Food and Agriculture Organization of the United Nations

WorldFish

Women's empowerment in aquaculture

Two case studies from Indonesia

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Engagement, outcomes, and constraining and enabling factors for women in shrimp farming and fish processing

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ABBREVIATIONS AND ACRONYMS

ACIAR	Australian Centre for International Agricultural Research
ADB	Asian Development Bank
APS	Sidoarjo Fishery School
Bappeda	Badan Perencanaan Pembangunan [Regional Development Planning Agency]
Bappenas	Badan Perencanaan Nasional [National Development Planning Agency]
CEDAW	Convention on the Elimination of All Forms of Discrimination against Women
DKP	Dinas Kelautan dan Perikanan [Marine Affairs and Fisheries Office, Indonesia]
FAO	Food and Agriculture Organization of the United Nations
FGD	Focus group discussion
GDP	Gross domestic product
GENNOVATE	Enabling gender equality in agricultural and environmental innovation
INPRES	Instruksi President [Presidential Instruction]
MMAF	Ministry of Maritime Affairs and Fisheries Indonesia
NGO	Non-governmental organization
Rp	Rupiah
SAFVER	Sustainable Aquaculture Development for Food Security and Poverty Reduction
SCI	Indonesian Shrimp Club
SIUP	Surat Ijin Usaha [Business permit]
WEAI	Women's Empowerment in Agriculture Index

EXECUTIVE SUMMARY

Indonesia is one of the top ten aquaculture-producing countries globally. The sector makes a significant contribution to the country's development, with a total sector value of Rp. 111.5 trillion (US$8.3 billion).[1] As well as aquaculture generating livelihoods for the 1 667 428 households involved in production, it has been estimated to benefit 1 356 675 individuals through their involvement in processing and 4 846 145 through marketing.[2] Brackish water aquaculture, which is the focus of these case studies, is estimated to contribute 38 percent of the total economic value.

Women are engaged in a range of aquaculture production and value chain activities in Indonesia. In particular, women are predominate in marketing and processing, with their involvement estimated to be 1.5 to 1.7 times higher than men's. Despite this, there is currently a lack of information regarding women's roles – and more fundamentally – the outcomes for women and factors that enable or constrain these. This represents a critical gap in the knowledge needed for effective aquaculture programmes and policies. Addressing this gap is of particular importance given the significance of the aquaculture sector: as such a vital economic sector, aquaculture has notable potential to contribute to women's economic and social empowerment, as well as to Indonesia's broader performance on gender equality and economic development indicators.

This report presents the findings of a small study that begins to address the above gap. Overall, the objective of the study is to generate a greater understanding of if, and the ways in which women's engagement in aquaculture may contribute to women's social and economic empowerment. Within this framing, empowerment is defined as "the expansion of people's ability to make strategic life choices in a context where this ability was previously denied to them" (Kabeer, 2001, p.19). In more specific terms, this small study explored women's empowerment in aquaculture through a qualitative investigation of several key issues. In particular, it assessed the engagement of women and their roles, positive and negative outcomes for women, and factors shaping all of these. The study was based on a literature review and two empirical case studies. The case studies were: homestead-based milkfish processing in Sidoarjo District; and household-scale shrimp farming in Barru District. The report presents the findings of the study and concludes with recommendations to inform research policy and intervention strategies in aquaculture that will better contribute to women's empowerment.

Gender roles

Women's involvement in shrimp farming and in milkfish processing enterprises was found to be socio-culturally gendered, and the degree and forms of participation varied with the nodes and types of aquaculture. Milkfish processing was found to provide significant opportunities for women's direct involvement in the given socio-cultural context, including income-generating opportunities for unskilled, poor and medium wealth group women and full-time mothers, who had limited access to other economic activities. Women's involvement was divided into engagement, either as processed milkfish business owners or as workers in milkfish gutting and deboning. This divide reflects socio-economic lines, with women from medium wealth groups able to engage as owners, while women from poor wealth groups were limited to worker roles.

[1] Based on an exchange rate of US$1=Rp.13 500.
[2] Only 2013 data is available.

In contrast, the shrimp farming case demonstrated low direct participation by, and opportunities for, women in the case study's socio-culture context. Women engaged in two main roles in this case: shrimp farm lead operators and casual labourers. It surfaced that only a very small number of women engaged as lead operators in the site; in contrast, larger numbers of women sought opportunistic work in shrimp sorting and grading. The latter work, however, is informal, insecure and of low value in terms of payment. Women's involvement as shrimp farm lead operators stands out as being the only 'deviant' or 'stretched' gender role of those played by women in both case studies. In other words, this role represented women's involvement, notably pushing the boundaries of the socially-accepted normative framing of 'women's' versus 'men's' work and spheres of engagement. Similar to the milkfish processing case, the shrimp case also reflected socio-economic differences amongst women. Specifically, poor women only accessed the opportunities for casual labour; the rare engagement as shrimp farm operators being found only amongst medium and high wealth group women. The study also found that women played a significant background role in the financial management of shrimp farming (in which men were lead operators), with men tending to seek their wives' input to mitigate potential financial risk associated with the investment.

Positive and negative outcomes for women

Participation in aquaculture in both cases provided women with the primary benefit of income. Varying by type of work and wealth group of the women, the income contributed to women meeting daily needs, improving financial security, and/or investing in the household (such as children's tertiary education) or in aquaculture businesses. The income was of particular importance given women's very limited options for earning income in the given contexts. The income benefits fed into the economic empowerment of the women, in the sense that earning their own income increased women's ability to make choices related to their personal or household expenditures. At the same time, this empowerment was limited in scope: women in the case studies continued to be predominantly engaged in low-return roles in aquaculture, with very few women crossing gender boundaries into the higher value nodes.

For women business operators in both case studies, engagement in the sector potentially reflected another form of empowerment, albeit a limited one. Through aquaculture, these women expanded the sphere of decision-making in which they engaged from the household sphere (i.e. about family) to also engaging in decisions in the business sphere (establishing and growing an entrepreneurial enterprise). Overall however, these women's scope to make strategic decisions remained notably unchanged: even as they engaged in the business sphere, their husbands still held final decision-making power, including over women's involvement in aquaculture, their time and their financial investments in their enterprises (see Factors, p.xiv).

In addition to economic benefits, engagement in aquaculture in the cases also contributed to some aspects of women's social empowerment. In particular, it engendered some women's expanding human and social capital in the form of increasing self-esteem, confidence, appreciation and respect from themselves and from their husbands in relation to earning income. While needing further study, changes in human and social capital appeared to be interlinked with socio-economic status and related opportunities, such as education, training and networking opportunities.

In addition to the above-noted limitations to women's empowerment, women in the study also identified some negative outcomes relating to their engagement in aquaculture. A key negative outcome for women was the associated time burden, especially for women in higher value roles (business owners and lead operators). Together with the direct time needed for the aquaculture activities, the burden is a direct function of the absence of re-distribution of tasks in the household as women take on paid work. Similar to the note above, that aquaculture involvement had not changed intra-household power and decision-making dynamics, women's involvement did not affect the prevailing gender norm of women as caregivers, and domestic and family work as 'women's work'. As such, as a result of women becoming involved in aquaculture, they were working very long days (with reportedly longer working hours and less leisure time than men). This reflects the women's having to juggle reproductive and productive roles – continuing to both cook and care for their husbands and children while engaging in the economic opportunities.

Factors shaping engagement and success

In line with the above outcomes, both case studies found that social and gender norms – in particular those regarding women's work and mobility – strongly shape the gendered nature of involvement in aquaculture. This manifests in women primarily engaging in lower value roles that can be seen as extensions of their reproductive roles (such as food preparation).

The case studies also highlighted that gender as a factor in engagement is crosscut by socio-economic status (class). In relation to this, the significance of access to resources and financial assets to women's involvement in higher value roles (business owners and lead operators) signals the importance of policy, norms and practice-shaping inheritance (of land and ponds) and access to resources and credit.

Through the milkfish case in particular, the study also surfaced the potentially potent role that external interventions and technologies can have in the development of a sector attractive to women. The case in particular, signalled the importance of training to help women build both their human capital (such as entrepreneurship) and their technical skills (deboning, processing). Government support programming allowed medium wealth group women to enter the sector by creating access to assets (such as pressure cookers and freezers).

In addition to these factors affecting women's engagement in aquaculture, the study found four main factors influencing women's outcomes, success and empowerment: intra-household decision-making and norms; human and social capital; financial assets; and spousal and family support.

Intra-household decision-making patterns and norms regarding household headship and obedience emerged as significant. Predominant socio-religious and gender norms positioning men as the 'head of the household' and women as needing to obey their husbands were strongly played out in both cases. In combination with the above-raised gender norms regarding roles, work and mobility, these headship norms limited women's ability to engage and benefit fully from various aquaculture and capacity development opportunities.

Human and social capital also arose as key factors. The case studies illustrated the important influence of training and formal education, not only in terms of direct exposure to new knowledge and opportunities to build transferable skills (such as communication), but also in terms of developing social networks and partnerships. While more research is needed, social capital – in the form of (shrimp) association membership, private partnership and informal networks – appeared to be important to women business owners or lead operators in terms of learning, innovation, investment or marketing. At the same time, connecting to the above normative factors, the study found that gender norms and relations ascribing responsibilities and narrowing freedoms in relation to women's roles as 'mothers' and positions as 'wives' limited women's participation in training programmes and capacity (and market) development opportunities.

Financial assets were factors in women business owners' and lead operators' successes. They are necessary to make the required enterprise investments for success, including recovery from crop failure, financing system intensification and market promotion. While the limited number of high wealth women involved expressed fewer financial barriers, the study found that both poor and medium wealth women had limited access to the needed family financial support or formal credit, with the latter related to a lack of required collateral.

Husband's and family members' support also emerged as an important factor contributing to women's success in both cases. Identified aspects of spousal support enabling success included providing financial support (as previously mentioned), business advice and (in the shrimp case study) emotional support to deal with the community-based social criticism of stretching gender boundaries. While this would need further investigation, the limited examples of women operators who successfully challenged gender norms suggested that extended family support and encouragement can contribute to women aspiring to take on 'stretch' gender roles.

Recommendations for policy, research and interventions

The study suggests that the Indonesian Government, at the national and subsidiary levels, can build on its commitment to gender equality by supporting policy and policy implementation mechanisms that enable gender-equal access to, and control over, resources and assets. In particular, it will be important for government actors to focus policy support on ensuring gender equal access to land and pond ownership through inheritance, and to financing and collateral. This includes gender-equal mechanisms for land and house ownership, including clear and accessible gender-equal title registration. Additionally, national and district governments can lay the foundation for empowerment in aquaculture – and a range of sectors – by sponsoring gender equality and awareness (communication) programmes both for men and women regarding equal rights and opportunities in economic activities as well as regarding the benefits of sharing household roles between genders.

Aquaculture interventions will be strengthened by responding to this study's fundamental findings regarding the significance of gender and social norms in constraining women's scope of engagement, opportunities, and benefits. Specifically, the study underscored that – in conjunction with other factors, such as financial, human and social capital endowments necessary to participate in aquaculture – gender and social norms related to roles, mobility and decision-making are currently a critical factor limiting positive outcomes. As such, to more effectively contribute to women's empowerment, aquaculture and development interventions and policies will be strengthened by engaging with these underlying normative barriers. This includes incorporating gender transformative strategies in aquaculture programmes and interventions.

Finally, the study suggests that FAO and non-governmental organizations, together with research agencies supporting aquaculture and aquaculture intensification can more effectively contribute to women's empowerment in aquaculture through three strategies. First, by training and support programmes more explicitly targeting women as well as men, including in higher return opportunities, and designing specific programmes for poor women. Second, through identifying, developing and promoting programme strategies to reduce time burdens and negative outcomes for women participating in the sector. Third, by providing interventions, support and capacity development that take a multi-faceted approach by addressing multiple, interconnected factors important to women's empowerment in aquaculture. The latter factors include technical skills, access to assets (such as production equipment), and network development (expanding professional and market/client connections).


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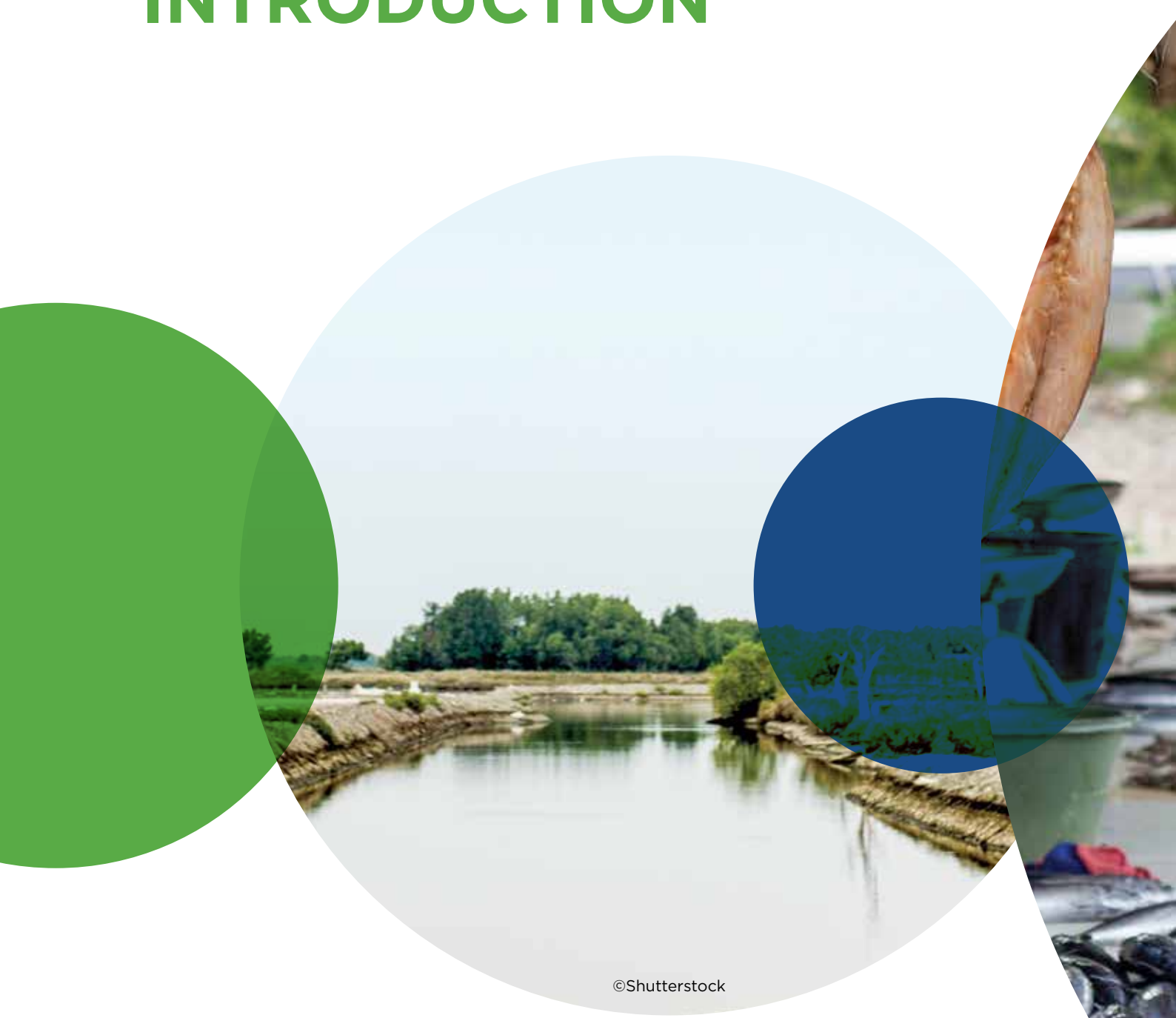
INTRODUCTION



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1.1 Background and objective of the study

01

1.1.1 Background

The Food and Agriculture Organization of the United Nations (FAO) is spearheading the *Asia and the Pacific's Blue Growth Regional Initiative*.[3] The main focus of the initiative is to promote informed policy, good governance and improved management practices in, and for, the sustainable intensification of aquaculture. The Initiative spans the whole supply chain, from input supply to the marketing of products. Within the above, a key focus is to enhance women's participation and empowerment in aquaculture.

This study contributes to the FAO and the *Blue Growth Initiative's* aims to provide empirical insights into women's empowerment in and through aquaculture. Such insights, in particular qualitative insights, are necessary to scope and map key issues, and thus suggest direction for policy and intervention strategies within the rapidly growing aquaculture sector. This study is one of two country case studies on women's empowerment in aquaculture conducted for this purpose. The other is a comparable case study in Bangladesh. Together, these two studies form the FAO-WorldFish initiative entitled *Women's empowerment in aquaculture production systems in Asia: Comparative case studies and synthesis from Bangladesh and Indonesia.*

In line with this focus, gender is a central concept in this study. Gender refers to the socially-constructed differences between men and women. It is a key aspect of an individual's social identity that interacts with other identities such as age, class, ethnicity and religion. Gender norms and power relations – together with structural factors such as policies and institutions – shape men's and women's roles and responsibilities, access to and control over resources and decision-making ability (Mulyoutami *et al.,* 2012). As such, women and men, especially those living in poverty and food insecure conditions, face different challenges and garner varied benefits from their labour and other opportunities (Bappenas, 2001). This means that an accurate understanding of gender norms, practices, roles and relations, challenges and outcomes is central to effective policy-making and programming for better poverty alleviation, livelihood, food security and nutritional outcomes in aquaculture.

1.1.2 Objective and study questions

The study objective is to generate greater understanding of if – and the ways in which – women's engagement in aquaculture may contribute to women's social and economic empowerment. Within this framing, empowerment is defined as "the expansion of people's ability to make strategic life choices in a context where this ability was previously denied to them" (Kabeer, 2001, p.19).

[3] http://www.fao.org/asiapacific/perspectives/blue-growth/en/

The study seeks to elucidate empowerment in relation to two types and nodes of aquaculture: household shrimp production operations and homestead milkfish processing. To this end, the study investigates the engagement and roles of women in these types of aquaculture, the outcomes of this engagement, and the factors that enable or constrain women in playing these roles and from achieving positive outcomes. Specifically, the study uses two case studies to explore the overarching question and its four sub-questions presented below.

Overarching question:
In what ways, to what extent and why are different women empowered (or disempowered) by their engagement in aquaculture?

Sub-questions:

i) What are the gendered patterns of engagement and roles played by women in these types and nodes of aquaculture?

ii) What enabling and constraining factors shape these patterns and roles?

iii) What are the positive and negative outcomes for women in these different aquaculture roles and nodes?

iv) What factors shape these outcomes, including what enables or constrains women in successfully meeting their aspirations in or through aquaculture?

The study meets this objective through combining a literature review (to inform the contextual understanding) and two empirical qualitative case studies in Indonesia. The study took place from January to March 2016.

This report is divided into five main sections. This Introduction (Section 1) presents the methodology, including case selection criteria, and the scope and limitations of the study. After this section, background information on aquaculture in Indonesia, including on gender, is provided (Section 2). Next, each of the case study findings are presented in turn: first, the shrimp production case study (Section 3); then the milkfish processing case study (Section 4). Within both case studies, the report presents findings related to each of the study's four sub-questions (engagement and roles; factors shaping roles; positive and negative outcomes; enabling and constraining influences on outcomes). The final section (Section 5) synthesizes lessons learned and policy implications regarding these questions. The study concludes with insights for a range of development actors regarding entry points and strategies by which aquaculture can contribute to women's empowerment.

1.2 Research methodology

1.2.1 Scope of the study

In line with the objective of the study, the research was designed and carried out as an exploratory qualitative study based on case study methodology (Yin, 2009). The fieldwork for each case site was undertaken over the course of ten days, i.e. five consecutive days in each site. The Context section of the study was developed through a desk review of peer-reviewed and grey literature.

In terms of the scope of the two case studies, they represent two specific types of aquaculture (shrimp and fish) and two specific nodes or parts of these aquaculture value chains (production and processing). In relation to subject focus, through the cases, the study focuses on three issues: i) the extent and types of (roles in) women's engagement with aquaculture; ii) the differential outcomes for men and women, both social and economic as a result of this engagement; and iii) the factors that influence and shape this engagement and these outcomes.

1.2.2 Case study selection

The cases were selected so that – together with the sister study in Bangladesh – they would represent a well-balanced range of livelihood activities involving women within aquaculture value chains, including production and processing. As well as this overarching criteria, the specific criteria that drove the selection of the particular cases were: aquaculture-based activities in which either both women and men, or all women, were involved; activities at a sufficiently mature enough stage that there is income being generated; interest and agreement by potential participants; and the accessibility/feasibility of the cases given the time and resources available.

Based on this, the following two cases were selected: shrimp farming in Barru District, South Sulawesi Province; and homestead processed milkfish (Chanos chanos) in Sidoarjo District, East Java Province. One village in each district was chosen as the focus of each case: Lawallu Village for Barru District and Kalanganyar Village for Sidoarjo District.

Shrimp was selected as the focus for Case study 1 because of its significance to aquaculture in Indonesia. In terms of sites, Barru District was selected because shrimp farmers practice a range of shrimp farming types, from traditional (extensive) and modified-extensive, to semi-intensive and intensive systems. In other districts, shrimp farmers mainly apply extensive and improved-extensive systems. This diversity in shrimp farming systems in Barru embodies a key advantage over other potential sites. While there were very few female operators that could be identified for any potential sites (in Barru or elsewhere), the choice of Barru and the specific selected village meant there was an opportunity to focus on a female lead operator with a semi-intensive and intensive shrimp system. These intensified systems are of particular relevance to the study because of the overall FAO Blue Growth Regional Initiative interest in investments in aquaculture development and intensification. In order to enable a comparative investigation of women's involvement in different systems, the site boundaries were expanded to include a female lead operator from the neighbouring district (Bulukumba). Despite the very limited presence of women as shrimp farm operators (see Limitations, p.8),

given that different wealth groups participate in different types of systems and types of work, the case study also enables some contrast between the female operators from different wealth groups (i.e. the intersection of socio-economic factors and gender).

