and 79 per cent of all secondary school age children were enrolled in school in 2018 (United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics (UIS): Data for the Sustainable Development Goals: Indonesia (Montreal, Canada, 2020). In Viet Nam net enrolment figures are not available, but in 2018 the gross enrolment in primary school was 111 per cent (probably indicating that children outside the usual age bracket for primary school enrolment started school that year). Secondary school enrolment figures are not available for Viet Nam (UIS: Data for the Sustainable Development Goals: Viet Nam (Montreal, Canada, 2020).

11 Bureau of International Labor Affairs, US Department of Labor (USDOL): 2018 *Findings on the Worst Forms of Child Labor: Indonesia* (Washington DC, USA, 2018), <https://www.dol.gov/agencies/ilab/resources/reports/child-labor/indonesia> and Environmental Justice Foundation (EJF): *Caught in the Net: Illegal fishing and child labour in Vietnam's fishing fleet* (London, UK, 2019), <https://ejfoundation.org/resources/downloads/ReportVietnamFishing.pdf>

12 K. Alam and M. Ajay: *Economic impacts of health shocks on households in low and middle income countries: a review of the literature* (2014), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4108100/>

C. Béné: "Are Fishers Poor or Vulnerable? Assessing Economic Vulnerability in Small-Scale Fishing Communities" in *The Journal of Development Studies* (2009), [https://www.researchgate.net/publication/46529282\\_Are\\_Fishers\\_Poor\\_or\\_Vulnerable\\_Assessing\\_Economic\\_Vulnerability\\_in\\_Small-Scale\\_Fishing\\_Communities?enrichId=rgreq-7879f1b1108a4e3e512960fbc1523754-XXX&enrichSource=Y292ZjQyYWdlOzQ2NTI5MjgyO0FTOjIwNjQ3ODY5MTU3Mzc2MEAxNDI2MjM5NzY0NTAx&el=1\\_x\\_3&\\_esc=publicationCoverPdf](https://www.researchgate.net/publication/46529282_Are_Fishers_Poor_or_Vulnerable_Assessing_Economic_Vulnerability_in_Small-Scale_Fishing_Communities?enrichId=rgreq-7879f1b1108a4e3e512960fbc1523754-XXX&enrichSource=Y292ZjQyYWdlOzQ2NTI5MjgyO0FTOjIwNjQ3ODY5MTU3Mzc2MEAxNDI2MjM5NzY0NTAx&el=1_x_3&_esc=publicationCoverPdf)

13 K. Jones, D. Visser, J. Prasetya and D. Nuriyati: *Fish for Export: Working in the Wild Capture Seafood Industry in Indonesia. British Academy Tackling Slavery, Human Trafficking and Child Labour in Modern Business* final report (2019), [https://crest.iom.int/sites/default/files/document/fish\\_for\\_export\\_final\\_report.pdf](https://crest.iom.int/sites/default/files/document/fish_for_export_final_report.pdf)

For recent research on working conditions in commercial (large-scale) fishing in Indonesia see: International Organization for Migration (IOM), *Report on Human Trafficking, Forced Labour and Fisheries Crime in the Indonesian Fishing Industry* (Jakarta, Indonesia, 2016), <https://www.iom.int/sites/default/files/country/docs/indonesia/Human-Trafficking-Forced-Labour-and-Fisheries-Crime-in-the-Indonesian-Fishing-Industry-IOM.pdf> In addition, the Tri-annual Journal of the International Collective in Support of Fish-workers' Trust regularly publishes articles relating to small fishers' livelihoods and working conditions, as well as articles related to industrial, long-distance fleets <https://www.icsf.net/en/samudra>

14 K. Jones et al., op. cit.

fishers related to limited access to services such as farm inputs, finance and insurance and generally have less capacity to adapt to and use technology and best practices that would ensure sustainability and better market access. In addition, aquaculture operations are prone to natural disasters (such as typhoons and flooding), disease outbreaks and other environmental challenges that may destroy production and assets and impact livelihoods.

This study aims to contribute to the understanding of economic and social drivers and the likelihood of debt bondage within the seafood supply chains in South-East Asia, particularly the role of intermediaries, also known as middlemen or traders, on the livelihoods of small-scale fishers and farmers in Indonesia and Viet Nam. Ensuring decent work and sustainable livelihoods in small-scale fishing and farming is particularly important for countries recognized as key countries of origin for migrant workers and victims of human trafficking.



## ► Methodology

The study used both qualitative and quantitative methods and employed the following survey methods. The study did not aim to have a statistically sound survey method or sampling methodology/survey size and therefore findings cannot be generalized.

### Survey method

#### Open ended and direct questions

This technique was used to gather information on respondents' knowledge and their socio-economic conditions, to ensure that all related questions did not violate the criteria of classical statistical theory and to answer specific questions. For example, answers to socio-economic questions (such as: "How old are you?") are independent between individuals, while the answers to questions on knowledge of artisanal fisheries (for example: "What fishing gear do you usually use?") are necessarily constructed through social interactive processes and are therefore dependent.

#### Semi-structured interviews

Semi-structured interviews were conducted with key informants (village head or government official) in the village. Key informants were interviewed before conducting fisher/farmer surveys in the village. Prior to the interview, the aim of the survey and the intended questions were discussed to obtain information that allowed further strategic development of survey questions.

#### Free listings

Free listings allowed the generation of a comprehensive list of items in a knowledge domain. These were conducted by asking respondents to generate a list of items in response to a question that captured the knowledge domain under analysis. Respondents were asked to list as many items as they could think of (for example: "Can you name all the fish that you usually catch?"). From the responses, it was then possible to calculate: 1) the percentage of people who mentioned each item; 2) the average ranking for mentions of each item; and 3) the saliency of each item. This information was then used to create an index that evaluates, with a range from 0 to 1, the overall importance of an item across all the lists.

#### De facto research

This research observed and described the fishing, farming, living, processing, and other ecological and social conditions of the research sites as they exist in reality. It also described any past or present trends that might be easily detectable (such as a new main road or planned port expansion).

The above methods were either used in one-to-one interviews or group discussions. One-to-one interviews were carried out with supply chain actors, such as processors and intermediaries. For the fishers and farmers the interviews were either one-to-one or group discussions, depending on the dynamic of the particular community and ease of getting people in a group versus individually.

### Sampling

A purposive sampling method was used to choose a range of respondents from the following categories:

1. intermediaries;
2. fishers and farmers relevant to the selected methods/target species;
3. processors linked to selected species/supply chains;
4. officials of local relevant government departments in selected locations; and
5. others such as industry associations, NGOs and academics.

In order to ensure that fishers and farmers were interviewed without the presence of the intermediaries, they were approached in neutral places.

There was no minimum target number of interviewees in this study as the study was targeting people for specific purposes rather than trying to cover a statistically relevant sample size. The detailed site specific number of different supply chain actors interviewed can be found in Appendix I.

### Identifying coercion

The study analysed the working and contractual conditions of small-scale fishers and farmers to explore the ways in which they may be vulnerable to coercion and higher degrees of exploitation and/or slavery-like practices than other fishers and farmers.

The ILO Indicators of Forced Labour<sup>15</sup> were used to guide analysis of forced labour and the following specific aspects were included in the analysis in order to understand whether coercion took place in the intermediary/producer relationships:

- The volume of work (including the number of hours of work per day, the number of working days per week and per month);
- The payments made in cash and in kind;
- The risks to safety and health faced by workers in forced labour, such as hazardous tasks performed without protection or night work (variables relating to injuries and illness due to work are analysed here);
- The existence or absence of a contract, its form (verbal or written) in relation to payments and debts; and
- The funding received for social and family expenses (such as loans for religious or family events).

In addition, Conservation International's social indicators for Fishery Improvement Projects (FIPs) were used, as they specifically include criteria for small-scale fishing and aquaculture debt bondage (see Appendix II for further details).<sup>16</sup> The indicators consist of three criteria:

1. Access to a reliable debt record;
2. Fishers' ability to pay off the debts; and
3. Transparency of the trade transaction.

## Gender and other considerations

Specific measures were applied throughout the study to ensure a gender-responsive approach. Due to the nature of aquaculture and fishing activities, where certain functions are heavily male dominated, the research did not strive to interview an equal number of men and women. Rather, women were actively sought out for interviews related to traditional female roles and responsibilities to ensure representation related to all functions and roles, both those performed by men and those performed by women.

In addition to gender responsive research methodology, the study took into account other characteristics that define or impact the experiences,

operations and livelihoods of fishers and aquaculture farmers. These may include (but are not necessarily limited to) age, ethnicity, and migration (including internal migration) status.

## Ethical considerations

As the subject of the research is considered sensitive, respondents could experience repercussions if recognized. Therefore, full transparency about the purpose and use of the study and ensuring respondents' anonymity were high priorities. A confidential consent form was explained and signed by each participant. To protect respondents, they are not quoted in the results of this study. Where necessary, interviews were conducted in complete confidence away from workplaces and public spaces.

No children or minors were interviewed as part of this study.

## Bias and limitations

The study only approached a limited number of participants and was also subject to selection, response and recall biases and hence cannot be interpreted as representative of entire communities or fishery/farming situations. The study focused only on the situation in specific geographical locations and species-specific situations. Hence the practices identified cannot be generalized across the small-scale farming and fishing sectors in the countries studied.

## Validation

A workshop was conducted in Indonesia to validate information collected and to receive feedback on the general accuracy and trends identified. In Viet Nam, the validation took place through a series of meetings with key stakeholders.<sup>17</sup> Possible solutions and recommendations were also discussed with the stakeholders during validation.

The validation processes in both countries included people who were interviewed for the surveys as well as people who were independent to the survey but generally knowledgeable about the sectors and issues, such as representatives from community groups, industry, government, and NGOs.

<sup>15</sup> ILO Special Action Programme to Combat Forced Labour (SAP-FL): *ILO Indicators of Forced Labour* (Geneva, Switzerland, 2020), [https://www.ilo.org/wcmsp5/groups/public/---ed\\_norm/---declaration/documents/publication/wcms\\_203832.pdf](https://www.ilo.org/wcmsp5/groups/public/---ed_norm/---declaration/documents/publication/wcms_203832.pdf)

<sup>16</sup> Conservation International: *Social Responsibility Assessment Tool for the Seafood Sector* (Arlington, USA, 2019) [https://045d2403-c85b-42b4-96d2-cccc7e925ee3.filesusr.com/ugd/2cb952\\_2c49ff86074441428dc979cafaa5be9d.pdf](https://045d2403-c85b-42b4-96d2-cccc7e925ee3.filesusr.com/ugd/2cb952_2c49ff86074441428dc979cafaa5be9d.pdf)

<sup>17</sup> Due to unforeseen circumstances, including measures to contain the spread of the COVID-19 pandemic, it was not possible to conduct one major validation workshop in Viet Nam.

## ► Chapter 1: Detailed industry and field site descriptions

Supply chains for farmed shrimp and wild blue swimming crab (BSC) were chosen for this study because they rely heavily on intermediaries to facilitate moving products from farmers and fishers to processors. Moreover, this choice allowed a comparison of supply chains of farmed and wild caught species and of similar production systems across the different socio-economic and cultural contexts of Indonesia and Viet Nam.

Farmed shrimp is a major export commodity in both Indonesia and Viet Nam and shrimp products from both countries are found in supermarkets and restaurants around the world, especially in major seafood importing markets, such as the European Union (EU), the United States of America (USA) and Japan. Shrimp farming is also an important livelihood source in coastal communities in both countries.

Wild caught BSC is also primarily an export product, though on a smaller scale than farmed shrimp. BSC capture and processing provide a livelihood for a substantial number of people in both Viet Nam and Indonesia.

### 1.1 Shrimp production

#### 1.1.1 Vietnamese shrimp industry

There are two main cultured shrimp species in Viet Nam, the indigenous black tiger shrimp (*Penaeus monodon*) and whiteleg shrimp (*Litopenaeus vannamei*). Black tiger shrimp has been farmed since the early 1980s. In 1998, whiteleg shrimp were introduced into Viet Nam with the advance of industrial intensive farming techniques.

