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# How do the voluntary sustainability standards contribute to enhancing smallholder farmers' livelihoods and progress towards SDGs? A systematic review of crop-based food commodities in Ghana and Vietnam

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**ABSTRACT**

This research investigates the effects of Voluntary Sustainability Standards (VSSs) on smallholder farmers' livelihoods within crop-based food commodity value chains in Ghana and Vietnam. Using the Sustainable Livelihood Framework (SLF), the study examines how VSSs (e.g. Fairtrade, GlobalGAP, Rainforest Alliance) influence the capital endowments upon which farmers depend. A systematic review of 26 empirical studies from the Evidensia Library was conducted to assess the effects of VSSs on 15 economic, social, and environmental indicators within the SLF. The main findings suggest that VSSs can enhance income, capacity building, and value chain integration among farmers, alongside other socioeconomic and environmental benefits. However, negative effects are primarily associated with high input costs, biodiversity impacts, and the use of agrochemicals. Moreover, challenges and trade-offs persist, including limited women's participation and the transfer of price premiums to smallholder farmers adopting sustainability schemes. This study underscores critical issues in the implementation of VSSs and provides policy recommendations, including fostering bottom-up approaches for extension service provision. It also emphasizes the need for stronger partnerships among governments, development agencies, and multistakeholder initiatives to address chronic issues of the agrifood system in developing countries, and to enhance the role of VSSs in advancing the SDGs by 2030.

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Sustainability standards; smallholder farmers; SLF; commodities; certifications

## 1. Introduction

Voluntary Sustainability Standards (VSSs) are a diverse set of principles and objectives established by third-party organisations, under which farmers are independently assessed and certified (Iddrisu et al., 2020). While the concept of VSSs has existed since the 1970s, their widespread adoption is a relatively recent phenomenon. The VSSs emerged as bottom-up, local standards developed worldwide through farmer-led initiatives, such as the International Federation of Organic Agriculture Movements (IFOAM), which was established in 1972 as a communications network among various organic agriculture projects (Addae-Boadu et al., 2017). VSSs gained prominence in the 1990s, experiencing consistent growth until the early 2010s. Non-Governmental Organisations (NGOs) played a crucial role in developing and disseminating standards because, unlike governments, they were more flexible and less constrained by formal procedures, allowing them to respond more effectively to market change (Oosterveer et al., 2014). According to the UNCTAD (2023), the proliferation of VSSs from the 1990s to the 2010s was influenced by various factors: i) consumer awareness; ii) motivations of firms to adopt VSSs; iii) response to failures of multilateral regulatory efforts; iv) reaction to the emergence of other VSSs; and v) governments' engagement with VSSs. However, in the past few years, the expansion of VSSs has been slowing down, and the numbers have stabilised since 2017 (UNCTAD, 2023).

Theoretically, certification enables producers to set sustainable targets, while allowing consumers to differentiate among agricultural products based on their embedded social and environmental characteristics (Addae-Boadu et al., 2017). This enhanced information supports higher prices for certified products and, in turn,

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provides financial incentives, known as price premiums, for farmers to meet certification standards (Addae-Boadu et al., 2017). However, in recent years several scholars have noted that the notion of 'voluntary' certification is increasingly misleading, particularly in export-oriented sectors such as cocoa, coffee, and palm oil. Although formally optional, VSSs very often operate as *de facto* market requirements (Elamin & de Córdoba, 2020). International buyers and processing companies frequently required certified products as a precondition for sourcing (Elamin & de Córdoba, 2020). This dynamic has created forms of market-driven coercion whereby smallholder farmers have to comply with certification to maintain market access, thus limiting their autonomy in decision-making (Bennett, 2021; Bitzer & Steijn, 2019; Ponte & Sturgeon, 2014).

As emphasised by Oya et al. (2018) and Bissinger et al. (2020) the VSSs have the potential to provide positive economic, environmental and social benefits to smallholder farmers, contributing to several Sustainable Development Goals (SDGs) at the same time. By promoting the adoption of sustainable farming practices and increasing product quality, VSSs empower farmers to participate in high-remunerative value chains, such as those in the EU and North American markets (Akrong et al., 2022). However, the adoption of VSSs may also impose additional financial burdens for producers, such as certification costs, and the enforcement of higher labour standards (e.g. ILO Conventions), which can be challenging for poorer smallholder farmers to meet (Maertens & Swinnen, 2015). Moreover, voluntary certifications might also shift local production away or redirect agricultural goods from food production to more profitable commodity markets (Oosterveer et al., 2014). Finally, the lack of institutional coordination, financial and technical capacities for accessible certification in developing countries could also represent a significant barrier for smallholders in adopting VSSs (FAO, 2014; Meemken, 2020).

Given the varying effects presented in the literature on the impacts of VSSs, further investigation and assessment is needed to understand how certification schemes can effectively contribute to improving smallholder farmers' livelihoods. Adopting an inclusive approach, this study aims to address the following research questions:

- Are VSSs effective in improving smallholder farmers' livelihoods within food-agricultural commodity value chains?
- What are the main advantages and trade-offs associated with VSSs adoption in Ghana and Vietnam?
- To what extent can VSSs be leveraged as sustainable market-oriented tools to achieve the SDGs Agenda by 2030?

## 2. Methodology

### 2.1. Socioeconomic and environmental indicators

The analysis of the effects of VSSs on smallholder farmers' livelihoods is based on the Sustainable Livelihood Framework (SLF), originally developed by Chambers & Conway, (1992) and later adapted by the Department for International Development of the UK (DFID, 1999). According to the SLF, a livelihood is made up of capabilities, material and social capitals, and activities required to earn a living (DFID, 1999). The SLF has been widely used as a tool to analyse rural poverty from a multidimensional perspective (Bennett & Franzel, 2013; Nelson et al., 2013; Garibaldi et al., 2017; D'Annolfo et al., 2017) and to assess which components of certification schemes have the greatest impact on farmers' livelihoods (Fenger et al., 2017). The SLF is based on five capital endowments: human, social, financial, physical and natural (Table 1). For each of the aforementioned capitals, three relevant socioeconomic and environmental indicators were selected based on the literature on VSSs to systematically extract and collect quantitative and qualitative evidence (Table 1).

In order to identify the relevant SDGs for the analysis, we referenced the studies of Bissinger et al. (2020) and Kosolapova et al. (2023), which offered comprehensive mappings of VSSs against the 17 SDGs. Therefore, a shortlist of SDGs and related targets was selected according to the main scope of this research (Table 2).

The SLF guided both the coding and synthesis of evidence by classifying each identified livelihood outcome under one of the five capitals: human, social, financial, physical, and natural. This structure ensured analytical consistency across heterogeneous studies and enabled a systematic comparison of VSS effects across indicators, commodities and value chains in different countries. The SLF framework also supported the integration of findings into broader sustainability dimensions aligned with the selected SDGs.

**Table 1.** Definition of capitals and related socioeconomic and environmental indicators according to the SLF.

| Capital | Indicator |
|---|---|
| **Human**: the competencies, knowledge, ability to work and health status that together enable farmers to pursue livelihood strategies and achieve personal and family goals | ✓ **Gender parity**: the level of participation and benefits received by women in the value chains<br>✓ **Labour rights**: the adherence to fair labour practices, including the provision of formal contracts, equal remuneration without discrimination, and safe working conditions<br>✓ **Capacity building**: the provision of training and extension services to enhance the skills and knowledge of farmers, enabling them to adopt sustainable farming practices |
| **Financial**: the economic resources derived from available stocks and inflows of money at household level | ✓ **Yield**: the total production of a specific commodity, including the output per hectare<br>✓ **Costs**: the expenses incurred by farmers, including certification and labour costs<br>✓ **Income**: the total and net income derived from the production of certified commodities, including price premiums and profitability received for sustainably produced goods |
| **Social**: the social resources (e.g. networks, affiliations, associations) and relationships (e.g. trust and reciprocity) which farmers draw on in pursuit of their livelihood objectives | ✓ **Market access**: the ability of farmers to sell their products in national and international markets<br>✓ **Value chain integration**: the extent to which farmers are integrated into horizontal (collaboration with other producers) and vertical (linkages with processors and retailers) value chains<br>✓ **Child labour**: the prohibition of child labour, ensuring that children are not involved in hazardous agricultural tasks |
| **Physical**: the availability of fixed capital (e.g. land), tools and equipment (e.g. pruning knives, protective equipment, packaging) to support farmers' business | ✓ **Land access**: the rights and accessibility of land for farmers, including secure land tenure<br>✓ **Tools & equipment**: the availability of essential farming tools and protective equipment, such as pruning knives and safety gear<br>✓ **Access to credit**: the accessibility of financial services and credit for farmers |
| **Natural**: the availability of natural resources (e.g. crop and livestock diversity) and environmental services (e.g. water provisions) which promote the sustainable use of the environment | ✓ **Biodiversity**: the variety of plant and animal species present at the farm level, including the diversity of vegetables, fruits and livestock<br>✓ **Water management**: the adoption and implementation of practices that improve water use efficiency, such as irrigation techniques, recycling and conservation methods<br>✓ **Use of agrochemicals**: the regulation and control of chemical inputs in farming, including the prohibition of hazardous chemicals and the limitation of chemical treatments |

Note: Authors' elaboration based on DFID (1999).

