









A review of inclusive business models and their application in aquaculture development

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Abstract

For aquaculture to continue along its current growth trajectory and contribute towards achieving the Sustainable Development Goals, value chains must become more inclusive. Smallholders and other local value chain actors are often constrained by circumstances and market failures in the global aquaculture industry. Integrating these actors into aquaculture value chains through inclusive business models (IBMs) is often touted as a solution to sustainable and ethical trade and business that can generate development outcomes. We reviewed 36 papers under seven business models commonly used in agriculture development to assess their application in aquaculture value chains in lower-income countries. A global value chain (GVC) analysis is used to unpack the economic and social upgrading objectives of the different IBMs, as well as the types of relational coordination used between actors in the chain to achieve development outcomes. The extent to which these IBMs helped poor actors overcome certain barriers is evaluated with a focus on how they may ensure or be a risk to *inclusiveness* through the relations and upgrading opportunities evident in their make-up. The analysis found that the majority of the models focused on economic upgrading over social upgrading. Providing opportunities for the latter is key to achieving the inclusive objectives of IBMs. Greater horizontal coordination between actors can create further opportunities for economic upgrading established under vertical coordination with other nodes upstream and downstream in a value chain. There is a need to further contextualize these models to aquaculture systems and develop clear indicators of inclusiveness.

Key words: business, inclusive, pro-poor, smallholder, value chains.

Introduction

Seafood¹ is one of the most internationally traded food commodities (Tveterås *et al.* 2012), and its production has grown rapidly in the last decades, with the bulk coming from aquaculture (FAO 2018). In 2015, an estimated 33%

¹Including freshwater and saltwater finfish, crustaceans, molluscs and other aquatic resources.

of all people involved in fish production were engaged in aquaculture (Lynch *et al.* 2017), and this is expected to rise to 52% in 2025, with the vast majority of employment generated in lower-income countries (FAO 2018). There are obvious benefits to engaging in aquaculture, as fish consumption contributes significantly to food and nutrition security (Béné *et al.* 2016; Haque & Dey 2016), and aquaculture production can play a positive role in increasing

local and global fish supplies (Dey *et al.* 2010; Toufique & Belton 2014). Moreover, aquaculture has the potential to alleviate poverty through employment and increased incomes for poorer, smallholder farmers and other economic actors (Dey *et al.* 2006; Haque *et al.* 2010; Genschick *et al.* 2017; Kassam & Dorward 2017).

Aquaculture can have a positive impact on economic growth and on countries' trade balances when targeting export fish markets (Bush & Belton 2012; Ponte *et al.* 2014). The degree to which smallholder producers, and poor people², are able to participate in and benefit from economic growth that is directly or indirectly attributable to aquaculture development is, however, a contested topic (Stevenson *et al.* 2009; Beveridge *et al.* 2010). Assessing issues of equity and inclusiveness in agricultural development more broadly remains a challenge (Seville *et al.* 2011). This is true for aquaculture where few studies have attempted to assess the social equity benefits of aquaculture development (see Pant *et al.* 2014; Belton 2016). Whilst it is generally understood that economic growth is crucial for sustained poverty reduction, there is evidence that growth can bypass poor and marginalized people and replicate inequality (Ali & Son 2007). *Inclusive growth*, therefore, emphasizes the need to improve economic opportunities for the poor, who are generally constrained by global, regional and national circumstances and market failures (Ali & Zhaung 2007).

There are good arguments for the inclusion of smallholders and other actors in the aquaculture industry. In Asia, 80% of farmers are termed 'small-scale' (Phillips *et al.* 2016), and in Egypt, 90% of the production of tilapia is produced by small- and medium-sized enterprises (Macfadyen *et al.* 2012). These figures suggest that the role of smallholder farmers is crucial to future fish supplies and increasing food and nutrition security for consumers (Waite *et al.* 2014; Herrero *et al.* 2017). The concept of a 'quiet revolution' in Myanmar (Belton *et al.* 2018) and Bangladesh (Hernandez *et al.* 2018) has recently gained ground suggesting that a growing increase in small- to medium-sized enterprises in aquaculture is playing an important role in economic growth and domestic fish supply. A study that modelled the impact of aquaculture in Myanmar revealed that small commercial fish farms generate larger spillovers by way of retail and labour in the rural economy than larger commercial farms (Filipski & Belton 2018). Studies in Bangladesh (Belton *et al.* 2012), and more recently in Ghana (Kassam & Dorward 2017), also suggest that the economic multipliers generated by small- to medium-sized farmers had more indirect benefits on poverty reduction than large commercial cage farms or low input

²Those who are marginalized to a certain degree from accessing the natural, human and financial resources, skills and technologies to actively participate in value chains by either producing or buying commodities and inputs.

subsistence ponds (Bush *et al.* 2019). These studies imply that there is value in assessing the potential for small- to medium-sized commercial enterprises and their role in aquaculture development and growth.

Some studies, however, focus on the social, economic and environmental risks of participating in the aquaculture sector. Bryceson (2002) surfaced the detrimental social effects of larger monopolies on market prices and competition for small-scale seaweed producers in Tanzania. Khiem *et al.* (2010) describe the exodus of small-scale farmers from the Pangasius sector in Vietnam and the importance of collective bargaining in improving farmers' position in the sector. Adduci (2009) revealed increasing conflicts over privatization and intensifying aquaculture practices in Chilika Lake in India. Tran *et al.* (2013) discuss the marginalization and exclusion of smallholders and traders in Vietnam from the lucrative global shrimp industry. Similar arguments are made for rural transformations and social well-being in Bangladesh (Belton 2016). Such analyses are not only limited to the role of smallholders. Miahle *et al.* (2015) present how landless people and traders engage in complex social hierarchies and power relations to gain access to various aquatic resources in the Philippines. Genschick *et al.* (2018) revealed how poor consumers in urban Zambia are mostly excluded from an increase in domestically produced farmed tilapia available in local markets. The opposite is true in places such as Egypt where domestically produced tilapia became more accessible for poorer communities (Macfadyen *et al.* 2012). Without actively including and recognizing the needs of poorer actors and certain power asymmetries, it is possible that commercial developments, intensification and upgrading efforts result in the exclusion of smallholders, consumers and other poor actors from the sector (Poole *et al.* 2013; Genschick *et al.* 2017).

The promotion of value chain approaches as poverty alleviation mechanisms has long been used in international development and agriculture (Humphrey & Navas-Aleman 2010; Webber & Labaste 2010). The term inclusive value chains is often used (Ruben 2017; Naziri *et al.* 2017) to describe approaches that attempt to enhance farmers, traders and consumers access to markets, and improving productivity and efficiency in ways that have positive effects on livelihoods, food security, climate resilience and gender equality (Haggblade *et al.* 2012; Thorpe *et al.* 2017 in Ros-Tonen *et al.* 2019). One key objective of inclusive value chains is the idea that greater partnerships between lead firms³, producers, value chain actors and consumers can help achieve the above-mentioned goals.

³Influential organizations that dictate the allocation of resources and distribution of gains and risks in a value chain, often dictating the terms of chain membership, including the incorporation/exclusion of other actors, and the reallocation of value-adding activities (Bolwig *et al.* 2010).

Whilst the configuration and function of value chains are dependent on the peculiarities of their broader economic, social and cultural environment, we focus this paper on specific contractual relations and mechanisms that aim to integrate poor people into value chains. We call these inclusive business models (IBMs), and they have been widely applied in sectors outside of aquaculture as a means to incentivize a sector to enable greater participation of and benefits derived by smallholders and other poor actors in a value chain (Vorley *et al.* 2009; Vermeulen & Cotula 2010; Kelly *et al.* 2015).

IBMs, such as those found in different agricultural commodity value chains (e.g. contract farming with tobacco smallholders in Zimbabwe (Scoones *et al.* 2018) or coffee farmers in Uganda (Bolwig *et al.* 2009), may be a potential solution for enabling inclusive participation in and equitable benefits derived from aquaculture value chains by poor people (Kruijssen *et al.* 2016). We define IBMs in this paper as pro-poor, equitable and profitable business activities that integrate poor producers, processors, retailers, distributors and consumers in the value chain whilst generating broader positive development outcomes. We review the literature on seven types of IBMs commonly used in agriculture value chains and their application in different aquaculture cases in lower-income countries. We look at how these models address the common barriers actors face in aquaculture value chains and the degree to which they facilitate *inclusiveness* using a global value chain (GVC) analysis. This approach provides an analytical framework by which to assess the economic and social upgrading opportunities presented by IBMs and how these are facilitated by different levels of relational coordination and contractualization in the value chain.