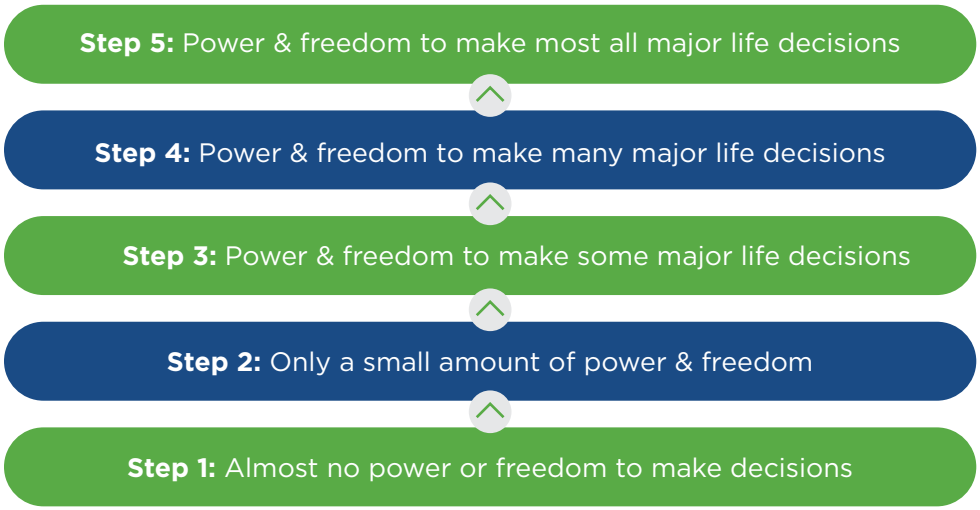
For Case study 2, homestead milkfish processing was selected due to the high degree of women's participation in this sector. Moreover, the selected case study presents a household-based processing case, whereas the processing case study from the Bangladesh sister study presents a private sector (factory-based) case. This selection will thus enable valuable insights regarding women's working conditions, challenges and opportunities in different nodes of processing. Sidoarjo District was chosen because it is the largest milkfish-producing district, and is one of the hubs of micro- and small-scale businesses in Indonesia, including homestead fish processing businesses. Key informants interviewed during the preliminary visit to the district identified Kalaganyar Village as having the highest number of women involved in processed milkfish. They suggested that approximately 70 women own processed milkfish homestead businesses in the village, including the woman with the largest home-based business in the area. Additionally, a key informant from the Government (an officer of the District Fishery Agency) highlighted it as a village that has received government support in the form of training and production facilities, thus enabling study insights relevant to government and development programmes. Finally, the village offered an additional advantage of having a male-led homestead processed milkfish business (as well as female-led ones), thus enabling some gendered comparison of experiences of engagement and support.

1.2.3 Data collection and analysis methods

The fieldwork was conducted from 4 February to 30 March 2016. Key informant interviews were used to gather background data about the cases. In-depth interviews using semi-structured questions and focus group discussions (FGDs) were deployed to gather information from respondents. In total, 16 interviews were carried out for the shrimp farming case study and 14 interviews for the processed milkfish case study. Additionally, three FGDs were held for the shrimp farming case study, and two FGDs for the milkfish processing case study. Annex 1 summarizes these numbers as well as the types and numbers of participants in each FGD.

Six tools were applied within the interviews and FGDs; these are presented in Annex 2. Amongst these, the study adopted and adapted the Ladder of Power and Freedom tool (see Figure 1). So that the findings derived from this tool are clear in the presentation of the cases, the tool is briefly explained here. The purpose of the tool is to catalyse respondents in the interviews and FGDs describing from their own perspective(s): what they see as the most important aspects of 'freedom and power' (i.e. over which aspects of their lives and decision-making is it most important to have influence); at what level respondents see themselves currently being; and how and why that has changed compared to ten years ago or prior to participating in the aquaculture sector. The first 'step' (or 'bottom rung' of the Ladder) represents the least capacity of the respondents to make their own decisions about important affairs in their lives; the fifth (top) 'step' represents a significant level of capacity to make important decisions for themselves. The guiding question did not prescribe the aspects of important decisions. If respondents had problems in understanding the question, the researcher provided examples, such as freedoms related to issues connected to unpaid or paid work, to spending money, to going places (mobility), or to expressing themselves.

Figure 1. Ladder of Power and Freedom



Source: Gennovate (https://gender.cgiar.org/collaborative-research/gennovate/).

A protocol and semi-structured question guideline – common to both the Indonesian and Bangladesh study – was developed for the interviews and FGDs. This was then adapted as needed for the specific cases and contexts. In addition, a transect walk and field observation was also performed in each study area to directly capture, as well as triangulate, insights on women's activities and gender relations during the fieldwork. The researcher stayed in the village during the fieldwork, which enabled better interactions and trust building in gathering information from villagers and respondents, as well as informal triangulation for validity.

A total number of 69 respondents were involved in the study. To the extent that each existed (see Limitations), this comprised female and male lead operators of shimp farms, milkfish processing enterprise owners and workers, husbands of women milkfish enterprise owners, and wives of male lead operators of shrimp farms, as well as government officers, non-governmental organization (NGO) workers and heads of communities (Annex 1). This participant selection was purposive in nature, based on criteria that would enable relevant gender insights. These focused on: women engaged in the forms of aquaculture selected (in the different identified categories of work/roles); their spouses, if any (in order to offer gender relation insights); and men engaged in the same roles as women (to offer gendered contrasts). Additionally, the aim was to involve women from different socio-economic (wealth) groups, in particular wealth groups, to enable the understanding of the intersectional nature of gender in these contexts. Characteristics of the identified wealth groups (poor, medium and high) were defined (see Section 3 and 4) and households were selected through a wealth-ranking process carried out with key informants. First, the researcher developed wealth categories with key informants. Based on these, all respondents were then classified into the defined socio-economic groups through the input of key informants, in particular the community head and the government extension officers responsible for shrimp farming and milkfish processing. Respondent selection criteria and selected cases are presented in Annex 3.

Data was coded and analysed manually by the researcher who led the field work, based on themes derived from the four subresearch questions. This was first carried out within each case, followed by cross-case analysis.

1.2.4 Limitation of the study

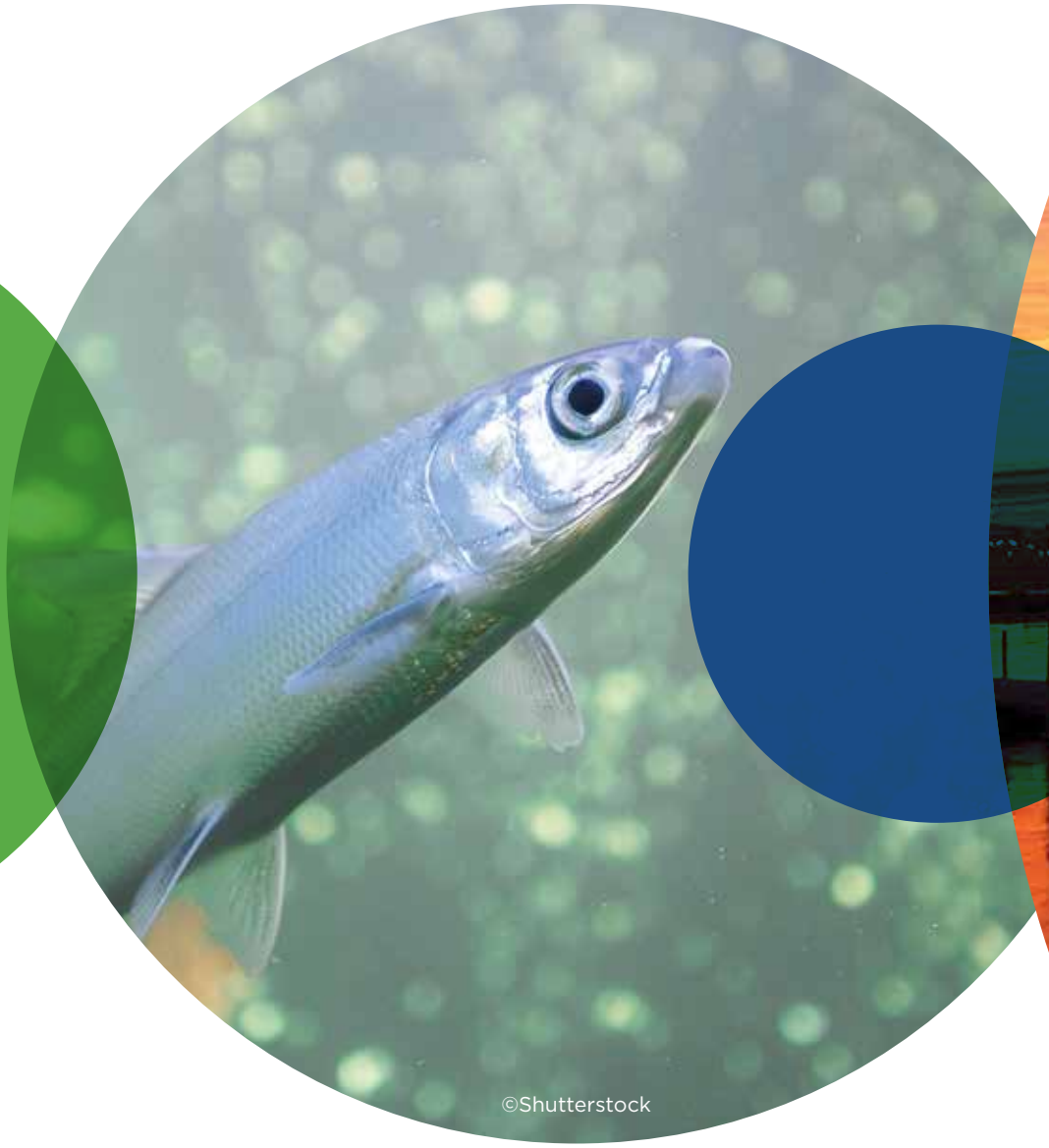
In line with the scope, methodology, and time and resource constraints, the following key limitations to the study are identified. First, being a qualitative study, the results add understanding of complex issues in specific contexts and are not meant to be statistically extrapolated. Second, the study timeline is that of a single point in time (versus a real-time longitudinal change). The study aims to accommodate that limitation somewhat by including participants' reflection of change over time in relation to aquaculture and empowerment (in-depth life history interviews with female operators, and Ladder of Power and Freedom tool). Similarly, while the study represents two important types and nodes of aquaculture, these are only two of the many possible types and nodes and only two cases in a large sector. As such, they are not intended to represent all possible cases or the entire sector.

Additionally, the gender balance of participants in the study was asymmetric because of asymmetries in the sector; this required and led to adaptations of the sampling strategies. Specifically, regarding Case study 1, while the original and ideal intent was to engage a group of female lead shrimp operators, the study revealed there to be only one female lead operator in Barru District. In addition to this being recognized as a finding in itself, the study was adapted to accommodate this limitation by: seeking and adding an additional female operator from the neighbouring district (Bulukumba District); and adapting the methods to apply more in-depth life-story type interviews with these women, rather than the originally planned FGDs. While this adds depth of insight to the cases given the limited number of women found operating shrimp farms, the findings should not be assumed to be widely generalizable. Further study is suggested in other provinces, including establishing if there are areas where direct women's participation in this role is higher, and if so, engaging larger numbers of women in this type of study. Because of the lack of statistical data on female shrimp farmers in Indonesia, such areas cannot be suggested at this time.

Similarly, in terms of focus group gender balance, while some studies allow comparative groups of male and female respondents who are engaged in the same roles or livelihood activities, in this study such a balanced approach was not possible. Specifically, in the shrimp operations case (Case study 1), as outlined above there were enough male respondents for a FGD but not enough female; the converse was true in the processed milkfish business case (Case study 2). As described above, methods were adapted accordingly, in particular using in-depth interviews with the minority gender participants. Similarly, while the study of some issues would allow for comparative FGDs of people from different wealth groups regarding similar livelihood activities, in the cases in this study, the key roles emerged as socio-economically homogeneous (e.g. all milkfish enterprise operators were from the middle wealth group). The study addressed this by analysing the relationship of wealth to the identified gendered roles, opportunities, and outcomes through comparing across – rather than within – the identified roles (livelihood groups).

/02

THE INDONESIAN CONTEXT



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Indonesia is an archipelagic country composed of 17 504 islands that are administrated under 34 provinces. Java, Kalimantan, Papua, Sumatra and Sulawesi are the five biggest islands. The Indonesian population was 255.5 million in 2015. Approximately 11 percent of the population is categorized as living below the poverty line, and there is reported to be 6.2 percent unemployment (Indonesian Statistics, 2016). The Indonesian gross domestic product (GDP) was reported as Rp.11 540.8 trillion in 2015 (Indonesian Statistics, 2016). Industry, service and agriculture are the dominant sectors contributing to 47 percent, 37 percent and 15 percent of the total GDP of Indonesia, respectively (Indonesian Statistics, 2016).

2.1 Overview of aquaculture in Indonesia

02

Indonesia is one of the top ten aquaculture-producing countries globally (Sari, 2015). The modernization of the sector was initiated under the Suharto regime in the 1970s to boost Indonesian export revenue (Sari, 2015). Prior to this era, Indonesian aquaculture production was a subsistence activity for coastal villagers, which started more than 400 years ago (Nash, 2011).

Currently, the Indonesian aquaculture sector is classified into brackish water ponds, freshwater ponds (*kolam*), public inland aquaculture (*Perairan umum*), rice farming integrated aquaculture (*mina padi*) and mariculture. Based on data of potential and utilized area for aquaculture (Table 1), there is still considerable opportunity for Indonesia to expand its aquaculture production areas for all five sub-sectors.

Table 1. Potential and utilized area of Indonesian aquaculture in 2013

	Brackish water ponds	Freshwater ponds	Public inland aquaculture	Rice farming integrated aquaculture	Mariculture
Potential area (ha)	2 964 331	541 100	158 125	1 536 289	12 123 383
Utilized (ha)	650 509	176 509	1 564	124 057	325 825
Opportunity for expansion (ha)	2 313 922	364 591	156 561	1 412 212	11 797 558

Source: MMAF (2014a)

Aquaculture production of major commodities was reported to be 14 521 349 tonnes in 2014 (see Table 2), with a total value of Rp.111.5 trillion (US$8.3 billion)[4] (MMAF, 2014a). Seaweed had the biggest production in terms of volume. However, in terms of value, brackish water ponds contributed 38 percent of the total economic value, followed by the freshwater ponds and mariculture (MMAF, 2014). This sector contributed to the livelihoods of 1 667 428 Indonesian households involved in aquaculture production in 2013 (see Table 3). Another six million people were involved in marketing and processing activities (see Table 4).

Table 2. Aquaculture productions of major commodities

	2013 (tonnes)	2014* (tonnes)	Average growth 2009-2013 (%)
Seaweed	9 298 474	10 234 357	33.23
Shrimp	645 955	592 219	19.25
Grouper	18 864	12 430	44.38
Giant seaperch	6 735	4 439	1.99
Milkfish	627 333	621 393	17.80
Common carp	412 703	484 110	13.80
Nile tilapia	914 778	912 613	29.97
Catfish (Clarias)	543 774	613 120	40.18
Catfish (Panggasius)	410 883	403 133	39.90
Giant gouramy	94 605	108 180	19.86
Others	326 801	535 355	19.76
Total	**13 300 906**	**14 521 349**	**29.78**

*2014 preliminary figure.
Source: MMAF (2014a).

[4] Based on an exchange rate of US$1=Rp.13 500.

Table 3. Number of households involved in aquaculture in 2013

	2012 (households)	2013 (households)	Average growth 2009-2013 (%)
Mariculture	183 357	192 871	13.31
Brackish water ponds	236 806	245 390	1.55
Freshwater ponds	927 755	966 229	6.21
Cage	67 874	56 069	0.02
Floating net	30 411	35 311	7.30
Rice farming integrated aquaculture	221 244	171 558	-0.75
Total	**1 670 447**	**1 667 428**	**4.90**

Source: MMAF (2014a).

Table 4. Number of people involved in marketing and processing in Indonesia (from capture fisheries and aquaculture)

	2011	2012	2013
Processing			
Male	485 758	524 633	524 640
Women	866 245	832 028	832 035
Processing total	1 352 003	1 356 661	1 356 675
Marketing			
Male	1 963 829	1 963 829	1 963 829
Women	2 882 316	2 882 316	2 882 316
Marketing total	4 846 145	4 846 145	4 846 145
Total	**6 198 148**	**6 202 806**	**6 202 820**

Source: MMAF (2015).

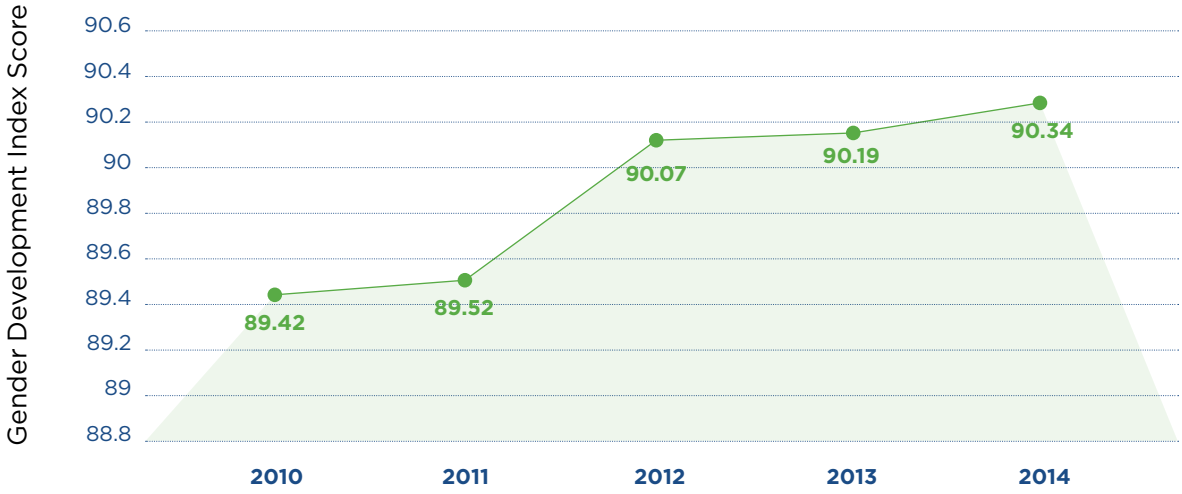
2.2 Gender in the Indonesian socio-economic and policy contexts

Socially and culturally, Indonesia is very diverse with five predominant religions – Islam, Buddhism, Hinduism, Protestantism and Catholicism – and many ethnicities, of which classification is still ongoing (Annata *et al.,* 2014). While not an Islamic state, Islamic principles influence social and political decision-making in Indonesia.[5] According to Gross (2014), religion is a significant factor shaping daily interaction and relation among Indonesians and has contributed to Indonesia's patriarchal culture. Gross (2014) also suggested that in most cases, the roles of authority and prestige in religious organizations are predominantly held by men who prescribe and control the norms of the tradition for women.

[5] http://www.indonesia-investments.com/culture/religion/item69.

According to 2015 UNDP data,[6] Indonesia fares poorly in gender equality – ranking 110th out of 155 countries in the Gender Inequality Index (2015).[7] In the recent tracking of the Gender Development Index, gender equality is shown to have been increasing since 2010 (see Figure 2). However, this trend is still weak compared to other Asian neighbouring countries such as Thailand, the Philippines, Singapore, Brunei Darussalam and Malaysia (Indonesian Statistics, 2014).

Figure 2. Indonesian gender development index (2010-2014)



Note: The Gender Development Index focuses on three dimensions of development: 1) a long and healthy life; 2) knowledge; and 3) a decent standard of living.

Source: Indonesian Statistics (2014).

Participation in economic activities in Indonesia is highly gendered. Indonesian Statistics (2015) reports the number of Indonesian women without income to be three times higher than Indonesian men (see Table 5). The same report also found that salaries are also gendered, with male workers' average salary being roughly 24 percent higher than female workers in various sectors (see Table 6).

Table 5. Percentage of women and men without income (2014 and 2015)

2014			2015		
Male	Female	Total	Male	Female	**Total**
16.95 %	49.78%	33.40%	17.29%	51.13%	**34.24%**

Source: Indonesian Statistics (2015).

[6] http://hdr.undp.org/en/content/gender-development-index-gdi.

[7] The UNDP Gender Inequality Index measures gender inequalities in three important aspects of human development: reproductive health, measured by maternal mortality ratio and adolescent birth rates; empowerment, measured by proportion of parliamentary seats occupied by females and proportion of adult females and males aged 25 years and older with at least some secondary education; and economic status, expressed as labour market participation and measured by labour force participation rate of female and male populations aged 15 years and older.

Table 6. Average salary for male and female labourers in various employment sectors in 2015

	Average salary (Rp)	
Employment sectors	Male	Female
Agriculture, forestry and fishery	1 436 589	928 885
Mining	3 872 536	2 517 529
Industry	1 967 911	1 659 978
Electricity, gas and water	2 639 697	2 279 074
Trading and hospitality	1 762 174	1 514 322
Social and private services	2 619 208	1 991 937
Total	**2 383 019**	**1 815 288**

Source: Indonesian Statistics (2015).

These gender disparities are underpinned by social and gender norms in Indonesian society (Bappenas, 2001). Gendered norms regarding role distributions between men and women is a central aspect of this. Specifically, while norms vary from context to context within the country (Taryono, 2004; Mulyoutami *et al.,* 2012; Fitriana and Stacey, 2012), a study by RPUK (2007) conducted in Aceh Province suggested that traditional norms have tended to frame acceptable male roles as centred in the public domain and engaged more actively outside the household to earn income. According to this study, generally, women are considered more responsible for dealing with domestic household matters and looking after family, with little expectation of earning an income. This norm shapes gendered role distribution, framing women as nurturers and men as primary family providers. Additionally and more fundamentally, dominant patriarchal social norms in Indonesia position women as 'second best' after men (Mulyoutami *et al.,* 2012). These gendered perceptions drive imbalances in participation in decision-making at different scales, as illustrated by the persistence of men's dominance in household-level decision-making (RPUK, 2007; Taryono, 2004). Women have strong control in household financial management, but lack access to land and some degree of agriculture productive facilities (RPUK, 2007; Mulyoutami *et al.,* 2012).

The Indonesian Government has endeavoured to promote gender equality through policy mechanisms, including its Constitution and several laws that ratify international conventions, such as the Convention on the Elimination of All Forms of Discrimination against Women 1979 (CEDAW) and the Beijing Platform for Action of the World Conference on Women 1995 (Mulyaningrum *et al.,* 2015). Central to Indonesia's efforts is the Presidential Instruction on Gender Mainstreaming (INPRES No. 9, 2000).

This gender mainstreaming strategy aims to integrate gender from planning to implementation, and through the monitoring and evaluation of all national development programmes. Under the strategy, women are intended to have equal opportunities and rights with men to participate in social, economic and political activities, and to access the benefits of the development. The strategy is implemented through gender analyses conducted by government institutions such as Bappenas – the National Development Planning Agency – within national development strategies for the agricultural sector that aim to identify and understand the causes, impacts and solutions to inequality (Bappenas, 2001). The strategy includes communication, information and education programmes to raise social awareness of gender issues in government agencies at the national, provincial and district levels (INPRES, 2000). One such intervention seeks to improve women's homestead businesses through the provision of capacity building and financial support, such as fish processing (MMAF 2014b).

