

Collaboration in agricultural value chains: a scoping review of the evidence from developing countries

Agricultural
value chains

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Abstract

Purpose – Collaboration in agricultural value chains (AVCs) has the potential to increase smallholders' participation in international value chains and increase their benefits from participation. This scoping review explores existing collaboration models among stakeholders of AVCs in developing countries, examines enablers and constraints of collaboration and identifies policy gaps.

Design/methodology/approach – We systematically searched three databases, CAB Abstracts, Econlit (EBSCO) and Agricola, for studies published between 2005 and 2023 and included 59 relevant studies on AVC collaboration.

Findings – The primary motivations for collaboration are to enhance market access and improve product quality. Key outcomes of collaboration include improvements in farmers' welfare, market participation and increased production; only a few studies consider improved risk management as an important outcome. Robust

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support from government and non-governmental entities is a primary enabler of collaboration. Conversely, conflicts of interest among stakeholders and resource limitations constrain collaboration possibilities. Collaboration involving high-value crops prioritizes income increases, whereas collaboration involving staple crops focuses on improving household food security.

Research limitations/implications – This study may have publication bias as unsuccessful instances of collaboration are less likely to be published.

Originality/value – This study is unique in highlighting collaboration models' characteristics and identifying AVC policy and programmatic areas where private firms, farmers' groups, local governments and donor agencies can contribute.

Keywords Agricultural value chains, Collaboration, Smallholders, Market access, Private food standards, Vertical coordination

Paper type Literature review

1. Introduction

Collaboration within agricultural value chains (AVCs) can play an important role in increasing smallholders' participation in global AVCs and transforming rural economies, especially in developing countries that heavily depend on agriculture for economic growth. [Lim \(2021\)](#) found that participation in global AVCs increases gross domestic product and employment in agricultural sectors. The key stakeholders of AVCs are smallholders, private firms, local governments, national governments (through incentives policies and investments), non-governmental organizations (NGOs) and donor agencies. Collaborative efforts within AVCs, combined with technological advances, changing consumer tastes and preferences and rising foreign direct investment, significantly influence the pace of transformation in AVCs ([Gómez et al., 2011](#); [Reardon et al., 2003](#)). A notable example is the substantial transformation of Brazil's pork industry due to efficient collaboration among research institutions, small producers and private firms ([Vilas-Boas et al., 2022](#)). Such collaboration within AVCs fosters innovations which can ignite new waves of global AVC transformations, particularly in regard to developing countries' participation.

AVCs are changing globally in scale, characteristics and priorities. In Asia and Latin America, the share of high-value products in agricultural exports has increased from 20 to 40% since the 1980s ([Swinnen, 2015](#)). A similar trend is occurring in Africa, albeit at a slower pace. However, successful instances of AVC collaboration mostly involve perishable and high-value horticultural products. Another trend, often referred as a "quiet revolution" involving staple crops, is also emerging in Africa and Asia and is fueled by collaboration among intermediaries and processors, including transporters, cold storage providers and millers ([Reardon, 2015](#)).

Collaboration networks in AVCs sometimes are inefficient and do not necessarily contribute to competitiveness of the product involved ([Benmehaia and Brabez, 2018](#); [Dannenberg and Nduru, 2013](#)). These challenges arise from capacity constraints in human and physical capital and inadequate agricultural policies ([Protopop and Shanoyan, 2016](#)). Consequently, successful interventions for promoting collaboration among stakeholders often require support in the form of public-private partnerships ([Dahan et al., 2010](#)). Despite constraints that generate unproductive examples, collaboration among stakeholders often enhances competitiveness, fosters sharing of goals and approaches to problem solving and creates long-term relationships ([Norton, 2017](#); [Wu et al., 2014](#)).

Some interventions emphasize the role of collaboration among stakeholders in AVCs as a driver of progress for development. For instance, a World Bank project ([World Bank, 2022](#)) in Indonesia and the AVC Cambodia competitiveness and safety project ([Asian Development Bank, 2024](#)) aim to strengthen AVCs by creating sustainable and competitive agricultural practices among smallholders. These trends reveal a shift toward greater developing countries' participation in global value chains (GVCs) and underscore the importance of collaboration in AVCs.

The objective of this scoping review is to systematically assess collaboration models among stakeholders of AVCs in developing countries, examine the factors that foster or impede collaboration (enablers and constraints) and identify gaps in research on collaboration in AVCs. We believe this is the first scoping review on collaboration models in AVCs that offers insights with evidence on AVC collaboration, for use by policymakers, governments, private agricultural enterprises, donor agencies and field advisors in developing countries.

2. Conceptual model of collaboration in AVC

Collaboration is an *approach* to solving complex problems in which “diverse groups of autonomous *stakeholders* deliberate to build consensus and develop *networks* for translating *consensus* into results” (Margerum, 2011) [1]. The collaboration concept in AVCs is mostly narrative-based and context specific (Saitone and Sexton, 2017; Tran *et al.*, 2013), with no established economic theory for it. However, competitiveness in agricultural markets has two critical dimensions that apply to AVCs: the ability to produce at low cost and product differentiation, mostly related to quality (Norton, 2017, p. 10). This can serve as the basis for the conceptual framework of this scoping review.

In a competitive agricultural market, exercising asymmetric market power, whether by small buyers or large private firms, often leads to declines in smallholders’ income (Casaburi and Reed, 2022; Bergquist and Dinerstein, 2020) and creates a long-run detrimental effect on the market as farmers exit (Sexton, 2012, p. 9). Therefore, forging sustainable collaboration within the value chain, benefitting both buyers and farmers, is important for the endurance of the market for those producers and locations. Such collaboration increases productivity due to technology transfer, expanded market access and improved product quality, and it provides incentives to farmers through price premiums (Abdul-Rahaman and Abdulai, 2020; Larsen, 2016; Bellemare, 2012).