Value chains and inclusive business models: an analytical framework

Rooted in Prahalad's (2004) theory of the commercial and development potential of 'serving the poor' at the base of the pyramid (BoP), it is argued that market interventions can help businesses make profits and transform the BoP through poverty alleviation (Prahalad & Hammond 2002; Prahalad & Hart 2002). Inclusive business describes how organizations engage with the BoP, usually by extending products and services to poor people as a market base or by incorporating more ethical policies and mechanisms, such as improved labour conditions and Corporate Social Responsibility (CSR) programmes, as a cornerstone of their business practice (Likoko & Kini 2017). In this paper, we do not necessarily discuss pro-poor products and services, or CSR programmes driven by philanthropic objectives, but rather assess how businesses are embedded within their local environment and how poor people are able to make

extended linkages to improve their own businesses and overall well-being (Altenburg 2007; Wach 2012).

Many models and approaches are centred on promoting competitiveness and improving collaboration, coordination and trust between actors based on prevailing market opportunities (Kelly *et al.* 2015). IBMs are extended to existing marketing opportunities either within or between actors in different nodes of a value chain, and generally describe the mutually beneficial relationships between these actors that promote more socially and environmentally responsible business (see Lundy *et al.* 2014). A key tenet of IBMs is to include poor people on the demand side as clients and customers; or on the supply side as employees, producers and business owners (or partners) at various points in the value chain (UNDP 2008). Not all smallholder farmers and value chain actors are poor (Murphy 2010) and the realities faced by poor people in different contexts are highly heterogeneous (Ferris & Seville 2010). Our focus is on the actors who are constrained by their resource endowments and technical capabilities relative to larger firms operating in the same chain (Dixon *et al.* 2003).

A global value chain (GVC) analysis primarily focuses on the relational dynamics between firms, stakeholders and different segments of a value chain⁴ (Gereffi 1994), which we apply to IBMs as a means of assessing how relations and business activities can be deemed *inclusive*. GVC analysis primarily focuses on two key concepts: coordination and upgrading.

Assessing the governance of a value chain reveals different levels of coordination (or types of contractualization) between various actors in a particular chain (Gereffi 2011). This surfaces who exerts more power and influence by actively shaping the distribution of rewards and risks of participating in a value chain (Gereffi & Lee 2012). Relations can be 'horizontal', between actors within one node in a chain (e.g. relations and arrangements between farmers in a cooperative) or 'vertical', between nodes and segments in a value chain (e.g. contract farming between farmers and wholesalers) (Gereffi *et al.* 2005). The degree to which various actors participate in and have influence over a value chain will depend on the strength of their relations within and between segments.

The relations between different value chains actors, and particularly between buyers and sellers, are of prime importance in assessing whether an IBM is, indeed, inclusive and whether development outcomes can be met (Lundy *et al.* 2014). The fairness and equity of these relations is critical as it goes further than just the formation of collaborative relationships but can also reveal who has power to

⁴A value chain is defined as the 'full range of activities that firms and workers perform to bring a specific product from its conception to its end use and beyond' (Gereffi & Fernandez-Stark 2011: p. 4).

influence decisions and outcomes and how equitable agreements and processes truly are (Gradl & Knobloch 2010). This will largely dictate how poorer value chain actors and lead firms can upgrade their overall position and performance in a value chain.

There are two types of upgrading commonly found in the literature. The first is economic upgrading, which directly relates to increasing competitiveness in value added processes that allow economic actors to improve their performance and functions (Gereffi *et al.* 2005). This relates to adopting more efficient processes of production (process upgrading); a change in the type of product (product upgrading); a change in the mix of activities performed by a firm (functional upgrading); or a move to a more technologically advanced chain (chain upgrading) (Humphrey & Schmitz 2002). Social upgrading is defined as the improvements in labour and living conditions and overall social well-being of workers and actors directly or indirectly involved in a value chain (see Barrientos *et al.* 2011). Social upgrading includes dimensions such as women's rights, land ownership, freedom of association and collective bargaining (Saildo Marcos & Bellhouse 2016). The concept shares similarities with other terms such as social well-being (Weeratunge *et al.* 2014), social licence (Arnalds 2011) or social inclusion (Ros-Tonen *et al.* 2015). Issues of empowerment, equity, fairness and agency are common themes in this literature, which we are unable to unpack here, but which are important aspects of social upgrading. A third type, environmental upgrading, is recognized in the literature (Jeppesen & Hansen 2004) and aims to highlight the narrowness of current upgrading literature that focuses on developing higher efficiencies at the expense of meeting environmental standards. Although there is scope to explore such concepts further, other authors have described social upgrading as comprising of environmental rights (Salido Marcos & Bellhouse 2016) or that upgrading must occur within ecological limits (Bolwig *et al.* 2010). For the purpose of this paper, we remain within these framings and do not use environmental upgrading as a separate category.

Studies in aquaculture have shown how actors can upgrade their position in a value chain by adopting new fish strains (Olesen *et al.* 2007), improving feeding or processing procedures to higher standards (Ponte *et al.* 2014), improving collective bargaining through cooperation (Ha *et al.* 2013) and integrating activities further downstream in more vertically integrated models (Kaminski *et al.* 2018). Other studies in aquaculture have commented on the negative side of upgrading where improvements in processes, standards and products has led to voluntary 'outgrading' (i.e. exiting a chain) or 'downgrading' (i.e. purposive reduction in functions) as the socio-economic situation of people worsens due to strict contractual compliance in the value chain; or from the effects of unfettered global market

forces (Khiem *et al.* 2010; Ponte *et al.* 2014). Many studies have pointed to the fact that economic upgrading (i.e. access to new inputs, processes, markets) does not necessarily lead to social upgrading (Barrientos *et al.* 2011; Rossi 2013; Pegler 2015; Vicol *et al.* 2018). The crux of *inclusiveness*, then, can be found in social upgrading as it directly relates to the overall well-being and equitable upliftment of those involved in a value chain. In IBM terms, it also relates to the development outcomes of those indirectly affected by a value chain.

This review attempts to identify examples of IBMs that have been applied in aquaculture value chains. We assess how IBMs may or may not have achieved their goal of inclusively and equitably integrating poor actors into value chains through profitable business models. We particularly look at types of coordination (i.e. horizontal and vertical), and the direction and strength of these ties, as well as the different forms of upgrading that enabled poor actors to improve their position and performance in various aquaculture value chains.

Inclusive business models and barriers to participation

The literature on IBMs is not extensive and is found mostly within the grey literature of development practitioners. Although there are conceptual roots in Prahalad's theory on the BoP, as well as driven by the inclusive objectives of the United Nations Sustainable Development Goals, especially on adapting the role of private businesses in value chains and development, there is little written on the conditions by which IBMs emerge or on their explicit functionality. Our review of this literature found three key articles that discuss various examples of what they call IBMs (Vorley *et al.* 2009; Vermeulen & Cotula 2010; Kelly *et al.* 2015). Almost all of the models are, however, biased towards smallholders, and very little is written about opportunities for poor actors downstream and upstream from production. Through our literature search we found several models, which we summarize in Table 1. These models are either producer-driven by farmers (collective groups and clusters); or buyer-driven by suppliers looking to find new clients and customer; or driven by the development objectives of intermediaries such as governments and non-government organizations (NGOs) (Kelly *et al.* 2015).

We provide a brief review of the current barriers faced by aquaculture producers and other value chain actors in the chain, which IBMs generally attempt to overcome. We use these criteria to assess whether improved vertical and/or horizontal coordination and upgrading opportunities enabled these actors to, indeed, overcome barriers to participation and improve their efficiencies and overall position in the chain. The following barriers are mostly faced