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2.3 Gender in the Indonesian aquaculture and agriculture sectors

Gender issues have been included in Indonesian aquaculture programmes since 2011 through collaboration between the Ministry of Women's Empowerment and Child Protection and the Ministry of Maritime Affairs and Fisheries (MMAF) (MMAF, 2014b). This collaboration resulted in a joint decree by the two ministries (KPPPA No.06 MEN-KP/III/2011) on the improvement of gender mainstreaming in marine and fishery programmes (including aquaculture). In response, various strategies promoting gender equality have been integrated into MMAF programmes. For example, the mainstreaming initiatives provided training for women on fish processing, to add value to fishery products and catfish farming in East Java, and seaweed farming in East Nusa Tenggara Provinces. The decree also established the Sustainable Aquaculture Development for Food Security and Poverty Reduction (SAFVER) Project that provided assistance to women's groups in establishing homestead fish processing clusters to develop business centres and networks of micro, small, medium and large businesses to support local economic development. Through the SAFVER programme, the supported women's groups produced 4 000 tonnes of fish fillets per year in Tegalsari Village, West Tegal Sub-District, Central Java Province. In West Tanjung Jabung, Jambi, the women's groups produced 12 tonnes of fish chips, 84 tonnes of dried fish and 15 tonnes of shrimp paste annually.

Despite the increasing attention from the Government and new projects to enhance women's participation in aquaculture, significant imbalances remain (RUPK, 2007; Mulyoutami *et al.,* 2012). While there is a dearth of empirical sex-disaggregated data, MMAF (2014) and Taryono (2004) report that men still play a dominant role in aquaculture production activities. Women are reported to be involved in minor activities, such as feeding and harvest sorting, and play larger roles in marketing and processing (Fitriana and Stacey, 2012). Seaweed farming reported the highest levels of women's participation out of all the forms of aquaculture (MMAF, 2014; Taryono, 2004).

Moreover, while knowledge gaps exist regarding aquaculture specifically, it has been established that women in Indonesia face considerable constraints when engaging in the broader agriculture sector (Bappenas, 2001). A study by RPUK (2007) evaluated women's participation in several agriculture government programmes – including aquaculture – during post-disaster rehabilitation and reconstruction initiatives in Aceh Province. The study argued that a central challenge was gender inequitable access to, and control over, assets and access to knowledge though training programmes. Mulyoutami et al. (2012), and the earlier gender gap analysis in agriculture sector by Bappenas (2001) confirm that household assets, such as land and houses, are generally registered in the name of the husband. RPUK (2007) reported that even when women have access, the opportunity to control the use of productive assets still tends to be male-dominated. The RPUK study found that married women can have legal ownership of natural and physical assets such as land or houses through inheritance. However, if women want to sell or rent the assets, they have to ask permission from their husband. This is reflective of the socio-cultural perception of men as the 'head of the family' and as having the primary financial management responsibilities. Furthermore, drawing on

findings in agriculture, RPUK (2007) and Bappenas (2001) indicate that men also have more access to production facilities and agro-inputs, such as chemicals and seeds. In government shrimp aquaculture farming programmes, production inputs and facilities were found to be given to men rather than women (RPUK 2007). The RPUK (2007) study reported that widows of male shrimp farmers have more access to government support than married women because of their husband's absence.

In addition to lower access to natural and agricultural production assets, the same study indicated that women also have limited access to information, including from government support programmes, and social and political activities in villages (RPUK 2007). The study suggests this is because of the low participation of women in the public domain. One aspect underlying this low participation is the reproductive and domestic time burdens and responsibilities accrued through looking after family members. The study notes that information on training and aquaculture production support is disseminated through public spaces such as coffee shops where women have limited access (RPUK 2007). Training programmes in aquaculture farming that directly disseminate new skills and information tend to primarily target men, while women have been targeted for training programmes related to skills needed to support domestic matters and health with limited engagement in agricultural technical training.

Overall the aquaculture sector provides important livelihood opportunities for women. As presented in Table 4, the number of women involved in fish processing and marketing is significantly higher than the number of men. The average ratios of women to men are 1.7 times higher for processing and 1.5 times higher for marketing (MMAF, 2015). Some reports indicated women's involvement in seaweed farming, backyard shrimp hatchery production and homestead catfish farming (MMAF, 2014; Brugere *et al.,* 2001; Taryono, 2004). However, there remains a lack of information in the literature about these livelihood opportunities in terms of the roles, social and economic benefits and costs, and factors affecting participation of women in aquaculture. This is a gap to which this study can contribute.

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CASE STUDY 1: BRACKISH WATER SHRIMP FARMING IN BARRU DISTRICT

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3.1 Background and overview of shrimp farming in Barru District

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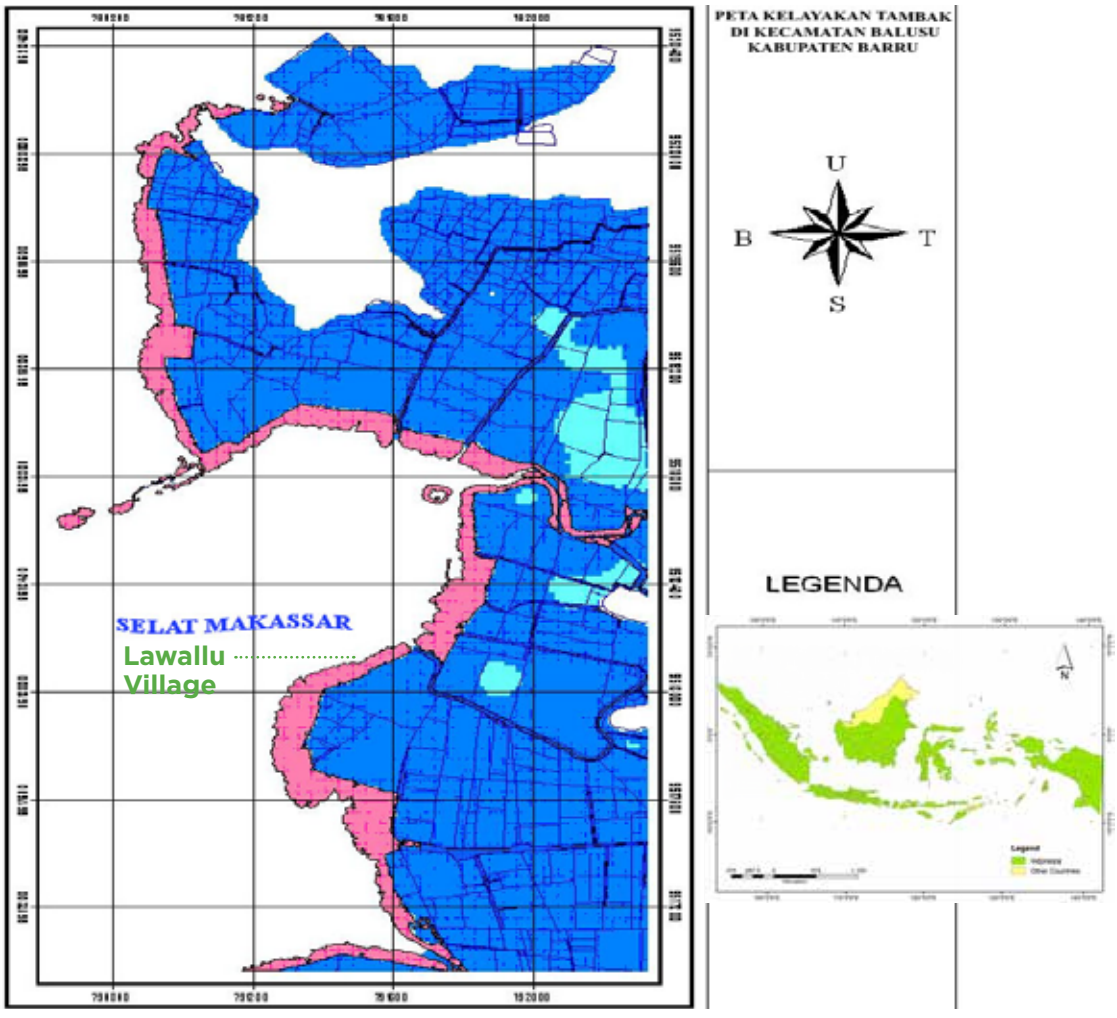
Case study 1 focuses on brackish water shrimp farming operations in the area of Lawallu Village, Barru District, South Sulawesi Province. According to the Barru District Government (*Pemerintah Kabupaten Barru*) (2013), the District was established in February 1960. The capital is Barru City. Prior to this time, Barru was comprised of small kingdoms, namely Berru (Barru) Tanete, Soppeng Riaja and Kerajaan Mallusetasi Kingdoms. Barru District is approximately 102 km north of Makassar, the capital city of South Sulawesi Province. It has a total area of 1 174.72 km2 (117 472 Ha), with a costal line of 78 km. It has a total population of 170 316 people, comprising approximately 42 579 households. Buginese is the dominant ethnicity, with strong Islamic influences; 99 percent of the population is Muslim (Pemerintah Kabupaten Barru, 2013).

Map 1. Barru District showing Lawallu Village



Source: ACIAR (2011).

Government statistics indicate that 50.39 percent of the District population engages in economic activities and 9.74 percent of the residents live below the poverty line (Indonesian Statistics for Barru District 2015). Wealth ranking with key informants in the selected study village (Lawallu Village), indicated that households involved in shrimp farming can be categorized into three main wealth groups (poor, medium and high), based on local definitions and characteristics of wealth (see Table 7).

Table 7. Wealth groups and their characteristics (households involved in shrimp farming in Lawallu Village)

Wealth group	Key characteristics
Poor	• Landless, work as paid labourers. • Income can only fulfil daily needs; minimal savings possible. • Most children do not obtain education beyond high school
Medium	• Own or rent land as the lead operator of shrimp ponds with a land area between 1 ha to 5 ha using extensive or improved-extensive system • May hire permanent workers, but usually only hire daily workers for pond preparation • Involved in the daily operations of shrimp farms, such as feeding, opening and closing water gates, and pond preparation • Often have other income sources, such as being a government officer • Children can afford to attend university • Regular savings are possible • Have at least a house in the village
High	• Own and rent land as lead operators of shrimp ponds larger than 5 ha with semi- and or intensive-shrimp farming systems • Own and rent land as the lead operator of shrimp ponds larger than 10 ha using extensive system • Hire permanent workers • They act as the manager and supervisor for the permanent workers who do the daily work • Children typically achieve a university education • Regular savings are possible • Have more than just a house in the village and Makassar • Have more than one car

Source: Key informant interviews and focus group discussions.

Key informants and focus group participants indicated that there is relatively little women's involvement in formal and paid economic activities in the case study area. The primary roles of women from all wealth groups were identified as reproductive roles (i.e. with a main identified role of 'housewife'), which aligns with the predominant socially-ascribed responsibility for women to look after their families. Some women were involved in livestock-rearing around their houses (Mulyoutami, 2012). Additionally, a few women from medium and high wealth groups were employed outside the home as government officers.

Agriculture, forestry, fisheries and aquaculture are the primary sources of income in the District, contributing 37 percent of its total production, which indicates high dependency on nature-based resource livelihoods (see Table 8). Brackish water pond farming for shrimp and milkfish provides one source of livelihoods for local residents. According to the Fishery Department of Barru District (2014), 2 594 ha (2.2 percent of the area) is used for brackish water ponds producing *vannamei* shrimp (*Litopenaeus vannamei*), tiger shrimp (*Penaeus monodon*) and milkfish (*Chanos chanos*) (see Table 9). In terms of households, 1 354 households in Barru District have participated in brackish water pond farming, producing tiger and *vannamei* shrimp and milkfish (see Table 9). Based on this data, approximately 3.2 percent of the households in Barru are involved in this sector. The data were not disaggregated by gender, however, therefore the number of women involved cannot be reported.

Table 8. Primary sources of income of Barru District

Livelihood categories	2012 (%)	2013 (%)	2014 (%)	Average (%)
Agriculture, forestry and fishery	37.83	36.30	36.74	37.67
Construction	15.65	16.74	17.26	15.76
Car and motorbike spear-part supplies and services	8.30	8.30	8.29	8.35
Public services	8.75	8.49	8.07	8.73
Processing	5.43	5.38	5.20	5.47
Information and communication	4.28	4.65	4.30	4.23
Mining	2.88	3.02	3.17	2.82

Source: Indonesian Statistics for Barru District (2015).

Table 9. Area and production of brackish water ponds in Barru District[8]

Sub-district	Area	No.	Production (tonnes)				Total
	(ha)	House-holds	Tiger	Vannamei	Milkfish	Others	
Tanete Rilau	468.24	349	71.8	98.2	202.2	8.6	380.8
Barru	732.39	260	36.7	49.8	462.6	4.6	553.7
Balusu	686.11	297	54.6	124.4	271.2	4.9	455.1
Sop. Riaja	608.43	371	30.9	352.7	279.9	5.7	669.2
Mallusetasi	99.14	77	5	382.9	17.1	1.5	406.5
Total	**2 594.31**	**1 354**	**199**	**1 008**	**1 233**	**25.3**	**2 465.3**

Source: DKP Barru (2015).

To frame the shrimp systems in the study, Tarunamulia's (2014) categories have been used: extensive, improved-extensive, semi-intensive and intensive brackish water systems (Tarunamulia 2014). Table 10 presents the characteristics of the four types in the Indonesian context. Extensive and improved-extensive systems rely on natural tidal movements and mostly produce tiger and milkfish as poly-culture. Semi-intensive and intensive systems stock higher stocking density, predominantly vannamei, and require improved technology such as the use of waterwheels, water-pumps and artificial feeds (Sammut and Tarunamalia, 2001). The use of higher levels of inputs in semi-intensive and intensive systems result in higher production compared to the extensive and the improved-extensive farming systems. As shown in Table 10, extensive and improved-extensive systems can only produce 500 to 600 kg per ha per year. In comparison, the semi-intensive and intensive systems produce up to 5 000 kg per ha per year and 20 000 kg per ha per year, respectively.

[8] Data were not disaggregated by gender.

Table 10. Characteristics of shrimp farming systems in brackish water ponds

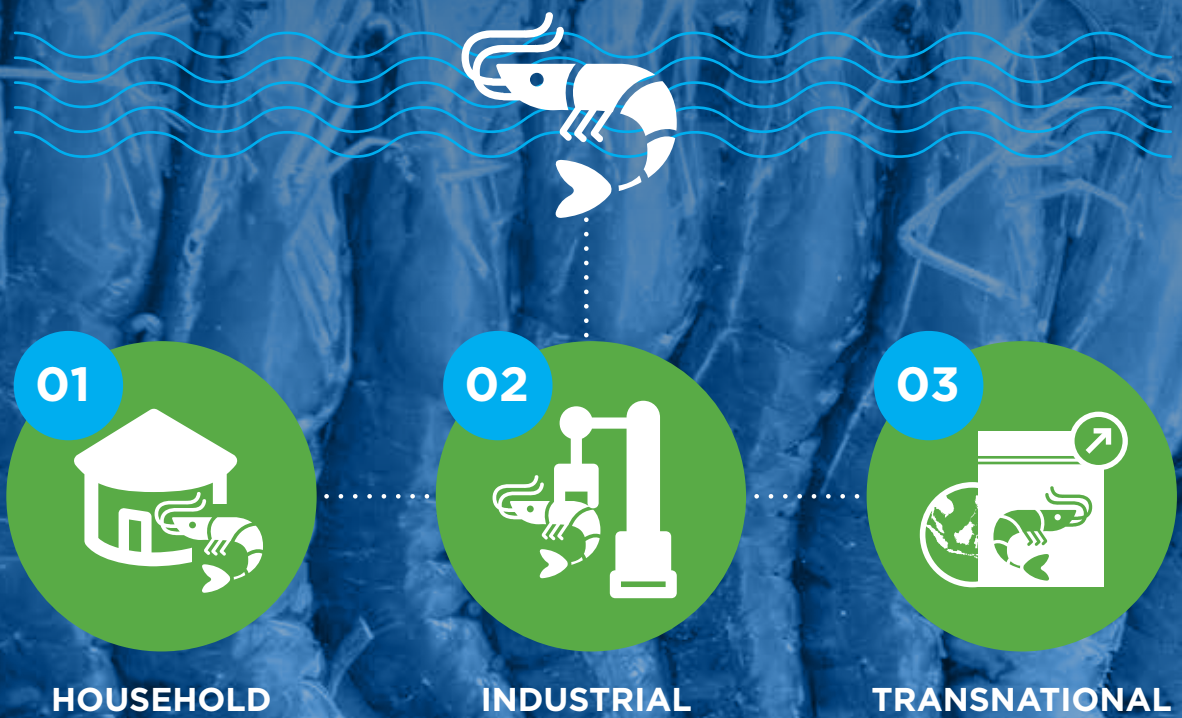
Classifying variables	Extensive system	Improved-extensive (traditional plus)	Semi-intensive	Intensive
Feed	Natural, fertilizer sometimes used to improve natural feed	Natural, fertilizer sometimes used to improve natural feed, additional feed sometimes added	Natural feed and supplementary arterial feed	Artificial feed
Water management	Tidal water exchange	Tidal water exchange; sometimes a pump is also used	Tidal water exchange, water pumped, sometimes with aeration	Water pumped and aeration
Species farmed	Mainly poly-culture; e.g. tiger shrimp and milkfish	Mainly poly-culture; e.g. tiger shrimp and milkfish Monoculture is also used often[9]	Monoculture; primary vannamei	Mono-culture; primarily vannamei
Stocking density (post-larvae/m2)	3-5	5-25	10-30	30+
Production (kg/ha/year)	Up to 500	Up to 600	500-5 000	5 000-20 000
Production cycle/year	1-2	2-3	2-3	2-3

Source: Tarunamulia (2014).

[9] In the study area of Barru, *vannamei* is also produced using improved-extensive system.

In terms of scale of operation, Sari's (2015) classification of Indonesian shrimp producers into three categories has been used: household, industrial and transnational. Household-scale shrimp production was defined as a unit of shrimp farm owned and operated by a household in which family members are the primary labourers. The Government does not require a legal business permit for household scale production. Instead, industrial-scale shrimp production is required to have a legal business permit from the Indonesian Government and is financed by domestic entrepreneurs (Sari, 2015). This scale of operation usually has permanent workers, including technical experts, and has well-defined organizational structures. Transnational-scale shrimp production includes transnational or multinational companies involved in shrimp farming that are operating in more than one country. While there may be comparable stratification of other types of aquaculture in practice, a review of the literature does not establish agreement on a classification system.

In this case study, based on the above typologies, the focus is household-scale shrimp producers who operate extensive, improved-extensive, semi-intensive and intensive-systems of shrimp ponds. Based on interviews and FGDs, the areas of shrimp ponds operated by the respondents are presented in Annex 1.



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3.2 Gendered categories of involvement and roles in shrimp farming households

3.2.1 Role categories and gender distribution of roles

Key informant interviews indicated, and subsequent FGDs confirmed, that individuals' roles in brackish water shrimp operations in Barru District can be classified into three main categories (types of work):

- **Lead operators**
  (lead decision-makers and actors managing and involved in daily operations);
- **Paid labourers**
  (regular day workers employed on a permanent basis or daily basis); and
- **Occasional casual help**
  (in post-harvest).

The emergence of the first category ('Lead operators') reflects the basic study finding that while spouses and family members engage and support household scale (or 'family') shrimp operations in various ways, the operations were found to be primarily led and managed by a single individual, rather than co-run jointly by spouses. In the presentation of the findings below, the shared and supporting roles of spouses are explored, in conjunction with the analysis of lead operators.

In terms of engagement, the key informant and subsequent FGDs assessment of involvement in these categories indicated that engagement in these categories is gendered, with women barely or not at all involved in some categories. Specifically, the key informant interviews and follow-up indicated that:

- The vast majority of lead operators were male: only one operation had a female-lead operator, all others were male-led;
- Paid labourers in the operations were all male; and
- Casual, periodic post-harvest sorting and grading roles were all performed by women, in particular poor women. There was an estimated 50 women from the village involved in shrimp sorting and grading as a source of income. While this post-harvest work is a relatively minor role in that is it casual and temporary, it is maintained in the analysis (through FGD findings) as it was the only identified existing entry point to shrimp operations for poor women.

In response to these findings, the study adapted its methods and framed its analysis accordingly (as presented in Table 11 and Section 1.2 Research Methodology).[10, 11]

Table 11. Categories of gendered involvement in brackish water shrimp farming in Barru District and study adaptations

Category	Gendered involvement in case site	Implications for study
Lead operators	Only one woman lead operator in the case study area	Replace planned FGD with women lead operators with in-depth interviews Add additional female lead operator to study from neighbouring district (n=2 in-depth operator life story-based insights, or 'embedded cases' (Yin, 2009) The above addition enables the analysis of contrasting socio-economic factors for lead operators (the first operator is from a high wealth group; the second is from a medium wealth group) Included spouse roles and support in analysis in relation to this role
Paid labourers	All male	Not pursued in this study because they could not give insights to women's empowerment in this role
Casual periodic work in hulling and sorting	All poor women	FGDs and interviews with poor women involved in this role

Source: Key informant interviews; confirmed via focus group discussions.

[10] As there were not enough women present in the lead operator role for FGD analysis, the study shifted to focus on a small-*n* investigation of empowerment of female shrimp farm operators through life story-based in-depth interviews. This included interviews with the husband of the female operator, drawing on relevant FGD information and observation. Additionally, as noted in the methods section, in order to allow greater insights into women's empowerment in relation to shrimp farm operations, the study found and added an additional woman operator from the neighbouring district (Bulukumba). These two embedded female operator cases offer contrasts in that the Barru operator (who is from a high wealth group) operates a semi-intensive and an intensive shrimp farm stocking *vannamei* (*Litopenaeus vannamei*); the added case from Bulukumba District is from a medium wealth group and manages a shrimp farm with an extensive system producing tiger shrimp (*Penaeus monodon*).

[11] Based on key informant interview information from both districts, accessing enough women operators to form a FGD would have been impossible without looking at multiple districts.

3.2.2 Gendered tasks and decision-making

FGDs and interviews found a gendered division of labour in shrimp operations, with men playing the lead role in pond preparation, feeding and harvesting, and women performing the lead in grading and sorting, as well as financial management (see summary findings in Annex Table 4A). The key roles of opening and closing the water gates and purchasing seeds and inputs were more mixed, depending on the gender of the lead operator. Shrimp feeding also had some flexibility in male-led operations, in that when the male lead operator is out of town or un-available, the spouse (wife) may sometimes carry out the feeding. Shrimp sorting and grading is undertaken as unpaid work by female spouses of the lead operators – as well as by their female friends and relatives – and as a form of family, extended family or friend support. When farmers do not have enough family and friends for shrimp sorting and grading, they hire women from poor families to help in this post-harvest activity. However, there is no formal payment agreement for this casual work; the shrimp operators pay the women with money or shrimp in the amount of remuneration they (the operators) want to provide.

Although women's direct participation in shrimp farming tasks is limited in all but the female-led operations, both male and female participants indicated that women play a significant role in the financial management in the shrimp farming households. During the FGD with male shrimp operators, participants indicated that their spouse's (wife's) ability to effectively manage the financial flow of the household determines the household's ability to save income. They indicated this as contributing to the male operator's capacity to finance shrimp production and to invest in the upgrading of their system. Building on this idea, some male respondents suggested that there would be value in capacity-building programmes on financial management for their wives. One point of divergence amongst male-led operations was that in the only male-led intensive system shrimp operation (with both higher inputs and production than other systems), the wife does not play the financial management role: the husband controls the cash flow and hires a permanent female worker to record all expenses.