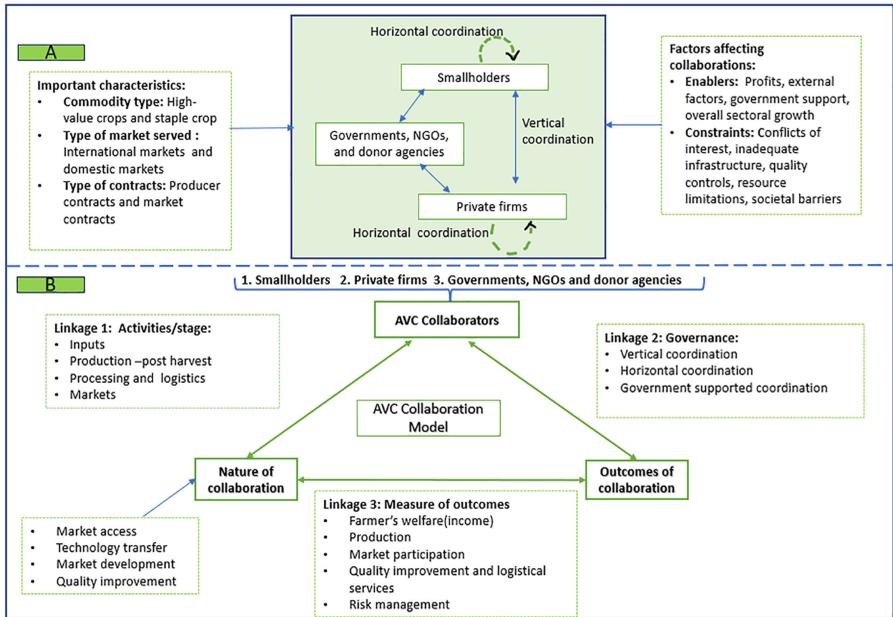
AVCs in developing countries have undergone significant transformation (Gómez *et al.*, 2011; Reardon *et al.*, 2003). Traditional inefficient AVCs in developing countries are being replaced by more efficient ones, and trades are increasingly regulated through stringent food quality and safety standards (Pérez and Gómez, 2022; Henson and Reardon, 2005). In global AVCs, it is common for private food standards to be more rigorous than those of the public sector (Vandemoortele and Deconinck, 2014; Fulponi, 2007). Moreover, exporters in developing countries are compelled to comply with GVC standards set by importing countries.

The influence of GVC standards extends to domestic markets as well (Henson and Reardon, 2005). To effectively address GVC standards and achieve competitiveness, AVCs in developing countries have undergone structural changes, including improved vertical and horizontal coordination among stakeholders and an increased power of lead private firms in AVCs (Widadie *et al.*, 2022; McCullough *et al.*, 2008; Swinnen and Maertens, 2007).

Figure 1 presents a conceptual model of collaboration among stakeholders by stages of an AVC. Main descriptors of this model are collaborators, the nature of the collaboration and its outcomes.

3. Study design and methodology

Our systematic approach (Levac *et al.*, 2010; Arksey and O’Malley, 2005) explores the breadth of existing evidence on collaboration models within AVCs and summarizes findings from studies with diverse methodologies, while identifying gaps in the literature. We have adhered to the guidelines (Tricco *et al.*, 2018) from the Preferred Reporting Items for Systematic Reviews and the Meta-Analyses extension for scoping reviews (PRISMA-ScR). Our approach follows the recommended five-step process: defining the research question, identifying relevant studies, selecting studies, extracting data, charting the data and summarizing and reporting results.



Note(s):

1. Panel B presents a competitive structure of a collaboration model in AVCs with the three important components: collaborators, nature, and outcomes of collaboration. Linkages 1,2, and 3 explain how the components of AVCs interact in a system
2. Panel A presents how the collaborators interact in an AVC and what factors affect such collaboration
3. In panel A: smallholders include small farmers and primary producers and groups of farmers. Governments, NGOs, and donor agencies include local and national governments, local and international donors, academic institutions, and NGOs. Private firms include lead firms, exporters, traders, processors, input suppliers, and contractors

Source(s): Authors' own creation

Figure 1. Conceptual model of collaboration in AVC, its mechanism and influencing factors

3.1 Eligibility criteria

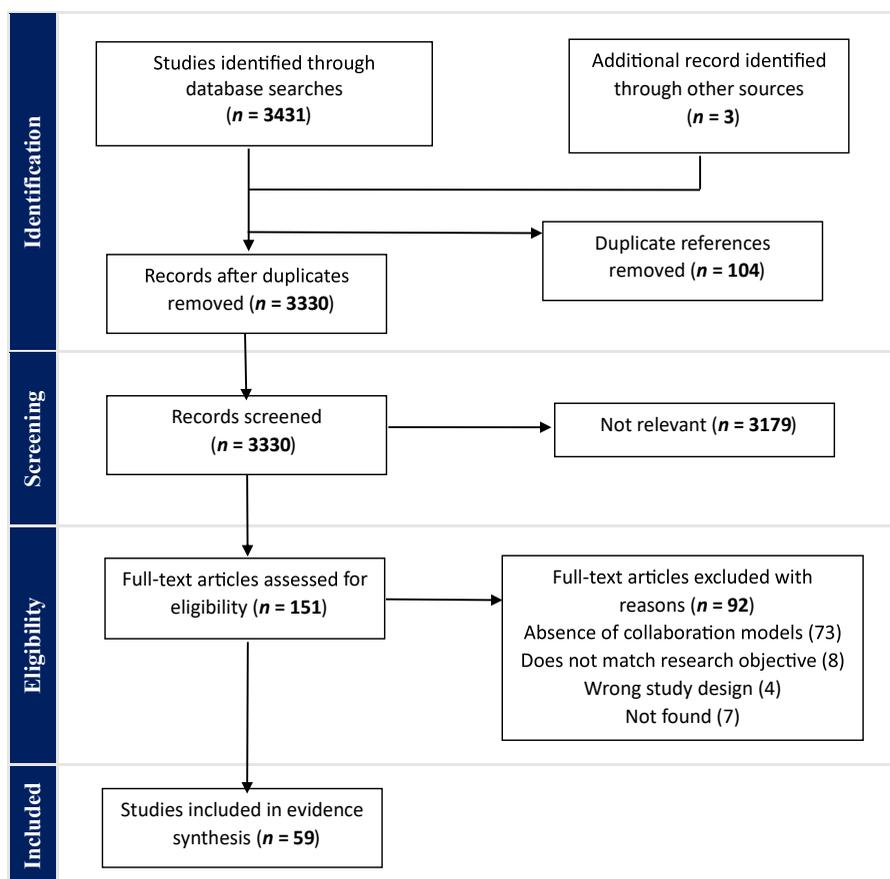
The research question of this scoping review is: “What is the extent of existing evidence regarding models of collaboration in AVCs and its characteristics, among local and international actors, including donors, private partners, academic institutions, and NGOs and governments that support AVC strengthening or policy changes?” To answer this question, our systematic research protocol delineates eligibility criteria for selecting the studies and has four key parameters: stakeholder population, type of collaboration, possible outcomes from collaboration and collaboration study design.

The protocol focuses on both formal collaboration as contract farming and informal collaboration like smallholders' groups with verbal agreements to sell harvests jointly to a buyer. We exclude studies on non-AVCs, urban agriculture and those focusing on hypothetical experiments and lacking collaboration details. Collaboration outcomes include input use and technology of production, production and processing levels, sales and producer prices received. The study design encompasses quantitative and qualitative evidence, mixed methods reports, systematic reviews and previous scoping reviews.

