



# Gender and aquaculture value chains: A review of key issues and implications for research

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## ABSTRACT

Although aquaculture is the fastest growing food producing sector in the world and generates significant employment opportunities at multiple scales, men and women are not necessarily able to participate in aquaculture value chains in the same way, and benefits may not be evenly distributed between them. This paper aims to elucidate current knowledge of gendered engagement in and returns from aquaculture value chains. It does so by presenting a review of existing evidence on gender issues in aquaculture value chains along five key dimensions: gender division of labor, distribution of benefits, access and control over assets and resources, gender and social norms, power relations and governance. Subsequently, the potential results for value chain performance and potential upgrading pathways are presented. The review shows that there is limited high quality sex-disaggregated data regarding aquaculture value chains, in particular related to the distribution of benefits in the chain. It also shows that evidence is limited regarding other aspects of the quality of women's participation in and returns from these chains. Existing evidence, however, indicates gendered imbalances in all five dimensions assessed, with formal and informal barriers, including gender norms, limiting women's equal engagement and returns. The specifics were found to vary by context and to be shaped in relation to factors such as class, needs, and social and religious norms. The impact of gender inequity on value chain performance was also found to be an area of literature for which evidence is still limited. While the upgrading pathways as described in the literature may result in economic upgrading, they may have limited effect on improving inequity or social conditions in the chain, if they do not take underlying inequities in institutions into account. Together the evidence indicates the need for research to elucidate practical ways to increase women's engagement in and returns from aquaculture value chains through addressing formal and informal barriers to women's control over assets, including shifting underlying gender norms and relations towards gender equality.

## 1. Introduction

Aquaculture is the fastest growing sector of food production in the world (Subasinghe et al., 2009), however its income, food, and other benefits are not evenly accessible to, nor distributed between women and men of different age and social groups who engage in and depend on it (Ndanga et al., 2013). In recognition of these gendered differences, recent literature suggests that including a gender perspective in value chain analysis and interventions is vital, including assessment of power structures, division of labor, welfare effects and empowerment (Schumacher, 2014). Gender here refers to the socially-constructed norms, roles, and behaviors for men and women in a society. It determines social expectations for men and women, as well as access to assets and resources, chain decision making and bargaining power, and

control over benefits derived. Gender relations influence and intersect with cultural practices, domestic and social interactions, aspirations and material livelihoods, and, especially, power relations, and outcomes for wellbeing (Schumacher, 2014). Gender relations permeate the value chain and are influenced by value chain governance (Barrientos, 2001).

Three sets of arguments have emerged for the importance of integrating gender issues in value chain analysis and development (KIT et al., 2012). The first is the social justice argument: men and women intrinsically hold equal rights to benefit from development. This argument is evident in the new Sustainable Development Goals, in particular Goal 5 on gender equality, and the broader commitment to 'leave no one behind' (ODI, 2015). The second argument is related to the direct link between gender equity and poverty reduction (KIT et al.,

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2012); evidence suggests that countries which have improved gender equity have reached higher levels of economic growth and social wellbeing (Weeratunge et al., 2010). Finally, the third is the business argument: inequity results in inefficiency in the allocation of human resources and results in missed opportunities for innovation (KIT et al., 2012). Failure to acknowledge and engage the unique experiences and perspectives of women on the part of researchers and policy makers also reinforces gender inequity (Glazebrook, 2011).

Gender analysis and a feminist perspective are by no means new to the (agricultural) development literature. This literature has highlighted the importance of the analysis of key social institutions such as the household, the labor market, the economy, and societal norms and values, as well as of the interactions between productive and reproductive roles, paid and unpaid work, and intra-household dynamics (for critical reflections on gender and development see Jackson and Pearson, 2005). As our review will show however, the gender literature on the aquaculture sector is scattered. While there are many issues that are likely to be applicable across sectors, as for example social and gender norms affect men's and women's roles and relative power overall, rather than in specific sectors only, the outcomes for aquaculture will be sector specific. The dearth of literature, also indicates that both research and projects in the aquaculture value chain still often fail to take a gender perspective into account, which likely results in sub-optimal outcomes for the sector as a whole and for women in particular. It has for example been shown that women's involvement in small-scale aquaculture production in Bangladesh and Cambodia helps increase productivity (Barman and Little, 2006; Jahan et al., 2010; Monfort, 2015; Shirajee et al., 2010) and fish consumption within the household (Heck et al., 2007; Jahan et al., 2010; Kawarazuka and Béné, 2010).

With this paper we aim to contribute to the effectiveness of gender integration in the analysis of aquaculture value chains. We do so by providing a review of the existing evidence on gender issues in aquaculture value chains, highlighting trends across value chains. The paper is based on a review of peer-reviewed journal articles, books, and grey literature focused on the period of 2000 to 2016, searched through Google Scholar and ScienceDirect. Articles were all English language. Our analysis of this literature identified four key areas of interest for gender relations in aquaculture value chains that emerge as common themes for gender analysis, and a fifth that arises specifically from the value chains literature, and we have organized this study around them: gender division of labor, distribution of benefits, access and control over assets and resources, gender and social norms, and power relationships within and outside the chain. We recognize that in practice many fish value chains in the processing and retail nodes combine fish sourced from capture fisheries and from aquaculture. Where possible we distinguish these and note where this is not possible.