Three different farming systems are used in Viet Nam: extensive, semi-intensive and intensive. Extensive farms are open systems that are often established in mangrove areas. Semi-intensive and intensive farms are closed systems.<sup>18</sup> Extensive and intensive farms

types have very different operational and financial profiles and requirements. While all types of farms are discussed in more detail, the focus is on small-scale farmers using either extensive black tiger shrimp farming or semi-intensive farming of black tiger or whiteleg shrimp.

The area used for shrimp farming in Viet Nam did not increase much between 2010 and 2018, reaching a plateau of about 720,000 hectares. However, the production of farmed shrimp increased significantly over the same period (from 469,893 mT to about 800,000 mT). Shrimp aquaculture now accounts for 61.3 per cent of the aquaculture export turnover and 39.8 per cent of the total production of the fisheries and aquaculture sectors in Viet Nam. The increase in shrimp production was driven by whiteleg shrimp farming, increasing from 136,719 mT in 2010 to 393,429 mT in 2018, mainly as a result of the further intensification of farms. Black tiger shrimp production declined from 333,174 mT in 2010 to 263,853 mT in 2016,<sup>19</sup> though Viet Nam remains the largest producer of black tiger shrimp in the world.

The export value of farmed shrimp fluctuates according to global supply and demand. The value of export turnover was over 2.9 billion US dollars (USD) in 2015 and reached USD3.58 billion in 2018. Vietnamese shrimp is exported to many countries, with the most important markets being the EU, Japan and the USA.

The Mekong River Delta is an important region for agricultural products, aquaculture, fishing and processing. The total natural area of the Mekong River Delta in Viet Nam is 4,046,400 hectares, of which 80.3 per cent is devoted to agriculture and fisheries. It is the most important region for shrimp aquaculture, with over 80 per cent of production taking place in the coastal provinces.<sup>20</sup> Among these, Ca Mau province has the largest farming area, accounting for 44.2 per cent of the shrimp farming area of the region.<sup>21</sup> For this reason, fieldwork for this study took place in the province of Ca Mau.

<sup>18</sup> Closed system: water is circulated within the system.

<sup>19</sup> BỘ NÔNG NGHIỆP VÀ PHÁT TRIỂN NÔNG THÔN TỔNG CỤC THỦY SẢN: ĐỀ ÁN TỔNG THỂ PHÁT TRIỂN NGÀNH CÔNG NGHIỆP TÔM VIỆT NAM ĐẾN NĂM 2030, <https://tongcucthuysan.gov.vn/Portals/0/De%20an%20nganh%20tom%2013-12-2017.pdf>

<sup>20</sup> Seafood Trade Intelligence Portal: "Cultured Shrimp in Vietnam" (Utrecht, the Netherlands, 2020), <https://seafood-tip.com/sourcing-intelligence/countries/vietnam/shrimp/>

<sup>21</sup> Ministry of Agriculture and Rural Development, *Planning the Development of Aquaculture in the Mekong Delta 2015-2020* <http://vukehoach.mard.gov.vn/DataStore/1778QHNTTS%20DBSCL.pdf>

Figure 1: Map of the Mekong Delta



### 1.1.2 Indonesian shrimp industry

According to the United Nations Food and Agriculture Organization (FAO), Indonesia is the world's second largest shrimp producer after China, producing 637,555 mT in 2017.<sup>22</sup> However, the official Indonesian Ministry of Marine Affairs and Fisheries (MMAF) figure for 2017 put Indonesian shrimp production much lower, at 400,000 mT worth USD4 billion.<sup>23</sup> The majority of shrimp production now comes from aquaculture, since a total ban on trawl fishing was applied in 2015.

Similar to Viet Nam, almost all semi-intensive farmers have shifted to the production of whiteleg shrimp, which now accounts for more than 75 per cent of total shrimp production. Farmers using extensive mono- and poly-culture ponds still grow black tiger shrimp. The top producing provinces are North Sumatra,

West Kalimantan, East Java, South Sulawesi and West Sumatra.<sup>24</sup>

Farmed shrimp exports of 175,000 mT (processed weight, including exports of wild shrimp) in 2017 had a value of USD1.7 billion and accounted for 38 per cent of Indonesian fisheries export value that year. Approximately 91 per cent (by volume) of exported shrimp goes to the EU, Japan and the USA.<sup>25</sup>

Three different locations were sampled for the Indonesia shrimp field research: East Lampung and Dipasena, where whiteleg semi-intensive farming is dominant, and Pinrang in South Sulawesi, a black tiger shrimp farming area. Shrimp production in 2017 was 23 million mT for South Sulawesi and 5 million mT in Lampung, together representing 7 per cent of total national shrimp production.<sup>26</sup>

22 FAO: Yearbook of Fishery and Aquaculture Statistics: Aquaculture Production 2017 (Rome, Italy, 2019), [http://www.fao.org/fishery/static/Yearbook/YB2017\\_USBCard/root/aquaculture/yearbook\\_aquaculture.pdf](http://www.fao.org/fishery/static/Yearbook/YB2017_USBCard/root/aquaculture/yearbook_aquaculture.pdf)

23 Kementerian Kelautan dan Perikanan (KKP): Kelautan dan perikanan dalam angka 2018 (Jakarta, Indonesia, 2018), <https://kkp.go.id/setjen/satudata/page/1453-kelautan-dan-perikanan-dalam-angka>

24 KKP (2018): idem.

25 Seafood Trade Intelligence Portal (2020), op. cit.

26 KKP (2018): op. cit.

Farmers in East Lampung and Dipasena were interviewed. For about the past five years, all the semi-intensive farms in the area have produce whiteleg shrimp. In East Lampung, the pond size ranges from 800 m<sup>2</sup> to 5,000 m<sup>2</sup>. In Dipasena, the size of the farms is uniform at about 2,000 m<sup>2</sup> (50 m x 40 m).

Black tiger shrimp farming in South Sulawesi is extensive and traditional with very minimal inputs. However, the size and management of the shrimp farms differ by area. In Palameang sub-district, for instance, each shrimp farm can be up to 150,000 m<sup>2</sup>. In this area, farm owners are not directly involved in the daily farm operations. Instead, they appoint a farm manager, who is usually a relative and who makes daily decisions about farm operations. In contrast, in the neighbouring sub-district of Lanrisang, where farm sizes are much smaller at around 10,000 m<sup>2</sup>, most farms are managed directly by farmers, a member of their family or rented.

## 1.2 Blue swimming crab fisheries

### 1.2.1 Vietnamese blue swimming crab industry

In 2017, Viet Nam's exports of crabs and other crustaceans (excluding shrimps) reached USD118 million in value. Viet Nam exported its crabs to 44 markets with the major export markets being the USA (44 per cent), Japan (27 per cent) and the EU (13 per cent).<sup>27</sup>

In 2008, Vietnamese BSC fishery was estimated to total around 11,300 mT.<sup>28</sup> This declined to 7,800 mT in 2013<sup>29</sup> and just 3,600 mT in 2017.<sup>30</sup> The most recent stock assessment for BSC in 2015 confirmed continued unsustainable levels of exploitation, although there had been a small improvement from the previous assessment.<sup>31</sup>

### 1.2.1.1 Management

Until 2018, BSC fisheries management in Viet Nam was based on an annual seasonal closure for fisheries from 1 April to 30 June in the coastal areas of Kien Giang and Ca Mau provinces, with a minimum landing size of BSC of 10 cm (carapace width).<sup>32</sup> These regulations are no longer valid since the implementation of the new Fishery Law (2019) and new measures are being drafted in 2020 for the fishery. It is not clear how effectively the closed season and landing size limitations are enforced and it appears that despite these regulations, resources are still declining and require further management action, as outlined in the FIP.<sup>33</sup>

The fishery is divided into four management areas, based on vessel size:

- No fishing within 2 nautical miles (nm) of the coast;
- Vessels <15 horse power (hp), fishing from 2 nm or at 4 m to 8 m in depth;
- Vessels >15 hp to 33 hp, fishing at 8 m to 18 m depth; and
- Vessels >33 hp, fishing from 24 nm or > 18 m depth.

This study looked at BSC vessels below 33 hp.

### 1.2.1.2 Study site

The study took place in an export orientated BSC fishery concentrated in Kien Giang province. Elsewhere in the country, BSC is caught as by-catch and retained mainly for local use. The rapid development in the processing and export sector, as well as increasing local demand from the tourism sector, has led to increased socio-economic benefits as well as concerns over the sustainability of the capture fisheries sector.

In Kien Giang province, the BSC fishery plays an important role for coastal communities in the districts of Hon Dat, Kien Luong, Kien Hai, Ha Tien and Phu

27 Vietnam Association of Seafood Exporters and Producers (VASEP): *Report on Seafood Exports of Vietnam 2017* (Ho Chi Minh City, Vietnam, 2018), [http://seafood.vasep.com.vn/Report-seafood-export/505\\_12360/REPORT-ON-VIETNAM-SEAFOOD-EXPORTS-IN-2017.htm](http://seafood.vasep.com.vn/Report-seafood-export/505_12360/REPORT-ON-VIETNAM-SEAFOOD-EXPORTS-IN-2017.htm)

28 D.T.P. Nguyen: Current Fisheries and Aquaculture Policies Relevant to RFLP in Viet Nam (Regional Fisheries Livelihoods Programme for South and Southeast Asia (GCP/RAS/237/SPA) Field Project Document 2010/VIE/1, 2010) <http://www.fao.org/3/a-ar478e.pdf>

29 T.H. Nguyen, T.H. Than, et al., Feasibility Study: Marine Fisheries in Vietnam (not published).

30 WWF: Fisheries Improvement Projects: Vietnam Blue Swimming Crab (2019), <https://seafoodsustainability.org/portfolio/vietnam-blue-swimming-crab/>

31 Sustainable Fisheries Partnership (SFP): FishSource: Blue Swimming crab – Vietnam (Honolulu, USA, 2020), [https://www.fishsource.org/stock\\_page/746](https://www.fishsource.org/stock_page/746)

32 Vietnamese Ministry of Fisheries, Circular 02/2006/TT-BTS dated 20 March 2006, providing guidance on the implementation of Decree No. 59/2005/ND-CP of 4 May 2005, <https://thuvienphapluat.vn/van-ban/Doanh-nghiep/Circular-no-02-2006-TT-BTS-of-March-20-2006-guiding-the-implementation-of-the-government-s-decree-no-59-2005-ND-CP-of-may-4-2005-on-production-an-72765.aspx>

33 WWF (2019): op. cit.

Quoc Island. It employs around 20,000 people in fishing, trading, picking and processing. There are 1,718 BSC fishing boats in the province.<sup>34</sup> Gillnets are the most common type of fishing gear, with 77.8 per cent of vessels using gillnet and 22.2 per cent using pots/traps.<sup>35</sup> Small-scale vessels normally use gillnets up to 10 km long.<sup>36</sup>

The main season for BSC fishing is from April to August. There is much variation in BSC size by month and among fishing boats, with catches being larger in gillnets.<sup>37</sup> During the southwest monsoon, most of the BSC fishing fleet shift to jellyfish as their target species.<sup>38</sup>

### 1.2.2 Indonesian blue swimming crab industry

BSC (locally known as *ranjungan*) is important for inshore fisheries in many parts of Indonesia. Indonesian vessels use gillnets, traps, and baby-trawls to catch crabs. According to the MMAF, the total national production in 2017 was 272,400 mT and West Java was the top-producing province, contributing 41 per cent of national production.<sup>39</sup>

BSC has the third highest export value among Indonesian seafood products, after shrimp and tuna. The total export volume of BSC in 2017 reached 15,867 mT valued at USD 308,827,461. The USA is the biggest market for Indonesian BSC, purchasing approximately 71 per cent of the total BSC exported. Other markets include Japan (9 per cent), Malaysia (7 per cent) and Singapore (3 per cent).<sup>40</sup>

An estimated 90,000 fishers and 185,000 pickers (working in over 550 mini-plants<sup>41</sup> or cooking stations throughout Indonesia) are directly employed in the crab fishery. In addition, several thousand other people are involved in the fishery, including intermediaries; operators of mini-plants, where initial processing is carried out; and final processors/packagegers who export the products.<sup>42</sup>

#### 1.2.2.1 Management

BSC fishery has been declared as either fully or over-exploited by Indonesia's National Commission for Fish Stock Assessment. It is further characterized by excessive fishing effort and increasing fishing trip distances to chase fewer and smaller crabs, with the frequent capture of juveniles and egg-bearing females, all evidence of a fishery in serious decline.<sup>43</sup>

In 2015, after sustained pressure from industry, the Indonesian Government imposed regulations on BSC harvesting:

- A minimum legal landing size of 10 cm (carapace width);
- Prohibition on landing/processing of egg-bearing females; and
- A ban on the use of trawl gear in the fishery (this was recently temporarily and selectively lifted).