3.2 Search strategy and study selection

The database search protocol was developed by the authors using the studies identified from the existing evidence gap maps (Yeritsyan, 2023). This approach facilitated identification and retrieval of the most relevant studies. The search was carried out in CAB, EconLit (EBSCO) and AGRICOLA databases. In addition, manual searches of websites of international development organizations were conducted along with Google incognito searches to avoid personalized selection of outcomes. All the retrieved records were uploaded into Covidence, software for managing and streamlining literature reviews.

This scoping review includes published research papers, theses and dissertations and reports from research institutions issued between January 2005 and May 2023 in English and conducted in the low, middle and upper-middle income countries (World Bank's classification, 2018). Two independent reviewers screened titles and abstracts of retrieved studies and conducted full-text readings using the eligibility criteria. Any disagreements were resolved by a third reviewer. Figure 2 shows the process for selecting studies for this review starting with identifying 3,434 studies. After full-text reading of the most relevant 151 studies and application of the eligibility criteria, 59 studies were selected to be included in this scoping review.



Source(s): Authors' own creation

Figure 2. PRISMA study selection flow chart

3.3 Data extraction and analysis

Dedoose software was used to organize the data extracted from the studies. It allows the coding of both textual and graphical evidence from the included studies and categorizes them into groups aligned with the review’s objectives. The coding structure was designed by the lead author and discussed and approved by coauthors in consultation with an expert on qualitative studies.

The data coding structure follows two major themes. The first theme places the general information from included studies into four categories: outcomes, enabling factors, constraints and reason for collaboration. Each category is then subcategorized into parent codes and, when necessary, child codes. For example, in the category of collaboration outcomes, there are five parent codes: farmers’ welfare, production outcomes, market participation, product quality and logistical services and risk management.

The second theme places information from the studies in five categories regarding the nature of the collaboration: value chain stage of the collaboration, primary collaborators, food groups, governance structure of collaboration and markets. Regarding food groups, parent codes are “high-value crop” and “staple crop.” The “high-value crop” parent code was subdivided into four child codes: fruits and vegetables, meat, dairy products and other high-value crops such as coffee, cocoa, cotton and turmeric.

4. Results

4.1 Included studies

The 59 studies on collaboration in AVCs analyze experiences in 32 countries: 33 from Africa, 20 from Asia, 6 from South America and 4 from North America (Figure 3a and Table 1). The studies were journal publications (51), theses (3), published reports (2), a book chapter (1) and discussion papers (2). Around 44 studies were published after 2012, averaging four studies per year, indicating an increased research focus on collaboration within AVCs (Figure 3b). Maryono *et al.* (2024), while looking at multistakeholder partnership in AVCs, found a similar pattern of increase in number of studies after 2012.

Figure 4 shows the distribution of collaboration studies by four characteristics: primary collaborators, food groups, outcomes and governance structures. Primary collaborators include three subgroups (Figure 4a): (1) private firms including lead firms, retailers, processors, traders and exporters; (2) local and national governments, research institutions,

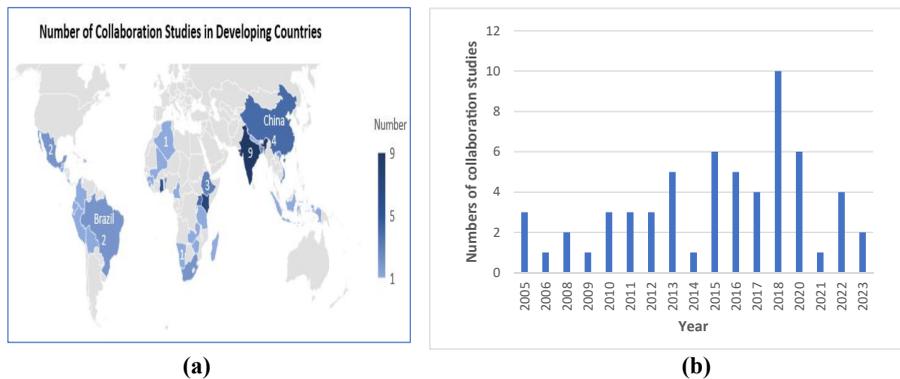


Figure 3. Included study characteristics (a) geographical representation and (b) distribution by year of publication

Note(s): Some studies cover multiple countries

Source(s): Authors’ own creation

No.	Author and year	Country	Nature of collaboration	Market served	Stage of AVC	Commodity type	Reported outcomes
1	Adékambi (2015)	Benin	Quality and market access	International	Markets	High-value crops (animal produce)	Income
2	Ahmed <i>et al.</i> (2016)	Bangladesh	Market access and technology transfer	International	Markets, production	High-value crops (animal produce)	Market participation, quality, logistics
3	Alemu <i>et al.</i> (2016)	Ethiopia	Market access	International, domestic	Markets, inputs (equipment services)	High-value crop (honey)	Production, income
4	Ao <i>et al.</i> (2021)	China	Market access	Domestic	Markets	Mostly staple crops	Income
5	Arbeláez <i>et al.</i> (2018)	Columbia	Domestic market development	Domestic	Markets	High-value crops (coffee, sugar), staple crop (rice)	Domestic market participation
6	Bavivana <i>et al.</i> (2018)	Tanzania	Market access and credit	Domestic	Inputs, markets	High-value output (milk)	Production, income
7	Vilas-Boas <i>et al.</i> (2022)	Brazil	Quality and market development	International, domestic	Production, post-harvest	High-value outputs (pork)	Production, market participation, logistics
8	Booker <i>et al.</i> (2016)	India	Market access and quality	International, domestic	Processing, logistics	High-value crop (turmeric)	Production, logistics, income
9	Benmehaia and Brabez (2018)	Algeria	Market access	Domestic	Markets	High-value crop (tomato)	Income
10	Choudhary <i>et al.</i> (2022)	India	Market access	Local	Markets	High-value crops (ginger, vegetables, hay, straw, manures, cashew)	Market participation
11	D'hotel and Bosc (2011)	Costa Rica	Domestic market development	Local	Markets	High-value crops (milk, coffee), staple crop (black bean)	Market participation with tariff barriers
12	Dannenberg and Nduru (2013)	Kenya	Quality and market access	International	Production, post-harvest, governance	High-value crop	Quality, logistics
13	Doherty and Tranchell (2005)	Ghana	Market access	International	Markets	High-value crop (cacao)	Income, market participation
14	Doyer <i>et al.</i> (2008)	South Africa	Market access	Domestic	Markets	High-value crop (tobacco)	Market participation

(continued)

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Table 1.
Studies included in the scoping review

Table 1.