### 2.2. Literature search

The selected studies considered for this analytical assessment have been retrieved from Evidensia Library (https://www.evidensia.eco), a multi-stakeholder initiative and knowledge platform providing evidence on supply chain sustainability tools, including VSSs. To ensure the comparability and reliability of the results, the Evidensia database includes only studies that meet stringent quality criteria in terms of research design (Evidensia, 2024). For the analysis of the literature, scientific articles and reports have been searched within the Evidensia database using filters for the specific tool we were interested in, namely 'Voluntary Sustainability Standards', and the countries of interest, 'Ghana' and 'Vietnam'. As of the end of January 2024, 49 publications have been retrieved in total.

### 2.3. Paper selection and classification criteria

The PRISMA 2020 framework was adopted for the selection of relevant studies (Page et al., 2021) (Figure 1). Several criteria were applied to screen and classify the 49 studies for this analytical assessment:

1. Studies that were not strictly focused on the production of crop-based food-agricultural commodities were excluded. Therefore, non-food agricultural commodities such as cotton and flowers, as well as fish, meat, and dairy products, were not considered.
2. Only empirical studies based on primary data collection in the field were included. These studies had to explicitly investigate the relationship between VSSs and farmers' livelihood outcomes in Ghana and Vietnam.
3. Publications that merely described the contribution of VSSs to specific outcomes (e.g. gender, biodiversity) without explaining the impact of VSSs on these indicators were excluded.

**Table 2.** List of selected SDGs and related targets considered in the analysis.

| SDG | Target |
|---|---|
| **1.** End poverty in all its forms everywhere | **1.4** By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance |
| **2.** End hunger, achieve food security and improved nutrition and promote sustainable agriculture | **2.3** By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment |
| | **2.4** By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality |
| **5.** Achieve gender equality and empower all women and girls | **5.1** End all forms of discrimination against all women and girls everywhere |
| **6.** Ensure availability and sustainable management of water and sanitation for all | **6.4** By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity |
| **8.** Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all | **8.3** Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalisation and growth of micro-, small- and medium-sized enterprises, including through access to financial services |
| | **8.7** Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms |
| | **8.8** Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment |
| **12.** Ensure sustainable consumption and production patterns | **12.4** By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimise their adverse impacts on human health and the environment |

Note: Authors' elaboration based on UN (2015).

The final database included 26 studies, comprising scientific publications and reports (Table 3). The selected 26 publications examining the effects of VSSs on smallholder livelihoods comprised 16 peer-reviewed articles, 9 technical reports and 1 working paper. Among these, a subset of 21 publications conducted a statistical analysis comparing the performance of farms implementing VSSs through matching processes, such as comparisons between certified and non-certified farmers or pre- and post-intervention.

Finally, an analytical framework was developed in Excel, and the selected socioeconomic and environmental indicators were tested on a limited number of publications (4) to guide the systematic extraction of information from the reviewed papers.

### *2.4. Data analysis techniques*

A vote-counting method was employed to identify general trends between the adoption of VSSs and the selected socioeconomic and environmental indicators based on the SLF (D'Annolfo et al., 2017; Knowler & Bradshaw, 2007; Prokopy et al., 2008). The following classification of effects was adopted:

- Positive: when the study documented a statistically significant improvement or a clearly stated beneficial change in the indicator among certified farmers compared to non-certified farmers, or when the authors explicitly attributed the improvement to VSS participation;
- Neutral: when the study reported no statistically significant difference in the indicator between certified and non-certified farmers, or when results were mixed or inconclusive, with no clear directional change attributable to sustainability certification;

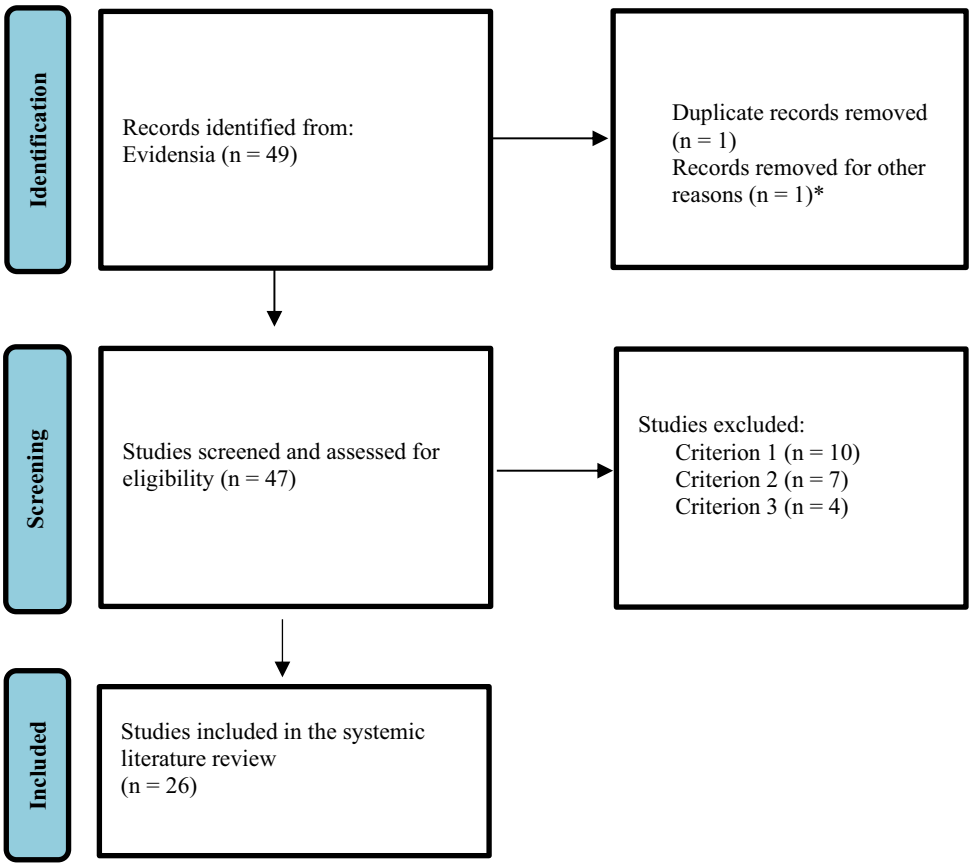


**Figure 1.** Publications selection process based on PRISMA 2020 flow diagram for new systematic reviews. *Books were excluded, with preference given to scientific articles and reports.

- Negative: when the study recorded a statistically significant decline in the indicator among certified farmers compared to non-certified farmers, or when the authors clearly stated adverse change in the indicator associated with VSS adoption.

The data extracted from the studies were analysed using descriptive statistical techniques, including frequency distributions, to investigate the main characteristics of our dataset, such as the most common certified commodities and the main SDGs addressed by VSSs. The analysis was conducted using R software (version 2023.06.1 + 524) and visualisations, such as bar charts and tables, were also provided accordingly (R Core Team, 2023).

It should be noted that the vote-counting approach identifies general associations between VSS adoption and SLF indicators but does not establish causality. As several studies relied on self-reported outcomes and cross-sectional designs, attributing direct cause-effect relationships between VSS adoption and SLF indicators remains challenging. Moreover, heterogeneity in farm characteristics, self-selection into certification, the type of local support services available, and international market conditions may mediate or confound the observed effects on the selected indicators. These limitations highlight the need for more rigorous impact studies to better identify the causal effects of VSS adoption.

## 3. Results

The results of the analysis reflected the broad scope of this research, which covers various value chains across distinct agroecological zones in Vietnam and Ghana. Figure 2 showed the distribution of crop-based food commodities considered in the reviewed publications. Cocoa was the most frequently studied

**Table 3.** Main features of the studies included in the analytical assessment.

| Reference | Country | Commodity | VSS | Gender parity | Labour rights | Capacity building | Yield | Costs | Income | Market access | Value chain integration | Child labour | Land access | Tools & equipment | Access to credit | Biodiversity | Water management | Use of agrochemicals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Addae-Boadu et al. (2017) | Ghana | Cocoa | RA,UTZ | | | | | | x | | | | | | | x | | |
| Akrong et al. (2023) | Ghana | Mango | GlobalGAP | | | | | | | | | | | | x | x | | x |
| Akrong et al. (2022) | Ghana | Mango | GlobalGAP | | | | x | | x | x | | | | | | | | |
| Ankuyi et al. (2023) | Ghana | Cocoa | RA | | x | x | x | x | x | | x | | | x | x | x | | x |
| Bandanaa et al. (2021) | Ghana | Cocoa | RA | x | x | | | x | x | x | | x | | | | x | | x |
| Bennett et al. (2013) | Ghana | Cocoa | UTZ | | x | x | x | x | x | x | x | x | | x | x | x | x | x |
| Brako et al. (2021a) | Ghana | Cocoa, palm oil | RA,UTZ, RSPO | | | | | x | x | | | | | | | | | |
| Brako et al. (2021b) | Ghana | Cocoa, palm oil | RA,UTZ, RSPO | | | x | x | x | x | | x | | | | x | x | x | x |
| Doanh et al. (2018) | Vietnam | Tea | NA | | | | | | x | | | | | | | | | |
| Fenger et al. (2017) | Ghana | Cocoa | RA | | | x | x | x | x | x | x | x | | x | x | x | x | x |
| Ho et al. (2018) | Vietnam | Coffee | 4C,UTZ | x | | x | x | x | x | x | x | | | | x | | x | x |
| Hung Ahn et al. (2019) | Vietnam | Coffee | RA,UTZ | | | x | x | x | x | x | x | x | | x | x | x | x | x |
| Iddrisu et al. (2020) | Ghana | Cocoa | RA,UTZ | | | x | x | | x | | | | | | | | | |

