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Trade
4 SUSTAINABLE DEVELOPMENT

DELIVERABLE 4.2

"Effects of the context heterogeneity on the relationship between trade and sustainability: Lessons from the case studies"
A synthesis report and individual case studies report

Trade 4 Sustainable Development

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TRADE4SD
Fostering the positive linkages between trade and sustainable development

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Deliverable 4.2:

"Effects of the context heterogeneity on the relationship between trade and sustainability: Lessons from the case studies" a synthesis report and individual case studies report

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About the TRADE4SD Project

Trade is a central factor in shaping not only global, but also regional and local development. Trade policy has an especially important part to play in achieving the UN Sustainable Development Goals (SDGs). The premise of the TRADE4SD project is that trade has the power to produce positive outcomes when the policies which define the rules of the game are framed and designed in a way to promote access to markets, fair prices and standards of living for farmers, as well as alleviating rural poverty and ensuring sustainable farming practices. Addressing the relation between trade and SDGs requires an integrated approach to policy-making and inclusive governance.

The main objective of the TRADE4SD project is to contribute to build new opportunities for fostering the positive sustainability impacts of trade supported by improved design and framing of trade policy at national, EU and global level, including WTO modernisation, increased policy coherence at different domains including agricultural, energy, climate, environmental and nutritional policies.

To meet this objective, the project will develop an integrated and systematic approach that combines quantitative models from different perspectives, and several qualitative methods recognising that SDGs and trade are highly context-related. On the one hand, a robust analysis of economic, social and environmental impacts is given by using diverse but integrated modelling techniques and qualitative case studies. On the other hand, a wide consultation process is implemented involving stakeholders both in the EU and in partner countries as well as those with a wide international scope of activity, providing opportunities for improved understanding, human capital building, knowledge transfer and dissemination of results. To this extent, the consortium involves, as co-producers of knowledge, a number of research and stakeholder participants with different backgrounds who will use their networks to facilitate the civil society dialogue and build consensus on the subject of gains from trade in view of sustainability.

Project Consortium

No.	Participant Organisation Name	Country
1	Corvinus University of Budapest (CORVINUS)	HU
2	University of Kent (UNIKENT)	UK
3	Consiglio per la Ricerca in Agricoltura e l'Analisi dell'Economia Agraria (CREA)	IT
4	Johann Heinrich von Thünen-Institut, Bundesforschungsinstitut für ländliche Räume, Wald und Fischerei (THUENEN)	DE
5	The University of Sussex (UOS)	UK
6	University of Ghana (UG)	GH
7	Luonnonvarakeskus (LUKE)	FI
8	Centrum Analiz Spoleczno-Ekonomicznych-Fundacja Naukowa (CASE)	PL
9	Food and Agriculture Organization of the United Nations (FAO)	IT
10	Institut national de recherche pour l'agriculture, l'alimentation et l'environnement (INRAE)	FR
11	Confederazione Generale Dell'Agricoltura Italiana (CONFAGRICOLTURA)	IT
12	Truong Dai Hoc Kinh Te Thanh Pho Ho Chi Minh (UEH)	VN
13	Luminaconsult Sprl (LUMINA)	BE

Deliverable 4.2:

"Effects of the context heterogeneity on the relationship between trade and sustainability: Lessons from the case studies"

SYNTHESIS REPORT

Outline

1. Introduction & methodology

1.1 Context background

The *Trade4Sustainable Development (TRADE4SD)* project, funded by the European Union's Horizon 2020 program, aims to analyse and enhance positive impacts of trade on sustainability. The Work Package 4 (WP.4) titled *"Qualitative in-depth analysis of linkages and case studies"* explores the existing relationships between trade and sustainability through detailed, country- and crop-specific case studies.

Deliverable 4.2 (D.4.2) provides context-specific evidence on how trade, private voluntary standards and sustainability dimensions are interconnected. To do so, stakeholders' views from five value chains – namely **cocoa**, **cashew**, **rice**, **tea** and **dragon fruit** – in two countries involved in specific trade agreements with the European Union (EU), **Ghana** and **Vietnam**, have been gathered.

Aligning with the WP.4 goals, the linkages between trade and sustainability issues in cocoa and cashew value chains in Ghana, as well as those of rice, tea and dragon fruit in Vietnam, have been framed within the context of the United Nations' Agenda 2030, selecting 7 specific Sustainable Development Goals (SDGs) to which these links contribute the most.

Stakeholders' insights, including farmers, traders, civil society and institutional representatives, range from farming practices and voluntary standards to policies and institutional contexts, converging in D4.2 in two country-case studies, one for Ghana and one for Vietnam. The findings of the value chains' analysis results in country-specific policy recommendations which will then inform Deliverable 4.3, titled *"Policy brief: Assessment of sustainability effects of voluntary and ethical trade standards"*, that will provide addressed actions-recommendations to reinforce the linkages between international trade and sustainable development.

This synthesis report of D4.2 aims at summarising the effects of context heterogeneity on the relationship between trade and sustainability by offering lessons from the two country-case studies. It presents the context of the research, the methodology adopted, the lessons learned with key insights from the two countries considered, as well as the comparative analysis of their outcomes. The choice of the two countries and related crops' value chains was developed also in coordination with WP.2 *"The role of WTO, and EU bilateral and regional trade agreement to meet SDGs: gaps and best practices"*, driven by the need to analyse diverse trade and sustainability frameworks across regions with strong trade relations with the European Union (EU). Indeed, this synthesis report provides linkages between D2.2 "*How the Sustainable Development Goals are currently included in preferential agreements and how are sustainability provision working*" and D4.2, offering at the same time country-level policy recommendations aligned with the 7 SDGs considered.

Before exploring the methodology of research in detail and the main analysis insights, it is important to underline that both Ghana and Vietnam share free trade agreements with the EU at different stages of development, which are hereby presented in Table 1. The selection of countries and crops was developed in coordination with WP.2 "*The role of WTO, and EU bilateral and regional trade agreement to meet SDGs:gaps and best practices*" and it was driven by the need to analyse diverse trade and sustainability contexts across regions with strong trade relations with the EU.

Table 1: Characteristics of Ghana and Vietnam trade agreements with the EU

Aspect	EU-Ghana Economic Partnership Agreement (EPA)	EU-Vietnam Free Trade Agreement (EVFTA)
Type of agreement	Interim Economic Partnership Agreement (iEPA)	Comprehensive Free Trade Agreement (FTA)
Enforcement date	1 July 2021	1 August 2020
Tariff provisions	- Duty-free and quota-free access for Ghana to the EU - Gradual liberalization of Ghana's market (80% EU exports duty-free)	- Elimination of 99% of all tariffs - Immediate removal of ~65% of duties on EU exports to Vietnam, phased removal over 10 years

Development focus	- Supports sustainable development and regional integration - Includes safeguards for local industries and employment	- Emphasises intellectual property rights, investment protection, sustainable development, and geographical indications
Scope and depth	Primarily focuses on trade in goods and gradual market access	Covers trade in goods, services, investment, intellectual property, and sustainable development
Pace of tariff elimination	Gradual market opening for EU goods over time	Rapid elimination of most tariffs within a decade
Sustainable provisions	- Safeguards to protect sensitive sectors - Addresses developmental asymmetries	- Strong focus on labour rights, environmental protection, and high standards
Geographical indications	Not specifically highlighted	Vietnam agrees to protect 169 EU geographical indications

Source: authors' elaboration based on the TAs

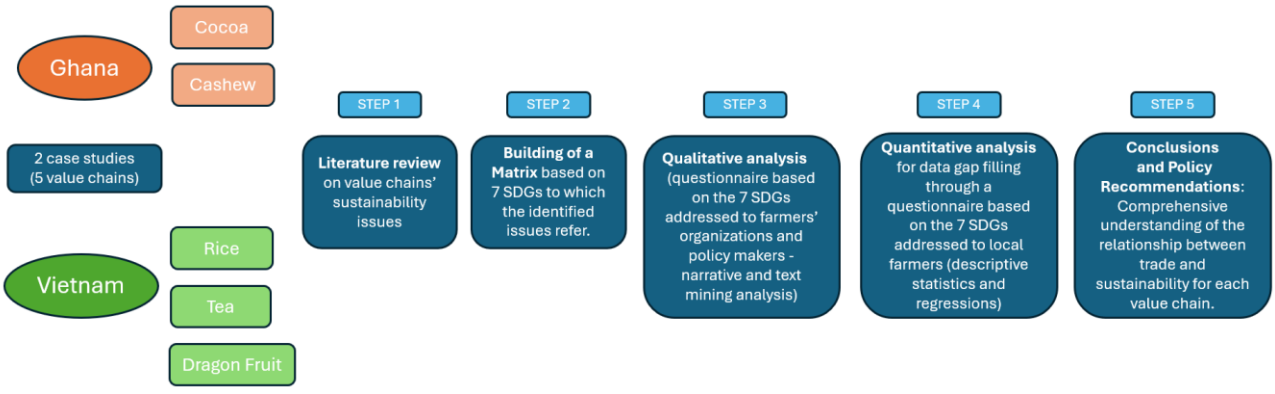
In relation to the different value chains examined in each country, the choice of a multi-crop approach allowed a comprehensive understanding of both challenges and opportunities linking trade with the SDGs considered.

Since the five selected value chains represent key commodities for Ghana and Vietnam, which are relevant for food security and international trade, the analysis allowed for a cross-cutting examination of issues characterising the three dimensions of sustainability. It also deepened the understanding of local capacity in meeting international requirements and trade standards, as well as examined the implementation of Voluntary Sustainable Standards (VSSs) and their implications for the livelihoods of local smallholder farmers.

1.2 Methodology and main considerations from the case studies

The study has been carried out through a mixed methods research (MMR) approach combining quantitative and qualitative research elements to deepen the understanding of results and their validation[1]. This approach was deemed most suitable for analysing the characteristics of the five selected value chains in Ghana and Vietnam and followed a five steps process as visible in Figure 1.

Figure 1: Research methodology



Source: Authors' elaboration from case studies report

Below, a description of the five steps are provided. The two case studies are built through the same methodological process.

Step 1. Literature review: National and international literature was reviewed to identify the key challenges and opportunities related to the country's agricultural sector, trade and sustainability in each value chain in Ghana and Vietnam. For the Ghanian case study, cashew and cocoa were analysed together due to their similarities in being both export commodities, predominantly cultivated by smallholder farmers through long-term land use and sustainable management. For Vietnam, instead,

[1] Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a definition of mixed methods research. *Journal of mixed methods research*, *1*(2), 112-133.

the three commodities, rice, tea, and dragon fruit, were considered separately due to their distinct botanical characteristics, economic roles and sustainability issues.

Step 2. Matrix construction: As indicated in the Grant Agreement, this report examines the linkages between trade in cocoa and cashew in Ghana, and rice, tea and dragon fruit in Vietnam, along with relevant social, economic and environmental aspects such as deforestation, gender inequality, child labour and income inequality. Relevant data and information were extracted from diverse sources, including databases, such as FAO and ILO, and mapped against seven specific SDGs, meeting TRADE4SD project's aims of understanding how trade and agreements influence sustainable development. These sustainability issues have been framed within the context of the United Nations' Agenda 2030. As detailed in Table 2, the chosen SDGs were 1, 2, 5, 6, 8, 15, and 17. The table provides a detailed overview of them, their related targets and indicators considered, together with the custodian agencies responsible for managing, monitoring and reporting their progresses.

Table 2: SDGs, targets and indicators considered for the value chains' sustainability analysis in Ghana and Vietnam.

SDG	Target	Indicator	Custodian agency
1 – No poverty	**1.4:** ensure that people have equal access to economic resources, services and property	**1.4.2:** Proportion of the population with secure access to essential services.	United Nations Human Settlements Programme (UN-Habitat) & World Bank (WB)
2 – No hunger	**2.3:** Increase agricultural productivity and income of small food producers.	**2.3.1** Volume of production per labour unit by classes of farming/pastoral/forestry enterprise size. **2.3.2** Average income of small-scale food producers, by sex and indigenous status.	Food and Agriculture Organization of the United Nations (FAO)
	2.4: Ensure sustainable food production systems.	**2.4.1:** Proportion of agricultural area applying sustainable practices.	
	2.5: Maintaining the genetic diversity of seeds, plants and animals.	**2.5.1:** Number of food genetic resources stored in gene banks.	
	2.a: Increase investment in agricultural systems.	**2.a.1**: Agricultural orientation index for government expenditures. **2.a.2**: total flows to the agricultural sector.	FAO; Organisation for Economic Co-operation and Development (OECD)
	2.b: Correct and prevent trade restrictions and distortions in world agricultural markets.	**2.b.1:** Agricultural export subsidies	World Trade Organization (WTO)
	2.c: Ensure the proper functioning of food commodity markets and their derivatives	**2.c.1:** Indicator of food price anomalies.	FAO
5 – Gender equality	**5.a:** Ensure women equal rights to property and economic resources.	**5.a.1** agricultural population with ownership or secure rights over agricultural land, by sex; share of women among owners or rights-bearers of agricultural land, by type of tenure. **5.a.2:** legal framework guaranteeing women's equal rights to land ownership and/or control.	FAO

	5.c: Adopt policies to enhance gender equality.	**5.c.1:** countries with systems to track and make public allocations for gender equality and empowerment.	United Nations Entity for Gender Equality and the Empowerment of Women; OECD; United Nations Development Programme (UNEP)
6 – Water and sanitation	**6.3:** improve water quality, halving the proportion of untreated wastewater and increase safe reuse.	**6.3.1:** domestic and industrial wastewater flows safely treated. **6.3.2:** bodies of water with good ambient water quality.	UN-Habitat, Department of Economic and Social Affairs – United Nations Statistics Division; WTO; UNEP
	6.6: protect and restore water-related ecosystems	**6.6.1** Change in the extent of water-related ecosystems over time.	UNEP
	6.a: expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes.	**6.a.1:** Amount of water- and sanitation-related official development assistance supported by governments.	UNEP; World Health Organization (WHO)
8 – Decent work and economic growth	**8.3:** Promote development-oriented policies for decent job, entrepreneurship, creativity and innovation; encourage the formalization and growth of micro-, small- and medium-sized enterprises.	**8.3.1** Proportion of informal employment in total employment, by sector and sex.	International Labour Organization (ILO)
	8.7: Measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour	**8.7.1:** Proportion and number of children aged 5-17 years engaged in child labour, by sex and age.	ILO; United Nations Children's Fund
	8.8 Protect labour rights and promote safe and secure working environments for all workers.	**8.8.1** Fatal and non-fatal occupational injuries per 100,000 workers, by sex and migrant status. **8.8.2** Level of national compliance with labour rights based on ILO and national legislations	ILO
15 – Life on land	**15.2**: promote the implementation of sustainable management of all types of forests and halt deforestation.	**15.2.1:** Progress towards sustainable forest management.	FAO
	15.3: combat desertification, restore degraded land and soil.	**15.3.1** Proportion of land that is degraded over total land area.	United Nations Convention to Combat Desertification
	15.5: reduce degradation of natural habitats and halt the loss of biodiversity.	**15.5.1:** Red list index	International Union for Conservation of Nature
	15.9: Integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts.	**15.9.1** (a) Number of countries that have established national targets; (b) integration of biodiversity into national accounting and reporting systems.	UNEP; Convention on Biological Diversity
	15.a Mobilize and increase financial resources to conserve	**15.a.1:** (a) Official development assistance on conservation and	OECD

	and sustainably use biodiversity and ecosystems.	sustainable use of biodiversity; (b) revenue generated and finance mobilized from biodiversity-relevant economic instruments.	
	15.b: mobilize resources to finance sustainable forest management and incentives to developing countries for conservation and reforestation.	**15.b.1:** (a) Official development assistance on conservation and sustainable use of biodiversity; and (b) revenue generated and finance mobilized from biodiversity-relevant economic instruments.	OECD
17- Partnership for the goals	**17.10:** Promote a universal, rules-based, open, non-discriminatory and equitable multilateral trading system under the WTO.	**17.10.1:** Worldwide weighted tariff-average.	International Trade Centre (ITC)
	17.11: Increase the exports of developing countries	**17.11.1:** Developing countries' and least developed countries' share of global exports	United Nations Conference on Trade and Development
	17.12: Realize timely implementation of duty-free and quota-free market access on a lasting basis for all least developed countries.	**17.12.1** Weighted average tariffs faced by developing countries, least developed countries and small island developing States.	ITC
	17.14: Enhance policy coherence for sustainable development.	**17.14.1:** Number of countries with mechanisms in place to enhance policy coherence of sustainable development.	UNEP

To address data gaps related to SDG indicators at value chain level, additional research through review of recent literature, relevant reports, and scientific articles has been pivotal. This effort enriched the matrix with both qualitative and quantitative information at the value chain level, complemented by feedback and insights from our key partners in Ghana and Vietnam.