In terms of decision-making, both female and male participants indicated that women and men were involved in expenditure and other key decisions regarding production, but to varying degrees and in different decisions, as indicated in Table 12. Male lead operators expressed that their wives' input may shape their investment decisions. They indicated that although there might be disagreements, they needed their wives' input, especially to discuss and mitigate potential risks associated with investment plans.

Mirroring the pattern above, interviews with the married female lead operator and her husband indicated that in their case, the lead operator (the woman) is in charge of the daily operations, with help from paid workers, but also gets input from her spouse. This input is typically in relation to decisions regarding significant investments and calculating costs and risks that enabled risk mitigation for the operations. However, the FGDs and interviews uncovered a key difference in negotiated decisions between male-led and female-led operators. In the former, if there is a difference of opinion, the lead operator's preference is followed. In the latter, the preference of the spouse of the lead operator is usually followed. In other words, in both male- and female-led operations, the male

spouse's preference is followed regardless of whether the man is the lead operator. The common driver shaping this negotiation is the prevalent socio-cultural and religious norm in which men are 'head of the household' and thus the key decision-maker. As expressed by the married female lead operator, if there is a difference in opinion between her and her spouse, she follows her husband's decision and not her own. She indicated that she does so because she feels she has to 'be aware of her position as a woman', which to her means respecting her husband in a way that complies with the predominant religious and socio-cultural norms.

In terms of engaging in trainings, interviews indicated that the wives of male shrimp farmers had, to date, been excluded from shrimp farming training programmes provided by the Government.

Table 12. Gendered negotiations in decision-making in shrimp farming households

Decision	Who is consulted during decision-making?	Who participates in the final decision?	Semi-intensive
1. Investing in fishing gear, boat, pump or other equipment	Male operators and the married female operator always consult with their spouses	Usually the man is the one who decides, in both male-led operations and in the married female-led operation. The unmarried female operator makes her own decision	Always the man's opinion (i.e. even for the married female operator, for matters that have significant economic implications)
2. Buying or leasing a pond	Male operators and the married female operator always consult with their spouses	Married couples always participate in the final decision. The unmarried operator makes an independent decision	Always the man's opinion

3. How aquaculture income is spent	Women are the primary managers of the income	The woman takes more of a lead role in deciding household income expenditures for daily needs, but the man controls the decisions regarding expenses related to shrimp farming and large expenditures (for example, buying a house), in both the male-led operations and in the married female-led operation. The unmarried female operator makes her own decisions	Always the man's opinion
4. What varieties of fish to stock	Male and the married female lead operators discuss more often with pond workers than with their spouses	Male operators and the married female operator lead in the final decision The unmarried female operator makes her own decisions	Always the man's opinion
5. How to deal with an aquaculture production problem	Male operators consult their male workers or peers than their spouses on such matters The married female operator discusses this more often with her workers than her husband	Male operators and the married female operator lead in the final decision. The unmarried female operator makes her own decisions	Always the man's opinion

6. When to harvest fish	Male operators and the married female operator always consult with their spouses, but they also involve workers in the decision-making	Male operators and the married female operator take the lead in the final decision more than their spouses The unmarried female operator makes her own decisions	Always the man's opinion
7. How much of the produce to sell and how much to keep for consumption	Male operators and the married female operator always consult with their spouses	Male operators and the married female operator lead more in the final decision than their spouses The unmarried female operator makes her own decisions	Always the man's opinion
8. Which market to sell the fish at	Mainly the operators (male or female). They only discuss with spouses if there is a new buyer	Male operators and the married female operator lead more in the final decision than their spouses The unmarried female operator makes her own decisions	Always the man's opinion
9. Whether to invest in feed, fertilizers and other inputs	Male operators and the married female operator often consult with their spouses	Male operators and the married female operator lead more on the final decision than their spouses The unmarried female operator makes her own decisions	Always the man's opinion

10. Determining the selling price of fish	Male and married female operators do not really consult spouses on the price, they negotiate with buyers directly	Male operators and the married female operator lead more in the final decision than their spouses. The unmarried female operator makes her own decisions	Always the man's opinion
11. Women getting involved in aquaculture outside the homestead	The married female operator always consults with her spouse	The married female operator always involves her husband in the final decision The unmarried female operator makes her own decisions	Even for the married female operator, for homestead activity with high financial risk, the man (husband) has the final say
12. Women getting involved in aquaculture inside the homestead	The married female operator may consult with her husband, but not as frequently as for activities outside the homestead	The married female operator may consult with her husband, but not as frequently as for activities outside the homestead The unmarried female operator makes her own decisions	Even for the married female operator, for homestead activity with high financial risk, the man (husband) has the final say

Source: Focus group discussions and in-depth interviews.

3.3 Factors influencing women's participation in shrimp farming

The FGDs and interviews highlighted two key factors influencing women's participation in shrimp farming and the above roles: access to land (ponds), and financial motivation (financial pull). As a backdrop and to put into context the factors influencing the lead female operators, the contrasting life stories of the two female lead operators are presented in the following two boxes. Box 1 presents the semi-intensive and intensive married shrimp farm operator from a high wealth group. Box 2 presents the traditional (extensive) shrimp farm operator who is unmarried and from a medium wealth group.

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Box 1. Embedded Case study 1 (high wealth group):
A female shrimp farm operator using semi-intensive and intensive systems, producing *vannamei* (6 ha)

She was from a shrimp farming family – her parents had worked three hectares of shrimp ponds. Her mother was a teacher at a primary school in her village. Being from a wealthy family that could afford her education, she went to university and studied architecture design in Makassar. She was then married to a man from Java. Her husband moved to Java for work in community development and she followed him. They moved to Barru, Sulawesi in 2007. Based there, however, her husband got a job with a construction company in another district and only receives payment on a contract basis.

Because her husband could not provide a sufficient and stable income, she became interested in trying shrimp farming to generate family income. She started to learn about shrimp farming from other senior, experienced shrimp farmers in the area. Her husband provided Rp.25 000 000 to start her farm. In 2009, she took over her parents' shrimp ponds and began her operation with an extensive system on 2 ha of shrimp ponds.

She gradually adopted semi-intensive and intensive systems. The investment for the technology required to upgrade to these more intensive systems has been supported through a partnership she developed with a private company 'CP Prima'. The company provided credit for seed, feed and free technical assistance. She borrowed additional financial capital from the banks. Her shrimp farming business has gone through various up and down stages, with some crops failing. Currently, she has three paid labourers working on 6 ha of shrimp farms. Although she has permanent workers, she is also involved in the daily work and in managing and supervising her workers.

Box 2. Embedded Case study 2 (medium wealth group):
A female shrimp farm operator using an extensive system, producing tiger shrimp (5 ha)

She grew up with shrimp farming. Her late father had an extensive farming system of over 40 ha of shrimp ponds. Her father used to take her to the shrimp ponds; even at a very young age, she stayed overnight at their ponds with her father and was always fascinated watching the shrimp grow. The exposure sparked her lifelong interest in shrimp farming.

When her father passed away, he bequeathed his 40 ha of ponds to his eight children, of which she was the youngest, she received five ha. As the youngest, she only received seven years of schooling, while her other siblings had completed secondary school. When they migrated to the city and went to university, she stayed behind. Her siblings leased out their inheritances while pursuing other work. With her inheritance, she started her farm (in 1995) because – unlike her siblings – she did not have the education for other options. She only knew shrimp farming and felt it was the only livelihood opportunity that might enable her to be financially independent.

She has been using a extensive polyculture system that stocks milkfish and tiger shrimp. The farming practice has never changed. She has no partnerships, investors or husband with whom to share responsibilities and so does most of the shrimp farming activities herself. She only hires daily labour to help her remove sludge and maintain pond dikes. She often travels to her ponds to manage them – three kilometres away from her house – at midnight or 2 a.m. to open and close water gates.

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3.3.1 Access to land (shrimp ponds)

For both women and men, access to land emerged as a necessary pre-condition for engaging in shrimp farming as an operator. This access was identified as being interrelated with financial ability (wealth), in terms of the individual having sufficient funds to lease or buy land, and with family (parental) assets in terms of the inheritance of ponds as an entry point to aquaculture. Both the female operators indicated that inheritance had been a key opening for them to enter aquaculture (see Boxes 1 and 2). It reduced the entry cost, which would have otherwise been prohibitively expensive for them.

Interconnected to inheritance and family background in aquaculture, the in-depth interviews with the two women operators indicated that their motivation to pursue shrimp farming – versus other livelihood options – was strongly influenced by the exposure to shrimp farming as a livelihood option through their families. As noted in Box 2, one of the female operators underscored that she used to go with her father to his shrimp ponds from the time she was very young, even staying overnight. She described the experiences there as having catalysed a lasting interest in shrimp farming.

3.3.2 Financial push-factors and options

All of the women respondents (both female operators and poor women involved in casual work sorting and grading) indicated that income or financial security was a primary pull factor for their engagement. One key difference between female and male operators was that while men were perceived (by both women and men) to be fulfilling their economic responsibilities as the 'main household provider', women's draw to aquaculture was framed (by the women operators) in terms of their earning income in a husbands' absence or in securing additional income flows to the households. Specifically, the woman who operated an extensive shrimp farm (Box 2) was a mature, single woman who said that the absence of a husband forced her to directly operate her farms. If she had a husband, she would expect her husband to operate her farms with her support. The other female lead operator (Box 1) is married, but her husband did not have constant work, so he could not ensure income security.

Gendered differences were also found in terms of opportunities that women and men from different wealth groups have to respond to financial needs through engaging in aquaculture. Specifically, in addition to land access, the case study highlighted that medium and high wealth group men – and women to a much smaller extent – had been able to leverage, to various degrees, the financial resources needed to operate and invest in a farm. In contrast, operating a shrimp farm was not seen as a viable livelihood option by poor women and men. Additionally, there were gendered differences in the shrimp-related opportunities that did exist for poor men and women. Specifically, poor men – landless or with insufficient capital to buy ponds – had the option to engage in shrimp production by becoming contract labourers. A poor male respondent said:

"As husbands and heads of the households, we have to support our family with whatever means we have. If we do not have lands to work on, we have to work as labourers for any opportunity here. Brackish water shrimp farming is one of our main livelihoods."

While poor women expressed similar financial needs and motivations, they said the only option in shrimp production accessible to them was to informally sell their services in casual, temporary sorting and grading.

3.4 Benefits and costs for women

3.4.1 Benefits

Income

Although the direct participation of women in shrimp farming is limited, the identified opportunities through casual labour, and through (limited) involvement as a lead operator, offer some income options for women from shrimp-producing areas. As noted above, *vannamei* farms (using extensive, semi-intensive and intensive shrimp farming systems) created sufficient production to create seasonal income opportunities for poor women in sorting and grading. However, the security and financial return for this work was not assured. The availability of work depended on whether the shrimp operations needed additional workers over and above their relatives and friends. Payment was not always in cash and the amount was not based on a mutual agreement, but at the operator's discretion. Women who were interviewed doing this work said that when paid in cash, they earned approximately Rp.50 000 (US$3.70) per day/harvest with an opportunity of two working days per week between 15 to 26 weeks per year. When they were paid in shrimp, they sold the shrimp to the shrimp collectors in the village for cash. They noted that the benefit for them was income for food and other primary daily needs.

For the shrimp operators, income generated is determined by the yield, which is influenced by the type of shrimp farming system. The two cases of women-operated farms had comparable sized shrimp farming areas (6 ha for Case study 1, semi and intensive, high wealth group; 5 ha for Case study 2, extensive, medium wealth group). However the revenues differed significantly because of different farming systems. The operator with semi-intensive and intensive systems estimated that she could produce ten tonnes of *vannamei* per ha per year with two to three production cycles a year. In contrast, the operator of the extensive shrimp farm estimated that she could only produce 200 kg of tiger shrimp per ha per year with one to two production cycles per year. Based on these data, the annual revenue of shrimp ponds operated by the women are estimated in Table 13.

Table 13. Estimated total revenue of the two female lead operators of shrimp farms, by different farming systems

Women operators	Land operated	Yield per ha year	Price per kg (Rp)	Estimated total revenue annually
Woman with semi- and intensive farming systems	6 ha	10 tonnes of vannamei	35 000	Rp. 2 100 000 000 [US$ 157 894.74]
Woman with extensive farming system	5 ha	200 kg of tiger shrimp	75 000	Rp. 75 000 000 [US$ 5 639.10]

Source: In-depth interviews.

Given the differences in production, income and wealth status of the two operators, the revenue generated is used differently. In the case of the (high wealth group) semi-intensive/intensive female farmer, she uses the income for household financial security, spending the money on daily needs when the husband is not employed. Otherwise, she uses the income to expand her business, to support relatives and to finance her political aspiration to be the head of her village in the next election. In comparison, the (medium wealth group) extensive system female farmer does not have another source of income, thus, the priority of income expenditure is to pay household daily needs and to support her mother.

Recognition

The indirect participation of married women in shrimp farming, by managing household and farming finances, is unpaid labour but was reported by the women as contributing positively in terms of sharing responsibilities and enhancing women's self-esteem. Male lead operators stated that women's participation in managing financial flows allowed men to concentrate on the technical aspects of shrimp production. They added that it was quite difficult for them to record all expenses used for shrimp production, therefore women's participation was crucial. From the women's perspective, their direct involvement in livelihood activities has contributed to a feeling of being recognized, included and respected.

Strategic freedoms

In addition to the benefits mentioned above, this study also evaluated the contribution of the sector to empowerment – strategic freedom – using the Ladder of Power and Freedom tool. The findings indicated both overlapping and differing perceptions of strategic freedoms amongst women of different wealth groups. In particular, social and political freedom was only suggested by the (high wealth) female semi-intensive operator. In contrast, for all other women, financial freedom was found to be the most frequently indicated important area of freedom. This was echoed by men, with income being noted by all male and female respondents as a key motivation for their involvement in shrimp farming. Primary financial aspirations for all were largely limited to fulfilling household needs and to providing better support for families. Furthermore, the interviews also revealed that for the two female operators, the freedom to which shrimp farming contributed included the freedom to make a livelihood choice that aligned with their interests – even if their interests are in contradiction with social expectations and norms (see 3.4.2 Negative outcomes and limitations, p.44).

Perceptions of women and men operators and of women sorters and graders, regarding the contributions of aquaculture to their strategic freedom, are summarized in Table 14, showing changes on the Ladder of Power and freedom, (with "1" as the lowest rung and "5" as the highest). Overall, the women sorters and graders expressed both the lowest starting point and the lowest end point in terms of aquaculture contributing to meeting their aspirations (starting at "1", ending at "2"). Notably, both women and men operators all started from the same point (at "2"), which was where the poor women ended. While both the female and male operators from the medium wealth group (extensive and improved extensive) indicated a one point increase (to a "3"), the female and male operators from the high wealth groups (semi-intensive/intensive system, intensive system and extensive systems, respectively) signalled higher contributions from aquaculture.

While the sample size is too small to confirm, it is interesting to note that both high wealth group men indicated higher gains than the high wealth group woman, despite one of the men's system's being extensive, and thus potentially less profitable. Finally, the fact was noted that women operators', and women sorters and graders', differing starting levels of capabilities, assets and resources might have contributed to their different degrees of 'success' (discussed in Section 4).

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Table 14. Ladder of Power and Freedom: Contributions of shrimp farming to changes in strategic freedoms

	Female operator using an extensive system (medium wealth group)	Female operator using semi-intensive/intensive farming system (high wealth group)	Male shrimp operators using improved-extensive (medium wealth group)	Male shrimp operator with intensive system and male operator with extensive system of 30 ha of shrimp ponds (high wealth group)	Paid women workers in sorting and grading (poor wealth group)
Distribution	**Moved from 2 to 3**	**Moved from 2 to 4**	**Move from 2 to 3**	**Move from 2 to 5**	**Move from 1 to 2**
Reasons	Before, she was supported by her parents and was only responsible for herself Currently, the income from shrimp farming is used to support herself and her mother. She has been paying her mother's health care expenses	Prior to participating in shrimp farming, she felt that she (herself) 'had nothing' Currently, her life has been upgraded and she is able to support others beyond her immediate family She acknowledges that she is recognized as a strong female farmer, able to engage in social and political activities	Before, some of the operators did not own houses and motorbikes as they could not afford them Currently, the income from shrimp farming has enabled them to send all their children to university. Some of them have been able to buy houses, motorbikes and have some savings. But, they still cannot adopt intensive shrimp farming systems or expand their shrimp farms due to the costs	Before, they had nothing and were only able to rent shrimp ponds. They saved the profits and bought their own ponds and expanded Currently, they can fulfil most of their aspirations and are able to accumulate assets such as cars and houses They also contribute to local employment: the operator with the intensive farm hires 13 workers and the one with the extensive system hires ten	Previously they did not have paid jobs, so they did not have any hope to earn money and did not have assurance of being able to buy food Currently, they can buy food and provide for their basic personal needs, but they still do not have secure incomes

Note: In this tool, "1" represents the lowest level of empowerment and freedom, while "5" represents the highest.
Source: in-depth interviews and focus group discussions.

In the Ladder of Power and Freedom tool, the specific understanding of the freedoms and the scale were determined by the groups themselves. Overall, the main form of freedom or empowerment discussed across all groups was financial freedom or empowerment, meaning the ability to earn sufficiently and control the expenditures in line with one's own needs and priorities.

3.4.2 Negative outcomes and limitations

Women operators and shrimp farmers identified two main negative outcomes: time burden and social costs. Unchanged gender norms, expectations and social relations crosscut these outcomes.

Time burden and unchanged gendered norms and responsibilities

In terms of time burden, while women involved in sorting and grading did not indicate time burden as a challenge, both women operators did. These time burdens differed for the women operating the two different types of systems. Specifically, the high wealth group operator with the semi-intensive system experienced the highest time burdens. This operator indicated that she spends the vast majority of her time managing the workers in her three pond locations and that this has reduced her ability to care for her family. Her daily routine entails:

- Getting up at 4 a.m., preparing the children for school, cooking breakfast and meals for the day for the family;
- Going to the ponds after her children go to school at 8 a.m. and spending the whole day on her farms;
- Returning home at 5 p.m. to cook dinner and look after the family; and
- Going to her farms again at 8 p.m. to supervise her workers feeding the shrimp as she must be available at all hours to address problems with the operation.

The operator underscored that this routine does not only cost her personal wellbeing in terms of reduced sleep and stress from juggling multiple demands, but it also affects her relationships with her family members. This includes her husband and children who have complained about her unavailability in providing more attention and care. Additionally, she experiences a related social cost: people in the village criticize her for spending time on her business and not looking after her family. As a result of these pressures, she has reduced the size of her operations from nine to six ponds. Although time is also a burden for the extensive female operator because she is single, without children and operates an extensive system with less time intensity in operation, it does not affect her wellbeing as significantly.

In contrast, male shrimp operators (with extensive or intensive production systems) noted that they did not face similar challenges nor do they experience complaints from their children for spending much of their time on their shrimp operation. Male operators also indicated that they had more leisure and rest time than the female operators. During the male operators' FGDs and interviews, men described their daily schedule as:

- Getting up at 5 a.m., enjoying coffee and breakfast prepared by their wives;
- Going to the ponds at 7 a.m. for shrimp feeding (those who do not have permanent workers);
- Staying at work until noon, then coming home for lunch and a rest; and
- Those with permanent workers are usually done for the day—those without may go back to the shrimp ponds in the afternoon at 4 p.m. and midnight.

Social costs and unchanged expectations regarding gendered mobility and behaviours

In terms of social costs, the FGDs and interviews with men and women highlighted that both the women operators and the women involved in casual sorting and grading faced social burdens not experienced by men in shrimp production. In addition to the above-noted criticisms related to time and attention to family, both women operators said they faced judgements related to their mobility and timing. Specifically, as noted, some activities in shrimp farming need to be done at midnight or early morning. For the female operators, going to the ponds alone at such a late hour meant putting their personal security at risk and resulted in negative social judgement. The wives of male lead operators and the male operators who participated in FGDs stated that women should not be outside at this time. The extensive female operator expressed that people in her community had bullied her for this behaviour, calling her "a strange woman".

Social costs and socio-economic power relations

While the female farmers faced the above pressures, the poor women involved in shrimp sorting and grading experienced a different form of social cost in relation to their involvement. They experienced social embarrassment because they had to take the initative to seek out work and payment, rather than being invited to help. They had to go to the operators 'hoping' both for work and for cash payment for the work. They described that this causes them social and emotional discomfort as they may not be welcomed or turned away.

3.5 Factors shaping success in aquaculture

3.5.1 Local interpretations of 'success' and aspirations

To investigate factors shaping 'success', respondents were first asked to articulate what they understand by 'success' and their aspirations in relation to shrimp aquaculture. Table 15 presents the respondents' answers captured from FGDs and interviews. For the poor women working in sorting and grading, earning sufficient money for their daily needs was the main aspiration. By comparison, the two women farmers (from medium and high wealth groups) framed 'success' at a level beyond basic needs: like the male operators, they both described 'success' in terms of a 'good harvest'. In terms of aspirations, both women (and most male respondents) identified their aim to expand and strengthen their operations and related assets, upgrade technologically or intensify their farming. As an outlier to all other women respondents, the intensive (high wealth group) female farmer further identified that she had socio-political aspirations. Building on her success and networks to date, she aspires to become the village leader. She identified the desire to contribute to the wellbeing of people beyond her immediate family as part of this aspiration.

Table 15. Definitions of success and aspirations related to aquaculture, by respondent type

	Female operator using extensive system (medium wealth group)	Female operator using semi-intensive/intensive farming system (high wealth group)	Male farmers with an improved extensive system	Male shrimp operator with intensive system and male operator with extensive system of 30 ha of shrimp ponds (high wealth group)	Paid women worker in shrimp sorting and grading (poor wealth group)
Definition of success	Good harvest	Good harvest; able to expand shrimp farming and adopt better shrimp farming practices; happiness and having lots of friends	Good harvest; able to fulfil all household needs, and send children for better education	Good harvest	Able to pay for basic daily needs, including meals
Aquaculture-related aspiration	Wants to adopt a semi-intensive system and have bigger ponds	Wants to expand the shrimp ponds when her children are less dependent on her Wants to be head of the village Wants to send her children for a better education to help them in achieving their aspirations Wants to have freedom to contribute and share with others, i.e. as a provider who is not limited to helping her own family and relatives, but who can also help others	Wants to graduate to the intensive shrimp farming system Wants to have a bigger area of shrimp ponds	The intensive system operator wants to learn and adopt updated technology in shrimp farming with an intensive system He is training his son to lead and expand the business to other sectors such as feed and shrimp trading The extensive system operator expresses that he is satisfied if he can pay and improve the living standards of his workers He said that every year he sends one of his workers for *Haji*[12]	Wants to have better regular income or work

Source: In-depth interviews and focus group discussions.