These national regulations remain at various degrees of implementation, even though this may cause issues with the legality of exports: legislation in the USA requires that all imports be checked to ensure they comply with source-country regulations.

In 2016, the Indonesian Government established the National Fishery Management Plan for BSC Fishery for Indonesian Fishery Management Areas (Ministerial Decree No. 70/Kepmen-KP/2016). This Decree guides the national government, local governments and stakeholders in detailed implementation.

#### 1.2.2.2 Study site

This study was mainly conducted in Lampung province, South Sumatra. A smaller survey was also conducted in Cirebon, West Java province in order to have a comparison site. Lampung province registered production was only 34 mT in 2017.<sup>44</sup> This is most likely an underestimate as another source estimates

34 WWF (2019): op. cit.

35 T.H. Nguyen, T.H. Than, et al.: op. cit.

36 The stretched mesh of gillnets vary from 70–120 mm. Nets are made of monofilament and usually comprise individual sheets 100–150 m long to make up the complete net. The height of the net is around 1 m, but may reduce in the water to about half. The nets are set in triangular patterns, at approximately 30° angles, over the length of ground covered.

37 T.H. Nguyen, T.H. Than, et al.: op. cit.

38 T.H. Nguyen, T.H. Than, et al.: idem.

39 KKP (2018): op. cit.

40 Asosiasi Pengelolaan Ranjungan Indonesia (APRI): Fishery Improvement Projects: Indonesian Blue Swimming Crab Fishery Improvement Project, Surabaya, East Java, Indonesia (2020), <https://www.apri.or.id/fip/>

41 Mini-plant is a processing step of the crab industry where meat is separated from the crab and the meat boiled.

42 APRI (2020): op. cit.

43 APRI (2020): idem.

44 KKP (2018): op. cit.

production for Lampung in 2015 was about 9,000 mT and the export volume of BSC meat in 2016 was nearly 2,000 mT.<sup>45</sup>

It is estimated that there are more than 4,100 fishers undertaking BSC fishing in Lampung.<sup>46</sup> These can be classified into two groups: one-day fishers and multiple-day fishers. This coincides with the fishing gear type, and the origin of the vessels and its crew.

One-day BSC fishers from Lampung are mostly local fishers. They operate *asoka* (<3 GT), *pampang* (3–5 GT) and *small asco* (5–10 GT) boats using gillnets. A fisher on average carries three sets of gillnets of approximately 1.8 kilometres (*kambangan*) on one fishing trip. Fishers who do not have a boat, but own a net, may join a boat to go fishing.

Meanwhile, *big asco* and *sope* do multiple-day trips (up to seven days) and utilize traps to catch BSC, as well as targeting other species of fish. The vessels are equipped with boilers to cook the crab on board. The boiled crab is then stored with ice until sold to an intermediary on land. These boats and the crews come mainly from West and East Java. These internal migrant fishers (*andon* fishers) usually do not own their own vessels but work for a vessel owner. They are often provided basic accommodation on shore as part of their employment, and they may not stay in Lampung all year round, travelling to other locations depending on the season. Some may also catch crabs in Lampung but land them in West Java.

In addition, employment is provided in Lampung by the processing sector. This is an important source of income for women in particular, with seven processors and 29 mini-plants engaged in BSC processing providing several thousand jobs.

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45 Starling resources, The environmental Defence Fund, Yayasan bina usaha lingkungan (2017): *Blue Swimming Crab Sustainable Fishery Management Initiative Phase Ii: Lampung Site Characterization Report* (not published).

46 Starling resources: op. cit.



## ► Chapter 2: Research findings

### 2.1 Shrimp farming research findings

#### 2.1.1 Vietnamese shrimp production and supply

##### 2.1.1.1 Supply chain organization

Most of the shrimps produced in both extensive and semi-intensive farms are usually sold to intermediaries who collect them from the farms and sell onwards to either the local market, aggregator intermediaries or to processing plants. Some extensive farms sell directly to processors, but the majority of direct sales to processors derives from industrial, intensive farming operations.

Although selling directly to processors can increase shrimp price from 15,000 to 20,000 Vietnamese dong (VND) per kilogram, farmers must pay the cost of transport and preservation (cold storage/ice). Transportation is a significant challenge for small-scale farmers, especially if they are in more remote areas. In addition, the processing plants require one or two days for sorting and pricing the shrimp. According to farmers, this sorting and pricing process is not transparent as they cannot witness or verify it, which sometimes results in lower prices than selling to intermediaries. The intermediaries usually grade the harvest on the spot and provide payment immediately, which is preferred by farmers. Normally, intermediaries also buy shrimp of all sizes and species and in the case of poly-culture they would also purchase fish, which ensures that the entire harvest is sold all together.

Usually due to lack of financial resources for farming operations, small-scale farmers obtain financing for working capital from feed manufacturers through distributor agents and/or intermediaries. They usually have to put down a small payment for the purchases, such as feed or other inputs, and the rest is paid after harvest.

The cost of production to the farmer for whiteleg shrimp is around VND70,000–95,000 per kilogram and for black tiger shrimp around VND85,000–100,000 per kilogram. The higher cost of black tiger shrimp is associated with a longer production period.

The detailed money flow and different roles of financiers in the two situations are discussed in detail below.

#### Role of input suppliers

Shrimp farmers need four main inputs: 1) seed; 2) feed; 3) chemicals and medicines; and 4) equipment. In general, these inputs are sold through two marketing channels: 1) directly from the producer to large-scale farmers or 2) through local distributors, who are often also intermediaries and sometimes provide working capital and harvest (and post-harvest) services.

The way in which farmers purchase their inputs depends on their financial situation as well as the farm type. Extensive farms require few inputs and may only need seed, while semi-intensive and intensive farms will require additional feed and medical and chemical inputs. The distributors of the farm inputs (specified below) do not buy the shrimp and only require repayment for the inputs. The distributor is usually someone local, who is able to monitor the harvest times and approach farmers about repayment and restocking needs. In some cases, the intensive farms may also obtain bank financing. In cases where the distributor also acts as an intermediary, the farmer is not obliged to sell the harvest back to the distributor/intermediary providing the inputs, but retains the right to sell to the highest bidder.

The cost cycle of the intensive production is approximately 80–85 per cent cost and 15–20 per cent profit. The extensive farming costs are lower and depend on the size of the farm. The cost structure of an extensive cycle is approximately 20–25 per cent expenses and 75–80 per cent profit, but the volumes harvested are small. The intermediaries can buy everything at post-harvest including any fish species cultivated with the shrimp.

#### Seed

Hatcheries breed shrimp and produce young larvae (*naupili*) or even post larvae, which are sold to shrimp farms. In Viet Nam, shrimp hatcheries can be separated into small and large hatcheries. In general, the quality of seeds from small hatcheries is lower and this is one of the reasons behind the high mortality rates in shrimp production.

Small-scale hatcheries mostly supply to intermediaries and seed traders. Farmers can acquire seed on credit from small hatcheries (in contrast to large hatcheries)

and pay for it after harvesting their product. This increases the price of the seed by 10–15 per cent.

### *Feed*

The feed prices in Viet Nam are higher compared to many other countries due to the dependency on imported products. In addition, there is a local distribution system which increases feed price especially if the farmer cannot purchase inputs in large volumes and relies on feed distributors to bring the feed to farms in small batches. This results in 10–15 per cent higher feed costs, on average (VND24,000–32,000 per kilogram as opposed to VND21,000–30,000 per kilogram for bulk purchases). Again, depending on the financial situation, farmers can delay payment until harvest under these arrangements.

### *Medicine, chemicals and equipment*

Medicines and chemicals are often distributed through local feed traders and retail shops. Equipment for shrimp farming is mostly sold through local warehouses that sell inputs for the agricultural sector. Similar financial arrangements are in place as for feed and seed, with a mark-up on price for delayed payments.

## **Role of intermediaries**

According to interviewees, 80 per cent of intermediaries are independent and 20 per cent work for particular processors. There are two levels of intermediaries that can be distinguished. The first are the intermediaries that operate at the production level in the middle of shrimp farming areas. At a second level, intermediaries buy shrimp from small collectors and sell them to the processors.

Semi-intensive/intensive farmers harvest the shrimp at the time of ideal size and highest price. They usually try to sell the harvest to the highest bidder and are well aware of prices due to social media. They may also auction their harvest on social media. In this arrangement, the intermediary has little leverage on the farmer as they do not provide any finance, they can only obtain the product by approaching the farmer and offering a good price. There is little risk for intermediaries in this arrangement, as long as they evaluate the quality properly and are confident of getting the price they estimate when selling the product onwards.

Extensive farmers do not purchase feed and hence they do not borrow from the feed distributors. In this case the intermediary may provide occasional finance to the farmer for farm equipment, nets and so on, as well as seed and other necessities. They may also provide cash for a community or family

event, like a wedding or funeral. These loans from the intermediaries are usually interest free and repaid at the farmer's next harvest. However, while debt is outstanding, the farmer is obliged to sell the catch to the intermediary. In other circumstances, farmers are free to sell to any intermediary based on factors such as price and convenience. While stakeholders mentioned these arrangements could be in place, none of the farmers interviewed for this study reported debts to intermediaries.

## **Role of processors**

Recently, some large processors have actively developed their own farming operations to support their processing and exporting needs. These are mainly intensive farms that require high-level inputs and monitoring technology. However, none of them produce enough from their own farms alone and they still rely on independent farm production and intermediaries.

All the processors interviewed for this study depend on intermediaries to obtain shrimp and purchase from between five to 50 intermediaries to obtain the raw materials they need. They prefer to use regular intermediaries to ensure a secure adequate supply of products and pay them on receipt of the product; they do not pay intermediaries upfront. The price range they pay for shrimp varies between VND100,000–150,000 per kilogram, depending on the market price, species and quality.

The most important issue raised regarding this process is that the shrimp changes ownership several times before reaching the processing factory, and this can have major implications for issues such as food safety and traceability that are crucial in international trade. Intermediaries may take illegal and unsafe steps to increase shrimp volume and price in pursuit of higher profit margins.

### **2.1.1.2 Impacts of financial practices**

Small-scale farmers have few alternative options for getting their harvest to processors/market because their position in the supply chain has traditionally given the intermediaries a lot of power and influence. In the past, this was economically disadvantageous for farmers, but there has been significant improvement in recent years due to the higher numbers of intermediaries in the sector, as well as better price transparency due to social media. The farmers also often prefer to sell to intermediaries because exporters are accused of deliberately delaying payment, while farmers urgently need the money to pay their production-related debts. Also, if they sell

to intermediaries, farmers always have a 100 per cent guarantee that all the shrimp will be purchased, while some exporters may reject part of the harvest.

Currently, the main financiers of production, especially for the semi-intensive sector, are distributors (not intermediaries). This results in a total increase in farm costs of between 20–35 per cent due to the distribution and payment arrangements for the farmer. This could be brought down 10–15 per cent if farmers had the cash to pay for inputs immediately, and a further 20 per cent if they were able to purchase in bulk from companies and were not dependent on small-scale distributors.

Some farmers can get bank loans at 9–12 per cent interest per year. These loans, however, cannot be given for working capital but only for acquiring assets. Given the tight margins within which farmers operate, sometimes making a loss due to shrimp price fluctuations, limited access to financing could have a big impact on the socio-economic well-being of the farmers, as well as on their ability to comply with regulations. Most of the interview respondents raised the need for a stable and accessible credit programme to reduce the dependency of farmers on seed companies/agents for financing.

### **Social security and labour issues**

Small-scale farmers interviewed in this study do not employ additional workers on their farms, so additional labour issues were not uncovered as part of this research. However, small-scale farmers believe that theirs are the lowest profits in the supply chain. Moreover, small farmers face many potential risks (such as natural disasters, disease or shrimp price fluctuation) in their farming operations. It is also likely that cash-strapped farmers forego safety measures at farms to limit costs or engage in unsustainable and unsafe practices to improve yields (such as illegal medicines). This issue must be considered appropriately in management policies and long-term strategies of the sector.