Table 1 Definitions of inclusive business models

Type (Vorley <i>et al.</i> 2009)	Description	Models (Vorley <i>et al.</i> 2009; Vermeulen & Cotula 2010; Kelly <i>et al.</i> 2015)
Buyer-driven models	Smallholder production is driven by off-takers such as processors, exporters and retailers to maximize benefits in processing and retailing, often by securing better contracts with producers. The contracts and agreements are driven more by market demand	<i>Contract farming</i> : pre-agreed supply and purchase agreements between farmers and buyers, usually at an agreed price and delivery date. These agreements generally provide benefits for traders, processors and wholesalers. Individual farmers or farmer groups can benefit from access to improved inputs and markets <i>Micro-franchising</i> : involves the selling and replication of tried and tested agribusiness models by the micro-franchisor (firm) to the micro-franchisee (smallholder or agribusiness entrepreneur). This enables new market entrants to capitalize on existing knowledge, brands, products and processes to promote successful self-employment, whilst allowing the franchisor to expand (Fairbourne 2007) <i>Joint ventures</i> : co-ownership of a business venture by two independent market actors who share equity in the venture, thus also sharing the financial risks and rewards. This generally involves investors and market actors to both provide some form of capital to the business
Producer-driven models	Production is driven by individual or groups of producers. Their main objectives are to serve new markets, achieve better market prices, stabilize market position, supply larger volumes, increase bargaining power and access inputs and services	<i>Farmer-owned businesses (cooperatives, associations or groups)</i> : groups of farmers organize to generate collective action, share costs and risks and increase bargaining power. Farmer-owned businesses are normally incorporated business structures for farmers to pool their assets and limit liability of individual members. Such businesses are often owned by cooperatives in order to facilitate business transactions <i>Tenant farming sharecropping</i> : management contracts in which individual farmers (or landless labourers) work the land of larger agribusinesses and/or farms. In tenant farming, the usual arrangement is a fixed rental fee, whilst in sharecropping, the landowner and sharecropper split the crop (or its proceeds)
Intermediary-driven models	Models driven by intermediary actors such as market actors (wholesalers), NGOs or national and local governments, who focus on food safety, consistent quality, year-round supply and innovation at a competitive price	<i>Public private partnerships</i> : a governing arrangement where public agencies engage with non-state stakeholders, usually the private sector, in a collective decision-making process that is consensus oriented (Björstig 2017). The aim is to improve distribute allocation of skills and risks between the private and public sector <i>Certification</i> : a governance approach that incentivizes supplier upgrading by providing food production standards (Bush <i>et al.</i> 2019). This involves setting up and enforcing standards that set the norm, levels and values of production and marketing of food products (Hatanaka <i>et al.</i> 2005)

by smallholders in aquaculture value chain, though other actors (such as agribusiness entrepreneurs⁵) can face similar barriers:

Access to inputs, technical assistance and services

One of the biggest constraints often repeated in aquaculture literature is that smallholders lack access to affordable and high-quality inputs such as feed and seed (Lynch *et al.* 2017), technical knowledge and rural advisory services, and affordable transport and storage facilities, especially in Africa (Brummett *et al.* 2008). This can also be true for actors in other parts of the chain.

⁵These include entrepreneurs and businesses within input supply, transport, trading, processing, marketing, wholesale, retail, etc.

Access to finance

Smallholders lack access to capital and credit to invest in aquaculture activities, which in turn prohibits them from accessing key inputs and services. Smallholders often struggle to access capital and credit because they lack collateral or cannot afford to pay the excessively high interest rates, as bankers generally perceive aquaculture as a high-risk venture (Hishamunda & Manning 2002). Given the infancy of aquaculture sectors in some lower-income countries, financial institutions pay little attention to conducting risk analyses, which results in a lack of suitable financial products for smallholders and entrepreneurs to access. There is a lack of expansion capital available to small- and medium-sized enterprises because microfinance institutions perceive them to be too large and bigger capital investors perceive

them to be too small or risky (De Ferranti & Ody 2007; Macfadyen *et al.* 2012).

Poor infrastructure and inefficient institutions

Where these are lacking, there are limits to the degree to which smallholders can expand and adapt to commercializing value chains dominated by larger firms (Swinnen & Maertens 2007). The vast geographical distribution of smallholders in certain countries often results in infrastructure development in areas that favour larger-scale commercial producers at the expense of rural areas where predominately poor people live (see the cases of Siavonga in Zambia [Genschick *et al.* 2017] and peri-urban areas in Nigeria [Miller & Atanda 2011]).

Challenges in coordination (e.g. high transaction costs) between smallholder farmers and other value chain actors

This relates to the costs borne by the public and private sectors to engage with farmers, especially smallholders who are spatially disbursed and relatively unorganized (Moehl *et al.* 2006). Coordination is particularly important in value chains where quality standards are enforced (Markelova *et al.* 2009). The perceived general inefficiency of public extension (Brummett *et al.* 2008) and the high costs associated with the provision of private extension services can prohibit the formation of extended relations in the value chain (Ridler & Hishamunda 2001).

Inability to meet requirements and make investments related to international standards and regulations of high value markets

Smallholders are sometimes unable to meet the costs of compliance with market standards and conditions, leading to exclusion from certain markets (Jespersen *et al.* 2014). The social conditions of labour, including of wage employment and household production labour, may influence the ability of people to engage in value chains, and often economic standards of production are favoured above social standards (Vince & Haward 2017).

Excessive individual risk related to commercialization

Farmers face a variety of risks in their production, ranging from those associated with input and output prices, and various types of production risks such as biosecurity, theft, animal predation and environmental shocks (Arthur 2008). These risks cause uncertainty and influence investment decisions. Risk preferences of individual farmers vary (Picazo-Tadeo & Wall 2011), dependent also on their location within a spectrum of rural poverty (Vorley 2002).

Constraining sociocultural factors

These relate to the prevailing norms, values and beliefs that can affect the capacities of resource-poor and marginalized groups to adopt aquaculture technologies or innovations (Morgan *et al.* 2017). Ethnic or cultural norms around cooperation or certain belief systems can enable or constrain the adoption of such technologies. Blythe *et al.* (2017) found that broader social and institutional factors, including issues of power, shaped aquaculture adoption in the Solomon Islands. Harrison (1996) surfaced similar issues in Zambia in the 1990s, with various beliefs around land rights preventing fish farmers from improving their production systems.

The above also includes social and gender norms and unequal power relations, which are the underlying causes of inequalities in women's and men's participation in aquaculture value chains. This includes access to and ownership of resources (including start-up capital) and other technologies, training, output markets and the incomes derived from people's involvement in aquaculture (Kruijssen *et al.* 2018). They also dictate the time and effort women and men are required to invest in activities outside of the aquaculture value chain. Most notable are the home-based or unpaid tasks that women are socially assigned that prohibit or limit them from engaging in paid activities including fish farming, processing and trading but also from leaving their homes to attend trainings or sourcing financial support from banks located in urban centres (Kruijssen *et al.* 2018).

Method

There has been little research on IBMs in an aquaculture context. In this paper, we reviewed case studies from the literature that provide some insight into the potential business models that were used to varying degrees. The review process relied on journal and Google Scholar searches of aquaculture case studies in the peer-reviewed and grey literature. Our first approach was to search 'aquaculture' + 'inclusive business model', which yielded few results. We then reviewed some of the key studies on IBMs in general (see Table 1) and settled on the seven models described above.

We searched 'aquaculture' + 'contract farming'; 'aquaculture' + 'joint ventures' and so on, utilizing all seven business models. We restricted our search to low- and middle-income countries (LMICs) where smallholders and poor actors face various barriers, described above; and where IBMs (as poverty alleviation strategies) are arguably, most needed. Compared to other agricultural commodities, such as cotton or coffee, the search yielded few results, thus showing a critical need to explore inclusive business models in an aquaculture context. We reviewed the articles to assess whether indeed an IBM was used, which was notably

difficult to determine as there is significant variation within each model and a range of ways in which they were interpreted and implemented. We relied on specific mentions of the IBMs and details of the mechanisms and/or relations employed in each case, or how specific models helped overcome some of the barriers described above. We were not always able to ascertain whether any one model was used or whether it was able to achieve a certain degree of *inclusiveness* per se, given that most papers did not necessarily focus on these aspects or use specific GVC terminology. We note that the overwhelming majority of cases dealt with smallholders and where possible, we attempt to show IBMs in other parts of the chain too. In some cases, we were unable to always ascertain whether target groups or beneficiaries were indeed poor people. This review, therefore, does not provide a definitive answer on which models worked or not based on development outcomes, as this would have to be addressed in the particular papers under review. Instead, we focus on the modalities and aim to showcase where any mechanisms constituted as economic and/or social upgrading, and which may have enabled actors to overcome some of the barriers described above. We further attempt to determine, through induction, what forms of coordination led to these upgrading opportunities. Where possible, we attempt to showcase any negative impacts that certain models may have had or whether they posed risks to inclusiveness. A total of 36 papers were reviewed (see Table 2).

Results and discussion

Contract farming

Contract farming or out-grower schemes are agreements whereby a firm purchases the harvest of independent farmers based on terms and conditions agreed upon in advance (Baumann 2000). Larger commercial firms and smallholders agree upon specific prices, delivery dates and the quality and quantity of goods to be produced (Vermeulen & Cotula 2010). This usually requires the provision of farm inputs (seed, feed, credit, extension and training) to smallholders in return for the delivery of a product (Simmons 2002; Miyata *et al.* 2009). This allows smallholder farmers to economically upgrade their products, processes and functions. There are varying types of contractual arrangements that fall under more centralized models where there are tighter, coordinated contracts suited for products that require a higher degree of processing, or more informal models that are seasonal and require lower levels of support (Chamberlain & Anseeuw 2017). These forms of contractual relations are usually vertical (Khiem *et al.* 2010) and, depending on their formulation, can be beneficial to both farmers and other actors in the value chain.