Step 3. Qualitative analysis: Semi-structured surveys have been built and administered to farmer organizations (FOs), cooperatives and policymakers (PMs) in Ghana and Vietnam to gather relevant insights and direct opinions. Surveys for both FOs and PMs were divided into four sections: three for the dimensions of sustainability (economic, social and environmental) and one dedicated to sustainability standards. Table 3 collects information about Ghanian stakeholders, whereas in Table 4 the characteristics of Vietnamese stakeholders are provided.

Table 3: Ghana's stakeholders included in qualitative analysis

Typology	Gender	Organization	Role	Affiliation	Value chain
FOs	M	Community Advisory Committee, Israel	Member	Community group	Cashew/cocoa
	M	Cashew Buyers' Association	Chair	Cashew buyers' association	Cashew
	M	ABOCFA, Tei-Mensah	Chair	Cooperative member	Cocoa
	M	ABOCFA, Kokotesua	Secretary	Cooperative member	Cocoa
	M	ABOCFA, Tei-Mensah	Secretary	Cooperative member	Cocoa
	M	ABOCFA, Yokuhe	Chair	Cooperative member	Cocoa
	F	EU Delegation	Programme Manager: Sustainable Agriculture & Cocoa	Development Partners	Cocoa
	F	EU Delegation	Programme Officer: Macro-Economic & Trade Section	Development partners	Cocoa

PMs	M	African Center for Economic Transformation (ACET)	Senior Policy Analyst and Private Sector Development	Researcher	Cashew/cocoa
	M	African Center for Economic Transformation (ACET)	Senior Policy Analyst and Private Sector Development	Researcher	Cashew/cocoa
	M	African Center for Economic Transformation (ACET)	Senior Policy Analyst and Private Sector Development	Researcher	Cashew/cocoa
	M	COCOBOD	Deputy Director of Research	Policy makers	Cocoa
	M	Ghana International Trade Commission	Researcher	Policy makers	Cashew/cocoa
	M	Ghana International Trade Commission	Researcher	Policy makers	Cashew/cocoa
	F	Ministry of Food and Agriculture	Director, Women in Agriculture	Policy makers	Cashew/cocoa

Source: authors' elaboration

Table 4: Vietnam's stakeholders included in qualitative analysis

Typology	Gender	Organization	Role	Affiliation	Value chain
FOs	M	Que My Thanh Commune, Tan Tru District, Long An Province.	Head of 1 Hamlet	Farmer's organizations & cooperative members	Rice
	M	Dong Son Commune, Go Cong Tay District, Tien Giang Province.	Agricultural Officer of Dong Son Commune	Farmer's organizations & cooperative members	Rice and dragon fruit
	M	Long Binh Commune, Go Cong Tay District, Tien Giang Province.	Agricultural Officer of Long Binh Commune	Farmer's organizations & cooperative members	Rice
	M	Huong Tho Phu Commune, Go Cong Tay City, Long An Province.	Agricultural Officer of Huong Tho Phu Commune	Farmer's organizations & cooperative members	Rice
	M	Cooperative of Linked Regions for Growing Dragon Fruit in Van Thanh	Cooperative director	Farmer's organizations & cooperative members	Dragon fruit
	M	Hoa Phu Hamlet, Long Binh Commune, Go Cong Tay District, Tien Giang Province.	Head of Hoa Phu Hamlet	Farmer's organizations & cooperative members	Rice
	M	Huong Tho Phu Commune, Go Cong Tay City, Long An Province.	Agricultural Officer of Huong Tho Phu Commune	Farmer's organizations & cooperative members	Rice and dragon fruit
	M	Head of An Binh Hamlet, Hiep Thanh Commune, Chau Thanh District, Long An Province.	Head of An Binh Hamlet, Hiep Thanh Commune	Farmer's organizations & cooperative members	Dragon fruit
	M	Hoa Phu Hamlet, Long Binh Commune, Go Cong Tay District, Tien Giang Province.	Deputy Head of Hoa Phu Hamlet	Farmer's organizations & cooperative members	Rice

	M	Head of 10 Hamlet, Loc Thanh Commune, Bao Lam District, Lam Dong Province.	Head of 10 Hamlet, Loc Thanh Commune	Farmer's organizations & cooperative members	Tea
	M	Tram Hanh Commune, Da Lat City, Lam Dong Province.	Agricultural Officer of Tram Hanh Commune	Farmer's organizations & cooperative members	Tea
PMs	M	Agriculture and Rural Development Department of Tan Tru District, Long An Province.	Head of Department	Policy maker	Rice and dragon fruit
	F	Service Center and Agriculture of Long An Province.	Head of Department	Policy maker	Dragon fruit
	M	Service Center and Agriculture of Long An Province.	Director	Policy maker	Rice
	M	Agriculture and Rural Development Department of Tan Tru District, Long An Province.	Head of Department	Policy maker	Rice and dragon fruit
	M	Rural Development and Irrigation Department of Long An Province.	Head of Department	Policy maker	Rice and dragon fruit
	F	Agriculture and Rural Development Department of Tan Tru District, Long An Province.	Head of Department	Policy maker	Rice and dragon fruit
	M	Department of Agriculture and Rural Development of Lam Dong Province.	Head of Department	Policy maker	Tea
	M	HCMC Department Of Agriculture & Rural Development.	Head of Department	Policy maker	Tea
	M	Felix Technology Solutions Jsc.	Director	Trader	Tea

Source: authors' elaboration

Results were analysed using narrative and text analysis for both case study. The software IRaMuTeQ version 0.7 alpha 2[2] has been used for textual analyses. Indeed, to present a comprehensive elaboration of outcomes, the main results divided per SDGs and stakeholders' typology (Fos and PMs) were complemented with the most relevant figures, presented in the following order of priority: dendrogram, similarity graph, and word cloud, reflecting the robustness of the analysis.

Step 4. Quantitative analysis: A close-ended survey was designed and conducted with smallholder producers in Ghana and Vietnam to collect structured data at field level. This step was aimed at filling the aforementioned gaps in information and data revealed by the literature reviews and analysis of SDGs databases on linkages between trade and sustainability in the selected value chains. The quantitative survey has been based on the same 7 SDGs, addressed to local farmers, divided into the same four main sections of the qualitative ones, with different questions. Table 5 shows stakeholders' characteristics for both countries. A total of 532 farmers have been reached in Ghana, coming 321

[2] Ratinaud, P. (2014). IRAMUTEQ: Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires [Computer software], http://www.iramuteq.org. Touluse, Lerass

from the cocoa value chain and 211 from the cashew one. The sample showed an almost equal gender representation among the two, with a higher male presence for both crops. In Vietnam, 332 smallholder farmers across the country have been reached through a structured sample selection. 110 farmers came from the rice value chain, 105 from tea, and 117 from dragon fruit. The sample demonstrates an almost equal gender representation.

Table 5: Farmers' stakeholders involved in quantitative analysis

	Ghana		Vietnam		
	Cocoa	**Cashew**	**Rice**	**Tea**	**Dragon Fruit**
Male	227 (70.7%)	155 (73.5%)	58 (52.7%)	52 (49.55)	66 (56.4%)
Female	94 (29.3%)	56 (26.5%)	52 (47.3%)	53 (50.5%)	51 (43.6%)
Tot	**321**	**211**	**110**	**105**	**117**

Source: Authors' elaboration

Step 5. Conclusion and policy recommendations: The findings from desk research, combined with the results of qualitative and quantitative surveys, were triangulated to provide a comprehensive understanding of the relationship between trade and sustainability, along with actionable recommendations for each value chain.

In Ghana, cocoa and cashew value chains play crucial roles in the agricultural sector, though with different development and challenges. Cocoa represents a keystone of the national economy despite having caused significant environmental challenges, including deforestation and pesticide pollution. Cashew, a pretty new crop, is offering many opportunities for sustainable growth due to its resilience to climate change and reduced need for pesticides. They both provide livelihoods for millions of smallholders' farmers while contributing to export revenues but addressing the various challenges they face in terms of economic instability, environmental degradation, gender inequalities and vulnerability to climate change (especially cocoa) would be vital to allow Ghana's progress toward achieving the Sustainable Development Goals (SDGs).

In Vietnam, several gaps persist in the rice and tea value chains despite institutional efforts and significant progresses in promoting sustainability of the two historical crops. Among these, the need to boost the adoption of sustainable farming practices while reducing pesticides use; the empowerment of women in terms of improved access to training, credit and land, as well as equal salaries; the enhancement of labour standards and work safety. Dragon fruit, instead, is a relatively new crop intended mainly for export, which seems adapting well to climate conditions and without causing any particular issues in terms of pollution and biodiversity losses. Similar to what happens in rice and tea value chains, areas that need improvement concern mainly labour standards, sharing of climate change adaptation practices, forest management and trade incentives. By addressing these gaps, the EVFTA could then offer opportunities to incentivize the production of high-quality rice, tea and dragon fruit for both domestic and export markets.

2. Lessons learned from context heterogeneity

The lessons learned presented in this section reflect the heterogeneity of agreements with the EU - the EU-Vietnam Free Trade Agreement (EVFTA) and the EU-Ghana Economic Partnership Agreement (EPA) - as well as the distinct characteristics of the analysed value chains: cocoa and cashew in Ghana and, rice, tea, and dragon fruit in Vietnam. These lessons are grouped into two main categories: "Key insights", which explore how variations in government support, value chain structures, and economic, social and environmental dimensions shape trade-sustainability linkages; and "Comparative outcomes between Ghana and Vietnam", which analyse commonalities and differences between the analysed value chains in Ghana and Vietnam, with an in-depth focus on the EVFTA.

2.1 Key insights

The following subsection aims to explain how variations in government support, value chain structures, and economic, social and environmental dimensions shape trade-sustainability linkages across different value chains in Ghana and Vietnam.

2.1.1 Ghana

2.1.1.1 Government support

Cocoa: The cocoa sector benefits from robust governmental support, primarily through the Ghana Cocoa Board (COCOBOD). Established in 1947, COCOBOD regulates cocoa production, marketing, and quality control. It carries out several initiatives, such as research programs and disease control interventions (e.g., mass spraying), to strengthen the sustainability of Ghana's cocoa sector. Additionally, the Government of Ghana takes part in the price setting process at the beginning of each season in order to protect farmers from international market volatility.

Cashew: Compared to cocoa, cashew producers face weaker institutional support and greater exposure to international price volatility. In recent years, the cashew sector has seen increasing governmental support through initiatives such as the Cashew Development Project (CDP) and the Tree Crops Development Authority (TCDA). These programs have focused on providing training, improving access to credit and facilitating market opportunities.

2.1.1.2 Value chain structures

Cocoa: The cocoa value chain is highly organized, with a significant portion of production regulated and marketed through cooperatives and COCOBOD-affiliated buyers. However, the processing and manufacturing of cocoa are dominated by international firms, limiting the share of value-added benefits accruing to Ghanaian farmers.

Cashew: The cashew value chain is highly fragmented, with most raw cashews exported for processing in Vietnam and India. Over 90% of cashew exports consist of unprocessed raw nuts, significantly limiting local value added. The weak bargaining power of smallholder farmers further exacerbates income inequalities within the sector.

2.1.1.3 Economic dimension

Cocoa: Despite being Ghana's top export crop, cocoa farming remains economically unsustainable for many smallholder farmers. Most cocoa farmers earn below the Living Income threshold due to small farm sizes, low yields (often under 350 kg/ha), and high production costs. Value distribution heavily favours downstream actors, such as manufacturers and retailers, with farmers obtaining only 6.6% of the total earnings.

Cashew: Cashew farming is an increasingly important source of income for smallholders, with average yields of around 400 kg/ha. However, yield fluctuations are very common among cashew farmers, due to several challenges faced by the sector, such as price fluctuations, land tenure issues, high borrowing costs, and limited access to agricultural extension services, all of which constrain the profitability of the cashew sector. Additionally, the seasonal nature of the crop and the reliance on monocropping systems create income gaps for farmers.

2.1.1.4 Social dimension

The social dimension focuses on common issues - labour standards, gender inequality and child labour - that cut across all value chains. These challenges require systemic interventions rather than sector-specific solutions, as they are deeply embedded in the broader agricultural sector in Ghana.

Labour standards: Cocoa production relies on a mix of family labour and sharecropping systems, such as Abunu and Abusa. Sharecroppers, particularly those under Abusa arrangements, are vulnerable to exploitation and often lack access to sustainability programs, which typically require land ownership. The same informal labour arrangements are widespread in the cashew sector, leaving workers with limited social protections.