No.	Author and year	Country	Nature of collaboration	Market served	Stage of AVC	Commodity type	Reported outcomes
15	Esther. (2018)	Ghana	Technology transfer	Local	Production, post-harvest	Staple crops	Risk; pests, diseases
16	Figueiredo <i>et al.</i> (2016)	Brazil	Quality	International	Production, post-harvest	High-value crop (honey)	Production, quality, logistics
17	Guei <i>et al.</i> (2011)	Cameroon	Technology transfer and market development	Domestic	Inputs, production, post-harvest	Staple crops (rice, maize, sorghum, millets)	Production, market participation
18	Gyau and Spiller (2008)	Ghana	Market access	International	Markets	High-value crops (fruits, vegetables)	Income, market participation
19	Hernández <i>et al.</i> (2006)	Guatemala	Market access and quality	Domestic	Markets	High-value crop (tomato)	Income, quality, logistics, market participation
20	Hulke and Diez (2022)	Namibia	Domestic market development	Domestic	Markets	High-value crops (horticulture)	Market participation
21	Ibáñez (2015)	Dominican Republic	Market development (quantity and quality)	Domestic	Processing, logistics	High-value output (milk)	Market participation
22	Jaffee and Masakure (2005)	Kenya	Quality	International	Markets, production, post-harvest	High-value crops (vegetables)	Quality, logistics
23	Kamara <i>et al.</i> (2023)	Sierra Leone	Technology transfer	Domestic	Inputs	Staple crop (rice)	Production, income, costs
24	Kar <i>et al.</i> (2020)	India	Market access and inputs	Domestic	Markets, inputs	Staple crop (rice)	Income
25	Khondker <i>et al.</i> (2018)	Nepal and Bangladesh	Market access, quality and productivity	Domestic	Markets, governance	High-value crops (seafood)	Production, market participation, income
26	Kumar <i>et al.</i> (2019)	India	Market access and technology transfer	Domestic, international	Inputs, markets	High-value crops (onion, okra, pomegranate)	Income
27	Larsen (2016)	India	Market access and quality	International	Processing, logistics	High-value crop (tea)	Income, quality
28	Liang <i>et al.</i> (2023)	China	Market access and inputs	-	Markets, inputs	High-value output (meat)	Income by type of contract

(continued)

No.	Author and year	Country	Nature of collaboration	Market served	Stage of AVC	Commodity type	Reported outcomes
29	Lu Hualiang <i>et al.</i> (2010)	China	Quality and market access	Domestic	Markets	High-value crops (including animal production)	Quality, logistics
30	Masuka (2013)	Zimbabwe	Quality	Domestic, international	Inputs, markets	High-value crop (cotton)	Quality
31	Melese and Helmsing (2010)	Ethiopia	Market access and market development	International	Markets	High-value crops (flowers)	Production, market participation, quality
32	Minten <i>et al.</i> (2009)	Madagascar	Market access and quality	International	Markets	High-value crops (vegetables)	Income, risk
33	Muyombano, Esping (2020)	Rwanda	Technology transfer	Policy on land consolidation	Inputs	Staple crops	Production
34	Mwambi <i>et al.</i> (2016)	Kenya	Market access	International	Markets	High-value crop (avocado)	Income
35	Ng'asike <i>et al.</i> (2020)	Kenya	Domestic market development, market infrastructure and quality	Domestic, international	Markets	High-value output (animal produce)	Market participation
36	Oberholster <i>et al.</i> (2015)	South Africa	Access to finance (smallholders)	Domestic	Inputs	Agricultural finance	Risk, competitiveness, agricultural finance
37	Ogutu <i>et al.</i> (2020)	Kenya	Market access	Domestic	Market	High-value crops (vegetables)	Income, poverty reduction
38	Okry <i>et al.</i> (2011)	Guinea	Technology transfer	Domestic	Inputs	Staple crops	Production, inputs
39	Ortiz <i>et al.</i> (2013)	Bolivia, Ethiopia, Peru, Uganda	Technology transfer	Domestic	Production and post-harvest	High-value crops (vegetables)	Production and technology
40	Ouma <i>et al.</i> (2017)	Uganda	Market access	Domestic	Processing and logistics	High-value crops (animal produce)	Market participation and risk
41	Padron <i>et al.</i> (2012)	Mexico	Domestic market development	International	Markets	High-value crops (coffee)	Income, market participation and risk

(continued)

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Table 1.

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No.	Author and year	Country	Nature of collaboration	Market served	Stage of AVC	Commodity type	Reported outcomes
42	Quaraine (2013)	Ghana	Quality through certification and market access	International	Markets	High-value crops (cocoa)	Income and market participation
43	González-Ramírez <i>et al.</i> (2020)	Mexico	Market access	International	Markets	High-value crops (berries)	Production and governance
44	Rao <i>et al.</i> (2017)	India	Infrastructure and domestic market development	Local	Markets	High-value crop	Income, production and market participation
45	Ravikumar and Rajesh (2015)	India	Technology transfer	Domestic, international	Market and inputs	High-value crops (flower)	Income, production and market participation
46	Romero Grania and Wollni (2018)	Ecuador	Market access	International	Market	High-value crops (broccoli)	Income
47	Sulistiyowati <i>et al.</i> (2016)	Indonesia	Market access	International	Market and inputs	High-value crop (mango)	Partnership between wholesalers and farmers
48	Swinnen <i>et al.</i> (2011)	India	Market access	Domestic	Market	High-value output (milk)	Income, production
49	Thérault <i>et al.</i> (2018)	Mali	Technology transfer (fertilizer)	Local	Inputs	High-value crops and staple crop	Production
50	Totin <i>et al.</i> (2015)	Benin	Technology transfer	Local	Inputs	Staple crops	Production, income
51	Tran <i>et al.</i> (2013)	Vietnam	Quality and market access	International	Markets	High-value crops (shrimp)	Quality
52	Tru <i>et al.</i> (2012)	Vietnam	Market access	International	Production and post-harvest	High-value crop	Market participation
53	Tschirley and Kabwe (2009)	Zambia	Inputs	Domestic	Inputs, production and post-harvest	High-value crop (cotton)	Production

(continued)

No.	Author and year	Country	Nature of collaboration	Market served	Stages of AVC	Commodity type	Reported outcomes
54	Uddin <i>et al.</i> (2022)	Bangladesh	Market access	Domestic	Market, production and post-harvest	High-value output (milk)	Production and income
55	Venkatesh <i>et al.</i> (2017)	India	Market access	Domestic, international	Market, processing, logistics	High-value crop (mango)	Income
56	Van Campenhout <i>et al.</i> (2021)	Uganda	Quality and market development	International	Markets	High-value crop (milk)	Production, quality and logistics
57	Weyori <i>et al.</i> (2018)	Ghana	Technology transfer	Domestic	Input, production and post-harvest	High-value crops (plantain)	Technology adoption
58	Yaseen <i>et al.</i> (2018)	Kenya	Market access (market information)	–	Market	High-value crops (vegetable)	Market participation
59	Zhu <i>et al.</i> (2018)	China (Inner Mongolia)	Market access, inputs and costs	Domestic, International	Input, production, and post-harvest	High-value crops (including animal production)	Production, market participation and, income

Source(s): Authors' own creation

Table 1.