Contract farming agreements have the ability to address risk, mitigate market failures, reduce transaction costs

associated with uncertainty and address market imperfections in coordinating the supply chain (Key & Runsten 1999; Minten *et al.* 2009; Barrett *et al.* 2012). Evidence suggests, however, that contract farming may also reduce the autonomy of smallholders whilst increasing their financial and production risks due to power imbalances that especially occur during contract negotiation phases (Little & Watts 1994; Kirsten & Sartorius 2002; Abebe *et al.* 2013). Much of the literature discusses trajectories of upgrading and whether contract farming improves farmers' positions in a chain or forces farmers to downgrade or even outgrade (Ponte & Ewert 2009; Khiem *et al.* 2010). These studies refer to the constraints faced by smallholders in taking advantage of upgrading opportunities and improving their overall position, with some farmers purposefully downgrading their functions to retain more autonomy in local markets.

The case of mussel farming in South Africa shows how well-facilitated contracts can make smaller firms more efficient than larger firms at covering initial transaction costs associated with farming (Karaan 1999). In this example, more vertically integrated models, where smallholders upgraded their position by adopting functions of other nodes into their activities, were better suited to deal with pre-production and production costs. Additionally, market imperfections encouraged the establishment of contractual arrangements with larger buyers and provided more stability for 'first-time' farmers. Contracts were based on a combination of resource provision and market specification, with a strong emphasis on training. The buyer in turn, acted as a financial intermediary by capitalizing on the availability of household labour and increasing production (Karaan 2002), providing benefits for farmers who had more autonomy in their activities.

In the late 1990s in Thailand, small-scale shrimp farmers were opposed to fixed-price systems in contracts with large vertically integrated companies and many of the contract models broke down (Goss *et al.* 2000). The lack of success implementing the models led shrimp companies to purchase shrimp through auctions at harvest sites, which gave more autonomy for farmers to influence market prices. To counter such issues of fixed-price systems, five shrimp-farming cooperatives in Vietnam joined together to form a federation, whose responsibility it was to negotiate various agreements with large processors and buyers to secure a market for their shrimp (Ha *et al.* 2013). The cooperatives allowed farmers to upgrade their functional and relational dimensions of production through increased horizontal coordination. In such cases, there is crossover between contract farming, where vertical relationships are established between farmers and other nodes in the value chain, and farmer-owned businesses or collectives (discussed below), where horizontal relationships are built between farmers to

Table 2 Total numbers of papers under review

Models	Publications	No #
Contract farming	Karaan (1999) (South Africa); Goss <i>et al.</i> (2000) (Thailand); Khiem <i>et al.</i> (2010) (Vietnam); Ha <i>et al.</i> (2013) (Vietnam); Trifkovic (2014) (Vietnam)	5
Micro-franchising	Karaan (2002) (South Africa); Van Dijk <i>et al.</i> (2015) (Bangladesh); Obwanga & Lewo (2017) (Kenya); Otieno <i>et al.</i> (2018) (Kenya)	4
Joint ventures	Oellermann (2014) (South Africa)	1
Farmer-owned businesses	Ravikumar & Yamamoto (2009) (Indonesia); Umesh <i>et al.</i> (2009) (India); Lebel <i>et al.</i> (2010) (Thailand); Miller & Atanda (2011) (Nigeria); Kassam <i>et al.</i> (2011) (Asia); Vincent & Morrison-Saunders (2013) (Madagascar)	6
Sharecropping and tenant farming	Mandima (1995) (Zimbabwe); Prein <i>et al.</i> (1996) (Ghana); Siriwardena (1999) (Sri Lanka); Asian Development Bank (2005) (Philippines); Belton <i>et al.</i> (2014) (Bangladesh); Adnan (2013) (Bangladesh); Miahle <i>et al.</i> (2015) (Philippines); Belton <i>et al.</i> (2016) (Bangladesh); Belton <i>et al.</i> (2017) (India)	9
Public private partnerships	Weirowski & Hall (2008) (global); Lebel <i>et al.</i> (2009) (Mexico); FAO (2013a) (Nigeria); FAO (2013b) (Philippines)	4
Certification	Belton <i>et al.</i> (2009) (Thailand); Belton <i>et al.</i> (2011) (Vietnam & Bangladesh); Anh <i>et al.</i> (2011) (Vietnam); Bush and Belton (2012) (Bangladesh); Marschke and Wilkings (2014) (Vietnam); Tran <i>et al.</i> (2013) (Vietnam); Samerwong <i>et al.</i> (2018) (Thailand)	7
Total		36

bolster collective action and negotiating power. The latter forms of horizontal coordination can provide social upgrades such as freedom of association and/or increased decision-making and bargaining power that can help secure vertical contracts.

Contract farming can also be a means of ensuring supply side quality specifications, as seen in the Pangasius sector in Vietnam (Trifkovic 2014). Larger processors vertically integrated their primary functions and were both suppliers of inputs (seed and antibiotics) and buyers of Pangasius based on international food standards. The agreements made were a means to source unprocessed Pangasius through marketing contracts with smallholders. To make contracts more inclusive, Trifkovic (2014) suggests that agreements should contain knowledge sharing and learning opportunities that allow smallholders to upgrade their farms. Khiem *et al.* (2010), however, showed that the smallest Pangasius grow-out farmers in Vietnam who did not have the infrastructure and capital to invest in upgrading opted to exit the value chain altogether (i.e. outgrading).

Micro-franchising

Micro-franchising refers to a business model that enables new market entrants to capitalize on existing knowledge, brands, products and processes to promote successful self-employment, whilst allowing the franchisor to expand geographically (Kistruck *et al.* 2011). Micro-franchisees operate under the firm's trade name and guidance in return for a small fee yet retain ownership of their operations. The degree to which the micro-franchisee is automated relates directly to the amount of risk the smallholder is exposed to (Christensen *et al.* 2010). In the case of inclusive businesses

with smallholders, it may also involve a provision of inputs such as credit, feed and seed (Kistruck *et al.* 2011).

In Bangladesh, the Shiblee Hatchery Farms project was launched in 2013 with 100 landless farmers to enable them to engage in the culture of tilapia in cages (van Dijk *et al.* 2015). Whilst the model was originally based on a combination of tenant and contract farming, the goal of the project was to develop a franchise model for tilapia, where farmers could cultivate fish with more autonomy than would otherwise be offered through contract farming. Shiblee Hatchery Farms provided access to quality inputs such as seed, training and advice and helped facilitate farmers' access to finance and equipment, as well as providing a stable market for fish. The training involved cage construction, fish husbandry, disease recognition, credit planning and marketing (van Dijk *et al.* 2015), all important economic upgrades for the farms.

According to Rogers *et al.* (2011), micro-franchise models are most inclusive when they accommodate local needs, are simple enough for low-income groups to operate, involve some degree of mentoring between the franchisor and franchisees and function under a detailed operating system developed and ensured by the franchisor. Micro-franchising could, therefore, allow better opportunities for social upgrading than contract farming as it provides farmers more autonomy to operate businesses that they are able to adapt to their needs.

In oyster and mussel farming in South Africa, Karaan (2002) found that franchise models are more efficient than contract farming because they are easier to enforce and franchises are less prone to bureaucratic issues (i.e. faster decision-making). In both examples above, micro-franchising offered better upgrading opportunities than contract

farming by providing farmers equal opportunities to cover initial transaction costs and easier enforcement of agreements to franchisees rather than individually contracted farmers. Becoming a franchisee under such models, however, may require more skills, knowledge and financial capital from the beginning (Rogers *et al.* 2011).

In Kenya, a non-profit organization, Farm Africa, attempted to set up a micro-franchise model of supply chain agribusinesses that provided inputs for thousands of smallholder tilapia farmers (Obwanga & Lewo 2017). Farm Africa worked with the agribusinesses to establish 'Aqua Shops' to sell basic aquaculture inputs and equipment, and provide training and technical support to farmers (Obwanga & Lewo 2017). Fifty-six shops were set up in five years benefiting over 7500 farmers, increasing their incomes by 63% (Otieno *et al.* 2018). The model was developed and driven by an NGO in partnership with private sector actors and was donor supported. This case demonstrates that focusing on businesses further upstream or downstream from smallholders may be more beneficial in terms of providing farmers opportunities for economic upgrading than focusing on developing specific IBMs with smallholders. The manner in which farmers engaged with the Aqua Shops (i.e. loans, credit transactions) is unclear, and the articles above do not provide details on the nature of these relationships.