Gender inequality: Women are essential to both value chains but face significant barriers, including limited access to land ownership due to patrilinear or paternal inheritance systems, and unequal access to resources and training. Only a small percentage of landowners are women, restricting their

participation in decision-making processes and sustainable agricultural initiatives, including certification schemes.

Child labour: Although child labour is widely recognized in literature as a pervasive issue, particularly in the cocoa sector, stakeholders emphasise that significant efforts have been made to address this controversial challenge. They argue that children's involvement in the farms' activities does not hinder their school attendance and, instead, is viewed as an important part of their upbringing and integration into their communities. Nevertheless, systemic challenges persist, largely due to the widespread poverty in rural Ghanaian areas.

2.1.1.5 Environmental dimension

Cocoa: On the one hand, cocoa farming contributes to climate change as often associated with deforestation, soil degradation and biodiversity loss. On the other hand, it faces its consequences, as cocoa harvest is threatened by rising temperatures and declining rainfall. It is therefore crucial that environmental programs focus on disease control and agroforestry management systems in order to both mitigate environmental impacts and improve the sustainability of the cocoa sector.

Cashew: Cashew is a relatively drought-tolerant perennial crop, making it more resilient to the effects of climate change. However, monocropping practices and limited investment in agroecological approaches (e.g., agroforestry, intercropping systems) can exacerbate soil degradation and reduce the long-term sustainability of the cashew sector.

2.1.2 Vietnam

2.1.2.1 Government support

Rice: Vietnam's government has played a pivotal role in sustaining rice production through policies, such as Resolutions No. 63/NQ-CP (23/12/2009) and Resolution No. 34/NQ-CP (25/03/2021), which guarantees minimum profitability for rice farmers. Subsidies for irrigation services and direct payments for maintaining rice land have stabilised production but discouraged the adoption of water-efficient technologies.

Tea and dragon fruit: Tea and dragon fruit have benefited from broader agricultural programs, such as Decision No. 339/QD-TTg (19/02/2013) on the Economic Restructuring Master Plan; however, they lack specific targeted governmental interventions compared to rice. These value chains face chronic constraints, including low productivity, underdeveloped rural infrastructure, and limited access to extension services, especially for smallholder farmers.

2.1.2.2 Value chain structures

Rice: The rice sector faces imbalances, as it is dominated by smallholder farmers in production while larger firms control the export market. Smallholders often cannot access high-value markets due to quality constraints and limited access to international certification programs (e.g., GlobalGAP).

Tea: The tea value chain's fragmentation, characterised by a mix of diverse processing firms and small cooperatives, hampers the consistent production of high-quality tea required to meet the demands of export markets.

Dragon fruit: Dragon fruit production is highly export-driven and heavily dependent on China as its primary export market. The dragon fruit value chain is characterised by strong vertical integration. Export firms often dominate the sector, marginalising smallholder farmers and limiting their access to higher-value markets.

2.1.2.3 Economic dimension

Rice: The EVFTA has created significant opportunities for Vietnam's rice exports. However, rice often sells at lower prices due to quality issues and limited adoption of international certification

schemes, such as GlobalGAP and the Sustainable Rice Platform. These certifications help align production with international sustainability standards but remain inaccessible for many smallholders due to high costs, limited capacity, and weak institutional support.

Tea: Tea exports in Vietnam face constraints stemming from fragmented supply chains and low product quality. Although EVFTA offers opportunities for market expansion, the adoption of certifications like Rainforest Alliance and VietGAP remains low. This is partly due to the limited incentives for smallholders to meet international standards and the low premium prices offered for certified tea.

Dragon fruit: Dragon fruit has significant potential for market diversification under the EVFTA framework. However, the sector currently relies heavily on exports to China, which accounts for 90% of total exports, making it vulnerable to market fluctuations. Compliance with certifications, like GlobalGAP, has been higher in the dragon fruit value chain compared to other value chains, driven by export market demands. Despite this progress, there is a need to further align production with EU sustainability standards to unlock its full potential in high-value markets.

2.1.2.4 Social dimension

The social dimension focuses on common issues - labour standards, gender inequality and child labour - that cut across all value chains. These challenges require systemic interventions rather than sector-specific solutions, as they are deeply embedded in the broader agricultural sector in Vietnam.

Labour standards: Informality dominates Vietnam's agricultural sector, with rice farming heavily reliant on informal and unskilled labour. Poor working conditions and exposure to extreme heat are prevalent, particularly in the Mekong Delta. In the tea sector, informal labour arrangements are widespread, with many workers, especially women, engaged in physically demanding tasks such as plucking leaves and manual processing. These labourers often lack formal contracts, receive low daily wages, and have limited or no access to social protections like healthcare and job security. Similarly, the dragon fruit value chain is heavily dependent on seasonal informal workers, particularly during harvesting and post-harvest handling. These workers frequently operate without formal agreements, leaving them exposed to wage instability, inadequate safety measures, and exploitative labour practices.

Gender inequality: Women contribute significantly to the labour force in rice, tea and dragon fruit production but face barriers such as unequal wages, limited access to training, and smaller landholdings. Gender disparities in decision-making and economic resource allocation are pronounced across these three value chains, with women carrying an increasing workload due to the double burden of agricultural labour and domestic responsibilities.

Child labour: According to interviewed stakeholders, although children's participation in agricultural tasks is often voluntary and does not interfere with their education, child labour persists in rural agricultural areas, particularly among poor households. This issue underscores the need for targeted interventions in social policies linked to trade.

2.1.2.5 Environmental dimension

Rice: Rice production contributes significantly to Vietnam's greenhouse gas (GHG) emissions, particularly methane. Government initiatives, such as "One Must Do, Five Reductions" (1M5R), aim to mitigate these environmental impacts, but their effectiveness is limited by uneven adoption across the countries.

Tea: Environmental challenges in tea cultivation include deforestation and soil degradation. While progress has been made in reducing pesticide use, broader adoption of sustainable practices, such as agroecological approaches, requires stronger policy support.

Dragon fruit: The dragon fruit sector faces challenges related to water use and pest control, although its environmental footprint is lower compared to rice and tea. However, its heavy reliance on chemical products poses ongoing environmental concerns.

2.2 Comparative outcomes between Ghana and Vietnam

This subsection examines the commonalities and differences between the cashew and cocoa value chains in Ghana and the rice, tea and dragon fruit value chains in Vietnam, with an in-depth focus on the EU-Vietnam Free Trade Agreement (EVFTA), which represents a 'new generation' of Free Trade Agreements promoted by the EU.

2.2.1 Commonalities across value chains

Smallholder farmers: Smallholder farmers dominate production across the analysed value chains in both countries. In Ghana, smallholders cultivate most of the cocoa and cashew, while in Vietnam, they are pivotal to rice, tea and dragon fruit production.

Resource constraints: Farmers' limited access to resources, such as credit, extension services, productive inputs, and infrastructure, poses a significant challenge, reducing productivity and making it difficult to meet the international standards required by export markets.

Gender inequality: Gender disparities are prevalent in both countries. Women represent a significant share of the labour force but have less access to land ownership, financial resources and decision-making roles across value chains.

Market access: Farmers in both countries face challenges in accessing high-value markets due to difficulties in meeting quality standards, high certification costs, and limited market integration of smallholder producers. These issues are more pronounced in fragmented value chains, such as cashew in Ghana and tea in Vietnam.

Labour informality and social protection: Farmers' work is often characterized by limited access to stable contracts, social protection mechanisms, and labour rights, leaving them vulnerable to economic shocks, income instability, and health issues. Smallholder farmers frequently lack access to pension schemes, health insurance, and unemployment benefits, further exacerbating poverty and inequality. Informal labour also perpetuates child labour and gender inequities, particularly in fragmented value chains, where weak institutional frameworks hinder the implementation of comprehensive social protection.

Skilled workforce and training: Smallholder farmers often lack adequate technical knowledge to improve productivity, adopt sustainable practices, and meet international standards. Training programs are often underfunded or restricted to specific initiatives led by development agencies, NGOs, or private actors. Furthermore, unequal access to extension services exacerbates this issue, particularly in remote areas, hindering farmers’ ability to adopt best practices and comply with international standards.

Environmental challenges: Cocoa farming contributes to deforestation and biodiversity loss, while cashew farming presents lower environmental risks but lacks sustainable management practices (e.g., agroecological approaches). Rice cultivation in Vietnam is associated with high water consumption and GHG emissions, while tea and dragon fruit face challenges such as pesticide use and soil degradation. Both countries face difficulties in scaling sustainable agricultural practices, as the adoption of environmentally friendly technologies appears limited, restricting benefits to a local scale.

2.2.2 Key differences across value chains

Policy frameworks: Cocoa benefits from strong government oversight through COCOBOD, which ensures quality control, minimum pricing, and farmer interventions, such as subsidized inputs and pest management. Cashew, with less institutionalized support, relies on emerging initiatives like the Cashew Development Project (CDP) and the Tree Crops Development Authority (TCDA). These provide training, technical assistance, and sector regulation. However, challenges persist in price stabilization, input access, and expanding local processing. The Government of Vietnam's interventions in rice include subsidies for fertilizers and seeds, irrigation schemes, and guaranteed purchasing prices to ensure food security and support smallholders. Tea and dragon fruit, however, are shaped by market-driven policies that emphasise private sector participation and export incentives.

Value-added and market diversification: Cocoa and cashew have primarily been exported as raw commodities with low value added. Efforts to expand domestic processing capacity, including initiatives by COCOBOD and TCDA, have been made but remain limited. In contrast, Vietnam has made significant strides in exporting high-quality and processed agricultural products, particularly rice and dragon fruit, catering to more remunerative markets such as the EU and North America.

Sustainability certifications: Cocoa is highly integrated into certification schemes, such as Fairtrade and UTZ, promoting sustainable farming and fetching premium prices. Cashew certification uptake remains limited due to institutional and financial constraints. Certification adoption is growing in rice and dragon fruit (e.g., VietGAP), driven by the Vietnamese Government and export market demands. Standards like Rainforest Alliance and GlobalGAP have improved competitiveness, although the tea sector lags due to fragmented value chains and weak incentives (e.g., low price premium for farmers).

2.2.3 The EVFTA: Trade and sustainable development chapter and geographical indication products

Compared to the EPA with Ghana, the EVFTA represents a "new generation" of free trade agreements promoted by the EU and includes the Trade and Sustainable Development (TSD) Chapter, which sets a benchmark for embedding sustainability in trade agreements. It promotes compliance with labour rights, environmental protections, and sustainability standards, influencing Vietnam's agricultural and trade policies. Moreover, the EVFTA includes a list of Geographical Indication (GI) products that are mutually recognized by the parties.

Trade and sustainability certifications: The EVFTA has incentivized compliance with international standards for export-oriented crops such as rice, tea and dragon fruit. Certifications like GlobalGAP, the Sustainable Rice Platform (SRP), and Rainforest Alliance have improved farming practices, reduced environmental impacts, and aligned production with EU requirements.

Multilateral labour standards: The EVFTA includes provisions to uphold International Labour Organization (ILO) labour standards, addressing critical issues such as child labour, gender equity, and workplace safety. While these provisions have initiated discussions to improve working conditions in Vietnam's agricultural value chains, informal labour arrangements in key sectors like rice and tea hinder progress toward equitable and safe working environments.

Geographical indications (GIs): GIs enhance the branding and marketability of Vietnamese agricultural products, including rice, tea, and dragon fruit, in the EU market. GIs are associated with high-quality standards, enabling smallholder farmers to secure better prices. For example, rice

varieties like Hải Hậu and Điện Biên, tea from Mộc Châu, and Bình Thuận dragon fruit have leveraged GI certification to access high-value EU markets.

3. Policy recommendations

Examining the results and subsequent policy recommendations cannot be separated from the framework of existing trade agreements, which play a crucial role in shaping national agricultural strategies and development priorities. The iEPA between the European Union and Ghana, alongside the EVFTA, significantly influences how each country approaches agricultural policy.

In Ghana, agricultural policies focus on promoting sustainability and safeguarding local industries. This involves implementing measures that protect domestic producers while fostering environmentally sound practices to ensure long-term agricultural viability. On the other hand, Vietnam's strategies are oriented toward rapid integration into international markets. The country emphasises adherence to stringent quality and safety standards, which help improve its agricultural exports and align with global market demands.

These distinct approaches underscore how trade agreements can effectively navigate sectoral development and economic growth, aligning with both international commitments and emerging market opportunities.

Before delving into specific policy recommendations tailored to each country and the associated SDGs, the challenges that agricultural value chains face in Ghana and Vietnam must be highlighted first. This comprehensive analysis serves as a foundation for identifying relevant policies and strategies that can be successfully implemented in the future.

Ghana's cocoa and cashew industries and Vietnam's rice, tea, and dragon fruit sectors encounter various shared and unique challenges.

In Ghana, once a major contributor to the country's economy, the cocoa industry faces significant environmental issues, including deforestation and pesticide pollution. These challenges are compounded by declining farmer incomes, making cocoa farming less appealing to the younger generation. On the other hand, the cashew industry presents an opportunity for sustainable growth, but avoiding the environmental pitfalls that have affected cocoa cultivation is crucial.

In Vietnam, the rice sector is under threat due to land fragmentation, overreliance on chemical inputs, and the adverse impacts of climate change. The tea and dragon fruit industries are also dealing with sustainability challenges, product quality issues, and gender equality concerns.

Both Ghana and Vietnam highlight several common themes that call for improvements in environmental sustainability, efforts to ensure decent incomes for farmers, the promotion of gender equality, and the adoption of broader certification standards. These measures are essential for gaining access to more lucrative international markets.

Table 6 highlights the unique challenges encountered by Ghana's cocoa and cashew value chains, emphasising the need for targeted interventions to address the specific issues affecting each sector.

Table 6: Challenges in Ghana by Value Chains

Topic	Cocoa value chain	Cashew value chain
Farmer incomes	Declining profitability; incomes below poverty thresholds.	Growing sector but still offers low incomes for farmers.
Environmental sustainability	Deforestation, pesticide pollution, and biodiversity loss from monoculture practices.	Opportunity for sustainable growth; lower pesticide usage but needs careful management to avoid future issues.
Climate change vulnerability	Highly sensitive to climate change; water scarcity and soil degradation.	Resilient to climate change; less water-intensive but still faces risks.

Land tenure issues	Complex land tenure systems (Abuna, Abusa) limit access to land; challenges in formalizing land rights.	Fewer entrenched systems, but land access and ownership issues persist.
Gender inequality	Women face limited land inheritance rights and lower incomes; concentrated in lower-value tasks.	Slightly better opportunities for women, but income and access disparities remain.
Health risks	High exposure to hazardous tasks like pesticide application without adequate protection.	Lower pesticide uses but still risks without proper PPE and training.
Youth engagement	Sector losing appeal to younger generations due to low incomes and challenging conditions.	Emerging sector with potential appeal but also limited profitability for youth.
Market access and certification	Limited adoption of sustainability certifications; high costs and low farmer awareness.	Potential for certification, but similar barriers as cocoa, including cost and market access.
Child labour concerns	Persistent issues with child labour, particularly in hazardous tasks like weeding.	Less pronounced but still requires monitoring to prevent hazardous labour practices.
Policy and support needs	Need for integrated policies to address environmental, economic, and social challenges.	Requires supportive policies to promote sustainable practices and fair market access.