The paper is framed in the literature on value chains, in particular the body of literature that has aimed to introduce a gender lens into value chain analysis. The term value chain refers here to the full range of activities that are required to bring a product or service from conception, through production and transformation, to delivery to final consumers, and final disposal after use (Kaplinsky and Morris, 2000). Of key interest in value chain analysis in the development context, are the division of tasks between value chain actors, the relationships between them, and the benefits derived from participation. Inclusion of a gender lens to value chain analysis usually adds a more nuanced understanding of women's and men's visible and invisible roles and responsibilities in value chains and the distribution of benefits between them, as well as a gendered analysis of access and control over assets, resources, information, and decision making power (e.g. Herr and Muzira, 2009; KIT et al., 2012; Mayoux and Mackie, 2007). From a feminist perspective, we bring in the concept of gender and social norms, which are embedded in existing rules, practices and institutions in society that reinforce and perpetuate inequalities in society and the value chain (Hillenbrand et al., 2015). We examine the aquaculture

literature for these four themes.

From the global value chain literature, this paper in addition introduces the concepts of value chain governance and upgrading. Value chain governance are “*the inter-firm relationships and institutional mechanisms through which non-market, or ‘explicit’, coordination of activities in the chain is achieved*” (Humphrey and Schmitz, 2004: 97). Governance is usually analyzed either at the level of the whole chain, (Ponté and Sturgeon, 2014) or at the level of specific nodes (Gibbon et al., 2008) and mainly relates to value chain actors, rather than the supporting services (such as inputs). In this paper we add a third level, the analysis of power relations and governance at the intra-household and community level, which again comes from a feminist perspective in which understanding intra-household power dynamics are of key importance. Upgrading, or improving the capabilities, technologies, and institutional models, such that value chain actors are able to improve their competitiveness, or move into higher value products, is brought in, to discuss the outcomes of gender (in)equity in the chain. This relates both to economic and social upgrading (Barrientos et al., 2011).

The remainder of this paper is structured into three sections. First, we present an overview of the literature on the four key themes for gender analysis in the aquaculture value chain literature; gender division of labor, distribution of benefits and quality of participation, access and control over assets and resources, and gender and social norms. Then, we reflect on the more general literature on gender and value chain governance and upgrading and the potential insights this provides for the aquaculture sector. Finally, implications of these findings for aquaculture value chain performance and research are discussed and a research framework is proposed. In particular, we elucidate key gaps in the existing data and signal some priorities for future research.

## 2. Existing evidence on gender issues in aquaculture value chains

### 2.1. Attention to gender

In aquaculture value chains, gender has received increasing attention, however analyses are scattered across the globe and the depth of some of these analyses is limited. Sex disaggregated data is still scant. Analysis of the intersection of gender with other factors is beginning (e.g. Goss et al., 2000 in which reference is made to age as well), but still limited (i.e., women and men are presented as homogeneous categories). Additionally, aquaculture value chain data, in particular at the nodes downstream from production, is often aggregated with capture fisheries, although value chains and governance mechanisms may be entirely different for the two sources of fish.

### 2.2. Gender division of labor in aquaculture value chains

The gender division of labor refers to the division of tasks and responsibilities between men and women. It relates to both paid and unpaid work and to productive and reproductive roles. The gender division of labor has important implications for the way men and women can allocate their time to paid and unpaid work, education, health care, social networks, leisure, and other activities. This in turn affects the way men and women can participate in decision making around particular tasks as well as the control over incomes (Alsop et al., 2006).

Globally, and in particular in developing countries, aquaculture value chains provide a significant level of employment and income. Phillips et al. (2016), for example, estimate that between 27.7 and 56.7 million people are employed (including formal and informal employment and entrepreneurship) in aquaculture value chains globally, on a full or part-time basis. This figure is extrapolated from a recent nine country study<sup>1</sup> estimating that there were approximately 11.4 million people employed (both full-time and part-time) in aquaculture value

<sup>1</sup> Vietnam, Indonesia, Thailand, Bangladesh, Egypt, Zambia, Chile, Ecuador, Mexico.

**Table 1**

Gender division of labor in aquaculture value chains.  
Source: Authors' compilation from sources indicated.

Region/country	Share of women	Specifics	Source
<b>Pre-production/inputs</b>			
Bangladesh	39% shrimp fry catching 2% shrimp hatchery	Share of total labor days	USAID, 2009
Nigeria	20% in hatcheries	Catfish hatcheries in Lagos state	Veliu et al., 2009
Bangladesh	2% in feed mills	Share of women in people employed	Rahman et al., submitted
Thailand	50% in feed mills		Goss et al., 2000
<b>Aquaculture production</b>			
Global	70% of 18.5 million		Hishamunda et al., 2014 <sup>a</sup> & FAO, 2014 <sup>a</sup>
Asia	72% of 18 million		
Americas	25% of 250,000		
Africa	20% of 230,000		
Europe	20% of 100,000		
Europe	24%		STECF, 2012 <sup>a</sup>
Bangladesh	22% in homestead ponds 5–24% in semi-intensive ponds 2% in intensive koi & pangasius production 6–17% in brackish water ponds ( <i>ghers</i> ) < 1% pond ownership	Based on study of aquaculture technologies in Bangladesh. The first four percentages relate to the contribution of women's labor, the last value is the share of women interviewed as pond owners.	Jahan et al., 2015
Bangladesh	2% shrimp farming	Share of total labor days	USAID, 2009
China	33%		Monfort, 2015
Indonesia & Vietnam	42–80%	In freshwater and cage culture	
Cambodia	50%	In fish farming in Tonle Sap	ADB, 2007 in Weeratunge et al., 2010
Vietnam	40–50% freshwater 20–30% brackish water 10–15% marine cage 2–3% farm ownership	In Quang Ninh province in 2007	Veliu et al., 2009
Zambia	45% of 6700–15,400	Mainly in subsistence farming	Phillips et al., 2016
Egypt	0%	In farming and transport of tilapia	Eltholth et al., 2015
Nigeria	40% pond ownership 35% for earthen ponds 11% for concrete ponds	Catfish farms in Lagos state.	Veliu et al., 2009
Chile	30%	Workforce in salmon cage production	Barrett et al., 2002
Chile	8% marine farming 16% fresh water farming 47% aquatic plants	Proportion of aquaculture workers	Hishamunda et al., 2014
<b>Processing (both aquaculture and capture)</b>			
Global	85.5%		World Bank, 2010 <sup>a</sup>
Global	90%	In secondary seafood activities	FAO, 2012 <sup>a</sup>
Europe	56% of 150,000	With differences between countries: e.g. Poland 68%, UK < 40%.	STECF, 2012 <sup>a</sup>
India	90%	In shrimp processing (peeling)	Dhanya, 2013 <sup>a</sup>
Vietnam	80–90%	In Quang Ninh province in 2007	Veliu et al., 2009
Nigeria	99%	Catfish processors in Lagos state	
Bangladesh	62% shrimp processing	Share of total labor days	USAID, 2009
Bangladesh	77% of permanent workers 97% of temporary/seasonal workers	Share of total workforce in shrimp processing.	Solidarity Center and SAFE, 2012
Chile	80% of workforce	Salmon processing plants	Barrett et al., 2002
<b>Trading and retail</b>			
Zambia	88% of 450	In farmed fish trading	Phillips et al., 2016
Nigeria	99% of wholesalers	in farmed catfish in Lagos state	Veliu et al., 2009
Egypt	38%	In farmed tilapia retailing	Eltholth et al., 2015
Bangladesh	1% shrimp auction	Share of total labor days	USAID, 2009
Bangladesh	0–1%	Trade and retail of farmed fish in southwestern Bangladesh	Kruijssen et al., 2016
Cambodia	85%	Participation in buying and selling of farmed fish in Tonle Sap	ADB, 2007 in Weeratunge et al., 2010
<b>Whole aquaculture value chain</b>			
Vietnam, Indonesia, Zambia	40–80%	Mainly in post-harvest activities & integrated/homestead aquaculture production	Phillips et al., 2016
Ecuador	19%	Especially in processing plants and business management	
Mexico	8% of 22,582		