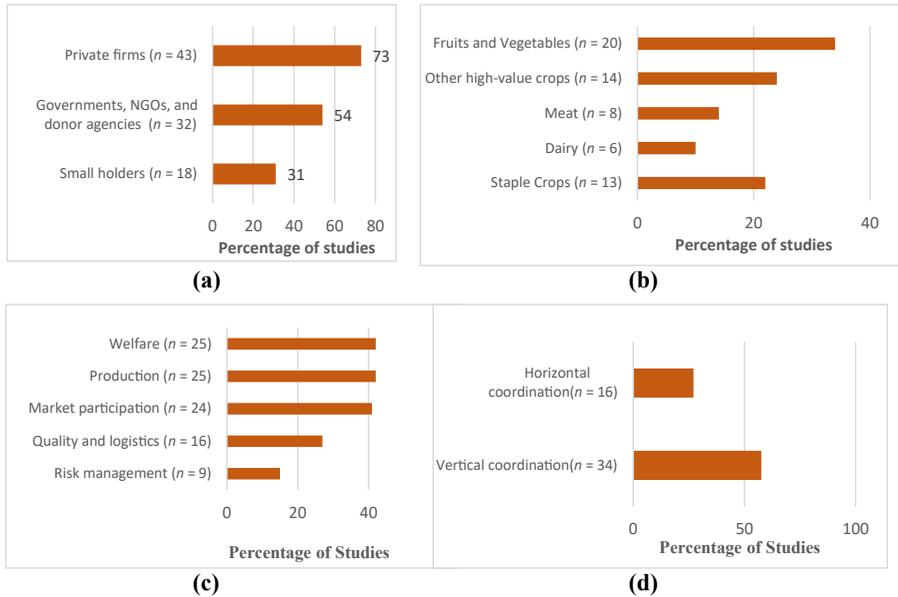


Figure 4. Included studies by (a) primary collaborators in AVCs, (b) food groups involved, (c) collaboration outcomes and (d) governance structure of AVCs

Note(s): The percentages do not sum to 100 as studies often report more than one primary collaborator, food group and/or outcome

Source(s): Authors' own creation

local and international NGOs, donor agencies; (3) smallholders and cooperatives. They are vital for the success of collaboration. For instance, local governments and NGOs were primary collaborators for technology transfer for rice crop intensification in Sierra Leone (Kamara *et al.*, 2023). In India, private firms were primary collaborators in contract farming for onion, okra and pomegranate crops (Kumar *et al.*, 2019). About 73% of the studies report private firms as primary collaborators; 54% report governments, NGOs and donor agencies in that role; and 31% report smallholders and cooperatives. The majority of studies conducted in non-African countries report private firms as collaborators (60%), while studies in African countries report private firms (40%) along with governments, NGOs and donor agencies (38%) as collaborators.

The categories of food groups reported in the literature are high-value crops and staple crops (Figure 4b). AVC operations depend on the commodity. Perishable foods such as fruit and vegetables, dairy and meat products need a fast and efficient AVC to meet global food safety and quality standards. Forty-eight studies report collaboration involving high-value crops: 20 for fruit and vegetables; 14 for other high-value crops including tea, cotton, medicinal plants, coffee and cocoa; 6 for dairy; and 8 for meat. Staple crops usually are grains like rice and corn. Over 55% of studies report collaboration involving high-value crops. Studies conducted in African countries frequently report collaboration involving staple crops more often (30%) than those conducted in non-African countries (10%). The concentration on high-value crops is not surprising; Norton (2017) points out that those value chains are more likely to be sustainable than ones for staple crops.

The markets for AVCs vary by primary collaborator and output. Most studies of smallholder farmers in Africa analyze high-value crops such as fruit, vegetables, coffee and cocoa for Europe. However, AVCs in Asian countries serve both domestic and international

markets. Among the studies, 38 reported serving domestic markets and 32 international markets.

Twenty-five studies focused on welfare-related outcomes; 25 on market participation outcomes; 24 on production outcomes; 16 on quality and trading services; and 9 on risk management (Figure 4c). Studies consistently report farmers' welfare as an important collaboration outcome, with production outcomes emphasized in African countries and market participation and quality related outcomes emphasized in non-African studies. Vertical coordination is preferred in collaboration rather than horizontal coordination. More than 57% of the studies reported vertical coordination (Figure 4d).

4.2 Nature of and motivations for collaboration

Studies report collaboration for market development, technology transfer, market and input access, quality improvement and cost reduction. Figure 5 presents the reasons for collaboration by value chain stage, primary collaborator and governance structure of an AVC.

Thirty studies (50%) report market access, 12 (20%) market development, 22 (37%) quality and 18 (30%) technology transfer as main reasons for collaboration. One study reports multiple reasons: in Kenya fruit and vegetable producers collaborated in AVCs to secure access to European markets while also meeting stringent private quality standards (Dannenberg and Nduru, 2013; Jaffee and Masakure, 2005).

Market access and product quality are reported as two main collaboration reasons across all stages of AVC, with technology transfer being important for input supply, production and post-harvest stages of AVC in African countries (Figure 5). Studies involving small farmers report all four main reasons, while studies involving private firms frequently report market access and quality as motivations. In vertical coordination cases, market access and quality are two main reasons for collaboration, while studies involving horizontal coordination report all four reasons.

4.3 Collaboration results

Figure 6 shows collaboration patterns organized by major themes aligned with our conceptual framework: collaboration stages, outcomes, enablers and constraints.

4.3.1 Stages of collaboration. Collaboration stages include input supply, production and post-harvest, processing and the market (Figure 6a). Several studies revealed collaboration spanning multiple stages. In contract farming, lead firms collaborated both at the market

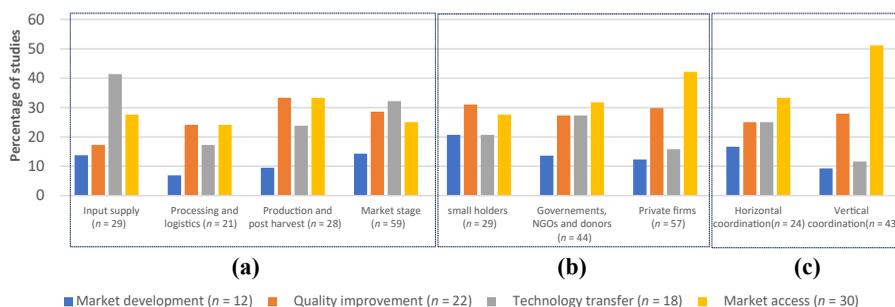


Figure 5. Reasons for collaboration by (a) collaboration stage, (b) primary collaborator and (c) governance structure