Source: Authors' elaboration based on case study analysis

By strategically addressing these challenges through targeted policy interventions, comprehensive training programs, and robust support systems, Ghana can pave the way for more sustainable and equitable growth in its cocoa and cashew sectors.

Table 7 effectively highlights the critical challenges confronting each value chain in Vietnam, divided into economic, environmental, gender-related, safety, sustainability, certification, and policy issues. Comprehending these challenges is crucial for driving transformative improvements and fostering growth in these essential areas.

Table 7: Challenges in Vietnam by value chains

Topic	Rice	Tea	Dragon Fruit
Economic challenges	- Excessive land fragmentation limits productivity and market power.	- Small-scale production limits ability to meet international market standards.	- Heavy dependence on the Chinese market poses risks to profitability and market stability.
Environmental challenges	- Reliance on chemical inputs threatens long-term productivity. - Water scarcity and salinity intrusion exacerbated by climate change.	- Overreliance on fertilizers and weather-related risks reduce crop quality and stability.	- Increasing use of chemicals risks competitiveness and environmental impact.
Gender inequality	- Women face smaller farm sizes and hazardous tasks with limited training.	- Significant gender pay gap and limited access to finance, credit, and training for women.	- Women's roles are limited to simpler, lower-value activities.
Occupational safety	- High rate of informal labour and lack of protective equipment.	- Inappropriate use of chemicals threatens health and environmental quality.	

Sustainability	- Conventional methods lead to GHG emissions and biodiversity loss.	- Climate change and unsustainable practices contribute to water scarcity and soil degradation.	
Certification barriers	- High costs and fragmented landholdings hinder the adoption of certification schemes.	- Low adoption rates of sustainable and organic practices despite higher profitability.	- Difficulty meeting international standards due to smallholder dominance and financial constraints.
Policy and istitutional gaps	- Need for integrated policies to promote sustainable practices and market development.		- Fragmented institutional support and overlapping responsibilities create confusion and hinder compliance efforts.
Supply chain issues			- Presence of intermediaries and informal relationships lead to asymmetric benefit distribution and lack of written contracts.
Cooperative strength			- Weak cooperative organization limits production planning and bargaining power.

Source: Authors' elaboration based on case study analysis

After assessing each country's obstacles in different supply chains, a table summarising the shared issues facing Ghana and Vietnam has been developed, regardless of the particular supply chains involved. These overlapping challenges highlight the need for focused interventions to enhance sustainability, economic feasibility, and social equity within the agricultural sectors of both Ghana and Vietnam.

Table 8 explores the similarities between Ghana's agricultural value chains (cocoa and cashew) and those in Vietnam (rice, tea and dragon fruit).

Table 8: Common features and challenges in the countries between the supply chains

Aspect	Ghana (cocoa & cashew)	Vietnam (rice, tea & dragon fruit)
Low farmer incomes	Farmers earn below poverty thresholds; economic challenges in value chains.	Farmers earn low incomes, with limited profitability in value chains.
Market access and certification	The challenges with adopting certification schemes like Fair Trade include high costs and low awareness.	Barriers to certification (VietGAP, GlobalGAP) due to high costs and fragmented farms.
Sustainability issues	Environmental issues such as deforestation and biodiversity loss from monoculture.	Overuse of chemical inputs leads to soil degradation and water pollution.
Climate change vulnerability	Cocoa and cashews are sensitive to climate change, water scarcity and soil erosion.	Rice, tea, and dragon fruit are affected by water scarcity, salinity, and extreme weather.
Limited access for women	Women face limited land inheritance rights, lower income, and fewer opportunities in higher-value tasks.	Women have smaller farm sizes, lower incomes, and limited access to credit and training.
Health risks	Farmers lack PPE and face exposure to hazardous tasks like pesticide application.	Farmers often lack protective equipment, increasing health risks from chemicals.
Land tenure issues	Complex traditional systems (Abuna, Abusa) limit land access and productivity.	Land fragmentation reduces productivity and market efficiency.
Need for policy support	Integrated policies required to address environmental and economic challenges.	Policies needed to support sustainable practices, market access, and equity.

Child labour concerns	Child labour persists in hazardous tasks, though efforts are being made to reduce it.	Reports of child labor in agriculture, with ongoing concerns in certain sectors.
Weak cooperative structures	Need for stronger cooperatives to improve farmers' market power and compliance with standards.	Limited number of cooperatives in dragon fruit; need for stronger organizations to support farmers.

Source: Authors' elaboration based on case study analysis

3.1 Policy Recommendations by SDGs

Table 9 highlights policy recommendations from the questionnaires submitted to local stakeholders divided by SDGs. Many of them are common to the two countries analysed. Specific policy recommendations by country are reported in the corresponding column.

Table 9: A synthetic representation of the main required policy action according to the SDGs

	Ghana	Vietnam
SDG 1: No Poverty	To improve livelihoods and reduce poverty in farming communities, both countries should enhance technical skills of workers, especially women.	
	In Ghana, the pre-condition to ensure is the formalization of land tenure systems alongside with the diversification and stabilization of income, the access to financial services and the enhancement of work conditions.	Vietnam should support the participation of smallholder farmers to cooperatives who play a crucial role in helping farmers increasing their income, to have formal contracts and to access to the richest foreign markets.
SDG 2: Zero Hunger	Improving farmer education and support capacity building initiatives are considered fundamental for both countries to improve knowledge on sustainable agricultural practices for both food security and environmental sustainability. Supporting sustainable farming techniques are in both cases important to prevent soil erosion and improve land productivity.	
	Ghana should promote local product processing to enable Ghanaian producers to retain greater value within the country.	In Vietnam, other relevant policy recommendations include promoting EU-Vietnam knowledge-sharing initiatives to advance climate-smart agricultural innovations and encouraging the adoption of VietGAP and GlobalGAP certifications to improve production standards and marketability.
SDG 5: Gender Equality	In both countries, empowering women and promoting gender equity in agriculture should involve ensuring that women have equal access to land ownership and inheritance rights, while also ensuring training and skills development, improving women's participation in decision-making and, overall, creating equal opportunities and reducing the gender wage gap supporting women's access to resources (agricultural inputs, finance, and technology).	
SDG 6: Clean Water and Sanitation	Although the analysed supply chains of both countries present different levels of vulnerability related to drought, reduced rainfall and salinity levels, sustainable water management is essential. To this end, it is necessary to support the development of sustainable water management systems, provide technical assistance to small farmers to address water scarcity also in view of climate change, and promote sustainable agricultural techniques to reduce water pollution.	
	No specific actions are required for Ghana.	For Vietnam the support to public-private partnerships is considered crucial to improve irrigation systems and ensure water-efficient practices.
SDG 8: Decent Work and Economic Growth	Support for producer organizations is seen as a means to ensure both better working conditions and economic growth, in both countries.	
	At the same time, for Ghana, there is the need to facilitate the access to Personal	For Vietnam, the focus is on aligning labour standards with the ILO's Decent Work

	Protection Equipment and raise awareness on the importance of its correct use, together with the promotion of the adoption of agricultural insurance schemes.	Agenda and collaborating to create more economic opportunities for smallholder farmers through initiatives that increase added value including through the development of a local processing industry to differentiate destinations and market segments.
SDG 15: Life on Land	The need to restore degraded land through sustainable land-use practices, including agroecological practices, and to improve farmers' skills in these practices, with the support of cooperative systems and associations, are common to both countries. More targeted policy recommendations concern specific value chain.	
	In Ghana, the cocoa and cashew value chains need to integrate their cultivation into agroforestry systems to address deforestation.	In Vietnam, the rice value chain should encourage integrated rice-fisheries systems to increase productivity while conserving natural habitats.
SDG 17: Partnerships for the Goals	Policy recommendations for achieving this SDG are sensitive to the type of relationship with the EU and the degree of development of production certifications, including organic production. Indeed, in Vietnam, certifications are well established unlike Ghana, where the adoption of Voluntary Sustainability Standards need to be expanded to more products (e.g. cashew). For both countries it is recommended to strengthen partnerships with international organizations, development agencies, donors, and the private sector, with different aims according to country.	
	For Ghana, the partnership should promote sustainable agricultural practices, improve farmer income, and enhance market access. Moreover, in Ghana the focus should also be on supporting the development of Voluntary Sustainability Standards for specific crops like cashew, and on encouraging a broader adoption of them for crops which are already covered by certification schemes, like cocoa.	For Vietnam the partnership should improve the setting up and the adoption of higher standard required by international markets. Moreover, for Vietnam where a Free Trade Agreement with EU is in place, it is recommended to build capacity for Vietnamese enterprises and authorities to ensure compliance with EU sustainability regulations and enhance institutional and scientific cooperation to improve linkages and integration into the policy measures and standards required by the European market.

Source: Authors' elaboration based on case study report

3.2. Policy recommendations by sustainability pillars

The goal of organising the policy recommendations comes out of the questionnaires to different actors of the value chain in Ghana and Vietnam according to the main pillars of sustainability, which requires some flexibility since any of them could cover more than one pillar of sustainability. In fact, each goal has many direct and indirect effects on economic, social, and environmental sustainability. At the same time, Table 10 provides general policy recommendations without attributing them to specific countries. Indeed, this concluding exercise aims more to systematise the required action and policy demand in a more generalised framework of sustainability rather than highlighting sector-specific actions and national policy measures. Keeping this in mind and considering that the same idea of sustainability implies that each action can have direct and indirect effects on multiple aspects and meet diverse societal demands, the subsequent paragraphs present the already presented action required (Table 9) into a more general framework of sustainability (Table 10).

Table 10: A synthetic representation of the main required policy action according to the pillars of sustainability

Economic sustainability	Environmental sustainability	Social sustainability
Access to land	Promote agroecological practices	Improve work conditions
Income diversification	Promote sustainable water management	Improve education and capacity building
Income stabilisation programs	Reduce agro-chemical pollution	Improve gender land rights
Access to financial support	Address deforestation	Enhance women in decision-making
Promote local product processing	Restore degraded land	Support women's access to resources
Promoting agricultural insurance	Promote sustainable agricultural practices	Increase access to training and safety equipment
Foster collaboration with international partners	Improve organic production	Support farmers' organisation
Improve technical skills	Improve irrigation systems and WMS	Encourage gender-sensitive trade policies
Improve relationships with donors		Enhance cooperatives
Improve quality and meet standards		Improve fairness along the value chains
Improving the legal system and reducing bureaucracy		Measures for a fairer labour division
Trade Incentives		More transparent rights
Technical assistance to smallholder farmers		Improve food security
Improve the efficient use of production factors		Secure formal contracts
Improve work organisations		

Source: Author's elaboration based on case studies report

Policy recommendations pursuing economic sustainability can be subdivided into three main categories: policies for land access and use, policies for improving economic efficiency, and policies for the supply chain. In the first category, all the advocated measures to make access to land and land rights more transparent, including those securing fair conditions of inheritance for women, can be filed. In the second category, sector measures aimed at improving the efficiency of the agricultural and processing sectors, such as the use of production factors, financial support, and technical skills, are grouped.

Finally, the third category includes measures aimed at improving the functioning of supply chains and their links, such as quality standards, trade incentives, and fostering collaboration with international partners.

Environmental sustainability is intended to be pursued mostly through reducing agrochemical pollution, which is one of the most challenging objectives in both studied countries. Deforestation is also relevant in the case of permanent crops, while organic production is seen as a viable solution for a potential market strategy and for exports.

Ghana and Vietnam have vast spaces for social sustainability, and many policies are advocated to improve them. Three directions of action can be identified: measures in favour of workers' rights, measures in favour of workers' education and training, and measures in favour of filling the gender gap and women's empowerment. In both countries, the role of cooperatives in all these matters seems crucial since they can foster more transparent work conditions and improve skills in all the

components of the households. As for two issues under the spotlight, the gender gap in agriculture and the workers under the legal age, in both countries, there is great awareness of the strict legal rules against discrimination and juvenile work; however, sometimes, there is no full perception of what falls into the regulation norms. For example, women are still involved in seasonal and under-skilled heavy work, while youngsters are involved in weekends and summer as a temporary involvement out of the school season. For these reasons, policy intervention on these aspects is advocated since the current legislation is not fully enforced.

3.3 Trade and Sustainability

The focus provisions and areas of the EU-Ghana iEPA and EU-Vietnam EVFTA define policy recommendations for their respective agricultural value chains. Ghana's policies will likely focus more on sustainability, gradual market integration, and protection of local industries. Vietnam focuses on rapid entry into global markets, high standards, and value creation in various sectors. These differences show how trade agreements can shape local agricultural plans and development goals.

Vietnam faces challenges common to all rice, tea and dragon fruit value chains, including improving working conditions, market access, environmental sustainability and addressing gender inequality. Specific challenges have been different; for example, rice requires greater adaptation to the climate, farmers show less interest in it, and the dragon fruit requires better water management and development of the processing industry. The trade liberalisation process offers opportunities but challenges for agricultural value chains. On the one hand, increased exports can increase farmers' incomes, improve workers' standards and promote economic stability. Market integration encourages compliance with international certification standards, and thus, the condition of workers can be improved. But we must not forget the challenges, and for this reason, it is essential not to underestimate primarily the environment and its associated costs, particularly in the case of cocoa in Ghana and tea in Vietnam. An increasing demand for these products, especially cocoa, can lead to deforestation, biodiversity loss, and disproportionate use of chemicals. Global policies and broad-based, global cooperation are needed to address these challenges.

Table 11 presents the trade and sustainability issues faced by Ghana and Vietnam's agricultural sectors, showing how their respective trade agreements with the EU influence these issues.

Table 11: Trade and sustainability recommendations in the implementation of the agreements

Topic	Ghana (Cocoa and Cashew)	Vietnam (Rice, Tea, Dragon Fruit)
Trade Issues	- Improved access to EU markets through iEPA.	- Tariff reductions and privileged market access via EVFTA.
	- Need to meet higher quality and sustainability standards to enhance international competitiveness.	- Requirement to comply with stringent EU standards for quality and traceability.
	- Challenges in increasing crop profitability under the iEPA framework.	- Encouragement to adopt certifications like VietGAP and GlobalGAP to meet EU demands.
Sustainability Issues	- Emphasis on eco-friendly farming practices to align with iEPA sustainability standards.	- Promotion of sustainable agricultural practices as a key aspect of the EVFTA.
	- Focus on reducing environmental impact, especially in cocoa and cashew farming.	- Elevation of working conditions and encouragement of sustainable practices through certifications.
	- Addressing gender equality and enhancing the roles of women in agricultural sectors.	- Addressing gender imbalances, empowering small farmers, and strengthening agricultural cooperatives.
	- Aligning national policies with iEPA commitments to overcome environmental and social challenges.	- Aligning national strategies with EVFTA to promote sustainable, inclusive growth.