### **Debt bondage**

Using the Conservation International FIP social risk tool as guidance, it appears that there is only a low to medium risk of debt bondage in the shrimp value chains surveyed. In most cases, farmers are free to sell their harvest to the highest bidding intermediary/buyer, which increases their ability to pay off the debts incurred during the farming cycle. In addition, recent years have seen increased transparency in pricing due to social media and farmers are able to view the weighing and grading of their products by the intermediaries, reducing the risk of fraud.

In this survey, no direct cases emerged in which intermediaries had bonded the farmers to selling their catch to them via additional loans. However, other key informants interviewed stated that this can still take place in instances where the farmer has urgent cash needs. Hence, in especially remote areas, there is still a low risk that debt-bondage-like situations may occur among small-scale shrimp farmers. These situations can be exacerbated by disease outbreaks or other events that lead to farmers experiencing catastrophic loss of crops. Presumably, in the case of harvest failures, farmers would default on their debts to the distributors and it is not clear how they would recover from these debts over time, given the lack of alternative finance systems in place. More research in other areas of Viet Nam would be needed to fully understand the patterns.

### **Sustainability**

Access to working capital is one of the most urgent issues in the shrimp sector in Viet Nam, especially in the semi-intensive to intensive category. Although this was not directly uncovered as part of this study, there are indications that lack of sustainable finance, tight margins, and the need to maximize harvest value can lead to environmental violations and sustainability issues. Farmers may, for example, decide to use cheaper illegal chemicals due to inability to purchase legal chemicals from distributors, or use banned medicines. Their ability to invest in environmental monitoring and restoration activities will also be compromised by financial insecurity.

### Box: International Collaborating Centre for Aquaculture and Fisheries Sustainability (ICAFIS) cooperative model

ICAFIS, together with local NGOs, has been working extensively in the shrimp farming sector to improve the lives of small-scale farmers. There have been many attempts to develop alternative finance programmes for farmers, but there is ongoing reluctance in the banking sector to develop appropriate finance mechanisms in the absence of insurance schemes and collateral, as the farming sector is seen as very risky and disease prone.

As a result, in recent years ICAFIS has started to work with farming cooperatives that use a supply chain model to improve farmers' finances. This includes the establishment of direct farm contracts with cooperatives and processors, cutting out intermediaries. The processors make a purchasing agreement with the group of farmers and, one week before harvest, take test samples of the shrimp produced. If the shrimp is of good quality and has no residue of illegal chemicals, the processors will come to collect and buy the harvest at a pre-agreed price. As the mechanisms cut out the different layers of intermediaries, the farmer ends up getting a higher price (around 10 per cent).

In addition, the cooperatives ensure that farm inputs are purchased in bulk and directly from the primary distributors. This guarantees a better price and, again, improves the margins for farmers as explained earlier (around 10-20 per cent).

This cooperative model is currently being tested at different semi-intensive locations and is bringing promising results. Processors are guaranteed a good volume of shrimp with secure testing and quality, while the farmers gain much more security with sale and purchasing prices and improved margins, which enables better long-term planning. The intermediaries, on the other hand, are entirely cut out of the supply chain.

## 2.1.2 Indonesia shrimp production and supply

### 2.1.2.1 Supply chain organization

In the Indonesian case studies, the supply chain and financial practices differ in all the three locations researched and are therefore described separately.

#### Lampung province

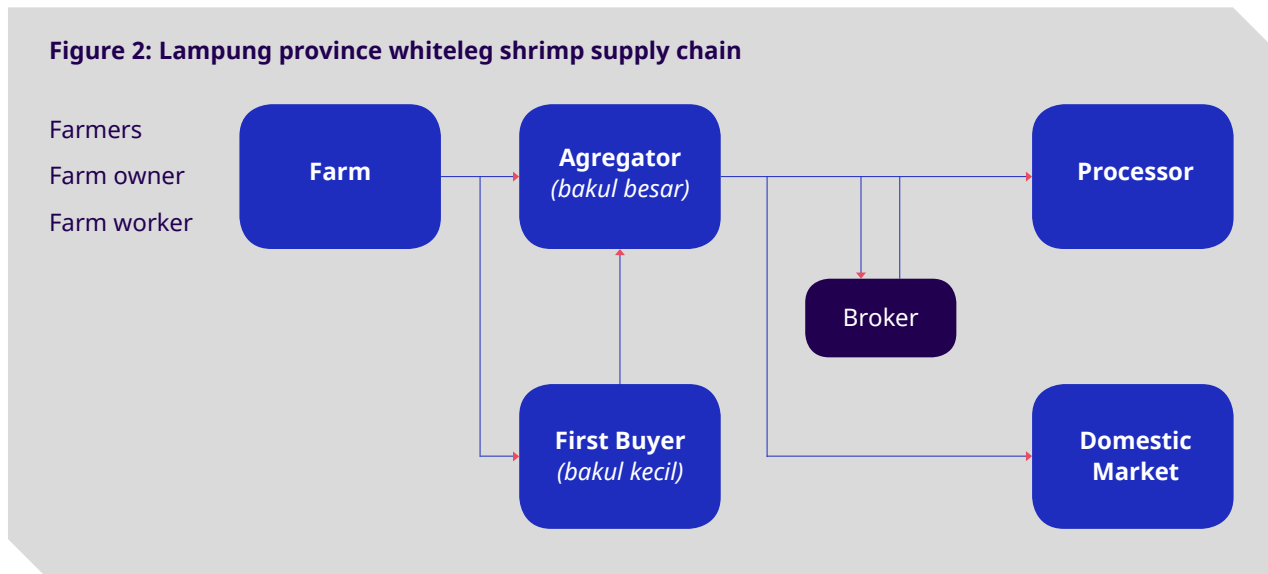
In Dipasena and East Lampung, most farmers sell whiteleg shrimp to either first buyers/small intermediaries (*bakul kecil*) or aggregators/large intermediaries (*bakul besar*). The large intermediaries then sell the shrimp onwards to either domestic market channels or directly to the processing company. Unlike the small intermediaries, they are normally registered entities that have met the government requirements of the Good Fish Handling Practice Certificate. In addition, in Lampung, a broker (*pembina*) can finance aspects of the supply chain (see Box 2).

#### Box 1: *Pembina*

*Pembina* is the local term in South Sumatra and the Lampung area used to denote a broker or someone who provides finance to fishers and farmers in the BSC and other fishery and shrimp supply chains.

In the case of fisheries, a *pembina* also acts as an intermediary, usually the first buyer rather than a large aggregator intermediary. In aquaculture, they often also provide farm inputs (feed, seed and so on) as well as advance finance for farmers and may also be the first buyer or intermediary.

For domestic markets, an additional broker plays an intermediary role between the large intermediary, the processor and the domestic market. According to the intermediaries who participated in the study, about 50 per cent of the product goes to the domestic market across Jakarta, Lampung and Palembang. The price offered by processing plants is often less competitive and intermediaries prefer to sell to the domestic market, if possible. For a detailed financial analysis of the Lampung shrimp supply chain see Table 1.



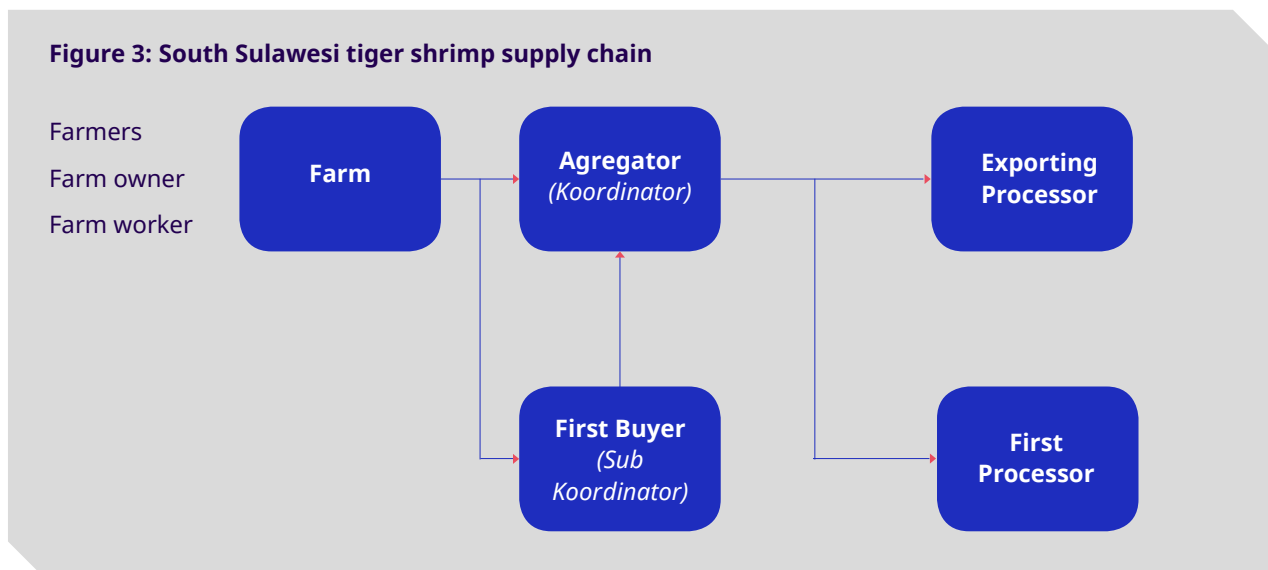
### Black tiger shrimp – South Sulawesi

In Pinrang, South Sulawesi, the farms studied were extensive black tiger shrimp farms with almost 100 per cent of the product going to the export market, mainly Japan. Only limited volumes go to the domestic market through irregular sales.

Compared to semi-intensive farms, farming density is low, ranging from one to ten seeds per meter, with one or two cycles a year. In most black tiger ponds, farmers also grow milkfish and/or tilapia. Shrimps are fed on plankton and small crustaceans naturally available in the pond, but this may require fertilizer input for phytoplankton production, before the farmer adds shrimp seeds.

After harvest, the shrimp typically goes to the small intermediaries (locally known as sub-coordinators) and then onwards to an aggregator intermediary (coordinators). A small intermediary will normally pick up the shrimp from the farms, while an aggregator intermediary usually does the weighing at their facility. Aggregators still need small intermediaries to deal with the large number of farmers. In Lanrisang for instance, there are four aggregators and each aggregator coordinates approximately 10 to 15 sub-coordinators.

There are four processing companies exporting directly from South Sulawesi, with one exporting from Java.



### 2.1.2.2 Financial analysis

#### Lampung

Most whiteleg shrimp farmers interviewed in Lampung finance their own farm operations. Many were in a fairly strong financial position and owned other businesses, such as BSC mini-plants or traditional fish processing, which enabled them to start farming. Almost all *pembinas* also have shrimp ponds, possibly reflecting their lucrative roles as suppliers, intermediaries, and financiers in the supply chain.

In addition to their own capital, some farmers get financial support from *pembinas*. *Pembina* is a broad concept and could mean either other shrimp farmers, intermediaries, or feed suppliers that provide financing for the farm inputs. When a *pembina* lends money for operational costs, they are repaid through a proportional payment for every kilogram of shrimp harvested. The amount depends on the size of the loan associated with the farming operational costs. For supplying feed, the *pembina* will get a share of IDR3,000 per kilogram of harvested product. If they also supply seed and medicine, they will get an additional share of IDR2,000 per kilogram. However, all the risks of farm operations rest with the farmer. In addition, if the farmer pays for the feed immediately, the *pembina* charges an additional IDR10,000 per kilogram per sack of feed.

The weighing and sorting processes are conducted on the farm. The small intermediaries can purchase shrimp at up to IDR5,000 more per kilogram than the price offered by the processor, even though in the end the shrimp will be sold to the processor. For instance, the price offered by the small intermediaries for shrimp sized 60 is IDR63,000 per kilogram while the price offered by the processing company is IDR58,000 per kilogram.<sup>47</sup> Regardless of loans or any other financial arrangements between farmers and a *pembina*, the farmer retains the right to sell their produce to any intermediary/*pembina* they wish.