Note(s): one study may report multiple reasons of collaboration

Source(s): Authors' own creation

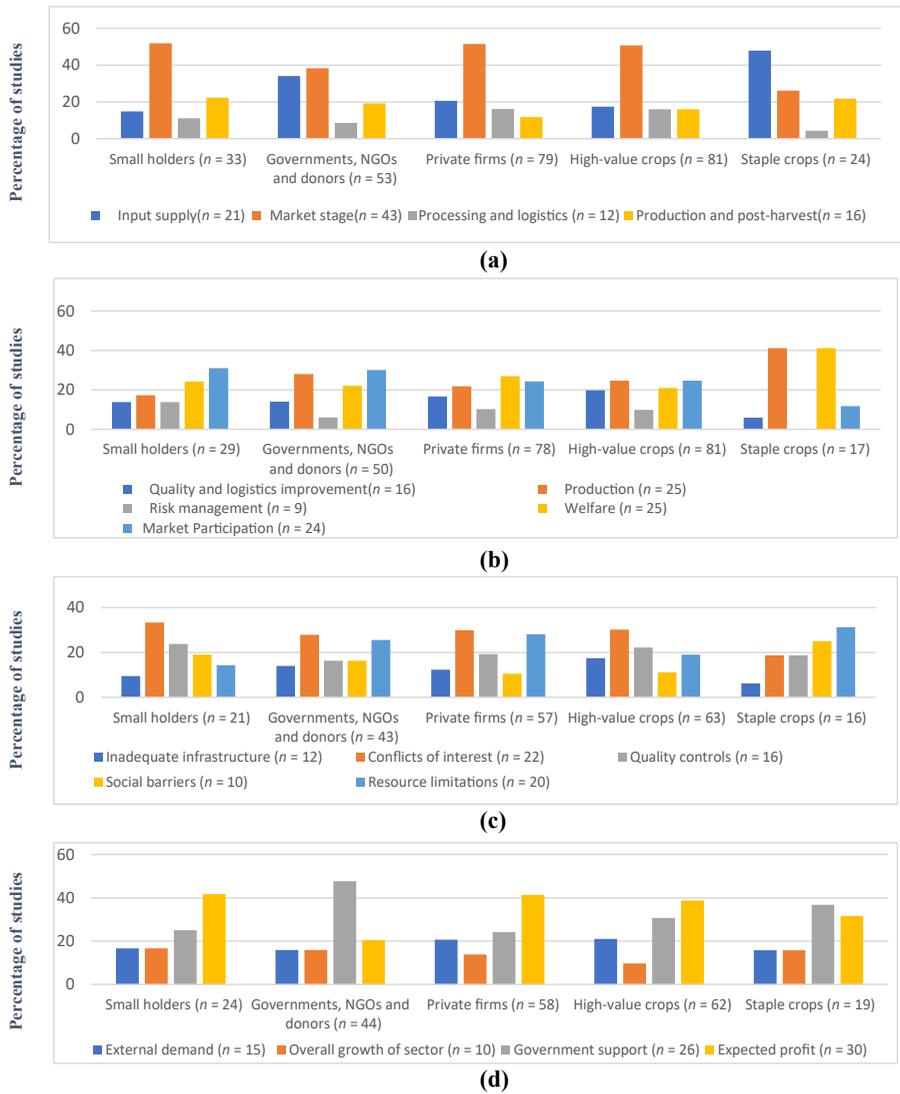


Figure 6. Collaboration results by primary collaborator and food group for: (a) stages, (b) outcomes, (c) constraints and (d) drivers of collaboration

Note(s): Total outcomes per subgroup is over 59, as some studies report multiple outcomes

Source(s): Authors' own creation

stage, purchasing outputs, and at the input stage, supplying inputs and technology to farmers. A significant proportion of studies (72%) report collaboration taking place at the market stage. For staple crops, collaboration is reported at the input supply stage, particularly in African countries. Private firms and smallholders primarily collaborate for markets. Governments, NGOs and donors tend to collaborate at both market and input stages.

4.3.2 Outcomes of collaboration. Among outcomes of collaboration (Figure 6b), farmer's welfare, market participation and production are the most commonly reported, whereas risk management is mentioned less often. Analyses of collaboration for high-value crops frequently report outcomes such as welfare of producer households, market participation, quality improvement and production; for staple crops chief outcomes are production and income (Muyombano and Espling, 2020; Totin *et al.*, 2015). This difference may be attributable to prioritizing food security and livelihoods through subsidized seeds, fertilizers and technology transfer in actions of governments, NGOs and donor agencies. Overall, studies of smallholders frequently report market outcomes, including market access, updated market information, better prices and higher incomes.

4.3.3 Constraints on collaboration. Resource limitations and conflicts of interest emerge as major constraints to collaboration in 22 and 20 studies, respectively; other constraints include inadequate infrastructure, quality challenges and societal barriers in 12, 16 and 10 studies, respectively (Figure 6c). In collaboration involving staple crops, private firms and governments, NGOs and donors, resource limitation is a major and frequently reported constraint (Mwambi *et al.*, 2016; Muyombano and Espling, 2020). In collaboration for high-value crops, conflicts of interest are reported more frequently than for staple crops. This discrepancy may be attributed to higher input and labor costs and high margins associated with high-value crops, prompting stakeholders to seek higher returns by exercising market power. While conflicts of interest are a major challenge, quality constraints are also frequently mentioned in many studies conducted in African countries.

Here are examples of conflict of interest that can emerge in AVCs. In Ecuador's broccoli value chain, payment delays from private firms diminished farmer interest in collaboration, as the spot market offered immediate payment (Romero Granja and Wollni, 2018). Collaboration between the Danish government and the Bangladesh government, for enhancing prawn marketing and quality through community-level collection centers led to conflicts, due to influential local intermediaries losing their livelihoods (Ahmed *et al.*, 2016). Rwanda's government policy on land use consolidation required farmers to grow only one specific grain, which led to food insecurity for some families that couldn't grow other crops like vegetables and other grains (Muyombano and Espling, 2020). Such issues underscore the need for planning attuned to local traditions and preferences when formulating collaboration policies.

Quality control constraints like strict private food standards under global AVCs, sometimes cause smallholders' exclusion from AVCs in developing countries. Broccoli farmers in Ecuador were excluded from collaboration due to high transaction costs and perceived risks of non-compliance with export quality standards. Studies from Nepal and India report social constraints like gender disparities and food adulteration malpractices by stakeholders. In Nepal, the gender disparity in participation was a constraint in fish farming collaboration. Adulteration of turmeric by stakeholders was a constraint in an AVC in India.