[12] *Haji* is the annual Islamic pilgrimage to Mecca.

Reflecting the pattern identified in the Ladder of Power and Freedom, the respondents reported different levels of achievement of success related to aquaculture. Poor women engaged in sorting reported that the work enabled them to better meet their 'success' goal of daily needs, but this income was still small and insecure. Notably, the two female operators offer contrasting cases: while the (medium wealth group) extensive female operator doubted if she could classify herself as a "successful shrimp farmer", the (high wealth group) semi-intensive/intensive operator identified herself clearly as a "successful shrimp farmer". The former explained her doubts in terms of regularly having unsuccessful crops – the highest survival rate for her shrimps was only 40 percent – and she often did not have sufficient financial capital to pay for the inputs needed. In contrast, although the high wealth group female operator (semi-intensive and intensive systems) had roughly the same size ponds, and also experienced fluctuating shrimp productions and some crop failures, she identified herself as successful based on her rates of production, innovation and status. Specifically, estimates suggested that she produced ten tonnes per ha annually (while the medium wealth/extensive operator produced 200 kg per ha annually). Additionally, interviews and FGDs with men and women underscored that the female operator was the early adopter for intensive shrimp farming in her area and thus she is well recognized by other shrimp farmers from nearby villages.

3.5.2 Factors shaping success

Given the absence of a larger number of 'successful' female shrimp operators in the case study area, the semi-intensive/intensive high wealth group operator is the focus of the 'nested case' investigation of factors of success. This is followed with contrasting insights from the self-identified less successful female operator. In summary, the 'nested case' of the (high wealth group) semi-intensive/intensive female operator highlightst the key enabling factors of spouse support, formal education and related interpersonal capacities, networks, and enabling family background. The key constraining factors emerging from her case are gendered responsibilities and associated time burden. Insights from the medium wealth group extensive female farmer provide contrast, in that the absence of the enabling factors appear to limit her success. Additionally, while training is identifed by both women as an enabling factor, both experience gendered limitations in access – albeit ones that are moderated by other factors of social networks and capacities.

Spouse support

The semi-intensive/intensive (high wealth group) female operator identified personal and financial support from her husband as an important factor in her success. Specifically, she perceived him to have helped her to overcome the social stereotypes against her involvement in shrimp farming. She noted that her husband regularly asserted that she should not let herself be bothered by people's criticisms of her choice or by social pressure to conform to gendered expectations. He corroborated this by expressing in an interview that although a woman operating shrimp ponds is not customary in their village, he backed her in pursuing this because it was her interest. At the same time, the female operator remarked on the limitations to her freedoms within the spousal relationship – limitations that are reflective of broader social and religious norms. Specifically, she underscored that if her husband asked her to stop shrimp farming she would have to conform, as he has the ultimate decision-making power in their relationship, including with regard to her operations and livelihood. She explained that:

"In making a decision I have to refer to my husband, although we might have a disagreement. On my own awareness, I have to be aware that I am a wife who has to follow her husband... In my religion this is a norm that one has to obey."

Support from her husband also included financial assistance for the shrimp operation. She borrowed Rp.50 million (US$ 3 700) from the bank using her husband's work contract as collateral. As this was not sufficient, her husband provided financial support to expand the shrimp area and buy equipment. Her husband also reinjected funds when she had a big loss caused by a failed crop, which enabled her to start again. Taking into account the indications from other FGDs about the prohibitive costs of shrimp farming, this financial support appears to be a contributing factor to this female farmer's success.

Education and skills

Formal education played an indirect but important enabling role in shaping the success of this operator. Although her formal education (university degree) did not provide relevant technical knowledge, the interview suggested that it played a role in enhancing other tacit skills. Specifically, she said that the formal education and associated social activities at university developed her interpersonal competencies and learning skills, which she then applied to establish good relations with and learn from experienced, successful male shrimp farmers.

Interviews with this operator and key informants indicated that, in turn, these skills and the emergent relationships contributed to her developing important enabling professional networks and partnerships. Specifically, the relationships with experienced operators helped her become a member of the Indonesian Shrimp Club (SCI).[13] This membership was significant to her success, as it enabled her to participate in the Club's regular trainings, workshops, and knowledge and experience sharing on shrimp production. Additionally, these interpersonal skills and learning skills, nurtured via her formal education, also favoured her to develop a partnership with a multinational shrimp producing company (PT. Central Proteina Prima Tbk). The partnership contributed to her success on an ongoing basis by enabling her to access good quality shrimp seed, feed and technical assistance. The company also provided credit for shrimp feed that was paid after harvest, waterwheels and day-to-day technical assistance for free. In addition, the company invited her to participate in a training programme. The participation expanded her network with other farmers using similar systems and developed her knowledge and skills.

[13] A club for Indonesian shrimp farmers, mainly those using intensive shrimp farming systems. The Club enables farmer members to stay connected with one another across the country, and to have access to technology and information at regional and international levels.

Family background

Finally, the high wealth group female operator's enabling family background appears to have contributed to her success. While she and the medium wealth group female operator both came from similar religious and ethnic backgrounds (Muslim, Buginese), this operator underscored the significance of the education and encouragement she received. Specifically, as well as investing in her education, her parents and grandparents had a strong influence on her in terms of valuing gender equality and encouraging self-confidence, independence, persistence and courage to pursue her interests. For example, she highlighted that her mother and late grandfather (in contrast to prevailing socio-religious gendered norms) routinely articulated to her values such as:

"You have to do what you want and can, do not let your life rely on a man and do not allow them to beat you."

She perceives that these normative contributions shaped her sense of worth and character, and inspired her to be an independent woman. She sees these qualities as important to her success and for other women, noting that:

"Unless I have tried all the possible ways to achieve my aspiration, I would not give up... We as women, we have to be brave to deal with people from different groups."

Time and family responsibilities

Time and family responsibilities emerged as the main constraining factors to the high wealth group female operator's success. One male operator noted that although the successful female operator participated in collective activities with other farmers from SCI, her participation was lower than men's. She confirmed that her need to juggle her shrimp operation and family responsibilities constrained her ability to participate as men did, thus limiting her personal development opportunities.

In contrast to the semi-intensive/intensive (high wealth group) female shrimp operator, the 'nested case' of the extensive (medium wealth group) female shrimp farmer demonstrated a lack of such enabling factors or other identifiable enablers of success. The woman was unmarried, without financial or spousal support, and had less than nine years of schooling. In contrast to the other operator, this farmer said she did not have self-confidence to take part in professional shrimp farmer groups such as SCI. She did not identify any enabling formative input from her parents or others. Her network was limited to within her village, which was located in a relatively isolated area, and she does not have access to the knowledge and opportunities being shared amongst the club's members. She could not access credit support from the bank because her assets were not sufficient as collateral. She is not eligible for a private company partnership that would enable her to access technical assistance and credit for farming inputs because her farming system does not require a high volume of production inputs.

Finally, while training was valued by both female and male operators as an enabling or potentially enabling factor, women operators had less access than men. Interviewees indicated that government officers, together with heads of community or farmer groups, select the training participants and they purposively target men. The dominant role of men in shrimp farming was understood by interviewees to be the reason. Respondents stated that when men were unable to attend, they would sometimes request that their wives participate in a training or meeting in their place. However, they also noted that the women often could not go because of their household responsibilities and that husbands actually prioritized their sons for attending in their place. In line with this, the extensive female operator confirmed that she routinely felt excluded from training programmes provided by the government despite her interest and need. As suggested above, the semi-intensive/intensive female farmer had somewhat more access to training. Her case suggests that women's ability to network and develop partnerships and earn recognition amongst male farmers and government officers can contribute to offsetting marginalization from training. Her interviews highlighted that over time she overcame a sense of "awkwardness" in participating in a training or activity and being surrounded by men. What she was not able to overcome, however, were the time constraints from her workload at the ponds and her family. These continued to limit her ability to participate on par with male operators.

/04

CASE STUDY 2: HOMESTEAD MILKFISH PROCESSING BUSINESSES

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4.1 Background and overview of milkfish processing industry in Sidoarjo District

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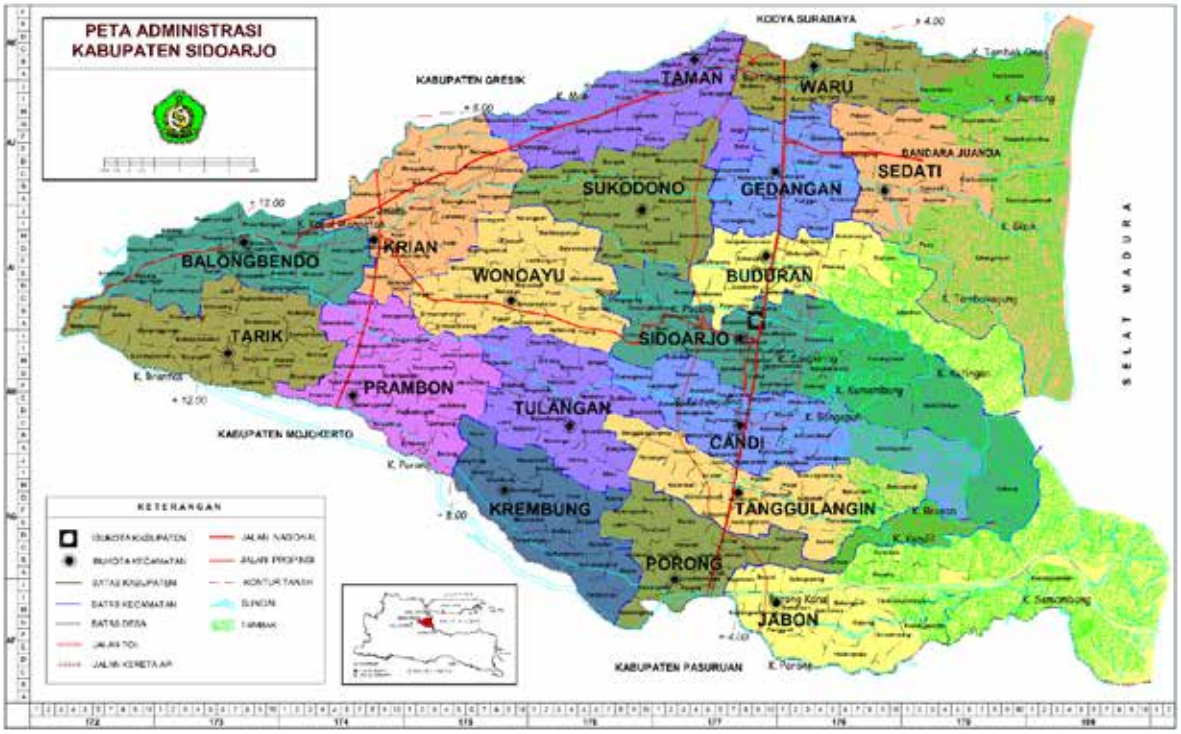
Sidoarjo District is in East Java Province, situated between 7°3' and 7°5' south latitude, and between 112°5' and 112°9' east longitude. Prior to the colonial eras of the Netherlands and Japan, Sidoarjo District was controlled by the Jangala Kingdom. The district was established in 1859. Currently, Javanese and Madura are the dominant ethnicities in the area, with some migrants of Chinese origins and other ethnicities from across Indonesia (Kabupaten Sidoarjo, 2014). The district is home to 2 049 038 individuals, with 68 percent of the population participating in economic activities and with real unemployment sitting at 3.8 percent (Indonesian Statistics for Sidoarjo District, 2015a). According to Bappeda Sidorarjo and Statistic Sidoarjo (2013), 95.45 percent of the district's population is Muslim and Islamic values strongly influence social and cultural norms.

Map 2. Sidoarjo District presenting Kalanganyar Village



Source: Aditama (2014).

The district borders the metropolitan city of Surabaya City, which is the capital of East Java, and has significant economic roles in relation to the city. Table 16 illustrates that manufacturing and industry are important economic activities in Sidoarjo District, including small and medium enterprises such as shoes, bags, food and beverage processing industries (Indonesian Statistics for Sidoarjo District, 2015a). Table 17 presents the number of business permits (SIUP) issued by the Government, by business scale and gender (data on income and total labour per business unit is not available). As indicated in Table 17, the number of male business permit-holders is higher than female, with women representing only 21 percent of the business permit-holders.

Table 16. Livelihood activities in Sidoarjo District

Livelihood categories	2013 (%)	2014 (%)
Agriculture, forestry and fishery	6.54	6.00
Mining	0.59	0.35
Industry/manufacturing	36.88	35.65
Electricity, gas and water supply	0.21	0.10
Construction	5.24	5.91
Retail and hospitality services	21.42	22.45
Transportation, warehouse and communication	5.10	5.42
Finance, real-estate and renting services	4.96	6.01
Social and community	19.05	18.11

Source: Indonesian Statistics for Sidoarjo District (2015a).

Table 17. Number of business permits (siup) issued by the Government, by scale of business

Business scale categories	Male (unit)	Female (unit)	Total
Large-scale industry	31	15	46
Medium-scale industry	587	121	708
Small micro-scale industry	1 794	519	2 313
Total	**2 412**	**655**	**3 067**

Source: Indonesian Statistics for Sidoarjo District (2015a).

There is reportedly lower poverty in Sidoarjo District compared with the national Indonesian poverty level: approximately 6.69 percent of the district population was classified as falling below the poverty line (Indonesian Statistics for Sidoarjo District, 2015b), which is lower than the national poverty level of 11 percent (Indonesian Statistics 2015). Within the selected study village (Kalanganyar Village), based on information from interviews and FGDs, households involved in processed milkfish in the studied area can be classified into three wealth groups: poor, medium and high. The defining characteristics of the groups, based on the local context and framing, are in Table 18.

Table 18. Characteristics of households by wealth group in the study site (Kalanganyar Village), including relation to milkfish industry

Wealth group	Key characteristics
Poor	• Landless • If women work, it is as paid labourers such as milkfish deboners or as household maids • The majority of husbands of poor families are paid labourers in fish or shrimp ponds • They may be migrants from other sub-districts, districts or provinces • Some of them do not have houses or motorbikes; some of them live in shelters along the riverbanks in the village • Income can only fulfil daily needs, they may not be able to make regular savings • Most only obtain a high school education
Medium	• May own a processed milkfish business • Markets are still based on customers placing orders • They may hire household maids • Children may attend university • Able to make regular savings • May have at least one house in the village (or stay with in-laws) and a motorbike • They have market connections, at least within the village and neighbouring villages
High	• Owns land (milkfish farming ponds) • Owns a business; one spouse may work as a government officer • Able to purchase more advanced production technology, such as a vacuum packaging machine • Has their own store, markets do not only rely on individual orders • Markets may extend into other districts • Own at least one house and a car • Hire permanent workers or maids • Children earn a university education • They are able to make regular savings

Source: Key informant interviews and FGDs.

While aquaculture makes a smaller economic contribution in Sidoarjo District than the industrial sector, Sidoarjo has a large area for brackish water ponds and milkfish production. Specifically, there are an estimated 15 513 ha of brackish water ponds producing milkfish and shrimp, which account for 29.99 percent of the total area of the District (Table 19). In total, the District produced 22 412 tonnes of milkfish in 2014 (Indonesian Statistics for Sidoarjo District, 2015a).

Table 19. Area and production of brackish water ponds in Sidoarjo District

Sub-district	Area (ha)	Milkfish (kg)	Tiger shrimp (kg)	Vannamei (kg)
Sidoarjo	3 272	6 515 600	827 000	571 600
Buduran	1 511	3 009 600	382 000	264 100
Candi	1 032	2 047 800	259 900	179 700
Parang	493	992 800	126 000	87 100
Tanggulangin	497	1 116 900	141 700	97 900
Jabon	4 144	6 515 600	827 000	571 500
Waru	488	961 800	122 000	84 300
Sedati	4 077	1 252 100	1 252 100	865 500
Total	15 513	22 412 200	3 937 700	2 721 700

Source: Indonesian Statistics for Sidoarjo District (2015a).

The milkfish processing industry in Sidoarjo District originated in response to the District's high milkfish production. As presented in Table 20, in 2014, Sidoarjo District milkfish production contributed 38.73 percent of East Java's total milkfish production and involved 3 257 households in production. While separate milkfish processing (value chain) data is not available, combined species processing is estimated to involve over 33 000 individuals in the district, the majority of whom are women (Table 21). The reported predominance of women in milkfish processing is in line with the national statistics that indicate that the majority of people involved in fish processing are women (MMAF, 2014a).

Table 20. Production share and number of households involved in milkfish production in/from Sidoarjo District (2014)

Production share of East Java Province (%)	Number of households	Brackish water pond area (ha)
38.73	3 257	15 531

Source: Indonesian Statistics for Sidoarjo District (2015a).

Table 21. Number of men and women involved in the fish processing industry in Sidoarjo District, including products from capture fisheries and aquaculture

Male	Female	Total
9 263	24 142	33 406

Source: MMAF (2013).

According to key informants, in the early stage of sector development in this district approximately a decade ago, milkfish products were limited to smoked milkfish that was introduced by Chinese migrants. Innovation and modernized technology have since triggered the development of processed milkfish products. At present, local processed milkfish products have diversified and now include milkfish presto[14] and deboned milkfish[15] products. In terms of the latter, the innovation of milkfish deboning disseminated by Sidoarjo Fishery School (APS) in 2005 led to wider product innovation such as crispy milkfish, *otak-otak*[16] and *abon.*[17] As well as being sold to local consumers, they are also widely promoted and marketed to consumers from other provinces. Many stores selling processed milkfish products can be seen in East Java airport and big cities in East Java Province.

[14] Milkfish bones are softened using a pressure cooker; this product was started after introductions on how to use pressure cookers.
[15] Milkfish with all the bones were removed.
[16] Fishcakes.
[17] Shredded milkfish.

Processing milkfish in Sidoarjo District is a homestead-based industry. Key informants reported, and FGDs confirmed, that women operate the majority of the local milkfish businesses either individually or in groups. Few of the businesses have been accredited as legal entities however, which means that most owners cannot sell to supermarkets, because only legal business entities can be suppliers. The low accreditation level was reported to be in large part due to the owners' inability to meet the legal requirements, such as a dedicated space for production. The operators of the majority of these businesses have been using their own home kitchens for production. The majority of the businesses operate on an order basis, i.e. the women produce their products in response to orders from consumers. Based on interviews, the average frequency of orders is twice a week, however, some businesses may have higher numbers of orders.

Various government agencies have provided technical and production facilities support, including the development of a processed milkfish business group. These agencies include Fisheries, Industry and Trades and extension services at district, provincial and national levels. According to an officer of *Badan Ketahanan Pangan dan Pelaksana Penyuluhan* (Food Security and Extension Service Agency) in Sidoarjo District (2015), the agency has established and supported 35 women's groups, involving 612 women in the District producing processed milkfish and other products such as shimp paste and chips

4.2 Gendered categories of involvement and roles in homestead processed milkfish industry

FGDs and interviews identified two main categories of involvement (types of work) in milkfish processing in the District: business owners/operators and paid labourers. Engagement in both categories tends to be gendered, with women strongly dominating both.

Within the study area, key informants were able to identify one male-operated milkfish processing business (a male operator who produces and sells crispy milkfish, including preparing the batter and frying the fish). His case is used in this study to generate some gendered insights, including factors and social-gender norms related to engagement in the work. While casual labour was also dominated by women, key informants were able to identify one man working in this area for inclusion in the study for comparison.

The FGDs and interviews also highlighted that there is a socio-economic stratification of women engaged in these different categories in homestead milkfish processing: the majority of women-owned milkfish processing businesses are led by women from the medium wealth group, while those involved in gutting, deboning, cleaning and assisting

as production helpers at home are from the poor wealth group. Inputs from respondents from poor wealth group households indicate that this stratification may relate to their financial ability to enter the business. Specifically, the women from the poor wealth group indicated that purchasing production facilities was prohibitively expensive for some poor households. This is further elaborated on in 4.3 Factors influencing women's participation in homestead processed milkfish businesses (p. 63).

In terms of roles, the main tasks involved in the processing operations are fish purchasing, deboning and gutting, cooking and marketing. These roles are distributed between the predominantly female owners and the female labourers as indicated, with male spouses identified as playing occasional roles, in particular, delivering products to customers (see Annex Table 4B).

In terms of decision-making, the negotiation of decisions related to the milkfish businesses varied between different groups of respondents (Table 22). The majority of women owners are married and reported very little input from their husbands, and indicated this was because the husbands had limited knowledge of the fish processing business. In cases where the husbands had a high degree of education, women owners reported that their husbands made some contribution of ideas around product innovation or advanced marketing strategies.

Table 22. Gendered negotiations in decision-making in homestead processed milkfish business households

Decisions	Consult in decision-making	Participation in the final decision	If there is disagreement, whose opinion usually prevails
1. Investing in cook-wear and technology such as packaging	The woman with the biggest business (high wealth group) always consults with her husband	10 tonnes of vannamei	35 000
2. Buying or leasing a store	Buying and leasing a store is a big investment; all respondents indicated they (would) consult with their spouses.	Spouses are involved in final decisions	Always the man's opinion

3. Where to buy fish from	All women business owners take full responsibility in selecting suppliers Some of the husbands may help in fetching fish as directed by the women The male owner consults with his wife	Spouses are involved in final decisions Women owners make the final decisions, including the size of the fish The male owner makes the final decision together with his wife	Always the man's opinion In women-owned businesses, it is predominately the woman's decision In male-owned businesses, the spouses make a joint decision, but there is a tendency to follow the man's preference
4. How income is spent	Women are responsible for managing income	Women play a larger role in deciding income expenditures The wife of the male owner has a larger role than her husband in managing daily expenses. For a new investment, both share the responsibility for coming up with the final decision	It is predominately the woman's decision, but the man controls big investments, such as those for land, housing or industrial-sized freezers

5. What products are produced	The woman from the high wealth group consults with her husband Women from the medium wealth group were mixed: a few consult their husbands, but the majority does not The male owner consults with his wife	In woman-owned businesses, women have a larger role in final decisions In the male-owned business, he and his wife are involved in the final decisions	In woman-owned businesses, the woman decides what kinds of products are produced In the male-owned business, the man and his wife are both involved in production but have different specialties.[18] He leads on crispy milkfish innovations and his wife leads on her specialty
6. Market development for new customers	The woman from the high wealth group consults with her husband Women from the medium wealth group were mixed: a few consult their husbands, but the majority does not The male-owner consults with his wife	In women-owned businesses; women have a larger role in final decisions In the male-owned business, the owner and his wife are both involved in final decision-making	It is predominately the woman's decision
7. Participation in training	The women always consult with (ask permission from) their husbands The male business owner informs his wife but does not ask for permission	Men are involved in the final decision-making	It is the man's decision

8. Participating in exhibitions	The women always consult (ask permission from) their husbands The male business owner informs and consults with his wife	Men are involved in making the final decision	It is the man's decision
9. Women getting involved in activities outside the homestead	The women always consult (ask permission from) their husbands The male business owner informs his wife but does not ask for permission	All women are involved in the discussion, but they always follow their husband's decision The male business owner informs his wife, but does not ask for permission	Women follow their husband's opinion/decision
10. Women getting involved in activity inside the homestead	Women rarely consult with their husbands The male business owner informs his wife, but does not ask for permission	Women play a larger role in the final decisions	Women follow their husband's opinion/decision

Source: Focus group discussions and in-depth interviews.