Many intermediaries can offer a higher price, but they may cheat on the sizing and weighing process, which results in losses for the farmer. Farmers, therefore, mostly prefer to deal with small intermediaries who are considered trustworthy.

There is no direct financial support from processors to aggregators/large intermediaries or from large to small intermediaries. When the production volume is high, processors may reject supply and even when demand is good, prices can remain low due to international pricing dynamics.

It is difficult to obtain standardized production costs for farms due to variation in pond size and density and a reluctance to share the data. It seems that approximately 66 per cent of the cost is for the feed and the remaining costs are for medicines, seed, electricity, and technician costs and sometimes payment for additional workers for farms with more than three ponds (not included in the example below). In the best case scenario, the farmer produces 1 mT of shrimp from three partial harvests and one main harvest, which is equal to a payment of approximately IDR85.5 million to the farm owner. A summary of the farm cycle finances is shown in Table 1.

#### South Sulawesi

In South Sulawesi the study found that for black tiger shrimp the farm cost per six-month cycle per hectare is about IDR7.5 million, including seed and the cost of renting the farm (IDR5 million). In most cases farmers are able to finance the farm cycle cost themselves, under the following finance scenarios for production.

In a good case scenario, a pond of 1 hectare would yield a gross income per cycle from shrimp of IDR21.6–75 million. Furthermore, from one cycle approximately 800 kilograms of tilapia and 250 kilograms of milkfish are also produced. These secondary species provide additional income of IDR33 million per cycle. However, productivity varies widely among farmers and there could be times that the production does not cover the farm cycle costs. In these instances, the farmer may seek finance and loans from either the intermediaries or the suppliers. The pricing scheme between farmer, intermediary, and processor are the same as the value chain in Lampung. The intermediaries purchase the shrimp at IDR5,000 per kilogram higher than the price given by the processor.

47 This is possible if the shrimp is stored in ice for at least one day, as this increases weight by 5–10 per cent, which, in turn, increases the price per unit

**Table 1: Financial example for whiteleg shrimp farmers in Lampung**

		IDR
Sale of harvest	1,000kg	85,000,000
Operational cost	Seed	2,750,000
	Feed	19,500,000
	Medicine	3,750,000
	Electricity	1,125,000
Workers	Technician 1,000 IDR/kg	1,000,000
<b>Total operational cost</b>		<b>28,125,000</b>
<b>Total after operational cost</b>		<b>56,875,000</b>
<i>Pembina</i> seed	2,000 IDR/kg x 1000	2,000,000
<i>Pembina</i> medicine	2,000 IDR/kg x 1000	2,000,000
<i>Pembina</i> feed	3,000 IDR/kg x 1000	3,000,000
<b>Total <i>Pembina</i></b>		<b>7,000,000</b>
<b>Total after debts</b>		<b>49,875,000</b>

### Box 2: Dipasena farming background

Dipasena is a special shrimp farming area in the Tulang Bawang district of Lampung province, Sumatra. Each farmer has two shrimp ponds that are all the same size (50 m x 40 m). In the past, all farmers worked under the partnership of the company PT. Dipasena. The company started building the facilities in 1989 by establishing the farms as well as a processing facility, feed factory, hatchery and other supporting infrastructure in the area, which made it the biggest integrated shrimp company in the world at the time.

PT. Dipasena built the shrimp farms before recruiting the farmers. Once the shrimp ponds were ready, the company then recruited thousands of farmers who essentially were given the farms and houses against a mortgage-like debt. The company estimated, and told the farmers, that if everything went well, the debt would be paid off after 10 years and the shrimp pond and the house would belong to them permanently. All the farm operations were fully controlled by the company. The company provided all inputs and the harvest had to be sold to the company as well. However, the company arbitrarily determined the input price and the shrimp price. Farmers also did not have access to the debt record. Due to this lack of transparency and practices, farmers became suspicious and staged a lengthy strike in the late 1990s.

*Petambak Plasma Udang Windu* (P3UW) is the cooperative established by farmers in the Dipasena area through which protests and negotiations with the company were carried out. When PT. Dipasena was declared bankrupt in 1998, the farmers, with the support of P3UW, took over the farms and organization of farming activities.

There are approximately 6,500 farmers currently in Dipasena who now operate independently. Due to the previous negatives experiences, especially with regard to incurring non-transparent debt, P3UW established the Usaha Bersama (UB), a collective farm financing body. The UB is established per village, which consists of 100 farmers (who own 200 ponds in total). A UB can be formed if all the farmers in the village agree to join. This makes it easier to coordinate and mutually monitor and check among the members. The UB finance model is described further below.

### Dipasena cooperative finance model

UB cooperative financing group obliges its members to collectively invest their money to finance the farm operations of their members, instead of self-funding or lending by individual means. A committee in the UB helps individual farmers to find the best price for inputs, such as feed. As a group, the UB can bulk buy, which allows them to reduce the cost of buying feed by around 36 per cent compared to individual farmers buying smaller quantities. Normally, the UB committee also contacts buyers on behalf of members a week before the harvest to identify the highest bidder.

Farmers pay membership contributions to P3UW as UB members. First, for a harvest that is considered profitable, the farmers pay IDR1,000 per kilogram of harvest as a contribution called "investment 1000". This investment applies to all P3UW members and aims to improve and maintain the farm infrastructure, such as irrigation systems. Second, there is a contribution of IDR500 per kilogram of harvest, which goes to the Rukun Tetangga RT (a smaller unit of a village consisting of 20 farmer households). This fund is used for investments in general public infrastructure and activities within the RT. Third, the farmers pay a contribution to a charity fund equal to 2.5 per cent of

**Table 2: Dipsena financial example**

		IDR
Sale of harvest	628 kg (size 54) x IDR71,300	44,776,400
	482 kg (size 59) x IDR69,800	33,643,600
<b>Total</b>	<b>1,100 kg</b>	<b>78,420,000</b>
Investment 1000	1,100 kg x 1000	1,100,000
Contribution to RT	1,100 kg x 500	555,000
<b>Total</b>		<b>76,755,000</b>
Operational cost	Seeds (83,700 seeds)	3,406,590
	Feeds	12,338,000
	Medicine	2,312,000
	Fuel	2,410,000
	other	500,000
<b>Total operational cost</b>		<b>20,966,590</b>
<b>Total after operational cost</b>		<b>55,788,410</b>
Charity fund	2.5%	1,394,710
<b>Total after charity fund</b>		<b>54,393,370</b>
Risk hedging fund	10%	5,439,337
<b>Total after Risk Hedging Fund</b>		<b>48,954,330</b>
Share to the farmer	80%	39,163,464
Share to the investor	15%	7,343,149
Share to the management	5%	2,447,716
Personal loan		1,500,000
<b>Received by the farmer</b>		<b>37,663,464</b>

income from the sale of a harvest after deductions for the investment 1000, the RT contribution and operational costs. The fourth is a contribution to a risk-hedging fund of 10 per cent of revenue after deduction of all the above contributions. The risk-hedging fund has two aims. First, it compensates farmers whose crops fail, a significant contribution to preventing farmers from incurring debt. Second, it is used to assure investors that their investment is safe. After the risk-hedging fund deduction, 80 per cent of the revenue goes to the farmer, 15 per cent goes to the investor, and 5 per cent goes into management of the UB. Farmers may also take interest-free personal loans from the UB that are paid back at harvest time. A sample calculation of the finance model per harvest cycle is given in Table 2.

### 2.1.2.3 Impact of financial practices

The examples studied in Indonesia are all quite different and farmers have varying needs for financing depending on the intensity of production. Farmers remain at risk of shrimp disease in both semi-intensive and extensive farming. Only in the case of Dipasena are the farmers collectively insured against failure. The overall cost of the finance model is slightly higher for the Dipasena farmers as a result; according to our data they received a 35 per cent discount off feed, but pay 20 per cent to the investor and in association costs. The Lampung farmers pay around 12 per cent of the harvest income to the *pembina* for their farming inputs, including feed, and may have to pay additional elevated prices, depending on their ability to bargain. Hence, the take-home income may be higher for the farmers in Lampung than in Dipasena, but the farmers in Dipasena face significantly lower risks of economic shocks if a crop fails or if they face other hardships. In addition, the investment they make to the cooperative takes care of some important farm maintenance and infrastructure not costed in the Lampung example.

As in Viet Nam, farmers have difficulty getting credit from banks because shrimp farming is considered risky. Furthermore, farmers reported that the current credit schemes do not suit farm operations. The farmers receive money from harvest every four months or so, but they have to pay back bank loans monthly. Hence, owing money to the intermediary is the most convenient way to access finance as repayment schedules are aligned with the farming cycle.

### Labour conditions

The use of hired labour in the small-scale farming sector is minimal as the owner operates most of the farms. In Lampung, some farm owners with more than three ponds employ a worker for the day-to-day

operation of the farm. The worker is generally paid IDR2 million a month plus a fee/share of IDR500 per kilogram of harvest.

In South Sulawesi, workers are paid a modest IDR125,000 a month and receive a share of 10 per cent of the gross value of the harvest once a year. A worker takes care of one pond with an average size of 10 hectares. At this size, the annual production can be less than 1 mT and workers may only take IDR6–20 million a year. The daily workload averages two hours per day and is considered part-time work. In both farm types, there is no official contract between the farm owner and the worker. The agreement is only about the payment and fees; social security, such as insurance and pensions, are not covered.

As in Viet Nam, safety is one of the main labour issues in the farms. Small operators sometimes overlook issues, like safe electrical installations or use illegal medicines and chemicals, in order to minimize the risk of disease.

### Debt bondage

Although the *pembina* intermediaries that act as distributors may finance farmers' operations from time to time, there is no indication of a debt-bondage-like relationship between farmers and *pembina*. The farmers indicated that they still have the freedom to sell to the highest bidder, regardless of any debts incurred. In addition, there is competition between the intermediaries, who usually have no leverage over the farmers, and the price offered by most intermediaries is almost identical. Social media has also added to price transparency in recent years. Therefore, most farmers may find it more convenient to sell to the *pembina* intermediary who provided financing for the inputs.

There was no indication that the *pembina* set the price of the inputs and a transparent and well-known system of price per kilogram was in place. The debt record is kept by the *pembina*, but the farmers are free to access or copy it. The trade conditions are also transparent in that farmers can freely see the weighing and grading process. Still, cheating can take place on the quantity and grading if the farmer is not experienced.

Unfortunately, information about the ability of farmers to pay off debts was not yet available at the time the study was carried out because the farmers interviewed had just begun borrowing money within the last two cycles. Previously, they had used their own means to provide working capital, but due to failures in some growing cycles, *pembina* had extended loans to farmers. It seems, however, that cases where farmers fail to pay their debts are not driven by the loan system created by intermediaries, but rather are

due to farming failures (that is, multiple consecutive crop losses). Hence, the risk of debt bondage, as defined in the ILO and Conservation International indicators appears to be low in the shrimp farming areas researched in Indonesia.

## 2.2 Blue swimming crab research findings

### 2.2.1 Viet Nam blue swimming crab fishing and supply

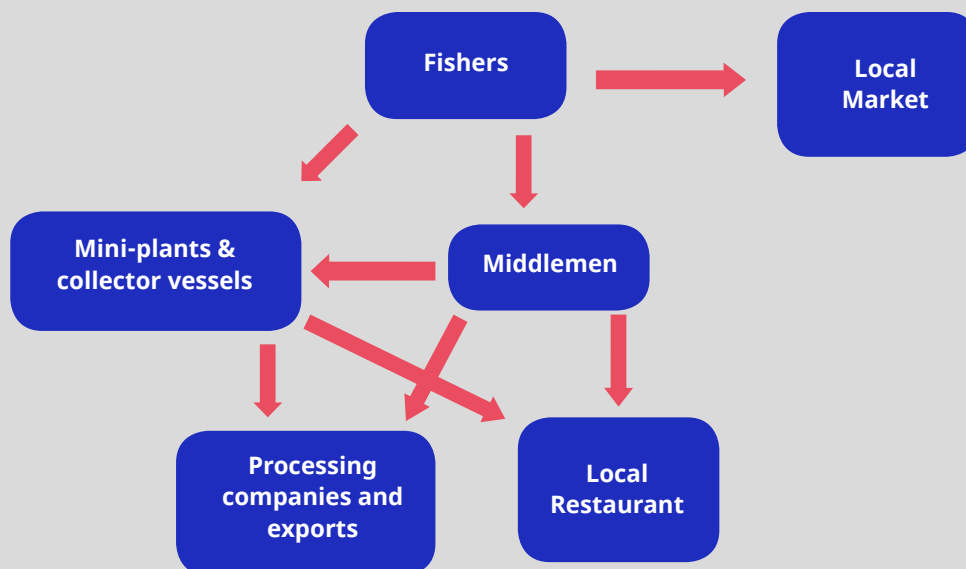
#### 2.2.1.1 Supply chain organization

A simple supply chain illustration of BSC in the Kien Gian province is presented in Figure 4. Generally speaking, fishers can sell their BSC catch directly to local markets, through intermediaries on land, or through a mini-plant-owned collector vessel. Fishers do not sell directly to processors as the product needs to be sorted, boiled, and the meat separated before processing.