**Table 3.** (*Continued*)

| Reference | Country | Commodity | VSS | Gender parity | Labour rights | Capacity building | Yield | Costs | Income | Market access | Value chain integration | Child labour | Land access | Tools & equipment | Access to credit | Biodiversity | Water management | Use of agrochemicals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ingram et al. (2018) | Ghana* | Cocoa | UTZ | | | | x | x | x | | | x | | x | | | | x |
| Kleemann et al. (2014) | Ghana | Pineapple | GlobalGAP | | | | x | x | x | x | x | | | | | | | x |
| Klier and Possinger (2012) | Ghana* | Cocoa | FI | x | x | x | x | x | x | x | x | x | x | | | x | | |
| Mauthofer and Santos (2022) | Ghana* | Cocoa | FI | x | x | x | x | x | x | x | x | x | | | x | x | x | x |
| Nelson et al. (2013) | Ghana | Cocoa | FI | x | x | x | | x | x | x | x | x | x | x | x | x | x | x |
| Oosterveer et al. (2014) | Ghana* | Palm oil | RSPO | x | | | | | | | | | x | | | x | | |
| Rijn et al. (2016) | Ghana* | Banana | FI | x | x | x | x | x | x | x | x | x | x | | | | | |
| Smith (2010) | Ghana* | Banana | FI | x | x | x | | x | x | x | x | | | | | x | | x |
| Stuart et al. (2018) | Vietnam | Rice | GlobalGAP, VietGAP | | | x | x | x | x | | | | | | | | x | x |
| Tu et al. (2019) | Vietnam | Rice | GlobalGAP, VietGAP | | | | x | x | x | | | | | | | | | x |
| Waarts et al. (2015) | Ghana | Cocoa | UTZ | x | x | x | x | x | x | x | x | x | x | x | x | | x | x |
| Waarts et al. (2013) | Ghana | Cocoa | UTZ | | | x | x | | | | x | | | | | | | |

Note: The abbreviations used for the VSSs are as follows: 4 C Association (4 C), Fairtrade International (FI), GlobalGAP, Rainforest Alliance (RA), Roundtable on Sustainable Palm Oil (RSPO), UTZ, VietGAP and Not Available (NA). Since 2018, the UTZ certification programme has been part of the Rainforest Alliance (RA).

*Seven studies have a wider geographical coverage, encompassing more than one country.

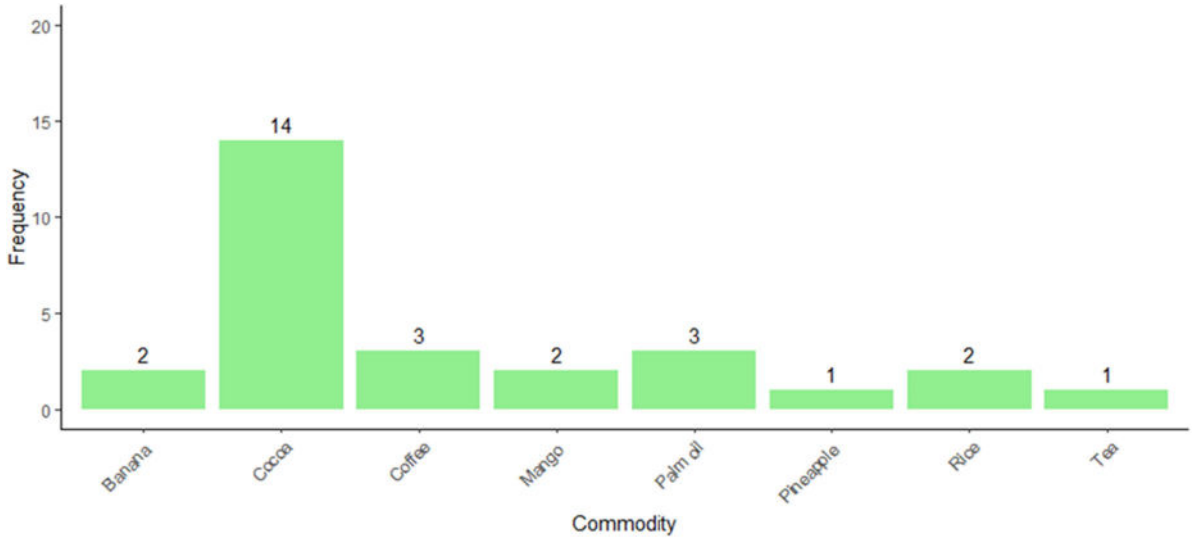


**Figure 2.** Number of crop-based food commodities included in the analysis based on the reviewed studies (frequency). Note: The total number of observations (28) exceeds the total number of considered publications (26), as two studies focus on several agricultural commodities at the same time resulting in their inclusion multiple times in the count.

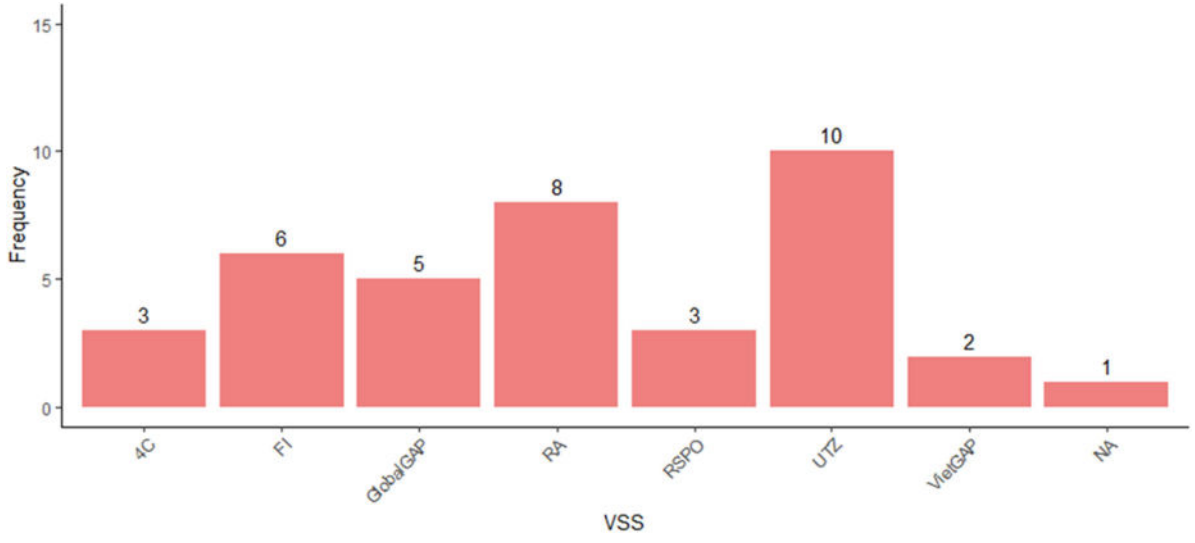


**Figure 3.** Distribution of VSSs across the reviewed studies (frequency). Note: The total number of observations (38) exceeds the total number of considered publications (26), as seven studies focus on various VSSs resulting in their inclusion multiple times in the count. The abbreviations used for the VSSs are as follows: 4 C Association (4 C), Fairtrade International (FI), GlobalGAP, Rainforest Alliance (RA), Roundtable on Sustainable Palm Oil (RSPO), UTZ, VietGAP and Not Available (NA).

commodity, appearing in 14 instances, followed by coffee and palm oil, each examined 3 times. Banana, mango and rice were studied 2 times each. Pineapple and tea were examined only once.

Figure 3 illustrated the distribution of VSSs across the reviewed publications. Among the considered VSSs, UTZ emerged as the most frequently studied, appearing 10 times, followed by RA with 8 instances. FI and GlobalGAP were mentioned in 6 and 5 studies respectively, while 4 C and RSPO appeared 3 times each. Additionally, VietGAP was investigated twice in the studies. Furthermore, only 1 study did not specify the type of certification adopted by farmers.

Table 4 and Figure 4 presented the results of the assessment based on the 26 reviewed publications, focusing on the effects of VSSs on 15 social, economic, and environmental indicators constituting the SLF of smallholder farmers. Overall, a consistent distribution pattern of positive, neutral, and negative effects was observed across the 5 capitals, totalling 128 positive, 57 neutral, and 23 negative outcomes attributed to VSSs (Table 4).