Both the women business owners and women hired labourers stated that they play a primary role in household financial management, including their and their husband's income. They indicated that they take full control of the daily household expenses such as meals and children's expenses, but consult with their husbands on big investments such as purchasing motorbikes.

4.3 Factors influencing women's participation in homestead processed milkfish businesses

The data from the FGDs and interviews indicate that gender and social norms, access to the needed raw materials (resources), entrepreneurship, training, and financial ability are the key factors contributing to women's involvement in the milkfish processing industry in Sidoarjo. Each of these are discussed here.

4.3.1 Fit with social and gender norms

A fundamental factor in the high participation of women in the processing businesses was the job's social fit and accessibility. Specifically, FGDs found coherence between the types of tasks involved in milkfish processing and tasks that are typically considered 'women's work'. Correspondingly, the women involved indicated that there was no negative social judgement against them for engaging in this work. Similarly, the fact that the work was home-based meant that the women were operating within the 'normal' (socially expected) physical sphere of engagement (the homestead), so they did not incur negative judgement in that way either. As well as being socially acceptable (normative), the home-based nature and the relative flexibility of the work had practical accomodative value for the women, allowing them to juggle income-generating work with their reproductive and caregiver roles (looking after their husbands and families through cooking and serving meals).

Conversely, while this normative influence directed women towards this job, there was no strong social judgement preventing men from participating in milkfish production, even though many of the tasks (such as food preparation) were perceived to be women's work. Female respondents elaborated that it is not a significant issue or taboo if men are involved in processed milkfish production activities as their livelihoods. However, this flexibility was limited to men engaging with cooking as a livelihood. There is a stronger negative opinion (social judgement) of husbands who partake in household work, such as cooking, cleaning and doing laundry, as these tasks are traditionally seen as wives'/women's responsibilities.

4.3.2 Access to raw material (resources)

Raw material supply – i.e. milkfish – in the study area was the initial trigger for the establishment of processed milkfish products in Sidoarjo. All the women involved in the study lived in milkfish producing areas and most were daughters and/or wives of milkfish farmers or milkfish farm workers. For instance, a woman who was married to a milkfish farmer started the first processed milkfish business in the studied village. The milkfish supply from their ponds inspired her to encourage increased consumption of milkfish served in various traditional dishes, not only by her family but by their visitors as well. Hence, she began to increasingly serve milkfish to family visitors and experiment with processing (milkfish preparation and dishes). The positive responses of her visitors motivated her to start promoting milkfish products to her friends and neighbours. She became well-known for this over time, including by people from other districts. From that supply-based start, her initiative has grown into a formalized small- to medium-scale business, licensed by the Indonesian Government (UKM).

4.3.3 Entrepreneurship, technology and training

Entrepreneurship – meaning the ability to identify a business opportunity and act on it, such as demonstrated by the previous example – was identified by FGD participants as an important factor in shaping women's involvement in processed milkfish businesses. Entrepreneurship in this case was seen as inter-related with the opportunity to add value to the fresh milkfish supply, which is in oversupply during harvesting season resulting in low prices.

Up until a decade ago, fish bones had been the main factor preventing the wider consumption and processing of milkfish in the area. Key informants and male and female study participants strongly indicated that the introduction of deboning technology at that time had enabled the development of processed milkfish products and enterprises, in combination with training programmes. Specifically, they identified a milkfish training

programme by the Sidoarjo Fishery School (APS) on entrepreneurship and milkfish processing skills as an important factor for catalysing participation in and development of milkfish enterprises. In the study area, following the APS training, the processed milkfish industry emerged and has since grown rapidly. The training participants were predominantly wives of milkfish farmers and a few men.

The majority of female milkfish business owners reported that since that initial catalyst, government training programmes and government-supported production facilities have been the triggers for them entering the sector. As a result of the trainings and support, they adopted the technology and entered the homestead milkfish deboning business. For example, one woman from the middle wealth group said:

"My late husband and I were selling gado-gado, then I was approached by a teacher from APS to participate in his training programme. He said that my life would be easy if I followed his advice. I agreed to participate in their training programme, they provided financial capital to start my business in 2004. They also provided me with trainings, including on the milkfish deboning technique, product development and financial management."

Additionally, the remaining minority of women business owners reported that they started their businesses because of informal diffusion and the adoption of skills rather than direct participation in government or NGO programmes. Some respondents, notably previously unemployed women, stated that the earlier adopters and their ability to generate profits had inspired them to enter the business. They gained the necessary knowledge and skills by working for and developing relationships with other women who were succeeding in the sector.

To date, there have been several government training programmes in the village focusing on producing processed products from deboned milkfish such as *otak-otak, bandeng crispy, bandeng abon* and milkfish fishcakes. The Government has also formed milkfish enterprise women's groups as institutional bases for this government support, including training and production technologies, and has provided these women's groups with industrial-sized pressure cookers and freezers. Most of the respondents are members of these groups. They stated that this support was necessary to establish their milkfish processing businesses as the costs would otherwise have been prohibitively high for the average household, in particular for medium and poor wealth groups.

4.3.4 Financial factors and socio-economic status

As in the shrimp farming case study, the potential to earn income for the benefit of the family, beyond the earnings of spouses, was a 'push factor' for women's participation in the sector. Specifically, the vast majority of the women involved as business owners and as workers in milkfish deboning were from middle and low wealth groups. All respondents (in both wealth groups) highlighted earning money as the reason for their participation in the business. Many of their husbands are paid labourers for shrimp and milkfish ponds or in other sectors. Some of the respondents asserted that their husband's income was insufficient to support their household needs. Therefore, they had to take on milkfish deboning work or start the business as an additional income source. In contrast, interviews and observations in the study area suggested that women from high-income families – such as those with large areas of shrimp and/or milkfish ponds – tend not to participate in milkfish processing businesses. Rather, many of these women are full-time housewives or government officers.

A male milkfish processing business owner indicated that financial need and business opportunities were also a motivating factor for his participation in the business. He shifted to milkfish processing (in 2006) because he perceived it to be more profitable than his grocery business. His rationale was that the milkfish business had a wider market coverage: the market for the grocery store was limited to the village and could not compete with the growing modern retail chains, but a milkfish enterprise could engage in a larger market.

While homestead milkfish processing is a relatively low-investment business, the study found that cost is still a financial barrier to poor women's participation. The cost for basic production facilities, including a stove and an industrial-sized pressure cooker, was indicated by respondents as being approximately Rp.4 000 000 (US$307).[19] According to women from the poor wealth group, this cost is prohibitively high for them. Additionally, marketing is also a constraint for them because they have limited social networks outside their village.

4.4 Benefits and negative outcomes for women participating in processed milkfish businesses

4.4.1 Benefits

Livelihood options

As noted above, it is predominantly women from poor and medium wealth groups who are involved in the sector. Women from both of these groups indicated that – other than milkfish – they had very limited employment opportunities because of their low level of education and age (only having approximately nine years of schooling and being more than 45 years of age)[20] (see Annex Table 5 for comparison of opportunities). They thus saw homestead fish processing as providing them with an opportunity in a context with no other opportunities for them. In contrast, a male deboning worker highlighted that for him and other men, deboning provides an additional (but not the only) livelihood option. Specifically, as well as an alternative to other business options, it provided him with a work option for which less physical strength is required, compared with the male-dominated work in shrimp ponds or construction.

Income

Income is the main direct benefit gained by those involved in the sector. Incomes from the processing businesses, however, varied and were based on the number of buyers and order sizes. Business owning respondents stated that the average order per week is round 50 to 100 kg of fish, or around 150 to 300 pieces. The average monthly incomes from milkfish were estimated around Rp.4 000 000 (US$296). Often, they had orders for 1 000 piece sets consisting of processed milkfish,[21] rice and vegetables. Thus, income

[19] At the current exchange rate of US$1 to Rp.13 000.
[20] The respondents indicated that private sector employers such as industrial manufacturing companies in the district prefer to hire younger workers with higher levels of education.
[21] The price of one set of processed milkfish is Rp.20 000.

generated from homestead milkfish processing may be higher than stated above. By comparison, as noted previously, the male business owner conveyed that this represents a better financial return and is a lower risk livelihood than the grocery business.

The women workers indicated that product demand determines their income. The normal income for deboning is between Rp.50 000 (US$3.7) to Rp.150 000 (US$11) per day, with the demand being higher on weekends and during holiday seasons. Women can work four to six days a week for the whole year. Additionally, while their returns were lower than business owners', women workers perceived the benefit of the deboning work being "risk-free" to them (in the sense of no financial capital investment needed for production).

The extent to which revenue supported the households varied between owning a business and working in deboning (Table 23). This is because of different incomes associated with the two roles, and the different needs and other sources of income of families in different wealth categories. Overall, as indicated in Table 23, both women business owners (medium wealth group) and women working in deboning (poor wealth group) indicated that the milkfish sector was able to support them in meeting their basic needs. Furthermore, milkfish processing was providing women owners with income for business investments and social and spiritual pursuits.

Table 23. Comparison of income usage of processed milkfish business owners and deboning workers[22]

	Milkfish processing owners	Deboning workers
Household primary needs	Food Household bills (electric, telephone) Children's school fees House purchase (one woman was able to build a house for her family)	Food Children's school fees Household bills (electric, telephone) House (one respondent said that she is now saving to buy a house)
Luxury and business items	Clothes Cosmetics and accessories Jewelry Investments in milkfish processing business	Clothes Cosmetics and accessories Jewellery

[22] The list indicated the use of the incomes towards these needs. As money from husbands and wives was managed by women and combined, the respondents were not able to make a clear separation of each income for these needs. Thus, income from husbands and wives contributed in financing these expenses.

Social and spiritual	Supporting orphans and widows Haji (religious/spiritual pursuit)	

Source: Focus group discussions and in-depth interviews.

Financial security

Closely related to income, the engagement of women in the sector has improved the financial security (i.e. security of flow of cash) of the involved lower socio-economic households, which would otherwise rely only on the husbands' income as shrimp farm workers. FGDs and interviews with women and men found that shrimp and fish farming work does not assure regular income. Workers are usually paid on a crop-sharing basis and production (especially shrimp) is prone to crop failure. Poor women respondents indicated that their incomes supplement the flow of cash for household needs.

Intangible benefits to households

As indicated in Table 23, the financial gains from milkfish processing have contributed to other aspects of development of the involved households including human capital, physical assets and enabling spiritual benefits. Business owners, for example, stated that their income is used to support their children's tertiary education. One woman involved in milkfish deboning mentioned the income has enabled her to pay her house down payment. The income allowed some fish processing business owners to invest in their spiritual aspirations of going on Haji. Moreover, beyond the benefit to immediate family members, the sector has enabled some women to contribute to wider community gains. For instance, the woman with the biggest business has provided support to 25 orphans and 20 widows using her milkfish income. She provides money to assist with their living or education expenses and takes them for a recreational activity every year.

Strategic freedoms

As described in the Methods section, the study also assessed the benefit of the sector on women's empowerment using the 'Ladder of Power and Freedom' tool. Female business owners and deboning workers were asked their perceptions of what were the most important kinds of strategic freedoms. Both groups of women perceived several key freedoms as important to them, in particular: economic freedoms (the ability to purchase household and individual needs); the ability to make an independent choice (such as participating in training and social activities); and self-esteem and self-appreciation. Of these, economic freedom was the most frequently cited, in particular by women from the lower wealth group.

Table 24 presents a summary of different groups' perceived change in freedom (rungs on the 'Ladder') over the past ten years or since their involvement in the milkfish processing business. Although the changes varied between groups of people, across all groups all the respondents stated that their involvement in milkfish processing had expanded and enhanced their freedoms, in particular, economic freedom, agency and self-confidence.

For example, as illustrated in Box 3, it has contributed to a woman shifting into a leadership role in her village. All female respondents (business owners and deboning workers) noted an increase in their independence in pursuing their own wishes. They indicated that they are less or no longer dependent on their husband's income to buy individual needs, including clothes and accessories. In relation to this, both groups of women respondents indicated that before engaging in the milkfish business, some of them had to ask their husbands prior to purchasing any household items or personal needs items – having their own income had decreased this need to ask permission. Their ability to earn money had contributed to their self-esteem and to their gaining greater respect from spouses and community members, as well as self-appreciation when they are able to financially support their children's higher education.

Box 3. From background actor to leader through milkfish processing

She came from a strongly conservative Muslim background; her family restricted her mobility to schooling and necessary activities. Her parents did not allow her to go out at night. She got married to a man – also from a strongly Muslim family – through their parents' arrangement. She and her husband had a food vending business that sold gado-gado and fried bananas around the village. She cooked the food dishes and he led the delivering and marketing. The business attracted the attention of the Sidoarjo Fishery School (APS): they provided production facilities and training to start milkfish processing. Through this, the couple were invited to many training programmes through APS and various Indonesian government agencies such as Trade and Industry, and Fisheries. The support also included exhibition opportunities to other cities and provinces in Indonesia. Her participation in these activities was limited to being the 'background actor' behind her husband, until her husband passed away five years ago.

Following her husband's passing, she took over her husband's role, including engaging with government officials and attending many training programmes. She was appointed to lead a women's milkfish processing group because of her high participation in the Government programmes. Having left her 'background role' behind, she currently manages a group of 50 women and has received several awards from the Government. She was also selected to be an independent trainer by MMAF and she conducts and manages training programmes in milkfish processing using government funds.

She reflected that her milkfish endeavour has changed her in many ways. It has built her ability to articulate her ideas, not only to her female group members, but also to wider and more formal audiences, such as in meetings with government officials. At present, she is often a speaker in training activities. Her involvement in this sector has also sharpened her leadership skills, business management ability and expanded her friendships and networking to different cities and provinces.

Table 24. Ladder of Power and Freedom: Contributions of processed milkfish homestead business to changes in strategic freedoms

Women working in milkfish deboning (poor wealth group)	Women owners of milkfish processing businesses (middle wealth group)	Woman owner of the largest milkfish business in the village (high wealth group)
Move from 1 to 3	**Move 2 to 3**	**Move from 3 to 5**
Before, they did not have a regular job to earn money. Their household incomes were not sufficient to assure them of buying food, because most of their husbands work as daily labourers. They did not have any savings, and could not aspire to purchase material possessions such as a freezer or clothes for themselves Currently they can support their households' needs, ensure food security and have some ability to purchase material aspirations. For example, one of the respondents can now buy clothes any time she wants and is saving money to buy her own house	Before, most of them did not earn money and were totally dependent on their husband's income. They lacked self-esteem and confidence to speak in public fora Currently, they earn income and have the freedom to buy things they want. They have gained the ability and self-confidence to speak in public. Some of them are still not able to finance their needs or desired investments, including buying a car, going for Haji, or owning a restaurant or store closer to the paved road A reason given for not being on a higher rung of the Ladder was that they are limited by their husbands or households from participating in trainings	Before, she had a business selling clothes, but the revenue was low compared to the processed milkfish business. The income was only used to support the household needs, in addition to her husband's salary as a lecturer Currently her income is not only used to support her daily needs but is also used to support local orphans and widows

Source: Focus group discussions and in-depth interviews.

4.4.2 Negative outcomes and limitations

Time burden and unchanging expectations regarding gendered responsibilities

As noted, the working hours for a homestead processed milkfish business are relatively flexible. Similarly, some respondents articulated that the demands were manageable because they were working from home and could oversee their children's activities while carrying out the business tasks (i.e. multi-tasking paid and unpaid work). Also, the intermittent orders enabled women to alternate between responsibilities, and some women aimed to compensate for their reduced family time in periods when there were no orders (i.e. juggling roles temporally between intensive bursts of investment of time in each role).

At the same time, however, the production itself is very labour intensive and requires long hours of preparation, cooking and packaging. Although fish gutting, deboning and blending spices were outsourced to reduce the production time in periods when orders are high, business owners reported that they might barely sleep for several days in busy periods.

In both regular and high demand periods, the business time demands were in addition to women's workloads of caring for their families. In other words, despite women's expanding financial empowerment through paid work, there was no associated renegotiation of gendered household roles or responsibilities between spouses to accommodate the business demands. Specifically, to accommodate their business demands, women usually wake up at 4:30 or 5:00 a.m. to prepare the family's daily meals and start milkfish production by 7:00 a.m. In the absence of spousal renegotiation of domestic work, some respondents with younger children sought support from their relatives in looking after their children (such as taking them to and from school).

Gender norms and power relations

Despite positive impacts on the above aspects of women's empowerment, the constraining social and gender norms and relations, and women's overall scope to make independent choices and exercise strategic freedoms, did not substantively shift through their involvement in milkfish. For example, during the FGD with women business owners, one participant highlighted that women's participation in trainings is still limited because it is constrained by husband's or household member's preferences for women/wives not to participate. This was also confirmed by the above non-renegotiation of domestic responsibilities, and by the assertion that women have to ask their husband's approval for participating in training and comply with their husband's decisions if there is difference of opinion. Gender relations are further discussed in Factors shaping success in milkfish processing (Section 4.5).

4.5 Factors shaping success in milkfish processing

4.5.1 Local interpretations of 'success' and aspirations

Respondents held differing definitions of success in relation to milkfish livelihood (Table 25) and identified themselves as being at various levels of success. From the medium wealth group (female enterprise owners and the male enterprise owner), individuals perceived themselves at a '50 percent success' achievement level because they still see scope for achieving their other identified aspirations. In contrast, although she has further aspirations for the future, the female enterprise owner from the high wealth group who owns the largest business identified herself as 100 percent successful.

Table 25. Perceptions of own success and aspirations, by wealth group

	High wealth group: Woman owner of the largest scale milkfish business in the village	Medium wealth group: Women milkfish processing business owners	Medium wealth group: Male milkfish processing business owner	Poor wealth group: Women working in milkfish deboning
"Success" means	Able to continue supporting orphans and widows	Having lots of orders Market expansion Can fulfil family needs, send kids to a good school and pursue a better future Do not have any debt and can pay the workers	Higher orders and bigger markets	Able to save money and fulfil all family needs
Aspiration	To expand the markets, including wider national and export markets Able to sell products in supermarkets	Enhance markets by having an outlet close to the paved roads Is able to advertise through social media	Expanding businesses and his own brand to other provinces	They want to graduate from being workers to being business owners

Source: Focus group discussions and in-depth interviews.

Despite different definitions of success, in terms of aspirations, all milkfish processing business owners expressed the desire to increase the scale of their businesses and expand marketing. For them, the market was still the main obstacle, as sales are based on orders. The majority of interviewed processed milkfish producers (medium wealth group) are not capable of producing higher volumes or distributing their products through the retail chains of stores or supermarkets. Interviews revealed that only the woman with the biggest business (high wealth group) sells her products out of a store and can serve customers on an immediate basis

4.5.2 Factors shaping success

Human and social capital, timing of market entry, family support, financial capital, market promotion, technical training, gender, and social norms and relations were all identified as contributing to success in relation to milkfish businesses. These are discussed in turn.

Human and social capital

Education, persistence in doing business, inventiveness and entrepreneurship were identified by participants across all groups as key factors in determining success in the processed milkfish business. In connection to entry into the business, the quality of 'entrepreneurship' was also recognized as critical to success.

Having higher education – which tends to intersect in this context with family wealth – enabled business owners to strengthen skills for business development. In particular, female owners noted the importance of the social networks they developed during university. Having to leave their home village and engage in the university context, these women developed a wide network of friends and potential customers. In contrast, those who only studied within the local area reported that their social networks were limited within Sidoarjo District. Social networks translated into benefits in market expansion and were a potential source of innovative ideas. For instance, one respondent came up with the idea to produce *otak-otak* for the first time when she visited her friend in another district that had a more advanced fish processing industry. The same respondent added that trips to other areas resulted in inspiration for a new recipe.

Timing of market entry

The above factors interacted favourably with market share for early adopters over latecomers to the sector. The interview with the earliest adopter (who was from a high wealth group) suggested that being first on the market enabled her to readily grow her business (to become the largest in the village) and capture the largest number of loyal consumers. In contrast, other later entry business owners (medium wealth group) noted that the sector has become increasingly competitive over time, as the number of processed milkfish businesses, including from other locations, has continued to increase. As later entries, these women face greater challenges and the insecurity of a relatively saturated market.

Family support

Some women owners reported that the support of their spouses and children, including technical and marketing assistance, contributed to their ability to be successful in their businesses. In particular, several women from medium wealth groups said that their university-educated children had contributed to the business by helping with online promotion and marketing. Additionally, the high wealth group woman indicated that her husband – who was a lecturer on the food processing industry – acted as a business advisor. The interview with the husband and a key respondent from the government Fisheries Agency confirmed that financial and intellectual support. That high level of spousal support appeared to be an outlier however, as other husbands (low and medium wealth groups) did not provide that degree or type of input.

Financial capital

Socio-economic status also played a role in success, as financial capital was needed to purchase modern production facilities for market promotion or to own an outlet close to the paved road. Yet, despite this need, women reported that banks offered them limited financial support. This is because credit requirements are an obstacle, with most women lacking assets that qualify as collateral. In particular, they lack land titles as they do not own land – instead they either lease their houses or stay in their in-laws' homes – or they lack official certificates for their lands and houses. While these women said that they can access cooperative funds, the available amounts are very small compared with bank credit. Some of the respondents resorted to financial support from their family and relatives – however, this was accessible only to women from wealthier families.

Market promotion

Product promotion, especially through participation in exhibitions and advertising, was highlighted as an essential way to expand markets. However, for the vast majority of these women business owners, their involvement in product exhibitions was limited to exhibitions supported financially by the Government. This is because the costs of participation are otherwise prohibitive. Only the largest business owner was willing and able to invest financially in participating in non-supported trade exhibitions and in advertising her products in the newspaper.

Recently, the Government also provided Internet promotion training. However, because of their relatively low education, the majority of the women were not computer and Internet literate. As such, although they participated in the training, they reported that they could not effectively utilize the knowledge because they still needed to develop the required basic computer and internet skills.

Technical training

As indicated above, the initial milkfish processing training was a catalysing factor for many respondents, prompting them to start their businesses. More generally, training was also found to be a factor that influenced success: women operators reported that participating in trainings stimulated innovation in products and provided useful ideas for packaging design and marketing strategies. However, one respondent noted that most of the training programmes were only delivering theory on marketing, whereas business owners needed practical technical assistance in developing and executing their market expansion strategy.