Normally, mini-plants use collector vessels that take BSC directly from fishing boats at sea and cook the fresh crabs on board (VDN120-150 per kilogram),<sup>48</sup> before delivering them to mini-plants where the crab meat is then removed. This practice appears to produce better quality meat, as compared to landing in port, collecting, and then cooking and processing the crab at a land-based mini-plant. For fishermen, depending on their harvest, it may still be more convenient to sell to land-based intermediaries as they accept all species and sizes for sale (secondary species are shrimp, snails, and fish). The mini-plant collector vessels only purchase some crab sizes for processors/exporters supplying to foreign markets.

Where traditional intermediaries do purchase crab, they can also sell their products to the mini-plants after a very simple sorting. Larger BSCs are normally sold to local restaurants for domestic consumption as fresh meat, this being the most valuable market (VDN200-300 per kilogram). Small fresh crabs can also be sold to either mini-plants for further processing or to exporters as frozen meat for foreign markets. The processed meat costs vary, according to body part, between VDN300 and VDN600 per kilogram.

Figure 4: Blue swimming crab supply chain in Viet Nam



48 Prices at the time of research; prices are subject to seasonal fluctuation



### 2.2.1.2 Financial analysis

Fishers prefer to sell all their catch immediately after a fishing trip in order to pay the crew and obtain funding for the next fishing trip. Therefore, the fisher–intermediary relationship is very important, as intermediaries will buy the whole catch, including species other than BSC, and provide immediate cash for the fisher. The mini-plants only purchase some of the species/sizes, according to the requirements of their buyers and processing needs.

The fishing vessels targeting BSC are small, with limited equipment and facilities. Fishing trips last only one or two days. Therefore, the vessel owners/fishers can usually afford to pay for fuel, ice, and any other requirements in advance without the need to borrow money from the supply chain. In some cases, the owners also finance the fishing nets, the most expensive item after the vessels, from their earnings.

Although the fishers try to self-finance their operations, approximately 80–90 per cent of them will require some loans from intermediaries, especially during low season. They may also take personal, non-fishing related loans from intermediaries. Exact figures for typical loan amounts were not available and will vary from case to case. Once a loan is provided, the fishers then commit to sell their catch (all sizes and species) to those intermediaries. In these cases, the price that fishers get for their catch is lower than if it was freely sold to the highest bidder. In this way, these larger intermediaries with financial capital to invest can secure a steady supply of crabs. Smaller intermediaries, who are unable to provide finance to fishers, can only use their negotiating skills to obtain products and often need to make a higher offer to succeed.

It was not possible to quantify the price reduction as part of this study as this depends on the market price, catch and the amount of finance provided, and the intermediaries were unwilling to quantify this.

Between the intermediaries and mini-plants/processors, there are two types of cooperation. As regards small intermediaries, the mini-plants/processors usually select a group of intermediaries who then collect BSC for them. However, they only have a verbal agreement to support this relationship; no contract or advance cash payments are made. The second type are the larger intermediaries who receive direct investments from the processor (up to VND20 billion by one processor). This relationship is normally established via a long-term agreement/contract and these intermediaries work permanently for the processors/exporters.

### 2.2.1.3 Impact of financial practices

The supply chain is highly dependent on the role of the different types of intermediaries – the mini-plant collector, the shore-based first buyer and the broker – to organize the logistics of getting raw and cooked crab meat to the processors. The system works for fishers as they can sell all their catch to intermediaries as opposed to only crabs of certain sizes. There are, however, issues around the lack of working capital as well as personal finance for some fishers and the resulting debt dependence on intermediaries. Although the finance provided is “interest free” at the outset, once the fishers are in a debt relationship, they lose their ability to sell the crab meat to the highest bidder, with economic consequences for the fishers.

### Socio-economic concerns

The BSC fishery sector uses small boats that are usually family owned. There are only one or two people on a fishing trip, often close relatives. The interviewers did not detect any labour issues beyond common safety concerns for small-scale vessels and the risk of child labour in family business operations if children are “helping out”, performing hazardous work or missing school to work long hours in the family business. The fishing trips are relatively short at one or two days, so despite long working hours on board, fishers usually get sufficient rest time on land. The main concerns raised by fishers were the high variability of BSC catches and price, which makes the profession unpredictable, and finding it difficult to make ends meet (see below).

### Sustainability concerns

Sustainability is a serious concern as regards BSC fishing, expressed not only by the government, market and NGOs, but also by supply chain actors from fishers to processors. Better resource management and strong enforcement by the government are two important factors to achieve sustainability. In the case of Viet Nam, it is difficult to determine to what extent the current financial arrangements within the supply chain are hindering sustainability. The downstream buyers (importers and processors) understand that the crab catch is seasonal. However, they have contracts and capital invested in the intermediary business, and hence can put pressure on the supply chain to produce more raw material. The same applies to the fishers and intermediaries. Although intermediaries sometimes finance fishing operations, it is not clear how much they can pressure fishers to catch more, due to limitations of seasonality and stock health.

Unsustainable practices supported by the supply chain are clearer in relation to management measures for minimum size limits and closed seasons.

Intermediaries (and consequently the processors) that buy crabs of all sizes undermine incentives to catch larger crabs, aimed at enabling stocks to recover, to ensure long-term sustainable and economically prosperous fisheries.

### Debt bondage

Using the Conservation International FIP social risk tool as guidance, it appears that there is low to medium risk of debt bondage in the Viet Nam BSC fisheries surveyed. While it appears that fishers can finance their own fishing operations most of the time, during low seasons many fishers enter debt relationships with intermediaries, which in turn negatively impact their income and economic situation. In addition, there is some indication that personal, long-term loans are also encouraged to help secure supply for the intermediaries. While this type of finance is promoted as interest free, it does have unquantified economic impacts that are not necessarily fully understood by less financially informed fishers.

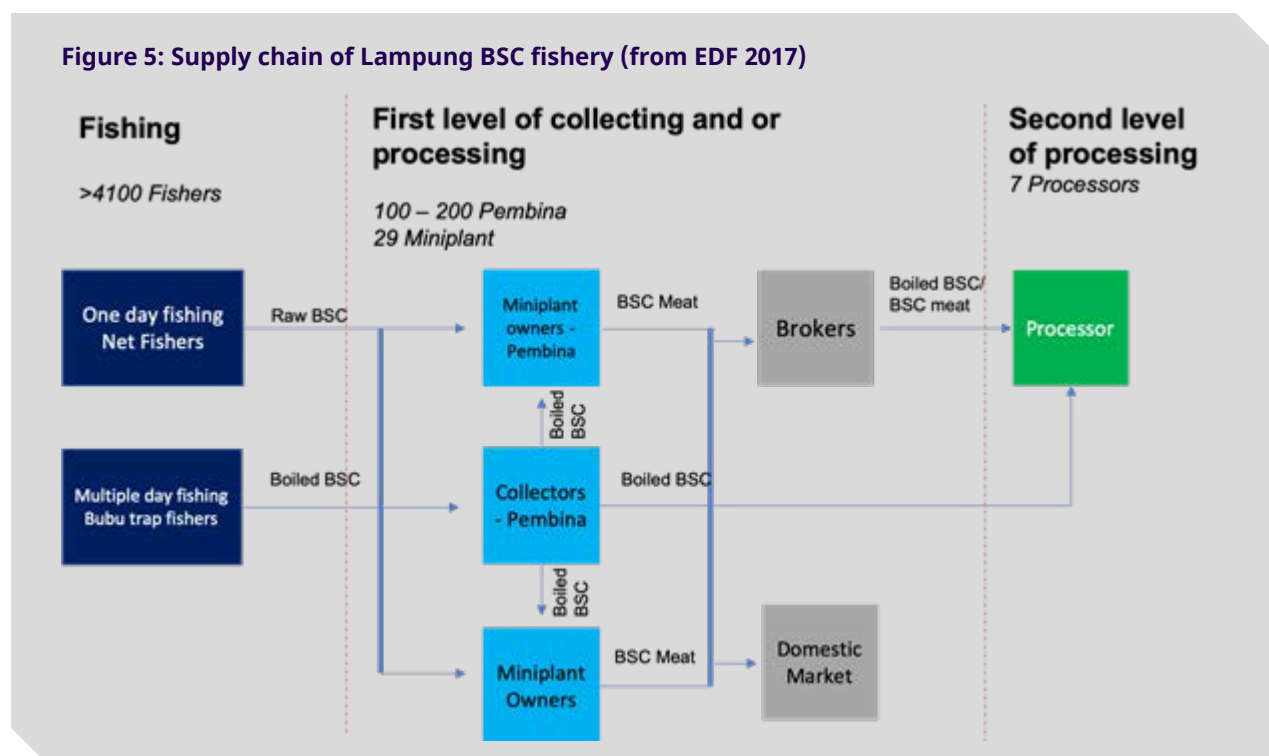
## 2.2.2 Indonesia blue swimming crab fishing and supply

### 2.2.2.1 Supply chain organization

The BSC value chain in both study locations in Indonesia was complex with multiple actors involved, and our findings were comparable to those of Sterling, EDF and YBULL in their BSC characterization study (see Figure 5).<sup>49</sup> Intermediaries play a crucial role, not only in moving product from fishers to processors, but also in financing fishing operations.

BSC fishers in Lampung can be classified into two groups: one-day fishers and multiple-day fishers. The fishing operation costs for one-day fishers are very small, ranging from IDR150,000 to IDR500,000 per fishing trip, depending on the type of fishing boat and the distance to the fishing ground. These costs include fuel, meals, and cigarettes. As this cost may be shared if other fishers join the trip, the cost per fisher may be significantly smaller. Nevertheless, the cost of net maintenance and replacement is high and can reach

Figure 5: Supply chain of Lampung BSC fishery (from EDF 2017)



49 Starling Resources, Environmental Defence Fund and Yubull: *Blue Swimming Crab Sustainable Management Initiative - Lampung Site Characterization Report* (2017), (not published).

IDR2,000,000 per month. Fishers who do not have a boat but own a net may join a vessel to go fishing. Under this scheme, the operational costs are shared, or the boat owner charges a set fee of between IDR2,000 to IDR5,000 per kilogram of BSC.

One-day gillnet fishers sell the crabs fresh or even still alive and hence they do not use ice to store the crabs on board. The amount of catch varies by season with the peak season occurring from December to February. Fishers described the average catch as 10–20 kilograms per day and during the peak season one fisher may catch up to 500 kilograms per trip. However, there are quite long periods when fishers cannot go to sea, either due to bad weather or low catch. During off-season or bad weather, some fishers target banana shrimp and other species in the river.

Multi-day boats operate *bubus* (baited traps). Processors and intermediaries often describe the catch from *bubus* as “smelly” as the bait, often “trash fish” or even cow skin, is not fresh and often remains partly digested in the crabs. Despite this, there is no price difference between gillnet catch and *bubu* catch. During low season *bubu* vessels also target spiral babylon sea snails (*Babylonia spirata* L). During high season, *bubu* vessels catch up to 1.4 mT per trip, while in low season the catch is only about 200 kilograms per trip. Fishers estimate the average catch is 700 kilograms per trip and they normally make two to three trips each month. The operational cost of *bubu* fishers is much higher than the net fishers, requiring about IDR25,000,000 per trip to purchase fuel, meals, lubricants, cigarettes, gas for the crab boiler, and bait.