Source: author's elaboration on case studies report

The data presented in the table reveals a significant and complex relationship between trade and sustainability, highlighting several key aspects:

- Sustainability as a competitive advantage: Ghana and Vietnam can gain greater access to the European market if they adopt sustainable agricultural practices. Thus, trade agreements can stimulate environmental and social transformation. For example, Ghana's commitment to eco-farming techniques demonstrates its focus on sustainability. Vietnam's accession to VietGAP and GlobalGAP shows how the integration of sustainability into business strategies aligns, on the one hand, with market expectations, improves competitiveness, and ensures lasting economic profitability.
- Incentivizing better practices: The trade agreements between the EU and Ghana and the EU and Vietnam link specific trade benefits to adopting sustainable and socially responsible practices. This linkage motivates sectors to minimise environmental impacts, enhance labour conditions, and tackle pressing social issues, including gender inequality. Therefore, the agreements allow a shift towards more responsible, sustainable, and ethical practices.
- Aligning policies with global standards: Ghana and Vietnam can address their structural challenges by aligning their national policies with the sustainability commitments of trade agreements. This alignment process would permeate the achievement of sustainability goals and the promotion of inclusive development. Examples are Ghana's initiatives on environmental sustainability and the priority of workers' rights in Vietnam.

The agreements contain conditional provisions that promote the interaction between trade and sustainability. These provisions, promoting environmentally sustainable practices on the one hand and social inclusion on the other, allow Ghana and Vietnam to build a more resilient and competitive agricultural sector. Although sometimes stringent, adherence to the clauses in the agreements protects ecosystem health and promotes the well-being of different communities. These synergies through the agreements could strengthen economic ties and lay the foundations for sustainable growth that allows ecological conservation and social equity.

3.2.1 Trade-specific sustainability concerns

Ghana - Cocoa and Cashew value chains

The EU-Ghana iEPA has a positive impact on poverty alleviation for cocoa farmers in Ghana. However, the expansion of cocoa plantations driven by higher global demand and the use of unsustainable agricultural practices has placed significant pressure on natural resources, particularly primary forest. Income generated from cocoa remains insufficient for small growers to ensure a sustainable living wage. Additionally, they are likely to face further challenges in the future due to the adverse effects of climate change, since iEPA’s primary focus is on economic sustainability, while neglecting environmental and social concerns. Cocoa imported into the EU will soon require proof of being deforestation-free. In contrast, the UE currently lacks specific requirements on social issues, such as the gender gap and the prevention of child labour. VSSs are considered the primary market tool for addressing these challenges, provided that they are both reliable and effective.

A key challenge limiting the socio-economics development of both the cocoa and cashew value chains is the minimal level of local processing. These products are predominantly exported as commodities to international markets, significantly limiting opportunities for generating added value within their countries of origin. Trade relations with the EU can play a key role in attracting foreign direct investment (FDI), which can further support the development of local processing industries and unlock their economic potential. Specifically, the local processing of cashew offers the potential for direct trade with the EU, eliminating the need for intermediaries such as India and Vietnam. Such direct trade would foster the production of high-quality, sustainable products while enabling the country to retain a greater share of the added value.

Vietnam - Rice value chain

The EU-Vietnam Free Trade Agreement presents an opportunity to strengthen sustainability in Vietnam's rice sector by improving market access, while ensuring environmental and social responsibility. A critical step is to expand the role of VSS, such as the Sustainable Rice Platform, GlobalGAP and organic certifications, in shaping trade relations between the EU and Vietnam. Additionally, VietGAP should be better aligned with other international certifications, to ensure full recognition in global markets. An ambitious approach would involve linking tariff preferences to sustainability performance, thereby incentivizing exporters and farmers to adopt certified practices. To support this transition, the EU should facilitate capacity-building programs that provide farmers with the knowledge and financial resources needed to comply with these standards. Promoting training on sustainable farming techniques could also improve environmental outcomes by reducing methane emissions and water use.

Currently, Vietnamese rice often struggles to compete in high-value EU markets due to quality concerns and limited branding strategies. Moreover, EU consumers are often unaware of the geographical indications of Vietnamese rice. EU support should focus on rice processing and quality improvement, allowing Vietnam to export premium, high-value rice varieties rather than primarily raw milled rice.

Vietnam's rice sector still faces challenges related to informal labour, including precarious working conditions, lack of social protection, and unsafe work environments. Additionally, gender disparities persist in wages, access to resources, and decision-making roles within the sector. Special attention should be given to women's participation in farm management and cooperatives.

Another pressing concern is environmental sustainability, particularly regarding water use, greenhouse gas emissions, and biodiversity loss. The promotion of eco-friendly packaging and sustainable supply chain logistics could further reduce the environmental footprint of Vietnamese rice exports.

Vietnam - Tea value chain

Enhancing trade relations between Vietnam and the EU through a sustainable and fair implementation of the EVFTA will represent an opportunity to boost GI imports (i.e. tea of Mộc Châu) within the European market, improving their visibility and quality recognition.

Since tea is mainly exported as raw material with the private sector gaining space as trade vector, a stronger link between the two partners should enhance the implementation of required measures bettering product safety and quality, as well as marketing and product diversification processes, which could boost producers' and exporters' added value.

A sustained bilateral trade would mean also a major improvement effort for local tea industry, especially in terms of sector technology and spreading of sustainable cultivation methods, since unsustainable practices and pesticide use remain among the most important challenges to be addressed.

Thanks to the expected and required increased technical skills of workers and the expanded commercial relationships, workers' salaries and land productivity could improve, addressing challenges like small-scale producers' low bargaining power. Forms of cooperation should be vital in this sense, since they are already identified as pivotal in improving workers' conditions and product positioning in the market. Likewise, the implementation of certification systems should gain space, reflecting the benefits enjoyed to date by only a small proportion of producers adhering so far to the various standards in place.

An additional effect of reinforced bilateral trade relations should positively concern workers' representation and collective bargaining, focusing the attention on the functioning of WOs and their engagement in fairly promoting labourers' rights.

Vietnam - Dragon Fruit value chain

The increase of dragon fruit exports towards the EU will imply, at least in the short-medium run, a diversion from exports towards China, which at the moment is by far the largest customer for dragon fruit. As a consequence, there will not be a sudden increase of the production, also due to the limited capacity in terms of land availability and skilled resources. At the same time, trade with the EU will imply better economic conditions and a favourable trend toward the upscaling of the quality of the fruit, which are expected to improve prices and incomes for farmers.

In the longer run, skills and training for workers in the value chain are supposed to grow as an effect of the improve of commercial relationships with the EU, which imply better work conditions, especially for women, who are currently cut out of the most skilled labours. In this case the potential role of cooperatives is key, especially for small farmers.

Trade growth within specific agreements with the EU might imply a revision of the support mechanism of the domestic production, as well as a change in the quality standards of the production, which might have uncertain effect of the local production. Besides, a fast improvement in trade might weaken the chance to build a domestic processing industry.

Finally, an uncontrolled growth of trade might also imply an intensification and an irrational use of chemicals and water in the production process. This could aggravate pollution and water management in the country, with undesirable effects on environment and natural resource uses.

4. Linkages between D.2.2 and D.4.2

This subsection highlights the connections between D.2.2, which examines the integration of SDGs and sustainability provisions in the EU-Vietnam Free Trade Agreement (EVFTA) and the EU-Ghana Economic Partnership Agreement (EPA), and D.4.2, which provides case-specific evidence on trade-sustainability linkages across five key value chains: cocoa and cashew in Ghana, and rice, tea, and dragon fruit in Vietnam. While D.2.2 focuses on the non-product dimension, explicitly analysing the environmental provisions included in the EVFTA and EPA agreements, D.4.2 adopts a product-specific approach, comprehensively examining three dimensions of sustainability: economic, social, and environmental. This distinction is also reflected in the methodological differences between the two deliverables. Both studies rely on a rigorous literature review and qualitative interviews with key stakeholders operating in the selected value chains. However, D.4.2 also incorporates quantitative analysis, providing field-level data insights from farmers. Despite these differences in scope and methodology, common areas for policy interventions from both studies are presented below.

Resource access and market development: Government policies play a crucial role in addressing structural barriers to achieve sustainability objectives. In Ghana, issues such as land tenure insecurity and limited access to credit hinder smallholder participation in cocoa and cashew value chains. Similarly, in Vietnam, while policies under the EVFTA, the TSD Chapter promote sustainability, challenges like fragmented landholdings and unequal resource access persist. Targeted infrastructure and market development investments are essential to bridge these gaps and ensure more inclusive growth for all stakeholders, including smallholder farmers.

Monitoring mechanisms: Robust systems for tracking the implementation and impact of sustainability provisions are necessary to enhance accountability among parties. While trade agreements establish a framework for such monitoring, stakeholder awareness and compliance gaps remain challenging. Improved dialogue between institutional and non-institutional actors can help address these gaps and strengthen the effectiveness of trade agreements in promoting sustainability. To enhance the enforceability of TSD provisions, it is crucial to identify critical value chains with significant environmental and social impacts. Drawing from the recent EU Regulation on Deforestation-Free Products (EU, 2023/1115), which targets commodities such as soy, beef, palm oil,

wood, cocoa, coffee, rubber, and their derivatives, targeted identification of these value chains is essential. This approach is particularly relevant for addressing key issues such as deforestation, biodiversity loss, and CO2 emissions, as well as social concerns like labour rights, child labour, and gender equity.

Capacity building: Capacity-building initiatives are essential for providing stakeholders with the skills, human resources and tools needed to adopt sustainable practices. Smallholders in both Ghana and Vietnam require technical training and institutional support to meet sustainability requirements. This includes training on the safe use of protective equipment and the proper handling of chemicals to minimise health risks and environmental damage. Enhancing such initiatives within trade agreements can ensure producers, traders, and policymakers are better prepared to drive sustainability across value chains.

Environmental profitability: Many stakeholders recognise that integrating sustainability practices addresses ecological challenges and aligns with profitable business models. Trade agreements facilitate this integration by promoting environmental provisions, as seen in efforts to mitigate deforestation in Ghana's cocoa farming and methane emissions in Vietnam's rice sector. Additionally, EU consumers are increasingly willing to pay a premium for environmentally safe products, such as organic crops, creating opportunities for producers to access higher-value markets. However, the limited adoption of sustainable practices - often due to cost and accessibility barriers - underscores the need for stronger support mechanisms.

Labour standards: Labour issues, including informality and non-compliance with ILO requirements, remain significant challenges in Ghana and Vietnam. Including labour provisions in the EVFTA has set essential benchmarks, but systemic issues often hinder implementation. For instance, Vietnam's agricultural sector faces a widespread lack of formal contracts, while in Ghana, child labour persists in the cocoa value chain. Stronger enforcement mechanisms and greater stakeholder engagement are essential to align labour practices with sustainability goals. Additionally, improving the living conditions of poorer farmers is critical to addressing these issues effectively.

Sustainability certification: Barriers to accreditation, such as high costs and limited institutional support, continue to constrain smallholders. This is particularly evident in Ghana and Vietnam, where certification processes often remain inaccessible for many small producers due to the high costs of adhering to certification schemes and market information asymmetries. Overcoming these obstacles through policy support and financial incentives enables broader participation in certified value chains and maximises their sustainability impacts. EVFTA underscores the role of voluntary sustainable assurance schemes, fair trade, ethical trade schemes, and eco-labels in achieving and maintaining high environmental and labour protection levels, which should complement national legislation.

The linkages between D.2.2 and D.4.2 highlight the critical role of EU trade agreements in advancing sustainability objectives. The “new generation” of agreements, such as the EVFTA, provides a platform to address structural barriers, enhance monitoring mechanisms, and promote sustainable practices through certification, market incentives, and geographical indications. However, persistent challenges, such as labour rights, informality, resource limitations, and the need for broader adoption of sustainable practices underscore the importance of a stronger enforcement and targeted policy support. Maximising the sustainability benefits of EU trade agreements requires a coordinated, multi-stakeholder approach that bridges regulatory commitments with national realities.