4.3.4 Enablers of collaboration. On factors enabling AVC collaboration, 30 studies report expected higher profits, 26 report government support, 15 report external factors like increase in demand and 10 report overall agricultural growth (Figure 6d). Studies involving smallholders and private firms report expected higher profits as an important enabler. This may be due to the more focused approach of stakeholders in collaboration involving vertical coordination and high-value crops. Studies involving high-value crops and private firms often report external demand as a driver of collaboration. Examples include African nations supplying vegetables to Europe (Minten *et al.*, 2009) and Mexico supplying fruit such as berries to the United States (González-Ramírez *et al.*, 2020).

Studies consistently report support from governments, NGOs and donor agencies as a significant driver of collaboration. Such support includes subsidies, technology transfers and

training. Examples of government assistance are evident, particularly in Africa nations, with subsidies given for staple crop cultivation (Muyombano and Espling, 2020; Thériault *et al.*, 2018). For high-value crops governments provide training, information and extension services to collaborating small farmers (Choudhary *et al.*, 2022). Additionally, these supporting institutions regulate collaboration policies, as in the cases of the milk industry in Dominican Republic and the flower industry in India. Policies can contribute to effective functioning of AVCs and safeguard smallholders' interests.

4.4 Governance structures in AVC collaboration

Governance in AVCs shapes the nature of collaboration. In this review, 34 studies report vertical coordination and 16 studies report horizontal coordination. Figure 7 presents collaboration results by the governance structure in collaboration.

As shown in Figure 7a, the market stage is the stage in which governance is most present. This may be due to lead firms, which often exercise their market power at the market stage to influence prices. Additionally, governance at the input supply stage in vertical coordination and at the production and post-harvest stages in horizontal coordination is also important.

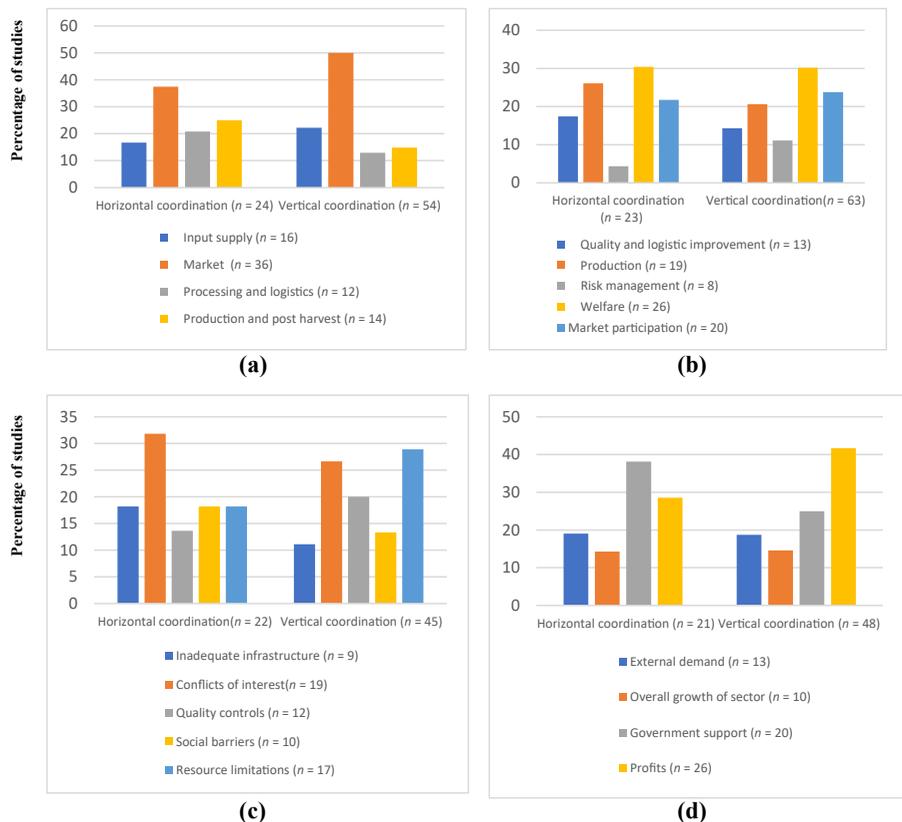


Figure 7. Collaboration results by governance structure for: (a) stages, (b) outcomes, (c) constraints and (d) drivers of collaboration

Note(s): A study may report multiple outcomes, constraints, and drivers of collaboration
Source(s): Authors' own creation

We observe a consistent pattern of preferred collaboration outcomes in both vertical and horizontal coordination, in regard to household welfare, production, quality improvement and market participation (Figure 7b). Vertical coordination also is more likely to incorporate risk management outcomes as drivers to the collaboration. Furthermore, in vertical coordination, resource limitations, quality control and conflicts of interest are three major constraints. However, in horizontal coordination, the major perceived constraint is conflicts of interest (Figure 7c).

Referring to Figure 7d, in collaboration involving vertical coordination, the primary driving factor is expectations of higher profits, followed by government support. In collaboration involving horizontal coordination, the priority is reversed, with government support as the main driver of collaboration, followed by higher profit expectations.

5. Discussion and policy implications

The collaboration models within AVCs depend on the type of interaction among stakeholders and factors that affect the success of such collaboration. Using evidence from literature, we discuss several interaction types, their related outcomes and identify gaps in AVC collaboration policy.

5.1 Market participation

In general, AVC collaboration improves market participation, facilitates access to potential markets, generates higher prices and provides market information for better decision-making. Collaboration of small farmers with supermarkets leads to improved market access, higher prices and adoption of innovative and more efficient production practices (Uddin *et al.*, 2022; Van Campenhout *et al.*, 2021). Implementing policies that lead to improved market participation not only increases incomes but also enhances producers' bargaining power and promotes a more equitable distribution of benefits.

Collaboration that enhances market participation mostly involves high-value crops, governed by private firms and supported by local institutions. Such a pattern may arise because private firms mainly focus on high-value crops and participate in international markets, while local institutions assist the small farmers involved in collaboration with private firms. For instance, farmers from African nations, geographically positioned near European markets, were involved in collaboration for crops like fruits, vegetables and cocoa. The success of such collaboration is strengthened by low-cost labor and the availability of required natural resources (Minten *et al.*, 2009; Benmehaia and Brabez, 2018). Conversely, collaboration involving staple crops experiences more limited market participation since staple crops are mostly meant for household consumption and food security. Hence, experiences of government-assisted collaboration for staple crops show low market participation.