In the regular BSC chain, there are *pembina* intermediaries and mini-plant owners playing the role of intermediaries between fishers and processors. In some cases, the *pembina* or mini-plant sells their product to a broker instead of a processor. This practice often occurs when *pembina* or mini-plant owners are running out of cash to purchase raw material, because the payment from processors takes place three to five days after the products are delivered. Interestingly, mini-plants often act as brokers as well.

*Pembina* are first buyers that can be independent or attached to a particular mini-plant (usually as the plant owner). *Pembina* who purchase fresh crabs from fishers usually boil the crabs before selling them, sometimes to processors, but more commonly to the mini-plants. This is due to the fact that some *pembina* obtain cash from mini-plants to run their business and the mini-plants are able to provide immediate cash. There are approximately 100 to 200 *pembina* throughout Lampung province.

Unlike *pembina* intermediaries whose business is often not officially registered, mini-plants are subject to fish processing regulations. In most cases, mini-plants are supported by a processing company partner to implement food safety and quality standards. Processing companies usually send a quality control inspector to make sure the required standards are met and support mini-plants owners in improving processing facilities.

In addition to the traditional intermediary operations, new web-based systems are emerging. In Indonesia, a new company, Aruna, promotes direct sale of products, such as BSC, from fishers to consumers via online trading platform.

### 2.2.2.2 Financial analysis

In general, the *pembina* and mini-plant intermediaries play a key role in financing the supply chain as they invest their money in the supply chain in order to secure raw material. Processors generally maintain the trade relationship only with *pembina* and mini-plant owners in order to obtain raw material.

*Pembina* are especially highlighted in the supply chain as the ones who provide the most capital for fishing operations. A *pembina* can provide a boat (if fishers do not have one), finance the fishing trip, boat and gear maintenance, and even provide loans for personal requirements unrelated to fishing. Therefore, *pembina* perceive themselves as enablers in the BSC fishing industry. There are two main types of loans.

In the first type, a *pembina* gives a long-term loan at the beginning of the relationship between themselves and a fisher. This loan is “*hutang pengikat*” or a binding loan. This loan is usually ongoing as repaying the loan in full would mean the fisher is aiming to end the relationship with the *pembina*. Sometimes, when fishers want to end the relationship with a *pembina* and do not have enough money to pay back a binding loan, they seek out a new *pembina* for a loan to pay off the old binding loan. The fisher is then subsequently tied to the new *pembina* through the debt owed on the new loan.

These binding loans are not only applied between *pembina* and fishers, but are also widely applied between mini-plant owners and some *pembina*, vessel owners and captains, as well as captains and crew. The amounts involved in binding loans differ according to who is making the agreement. Binding loans between captain and crew can be for as little as IDR1–2 million. Binding loans between *pembina* and fishers range from IDR15–50 million per vessel.

*Pembina*, especially in Lampung, also give loans for non-fishing related expenses, known as revolving loans, but this is rare in Cirebon, West Java, where *pembina* rarely give loans for purposes unrelated to fishing. For multi-day trip vessels, *pembina* pay the fishing operation costs, which can be up to IDR25 million. At the end of a trip, the cost is deducted from the price of the catch. The amount deducted is very flexible and can be negotiated. If the catch is low or the fishers are in need of money, the payment of the fishing cost can be delayed to the next trip. For net fishers, the loan is mainly used to replace or maintain the fishing gear, as they can usually afford to cover the relatively low costs of their short one-day trips.

In theory, *pembina* do not charge interest or set a time limit on their loans. Hence, the fishers understand that the services provided by *pembina* are free. However, *pembina* purchase BSC from the indebted fishers at IDR5,000 per kilogram lower than the price paid to independent fishers. This reduction is often not clearly communicated to fishers because it has been a common practice in the area. In addition, the amount of this reduction varies depending on the

number of *pembina* in the area. Where there are fewer *pembina* and the landing location is more isolated, the reduction can reach IDR10,000 per kilogram, but where the number of the *pembina* is high, the reduction is usually smaller (IDR3,000 per kilogram).

Fishers, both in Lampung and Cirebon, are highly dependent on the *pembina* for several reasons. First, fishers lack access to alternative sources of capital. Bank financing is not an option for most fishers as the fishing sector is considered high risk by banks, which therefore require substantial collateral that fishers cannot provide. Furthermore, if bank financing is obtained, the interest rates are considered high by fishers and regular servicing of the loan every month can be a problem during the low season when fishers' incomes dwindle. Second, fishers are comfortable with their relationship with their *pembina*, who are often perceived positively as people who have helped them in many situations. .

Because of the perceived zero interest on the *pembina* loans, the bank interest at around 8–9 per cent is perceived as high by fishers. However, the de facto

**Table 3: Interest calculations for the different vessel types and their typical finance**

Smaller vessels (nets)		Larger vessels (traps)	
15,000,000	Bridging loan	30,000,000	Bridging loan
2,000,000	Revolving loan	25,000,000	Revolving loan
trips		days/month	
5	high season	25	3 trips/mo
3	transition	15	700 kg/trip
4	low	-	
170	trips/year	5,000	interest/kg
			10,500,000 interest/month
15	kg/trip		4 months active
5,000	interest/kg		
12,750,000	interest/year	42,000,000	interest/year
<b>75.0%</b>	<b>annual interest rate</b>	<b>76.4%</b>	<b>annual interest rate</b>

interest rates of the *pembina* finance are five to seven times higher on average. According to the numbers obtained, there is a 75 per cent annual interest rate for the net fishers and 76 per cent annual interest for the *bubu* fishers on their *pembina* finance. The full interest rate calculation is set out below in Table 3.

### 2.2.2.3 Impact of financial practices

The study was unable to determine why the interest rates charged are so high, apart from the perceived risk and the fact that there is a general collusion between the *pembina* on the price deductions in the area that enables this “predatory lending”. Most *pembina* self-finance their business and high interest rates provide capital for expansion. Some also borrow money from banks, but the proportion of their own capital outweighs the amounts borrowed.

According to the *pembina* respondents, most of their capital is invested in the loans given to fishers, therefore, they cannot immediately leave their job if they want to. *Pembina* also can only rarely, if ever, use a hard approach to deal with the fishers who are unable to repay, or run away from their debt. This seems to be due to the large number of players in this sector, which creates competition. Therefore, each *pembina* tries to provide the best service to attract or keep their fishers, and there are some who lose their business every year when they lose their fishers to competitors.

Similar to *pembina*, some mini-plant owners run their business with their own capital. However, many of them have access to bank finance and hence have more financial stability compared to the *pembina*.

In some rare cases, *pembina* who have a strong relationship with a processor can request a down payment to run their business, mainly to purchase raw material. However, according to processors, they only provide this service for a limited number of suppliers who are trustworthy. Processors rely heavily on their intermediaries to obtain raw material because fishing vessels catching crab are all small-scale and it is not practical for processors to deal with a large number of fishers to obtain their product.

### Debt bondage

The field survey did not find any serious issues on the first and third criteria of the Conservation International indicators. Both fishers and intermediaries confirmed that fishers can witness the measurement of their catch. Price is determined by the *pembina*, but fishers can, to some extent, complain about the purchase price if they notice a significant difference in the prices offered by other intermediaries. With regard to the debt record, fishers are free to access or copy the record. When fishers take additional loans or pay

back a part of their loan, the *pembina* and the fisher update the record together. Most fishers do not have their own record, however, because they fully trust the intermediary.

Nevertheless, the ability to pay off debts seems to differ between fishing vessels that utilize *bubus* and nets. The *bubu* fishers interviewed had better catches and more stable income throughout the year. During the lean season, *bubu* fishers catch other species, which can give comparable alternative income. The larger vessel size in *bubu* fishing also allows them to go to other fishing areas when the catch is not good in Lampung. Most of the time, the catch can cover the fishing operations costs, according to those surveyed. They also stated that they could actually pay off the binding loan anytime; however, they choose to maintain their relationships with the *pembina* due to long personal relationships and good trading conditions. Therefore, the debt bondage risk for this type of fishing may be low to medium.

Many gillnet fishers come from poor communities and may already live close to the poverty line as they often seem to struggle to obtain a good stable income and pay off their loans. Some of the reasons behind this are that they cannot go fishing during bad weather and have fewer options during the low season. The biggest expenditure, putting them at high risk of debt, is net replacement and maintenance. The fishers require about IDR2 million a month to repair or replace broken gear. Furthermore, the net can also be lost at sea, due to currents, or stolen. In this case, the fisher needs approximately IDR36 million for a new net. The fishers realize that using traps is more profitable than nets, however they do not have enough capital to switch. Based on the interview data it also seems that the debt owed to the intermediary remains stable or even increases over the time, indicating that these fishers are unable to repay loans. Therefore, the debt bondage risk in net fishing from smaller vessels is medium to high.

### Sustainability

As with Vietnamese BSC fisheries, sustainability is a serious concern in Indonesian BSC fisheries, expressed by all supply chain actors from fishers to processors. Improving resource management and strengthening enforcement by the government are important factors in achieving sustainability. It is not clear to what extent the current financial practices of the supply chain are driving overfishing and unsustainable practices. The downstream buyers (importers and processors) realize that the crab catch is seasonal. The processors do not have the ability to force intermediaries to produce more raw material due to the absence of contracts and capital investment in the intermediary

business. Similarly, while intermediaries do finance fishing operations, they cannot force fishers to catch more crab due to seasonality and issues with stock health. Rather, during low catches, intermediaries allow fishers to put their repayment of loans on hold.

Nevertheless, the trade of undersized crab is still a supply chain related problem. The processors continue to purchase and process undersized crabs despite a government ban. There are a number of reasons this persists. First, enforcement by the government is still limited, many processors still accept small crabs and, therefore, rejecting the small crabs is not practical for the intermediary. Second, independent intermediaries usually buy all fishers' products (species and sizes) in bulk, not based on size or quality-based sorting, while the intermediaries that only trade with mini-plants sometimes buy according to size and quality, in line with the regulations. Third, fishers question the effectiveness of avoiding catching small crabs and releasing them alive, believing that they may as well sell the undersized crabs because they will likely die even if they release them.

### Labour issues and human rights

Awareness of proper working conditions, occupational safety and health issues, and available social security services are very low in the fishery researched. This was,

for instance, indicated by the lack of safety equipment on board vessels and the fact that only a few fishers had health and life insurance. Furthermore, there are no functional skills requirements when fishers and vessel crew are recruited. As long as the candidate can survive at sea and is able to work diligently, anyone can join a vessel no matter their age, prior education or training. Most of the fishers interviewed started fishing at a very young age, joining the industry straight from elementary school, and therefore consider it normal that children and young people join their vessel.

In Lampung, there is a large internal migrant labour force involved in the small-scale fishery. They live in semi-permanent rudimentary settlements and work for vessel owners. It appears there are no clear work contracts between the vessel owners and the fishers and the working conditions are seasonal. This study did not examine further to what extent the vessel owners may have leverage over the fishers by, for example, providing binding loans, or to what extent these fishers may also be debt bonded to the vessel owners, something that has been identified recently in larger industrial fleets in Indonesia.<sup>50</sup>

#### Box 3: Factors contributing to "social control" in intermediary relationships

In small-scale fishing communities, the social and emotional relationship between fishers and intermediaries is often very strong. In addition, the supply agreement between both parties is not laid down in a written contract. This is also the case between the captain and crew of fishing vessels.

Moreover, the relationship can usually be ended any time as long as the binding loans and other debts are paid back. However, even when this is possible, the strong emotional bonds act as glue in the working relationship and prevent both intermediaries and fishers from ending it. The emotional bonds make it harder for fishers to leave "their" intermediary, even if they are not satisfied with the conditions.

In addition, the debt owed is complex, as some of the loans are used to invest in the fishing business, while other loans are used for discretionary household purposes. This makes changing to a new intermediary a potentially daunting venture as it could impact on, not only the fishing business, but also on household dynamics.

As the intermediaries are often powerful local business people, even relatives, it becomes even more difficult to break out of bad, financially exploitative, situations especially in remote communities where there may not be alternative routes to the market or when severing an existing tie could have wide ranging impacts beyond the business transactions.