Gender and social norms and relations

Underlying and crosscutting all the above, the FGDs and in-depth interviews indicated that gender and social norms influence women's ability to achieve success in the sector. Specifically, the norm ascribing the husband as the 'head of family' and the wife as having 'to obey her husband' – and the associated hierarchal husband-wife relations – has shaped the ability of women to exert their freedom in pursuing their interests. Key variations of these norms in practice, as articulated by male and female respondents and observed by the researchers, were: wives should be obedient to their husbands; wives should seek permission from their husbands for participating for over a day in non-household activities or in activities outside the home; and wives are responsible for looking after their husbands and families. One male respondent's comment also illustrates this view:

"It is quite absurd for women to leave their family for days or for a week to chase their career. Earning money is not a woman's primary responsibility."

While some respondents (such as the man quoted above) found these to be 'normal' (i.e. how it should be), others indicated that these same norms constrain women's success in the sector by limiting their mobility, their ability to participate in capacity development and their opportunities to expand their business networks or meet new consumers. For example, some women reported that they routinely had to miss one-week training opportunities or (government-supported) product exhibitions in Jakarta because their husbands would not permit them to go or because they could not find a (female) helper or relative to take over cooking for their husband and children. Because they could not attend these important events, they also missed the opportunity to expand their knowledge, skills, inspiration for an innovative product or market expansion.

In contrast, while gender and social norm restricted women's pursuit of their businesses, they were not identified as significant for the male business owner. His mobility and actions were not limited in this way. He still needed to inform his wife, but it was not necessary for him to ask his wife's permission to participate. In line with the above, he observed that this was reflective of the fact that community attitudes and norms about mobility and roles differ for men and women.

While in need of further study, the interviews evidenced one case of a training programme on gender as having had a potential influence on gendered attitudes. Specifically, an interview with one of the operator's husbands suggested that his attitudes were slightly more equality-oriented than those of the other men interviewed. He attributed this difference to participating in a training on gender (through his work in a community development organization). However, the gender attitude shifts have been limited: he said he tolerated his wife's growing freedom by allowing her to attend a few days of training but still hesitated to (i.e. did not) take over any household responsibilities, such as cooking meals for himself and their children, because he saw these as 'women's work'. Interviews with fishery government officers at the district level indicated that, to date, aquaculture training programmes provided by the Government have focused only on the technical and managerial aspects of aquaculture and have not incorporated awareness raising and sensitization on gender (normative) barriers.

/05

LESSONS LEARNED AND RECOMMENDATIONS

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The two cases studies in this report have generated insights into the involvement, experiences and empowerment of women in two considerably different types and nodes of aquaculture value chains. The production versus processing systems – away versus home-based work and varying degrees of flexibility – offer contrasting forms and experiences of women's engagement. Moreover, the case studies highlight that socio-culturally embedded gender norms and relations co-shape engagement and outcomes together with socio-economic (class) and other inter-related factors. The case studies also generated insights into gendered perceptions and contrasting experiences, as well as gendered negotiations and relations. In this section, these findings are used to present cross-case analysis regarding the studies key questions, namely women's engagement (roles), outcomes and the factors shaping each of these. This section then concludes with recommendations for aquaculture-related research, policy and programmes.

5.1 Women's engagement and roles

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Overall, the study found that involvement and roles in the given aquaculture activities are gendered and shaped by socio-economic differences. Moreover, women's roles and degree of participation varies between nodes and types of aquaculture. These findings are discussed here, with outcomes and factors of the involvement and roles presented in the subsequent sections.

The milkfish case study indicates fish processing as providing a significant opportunity for women's direct involvement in aquaculture supply chains. This echoes the finding of the report of the Ministry of Maritime Affairs and Fisheries (2015) on women's significant role in the fish processing industry. It is noteworthy that milkfish processing provides employment opportunities for poor and medium wealth groups, unskilled women and full-time mothers who otherwise would have very limited access to economic activities. In this node, both the identified roles of women – as owners of processing enterprises and as workers – were home-based and, while time-consuming, relatively flexible. In contrast, low direct participation in, and accessible opportunities for, women were found in shrimp farming. Very few women have broken into the male-dominated arena of shrimp farm operators. A larger number of women – in particular poor women – engage in the sector in casual, opportunistic (and low return) work in sorting and grading. Additionally, the wives of male operators were perceived as playing some supporting on-farm roles such as feeding when their husbands were absent. This lower level of overall involvement aligns with a report from the Karawang District (ADB, 2015). However, in Karawang District women were also involved in activities that required physical labour such as pond preparation, fertilization and harvesting.

Looking across all types of engagement in both cases, to date, women's involvement in aquaculture largely represents expressions of socially acceptable 'women's work'. In particular, the casual labour in shrimp, the helpers and

the processing businesses are all extensions of women's domestic roles of food preparation, cooking and feeding. The shrimp operator role stands out as being the only 'stretched' gender role, i.e. a role in which women's engagement was noticeably pushing the boundaries of acceptable gendered roles and behaviours (see sections 5.2 Positive and negative outcomes of women's participation and 5.3 Enabling and constraining factors).

The gendered engagement in aquaculture was found to be significantly intersected by class (socio-economic factors). Specifically, the cases illustrate a hierarchy of more lucrative opportunities being accessible to (relatively) wealthier women and generally unavailable to women with insufficient financial capital (and land in the shrimp case). While the demands on women shrimp operators and business owners were higher, they also provided higher potential returns, status and decision-making power than those of workers and casual labourers. Even within operators and business owners, the higher wealth group women (from both cases) were more readily able to expand or intensify and succeed in their endeavours than medium wealth group women (see Factors section). Moreover, while this would need further study, gender and class also intersect in that poorer women have very few to no other income generating options aside from causal labour in aquaculture. In contrast, the study suggested that correspondingly poor men, including landless men, had more income generating opportunities available to them in the sector and beyond.

A significant household-scale finding surfaced in both cases regarding gendered roles (and relations) in decision-making, including strategic decisions related to aquaculture. In both cases, the male spouse had the final say in all significant decisions, including those that would affect the success of the enterprise. Conversely, the engagement of all (married) women depended on their husband's permission, even within the households of the women-led processing enterprises and the relatively supportive household of the intensive woman operator. This consistent thread was a noticeable manifestation of the earlier-identified gender norm (see Context) that considers men as the head of household and final decision-maker.

Additionally, the shrimp cases revealed that women play a significant role in the financial management of most shrimp households. This also confirms findings suggested by Mulyoutami et al. (2012) and RUPK (2007) that indicated that while men dominated gendered decision-making negotiation, they still tended to seek their wives' input, in particular to help mitigate the potential financial risk associated with investments affecting the household cash flow. Although women's contribution in this way is significant to household livelihood and wellbeing, the literature review for this study confirmed that this is little recognized in the sector. A related point that would need further study is that women's input to shrimp farming via financial management may change with the scale of the business and technology adopted. While this study only encompassed one household with which to assess this (one intensive shrimp farm with a male operator on the site), the household pattern aligns with the previous argument suggested by Brugere et al. (2001) – i.e. that women may have less control in the household business decision-making process as businesses become more intensive. Specifically, the complexity of modernized systems, financially and technologically, may be a barrier for wives' involvement because of a lack of specialized skills and knowledge. For this type of shrimp farming, owners usually hire permanent workers with specialized skills. This may reduce husbands' dependence on their wives' input and support. If this is the case, this may be a gender-related dilemma in intensification of the shrimp farming industry.

5.2 Positive and negative outcomes of women's participation

5.2.1 Benefits

Overall, aquaculture contributed to economic and social benefits for women in the case studies, although to a larger extent in the processed milkfish industry than in shrimp farming because of the predominance of women's engagement in lead roles in the former. The income generated by the women was significant for meeting daily needs, as well as improving financial security, poverty alleviation and supporting the wider development of the households. For example, women used some of the income to support their children's tertiary education, thus investing in the human capital of younger generations. In particular for the milkfish processing business, the direct economic benefits for the women involved (middle wealth group) were accompanied by some economic empowerment. This was in the form of women's expanding ability to make choices related to their economic expenditures (i.e. their income giving them expanded control over expenditures, including on themselves). In the case of the milkfish business operators and the semi-intensive/intensive shrimp farmer, this economic empowerment also expanded women's strategic economic decisions from the household to the business sphere.

Within the above, benefits varied by and with the type of role in which the women engaged, which reflected socio-economic differences, as outlined above. Processed milkfish has benefited women mainly from medium and poor wealth groups, providing income opportunities to previously unemployed women from both groups. Though overall benefitting women less, shrimp farming has improved the condition of women from the poor wealth group who otherwise had very little opportunity to find paid work in their villages. In both cases, it was notable that women with the least initial assets benefited less than others. This illustrated, for example, both the contrasts between the two women shrimp farm operators, as well as the poorest women with negligible alternatives (those seeking work as shrimp sorters and graders) receiving the least and most unpredictable benefits out of all the groups of women.

In addition to economic benefits, engagement in aquaculture also made some contribution to certain aspects of women's social empowerment. This was particularly related to increased self-esteem, confidence, appreciation and respect from their husband and community members, as well as developing relations with people outside their villages. Such intangible benefits were also reported in the above-mentioned Karawang project (ADB, 2015) and by Brugere et al. (2001). It is plausible that such benefits may have longer-term empowerment implications through the transference of such self-perceptions and gendered values to family members, in particular to children who will play roles in reinforcing or transforming gender relations in the future.

5.2.2 Limitations, costs and risks (negative outcomes)

While recognizing the above benefits, it is important to also note the limitations to empowerment. First, in relation to economic empowerment in particular, there were very few women involved in the potentially higher return activities in shrimp farming (operators). Second, the findings across both studies indicate that the extent to which

aquaculture contributed to expanding social (gendered) freedoms and strategic choices was distinctly limited. In particular, the ability of women to make decisions around their own mobility and engagement still rested on existing (constraining) social and gender norms. In other words, while generating economic benefits, the aquaculture engagement and outcomes did not substantively shift the underlying social and gender norms that shape (and limit) women's empowerment. Similarly, women's mobility to participate in trainings and opportunities that were of interest and strategic importance to them were limited by their husbands and by their socially ascribed reproductive responsibilities.

Direct involvement in aquaculture led to women incurring a number of costs or risks (negative outcomes), particularly in relation to time burden, social judgement and security risks. In terms of the former, both case studies demonstrated that time-related burdens had two facets. First, additional time is required for the aquaculture activities themselves. Second, compounding this outcome is the fact that there was no redistribution of gendered household responsibilities to offset that increase. Linking back to limitations of empowerment, the resulting burden ultimately limits the scope of women's flexibility and choice around strategic time use, and thus their empowerment. Overall, this signals that increasing men's involvement in family work – i.e. more gender-equitable sharing of intra-household responsibilities – could reduce this effect.

In terms of the second main negative outcome – social judgement – as noted in Roles, the role of shrimp operator was a 'stretched' role for women, in the sense that it pushed the boundaries of acceptable roles and behaviours (also see Factors). As a result, women's engagement meant that in addition to time burden, they also incurred social costs and risks facing critical social judgment from community members and personal security risks. These related to the perceived neglect of their household responsibilities as well as to the need to travel to their ponds. Both issues reflect the predominant gendered norms identified that limit women's mobility and prescribe their role as being primarily responsible for family wellbeing and domestic duties.

5.3 Enabling and constraining factors

5.3.1 Factors shaping participation in aquaculture

In both cases, gender norms (embedded in cultural, religious and social norms) emerged as highly significant. The relevant norms were, in particular, those regarding socially accepted gendered roles within the household, work and mobility shaped by the prevailing perception of men as the primary family provider and women as primary caregiver. As presented in Context, this appears to be common in Indonesian culture (RPUK, 2007). Stereotypes of 'male work' versus 'female work' appeared to have a significant role in determining dominant patterns of women's and men's involvement in aquaculture (economic activities) and household roles. Both cases illustrated this strong gendered classification: fish processing is defined as a woman's activity because of its relation to food preparation and proximity to the homestead (and is dominated by women); in contrast, shrimp farming is seen as work for men (and is dominated by men)

because of the external location and perception that there is a need for men to carry out the heavier physical work. Interestingly, though the data was limited, while there were clear social repercussions for women stretching gender boundaries by taking up shrimp operations, there appeared to be no equivalent social gender pressure for preventing men from taking up milkfish processing as a livelihood enterprise.

In line with this, prevailing gender norms were an underlying factor in making fish processing attractive to women: the nature of the processing work allows women to juggle (although not share) their socially-ascribed reproductive roles with income generation activities. In other words, the work is gender-accommodative (working within the boundaries of given gender norms and barriers). The home- and order-based nature of the enterprises allows some flexibility for women to take care of their families and household responsibilities in parallel with producing processed milkfish. As such, this flexibility is currently an important factor in allowing women to enter the value chain. In contrast, when women take on the male-ascribed shrimp operator role, this not only crosses the boundaries of gender acceptability, it also incurs more time costs and less flexibility. This helps explain why so few women were found among shrimp operators. This also highlights the need for transformative interventions (addressing underlying normative and other gender barriers) – not only accommodative ones – if goals of increasing numbers of and outcomes for women engaging in shrimp farming are to be achieved.

Both cases highlighted access to resources and financial ability as key factors affecting women's ability to enter the sector as business owners and operators. In other words, the study identified class (wealth) as an important intersectional factor for entering higher value roles. This was more pronounced in shrimp farming, which has higher entry costs than fish processing, including access to shrimp ponds (through inheritance, lease or purchase). Similarly, in terms of factors for ongoing success, shrimp farming requires more expensive production inputs and carries a risk of financial loss due to crop failure that processing does not – again pointing to the wealth and class. While further investigation is needed, access to the required financial capital was found to be gendered, with women facing particular barriers in access to sufficient credit and the required collateral. The importance of inheritance as an access mechanism for women was also highlighted within this financial constraint. While both women operators in the case study had been able to access land through inheritance, such access appeared to be in contrast with prevailing Islamic inheritance norms.[23]

Finally, the study evidenced underlying factors shaping women's decisions to enter into paid work at all and to engage in aquaculture versus other sectors. In terms of the former, the need for income or financial security was the driving force for women in both poor and medium wealth groups. In terms of the latter, some form of association or proximity to aquaculture as a livelihood (and surplus in the case of milkfish) motivated women's choices. For poor women, aquaculture was one of the only options for them in their given contexts. Additionally, different factors were found to be catalysing or facilitating women's entry into the different nodes. In fish processing, a key catalyst for

[23] While not the focus of this study, the shrimp case study touched on a disparity in land ownership between women and men that is influenced by social and religious norms. As reported by Mulyoutami *et al.,* (2012), family land ownership tends to be registered in the husband's name. Under predominant Islamic religious norms regarding inheritances, women receive half the share of male siblings.

women's entry was the enhancing of women's human capital – entrepreneurship and technical skills – through an external intervention. This was found not only to have direct impacts on the involvement of the women trainees in the sector, but also to have a spin-off effect on developing the whole sector though the informal transfer of knowledge and skills to other women. In contrast, women's entry into shrimp farm operations did not have a similar single catalysing force. Rather, while one female operator example uncovered the significance of the enabling role played by family (in encouraging entry despite social constraints), the catalyst for entry in the other example was a combination of necessity, lack of alternatives, interest and access to ponds.

5.3.2 Factors influencing success and outcomes

Beyond the factors affecting women's decisions to enter into aquaculture, this study suggested four main factors influencing women's success and associated empowerment: human and social capital; financial assets; spouse (and family) support; and gender and social norms. Each of these are discussed below, followed by a concluding note on the interplay of these factors. The findings are aligned with a study by Putri (2016) which evaluated factors affecting the performance of small- and micro-scale businesses owned by women in Bogor District, Indonesia, and found women's capability improvement in aquaculture to include family support (in particular from husbands), personal determination and initial wealth (savings).

In terms of human and social capital, the study confirmed that both were important and significantly interconnected. Specifically, the important influence of training and formal education was noted not only in terms of direct exposure to new knowledge and opportunities to build skills, but also in developing social networks and partnerships (social capital) that are important for learning, innovation, investment or marketing. The milkfish case study in particular highlighted that technical training programmes can play a significant role in opening up livelihood opportunities for women, and the importance of attaining such skills in a reasonable timeframe and through effective transfer processes (such as formal training and informal diffusion). At the same time however, the ability of women to take advantage of opportunities to build social and human capital was limited in several ways. Gender norms and relations ascribing responsibilities and narrowing freedoms (in relation to women's domestic roles and position as 'a wife') limited women's participation in training programmes. Additionally, opportunities to build human and social capital were shaped by socio-economic status. For example, in the milkfish case, poor and medium wealth group women could not attend exposure events around milkfish unless they had government subsidies. Similarly, in the shrimp case, operators' access to training and new knowledge was dependent on social capital in the form of shrimp association membership and informal networks, which was built through interpersonal communication skills and confidence – all of which the woman operator from the lower wealth group lacked. In conjunction with this, while both cases suggested that formal education can enhance human and social capital (communication skills for networking, confidence and networks of potential customers outside the village), they also confirmed that access to formal education for women is shaped by socio-economic factors as well as socio-cultural gendered factors that disadvantage poorer women.

In relation to the socio-economic factors above, financial assets were found to be a necessary factor enabling or limiting women's success in aquaculture. For example, in shrimp farming, financial assets enabled success through allowing a move to more intensive systems (with more costly inputs) that could provide greater returns; in milkfish processing, financial assets enabled engagement in key exposure events and investments in market promotion. Women's access to formal credit in both cases was limited. Ways around those limitations were shaped by family factors, including wealth and social capital (such as the intensive shrimp operator's private sector partnership). These points suggest that positive aquaculture outcomes may be more accessible to, and potentially greater for, women with financial assets and other capital associated with wealth, such as education. This poses a conundrum in need of further research: while women from lower socio-economic levels have the greatest need for the potential livelihood benefits from aquaculture, these women have access to fewer of the key supporting factors, including capital for investment, training and education.

Husbands' and family member support emerged as an important factor contributing to women's success in both cases. Identified aspects of spousal support enabling success included providing financial support, business advice and (in the shrimp case study) emotional support to overcome the community's social criticisms for stretching gender boundaries. Specifically, the emotional support and enabling family background in the semi-intensive/intensive shrimp operator case study appeared to contribute notably to the operator's confidence and comfort in pro-actively pursuing economic activities that were against social and cultural norms. Her story suggested that family support can be an important factor in creating space for women to exert their freedom of choice in livelihoods (empowerment) in the face of constraining gender and social norms. Overall, this support acted synergistically with the (above) financial assets and opportunities for human and social capital development, enabling this operator to secure elements critical to her success (the association membership, the private partnership, and the associated knowledge and capital) in a way that was not available to the poorer woman without family support.

In both cases, the emerging fundamental finding is that constraining gender and social norms limit women's ability to fully engage in or benefit from – and thus succeed in – the livelihood opportunities presented by aquaculture. For example, although fish processing was perceived as acceptable 'women's work', social norms still constrained women's freedom to make the most of their businesses. As noted, women's mobility and decisions required a husbands' approval and had to be balanced with their (unshared) domestic responsibilities. This was in contrast to the male fish processor who had the freedom to make the final decision and did not hold additional lead domestic responsibilities. In the case of the married female shrimp operator, while family and spousal support shaped her choices and successes, intra-household relations still operated within the boundaries of constraining gendered norms. Even with her husband as an ally in pushing community-gendered boundaries, this lead operator had not been able to negotiate a re-distribution of domestic chores and alleviation of her work burdens with her spouse. Moreover, her husband still held the ultimate decision-making power over her and her freedom to pursue strategic life choices.

Looking across these factors and building on the above, the case studies illustrate the extent to which not only women and men experience different degrees of success, but that different women entering the same sector experienced different degrees of success. For example, the shrimp case study illustrated that two women who had made the same overall livelihood choice for similar reasons ultimately had very different opportunities, returns and perceptions of their own success. Similarly, women with different backgrounds entering into milkfish processing found divergent opportunities, experiences and outcomes. As previously discussed in Factors, while the sample size is too small to draw generalizable findings, these differences were found to be associated with a complex set of factors, including the women's initial endowment of resources and capabilities (human, social and financial capital). This underscores the way in which the endowment of an asset is the means or foundation for attaining or enhancing another capital (Anand and Sen, 2000; Streeten, 1994; Sari, 2015), which resonates with Emery and Flora's (2006) argument that success is built on success. As such, the study signals the importance of aquaculture interventions taking into account the extent to which an uneven playing field (in terms of gender, wealth and other forms of capital) will lead to opportunities favouring some actors (men, wealthier, and those with greater human and social capital) unless they are intentionally designed to offset the imbalances.

5.4 Recommendations

While further research is needed to build on this study, the findings underscore that several interconnected factors significantly limit women's – especially poor women's – engagement in, and positive outcomes and empowerment from, aquaculture. In particular, these are inter-related financial, human and social capital barriers and opportunities, and constraining gender and social norms (and associated gender relations). This signals that more substantive, widespread and inclusive women's economic and social empowerment in aquaculture will rely on shifts towards policy and interventions that specifically address these factors. Doing this at multiple scales will involve aquaculture and development interventions expanding the focus from access to assets or technical knowledge to supporting the transformation of equality-inhibiting norms and relations. This is in line with strategies already adopted in the health sector (for example, WHO, 2007; UNFPA and Promundo, 2010; and Jewkes *et al.,* 2015), which are now being called for and pioneered in aquaculture and fisheries (Kantor *et al.'s* 2015; Cole *et al.,* 2014; McDougall *et al.,* 2015). As such, the current study recommendations provided on the following pages build on existing policy action towards gender mainstreaming in Indonesia, but go further in terms of calling for the transformative engagement of interventions in relation to such norms and associated power relations, and engaging with both women and men around issues of gender equality. Additionally, the study recommendations build on Kantor *et al.*'s, (2015) assertion that single-faceted or single scale interventions are insufficient to make transformative change – such transformation requires a multi-faceted and multi-scale approach.

This study offers the following specific recommendations for strengthening the potential of aquaculture in Indonesia to contribute to women's empowerment:

1. **The Indonesian Government at the national level and through its subsidiary scales can build on its commitment to gender equality by developing and supporting policy and policy implementation mechanisms that identify and address potential policy gaps or political and religious divides that limit gender-equal access to, and control over, resources and assets.** In particular, it will be important to focus policy support on ensuring women's equal access to land and pond ownership through inheritance and to collateral required for bank loans (such as through title registration). Additionally, national and district governments will benefit from carrying out gender equality and awareness (communication) programmes for men and women both on equal rights and opportunities in economic activities as well as on distribution of household roles. These include programming at the community level for men and women and for government staff in aquaculture, as well as in other related technical departments.

2. To enhance women's participation in aquaculture, **government and NGOs that design and implement aquaculture programmes would benefit from re-orienting the targeting of their training and support programmes.** Specifically, they can consider a two-fold approach that: i) targets and engages women as well as men; and ii) specifically targets and addresses the needs of poor women. The former refers to more pro-actively engaging women in a range of roles and nodes of potential interest, i.e. in programming for lead operators or other higher-return and leadership roles. The latter relates to increasing a specific focus on poor women as they are currently least able to access the available opportunities. Targeting poor women specifically would mean incorporating strategies to enable these women to overcome financial and other barriers, including a lack of capital for initial investment, as well as weaker social networks (and access to markets and associations) and other human capital factors (ranging from computer-literacy and confidence to interact in groups) (see point 4), based on an assessment of knowledge gaps

   Both shifts in targeting would involve gender-accommodative strategies, including working around women's schedules and multiple demands. Moreover, this kind of programme targeting has the potential to be even more impactful and lasting if it incorporates gender transformative strategies as well (see point 6).