The majority of studies focused on the effects of financial capital, resulting in a positive score (44) when examining income, yield and cost indicators. Although most studies reported positive outcomes for physical capital (14), a considerable number also found neutral effects (8) when assessing indicators related to land access, tools and equipment, and access to credit. Human (22) and social (28) capitals were largely positive: on the one hand, farmers benefited primarily from enhanced capacity building (14), including the provision of training and extension service; on the other hand, social capital improved mainly due to better

**Table 4.** Assessed effects of VSSs on the SLF by capital and indicator in Ghana and Vietnam (frequency).

| Capital | Indicator | Positive | Neutral | Negative | Total |
|---|---|---|---|---|---|
| Human | Gender parity | 2 | 6 | 1 | **9** |
| | Labour rights | 6 | 4 | 0 | **10** |
| | Capacity building | 14 | 1 | 1 | **16** |
| | **Subtotal** | **22** | **11** | **2** | **35** |
| Financial | Yield | 12 | 5 | 3 | **20** |
| | Input cost | 8 | 8 | 6 | **22** |
| | Income | 24 | 3 | 0 | **27** |
| | **Subtotal** | **44** | **16** | **9** | **69** |
| Social | Access to market | 11 | 2 | 0 | **13** |
| | Value chain integration | 13 | 1 | 1 | **15** |
| | Child labour | 4 | 6 | 0 | **10** |
| | **Subtotal** | **28** | **9** | **1** | **38** |
| Physical | Land access | 1 | 3 | 1 | **5** |
| | Tools & equipment | 5 | 1 | 0 | **6** |
| | Access to credit | 8 | 4 | 0 | **12** |
| | **Subtotal** | **14** | **8** | **1** | **23** |
| Natural | Biodiversity | 4 | 6 | 4 | **14** |
| | Water management | 5 | 3 | 2 | **10** |
| | Use of agrochemicals | 11 | 4 | 4 | **19** |
| | **Subtotal** | **20** | **13** | **10** | **43** |
| | **Total** | **128** | **57** | **23** | **208** |

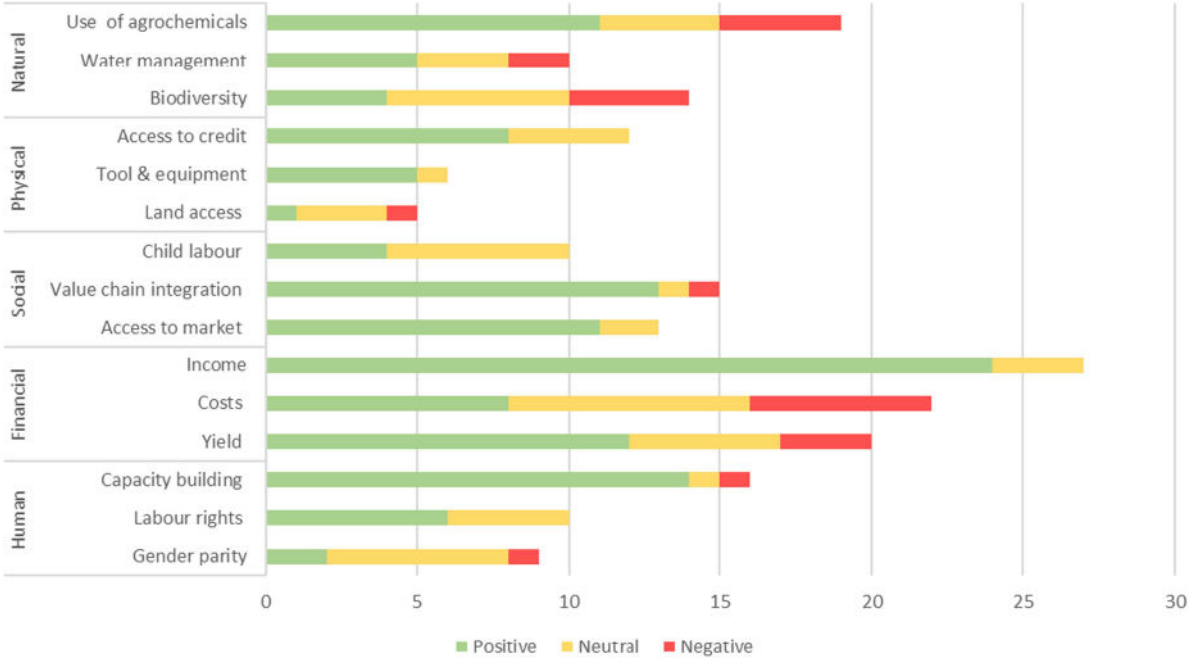


**Figure 4.** VSS effects on the SLF by capital and indicator in Ghana and Vietnam, using a traffic-light visualisation.

value chain integration (13), such as the setting of production groups and cooperatives. Although natural capital presented mainly positive outcomes (20), a relatively high number of observations (10) indicated some negative effects in terms of biodiversity, water management, and the adoption of agrochemicals at the farm level associated with VSSs (Table 4 and Figure 4).

Figure 5 illustrated a comparison of the effects of VSSs on the SLF across social, economic, and environmental indicators in Vietnam and Ghana. Overall, VSSs had positive impacts in both countries; however, the extent and nature of these effects varied also according to the specific value chain. Ghana generally exhibited more substantial positive outcomes across most indicators, particularly in economic and social aspects. In Ghana, VSSs significantly increased income levels for local farmers, with 18 positive outcomes compared to only 6 in Vietnam. Similarly, the impact of VSSs on agricultural yield was stronger in Ghana, where 9 positive outcomes were reported, whereas in Vietnam recorded only 3. In terms of labour rights, Ghana saw improvements with 5 positive outcomes, reflecting enhanced working conditions and fair labour practices. In contrast, Vietnam showed 1 positive outcome, indicating that improvements in labour rights were less pronounced. Additionally, VSSs improved market access in Ghana, with 9 positive outcomes, while Vietnam had only 2 positive outcomes in this area. VSSs in Vietnam displayed more neutral and variable impacts, suggesting that, while there were benefits, they were less consistent or pronounced compared to those observed in Ghana. In Vietnam, capacity building received 3 positive outcomes, which was significantly lower than Ghana's 11 positive outcomes, indicating a less extensive impact. Similarly, although VSSs in Vietnam made some progress in reducing child labour, with 1 positive outcome, in Ghana, VSSs achieved more success with 4 positive results. Moreover, the use of agrochemicals had a more negative effect in Vietnam: there were 3 negative outcomes associated with the use of agrochemicals in Vietnam, whereas 1 negative outcome in Ghana.

A few indicators, including 'biodiversity', 'tools and equipment', and 'land access', were not covered by the reviewed studies conducted in Vietnam. This gap in indicators reflects the thematic focus of the available evidence: most of the studies examined financial capital (e.g. yield, income, costs) rather than physical and natural capital indicators. Moreover, some assessments and evaluation reports in Vietnam were conducted at the farm or cooperative level and did not systematically collect and analyse land tenure and biodiversity data.

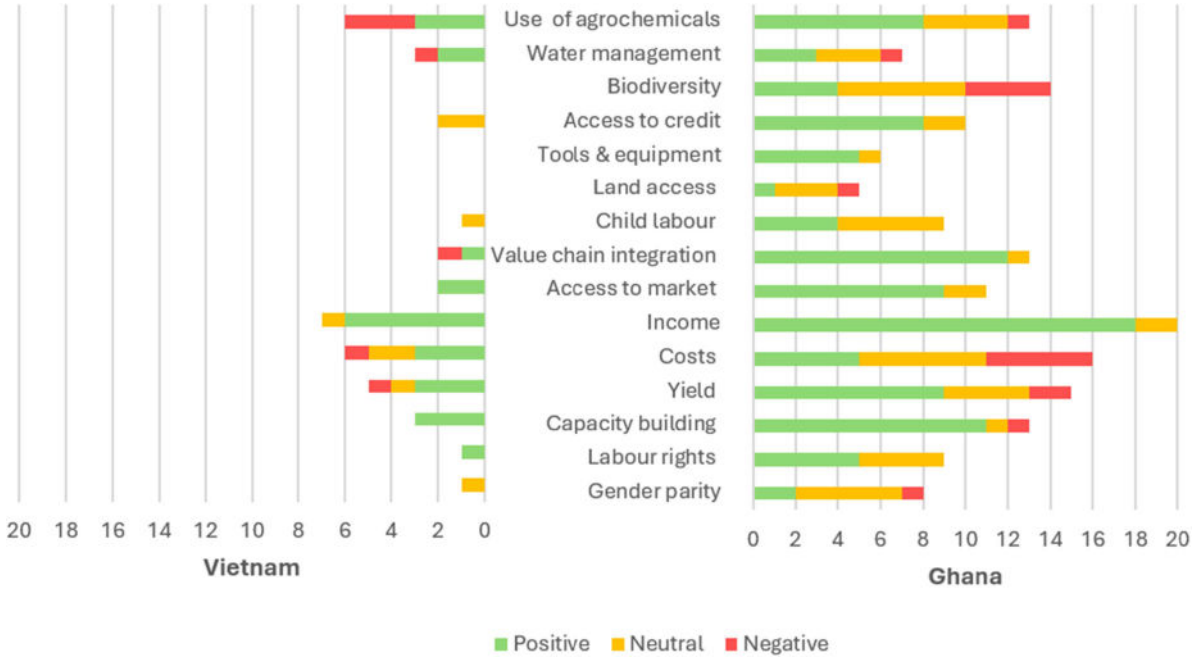


**Figure 5.** Comparison of the effects of VSSs on the SLF indicators in Vietnam and Ghana, using a traffic-light visualisation. Note: The following indicators - biodiversity, tools and equipment and land access - were not addressed by the selected studies on the effects of VSSs in Vietnam.

Figure 6 showed the positive contributions of VSSs to the selected SDGs. SDG 2 'Zero hunger' emerged as the most frequently addressed goal, appearing 27 times. This highlights the significant attention given by VSSs to increasing yield and income while promoting sustainable farming systems for smallholder farmers. SDG 8 'Decent work and economic growth' was addressed 14 times, emphasising the relevant role of VSSs as market-based solutions for promoting fair labour conditions, prohibiting child labour and enhancing integration for farmers in the value chains. SDG 12 'Responsible consumption and production' was found 10 times. VSSs help to meet specific sustainable production standards by reducing the use of agrochemicals and enhancing waste management minimising the negative impacts of chemicals on human health and the environment. SDG 6 'Clean water and sanitation' was addressed 4 times, highlighting the positive effects related to the promotion of more efficient water management practices for the protection and the restoration of the agroecosystems. Finally, SDG 5 'Gender equality' and SDG 1 'No poverty' were considered 2 and 1 times, respectively, reflecting a lesser but still notable emphasis on promoting the role of women in the value chains and improving access to land for poorer farmers through VSSs.