Joint ventures

Joint venture models differ from contract farming primarily on the basis that they are co-ownership agreements between firms and smallholders (or farmer organizations, cooperatives, associations and trusts). The two actors share equity in the venture, thus equally distributing the financial risks and rewards. Joint ventures mean that investors and smallholders both provide some form of capital to the venture. Joint ventures generally allow smallholders to unlock potential value from available land by using it as leverage to gain greater ownership of the business. Joint equity investments allow for multiple economic upgrading opportunities for smallholder farmers and equal decision-making powers between the two actors, which few of the other models exemplify (Vermeulen & Cotula 2010).

The only joint venture example found in the literature was where a company called Amatikulu Prawn (Pty) Ltd. assisted employees to set up small-scale ornamental fish farms near their prawn production site in 1992 using a joint equity model. The company provided seed and extension services and bought back the ornamental fish from their employees and sold to export markets under the Amatikulu brand. By 1995, 25 satellite farms were established. At these farms, employees were able to diversify into fish farming. Despite the collapse of the joint equity model in 1998 due

to export market restrictions on ornamental fish, Oellermann (2014) maintains that the model allowed small-scale entrants into capital-intensive aquaculture under one brand name. There are obvious overlaps between joint venture models and micro-franchising or contract farming models, the key difference being joint equity financing. The financing aspect that characterizes joint ventures may, to some degree, explain why our literature search only found one example of this type of model.

Farmer-owned businesses (cooperatives, associations or groups)

In farmer-led models, smallholders pool their resources together using a formal organizational structure, usually through associations, trusts, cooperatives or collectives (see Kassam *et al.* 2011). Farmer-owned businesses are similar to cluster arrangements where the goals are to access capital, pool resources and start a related business, which helps limit the liability of individual members (Narrod *et al.* 2009). The difference between these collective groups and farmer-owned businesses is that the latter are incorporated and registered as enterprises. Whilst cooperatives are a popular example of a collective action group, there is evidence that larger businesses are averse to working with cooperatives because of their slow decision-making abilities (Vorley *et al.* 2009). By creating formal companies, farmers can avoid the issues involved in collective decision-making. There is thus an implied trade-off between a cooperative, with democratic representation of all members, and a farmer-owned, incorporated business that can make rapid decisions by an executive committee that results in greater efficiencies. Farmer-owned businesses in agriculture are widespread and often involve collective activities such as marketing boards or agencies, processing facilities, distribution agencies and service provision (Vermeulen & Cotula 2010). In aquaculture, there are examples of cooperatives and collective action groups being used as a means to improve economic performance and participate in global value chains by countervailing market power for smallholders where high degrees of power are often concentrated upstream and downstream from production (Kassam *et al.* 2011).

One of the more successful associations identified is the Surat Thani Shrimp Farmers Club that was developed as an informal support group for farmers and is financed by donations from its members (Kassam *et al.* 2011). The group was able to coordinate an increase in production of shrimp by disseminating knowledge that enabled farmers to prevent emerging diseases and mitigate environmental risks (Lebel *et al.* 2010). The social networks between farmers in the associations, but also the vertical relations between farmers and hatcheries who operated in close

proximity to farmers, is noted by Lebel *et al.* (2010) to have created a highly organized system of trust, innovation and knowledge dissemination.

In Madagascar, a sea cucumber farmer association employed 20 four-person teams to manage one pen and divided the profits between all members of the association, 52% who were women (Vincent & Morrison-Saunders 2013). An NGO helped improve techniques for increasing juvenile survival rates from 46% to 76.9%, mostly by improving handling techniques and farming processes. The NGO encouraged farmers to use the incomes they earned from farming to pay for school fees for their children. Such a small collective group of farmers that is embedded in the community is able to adapt to local needs through horizontal coordination that can have better chances of extending social upgrading to living and working conditions.

The Samroiody Cooperative in the gulf of Thailand comprised smallholder shrimp farmers, almost half of who were women (Kassam *et al.* 2011). Declining international shrimp prices incentivized farmers to group together to compound their efficiencies in production. The farmers, managed by an executive committee, implemented better management practices and enforced the prohibition of banned chemicals and antibiotics. Members of the cooperative were able to acquire credit, technical advice and access to a computerized traceability system. As a result of such horizontal coordination, the cooperative was able to secure market access to a local processing plant with a European Union (EU) buyer. In such examples, it is evident that improved horizontal coordination can lead to establishing more lucrative vertical relationships later on.

Aquaculture livelihood service centres were developed by the donor community in response to the devastation of coastal livelihoods by the 2004 tsunami in Indonesia (Mills *et al.* 2011). The service centres were originally designed to develop and maintain high-quality seed for farmers operating in various clusters in the absence of government or private sector extensions services. The centres eventually incorporated trainings and acted as a central point where farmers could meet and bargain with overseas buyers by accessing communication technologies (Ravikumar & Yamamoto 2009). Farmers were able to establish business linkages with hatchery operators, input suppliers, processors and exporters. The service centres also offered a central location for community meetings and learning workshops, accessed even by farmers from outside of the association. The centres operated disease diagnoses, training services, credit facilities and laboratory services that were available to farmers. Although donor financed, the centres grew to allow farmers to make multiple relationships with overseas buyers whilst also offering various services for farmers.

In India, an investment fee was paid to become a member of a shrimp-farming group with a set limit of shares

available (Umesh *et al.* 2009). All members had to abide by production regulations developed by the executive committee, which were similar to better management practices promoted by a public body in India. By abiding by the cooperative regulations, members were able to increase production of higher-quality shrimp based on international food standards. This also allowed for standardization of products and processes across the value chain and increased opportunities for exportation.

In Nigeria groups of investors, mostly retired civil servants, invested in land and catfish farming in what they called 'fish farming villages' (estates), so that they could work together and invite private investment and public extension support (Miller & Atanda 2011). Such horizontal coordination and collective action allowed farmers to later increase their connections with larger firms and secure better inputs and markets.

Farmer-owned businesses are oftentimes implemented together with other models to ensure increased agency for smallholders when negotiating contracts and managing their relationships with other firms up or downstream in a value chain. It is clear that such horizontal relations create more opportunities for social upgrading in terms of allowing farmers the freedom of association, establishing collective action based on local knowledge and customs and increasing their position of power in a value chain. We argue that in such circumstances, social upgrading is what leads to further economic upgrading opportunities in the chain. However, many of these collectives are often supported by governments and NGOs before the private sector recognizes a sufficient downturn in risks and potential rewards from establishing further linkages.

Sharecropping and tenant farming

Sharecropping and tenant farming are perhaps the most commonly found business arrangements in agriculture and have existed for centuries. In sharecropping, smallholders are responsible for managing a piece of land owned by a firm or landowner, and the provision of inputs is usually divided between the two parties. Smallholders provide a landowner a return of either a share of the crop, a share of the proceeds from the crop, or some predetermined combination of the two. Inclusive sharecropping arrangements are meant to share the landlord's assets and knowledge with farmers (often landless people) who work on the land (Delgado 1999). The two actors generally share the risk exposure to harvest failures or price fluctuations. Tenant farming is similar, although farmers lease the land from a firm or landowner and therefore bear the whole risk of the harvest. The tenant (or company) only pays rent to the landowner or firm and has outright ownership of the output (Belton *et al.* 2014). In the Philippines, sharecropping

and aquaculture has created complex social systems where landowners and sharecroppers cooperate to produce for global and local markets and where poor landless people can still access certain aquatic resources through gleaning and trading activities (Mialhe *et al.* 2015).

Sharecropping and tenant farming has historically created negative outcomes for some smallholders because of the high possibility of exploitative practices and disagreements (Ray 2005), which can range from disputes on issues of how to use the land to how to distribute the rewards. Vermeulen and Cotula (2010) suggest that there can be positive outcomes from sharecropping and tenant farming when the terms and conditions are carefully set and governed by a third party.