<sup>a</sup> Those sources demarcated are as cited in Monfort, 2015.

chains in those countries. Within this, 8.3 million were engaged at the hatchery and grow-out level, and the remaining 3.1 million were involved as input suppliers, intermediaries, retailers, processors, and exporters (Phillips et al., 2016).

Despite the significance of the sector, and the significance of the gender division of labor in it, available data are rarely disaggregated by sex (FAO, 2014; Harper et al., 2013). The limited information that is available on the gender division of labor in aquaculture value chains varies between sources, pointing to a need to improve the quality of these data. Table 1 presents an overview of data on women's roles in aquaculture value chains, from a variety of sources. This shows the variation in the employment of women and men between geographic locations and value chain nodes. It also demonstrates that attempts at generalizing across regions, hides the significant variation within them.

The aquaculture production-related roles of women are significant, but often under-recognized or 'hidden' in value chain analyses (Rutaisire et al., 2010 in Ndanga et al., 2013). One factor in this is that women contribute to—but may not be the final decision makers regarding—pond management strategies and product uses and sales. Their role is similarly masked by ownership of ponds and land frequently being formally or informally held by male household-members (see Section 2.4 on Assets below). Where analyses has been done, the literature suggests that the gender division of aquaculture production roles depends on the existing division of labor and gender norms (relating to what work is considered appropriate for women and for men) in a particular geographic location. For example, in parts of Vietnam and Kenya, men may undertake most of the pond preparation (such as stocking), with women maintaining a central position in harvesting, post-harvest handling of fish, processing and marketing (Kibria and Mowla, 2006; Ndanga et al., 2013). In other contexts (such as Bangladesh) women are involved in day-to-day activities, such as fertilization and feeding, in particular when men are away (Shirajee et al., 2010). As noted below (Section 2.5 on Gender and Social Norms), the gendered nature of these and other value chain roles—and the underlying norms that shape them—are influenced by other factors including class and economic need, marital status, religious norms, and ethnicity and caste.

Our review indicates that the post-production nodes of aquaculture value chains are documented as having notably different gender patterns than the production nodes. Specifically, the evidence focuses on much stronger visible (i.e., documented) involvement of women in the post-production nodes. In the fish processing sector for example, evidence points to estimates of the proportion of women ranging between 56% and 99% of the workforce, with the lowest share for women found at European processing plants (Table 1). At the processing level it is difficult to distinguish between processing of fish from capture sources and farmed fish, but, operating with current knowledge, it is a reasonable assumption that the composition of the workforce is similar, given that processing plants often process fish from both sources. One study in Thailand found that in processing, women - mainly in their late-teens and early 20s - make up the majority of the workforce conducting the manual processing at the production lines, while male workers on the other hand were slightly older and held the jobs of drivers, guards and operating and maintaining machinery (Goss et al., 2000). At the trading and retail level, the estimates show a much wider range, from 0% in Bangladesh to 99% in Nigeria (Table 1).

### 2.3. Distribution of benefits in the aquaculture chain and quality of participation

Distribution of benefits and quality of participation in value chains relates to the returns from value chains and the quality of employment (e.g. types of jobs, job security, and wages). This is linked to the gender division of labor as certain roles will also be linked to low quality jobs.

Our review of the literature indicates that the quality of aquaculture value chain employment and returns differs between women and men. Specifically, women often receive lower returns and are

disproportionately represented in less-profitable nodes of aquaculture value chains (Kruijssen et al., 2013) or where jobs are regarded as especially insecure (Velu et al., 2009). For example, a study in Vietnam and Nigeria concludes that in processing, women often hold the lowest-paying jobs, while men hold the jobs that are more secure, responsible and senior, therefore dominating the management roles (Velu et al., 2009), while women are more likely to dominate in the administrative jobs (Hishamunda et al., 2014). As presented in Table 1, in the shrimp processing sector in Bangladesh men are more likely to have a permanent contract than women, who are more likely to be involved in seasonal employment (Solidarity Center and SAFE, 2012). This trend also seems to be visible in the salmon processing industry in Chile (Phyne and Mansilla, 2003), as well as in the shrimp processing factories in Thailand (Goss et al., 2000). The use of flexible labor not only allows employers to pay lower wages, but can also be used to reduce non-wage costs such as social insurance and other benefits.