## 4. Discussion

The findings of the analytical assessment are discussed in the context of a wide range of international research, including meta-analyses and qualitative reviews on the impact of VSSs on smallholder farmers' livelihoods. In line with the structure of the paper, we begin by outlining the limitations and areas for future research to frame the scope and methodological constraints of this study. We then present the main findings, offering deeper insights into the effects of VSSs on the SLF indicators, acknowledging both promises and trade-offs, and conclude with targeted policy recommendations.

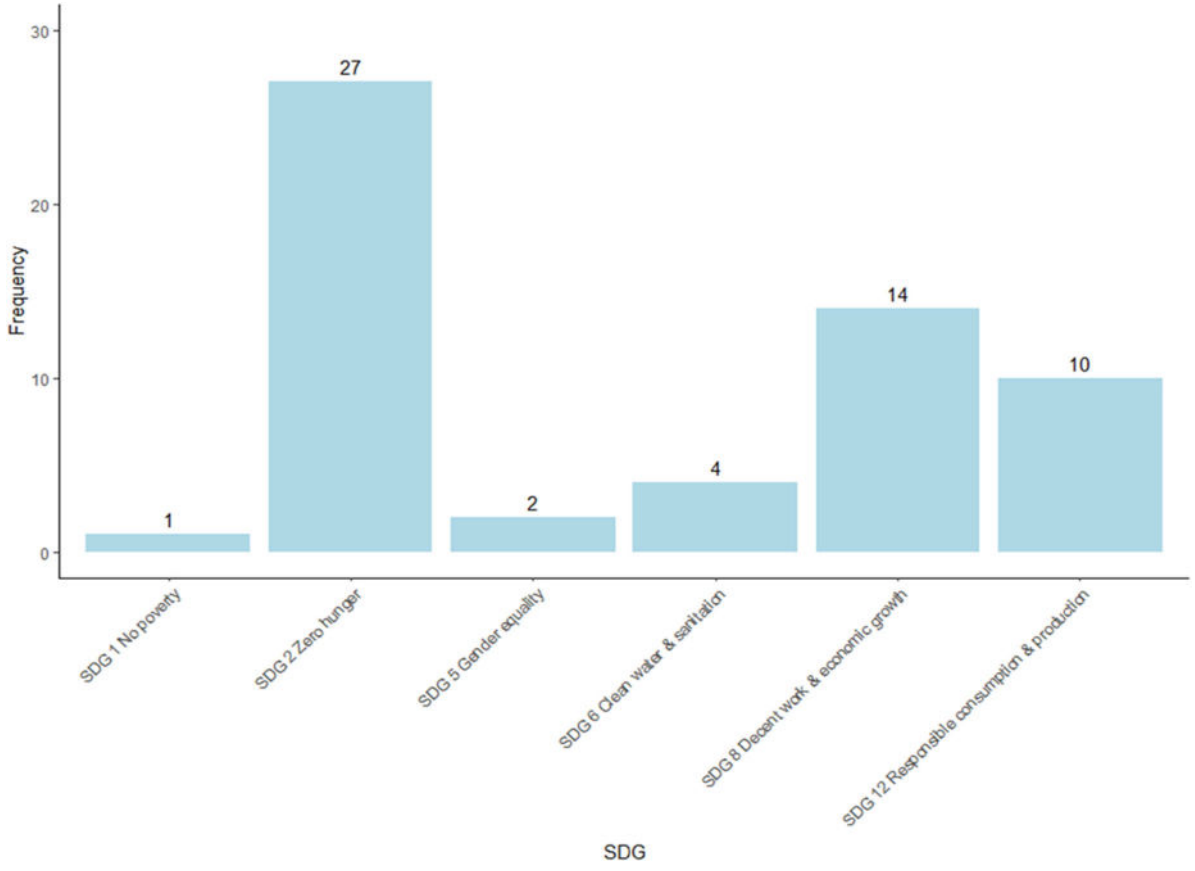


**Figure 6.** Main contributions of VSSs to the selected SDGs (frequency). Note: The total number of observations (58) exceeds the total number of considered publications (26), as a VSS may address several SDGs simultaneously resulting in their inclusion multiple times in the count.

### 4.1. Limitations of the study and areas for future research

This study did not account for which farmer-level variables, such as age, education, or farm size, are associated with success in certification schemes. Although these factors are relevant to SLF outcomes and merit further investigation, they fall outside the primary scope of this systematic review. Moreover, the synthesis of results relies on empirical studies and is subject to several methodological constraints. Many reviewed studies compared certified and non-certified farmers who also differed in market context, cooperative membership, and geographical location, reducing the comparability of findings. Most studies focused on farm-level outcomes and paid limited attention to institutional and supply chain factors, including the roles of cooperatives, NGOs, and private companies in organising and providing certification schemes. Selection bias into certification, often linked to farmer characteristics, resource access, and external support, was seldom addressed in the reviewed studies. Furthermore, indicator coverage was uneven across countries (e.g. in Vietnam, biodiversity, tools and equipment, and land access were not reported), which should be considered when interpreting the results. Importantly, this review also highlighted a significant gap concerning youth participation in VSSs. Only a few studies specifically analysed how the constraints faced by young people, such as limited access to land, restricted control over productive assets, and diverse livelihood aspirations, influenced the adoption of certification (Abukari et al., 2022; Mabe et al., 2021).

Building on the above limitations and constraints, priority areas for future research are outlined below:

- Multi-certification effects: examine how simultaneous participation in more than one sustainability scheme shapes livelihood outcomes, identifying the marginal contribution of each VSS (e.g. matched single vs multi certified comparisons, stepwise adoption panels) and account for sequencing and duration of certification.
- Long-term evidence and indicators: undertake longitudinal research with stronger biodiversity monitoring aligned with SDG 15 'Life on Land' to assess environmental effects, including biodiversity status and landscape-level outcomes (e.g. species diversity, habitat preservation, abundance of pollinators).
- Impact studies: prioritise rigorous evaluation, including experimental and quasi-experimental approaches, and explicitly account for relevant variables (e.g. gender, age) and context-specific factors (e.g. availability of extension services, market distance) when selecting factual and counterfactual groups.
- Comparative analysis: undertake comparative cross-country studies to assess how institutional settings, support services, and market structures mediate VSS effects across commodities and contexts, identifying best practices and lessons learned.
- Digital tools: investigate the role of apps, blockchain, and e-commerce in enhancing traceability and market access to better align VSSs with livelihood outcomes assessed through the SLF.
- Youth involvement: examine how certification schemes relate to the opportunities, motivations, and structural barriers encountered by rural youth, an increasingly relevant issue given demographic trends and the ageing farming population in both Ghana and Vietnam.

### 4.2. Economic and social dimensions

The following subsections explore key economic and social outcomes resulting from the adoption of VSSs by smallholder farmers. First, we provide a comparative synthesis of VSS effects, highlighting scheme-specific strengths, limitations, and common patterns. Second, we examine the effects of VSSs on income and yields, highlighting differences between certified and non-certified farmers. Third, we present the associated production costs, particularly those concerning inputs, labour and mechanisation. Fourth, we discuss the importance of capacity-building initiatives and their multiple benefits. Fifth, we highlight the spillover benefits generated by the introduction of VSSs in the commodity value chain. Finally, we analyse the market dynamics that shape farmers' ability to benefit from VSS adoption, including quasi-mandatory certification requirements in export-oriented commodity sectors and the specific market constraints affecting the rice value chain in Vietnam.

#### 4.2.1. Effects across VSSs

The reviewed studies revealed both heterogeneity and some common patterns in their effects on the selected SLF indicators across certification schemes, reflecting distinct objectives, operational models, and context-specific factors influencing performance.

Rainforest Alliance (RA) and UTZ primarily emphasised environmental stewardship and sustainable agricultural practices, with reported improvements in soil and water management, integrated pest management (IPM), and training in sustainable techniques (Bandanaa et al., 2021; Fenger et al., 2017). However, compliance and audit requirements increased costs for smallholder farmers, and environmental gains were sometimes limited where conventional practices persisted and enforcement of environmental law was weak (Bandanaa et al., 2021; Ingram et al., 2018).

Fairtrade International (FI), especially in Ghana's cocoa and banana sectors, was associated with stronger social benefits, including improved labour conditions, minimum price guarantees, and enhanced organisational capacity through cooperative membership (Nelson et al., 2013; Rijn et al., 2016). At the same time, FI outcomes depended on the size and pass-through of price premiums and on the local governance of producer organisations; in some contexts, benefits to individual farmers were constrained by how collective funds were allocated (Nelson et al., 2013; Rijn et al., 2016).

GlobalGAP focused on food safety, traceability, and quality assurance, facilitating access to high-value markets but showing mixed livelihood effects once compliance costs were accounted for (Akrong et al., 2022; Stuart et al., 2018). Producers often needed investments in infrastructure, such as packhouses, cold storage facilities, and protective equipment, as well as administrative procedures and record keeping. These expenses could be prohibitive for smallholder farmers (Kleemann et al., 2014; Akrong et al., 2022).

4 C Association (4 C) and the Roundtable on Sustainable Palm Oil (RSPO) showed similar patterns. 4 C certification in coffee production promoted key sustainability principles (e.g. prohibition of child labour, safe pesticide handling, soil and water conservation, and proper waste management) and greater supply chain transparency, but its entry-level requirements and farmers' limited compliance with standard criteria often resulted in modest socioeconomic improvements (Kuit et al., 2016). RSPO initiatives in palm oil aimed to reduce deforestation risks and improve labour practices; nonetheless, certification costs and consistent monitoring remained challenges, with mixed evidence on biodiversity and food security (Brako et al., 2021a; Oosterveer et al., 2014).