In Sri Lanka, the government examined sharecropping as a tool to ease concerns of commercial shrimp farming expanding into people's lands (Siriwardena 1999) and thus extended opportunities for social upgrading opportunities between landowners and sharecroppers by providing a more equitable land tenure framework. Sharecropping and tenant farming can lead to greater knowledge sharing and learning opportunities as landless farmers gain experience by having access to farmable land, as seen in India (Belton *et al.* 2017). A survey of rural fish farmers in Zimbabwe found that farmers learned more about aquaculture whilst working as labourers on other farms than they would have as subsistence smallholders, thus acquiring basic expertise in fish farming that they later applied to their own smallholdings (Mandima 1995). In Ghana, Prein *et al.* (1996) found various forms of tenant farming, including tenant farmers and landowners sharing land and landowners leasing land to groups of farmers. Both forms of tenant farming allowed farmers to successfully venture into tilapia aquaculture as new entrants and diversify their livelihoods.

In Bangladesh, sharecropping has created some negative effects. The transition from rice paddy farming to shrimp farming turned traditional sharecropping contracts into leasing contracts where landless sharecroppers were sometimes removed from accessing any land, suggesting that sharecropping is not resilient to agricultural transformations and commercialization (Belton *et al.* 2016). To counter such negative effects, farmers in the Philippines received certificates of landownership from the government that allowed them to lease land temporarily, thus giving them access to resources and greater land tenure security (Asian Development Bank 2005). Smallholders who have land and attempt to engage in sharecropping do not always have the financial power to remain in control. Powerful actors can take advantage of smallholders and, in worst cases, seize land from vulnerable groups (Adnan 2013). Although the benefits of economic upgrading are apparent in sharecropping and tenant farming, these arrangements have a high risk of engendering further inequalities when smallholders'

land and other rights are not protected by governments or other actors.

Public private partnerships

According to a manual on public private partnerships (PPPs) by PricewaterhouseCoopers (2011), the private sector recognizes an increasing role in international cooperation and development, especially market integration and working with governments to build more sustainable enabling environments. The aim of PPPs is to achieve the basic tenets of IBMs by using the skills of the private and public sectors to manage risks and improve quality services and cost-effectiveness in supply chains and markets, or products and processes (Weirowski & Hall 2008).

PPPs may not always be regarded as an IBM based on the definition provided above as they do not necessarily entail setting up contractual relationships between a larger firm and smallholders or agribusinesses. However, there are examples of PPPs where one or two firms work together with local governments to integrate smallholders into the value chain. The Lagos government and an Israeli agri-tech company encouraged young Nigerian farmers to become agro-entrepreneurs. The government funded the scheme and the Israeli company managed food production and processing facilities for the government whilst being paid a fee to train the young agro-entrepreneurs (FAO 2013a). Another PPP between the city of Panabo, fisher associations and the local government marine resources department promoted mariculture in the Philippines. Private partners contributed 80% of the total investment funds, whilst the government provided infrastructure and equipment. The partnership resulted in increased profits for farmers and an additional 500 jobs in the value chain (FAO 2013b).

Most PPPs, however, operate at the macro-level by creating an enabling environment for private investment and smallholder development, from which other IBMs can emerge. One example is the promotion of "aqua-parks," where governments designate a site specifically for aquaculture development and offer incentives (e.g. tax and permit exemptions) to the private sector to establish businesses that provide services, delivery of inputs and the development and marketing of products (Bueno *et al.* 2015). Lebel *et al.* (2009) briefly discuss an "aqua-park" in Mexico that portioned shrimp farmland with shared access to canals. Strong cooperative arrangement between farmers emerged as a result. A labour union was involved to provide administrative support by contracting skilled personnel to operate the farms, whilst farmers, who constituted less-skilled labour, worked on the farms. The arrangement provided farmers with external support for certain high-skilled, specialized jobs that they would otherwise be unable to perform.

According to Weirowski and Hall (2008), a PPP between a German fish import company and a NGO helped supply organic Pangasius produced by smallholders in Vietnam to consumers in European markets. The PPP increased knowledge on organic aquaculture in the Mekong Delta and also raised awareness of environmental and food safety challenges that farmers and other value chain actors faced in Vietnam. Such PPPs create important economic and social upgrading opportunities, including better labour and wage conditions, more equitable contracts or improved environmental conditions that ultimately benefit smallholder farmers.

Certification

Certification is increasingly seen as a “hands off” approach to governance that incentivizes supplier upgrading by providing increased profits when food production standards are met (Bush *et al.* 2019). Certification involves setting up and enforcing standards that set the norm, levels and values of production and marketing of food products (Hatanaka *et al.* 2005). There is some disagreement as to how inclusive certification models are of smallholders (Samerwong *et al.* 2018). Generally, certification standards are considered to be difficult to meet for smallholder aquaculture farmers (Belton *et al.* 2009; Tran *et al.* 2013; Jespersen *et al.* 2014), mainly due to the high costs associated with compliance (Belton *et al.* 2017). Anh *et al.* (2011) show how only a small number of Vietnamese farmers were able to adopt water-use reduction strategies as an environmental standard that was part of a governance certification scheme set up by state-enforced legislature. Khiem *et al.* (2010) note how smallholder Pangasius farmers opted out of the value chain or purposefully downgraded their production because of the difficulty in complying with the standards of international export markets. Outside of aquaculture, a study on a global certification scheme that aimed to provide access to a higher value export market for horticulture farmers in Kenya found a 60% drop in formal participation by smallholders, where only 10 exporters controlled 50% of the market (Graffham *et al.* 2007). There is some evidence that certification can have positive effects on integrating smallholders when the risks that accompany efforts to obtain certification are spread amongst smallholders (Bush & Belton 2012; Marschke & Wilkings 2014).

Based on this literature, we argue that whilst certification can provide access to more lucrative or niche markets, certification does not necessarily provide the economic upgrading required for smallholder farmers to produce consistently at an efficient level. Neither does it typically provide any access to inputs or services and thus almost always has to be accompanied by one or several of the other IBMs presented above. We argue that the ability of farmers

to upgrade their performance and position will be more determined by the vertical and horizontal relations they can build within other IBMs. Certification then, is a mechanism under which other IBMs could operate. Although some certification schemes aim to provide farmers with social upgrading opportunities, such as improved social licensing or recognizing social welfare standards in production, without the support of the private sector, NGOs or governments, few farmers are able to participate in such schemes.

Synthesis of results under GVC analytical framework

Many of the models overlapped in their make-up and operation, and based on our review, it appears no one model is better than the other in equitably integrating smallholders or other actors into value chains. In many cases, a combination of these models was used, such as in Vietnam where contract farming models implemented in the Pangasius value chain were arranged together with farming cooperatives (Khiem *et al.* 2010), and in shrimp farming in Thailand, where contract farming models broke down with farming cooperatives. In the mussel value chain in South Africa, for example, elements of both contract farming and franchise models were used (Karaan 1999, 2002). Trifkovic (2014) suggested that certification standards and PPPs were critical in establishing an enabling environment for contract farming in the Pangasius value chain in Vietnam.

Figure 1 presents how the different IBMs can be included in an aquaculture value chain to enable greater participation of and benefits derived by smallholders and other poor actors. The figure provides an overview of how the different models work together and how the development of horizontal and vertical relations can operate simultaneously within IBMs operating in this hypothetical value chain. From our review, it was not always easy to decipher under what conditions the IBMs emerged. Whilst we discussed that IBMs may be driven more by buyers and marketeers in an effort to secure better contracts with producers or other actors in a value chain; or driven by smallholder producers to gain a better foothold in a value chain – or even driven by the philanthropic goals of NGOs – the existence of certification programmes or PPPs can also stimulate more contractualization between nodes. In Figure 1, we present what IBMs may look like in a value chain and the importance of the horizontal and vertical relations that allow smallholders and/or agribusiness entrepreneurs the possibility to enter into various contractual relations that can establish a better coordinated value chain. In certain cases, horizontal coordination provided the impetus for establishing vertical relationships further down the line, such as with the livelihood service centres in Indonesia or cooperatives in Thailand and Vietnam.