50 K. Jones, D. Visser, J. Prasetya and D. Nuriyati: Fish for Export: *Working in the Wild Capture Seafood Industry in Indonesia* (British Academy Tackling Slavery, Human Trafficking and Child Labour in Modern Business final report, 2019) [https://crest.iom.int/sites/default/files/document/fish\\_for\\_export\\_final\\_report.pdf](https://crest.iom.int/sites/default/files/document/fish_for_export_final_report.pdf)



## ▶ Chapter 3: Discussion and Conclusions

The study highlighted some interesting contrasts between the small-scale shrimp and blue swimming crab (BSC) sectors in Indonesia and Viet Nam, as well as clear similarities across the two countries in how small-scale fishing and farming arrangements are financed and how this impacts the well-being of small-scale producers, as well as sustainability.

In all the examples studied, intermediaries play a very important role in enabling the supply chain. They usually buy all products (species and sizes), provide immediate cash payment, and distribute to different market channels that fishers/farmers do not have the capacity or the time to engage with.

Some intermediaries interviewed, especially at the aggregator level, were officially registered, and had obtained hygiene certification. However, it was clear that in both countries and sectors there is a gap when it comes to regulating intermediaries, particularly the smaller, first level, collector intermediaries, which usually operate informally and have no formal training in hygiene and safety or most likely in sustainable management regulations and environmental sustainability issues.

Furthermore, there are no regulations or standards on financial transparency, pricing, or reporting to ensure that intermediaries respect national conservation and management measures such as minimum size requirements. The lack of regulation is especially pressing for the farming sector where the pricing structure currently incentivizes intermediaries to increase the product weight in order to make a margin between the farm and the processor. This is an ongoing issue that needs to be addressed by the industry and regulators at both national and local levels.

Together with the absence of strong government enforcement, the lack of regulation on intermediaries is also enabling fishers to sell their undersized products or those caught during closed seasons. The buy-all practices may provide a higher income in the short-term, but the potential longer-term environmental impacts of this activity may further undermine the livelihoods of fishers and farmers, which may, in turn, increase their vulnerability to debt bonding over time.

The lack of regulation also means that there is no, or very limited, oversight of intermediaries' practices regarding loans. While small-scale shrimp farmers often lack access to capital and operate under less-

than-ideal economic scenarios, they have a lower risk of debt bondage than small-scale fishers. Even if farmers in both countries borrow money from distributors or intermediaries, they retain their freedom to sell their harvest to the highest bidders. The main risk factor that leads shrimp farmers into an unsustainable debt situation is through farming failures due to disease outbreaks or other events. This is, however, not related to inherent supply chain finance practices, but rather to the lack of insurance and sustainable financing for the small-scale sector.

Small farmers have traditionally been heavily reliant on intermediaries. However, the power and influence of intermediaries has been mitigated in recent years in both countries due to the higher numbers of intermediaries, leading to price competition, as well as better price transparency and sales channels due to social media.

Current financing processes do not allow small farmers to buy in bulk, exposing them to higher input costs; in some cases where the farmer cannot make cash purchases, costs may be up to 45 per cent higher, severely limiting profitability. The situation seemed to be more severe in Viet Nam, where it was reported that farmers may actually make losses even during normal farming cycles due to the high input costs and fluctuating shrimp prices, leading to debt cycles (but not outright debt bondage).

Like the shrimp farmers, small-scale fishers struggle with access to finance and are often dependent on intermediaries to provide capital to cover fishing trips and equipment in advance of the trip. The payments are usually deducted from the value of the catch after the trip. However, in contrast to the farming situation, the fishers lose their ability to freely sell their catch to the highest bidder and are debt-bonded to sell the catch to the intermediaries who provided them with finance.

In Viet Nam, loan/debt financing was more of a feature of the low season when the intermediaries' finance provided a financial "safety net", rather than being an underlying operational requirement. In Indonesia, in contrast, the financing of fishing operations appears to be almost exclusively loan/debt based. Other studies of different regions and fisheries in Indonesia have previously identified the prevalence of similar debt dependency.<sup>51</sup>

51 D.S. Adhuri et al.: Green market for small people: Markets and opportunities for upgrading in small-scale fisheries in Indonesia (Mar. Policy, 2015), <http://dx.doi.org/10.1016/j.marpol.2015.03.021>

In Indonesia, there was also a strong system of binding loans, larger personal loans that fishers are required to take in order to establish their relationship with the intermediaries. While the capital provided by the intermediaries is officially “interest free”, in practice the fishers pay through the reduction of catch value; in some of the examples identified there was up to 76 per cent de facto annual interest on the capital provided. In the case of Viet Nam it was not possible to calculate this de facto interest in as much detail, but there was evidence that the basic financial system was organized in a similar way and that the fishers were unlikely to fully realize the financial impact of their debts. This is especially problematic as many of those working in small-scale fisheries have low levels of financial literacy.

Despite the shortcomings in the practices of loan giving and debt relations between intermediaries and small farmers and even more so fishers, it is very important to bear in mind that intermediaries may sometimes be the only safeguard against economic shocks available to small-scale fishers and farmers. Both groups are highly vulnerable to economic shocks caused by factors such as weather patterns, seasonality, or the high risk of injury. Economic shocks in turn are frequently a main driver of child labour and fuel unsafe migration and human trafficking. Intermediaries play a crucial role in preventing adverse situations from driving families and communities into severe poverty and, as such, are a stabilizing factor in communities. However, this may come at a very high cost for some farmers and especially some fishers, such as those under binding loans. Therefore, regulation of intermediaries, alternative financing models and increased access to social protection and insurance are essential elements in decreasing their risk of debt bondage.

The issues highlighted by the study shows that there is a need to rethink the notion that debt bondage and responses to it are issues primarily associated with workers and employment relations. Debt bondage must also be recognized as an issue that affects small-scale, self-employed producers from vulnerable groups.

It also shows that there is a clear link between environmental sustainability, financing, livelihoods and well-being among small-scale shrimp farmers and BSC fishers, even where debt bondage does not appear to be prevalent. Vulnerability to economic shocks and declining profits, often due to environmental degradation, can still leave small-scale fishers and farmers vulnerable to debt cycles that negatively impact their well-being.

However, this study is not sufficiently broad in scope and methodology to generalize beyond the specific research areas of the study. Therefore, more research is required to fully comprehend the underlying causes and the different forms that debt bondage might take in different communities, supply chains, and sectors. Future research could include greater analysis of drivers such as narratives, gender relations. Moreover, to gain a better understanding, similar research in other supply chains in other locations is needed.

In conclusion, we identified additional analyses and steps to improve our understanding of intermediaries and opportunities to optimize outcomes related to livelihoods, working conditions, and environmental sustainability in small scale fishing and aquaculture sectors in Indonesia and Viet Nam:

- Further analysis to identify key gaps in regulation of intermediaries in the small-scale fishing and aquaculture sectors, including legal regulations, voluntary Codes of Conduct, or other measures. This could include exploring ways to improve transparency in pricing based on experiences with social media in Viet Nam.
- Explore alternative financing models and increased access to social protection and insurance for small-scale aquaculture farmers and fishers. A key element should be incorporating financing targeted at the specific issues of working capital and reducing the risks of debt bondage.
- Continue and enhance efforts to improve data collection and access to technology for small-scale farmers and fishers and ensure that these efforts focus not only on ecological sustainability, but also on the socio-economic situation of fishers.
- Consider expansion of farmers’ cooperatives and financial management units, building on the experiences of Dipasena in Indonesia and ICAFIS programmes in Viet Nam as a way of ensuring a fair price for farm inputs and fair selling prices, as well as insuring farmers against catastrophic losses. Most importantly, this also has the potential to create the basis for various other improvements needed in the sector, such as sustainability and traceability measures required by the markets.
- In addition, it could be explored whether organizing fishers into cooperatives and working on a supply chain model, similar to those in aquaculture (described above) can increase sustainability and reduce the risk of debt bonding among BSC fishers.

- Further research into the relationship between intermediaries and processors, particularly opportunities to increase the transparency and contractual terms to achieve social and environmental outcomes.
- Additional research to fully comprehend the underlying causes and the different forms that debt bondage might take in different communities, supply chains and sectors. Future research could include greater analysis of drivers such as narratives, gender relations and environmental impact. In addition, it could examine other species, supply chains and geographical areas. This will allow a more informed understanding of both the scale and nature of debt cycles and debt bonding in small-scale aquaculture and fishing.
- Such research would also allow for evaluation and revisions of the concept of debt bonding to better reflect the nature of debt cycles and potential debt bonding among small scale, self-employed seafood producers.

**For BSC fishers, especially in Lampung:**

- Introduce a circular economy concept for the gillnets, building on the net-bank programmes proposed elsewhere in Indonesia, and combine with an alternative finance scheme to support independence from binding loans from intermediaries.

**For the small-scale shrimp sector:**

- Develop new innovative insurance products that reduce risk in the shrimp sector, support livelihoods and support access to affordable capital for the transition to certified sustainable farming.

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## ► Appendix I

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As some of the interviews took place in group situations the exact number of respondents is not specified. The numbers given below are based on the number of individual consent forms signed during the study. The “other” category includes government officials, association representatives, academics and NGO representatives.

Role	Indonesia	Viet Nam
BSC fisher	12	18
Shrimp farmer	16	20
BSC intermediary	5	6
Shrimp intermediary	5	8
BSC processors	8	5
Shrimp processor	3	3
BSC other	14	7
Shrimp other	10	9
<b>Total</b>	<b>73</b>	<b>76</b>

## ► Appendix II

### Indicator 1.1.2.b: Debt bondage in small-scale fisheries

Score for small-scale

<b>RED:</b> High Risk (<60)	<ul style="list-style-type: none"><li>• There are no reliable or transparent data available or the assessment team is not able to collect primary data through observation, surveys or interviews in a manner safe for assessment team or affected workers/fishers.</li></ul> <p>OR</p> <ul style="list-style-type: none"><li>• The fisher/farmer is paying off debt to the cooperative, association, buyer, or permit holder (for equipment, permit fees, fuel costs, ice, etc.), and all or most of their income is used to pay back their debts.</li></ul> <p>OR</p> <ul style="list-style-type: none"><li>• The fisher/farmer is paying off debt to the cooperative, association, buyer, or permit holder (for equipment, permit fees, fuel costs, ice, etc.), and their debts has increased over time proportional to their income.</li></ul> <p>OR</p> <ul style="list-style-type: none"><li>• The fisher/farmer is not allowed to witness the product being weighed or graded to calculate their income.</li></ul>
<b>YELLOW:</b> Med Risk (60-70)	<ul style="list-style-type: none"><li>• There are reliable or transparent data available or the assessment team is able to collect primary data through observation, surveys or interviews in a manner safe for assessment team or affected workers/fishers.</li></ul> <p>AND</p> <ul style="list-style-type: none"><li>• The fisher/farmer is paying off debt to the cooperative, association, buyer, or permit holder (for equipment, permit fees, fuel costs, ice, etc.) but most of their income is kept and a smaller percentage is used to pay back their debts.</li></ul> <p>AND</p> <ul style="list-style-type: none"><li>• The fisher/farmer is paying off debt to the cooperative, association, buyer, or permit holder (for equipment, permit fees, fuel costs, ice, etc.) and their debt has remained stable or decreased over time proportional to their income.</li></ul> <p>AND</p> <ul style="list-style-type: none"><li>• The fisher/farmer is allowed to witness the product being weighed or graded to calculate their income.</li></ul>
<b>GREEN:</b> Low Risk (80+)	<ul style="list-style-type: none"><li>• The fisher/farmer is paying off debt to the cooperative, association, buyer, or permit holder (for equipment, permit fees, fuel costs, ice, etc.) but a minimal percentage of their income is used to pay back their debts, and their debt has decreased over time proportional to their income.</li></ul> <p>OR</p> <ul style="list-style-type: none"><li>• The fisher/farmer is NOT paying off debt to the cooperative, association, buyer, of permit holder.</li></ul>

▶ **International Labour Organization**

ILO Jakarta Office  
Menara Thamrin Level 22  
Jl. M.H. Thamrin Kav. 3  
Jakarta 10250 - INDONESIA  
Tel. +62 21 391 3112  
email: jakarta@ilo.org

**[www.ilo.org/jakarta](http://www.ilo.org/jakarta)**