Globally there is an absence of women in intermediate and high leading positions in the seafood industry (Monfort, 2015). Even when performing the same tasks in the same node, women are often (but not always) paid less than their male counterparts (Table 2).

Coles and Mitchell (2011) posit that the fact that women are represented disproportionately in chains for lower value products, and the lower value nodes within value chains, is an established feature of agri-food chains. This, according to them, is a particularly strong characteristic of globalized export chains, which are usually more lucrative than the traditionally feminized domestic markets. However, the aquaculture sector is too diverse to state that this is an all-encompassing feature of all value chains. The regulatory provisions in some countries better protect workers' rights in general, and have special provisions for women in particular, such as maternity leave, and earlier retirement for women than men in Vietnam (Hishamunda et al., 2014). Effectiveness of provisions however is dependent on whether, and the extent to which companies follow or circumvent these regulations in practice, for example by subcontracting companies that hire workers, thereby passing on the responsibility for working conditions to others that are under less scrutiny.

It should also be noted however, that a study in value chains for high value agricultural products also indicates that women benefit more, and more directly by participating through labor markets, rather than by farming and producing products in some high-value chains (Maertens and Swinnen, 2012). In the two case studies of modern supply chains presented, women benefitted more in the role of hired employees in processing, because of direct access to wages and because these wages improved their bargaining power over household income, while income derived from contract-farming was mainly controlled by (mostly male) contractors (Maertens and Swinnen, 2012).

**Table 2**  
Gender disparities in aquaculture value chain wages.  
Source: Authors' compilation of indicated sources.

Country	Value chain node	Wage/income disparity between women and men	Source
Bangladesh	Fish farming	10–20%	Jahan et al., 2015
Bangladesh	Shrimp fry catching	36%	Gammage et al., 2006
Bangladesh	Shrimp farming	18%	
Bangladesh	Shrimp processing	17–40% (depending on task)	
Bangladesh	Farm wage labor	26%	Halim and Ahmed, 2006
Vietnam	Shrimp processing	0%	Velu et al., 2009
Egypt	Fish retailing	46% (net profits)	Kantor and Kruijssen, 2014
Thailand	Shrimp processing	0%	Goss et al., 2000



It has been suggested that new product development in aquaculture value chains would help to create more economic opportunities for women in particular, whose involvement is concentrated around the postharvest segment of the aquaculture value chain (Velu et al., 2009). However, at the same time a trend has been observed of an appropriation of benefits by men in agri-food chains that become more profitable (Dolan, 2001), such as in the case of fish processing in Kenya where men entered fish processing, displacing women (Ndanga et al., 2013).

#### 2.4. Access to and control over aquaculture value chains assets

Access to and control over assets<sup>2</sup> is critical for successful involvement in value chains, as well as for equitable intra-household decision-making and empowerment (Galiè et al., 2015), and for poverty reduction (Johnson et al., 2016). Without control over assets and resources, one is unable to choose how and when to use them as an input into the value chain or allocate them to other uses. This refers to both material (capital) assets, as well as immaterial assets such as knowledge, skills and networks (van Eerdewijk et al., 2017). The literature suggests that asset distribution is gendered, with patterns of women being disadvantaged in ownership and control of assets, both in terms of numbers of assets owned and their values (Johnson et al., 2016).

For aquaculture, this has been documented in relation to several types of assets, including land or ponds (Ndanga et al., 2013; Velu et al., 2009), capital (Ndanga et al., 2013), skills, technologies and extension services (Morgan et al., 2016). For example, ownership studies in different contexts have shown that farm ownership among women is generally low (for example < 1% of pond ownership by women in Bangladesh (Jahan et al., 2015) and 2–3% farm ownership in Vietnam (Velu et al., 2009)). It has been argued that local definitions of asset ownership affect asset distribution in the household (Galiè et al., 2015). Gender and the intersection with religious or social norms also shape asset distribution, including through inheritance (Sari et al., 2017). In many countries, women face regulatory and customary limitations to own and inherit land, business and other property, making them dependent on husbands or other male family members (Coles and Mitchell, 2011).

The literature suggests that gender imbalances result in women having less decision-making power over the way land is used, and is also a limitation for access to formal credit (Ndanga et al., 2013; Quisumbing and Pandolfelli, 2010) and other value chain services (Halim and Ahmed, 2006). Access to financial services for young women in particular, may additionally be constrained by their higher rates of illiteracy than men, restricted mobility, and lack of consent of family members, much of which can be traced to gender discrimination embedded in societal norms (Dalla Valle, n.d.).

Social networks also seem to matter for access to credit. For example, Velu et al. (2009), documented that in Vietnam knowing the bank manager was found to be essential for getting a commercial loan, and establishing networks with local moneylenders were equally important; women were found to have less access to those social networks than men (Velu et al., 2009). Furthermore, social networks have been identified as being significant for market information and price negotiations, as well as for the sourcing of quality seed (Velu et al., 2009). Membership in formal organizations such as farm cooperatives is more prevalent among men than women, although poor men have also been excluded (WorldFish, 2010).

Access to technology may also be limited to women in Bangladesh, due to strongly held beliefs that women cannot operate machinery, and the fact that men mostly own all larger equipment (Naved et al., 2011).