Deliverable 4.2:

"Effects of the context heterogeneity on the relationship between trade and sustainability: Lessons from the case studies"

CASE STUDIES REPORT

List of Acronyms

ACA	African Cashew Alliance
ACI	African Cashew Initiative
ACPG	Association of Cashew Processors of Ghana
ADB	Asian Development Bank
ADF	African Development Fund
ASEAN	Association of Southeast Asian Nations
ASEANGAP	Association of Southeast Asian Nations Good Agricultural Practice
CARD	Collabouration for Agriculture and Rural Development
CBD	Convention on Biological Diversity
CBI EU	Centre for the Promotion of Imports from developing
CCG	Cashew Council Ghana
CDP	Cashew Development Project
CIAG	Cashew Industry Association of Ghana
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMC	Cocoa Marketing Company
CNSL	Cashew nutshell liquid
COCOBOD	Ghana Cocoa Board
CPAG	Cashew Producer Association of Ghana
CSSVD	Cocoa swollen shoot virus disease
DARD	Department of Agriculture and Rural Development
EPA	Economic Partnership Agreement EU-Ghana
ERP	Economic Recovery Programme
EU	European Union
EVFTA	EU-Vietnamese Free Trade Agreement
FAO	Food and Agriculture Organization
FDA	Food and Drugs Association
FOB	Free on Board
FOs	Farmers organisations
GAP	Good Agricultural Practice
GDP	Gross domestic product
GIs	Geographical Indications
GIZ	German Agency for International Cooperation
GlobalGAP	Global Good Agricultural Practices
GSO	General Statistics Office
Ha	Hectare
IFS	Integrated Farming System
ILO	International Labour Organization
IRRI	International Rice Research Institute
ISF	Irrigation Service Fees
ITC	International Trade Centre
LBC	Licenced Buying Company
LID	Living Income Differential
LURC	Land Use Rights Certificates
MARD	Ministry of Agriculture and Rural Development
MNRE	Ministry of Natural Resources and Environment
MOFA	Ministry of Food and Agriculture
MOTI	Ministry of Trade and Industry
MRLs	Maximum Residue Levels
NDC	Nationally Determined Contributions

NGOs	Non-Governmental Organizations
NPK	Nitrogen, Phosphorus and Potassium
NTMs	Non-tariff measures
OECD	Organisation for Economic Co-operation and Development
PBC	Producer Buying Company
PFR	Plant and Food Research
PHC	Packing House Codes
PMs	Policy makers
PPE	Personal protective equipment
PPRC	Producer Price Review Committee
PSAV	Partnership for Sustainable Agriculture in Viet Nam
PUC	Production Unit Code
QCC	Quality Control Company
RCNs	Raw cashew nuts
RRD	Red River Delta
SEANAFE	Southeast Asian Network for Agroforestry
SEDP	Socio-Economic Development Plans
SEDS	Socio-Economic Development Strategies
SIFA	Sustainable Investment Facilitation Agreement
SOFRI	Southern Fruit Research Institute
SPS(s)	Sanitary and Phytosanitary Measures
SRI	System of Rice Intensification
SRP	Sustainable Rice Platform
TBT	Technical Barriers to Trade
TCDA	Tree Crops Development Authority
TRQ	Tariff Rate Quota
UK	United Kingdom
UNEP	United Nations Environment Programme
UNICEF	United Nations Children's Fund
US	United States of America
USAID	United States Agency for International Development
VC	Value chain
VCCI	Vietnamese Chamber of Commerce and Industry
VGCL	Vietnam General Confederation of Labour
VietGAP	Vietnamese Good Agricultural Practices
VOAA	Vietnam Organic Agriculture Association
VOSTEA	Vietnam Organic Specialty Tea Alliance
VSLAs	Village Savings and Loan Associations
VSSs	Voluntary Sustainable Standards
VUSTA	Vietnam Union of Science and Technology Associations
WACOMP	West Africa Competitiveness Programme
WB	World Bank
WOs	Worker Organizations

Outline

1. Introduction

1.1 Scope and aim of the work

The *Trade4Sustainable Development* project, funded by the European Union's Horizon 2020 program, aims to create opportunities enhancing the sustainability impacts of trade. Within this project, Work Package 4 (WP.4) titled *"Qualitative in-depth analysis of linkages and case studies"* explores the relashionship between trade and sustainability through detailed, country- and crop-specific case studies.The primary objective of Deliverable 4.2 (D.4.2) is to provide context-specific evidence on how trade, private voluntary standards and sustainability dimensions are interconnected. This includes assessing the views of producers, processors, traders, and NGOs on farming practices, national policies, and institutional frameworks under specific trade agreements.

D.4.2 integrates insights from stakeholders across different value chains, focusing on how trade policies influence key sustainability aspects such as natural resource management, social equity, gender inclusion and income inequality. Furthermore, D.4.2 aims to explore whether sustainable standards enhance improve market access for smallholder farmers, particularly in contributing to selected Sustainable Development Goals (SDGs) of the UN Agenda 2030[3]. Ultimately, the findings of this analysis will inform Deliverable 4.3, titled *"Policy brief: Assessment of sustainability effects of voluntary and ethical trade standards",* which will provide actionable recommendations for strengthening the linkages between trade and sustainability.

1.2 Choice of country and crop

The selection of countries and crops was developed in coordination with WP.2 *"The role of WTO, and EU bilateral and regional trade agreement to meet SDGs:gaps and best practices"* and it was driven by the need to analyse diverse trade and sustainability contexts across regions with strong trade relations with the European Union (EU). A key characteristic of the selected countries, Vietnam and Ghana, is their distinct trade agreements with the EU:

- **The European Union-Vietnam Free Trade Agreement (EVFTA)**: entered into force on August 1st 2020, is a 'new generation' Free Trade Agreement (FTA). It is designed to foster mutual economic benefits while advancing environmental sustainability, human rights and the rule of law. A notable element of the EVFTA is the inclusion of a Trade and Sustainable Development (TSD) chapter, which serves as a model for integrating comprehensive sustainability provisions into 'modern' trade agreements with the EU. Moreover, the presence of a TSD chapter in the EVFTA offers a unique opportunity to analyse its implications for achieving sustainability goals through trade exchanges.
- **The Economic Partnership Agreement (EPA) EU-Ghana:** is a reciprocal Agreement that has been provisionally applied since December 1st, 2016. It aims to foster a mutually beneficial partnership between EU and Ghana that extends beyond tariff reductions. The EPA framework includes a range of economic cooperation and partnership commitments and is expected to be replaced by the EU-ECOWAS EPA in the future, as the EU seeks to establish a regional market.

A critical aspect of the analysis is the focus on the different value chains examined in each country:

- **Cocoa and cashew:** these are key commodities for Ghana's economy, exported with limited processing to high-income countries. Their value chains face significant challenges, including deforestation, biodiversity loss, and the adverse effects of climate change, making them critical for understanding the impacts of international trade in Ghana.

[3] UN, (2015). Transforming our World: The 2030 Agenda for Sustainable Development. Available at: https://sdgs.un.org/publications/transforming-our-world-2030-agenda-sustainable-development-17981

- **Rice, tea and dragon fruit:** these represent both staple and high-value crops. Rice is central to Vietnam's agricultural economy and food security, while tea and dragon fruit reflect the country's growing focus on exports and integration into global value chains.

The multi-country and multi-crop approach of the study ensures a comprehensive understanding of the context-specific challenges and opportunities in linking trade with the SDGs. Moreover, the selected value chains provide valuable insights into cross-cutting issues such as gender equity, human capital development, and governance in meeting international requirements and trade standards. Finally, the analysis of these value chains offers an opportunity to examine the implementation of Voluntary Sustainable Standards (VSSs) and their implications for the livelihoods of smallholder farmers in Ghana and Vietnam.

1.3 Main SDGs analysed

As indicated in the Grant Agreement, this report examines the linkages between trade in cocoa and cashew in Ghana, and rice, tea and dragon fruit in Vietnam, along with relevant social, economic and environmental aspects such as deforestation, gender inequality, child labour and income inequality. These sustainability issues have been framed within the context of the United Nations' Agenda 2030. Table 1 provides a detailed overview of the key SDGs, together with their associated targets and indicators, considered in the analysis for both Ghana and Vietnam.

Table 1: List of SDGs, targets, indicators and identified custodian agencies considered in the report.

SDGs	Targets	Indicators	Custodian agencies
 **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.	**1.4.2** Proportion of total adult population with secure tenure rights to land, (a) with legally recognized documentation, and (b) who perceive their rights to land as secure, by sex and by type of tenure	United Nations Human Settlements Programme & World Bank
 **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.	**2.3.1** Volume of production per labour unit by classes of farming/pastoral/forestry enterprise size.	Food and Agriculture Organization of the United Nations
		2.3.2 Average income of small-scale food producers, by sex and indigenous status.	Food and Agriculture Organization of the United Nations

	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.	**2.4.1** Proportion of agricultural area under productive and sustainable agriculture.	Food and Agriculture Organization of the United Nations
	2.5 By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed.	**2.5.1** Number of (a) plant and (b) animal genetic resources for food and agriculture secured in either medium- or long-term conservation facilities.	Food and Agriculture Organization of the United Nations
	2.a Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries.	**2.a.1** The agriculture orientation index for government expenditures.	Food and Agriculture Organization of the United Nations
		2.a.2 Total official flows (official development assistance plus other official flows) to the agriculture sector	Organisation for Economic Co-operation and Development
	2.b Correct and prevent trade restrictions and distortions in world agricultural markets, including through the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round.	**2.b.1** Agricultural export subsidies.	World Trade Organization
	2.c Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility	**2.c.1** Indicator of food price anomalies.	Food and Agriculture Organization of the United Nations

 **Achieve gender equality and empower all women and girls**	**5.a** Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws	**5.a.1** (a) Proportion of total agricultural population with ownership or secure rights over agricultural land, by sex; and (b) share of women among owners or rights-bearers of agricultural land, by type of tenure.	Food and Agriculture Organization of the United Nations
		5.a.2 Proportion of countries where the legal framework (including customary law) guarantees women's equal rights to land ownership and/or control.	Food and Agriculture Organization of the United Nations
	5.c Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels.	**5.c.1** Proportion of countries with systems to track and make public allocations for gender equality and women's empowerment.	United Nations Entity for Gender Equality and the Empowerment of Women, Organisation for Economic Co-operation and Development & United Nations Development Programme
 **Ensure availability and sustainable management of water and sanitation for all**	**6.3** By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.	**6.3.1** Proportion of domestic and industrial wastewater flows safely treated.	United Nations Human Settlements Programme, Department of Economic and Social Affairs – United Nations Statistics Division & World Trade Organization
		6.3.2 Proportion of bodies of water with good ambient water quality.	United Nations Environment Programme
	6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.	**6.6.1** Change in the extent of water-related ecosystems over time.	United Nations Environment Programme

	6.a By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.	**6.a.1** Amount of water- and sanitation-related official development assistance that is part of a government-coordinated spending plan.	United Nations Environment Programme & World Health Organization
 **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 formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services.	**8.3.1** Proportion of informal employment in total employment, by sector and sex.	International Labour Organization
	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.	**8.7.1** Proportion and number of children aged 5-17 years engaged in child labour, by sex and age.	International Labour Organization & United Nations Children's Fund
	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.	**8.8.1** Fatal and non-fatal occupational injuries per 100,000 workers, by sex and migrant status.	International Labour Organization
		8.8.2 Level of national compliance with labour rights (freedom of association and collective bargaining) based on International Labour Organization (ILO) textual sources and national legislation, by sex and migrant status.	International Labour Organization
 **Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss**	**15.2** By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.	**15.2.1** Progress towards sustainable forest management.	Food and Agriculture Organization of the United Nations
	15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.	**15.3.1** Proportion of land that is degraded over total land area.	United Nations Convention to Combat Desertification

	15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species	**15.5.1** Red List Index.	International Union for Conservation of Nature
	15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts.	**15.9.1** (a) Number of countries that have established national targets in accordance with or similar to Aichi Biodiversity Target 2 of the Strategic Plan for Biodiversity 2011–2020 in their national biodiversity strategy and action plans and the progress reported towards these targets; and (b) integration of biodiversity into national accounting and reporting systems, defined as implementation of the System of Environmental-Economic Accounting.	**United Nations Environment Programme & Convention on Biological Diversity**
	15.a Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems.	**15.a.1** (a) Official development assistance on conservation and sustainable use of biodiversity; and (b) revenue generated and finance mobilized from biodiversity-relevant economic instruments.	**Organisation for Economic Co-operation and Development**
	15.b Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation.	**15.b.1 (a)** Official development assistance on conservation and sustainable use of biodiversity; and (b) revenue generated and finance mobilized from biodiversity-relevant economic instruments.	**Organisation for Economic Co-operation and Development**
Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	**17.10** Promote a universal, rules-based, open, non-discriminatory and equitable multilateral trading system under the World Trade Organization, including through the conclusion of negotiations under its Doha Development Agenda	**17.10.1** Worldwide weighted tariff-average	**International Trade Centre**
	17.11 Significantly increase the exports of developing countries, in particular with a view to doubling the least developed countries' share of global exports by 2020	**17.11.1** Developing countries' and least developed countries' share of global exports	**United Nations Conference on Trade and Development**

	17.12 Realize timely implementation of duty-free and quota-free market access on a lasting basis for all least developed countries, consistent with World Trade Organization decisions, including by ensuring that preferential rules of origin applicable to imports from least developed countries are transparent and simple, and contribute to facilitating market access.	**17.12.1** Weighted average tariffs faced by developing countries, least developed countries and small island developing States.	**International Trade Centre**
	17.14 Enhance policy coherence for sustainable development.	**17.14.1** Number of countries with mechanisms in place to enhance policy coherence of sustainable development.	**United Nations Environment Programme**

Note: Custodian agencies refer to the organizations responsible for managing, monitoring and reporting on a specific SDG indicator within the UN framework.

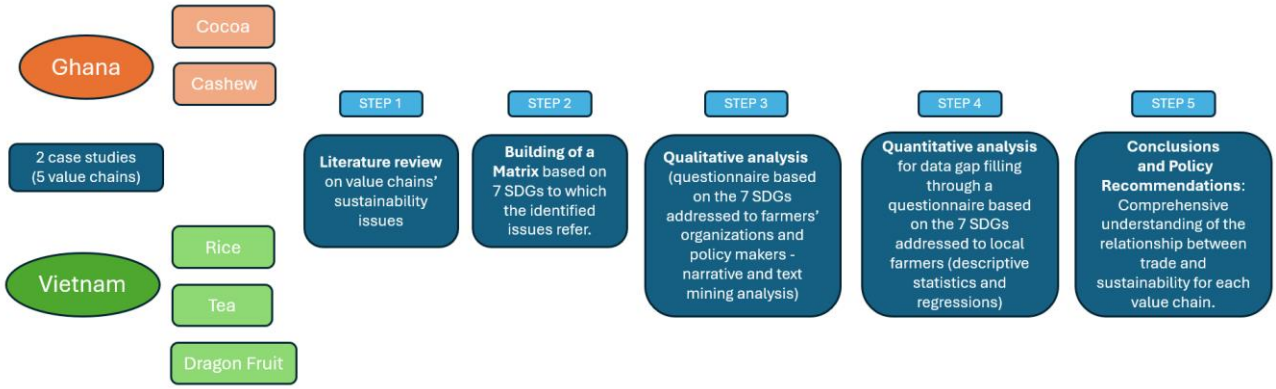
This report is structured as follows: Section 1 "Introduction" outlines the scope and objectives of the study, the selection of countries and crops and the main SDGs analysed. Section 2 "Methodology" details the desk analysis, survey approach, and sample description for both countries, along with an explanation of the techniques adopted for the qualitative and quantitative analyses. Section 3 "Case studies" presents the research on the analysed value chains - cashew and cocoa in Ghana, and rice, tea, and dragon fruit in Vietnam - together with relevant conclusions and policy recommendations for each valu chain. Finally, Section 4 "Appendix" provides detailed information on the templates used for the qualitative surveys (farmer organizations and policymakers) and the quantitative surveys (farmer-level) conducted in both countries.

2. Methodology

2.1 Mixed methods research for value chain analysis

The present study followed a mixed methods research (MMR) approach combining quantitative and qualitative research elements to deepen the understanding and validation of results[4]. This approach was deemed most suitable for analyzing the characteristics of the five selected value chains in Ghana and Vietnam (Figure 1).

Figure 1: Methodology of research followed by the authors



Source: authors' elabouration

A five-steps methodology has been adopted for the analysis of the two case studies related to Ghana and Vietnam:

Step 1. Literature review: National and international literature was reviewed to identify the key challenges and opportunities related to trade and sustainability in each value chain in Ghana and Vietnam.

Step 2. Matrix construction: Relevant data and information were extracted from diverse sources, including databases such as FAO and ILO, and mapped against seven specific SDGs.