VietGAP, which is led by the Ministry of Agriculture and Rural Development (MARD) in Vietnam, promoted better production planning and input management, yet improvements in income and biodiversity were limited, especially due to weak demand for certified products at the national level (Demont & Rutsaert, 2017; Stuart et al., 2018; Tu et al., 2019). Similar to GlobalGAP, compliance with VietGAP often required investments in basic farm infrastructure, such as storage, sanitation, and record keeping, as well as higher-quality inputs that many farmers could not afford.

#### *4.2.2. Income and yields*

The adoption of VSSs in crop-based food commodities boosted productivity and income levels among smallholder farmers in Ghana and Vietnam (Brako et al., 2021a; Doanh et al., 2018). Brako et al. (2021a) found that certified cocoa farmers exhibited substantially higher average total farm output (770 kg) and yield (276 kg/ha) compared to uncertified farmers. Likewise, certified oil palm growers demonstrated superior total output (16.90 tons) and yield (4.18 tons/ha), with statistically significant differences observed in total output compared to their uncertified counterparts (Brako et al., 2021a). Fenger et al. (2017) pointed out that certified cocoa farmers earned significantly higher gross income compared to conventional farmers, especially considering the price premium received by the former. This is the case of cocoa production in Ghana, where certification not only incentivized farmers to adopt sustainable cocoa farming practices but also enabled them to benefit from price premium, which is a crucial incentive for farmers to engage in sustainable value chains (Addae-Boadu et al., 2017; Ingram et al., 2018). According to Akrong et al. (2022), certified mango producers were also more likely to sell to industrial processors and the export market rather than to local traders, increasing the quantity sold to high-value markets by 12% for certified farmers. These results were also confirmed by Nelson et al. (2013) and Waarts et al. (2013), certified farmers reported significantly more improvements in product quality and enhanced market access, with multinational companies buying increasing quantities of cocoa beans. Finally, as highlighted by Kleemann et al. (2014), the transition from conventional to certified organic production offers small-scale farmers the opportunity to access niche markets in developed countries, resulting in higher returns on their investments.

#### 4.2.3. Total costs

As emphasised by Rietberg and Slingerland (2016) and Ingram et al. (2018), certified farmers experienced a substantial increase in total production expenses due to the significant rise in labour costs per hectare, especially when adopting organic production systems, and additional expenses related to monitoring, audits and administrative costs. Compliance with VSSs often entailed higher expenditures on quality inputs, such as fertilisers, seeds, and agrochemicals, which have experienced sharp price increases in recent years (OECD-FAO, 2024). In addition, rising energy prices, higher transport costs, and port disruptions associated with recent international crises (e.g. the Russia–Ukraine war) have further increased input-related expenses, with pronounced effects in developing countries (Leconte-Demarsy & Rice, 2025).

Kleemann et al. (2014) pointed out the importance of determining the total profitability of adopting VSSs, which is determined by several market factors: (i) the size and the sustainability of the premium over time; (ii) the percentage of the price premium that farmers receive; and (iii) the total cost of the adopted farming method. Ingram et al. (2018), Kuit et al. (2016), Mauthofer and Santos (2022), Waarts et al. (2015) and Iddrisu et al. (2020) highlighted that, while the overall performance of VSS adoption may appear mixed and modest compared to non-certified farmers, a closer examination revealed significant productivity and income increases among certified farmers who received more comprehensive support services, including training, financial services, and farm inputs (e.g. fertilisers, agrochemicals and protective equipment). Notably, the comparative study of Bordey et al. (2016) found that certified farmers in the Mekong Delta region were raising their productivity, largely attributed to intensive mechanisation, especially in the application of seeds, fertilisers and pesticides. Stuart et al. (2018) suggested that the ongoing mechanisation process in Vietnam might reduce dependency on farmer labour, which is becoming scarce in rural areas, while also decreasing total production expenses. Therefore, the availability and the price of production inputs, as well as the level of mechanisation are relevant factors when assessing the overall costs associated with VSSs at the field level.

#### 4.2.4. Capacity-building initiatives

Numerous studies highlighted the significant role of capacity building, such as mandatory training programmes, for farmers adhering to sustainability standards (Smith, 2010; Waarts et al., 2013). Waarts et al. (2013) noted that certified farmers were overall satisfied with the training provisions, as they improved social interactions, facilitated knowledge exchange, and helped solve common issues among farmers. Similarly, Mauthofer and Santos (2022) found that, despite labour-intensive conditions, farmers highly valued capacity-building provisions by VSS programmes, which also include training on farm management and work safety. These trainings led to increased production, better record-keeping, and improved savings practices (Mauthofer & Santos, 2022).

According to Bennett et al. (2013), certified farmers benefitting from capacity building initiatives demonstrated a high level of awareness regarding child labour regulations and the importance of education for children. On the one hand, Waarts et al. (2013) and Bandanaa et al. (2021) observed that in the cocoa value chain, children often assist their parents with harvesting, pod breaking, weeding, fertilising and transporting; on the other hand, Bennett et al. (2013) found that fewer children worked on certified farms, which also had lower injury rates compared to non-certified farms with higher child involvement in farming activities. In line with these results, Waarts et al. (2015) noted that certified farms had fewer children under 14 years old engaging in hazardous activities compared to uncertified farms and exhibited higher school enrolment rates. This finding was also confirmed by Mauthofer and Santos (2022), who reported improved access to primary education in cocoa communities adopting VSS schemes, with 75% to 85% of children successfully completing primary education. As a consequence, capacity-building initiatives are key components of VSS schemes, supporting smallholder farming livelihoods by aiming not only to increase productivity but also to enhance social well-being, health, and fair labour practices among smallholder farmers.

#### 4.2.5. Spillover effects

VSS programmes facilitated the emergence of more professional farmer associations, fostered competition and extension services and enabled market channels for certified products, while positioning farmers within global value chains (GVCs) (Furumo & Lambin, 2021; Ponte, 2019). This impact was particularly evident in a study by Ingram et al. (2018) in Ghana, which highlighted the crucial role of VSSs in rapidly scaling up sustainable cocoa production and providing smallholder farmers with access to lucrative markets in the EU

and North America. According to Akrong et al. (2022) and Kleemann et al. (2014), certification positively impacted the quantity sold to high-value markets and increased the income of smallholder mango and pineapple farmers by about 20%. Furthermore, Smith (2010) and Ingram et al. (2018) observed that VSSs generated spillover effects, such as the exchange of knowledge and practices, which also benefited non-certified farmers in the production area.

#### 4.2.6. Market dynamics

An important cross-cutting finding emerging from this review is that, in several export-driven value chains, certification increasingly functions as an institutionalised governance mechanism rather than a purely voluntary tool. For example, in the cocoa and coffee value chains, producers often encounter implicit pressures to adopt certification because it serves as a *de facto* entry requirement for international buyers (Grassnick et al., 2021). This quasi-mandatory character of VSSs has important implications for farmers' bargaining power and livelihood strategies, reinforcing the need to interpret certification not only as a sustainability instrument but also as a form of market governance that shapes the inclusion and exclusion of smallholder farmers within global value chains (Bennett, 2017; Ponte, 2019).

These power dynamics along the value chains intersect with several market challenges that affect the potential benefits of adhering to voluntary standards, particularly in the context of the rice value chain in Vietnam. As emphasised by Stuart et al. (2018), Vietnamese farmers face significant challenges such as the lack of established channels for certified rice. Additionally, Demont and Rutsaert (2017) identified other limitations: i) poor linkages among stakeholders; ii) the absence of a national and international brand reputation, as Vietnam primarily trades low-quality rice; and iii) the high use of pesticides to manage insect pests and plant diseases, even among farmers adopting VSSs. These constraints together with other market asymmetries, such as information and infrastructure gaps, hinder the adoption and scaling of VSSs in the rice value chain in Vietnam (Stuart et al., 2018).

### 4.3. Environmental dimension

The ensuing subsections examine relevant environmental aspects of VSS adoption by smallholder farmers. First, we assess how VSSs promote sustainable practices, such as IPM and water conservation techniques. Next, we evaluate the challenges in fully implementing these practices, including limited financial resources and inadequate training. Finally, we address the impact on biodiversity and the preference for monocropping systems within certain VSS schemes.

#### 4.3.1. Adoption of sustainable practices

Mauthofer and Santos (2022) and Klier and Possinger (2012) found that certified cocoa farmers in Ghana show a greater understanding and awareness of environmental issues due to trainings on IPM and soil improvement practices (e.g. use of compost and manure), which also enhance yield. Fenger et al. (2017) revealed that certified cocoa farmers reduced the frequency of burning over a 5-year period to comply with specific VSS objectives. Moreover, they implemented measures such as establishing buffer zones along farm boundaries and near rivers and other water bodies to minimise agrochemical leaching and contamination (Fenger et al., 2017). According to Stuart et al. (2018), certified farmers embraced water-saving techniques like alternate wetting and drying (AWD) to optimise irrigation times and reduce water consumption in rice cultivation. Akrong et al. (2023) observed that certified mango farmers in Ghana reduced their reliance on inorganic fertilisers, pesticides and herbicides, opting instead for indigenous methods of weed control. Moreover, farmers adhering to organic standards, while reducing their dependency on chemical inputs, increase the use of natural fertilisers and recycle nutrients, contributing to improved soil health and enhanced water retention in crop fields. Waarts et al. (2015) noticed also improved pesticides handling among certified farmers, observing: i) better health and safety practices, such as proper chemical waste disposal; ii) increased adoption of measures to reduce water contamination; and iii) enhanced use of personal protective equipment (PPE). In addition, Bennett and Franzel (2013) found that eliminating hazardous chemicals and promoting the use of PPE significantly reduced injury rate among certified producers. However, Klier and Possinger (2012) emphasised that, while training on the use of fertilisers and chemicals was crucial for creating a safer work environment, farmers could not afford to buy expensive PPE.