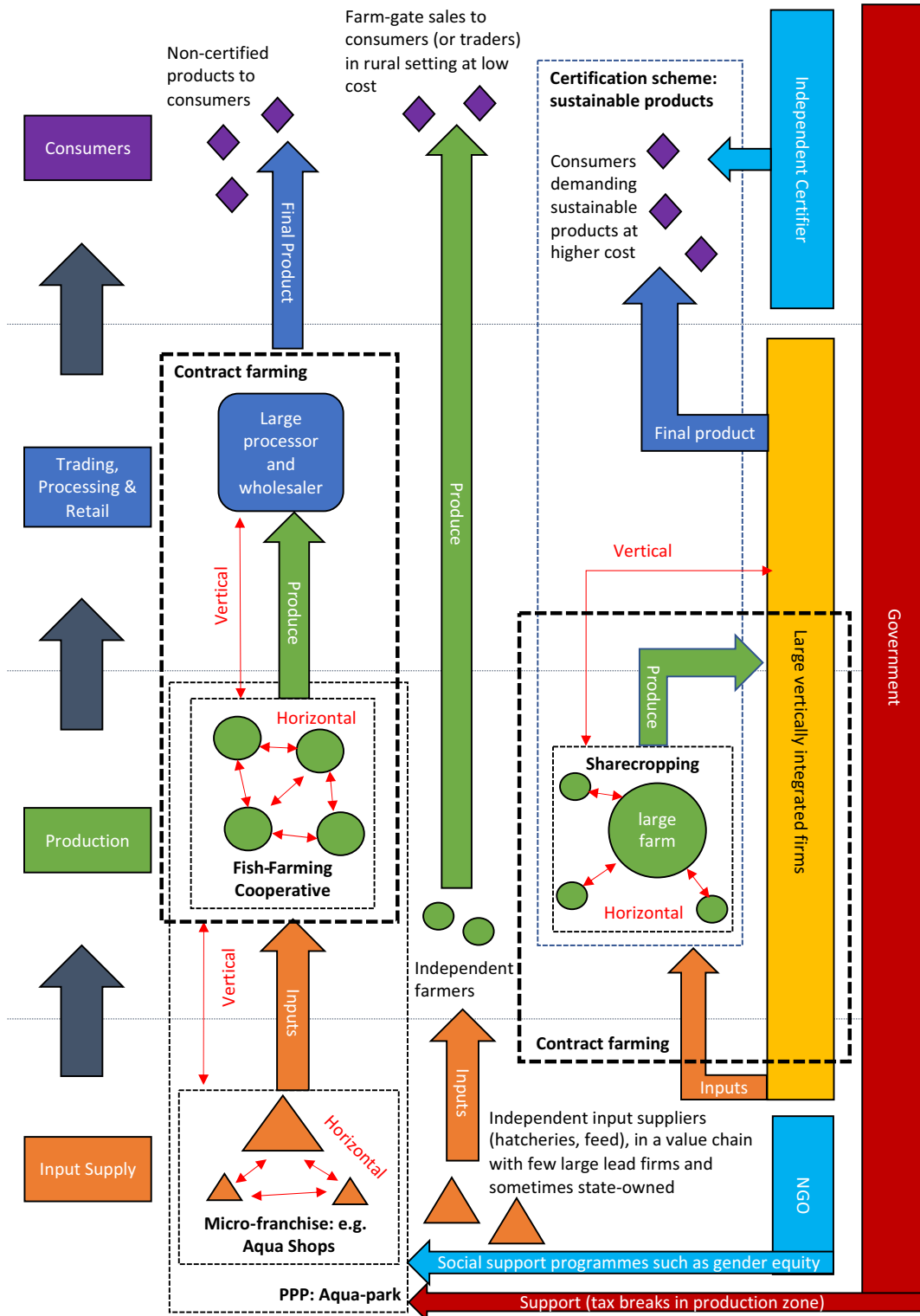


Figure 1 An example of how IBMs operate in an aquaculture value chain. *The nodes are colour-coded: orange – input supplies; green – production; blue – processing, trading and retail; purple – consumers; red – government; light blue – intermediaries (certifiers, NGOs). Small red arrows indicate horizontal or vertical relations.

Very few of the models in our review and the IBM literature go into detail on how to ensure *inclusiveness*. We attempt to do this by relying on the GVC analysis to provide operational terms we can use to distinguish between the relations and forms of coordination that enable actors to upgrade their position and performance in a value chain. We acknowledge, however, that more research is required to capture the dimensions and indicators of inclusiveness in IBMs as well as within value chain approaches to aquaculture development. For the purpose of this discussion, we look at how these models helped overcome barriers by enabling economic and social upgrading and where they still pose risks to inclusiveness (see Table 3).

Almost all models in the reviewed cases presented some sort of benefits gained through economic upgrading, such as new products, processes and functions that enabled smallholders or poor entrepreneurs to improve their agribusinesses. These economic upgrades generally provided actors with inputs, services, training, knowledge or credit that allowed them to overcome some of the economic barriers they faced when trying to enter into or participate more meaningfully in a value chain. There is evidence, however, that maintaining a business at an efficient level with these economic upgrades under certain agreements (contract farming or sharecropping) may overburden farmers who try to comply with high production standards; or create exploitative agreements where farmers do not necessarily improve their labour or living conditions. Social upgrading is regarded as a necessary mechanism that allows for more equitable business arrangements, processes and functions so that poor actors can overcome barrier to participating in value chains. It is evident from Table 3 that the degree to which actors are able to successfully participate in value chains has much to do with the nature of agreements, decision-making, labour or livelihood conditions and well-being. Certain models such as farming cooperatives or micro-franchises seem to offer better social upgrading conditions, which poor farmers and entrepreneurs can operate under to enable more equitable and empowering outcomes (i.e. increased agency). Freedom of association, independent decision-making and adapting the management of businesses and contracts to local needs allow poor actors to shape the direction of the enterprise on a more equal power basis in a value chain. One major risk with these models, however, is that without carefully enacting social protections in the make-up of the associations or businesses, they may replicate inequalities that exist at the local level, such as gender inequalities or unequal land distribution. There is little evidence in the reviewed papers where social upgrading actively responded to the needs of women or youth, for example. In many cases, external stakeholders such as government and NGOs were responsible for making IBMs more socially equitable,

as opposed to the businesses themselves actively making such efforts.

We conclude that a mix of vertical and horizontal relations will develop more inclusive and equitable business models. A contract farming model between smallholders and a larger buyer will likely be more inclusive when farmers are also able to establish horizontal relations and where arrangements include both economic and social upgrading opportunities. Whilst some authors question whether economic upgrading can lead to social upgrading (Barrientos *et al.* 2011; Rossi 2013; Pegler 2015), we argue that establishing social upgrading (equal power dynamics and labour processes) through horizontal coordination can lead to laying a foundation where other upstream and downstream actors will be more willing to engage in new vertical relationships and set up IBMs (e.g. contract farming). This can present new economic upgrading opportunities, which in turn may provide a need for additional social upgrading within the vertical arrangement.

The degree to which these business models succeed in being inclusive is only marginally dependent on the models used and is more associated with *how* they are being implemented and by *whom*. Backstopping and support from government and/or the donor community can greatly hedge certain risks for the private sector. If investments are made without also leveraging social development schemes (e.g. gender equity) localized inequalities can be replicated in business arrangements. It is evident that inclusive business models hinge on supporting institutions to facilitate the relationship between investors and smallholders or entrepreneurs and establish clear roles and responsibilities for governments, private sector actors and the donor community. Ha *et al.* (2013) call for governments to develop production infrastructure and create legal frameworks for private sector-led cluster formation. Such government intervention can be seen, for example, in the concept of 'aqua-parks' created through the establishment of PPPs. Contract farming agreements can, for instance, benefit from a strong legal framework to address issues of non-compliance or exploitative practices (Trifkovic 2014). Management contracts, tenant farming and sharecropping all depend on strong laws and regulations as well as local norms and beliefs surrounding landownership and land-use rights. In the absence of such social upgrading within a business model, the role of governments and donors is vital but arguably insufficient, hence the need for the private sector to leverage such opportunities. In Bangladesh, weak regulatory capacity with respect to poor compliance with food safety standards and inadequate enforcement of existing laws meant there was less upgrading taking place at the smallholder level than would have otherwise been realized (Toufique & Belton 2014). Conversely, investment in the creation of new regulations and public infrastructure in