Enhanced market participation in both vertical and horizontal coordination reduces costs and generates higher prices (Ahmed *et al.*, 2016; Guei *et al.*, 2011). Furthermore, enhancing market participation is also associated with the use of innovative production practices and the adoption of more efficient technologies of production and distribution, such as the establishment of collection points for dairy produce by farmers' groups (Uddin *et al.*, 2022; Van Campenhout *et al.*, 2021; Doherty and Tranchell, 2005). Use of such technologies fosters long-term market linkages among stakeholders and connects the local AVCs to the global markets as witnessed in the case of African nations. Additionally, better market participation keeps stakeholders informed about the market dynamics and changes in demand, tastes and preferences, information that helps them to adjust production quantities and quality.

5.2 *Product quality*

Collaboration that focuses on product quality improvement generates higher prices and facilitates access to high-paying markets (Booker *et al.*, 2016; Larsen, 2016; Melese and Helmsing, 2010). This is because collaboration models that emphasize product differentiation, food safety and quality improvement (Van Campenhout *et al.*, 2021; Tran *et al.*, 2013) are more likely to be competitive in the marketplace. Additionally, a functioning governance structure (vertical or horizontal) among the stakeholders also helps improved quality. Collaboration for product quality improvement often takes place at the production, processing and market stages. However, a policy gap often exists for collaboration at the input stage, where it is needed to promote use of good quality seeds, fertilizers and improved technologies that may further help in quality improvement.

Private firms act as dominant actors in collaboration for quality improvement, an effect that is particularly evident in horticulture, dairy and the meat industry (Vilas-Boas *et al.*, 2022; Jaffee and Masakure, 2005). However, challenges arise that may exclude small farmers due to stringent standards, necessitating some flexibility in collaboration (Dannenberg and Nduru, 2013). In such cases, the involvement of local institutions becomes crucial to safeguard the interests of smallholders (Tru *et al.*, 2012). These local institutions provide necessary training and establish essential infrastructure, enabling small farmers and their groups to meet quality standards and reduce production costs.

In collaboration involving staple crops, the primary goals have been food security and sustainable livelihoods with less emphasis on product quality (Totin *et al.*, 2015; Ao *et al.*, 2021). However, in evolving global AVCs, the focus on staple crops like wheat, rice and millet has increased. Therefore, policy interventions can be required for quality and product differentiation in staple crops as well.

5.3 *Trust among stakeholders and role of government, NGOs and donor agencies*

Trust among the stakeholders is important for effective collaboration. Lack of trust results in issues like side-selling, low product quality from unidentified suppliers, domestic protection measures and unequal distribution of benefits among stakeholders (Hulke and Diez, 2022; Romero Granja and Wollni, 2018). Addressing these challenges requires innovative and context-specific solutions, such as allowing flexibility in contract prices and streamlining payment systems to make them more efficient (Tru *et al.*, 2012).

Trust in collaboration yields positive outcomes, as seen in Guanxi network in China in the vegetable value chain (Lu HuaLiang *et al.*, 2010). Supporting institutions like governments, NGOs and donor agencies can play an important role in building trust among stakeholders in collaboration. They can help farmers understand contractual agreements, mitigate miscommunication on private food standards, upgrade production practices and facilitate necessary changes in trade-related protection policies (Larsen, 2016; Ibáñez, 2015).

Most successful collaboration models involve participation of support institutions (Ortiz *et al.*, 2013; Ravikumar and Rajesh, 2015). Increased participation of support institutions can help address challenges of inadequate infrastructure, transportation logistics, conflict resolution and of the need for innovative technology. A compelling case was seen in Kenya, where inadequate meat processing facilities were a hindrance in utilizing the increased livestock supply from Somalia and resulted in potential losses of revenue for producers (Ng'asike *et al.*, 2020). In such cases, support institutions can hold the potential for creating the necessary infrastructure facilities in developing countries. Additional avenues for donor agencies to support collaboration models include market and weather information services, training and extension services, capital investments in collection centers and introducing innovative technologies like block chains to curb malpractices.

5.4 Other provisions in collaboration contracts

The types of contracts in collaboration significantly affect outcomes. Some studies report that private firms, in addition to buying produce at agreed-upon prices (market contracts), also provide input and technological support to small farmers. While reaching agreement on prices requires dealing with inherently opposed interests, this kind of support generates shared interests and thus contributes to the sustainability of the value chains as well as their greater efficiency (Kar *et al.*, 2020; Norton, 2017). Less developed production technologies also make farmers susceptible to production-related risk. In such cases, a lead firm's intervention with the support of local institutions is crucial in providing production-related support facilities.

Additionally, AVC collaboration in developing countries often neglects the risk involved in agriculture production. Market-related risk due to price fluctuations in international markets is only acknowledged in a few collaboration studies (Padron *et al.*, 2012). Production risk, financial risk and institutional risk, which are inherent in agricultural production, have not been addressed adequately either. Incorporating risk-related provisions in collaboration could enhance the outcomes. Adding mechanisms such as crop insurance and financial services for distressed circumstances can fortify collaboration. Additionally, entrepreneurship development for small farmers can help manage the risks associated with agriculture. Lead firms and support institutions can support risk management practices in collaboration.

6. Conclusions and limitations

This scoping review presents evidence on existing collaboration models in AVCs, their outcomes, enablers and constraints and pinpoints research gaps. Our findings reveal that the primary reasons for collaboration in AVCs are to enhance market access and improve product quality. Key outcomes of collaboration include farmers' welfare, market participation and production outcomes. The expected higher profits and support from government and non-governmental entities motivate and facilitate collaboration. Conversely, conflicts of interest among stakeholders and resource limitations constrain the possibilities of collaboration. Notably, collaboration models frequently neglect risk management, conflict resolution and the provision of necessary infrastructure and resources. Results from this review can help policymakers and support institutions design effective, flexible and sustainable policy interventions tailored to the unique characteristics of AVCs, including geographical locations, the products involved and cultural and social practices of farmers.

It is important to note that although this scoping review provides a comprehensive overview of collaboration models in AVCs, it does not provide empirical evidence on these models' success or failure. The existing literature on collaboration models predominantly uses case studies and lacks strong empirical results. The evidence here is derived from qualitative assessments of static collaboration models from the included studies. Additionally, we suspect this study may have publication bias, as unsuccessful instances of collaboration are less likely to be published. Although our database search has been robust, we cannot neglect the possibility of publication bias. Despite these limitations, this study synthesizes the prevalent themes and patterns of existing collaboration models. It identifies AVC policy areas where private firms, farmers' groups, local and national governments and donor agencies can contribute to successful collaboration.

Note

1. Here the *approach* signifies a long-term collaboration among stakeholders within AVCs. *Stakeholders* include smallholders, processors, large and small intermediaries, large lead firms and government agencies, private donors and NGOs. *Consensus* involves agreements or contracts, written or verbal, guided by common goals and objectives. Collaboration relies on either *vertical coordination* or a *network* to effectively translate a consensus into tangible outcomes.

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