#### 4.3.2. Barriers to implementation of sustainable techniques

According to Waarts et al. (2015), many certified farmers did not fully adopt recommended sustainable practices due to several reasons: i) budget constraints; ii) lack of tools and equipment; iii) insufficient training provisions over time. Consequently, some certified farmers reported only small improvements in environmental indicators, whereas non-certified farmers observed a deterioration in environmental performance in the long time (Nelson et al., 2013). As noted by Smith (2010) banana certified farmers struggle to fully apply sustainable farming techniques until they see proof of their efficacy from early adopters, while Klier and Possinger (2012) highlighted that 10% of farmers in the cocoa plantations were not landowners, and thus did not benefit from access to training programmes, making them unable to apply newly learned methods. Smith (2010) observed a significant decline in the use of sustainable practices over time, even among certified banana farmers. This decline also suggested that other factors (e.g. increased international demand for coca) might have conflicted with the adoption of sustainable practices and contributed to the further adoption of detrimental practices (e.g. deforestation, slash and burn). Furthermore, Smith (2010) pointed out that the increased environmental requirements promoted by VSSs sometimes lacked sufficient technical guidance, which posed challenges for farmers in fully implementing these environmental standards.

Even under VSSs, the high use of inputs presented significant challenges in Vietnam. Ho et al. (2018) and Hung Anh et al. (2019) highlighted that certified coffee production is often based on the excessive use of chemical and water inputs. Similarly, Tu et al. (2019) also noted that certified rice farmers in Vietnam's Mekong Delta (MKD) often use inputs, like certified seeds, inefficiently, contributing to both poor economic and environmental indicators. High agrochemical dependence not only reduced biodiversity and degraded water quality and soil fertility but also heightened farmers' exposure to market volatility. As fertiliser and pesticide prices transmit external shocks (e.g. trade tariffs and restrictions), they erode margins and liquidity and increase the risk of indebtedness for farmers (Régnier et al., 2025).

Despite the availability of more ecologically efficient traditional farming techniques, such as floating rice, and local rice varieties that are more resilient to climate change effects (e.g. drought and floods), farmers often perceive these practices as technically less effective than those promoted by private and public extension services (Tu et al., 2019).

#### 4.3.3. Biodiversity

Smith (2010) pointed out that VSSs do not address issues associated with monocropping systems, which negatively impact ecosystems and natural resources by reducing biodiversity and crop resistance to pests and diseases. This, in turn, led to more frequent chemical treatments in banana plantations, depleting soil fertility and reducing yields in the long run (Smith, 2010). Similarly, Oosterveer et al. (2014) reported that the oil palm varieties adopted by VSSs were high-yielding, rather than local cultivars, which were preferred by the industry for their high productivity and standardised characteristics, thereby reducing oil palm biodiversity at the field level and affecting local dietary patterns. Consistently, Wätzold et al. (2025) observed that VSSs in Ghana's cocoa sector provided limited ecological benefits, showing no significant impact on biodiversity indicators like vegetation structure and animal diversity. Likewise, prior studies note that many certification schemes lack robust biodiversity monitoring frameworks and consistent indicators, which constrains the ability to detect ecological change over time (Castka et al., 2016; Potts et al., 2016).

### 4.4. Challenges and trade-offs

The following subsections aim to explore how VSS adoption might exacerbate existing disparities among farmers, focusing on: i) gender inequalities, ii) the distribution of price premiums, and iii) differences between small and large landholders.

#### 4.4.1. Women involvement in VSSs

According to Smith (2010), while no wage differences were found between men and women performing the same duties on banana plantations, women were often assigned to lower-level tasks, negatively impacting their overall earnings. A study by Mauthofer and Santos (2022) indicated that female cocoa farmers under VSSs remained more vulnerable and marginalised compared to their male counterparts. Nelson et al. (2013) observed that men generally dominated decision-making around income control, with no significant changes in intra-

household dynamics even after the adoption of VSSs. Cultural practices and norms often restricted women's access to farmland and decision-making, as land was typically inherited by males within families (Klier and Possinger, 2015; Waarts et al., 2015). Additionally, women who did inherit land typically received smaller plots, limiting their yields and further reducing their income (Klier & Possinger, 2012).

Although Nelson et al. (2013) reported an increase in women's membership in certified cocoa organisations from 28% in 2008 to 32.13% in early 2013, Rijn et al. (2016) noted that women's interests were often inadequately represented within unions and committees, with very few women holding supervisory positions. Mauthofer and Santos (2022) highlighted that systemic issues persist and that VSSs' efforts to promote gender equality were insufficient to overcome common stigmas. Gender-discriminatory practices were deeply rooted in society (e.g. land inheritance rules favouring men), requiring targeted strategies to improve representation and participation in VSSs (Mauthofer & Santos, 2022). Younger rural women, particularly those without secure land rights, encountered increasingly complex barriers to accessing training, becoming members of cooperatives, and participating in decision-making (Msosa, 2022). These limitations hindered the potential of sustainability certification to promote meaningful women's empowerment within agricultural value chains. These interconnected aspects reflected broader gender constraints present in many developing countries (Chiputwa et al., 2021; Lloyd, 2024).

#### 4.4.2. Price premium

The amount and utilisation of price premiums from VSSs have been pivotal in enhancing SLF and supporting project initiatives for the entire farming community (Snider et al., 2017). However, the effectiveness and equitable distribution of price premiums have sparked considerable debate in the literature (Boonaert & Maertens, 2023).

According to Rijn et al. (2016), the cocoa price premium in Ghana, approximately USD 200 per tonne, provided a significant financial boost to local economies by funding initiatives such as community projects and strengthening farmers' organisations. Similarly, Nelson et al. (2013) observed that while price premium funds were invested in essential community infrastructure, including boreholes, schools, and healthcare facilities, the benefits did not always effectively trickle down to individual farmers.

Smith (2010) reported that the allocation of premiums occasionally caused conflict due to perceived discrimination, as workers often viewed these premiums as charitable transfers rather than benefits earned from their labour activities. Consequently, this negative perception reduced the intended economic empowerment effect of the price premiums (Smith, 2010). According to Klier and Possinger (2012), farmers were sometimes unaware of how VSSs operate, including how the price premium is distributed and used. As a result, this lack of awareness limited farmers' participation in decision-making and reduced their sense of ownership over community projects funded by the price premiums (Jena et al., 2012).

#### 4.4.3. Small vs large farmers

Akrong et al. (2022) found that farmers with higher household incomes and secure land access were more likely to participate in certification schemes, as they could afford the monitoring, audits, and administrative costs associated with VSSs. In contrast, farmers with lower incomes or those relying on off-farm activities and insecure assets were less likely to comply with VSS initiatives (Akrong et al., 2022). Similarly, Kleemann et al. (2014) emphasised that the costs of adhering to VSS schemes in the pineapple value chain, along with the required investments, were prohibitive for smallholder farmers, particularly those with limited access to credit. Fenger et al. (2017) highlighted the need to provide inputs and financial services, such as savings and insurance services, through VSSs and government institutions to support poorer farmers. While VSSs can lead to productivity improvements and encourage the adoption of new technologies, they may favour larger farmers, potentially widening the gap between them and smaller farmers and intensifying existing inequalities and vulnerabilities (Kleemann et al., 2014).

### 4.5. Policy recommendations

As suggested by Ingram et al. (2018) and Eyhorn et al. (2019), a comprehensive and holistic transformation of the agri-food systems is highly advisable to move towards sustainability. The following policy recommendations should be framed within the context of enhanced partnerships among relevant stakeholders to strengthen the role of VSSs in advancing the SDGs agenda. Therefore, we identify specific areas for policy

interventions that governments, development agencies, and multistakeholder initiatives should implement to make VSSs fully beneficial for smallholder farmers while promoting transformative food systems.

#### 4.5.1. Promoting participatory and bottom-up extension models

Based on the studies conducted by Ho et al. (2018) and Tu et al. (2019), the availability of extension services provided by local governments was negatively associated with the efficiency levels of coffee and rice production in Vietnam. Barham and Weber (2012) and Ho et al. (2018) highlighted that government extension services mainly focus on conventional approach aimed at increasing yields in the short-term, rather than addressing environmental challenges, which require a long-term perspective. Moreover, Vietnamese farmers often had unrestricted access to agrochemicals and applied them under the guidance of input sellers, which contributed to the over-application of such products (Tu et al., 2019). Similarly, farmers participating in 'good agricultural practices' programmes in Vietnam must use certified seeds, which are more expensive and require additional inputs (e.g. water), as well as greater technical and financial resources (Okello et al., 2017). As suggested by Gliessman (2015), extension services aimed to increase sustainability should pay more attention to the variability that exists within and between agroecosystems, including bio-physical, social and economic factors. In this regard, agroecological approaches promoted by VSS schemes can serve as a strategy for transitioning to sustainable farming (Biovision, 2024). These approaches rely on common principles, such as increasing diversity, recycling nutrients and energy, and enhancing soil organic matter. However, they need to be adapted to site-specific conditions through collaborative co-creation between farmers and technical advisers, rather than through a prescriptive top-down approach (Barrios et al., 2020; Wezel et al., 2020).