<sup>2</sup> Assets are understood here in the broader sense, to include five capitals: natural (land, water), physical (agricultural and household durables), financial (cash or savings), human (health, knowledge, skills), and social (group membership, social networks) (Scoones, 1998).

Furthermore, technologies available may not meet the needs of women, such as in Bangladesh, where the relatively poor fit of small fish-harvesting technologies with women's needs was identified as an obstacle to women's involvement in homestead fish farming, because of perceptions that new roles associated with the technologies are not acceptable for women (Morgan et al., 2015). Lack of technical knowledge and entrepreneurial and technical skills, and a lack of access to training (Ndanga et al., 2013; Velu et al., 2009; Weeratunge et al., 2012) further limit women from full participation. Similarly, women may be limited in their access to specialized knowledge and skills, as well as extension services required for fish farming, hatchery or nursery management, or marketing. This has been partially attributed to cultural norms which limit women from interacting with male extension workers, and the lack of female extension workers (Quisumbing and Pandolfelli, 2010; Velu et al., 2009). However, although traditional extension methods that target women enhance women's technical knowledge, they do not necessarily lead to application and use, or empowerment (Kantor et al., 2015).

Finally, a study among women involved in aquaculture in five regions in Bangladesh showed that 78% of the women interviewed had no or limited control of the incomes derived from aquaculture (Halim and Ahmed, 2006). Control over income means the power to decide on how it is spent, and whether to invest it in aquaculture or use it for other purposes.

#### 2.5. Gender and social norms in aquaculture value chains

Men's and women's roles and responsibilities, access to assets and resources, and decision making power are not only limited by formal rules and regulations, but also by social and gender norms. Norms are the “collectively held expectations and beliefs of how women, men, girls and boys should behave and interact in specific social settings and during different stage of their lives” (van Eerdewijk et al., 2017: 35). They shape what men and women can do (gender division of labor), who they can interact with, and their mobility.

Gender norms and attitudes thus frame the context within which women and men participate in aquaculture value chains. As such they influence the types and locations of reproductive and productive works considered acceptable for women and men, the time women and men have available for different forms of work in the value chain, and the scope they have for decision making in the chain and control over the income earned (Kantor and Kruijssen, 2014). Moreover, social norms and power relations shape, and limit, women's adoption and use of aquaculture knowledge, technologies and practices through extension (Farnworth et al., 2015; Morgan et al., 2016).

In many cultures, gender roles expect women to fulfill reproductive roles and responsibilities, such as household management, food provisioning, and nursing tasks, which hinder their ability to participate in paid economic activities (Farnworth et al., 2015). In addition, women's freedom of movement may be limited by social norms regarding women's mobility, for example in Bangladesh, even though there are no laws limiting women's access to public space (Morgan et al., 2016). These social norms may also lead to women facing harassment in the workplace (Kantor and Kruijssen, 2014). This in turn affects women's access to markets and aquaculture ponds, limiting their involvement in aquaculture value chains. Importantly, these social and gender norms work both ways, as there are roles and responsibilities that are seen as unfit for a man, such as taking care of domestic and care responsibilities. Labor markets are embedded within and reflect the socially derived gender division of labor (Tallontire et al., 2005). This may result in women taking part in the informal economy moving between the productive (paid) and reproductive (unpaid) economy as required, while men dominate in the productive paid economy (Barrientos et al., 2003). One study in Egypt among farmed fish retailers, for example, found “a social context in which women's traditional roles in the family are strong, where women can move out of the home for work when economic

need requires but only with permission from husbands, where women's leadership capacity has limited acceptance among many men and some women, and where women's control over financial resources, even those they earn or contribute to, is limited; joint decision-making is an ideal, but when conflicts arise, men's views dominate. It is within this understanding of gender that the women and men fish retailer respondents in this study operate.” (Kantor and Kruijssen, 2014: 13). In practice this means that women in this type of context are severely limited in fish retailing by their traditional roles in caring for the family. This results in women working fewer hours per day in fish retail than men, and being more likely to report a conflict between fish retail work and domestic responsibilities. The outcomes are that women sell a narrower range of fish species and often buy lower volumes, leading to lower profits (Kantor and Kruijssen, 2014).

Other studies underscore the challenge for women to balance domestic and economic responsibilities and the burden this leads to in terms of workload. In an aquaculture case study in Central Cameroon, women favored those activities that could be undertaken in evenings or in spare moments over those related to aquaculture farming that required dedicated, daily supervision (Brummett et al., 2011). Similarly, women in southwestern Bangladesh expressed feeling limited in full participation in the value chain due to already heavy domestic workloads (Shirajee et al., 2010).

The gender division of labor often also comes from a socially constructed idea of intrinsic characteristics of a man's or woman's gender identity. This is used to rationalize preference for women or men workers (Dolan, 2001). For example, women are perceived to be trustworthy, dedicated, meticulous, flexible, compliant, patient, quality minded and cheaper than men for which reasons they may be preferred workers in the seafood processing sector (De Silva and Yamao, 2006; Monfort, 2015). These connotations however also lead to women being relegated to lower ranking jobs in processing (De Silva and Yamao, 2006). A study of the shrimp processing sector in Bangladesh states that “[w]omen are often seen as flexible workers who can be hired to meet immediate production or processing demands and then let go, or required to work overtime to meet production schedules dictated by buyers or input availability” (Gammage et al., 2006: 29).

Gender attitudes are also apparent in society's recognition and individuals' self-perception of their entitlement (Kruijssen et al., 2016). This becomes visible in the recognition by society of the work that women and men do in the value chain, and the individuals' own sense of contribution. For example, people in Bangladeshi society may not perceive it to be a woman's right to participate in paid work outside the household as a retailer or trader. Similarly, these attitudes may result in self-perception among women of having inadequate skills to participate in bargaining in markets or sourcing of good quality inputs for production (Kruijssen et al., 2016).