Step 3. Qualitative survey: Semi-structured surveys were developed and administered to farmer organizations, cooperatives and policymakers in Ghana and Vietnam to gather relevant insights.

Step 4. Quantitative survey: A close-ended survey was designed and conducted with smallholder producers in Ghana and Vietnam to collect structured data at field level.

Step 5. Conclusion and policy recommendations: The findings from desk research, combined with the results of qualitative and quantitative surveys, were triangulated to provide a comprehensive understanding of the relationship between trade and sustainability, along with actionable recommendations for each value chain.

[4] Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a definition of mixed methods research. *Journal of mixed methods research*, *1*(2), 112-133.

2.2 Desk research and matrix construction

The research methodology included a literature review and analysis for each value chain studied, providing a framework for understanding the general characteristics of the agricultural sector in the two countries examined. The literature reviews have been carried out by the single researchers of the team, following a general common structure but reflecting the peculiarities of the individual research style.

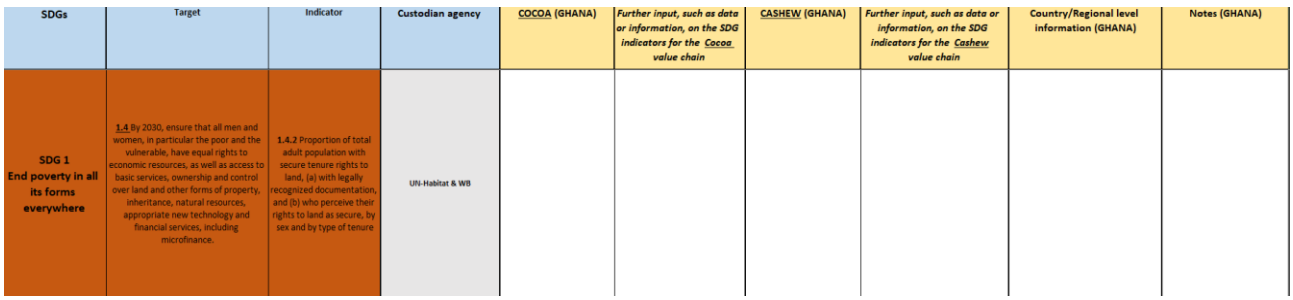
Due to their similarities, cashew and cocoa were analysed together and presented as a single case study. Both are export commodities vital to Ghana's trade balance and are predominantly cultivated by smallholder farmers. They require long-term land use and sustainable management (e.g., addressing deforestation, water use and child labour), making their joint analysis essential for understanding trade sustainability dynamics in Ghana. Rice, tea, and dragon fruit were considered separately due to their distinct botanical characteristics and economic roles. While rice and tea have been extensively studied in the international literature, dragon fruit represents an emerging commodity market for Vietnam. Consequently, there is limited national and international literature for this specific commodity.

After being identified, the main challenges of the selected value chains were classified under the three pillars of sustainability: economic, environmental, and social. Then, they were linked to the most relevant SDGs. For example, the "low productivity" of a specific crop was linked to SDG 2 *"End hunger, achieve food security and improved nutrition, and promote sustainable agriculture".*

The initial selection included 8 SDGs, 31 targets, and 44 relevant indicators. Since the focus of the Trad4SD project is to analyse how trade and trade agreements influence sustainable development, a second selection was conducted to retain only the most trade-relevant SDGs. The final selection encompassed 7 SDGs, 23 targets, and 28 indicators. The chosen SDGs are 1, 2, 5, 6, 8, 15, and 17, as detailed in Table 1.

A matrix (Figure 2) was created and populated with relevant information and data retrieved from the Custodian Agencies (e.g., FAO, OECD, WTO, UN), which are responsible for the official monitoring and data collection of the SDGs. While filling the matrix, some challenges emerged. Notably, a significant amount of data on SDG indicators is available at the country level rather than at the value chain level. To address this gap, additional research was conducted, including a review of recent literature, relevant reports, and scientific articles. This effort enriched the matrix with both qualitative and quantitative information at the value chain level, complemented by feedback and insights from our key partners in Ghana and Vietnam.

Figure 2: Conceptual scheme for addressing the linkages between SDGs and related sustainability indicators



SDGs	Target	Indicator	Custodian agency	COCOA (GHANA)	*Further input, such as data or information, on the SDG indicators for the Cocoa value chain*	CASHEW (GHANA)	*Further input, such as data or information, on the SDG indicators for the Cashew value chain*	Country/Regional level information (GHANA)	Notes (GHANA)
SDG 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.	1.4.2 Proportion of total adult population with secure tenure rights to land, (a) with legally recognized documentation, and (b) who perceive their rights to land as secure, by sex and by type of tenure	UN-Habitat & WB						

2.3 Qualitative analysis

2.3.1 Survey design and sample description

A qualitative survey, designed in collabouration with local partners and targeted for selected stakeholders, was developed to address the SDG-related challenges identified in each value chain. The survey is divided into four main sections, focusing on questions related to the three dimensions of sustainability (economic, social and environmental) and an additional section dedicated to sustainability standards. Template questionnaires are provided in Section 4.

The stakeholders selected to respond to the qualitative survey included representatives from farmers' organizations (FOs), such as cooperative, buyers' associations and community groups, as well as policymakers (PMs) associated with the five value chains in Ghana and Vietnam. In Ghana, interviewed FOs were all male[5], some of them representing cooperatives, one of them part of the cashew buyers' association and another one representing the community group (Table 2).

Table 2: FOs representatives, Ghana

Gender	Organization	Role	Stakeholder typology	Value chain
Male	Community Advisory Committee, Israel	Member	Community group	Cashew/cocoa
Male	Cashew Buyers' Association	Chairman	Cashew buyers' association	Cashew
Male	ABOCFA, Tei-Mensah	Chairman	Cooperative member	Cocoa
Male	ABOCFA, Kokotesua	Secretary	Cooperative member	Cocoa
Male	ABOCFA, Tei-Mensah	Secretary	Cooperative member	Cocoa
Male	ABOCFA, Yokuhe	Chairman	Cooperative member	Cocoa

PMs, instead, appear as a more heterogeneous group in terms of gender, with various women occupying leadership positions. They are representatives of an EU development and cooperation body, the Ghanian Ministry of Agriculture, the National Cocoa Board, the African Centre for Economic Transformation and the Ghana International Trade Commission (Table 3).

Table 3: PMs representatives, Ghana

Gender	Organization	Role	Stakeholder typology	Value chain
Female	EU Delegation	Programme Manager: Sustainable Agriculture & Cocoa	Development Partners	Cocoa
Female	EU Delegation	Programme Officer: Macro-Economic & Trade Section	Development partners	Cocoa
Male	African Center for Economic Transformation (ACET)	Senior Policy Analyst and Private Sector Development	Researcher	Cashew/cocoa
Male	African Center for Economic Transformation (ACET)	Senior Policy Analyst and Private Sector Development	Researcher	Cashew/cocoa
Male	African Center for Economic	Senior Policy Analyst and Private Sector Development	Researcher	Cashew/cocoa

[5] This pattern reflects the high presence of men in the agricultural sector of the two countries, as well as their predominant position in aspects related to the proper organization of agricultural activities. Indeed, the female presence in the sample is condensed in the PMs groups for both countries, covering leading administrative and political roles.

	Transformation (ACET)			
Male	COCOBOD	Deputy Director of Research	Policy makers	Cocoa
Male	Ghana International Trade Commission	Researcher	Policy makers	Cashew/cocoa
Male	Ghana International Trade Commission	Researcher	Policy makers	Cashew/cocoa
Female	Ministry of Food and Agriculture	Director, Women in Agriculture	Policy makers	Cashew/cocoa

In Vietnam, all FOs representatives were male, holding leadership positions across various cooperatives and organizations in different districts and provinces (Table 4).

Table 4: FOs representatives, Vietnam

Gender	Full organisation name	Role in the organisation	Stakeholder typology	Value chain
Male	Que My Thanh Commune, Tan Tru District, Long An Province.	Head of 1 Hamlet	Farmer's organisations & cooperative members	Rice
Male	Dong Son Commune, Go Cong Tay District, Tien Giang Province.	Agricultural Officer of Dong Son Commune	Farmer's organisations & cooperative members	Rice and dragon fruit
Male	Long Binh Commune, Go Cong Tay District, Tien Giang Province.	Agricultural Officer of Long Binh Commune	Farmer's organisations & cooperative members	Rice
Male	Huong Tho Phu Commune, Go Cong Tay City, Long An Province.	Agricultural Officer of Huong Tho Phu Commune	Farmer's organisations & cooperative members	Rice
Male	Cooperative of Linked Regions for Growing Dragon Fruit in Van Thanh	Cooperative director	Farmer's organisations & cooperative members	Dragon fruit
Male	Hoa Phu Hamlet, Long Binh Commune, Go Cong Tay District, Tien Giang Province.	Head of Hoa Phu Hamlet	Farmer's organisations & cooperative members	Rice
Male	Huong Tho Phu Commune, Go Cong Tay City, Long An Province.	Agricultural Officer of Huong Tho Phu Commune	Farmer's organisations & cooperative members	Rice and dragon fruit
Male	Head of An Binh Hamlet, Hiep Thanh Commune, Chau Thanh District, Long An Province.	Head of An Binh Hamlet, Hiep Thanh Commune	Farmer's organisations & cooperative members	Dragon fruit
Male	Hoa Phu Hamlet, Long Binh Commune, Go Cong Tay District, Tien Giang Province.	Deputy Head of Hoa Phu Hamlet	Farmer's organisations & cooperative members	Rice

Male	Head of 10 Hamlet, Loc Thanh Commune, Bao Lam District, Lam Dong Province.	Head of 10 Hamlet, Loc Thanh Commune	Farmer's organisations & cooperative members	Tea
Male	Tram Hanh Commune, Da Lat City, Lam Dong Province.	Agricultural Officer of Tram Hanh Commune	Farmer's organisations & cooperative members	Tea

Vietnamese PM representatives were drawn from various institutional bodies in Long An province, including two women serving as Heads of Departments (Table 5). A trader was also part of the interviewed group (Table 5).

Table 5: PMs representatives, Vietnam

Gender	Full organisation name	Role in the organisation	Stakeholder typology	Value chain
Male	Agriculture and Rural Development Department of Tan Tru District, Long An Province.	Head of Department	Policy maker	Rice and dragon fruit
Female	Service Center and Agriculture of Long An Province.	Head of Department	Policy maker	Dragon fruit
Male	Service Center and Agriculture of Long An Province.	Director	Policy maker	Rice
Male	Agriculture and Rural Development Department of Tan Tru District, Long An Province.	Head of Department	Policy maker	Rice and dragon fruit
Male	Rural Development and Irrigation Department of Long An Province.	Head of Department	Policy maker	Rice and dragon fruit
Female	Agriculture and Rural Development Department of Tan Tru District, Long An Province.	Head of Department	Policy maker	Rice and dragon fruit
Male	Department of Agriculture and Rural Development of Lam Dong Province.	Head of Department	Policy maker	Tea
Male	HCMC Department Of Agriculture & Rural Development.	Head of Department	Policy maker	Tea
Male	Felix Technology Solutions Jsc.	Director	Trader	Tea

2.3.2 Qualitative analysis technique

Qualitative survey results were analysed using narrative and text analysis for each case study. The textual analyses applied World Clouds, Similarity analysis and Topic Modeling – Correspondence (TM-C) automatic algorithms for textual data and were conducted through the software IRaMuTeQ version 0.7 alpha 2[6].

[6] Ratinaud, P. (2014). IRAMUTEQ: Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires [Computer software], http://www.iramuteq.org. Touluse, Lerass

World Clouds: A word cloud indicated also as "tag cloud"[7], represents a visual scheme of a set of words in different sizes or colours which indicate various features of the analysed terms, such as the frequency. Indeed, in this case they show the most frequently used words for each SDGs and value chains included in the analysis, presenting frequencies in different sizes.
Similarity analysis: Similarity analysis concernes plotting tree-structure graphs to visualize how frequently the words co-occur each other within the investigated text: the thickness of the branches represents the frequency of co-occurrences between words, while the size of the words indicates the frequency of each word itself. By following the branch-led concatenation patterns, it is possible to bring out how respondents conveyed their shared opinions. In this respect, the similarity graphs offer a descriptive representation of the common viewpoints among the respondents.
Topic Modeling – Correspondence: TM-C is a more robust method to further statistically validate these potential common views carried out from the similarities. The TM-C routine in IRaMuTeQ embeds ALCESTE[8] that is a method of segmentation based on hierarchical descending classification (HDC) known also as co-occurrence text analysis[9]. This method individualizes statistically independent words classes found in a text by maximising Chi-squared distance of matrices intersecting parts of texts and words; each class is within composed of words, and thus textual segments, concatenated each other producing a uniform meaning because the vocabulary is similar. Consequently, each class is also dissimilar between each other because the internal vocabulary is also distinct from the one in the other classes. The mechanism starts from the whole textual corpus with descending partitioning into two big classes with the most different use of words, successively the algorithm splits those classes into other parts that are again different, although less than the first ones and so forth until the partitions are not statistically significant anymore[10]. The main IRaMuTeQ output of HDC process consists of the clusters dendrogram with a percentage of stability and a cartesian graph with factors generated from the classifications. The dendrogram is a synthetic representation of the relationships between classes whereas the factorial graph is a more exhaustive visualization of how the classes are shaped: the more the words are big in the figures the more they statically contribute to that cluster.

To enhance the qualitative analysis discussion for each stakeholder group and each SDG, the main results were complemented with the most relevant figures, presented in the following order of priority: dendrogram, similarity graph, and word cloud, reflecting the robustness of the analysis.

2.4 Quantitative analysis

2.4.1 Survey design and sample description

Our in-depth literature review and analysis of SDGs databases developed by UN agencies (e.g., FAO, UNEP) revealed significant gaps in data and information concerning various aspects of the linkages between trade and sustainability in the selected value chains: cashew and cocoa in Ghana, and rice, tea and dragon fruits in Vietnam. Specifically, we found a lack of recent, detailed data on certain SDG indicators, such as income levels and the adoption of sustainable practices, for smallholder farmers working in these value chains. Moreover, gender-disaggregated data and information on minority groups were also missing. Therefore, following the advise of international organisations, such as FAO, that consider farmers' point of view is crucial to fully understand the relationship between

[7] Havley, M. & Keane, M.T. (2007). An assessment of tag presentation techniques, poster session presented World Wide Web Conference, Banff, Alberta, Canada.
[8] Reinert, M. (2001). Alceste, une méthode statistique et sémiotique d'analyse de discours: Application aux "Rêveries du promenade solitaire". La Revue Franç. Psychiatr. Psychol. Méd. 49, 32–36. Available at: https://hal.science/hal-04242207
[9] Illia, L., Sonpar, K., and Bauer, M. W. (2014). Applying cooccurrence text analysis with ALCESTE to studies of impression management. Br. J. Manag. 25, 352–372. doi: 10.1111/j.1467-8551.2012.00842.
[10] *Ibidem*

farming activities, trade and sustainability issues[11], a survey with close-ended questions was developed to collect firsthand data in a time-efficient way, as farmers were busy with their field activities.