3. **Government and NGOs, including FAO, together with research agencies, can contribute to empowering women by further identifying, developing and promoting strategies in their programmes to reduce time burdens associated with aquaculture production and processing.** This is important to both enhance the viability of women's participation over time and to reduce negative outcomes for women, given the double burden women incur by virtue of their socially ascribed domestic (reproductive) roles. Some of these strategies may involve technical and practical innovations. Moreover, such strategies will also rely on sparking constructive change in gendered perceptions and the sharing of domestic responsibilities (see point 6).

4. Given the multiple and interconnected factors that shape women's participation, outcomes and empowerment, a further recommendation is that **government and NGOs, including FAO, take a multi-faceted approach to capacity development for aquaculture.** In other words, to address the complexity of current limiting and potentially enabling factors, aquaculture programming effectiveness may be enhanced by expanding, combining or developing strategies and measures addressing gaps in technical, financial, human and social capital (and gender, see point 6). Through needs assessments and drawing on existing and commissioned research, programmes can be refined and adapted to include a combination of context-specific and priority areas for women (and for different women, see point 2). For example, interventions in shrimp operation management could (in acknowledgement of women's financial roles) incorporate financial management training along with production training. More broadly, production and processing interventions could be expanded to include and combine measures ranging from computer literacy, to communication, knowledge and support in accessing credit and inputs, practical market development and intensification.

5. While in need of further investigation, the study illustrated the potential for private partnerships to facilitate knowledge transfer, financing and access to inputs in a way that feeds into a 'virtuous circle' (success contributing to success) for women shrimp operators in overcoming barriers. Based on this, a recommendation emerged **for donor agencies, FAO and research agencies to further critically investigate and elucidate if, how and when private sector partnerships contribute to women's empowerment within aquaculture sector development** (and conversely under what circumstances they limit or erode empowerment). Based on these future findings, these and other actors can work to shape and direct private sector partnerships so that they are more gender-inclusive and contribute to benefitting and empowering women, in particular poor women. As well as shrimp partnerships, another area of investigation could include partnerships between homestead fish processing businesses and the private sector, such as Indonesian food industry retailers or restaurant chains.

6. A fundamental recommendation that emerges from the study is the need for **government, FAO, international NGOs and NGOs, as well as the private sector to be involved in aquaculture programming to engage with the fundamental informal barriers identified in the study, namely gender and social norms and gender relations that constrain women's involvement and outcomes.** Specifically, the recommendation is for these actors to incorporate gender transformative strategies into the previous interventions (points 1-5) in order to contribute to constructive gender norms, negotiations and relations that can better enable women's empowerment through aquaculture. This could effectively build on what has been initiated in the field of reproductive health (Pulerwitz and Barker, 2008) and draw on experiences recently piloted in micro-credit for fisheries contexts and in aquaculture (see McDougall *et al.,* 2015) and emerging tools (Promundo-US and CRP AAS, 2016). This would require that such actors build their own knowledge and understanding of gender transformative strategies, including their strengths and limitations, and develop guidelines for effective use. One area of practical application would be in catalysing normative shifts enabling the greater sharing of household responsibilities, thus reducing women's time burdens and potentially increasing their success in aquaculture.

7. Finally, to address the gaps in knowledge identified through the literature review, and in acknowledgement of the limitations in scope of this study, the recommendation emerges for **FAO, donor agencies and research agencies to build on this study by developing similar, but larger and mixed methods studies in these and other contexts.** Specifically, pursuing similar questions through qualitative and quantitative methods, and involving various groups of geographically and culturally diverse communities, would allow for more in-depth and more generalizable findings. Within these, more focused investigations are recommended to address the various gaps in knowledge identified throughout this study. Additionally, further research could build on the above recommendation (point 6) by including a participatory action research component in studies to develop, test and assess gender transformative strategies in aquaculture interventions. Such future studies should include carefully developed and recognized measures of empowerment, such as adaptations of the Women's Empowerment in Agriculture Index (WEAI) or other recognized and appropriate measures of gender transformative change (see Hillenbrand *et al.,* 2015).

In summary, the overall recommendation is that, in addition to working through policy and policy implementation, it is critical for aquaculture development interventions to integrate strategies that address the underlying gender and social barriers that hamper women's full and gainful participation. Along with the above-noted women-targeted, responsive and multi-faceted programming and filling gaps in knowledge through specific future research, this would involve agencies such as FAO, international NGOs and NGOs, and other actors seeking to integrate gender transformative strategies within aquaculture development and services. Together, the above recommendations for the Indonesian context could contribute to leveraging more inclusive and more substantive empowerment for women in and through aquaculture.

[24] http://www.ifpri.org/topic/weai-resource-center.

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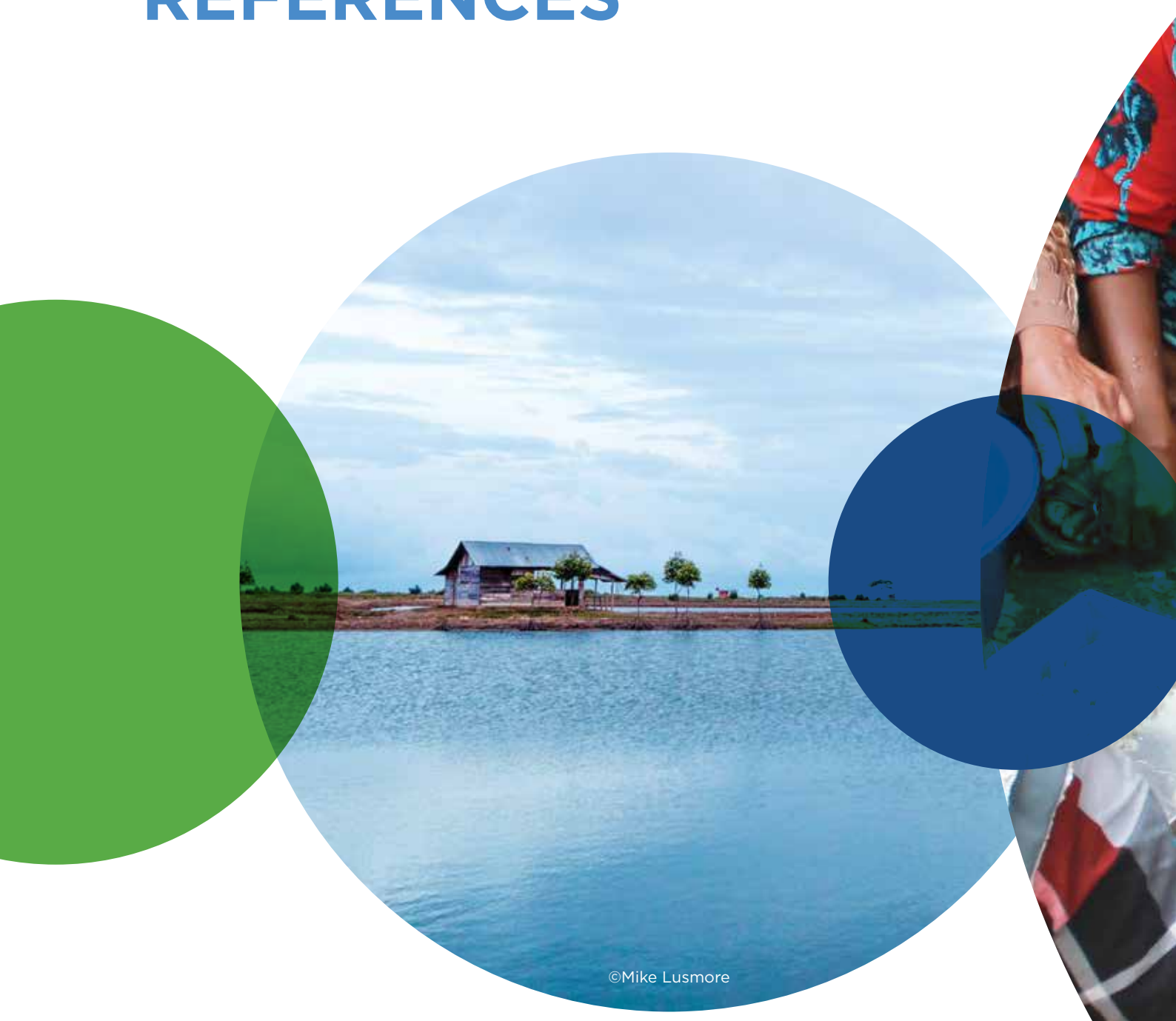

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ANNEXES

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Annex 1. List of participants by wealth category and data collection methods

Annex Table 1A. Shrimp farming in Barru District, South Sulawesi Province

No.	Group of respondents	Wealth group	Size of ponds	Number of participants	Data gathering method
1	Male shrimp farm operators with extensive and improved extensive systems (less than 5 ha)	Medium wealth group	1-5 ha	21	FGD (1) with 20 participants and interviews (2)
2	Wives of male shrimp farm operators using extensive and improved extensive system (less than 5 ha)	Medium wealth group	N/A	5	FGD (1) with five participants
3	Female shrimp farm operator using an extensive system	Medium wealth group	5 ha	1	Interview (1)
4	Male shrimp farm operator using extensive and improved extensive systems (over 5 ha)	High wealth group	30 ha	1	Interview (1)
5	Male shrimp farm operator using an intensive system	High wealth group	10 ha	1	Interview (1)
6	Female shrimp farm operator using semi-intensive and intensive systems	High wealth group	6 ha	1	Interview (1)
7	Wives of male shrimp farm operators using intensive systems and extensive/ improved extensive systems (area larger than 10 ha)	High wealth group	N/A	2	Interviews (2)
8	Husband of female shrimp farm operator using semi-intensive and intensive farming systems	High wealth group	N/A	1	Interview (1)

9	Female casual labourers involved in shrimp sorting and grading	Poor wealth group	N/A	3	FGD (1) with 3 participants and interviews (2)
10	Male casual labourers in shrimp ponds	Poor wealth group	N/A	2	Interviews (2)
11	Government officials from the Barru fishery agency	---	N/A	2	Interviews (2)
12	Head of community	---	N/A	1	Interview (1)
	Total participants	---	----	41	----

Annex Table 1B. Processed milkfish business in Sidoarjo, East Java Province

No.	Group of respondents	Wealth group	Size of ponds	Number of participants	Data gathering method
1	Women involved in milkfish gutting and deboning[25]	Poor wealth group	9	FGD (1) with five female participants and one male participant, and interviews (3) with female workers	FGD (1) with 20 participants and interviews (2)
2	Women not participating in fish processing activities	Poor wealth group	2	FGD (1) with five participants	Interviews (2)
3	Man involved in milkfish gutting and deboning	Poor wealth group	1	Participated in the FGD for milkfish gutting and deboning with five female participants	Interview (1)
4	Female owners of processed milkfish businesses (average size business)	Medium wealth group	9	FGD (1) with seven participants and interviews (2)	Interview (1)
5	Husband of a female owner of average scale processed milkfish business	Medium wealth group	1	Interview (1)	Interview (1)
6	Female owner of the largest scale processed milkfish business in the village	High wealth group	1	Interview (1)	Interview (1)
7	Husband of the female owner of the biggest processed milkfish business in the village	High wealth group	1	Interview (1)	Interviews (2)

8	Male owner of a processed milkfish business (average scale)	Medium wealth group	1	Interview (1)	Interview (1)
9	Government officials from the extension service agency	---	2	Interviews (2)	FGD (1) with 3 participants and interviews (2)
10	Head of the community	---	1	Interview (1)	Interviews (2)
	Total participants	---	28	---	Interviews (2)

Annex 2. Summary of tools and methods used for each tool

Annex Table 2. Tools and methods applied in both case studies

Tool	Themes	Methods (within the FGDs and interviews)
Tool 1	Demographics and wealth ranking	A set of questions for key informants including the head of the community and government officers. This is used in the identification of respondents from different levels of socio-economic groups
Tool 2	Understanding gendered roles, benefits and costs	Roles matrix
Tool 3	Enabling and constraining factors	A set of explorative questions, including in-depth interviews
Tool 4	Who decides?	A matrix of decision-making processes in the household
Tool 5	Access to resources and services	A set of explorative questions and resources access matrix
Tool 6	Aspirations and contributions of aquaculture to empowerment	A set of exploratory questions and the Ladder of Power and Freedom used to evaluate freedom changes

Annex 3. Respondent selection criteria and types of actors

Annex Table 3A. Respondent selection criteria and types of actors: Shrimp farming case

	Selection criteria	Types of actors selected	Methods in information collection
Actors working in shrimp	Male shrimp farm operators: - Classified as wealthy farmers; - Use intensive systems; and - Have the biggest shrimp ponds	Wealthy male shrimp farm operators using intensive systems and traditional/modified extensive systems, with shrimp farm areas higher than 10 ha	Interview
	Male shrimp farm operators; - Extensive/ improved extensive systems; and - Shrimp farm with an area of less than 5 ha	Male shrimp farm operators using extensive and improved extensive systems, with shrimp farm areas less than 5 ha	Interview and FGD
	- Female shrimp farm operator; and - Semi- or intensive systems	Female shrimp farm operator using semi-intensive and intensive farming systems	Interview
	- Female lead shrimp farm operator; and - Extensive systems	Female shrimp farm operator using extensive farming systems	Interview
	- Female casual labourers in shrimp sorting and grading	Female casual labourers in sorting and grading	Interview and FGD
Family member	Spouses of shrimp farm operators	Husbands and wives from the different groups above	Interview
External actors	Key informants, knowledgeable about village and sector development in the area	Heads of villages and government officers	Interview

Annex Table 3B. Respondent selection criteria and types of actors: Processed milkfish study case

Selection criteria	Cases	Methods in information collection
Female: - Processed milkfish business owners; - Has the biggest market coverage (most successful); and - Has own shop	The most successful processed milkfish business in the village (female owned)	Interview
Female: - Processed milkfish business owners: - Average market coverage; and - Does not have/sell in a shop	Female-owned processed milkfish businesses (average scale/success)	Interview and FGD
Male: - Processed milkfish business owner	Male-owned processed milkfish business (only case in study site)	Interview
Women working in deboning and gutting	Women involved in milkfish gutting and deboning	Interview and FGD
Men working in deboning and gutting	Men involved in milkfish gutting and deboning	Interview


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Annex 4. Gender task distribution in the case studies

Annex Table 4A. Gendered task distribution in shrimp production in the study area

Tasks	Time required to complete (day/season or hours/ day)	Who does this role?	Why?	Abilities required	Risks of tasks	Benefits or costs for women of this distribution of tasks
Pond preparation	Two weeks per season	Male (operator, household member or paid labourer)	It is the tradition of the community that women are not involved in physical labour	Physical ability to remove sludge using heavy tools	Physical risks such as getting a sore back and other sore muscles, and getting dirty	Benefit: Women are not exposed to the risks of getting dirty and hurt
Open and close water gate	Five days per season	Male (operator, household member or paid labourer), except in the woman-led extensive operation (she does it herself)	It may require going to the ponds at midnight or early morning, which is considered a high safety risk for women in remote areas	Need to understand the water flow movement and tides	Perceived security risks for women going to the pond at night	
Purchase seed and inputs	One day per season	Male or female (operator)	This task is the domain of shrimp operators who manage the cost	Have good relationships with seed and input suppliers, and mobility to seek good quality and competitive inputs	Risk of motorbike accidents, as it involves checking seed quality at hatcheries that could be an hour's distance away	Costs: Women miss the exposure from travelling; women can be excluded from decisions Benefit: Women are not exposed to the risks involved

Feeding	Four hours per day per pond	Generally male (operator or paid labourer) Occasionally female (i.e. wives of male operators sometimes play this role if their husband is absent)	Work is part of the operator's task but it requires less physical strength compared to other tasks such as pond preparation Women may not have experience in paddling a canoe (required in larger ponds)	The skill to spread the feed evenly around the pond. In larger ponds, a canoe may be needed and the skill to paddle it. Need to be able to assess shrimp behaviour in response to the feed, in order to know whether to change the volume and frequency for optimal growth	Getting wet and having to carry kilograms of shrimp feed from the shelter	Cost: Women's support for this task is unpaid Benefits: (When included) involvement can improve skills. (When not included): Can allow them to focus on household work
Harvesting shrimp/fish from pond	Seven hours per season	Male (household members and paid labourers)	It requires physical strength to remove and carry the shrimp/fish from the ponds	Physical power to lift the nets during harvesting	Getting dirty and wet, and developing sore muscles	Benefit: Women are not physically exhausted and dirty; they can focus on taking notes of the yield
Grading and sorting shrimp	Seven hours per session	Female (household members/relatives – unpaid; poor women – paid)	The work does not need physical strength	Ability to grade the harvest, classifying it into several grades based on rapid visual assessment. This requires long experience in shrimp grading Grading determines the price that leads to profit	Getting dirty	Benefit: Poor women can earn some money. However, this is limited to shrimp producing areas with semi-intensive and intensive systems, and limited in terms of generating low or in-kind pay and carrying social barriers/risks

Financial management	Every day	Mostly female (the majority of wives manage the income, but the husband may also manage the expenses related to shrimp production)	In the household, it is the norm that women manage household incomes. One male operator suggested the perception that women are more trustworthy than men	Book keeping and accounting skills	Households risk bankruptcy if the input exceeds the outputs; risks of insufficient finances for the next round of shrimp production	Benefits: Creates an opportunity for women to be involved in financial decision-making. However, there are limitations: men tend to make final decisions on shrimp farming matters The wife of the intensive system male operator had less of a role in the operation's financial management than in (lower technology/lower return) extensive opperations

Source: FGDs and in-depth interviews

Annex Table 4B. Gendered task distribution in milkfish processing in the study area

Tasks	Time required to complete (day/season or hours/ day)	Who does this role?	Why?	Abilities required	Risks of tasks	Benefits or costs for women of this distribution of tasks
Buying fish	Two to three purchases per week	Business owners (female or male). They usually have dedicated suppliers. Owners make an order request; suppliers deliver milkfish to paid workers for gutting, cleaning and deboning. If the supplier cannot deliver, then a male household member (or the male owner) fetches the milkfish. If the suppliers cannot meet the request, female business owners always seek male support to find alternative milkfish suppliers	Men have higher mobility. Additionally, many women do not drive a motorbike, and physical strength is required to carry milkfish (one order is usually 50-200 kg)	Mobility and physical strength to carry milkfish	Possibility to get injured while carrying and lifting heavy weights	Benefit: Opportunity to interact with outside actors
Gutting, deboning and cleaning	Five minutes per fish; two minutes for gutting and cleaning and three minutes for deboning	Paid workers (the vast majority are female). These activities are outsourced; the workers are specialized in gutting, deboning and cleaning. The majority are housewives	The work is done at home and the majority of men work in ponds	Removing fine bones requires good vision	In the long-term, physical issues are caused by sitting for overly long periods	Benefit: Source of income for poor women and reduces the time required for the production for women business owners

Cooking, including spices preparation	Based on volume. Can take a whole day, even all night. For larger orders, owners might not sleep for two to three nights	Business owners (male or female) create the recipes and are usually supported by paid women workers at home. The workers are usually hired when there is a big order and are paid on a day-to-day basis for their work	Business owners tend to keep their recipes secret	Innovation and the ability to find the right mix of ingredients and the best way to cook different products	May get burned	Benefit: Business owners (female and male) can control quality
Serving and packing the products	One hour per 100 packs	Female paid workers at home (household maids)	Owners prefer to hire permanent female workers; few men are willing to work as household workers	No specific skill required (the tasks consist of placing products into boxes)	No significant risk identified	Benefit: Poor women benefit from the income
Delivering to customers	Determined by distance. The longest delivery is a one-hour drive	Products are usually fetched; if needed, the husbands of the women owners may deliver the products to customers	Because it requires mobility	Driving a motorbike or car	Risk of motorbike accident	Benefit: Reduced time burdens and allows for some relaxation for women business owners

Source: FGDs and in-depth interviews

Annex 5. Milkfish processing and deboning compared to other livelihood options

Annex Table 5. Summary characteristics of milkfish processing and deboning compared to other livelihood options

	Business owner	Deboning	Grocery owner	Household maid	Factory worker	Government servant
Income	Around Rp.4 million (US$296) per month, or even higher during public holidays and wedding season	From Rp.1 500 (US$11 cents) up to Rp.2 500 (US$18 cents) per fish. Each worker may debone from ten up to 150 fish in a day	Income is unpredictable as this is based on profit margin	The income is lower than for deboning, i.e. the monthly maid salary is approximately Rp.400 000 (US$26) per month	Around Rp.2 000 000 (US$148) per month, based on minimum wage	Salary is based on the official level of the position and may be able to provide better financial security
Time flexibility	Working from home allows for looking after the children and taking them to and from school. The time can be quite demanding when the order is significant	Working from home, thus, better flexibility	Can be flexible as many of the grocery stores are home-based	The time is fairly demanding as maids usually have to work at least eight hours a day away from home	Time is inflexible, i.e. according to a rigid work schedule	Time can be demanding, based on government working hours
Market coverage	Not limited to close neighbourhoods	Customers are usually from villages nearby their home	Customers are restricted to the local area. The emerging modern market chain has added competition	The employers are in the village or in nearby villages	There is competition for positions with women from other locales who may be more capable	Government offices are located in the town

Business risk	Business risk is considered small because production is made based on orders	Deboning is risk free and provides better income compared with being a labourer (male respondent)	The risk is relatively high compared to milkfish processing. This is because grocers have to buy products in bulk in advance of sales	Maids are paid on a monthly basis, thus the risk is considered low	The business risk is relatively low, based on the nature of the business. Working risk is based on roles in the factory	Relatively low risk
Ease of access (entry)	Financial capital is the primary need. For a micro-scale as a start, although the cost is not high, it may be prohibitive for poor women	The deboning skill is the main requirement. If training is provided, it is relatively easy to learn	Requires higher financial capital to enter than milkfish processing	Relatively easy; the requirement is the physical ability to do household work	Can be selective with competitive requirements in terms of age, physical ability and education level	Very hard to enter because the requirements are very competitive. In the selection process and the applicant may compete with thousands
Accessibility to women from different socio-economic groups	Accessible in theory to women from different socio-economic groups, but entry costs are prohibitive for poor women	Accessible to women from lower socio-economic groups	Initial capital is quite high, thus excluding poor women	Accessible to women of low socio-economic levels	Only accessible to women who can meet factory requirements (above), so may be of limited access for middle and/or older, physically challenged, and less educated women	Only accessible to women from middle and higher wealth groups with social status and education

Source: FGDs and in-depth interviews.

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