Differences observed between women's involvement in aquaculture value chains in Hindu and Muslim communities in Bangladesh (Kruijssen et al., 2016), illustrate that gender norms vary greatly

between religion and ethnic groups. Moreover, the ways in which roles and responsibilities change over time and the roles that some women and men fulfill in ‘unusual’ situations (e.g. where the husband has employment away from the home) are indicative of the transformability of norms (Halim and Ahmed, 2006). For example, in Bangladesh, poor women have been observed to have more space to act against constraining gender norms in response to significant economic need (Choudhury et al., 2017). In salmon processing in Chile, 80% of the workforce is women, but a majority of these women are single parents and household heads (Barrett et al., 2002). This seems to indicate that these are jobs that women will take when driven by economic necessity. However, while these women's expanded roles stretch existing social norms, this does not necessarily lead to empowerment for the women involved (Choudhury et al., 2017).

### 3. Gender and value chain governance and upgrading: insights for aquaculture value chains

The two key elements of the global value chain literature, governance and upgrading, have thus far found little foothold in the literature related to gender relations in aquaculture value chains. This section therefore presents insights from the broader literature and reflects on the potential insights for aquaculture value chains.

#### 3.1. Value chain governance and gender

Power relations in value chains are often analyzed within the framework of value chain governance (e.g., Tallontire et al., 2005, Ponte and Sturgeon, 2014). Most commonly, in this framework, governance is understood either as ‘driving’, or ‘coordination’, and relates to who has the main decision making power in the chain and how the benefits of participation are distributed along it. As such, the concept and framework is useful to an understanding of gender inequity in value chains (Tallontire et al., 2005). The two approaches to analyzing value chain governance most dominant in the literature (‘driving’ and ‘coordination’) differ in their level of analysis. The first approach (governance as driving) is an analysis at the level of a ‘whole chain’ (Ponte and Sturgeon, 2014) and relates to the presence of ‘lead firms’ that drive the process of organizing activities in the value chain (originally developed by Gereffi, 1994), while the second approach (governance as coordination) relates to how activities are coordinated at specific nodes in the chain (Gibbon et al., 2008), i.e. between actors performing different functions.

For the purpose of analyzing power relations in this paper, we include a third level of analysis, that at the intra-household and community level (Fig. 1). This third level relates especially to relationships between value chain actors and other individuals important in their lives, how power is divided between them, and the effect this has on how labor and benefits are distributed. In addition the importance of

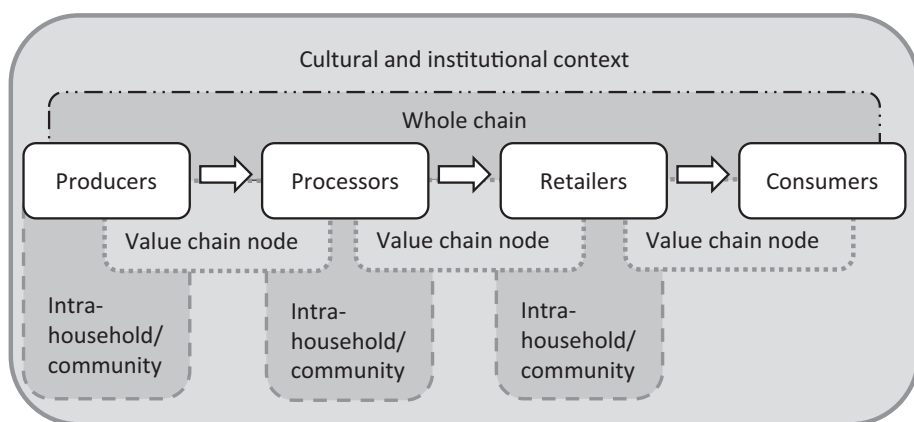


Fig. 1. Governance dimensions relevant for gender relations.

understanding the cultural and institutional environment in relation to governance has been highlighted (Bair, 2005) also for aquaculture value chains (Jespersen et al., 2014). We have already described the notion that value chains are embedded into wider existing social structures, and have shown how this relates to informal institutions such as social and gender norms. This also relates to the formal policies and institutions that affect the performance of a value chain. Value chain performance in this context refers to both *economic* performance in terms of the overall volumes and returns, its competitiveness, efficiency, and the value added and employment it creates, as well as *social* performance in terms of the equity in the chain and the quality of jobs across it. It should be noted that the two types of performance will not necessarily move at the same pace or even in the same direction.

At the ‘whole chain’ level, governance in relation to gender outcomes has been studied in other value chains in relation to the content and implementation of labor codes, and the relationship with the formality or informality of employment and roles of men and women within this (Dolan et al., 2003; Tallontire et al., 2005). We have discussed the nature of employment in the processing node of many fish value chains, and the tendency for women to be employed on seasonal contracts in lower paid jobs and men being more likely to have permanent contracts in better paid positions. In the cut-flower chain, this outcome for women has been linked to pressures from supermarket buyers, who are driven by price competitiveness. At the level of the value chain node this results in captive relationships in the chain (a particular type of coordination), and pressure on suppliers to keep costs down, particularly labor, which is a substantial portion of production costs in fresh produce (Tallontire et al., 2005). Jespersen et al. (2014) note similar relationships in several farmed fish chains between processors supplying the European market and the importers in that region,<sup>3</sup> mostly arising from risks associated with fish exports, related to food safety and product quality. This illustrates how value chain governance dynamics influence the quality of value chain participation of women, through pressure on companies to engage in these types of (lower cost) temporary contracting arrangements with women.