Strengthening the effectiveness of VSS implementation requires bottom-up and horizontal exchanges that empower farmers to co-design and adapt sustainability practices. Governments could therefore promote participatory extension models, in which farmer field schools and community organisations jointly develop and test context-appropriate solutions (Friis-Hansen & Duveskog, 2012). For example, in Vietnam's MKD and Ghana's cocoa regions, peer-to-peer learning and farmer-led experimentation on soil fertility management, water-saving irrigation, and IPM have enhanced both adoption and farmers' ownership of new practices (Ehiakpor et al., 2021; Leippert et al., 2020). Development agencies could further facilitate multi-stakeholder platforms linking producer organisations, universities, NGOs, and private buyers to adapt certification requirements to local contexts. For instance, partnerships between research institutes and certification bodies could co-develop locally validated sustainability indicators and disseminate good practices through peer-exchange networks linking certified and non-certified farmers (Lee et al., 2012; FAO, 2014). Financial incentives, such as matching grants, microfinance, and preferential credit lines, could support cooperative-led training and the transition to agroecological practices that complement existing certification schemes (FAO, 2022; WB, 2019).

#### 4.5.2. Increasing access to land capital

Nelson et al. (2013) highlighted that land access posed a significant structural challenge for smallholder farmers when adhering to VSS schemes. Akrong et al. (2023) emphasised that land ownership significantly affects compliance with VSS standards, noting that farmers who own their land are twice as likely to perform better on environmental indicators compared to those without land ownership. Moreover, Brako et al. (2021b) observed that land tenure in Ghana was predominantly male-dominated, with men typically serving as household heads and landowners. This land tenure system particularly affected cocoa and oil palm production, excluding women from more profitable value chains due to their limited access to larger landholdings (Brako et al., 2021b). Bennett and Franzel (2013) also pointed out that fragmented land parcel arrangements and lack of formal land titles, especially for indigenous groups, negatively affect famers adoption of VSSs, highlighting the need for reform in land tenure systems in developing countries. In line with Bennett and Franzel (2013), Tu et al. (2019) and van Vliet et al. (2021) discussed the necessity for structural land reforms, including increasing land sizes to enhance farm efficiency. Tu et al. (2019) highlighted that the Vietnamese Land Law, which limited farm sizes to 3 hectares per household, hinders the economic and environmental performance of smallholder farmers. As suggested by the same authors, policy changes that permit access to larger farm sizes could also facilitate the adoption of technological innovations and the mechanisation process, thereby enhancing productivity, which is often low among

smallholder farmers (Tu et al., 2019). In this regard, national and local governments, along with relevant stakeholders in the value chain, should collaborate to improve smallholder farmers' access to land while ensuring equitable land rights for women.

#### 4.5.3. Fostering food security

Although this study does not directly address food security, the effects of VSSs on food availability and nutrition patterns remain widely debated in the literature, with no clear consensus (Meemken et al., 2017). Oosterveer et al. (2014) reported that the Government of Mozambique introduced a national legal framework for sustainable crop-based biofuel production to address food security gaps in certification schemes. This framework requires international companies operating in the country to supply a portion of their production domestically and meet specific food security indicators (Schut et al., 2014). Similarly, policies that promote agrobiodiversity in Ghana and Vietnam could encourage private companies and farmers to diversify their marketable products and adopt sustainable agricultural practices, such as intercropping and integrated rice-fish system, moving beyond the conventional systems based on monocropping (Oosterveer et al., 2014). Finally, as highlighted by Tu et al. (2019), policies at various levels should be targeted and designed to address multiple sustainability indicators simultaneously.

#### 4.5.4. Boosting partnerships and legal requirements

According to Ponte (2019), governments should ensure the effective implementation of sustainability standards in food commodity value chains by creating legally binding commitments (e.g. mandatory sustainability reports) and fostering partnerships with various stakeholders, such as firms, producer associations, and NGOs. In this regard, Akrong et al. (2022) found that the Government of Ghana partnered with multinational firms and organisations to improve certification among small-scale farmers through training and capacity development programmes in the mango sector. In Vietnam, the Cooperative Law of 1997, along with its subsequent revisions, aimed to establish a national legal framework to promote the development and growth of commercial agricultural cooperatives (Tu et al., 2019). Nonetheless, the effectiveness of these governmental initiatives depends on several key factors, including local administrative support and farmer participation (Cox & Le, 2014). Boshoven et al. (2021) and zu Ermgassen et al. (2022) emphasised that governments should also promote measures, such as facilitating traceability and transparency requirements, setting minimum standards for fair labour conditions, and implementing region-specific sourcing strategies for certified products to enhance accountability and promote sustainable practices across commodity value chains.

#### 4.5.5. Strengthening marketing collaborations

According to Padhiary and Roy (2025), the expansion of certified products' global outreach depends on collaborative marketing strategies that foster stronger connections between international buyers and local producer organisations. Collaborative marketing in agriculture, defined as cooperation among farmers, marketers, distributors, and consumers working toward shared goals, enables resource sharing, collective branding, and enhanced bargaining power, which are vital for smallholders operating under VSSs (Grabs & Carodenuto, 2021; Schoneveld, 2022). In addition, farmer cooperatives and public-private partnerships can develop joint marketing platforms to showcase certified products through e-commerce channels and sustainable branding initiatives (Padhiary & Roy, 2025). The use of digital marketing tools, such as online marketplaces, traceability apps, and social media can increase producers' visibility and consumer engagement, while appealing to growing demand for ethical products (Ravi & Rajasekaran, 2023). Similarly, authentic storytelling that highlights product origin, community values, and sustainability commitments helps build consumer trust and long-term brand loyalty (Yueh & Zheng, 2019).

Collaborative approaches also support sustainable supply chains, where transparent relationships among producers, retailers, and consumers ensure product authenticity and equitable benefit sharing (Flora & Bregendahl, 2012). As emphasised by Padhiary and Roy (2025), partnerships with local distributors and retailers in target markets provide critical market intelligence and facilitate compliance with import regulations, enhancing smallholders' competitiveness in global trade. By developing collaborative marketing strategies, VSSs can strengthen the competitiveness of certified products while improving farmers'

incomes, preserving local identity, environmental integrity, and consumer trust in sustainable and ethical products (Bennett, 2021).

#### *4.5.6. Leveraging VSSs contribution to the SDGs*

It is widely acknowledged that there is significant alignment between VSSs and the SDGs, with clear potential for a mutually supportive relationship, making VSSs valuable tools for governments as well (Akrong et al., 2022; Kosolapova et al., 2023). In line with Bissinger et al. (2020), we found that the three SDGs most widely addressed by VSSs are SDG 2, 8 and 12. Although VSSs are oriented towards the sustainability of value chains, some of the impacts on farmers, producer organisations and local communities may not be explicitly linked to SDG targets but can create enabling conditions for their achievement (Bissinger et al., 2020). Additionally, VSSs can support governments by collecting disaggregated data to understand the situation of vulnerable groups, such as women and indigenous minorities, and by reporting on SDG progress through sharing impact data (Kosolapova et al., 2023). With the aim of leveraging VSSs' contribution to the achievement of the SDGs, the recommendations of this study are twofold: i) better align the socioeconomic and environmental objectives of different VSSs with the SDG indicators; ii) promote and develop an independent monitoring and evaluation system to assess the actual impacts of VSS initiatives in the agricultural sector.

## 5. Conclusions

The adoption of the SLF provides a comprehensive understanding of the significant effects of VSSs on the livelihoods of Ghanaian and Vietnamese smallholder farmers producing crop-based food commodities for international markets. VSSs can reduce smallholders' production constraints, expand market opportunities, and enhance farmers' livelihoods by addressing various forms of capital - human, financial, social, physical and natural - to varying extents. They are effective market-based tools for promoting sustainability across agricultural commodity value chains, although not without limitations. Despite their generally positive effects, the systematic review highlights the context-specific nature of VSS impacts, which differ across value chains and between countries.

On the one hand, VSSs need to better align their interventions with the social and economic characteristics of farmers while considering the site-specific and biophysical contexts in which they operate. This involves tailoring service packages to farmers' needs and addressing critical issues, such as improving input management (e.g. pesticides, certified seeds, and water), implementing innovative initiatives to increase women's participation in value chains, eliminating persistent child labour practices, and establishing robust monitoring and reporting systems. It is also essential to enhance the gender and youth sensitivity of certification systems to ensure that VSSs contribute to more inclusive and equitable rural development outcomes. Additionally, VSSs should avoid encouraging over-specialisation and its associated risks, such as commodity price volatility and climate change effects, by promoting crop diversification and integrated farming approaches.

On the other hand, governments should focus on overcoming structural barriers, such as insecure land rights, poor market infrastructure (e.g. storage and market facilities) and limited access to credit for smallholder farmers. These challenges underscore the need for investments in Ghana and Vietnam to close sustainability gaps, develop policies that address market constraints for certified products, improve extension services, enhance stakeholder integration and coordination in the value chain, and raise sustainability standards.

As outlined in SDG 17, revitalising global partnerships for sustainable development is essential. This should not only strengthen public-private partnerships but also foster broader societal collaboration among producers, consumers, researchers, and civil society organisations to create a foundation for a meaningful transition to sustainable food systems.

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## Author contributions

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