Table 3 Synthesis of IBMs and GVC analysis

IBM	Coordination	Economic upgrading	Social upgrading	Risks to inclusiveness
Contract farming	Vertical	<ul style="list-style-type: none"> ● Reduces transaction costs ● Reduces market risk and market imperfections ● Increases access to inputs, which women and poorest farmers lack access to ● Increases access to finance and new markets 	<ul style="list-style-type: none"> ● Can improve relationships and trust between nodes ● Contracts can provide improved labour conditions, especially for marginalized groups ● Can include development of social conditions outside of production (e.g. education, health) 	<ul style="list-style-type: none"> ● Smallholder bears production risk ● Difficulty in meeting contract requirements ● Could lead to more uneven power relations ● Requires access to some assets (land/ponds), which oftentimes women and youth lack ● Could limit financial returns when based on fixed prices ● Farmers can become excluded or trapped in contractual agreements ● Can replicate social inequalities (e.g. targeting men farmers and using women's labour with minimal benefits received)
Micro-franchising	Horizontal	<ul style="list-style-type: none"> ● Leverages a strong brand and reduces market risk ● Strong vertical integration controls for quality product ● Provision of all inputs and technical assistance ● Collective action reduces production risks 	<ul style="list-style-type: none"> ● Can create legal protection on labour conditions and social equity under one brand name rather than under multiple independent operators ● Reduces bureaucracy and slow decision-making of cooperatives 	<ul style="list-style-type: none"> ● Reduces ability of individual farmers to make independent decisions ● Requires substantial buy-in and capital ● Requires innovative private sector actors ● Requires business acumen and codes of conduct or constitutions ● Risk sharing means that all actors could be responsible for actions of a few
Joint ventures	Vertical	<ul style="list-style-type: none"> ● Provides opportunities to generate revenue outside of business processes ● Financial risk is shared between actors ● Actors can venture into new lucrative markets 	<ul style="list-style-type: none"> ● Increases ownership and balances power ● Provides equal decision-making and more agency ● Generates more equitable sharing of rewards and decision-making 	<ul style="list-style-type: none"> ● Risk for smallholder is greater than for firm ● Restricted to farmers with capital and assets, which further restricts marginalized groups ● Can require high business skills as prerequisite ● Usually small contracts that benefit a few rather than large groups
Farmer-owned businesses (cooperatives, associations, groups)	Horizontal	<ul style="list-style-type: none"> ● Pools resources to access better quality inputs ● Creates flexible trading arrangements with intermediaries ● Provides an attractive base for more financial investment from other value chain actors 	<ul style="list-style-type: none"> ● Farmers have equal voting rights within the organization ● Increases bargaining power with other value chain nodes ● Self-determination over management of business and practices ● Adapted to local needs and labour processes 	<ul style="list-style-type: none"> ● Requires strong organizational and governance structures ● Risk of free-riding ● Not always accessible to all, as membership is often fee-based ● Social norms may be pervasive, and inequalities can be replicated (i.e. for marginalized groups) ● Often requires development support to set up

Table 3 (continued)

IBM	Coordination	Economic upgrading	Social upgrading	Risks to inclusiveness
Sharecropping and tenant farming	Horizontal	<ul style="list-style-type: none"> ● Provides mechanism for credit and input provision ● Provides access to land for landless farmers ● Potential for knowledge sharing and learning 	<ul style="list-style-type: none"> ● Can develop governance and land management systems based on local needs ● Can have indirect development impacts (e.g. food security) on “the poorest of the poor” ● By providing labour on other farms, farmers can apply newly learned techniques to own farms 	<ul style="list-style-type: none"> ● High risk of replicating social inequalities ● Exposure to marketing risk ● Exposure to exploitative practices (sharecropping especially) ● Could lead to uneven power relations ● Present examples seem to rely heavily on development funding from NGOs or government
Public Private Partnerships	Vertical and horizontal	<ul style="list-style-type: none"> ● Closes the infrastructure financing gap through private sector capital ● Removes financial responsibility from public sector ● Risk sharing between public and private entities ● Better allocation of private and public skills 	<ul style="list-style-type: none"> ● Can remove exploitative practices from private sector by establishing rights-based frameworks ● Can provide greater room for Social Licence Operators 	<ul style="list-style-type: none"> ● Farmers and poor or marginalized people may not always have a voice in design and running of partnerships ● Can be difficult to enforce when roles and responsibilities are not clearly established ● Relies on strong leadership – conflicts between public and private entities can hinder projects and poor actors stand to lose out
Certification	Vertical	<ul style="list-style-type: none"> ● Creates high-quality inputs and outputs and improves farmers’ capacities and incomes ● Standardizes inputs and technical know-how ● Provides standardized products and processes across industry 	<ul style="list-style-type: none"> ● Can improve relationships and trust between nodes ● Certified products can include social equity indicators such as fair labour practices, inclusion of marginalized groups, etc. ● Can provide farmers with a social licence and improve labour conditions 	<ul style="list-style-type: none"> ● Many farmers struggle to comply with standards ● Standards can be invasive and not adapted to local context ● Difficult to enforce standards, especially around social equity ● Farmers can become excluded or trapped in contractual agreements

support of aquaculture led to successful product and process upgrading in some Asian countries and a strong reputation for high-quality farmed seafood produced under fair social conditions (Ponte *et al.* 2014).

Conclusion

This review is a first step in synthesizing a collection of papers around inclusive business models found in aquaculture case studies in low-income countries. The concept of inclusive business models is gaining ground in government, donor, civil society and private sector circles, pointing to a critical need for designing conceptual and operational frameworks and piloting more IBMs that fit the aquaculture context. We highlight the importance of determining the *inclusiveness* of these models by assessing the nature of the relationships between actors, as well as the economic and social upgrading opportunities that are presented as a result

of horizontal and vertical coordination. We conclude this paper with some additional insights and suggest areas where further research and development efforts are needed.

First, almost all of the IBM literature and the cases in our review focused on smallholder development. There is a critical need to apply value chain approaches to assessing IBMs, especially in the potential for models in other parts of the value chain where poor actors stand to benefit.

Second, whilst social and economic upgrading provide useful tools to examine various mechanisms of inclusive business models there is a notable gap in properly assessing environmental upgrading. Our review suggests that some forms of coordination led to increased awareness about disease control or environmental impacts, which were arguably important environmental upgrades. These papers however, did not reveal whether incorporating such upgrades had any effect on production efficiencies.

Upgrading and inclusiveness then, require a more thorough conceptualization of environmental considerations.

Third, almost a third of the studies were found in sub-Saharan Africa, which may seem surprising given that <1% of the total global aquaculture output is produced in the region and since the history and trajectory of aquaculture development is much longer in Asia than in Africa (FAO 2018). Promoting ethical and inclusive businesses is an attractive proposition for governments, investors and the donor community and likely the reason why our review found so many models in Africa where aquaculture is still a nascent industry and where governments and donors advocate for more social responsibility and inclusive economic growth in the sector. IBMs then, in many ways, still have connections to the donor community and development practices where NGOs and governments increasingly support private businesses to operate at the bottom of the pyramid. The role of businesses and the donor community in the establishment and implementation of these models requires more attention.

Fourth, there is a need to understand the context of aquaculture (e.g. fingerling supply, animal husbandry, etc.) and fish as a commodity (value, marketability, perishability) and explore which models best exploit these characteristics under what circumstances. Can contract farming models used in coffee in South America or cotton in Africa be applied to aquaculture in different contexts, for example? According to Murekezi *et al.* (2018), aquaculture is well suited for contract farming because it is labour-intensive and aquaculture produce is perishable and has a high value-to-weight ratio. Minot and Sawyer (2016) state that commodities that require high expertise and regulation such as tobacco and cotton ensure better enforcement of contracts. However, there is still a large gap in research and literature around IBMs and their application in aquaculture. Furthermore, aquaculture production systems are so broad and varied in different contexts around the world that some value chains may be better suited for IBMs than others. For example, extensive tilapia or seaweed farming in Africa may benefit from IBMs developed through cooperatives and linkages to local agribusinesses, whereas shrimp farming in southern Asia may require larger contract farming models with more semi-intensive smallholders that can comply with export market standards.

Fifth, our review suggests that most of these models require smallholders to have access to some degree of assets, such as land, finance and/or human and social capital. Integrating farmers into capital-intensive markets with high compliance standards, especially export markets, may not always be the best solution for smallholders. This is compounded further where domestic demand is high and where food standard compliance in Europe may be difficult to achieve for smallholders in low-income country

contexts. Our review shows evidence of smallholder farmers actively downgrading their businesses or even opting to outgrade from export value chains as a result. The livelihoods of and potential risks borne by farmers are extremely important points to consider. In contexts where aquaculture is not the mainstay of smallholders' livelihood systems (in much of Africa, for example – see Kaminski *et al.* 2018), the time, costs and efforts of moving into business arrangements for aquaculture may take people away from cash crop production and put their livelihoods at greater risk.

Finally, the variety of available models and the implementation modalities highlights the need to consider the socio-economic (including gender) and cultural contexts, as well as existing market realities and institutional frameworks. None of the articles in this review examined the social issues around inclusive business models. Context-specific and multidisciplinary understandings are needed to inform approaches that aim to help smallholder farmers and agribusiness entrepreneurs commercialize, including assessing the value systems, power asymmetries and perceptions of reality in heterogeneous contexts (Poole *et al.* 2013). This means using a broad spectrum of approaches, including business-related and social innovations, rather than only those that are technical in nature (see Joffre *et al.* 2017). Developing a more thorough conceptual framework of what *inclusive* really means in the context of business models, as well as indicators to monitor and evaluate inclusiveness would help to apply the concept to different value chains.

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