At the intra-household or community level, there is some evidence of other relationships that play a role in the outcomes for value chain participation, and the distribution of labor and benefits. These relationships are not only between value chain actors and other direct participants in the chain but are also with those individuals who may in other ways be able to support or hinder the participation of a particular actor in the chain. For example in Bangladesh, for some women this was found to be related to a particular family member, such as a husband, mother-in-law, father-in-law, uncle or son who was exercising power and blocking a woman from better participation in the value chain (Kruijssen et al., 2016).

### 3.2. Value chain performance and potential upgrading pathways and gender

Our review suggests that the impact of improving gender equity on (economic) performance of aquaculture value chains is an under-researched topic; in fact, the review did not find any empirical studies that quantify the implications. There are, some estimates for the impacts of improving gender equity on agriculture productivity and global GDP. In agriculture, FAO (2011) has estimated that at farm-level, if women had equal access to productive resources to men, they could increase their farm yields by 20–30%, which would raise total agricultural output in developing countries by 2.5–4%. A report by the McKinsey Global Institute concludes that under a scenario in which all countries match the rate of improvement of the fastest-improving country in their region in terms of improving gender equity, \$12 trillion

<sup>3</sup> Four countries (Bangladesh, China, Thailand and Vietnam) and four species, Pangasius (*P. sutchii* and *P. hypophthalmus*), Prawn (*M. rosenbergii*), Shrimp (*P. monodon* and *L. vannamei*), and Nile Tilapia (*O. niloticus*).

USD, or 11%, could be added to global annual GDP by 2025 (Woetzel et al., 2015). In the same vein, it is therefore highly probable that negative impacts of gender equity on aquaculture value chain performance are substantial.

Improving economic performance in returns, benefits and efficiency of value chains is usually described as ‘value chain upgrading’, recognizing four categories of process, product, functional and inter-chain upgrading (Humphrey and Schmitz, 2002). A more recent contribution to the literature, that aligns with our reference to economic and social performance, distinguishes between ‘economic upgrading’, and ‘social upgrading’ (Barrientos et al., 2011). Economic upgrading is the process in value chains of moving to higher value added activities, using more sophisticated or more efficient technologies and processes, increasing knowledge and skills, with the ultimate goal to increase the benefits derived from value chain participation (Gereffi, 2005). Social upgrading is described as the process of improving the working conditions, benefits and rights of workers in a value chain with the ultimate goal of enhancing the quality of their employment and their wellbeing (Rossi, 2011 & Sen, 1999, 2000 in Barrientos et al., 2011).

Product and process upgrading have been linked to improvements in employment contracts, in the sense that more sophisticated products require a more stable and skilled workforce to maintain quality (Tallontire et al., 2005). This is evident in some parts of the aquaculture value chain from China and Vietnam into the EU, where processing companies invest in process upgrading by training workers in the production of higher quality products (Ponte et al., 2014). However, it has also been shown that economic upgrading for a company does not necessarily result in social upgrading for workers (Rossi, 2011, in Barrientos et al., 2011). Similarly, a small case study in Indonesia suggests that strengthening aquaculture’s contributions to women’s economic empowerment (in the sense of generating and controlling own income), does not necessarily translate to social empowerment and benefits (in the sense of expanded mobility or social freedoms or alleviation of women’s workloads) (Sari et al., 2017).

Horizontal (organization between actors with the same function) and vertical coordination (organization between actors with different functions) have both been identified as potentially beneficial strategies to overcome gender inequity in value chains, by improving access to inputs and services and improving bargaining power, however it has also been stressed that this is highly dependent on the underlying inequities in the value chain, and in some contexts may actually reinforce them (Coles and Mitchell, 2011). Action research in Egypt found that combining horizontal coordination with an empowerment approach for women led to increased bargaining power by women retailers (Dickson et al., 2016). The latter was based in capacity development through interactive theatre for poor and illiterate women and focused on addressing gendered barriers such as harassment, and weak bargaining power, of these women retailers.

## 4. Implications for aquaculture value chain research

This review has presented a summary of the existing knowledge on gender issues in aquaculture value chains. While the review has highlighted a number of key issues for attention in aquaculture value chain development, it has also surfaced several gaps in the existing data and signaled some priorities for future research.

As has become apparent, there is still a general lack of high quality and consistent gender disaggregated data on **employment** in aquaculture value chains, as well as on **incomes and wages**. This lack of data impedes gender analysis, which is the basis for the development of gender sensitive policies and planning (Weeratunge et al., 2010). While quantitative data on participation is critical, information on the quality of participation is equally important. This relates to the conditions under which participation takes place and relates to all factors in Fig. 1. At the production level, there is still limited knowledge about **gendered preferences and needs for fish seed and breeding programs**, as well

as impacts of genetically-improved fish, fish feeds and disease prevention practices. There is also limited evidence on women's participation and gender relations in the input sectors in general (feed, seed). Furthermore there is limited understanding of **policies** that result in gendered inclusion or exclusion.

Analyses of **gender and social norms** are also rare and even where such analysis is included, practices required to change gender relations within value chains are not necessarily implemented (Weeratunge et al., 2012) as these may be outside the scope, timeframe or budget of a project, or the skills of the project staff. Such gender-blind approaches may result in programs that increase women's unpaid workloads, reduce women's control over resources, reduce their decision making power, or contribute to inequitable distributions of income (Weeratunge et al., 2012). Economic upgrading, may have limited effect on improving inequity or social conditions in the chain, if they do not take underlying inequities in institutions into account (Barrientos et al., 2011). While more gender aware value chain analysis tools have become available, that put focus on sex-disaggregated data collection, and understanding the social and institutional context of the chain (KIT et al., 2012; USAID, 2009) and are being used in some aquaculture value chains (e.g. Kruijssen et al., 2016), these are not yet the norm (Weeratunge et al., 2012). Addressing gender inequities may not always lead to improvements in economic performance, however, there is indication that it is likely in many situations. Even when the economic argument for enhancing gender equity does not hold, there is still the social justice argument, that make the efforts worthwhile.

Together, the evidence presented in this paper indicates the need for research to elucidate practical ways to increase women's engagement in and returns from aquaculture value chains. We propose a framework for analysis (Fig. 2) which may assist to conduct this type of research and develop appropriate programs. The framework includes the interconnected factors that constrain women's participation in and returns from aquaculture value chains, and that are likely to impact the

performance of the chain, that have been highlighted by our literature review. The figure represents how gender relations affect individual outcomes for participation and the performance of the aquaculture value chain as a whole. Gender analysis is required to examine the six elements presented in the diagram. They reflect the four 'common' subjects of gender analysis, but add a value chain perspective by including governance and power in the chain, and value chain performance and potential for upgrading.

These factors are inter-related and relationships are multi-directional, for example, gender norms that restrict women to own assets or manage income derived from aquaculture, will also result in limited incentives to participate and to invest in upgrading. Similarly, uneven power relations will limit decision-making power and value chain performance. It is also important to emphasize that these issues are highly dynamic and may be influenced by cultural or economic changes.

The framework signals the need for research to further identify avenues to address formal and informal barriers to women's control over assets, including shifting underlying gender norms and relations towards gender equality. Concurring with Weeratunge et al. (2012), this includes a need to further elucidate gendered time and labor burdens in aquaculture value chains. Additionally, research aiming to contribute to gender equitable engagement can usefully build from value chain interventions such as those promoting women's effective engagement in horizontal networks and institutions, by investigating when, why, how, and for which women these interventions lead to women's active participation and benefits. Further research on enhancing gender-equitable access and control over assets needed for effective engagement and returns from aquaculture value chains also emerges as a priority area for future investigation. This includes that research needs to assess and identify ways to mitigate risks, for example, building on Johnson et al. (2016) who note some cases in which women's increasing involvement in value chain activities contributed to

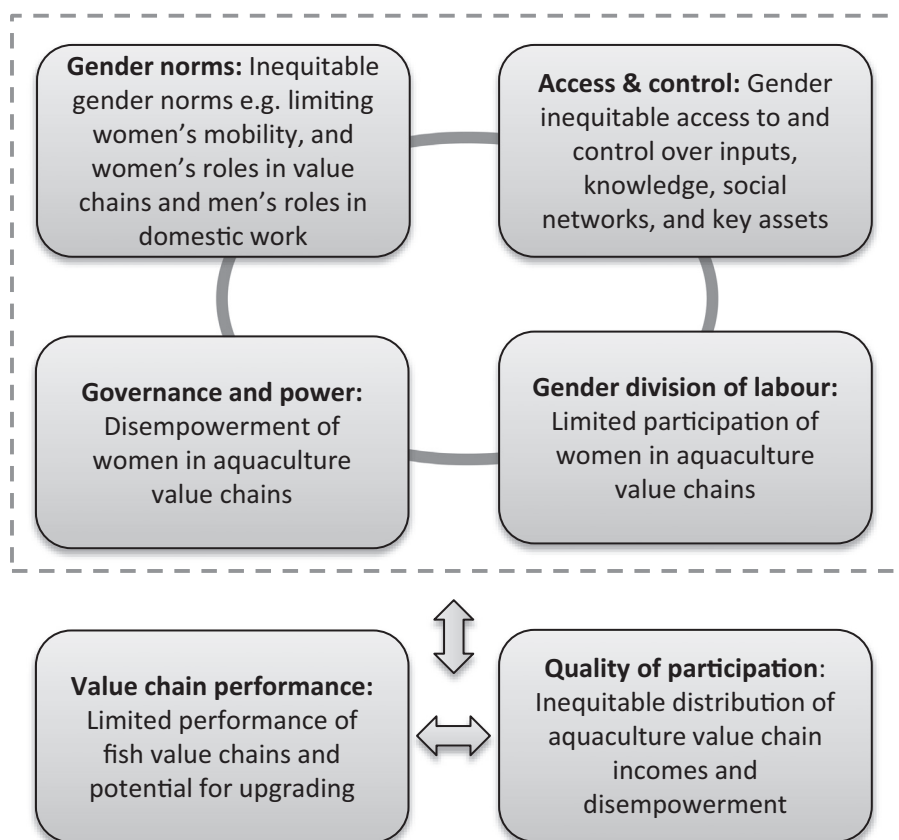


Fig. 2. Factors shaping inequitable gender relations in and outcomes for aquaculture value chains.



increases in gender-based violence in households.

Another area of further scrutiny that has been identified in this paper is that of the impact of value chain governance (at the value chain node level) on outcomes of gender equity in the chain, in particular in global value chains. By analyzing the pressures of international buyers, in particular in captive relationships, entry points for improving the social performance of the chain may be identified. Informal barriers for women's full engagement in aquaculture value chains may also result from pressures outside the value chain, but within women's households and communities.

Engagement of both women, men, and other influential household and community members was identified as of vital importance to address formal and informal barriers to engagement (Johnson et al., 2016). In relation to these complex gender challenges, a gender transformative approach has been proposed as a way to address gender barriers in a lasting way by shifting underlying gender norms (Kantor et al., 2015). The approach engages women and men in examining, questioning, and most fundamentally, in shifting inequitable gender norms, attitudes, behaviors and practices and the related imbalances of power (IGWG, 2010). Such shifts can reduce norm-based constraints on women's roles, mobility, and burdens, for example shifting intra-household sharing of responsibilities or control over assets. Early experiences in developing and testing the approach in relation to micro-credit and aquaculture extension indicate its challenges and promise (McDougall, 2017). Further research is needed to test this approach in value chains at different levels, including long term outcomes.

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