The quantitative survey was based on the same 7 SDGs, addressed to local farmers in Ghana and Vietnam. It is divided into four main sections, presenting questions related to the three sustainability dimensions and an additional one dedicated to certifications issues. The questionnaire is available in the section 4.
Direct engagement with local partners allowed to reach a total of 532 farmers in Ghana, distributed as follows: 321 from the cocoa value chain and 211 for cashew value chain. The sample shows an almost equal gender representation among the two value chains, with a higher male presence in both cases (Table 6).

Table 6: Number of farmers surveyed across Ghana's cocoa and cashew value chains.

	Cocoa	**Cashew**
Male	227 (70.7%)	155 (73.5%)
Female	94 (29.3%)	56 (26.5%)
Tot	**321**	**211**

The surveyed farmers are situated in two key production regions of Ghana. The Eastern Region which is among the top three cocoa producing areas of the country and the Bono Region, purposively selected since it is Ghana's top cashew producing district. Villages or areas included in the Eastern Region were Yokuhe, Tei-Mensah, Kokotesua, Pinto, Amanhyia; for Bono Region, the selected areas were Dagomba land, Estate, Isreal, Ahyiayem and Drobonso. ABOCFA and Yayra Glover predominantly operate in the selected areas, making them the two cooperatives from which the interviewed farmers were chosen. For cashew farmers, a census was conducted in the communities due to the lack of an official list of producers and their small population in the selected locations.

In Vietnam, direct collabouration with local partners facilitated access to 332 smallholder farmers producing rice, tea, and dragon fruit across the country. A structured approach was employed for sample selection to ensure diverse and representative data collection. The surveyed farmers were distributed as follows: 110 from the rice value chain, 105 from tea, and 117 from dragon fruit (Table 7). Also this sample demonstrates an almost equal gender representation (Table 7).

Table 7: Number of farmers surveyed across Vietnam's rice, tea, and dragon fruit value chains.

	Rice	**Tea**	**Dragon fruit**
Male	58 (52.7%)	52 (49.5%)	66 (56.4%)
Female	52 (47.3%)	53 (50.5%)	51 (43.6%)
Tot	**110**	**105**	**117**

The surveyed farmers are located in key agricultural areas of Vietnam, which serve as significant production hubs for their respective value chains. These regions are characterized by diverse farming practices and unique local conditions, with the following provinces identified as major production centers:

[11] FAO (2020). The State of Agricultural Commodity Markets 2020. Agricultural markets and sustainable development: Global value chains, smallholder farmers and digital innovations. Rome

- **Rice:** Primary rice farming areas are located in the Mekong Delta region, particularly in villages such as Dong Son, Huong Tho Phu and Que My Thanh. These villages are situated in Long An and Tien Giang Provinces, which are key hubs for rice production.
- **Tea:** Tea farmers are predominantly based in the Central Highlands region, specifically in villages such as Dai Lao, Loc Thanh and Loc Tan. These villages are located in Lam Dong Province, the primary center for tea cultivation.
- **Dragon fruit:** Dragon fruit farming is concentrated in the Southeast and South-Central regions. Villages such as Hiep Thanh and Thanh Phu Long are located in Tien Giang Province, while Dong Son is situated in Binh Thuan Province, both key areas for dragon fruit production.

2.4.2 Quantitative analysis technique

The results are presented using descriptive statistics generated through the software STATA. A comprehensive approach was adopted to analyse the data collected from the quantitative surveys, utilizing various statistical techniques to explore relationships between key indicators under each selected SDG. These methods included summary statistics, comparative analysis, and visual tools such as boxplots and bar charts, which were essential for highlighting trends, gaps, and differences across different value chain in Ghana and Vietnam.

3. Case studies

The following section presents the two case studies on Ghana and Vietnam analyzing sustainability issues emerged from the study of the five selected value chains: cocoa and cashew for Ghana; rice, tea and dragon fruit for Vietnam.

3.1 Ghana: cocoa and cashew production sustainability issues

3.1.1. Literature Review

3.1.1.1. Economic overview of the Ghanaian agricultural sector

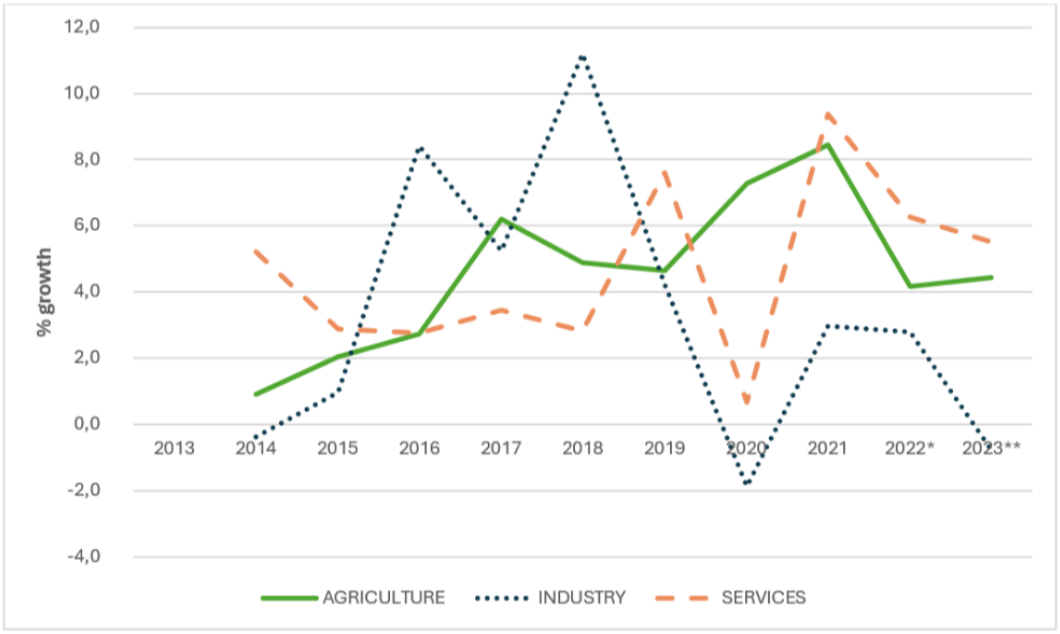
The agricultural sector is vital for the socio-economic growth of Ghana, acting as primary source of employment, income, and food security for rural populations.

As of 2021, 55.4% of Ghana's total land area of 126,037 km² is classified as agricultural land (World Bank, 2024). In 2022, the agricultural sector employs approximately 39.7% of the labour force, compared to 41.4% in services and 18.9% in industry (World Bank, 2024).

Agriculture also makes significant contributions to the national economy, accounting for 21% of the Gross domestic product (GDP) and generating over 40% of the country's export earnings (MOFA, 2022).

As shown in Figure 1, the growth of the agricultural sector has been relatively stable compared to the other sectors, generally hovering around the 2-6% range.

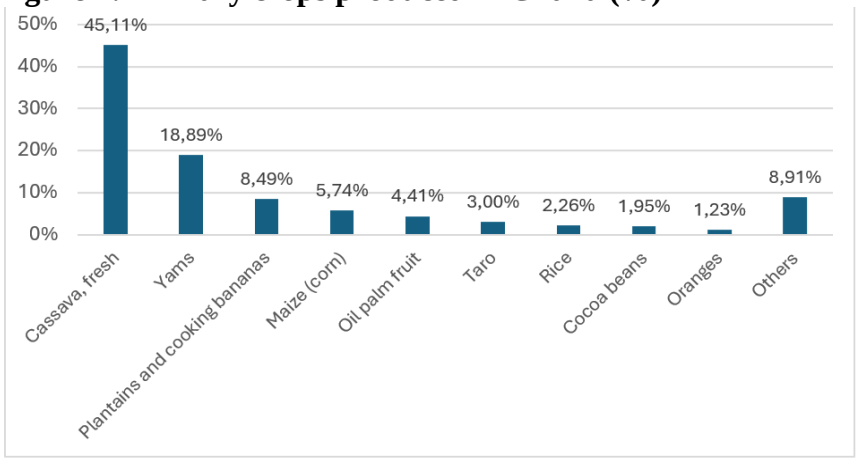
Figure 1: Growth rate of economic sectors 2013-2023



Source: MOFA, 2023

As shown in Figure 2, the dominance of tubers in the Ghana's agricultural output is evident. Cassava is the most widely produced crop, accounting for 45.1% of total production. It is followed by yams, which make up 18.9%, and plantains and cooking bananas, contributing 8.5% to the overall production.

Figure 2: Primary crops produced in Ghana (%)



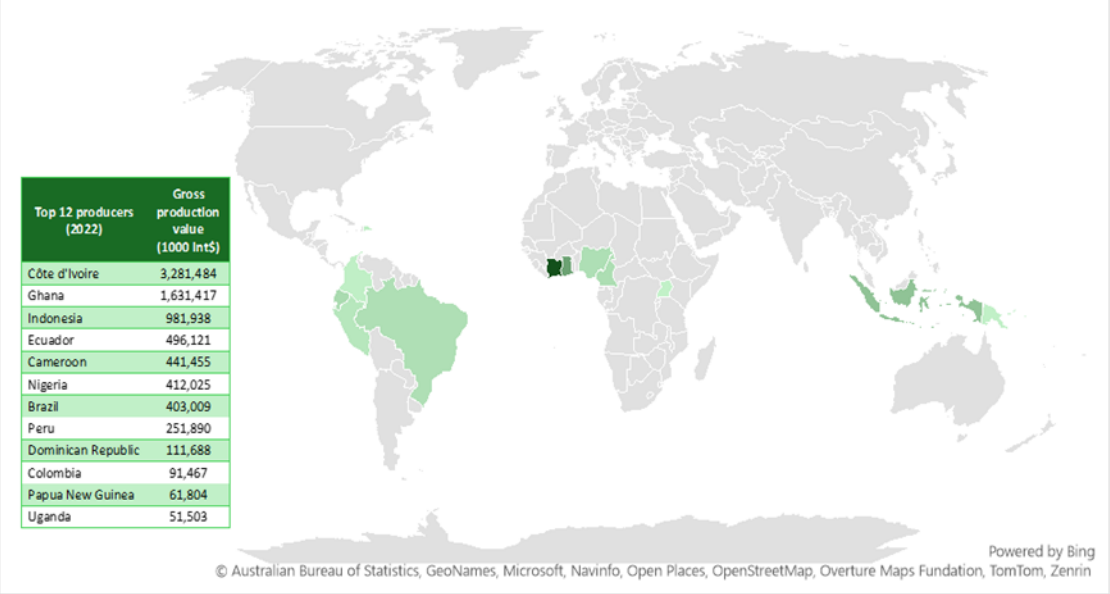
Source: FAOSTAT, 2024

3.1.1.2 Main cocoa and cashew world producers

According to the Centre for the Promotion of Imports from developing countries (CBI EU) the global cocoa beans market, valued at USD 16 billion in 2023, is expected to grow at an annual rate of nearly 7%, reaching USD 22 billion by 2028 (CBI EU, 2024).

Cocoa production is dominated by West Africa, specifically by Côte d'Ivoire and Ghana, which together are responsible for over 54.3% of global production (FAOSTAT, 2022).

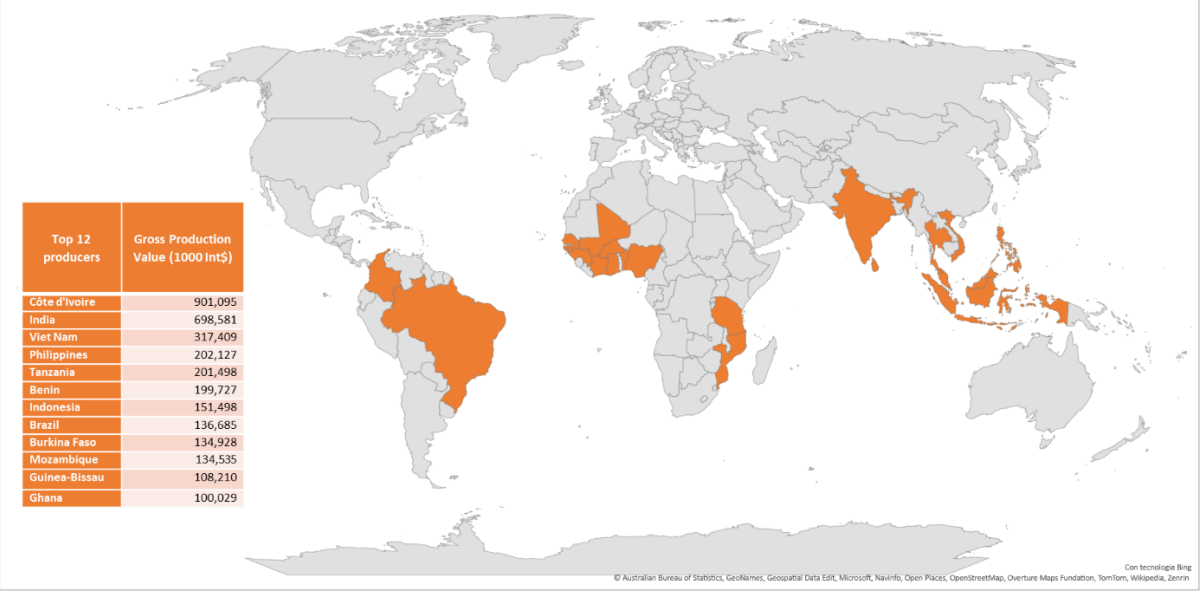
Figure 3: Main cocoa beans producers (2022)



Source: authors' elabouration on FAOSTAT data

The cashew supply value has consistently increased in the last decade from $4.15 billion in 2013/2014 to $7.77 billion in 2022/2023 (INC, 2023). In 2021, cashews were estimated to be the third most consumed tree nuts at a global level, accounting for 19% of world share and the demand is expected to grow (INC, 2023). India, USA, Europe, the United Arab Emirates, and Australia are the main regions where cashews are consumed (Boafo et al., 2019). Both cashew production and exports have risen linearly over the last decade peaking respectively in 2022/2023 with 5 million tons and of raw cashew nuts (RCN) produced globally and $704,576 tons exported in 2021. Western Africa countries, with Côte d'Ivoire on the lead, account for half of global production of RCN, followed by India and Vietnam. Around 90% of the RCNs produced in Africa are exported to India and Vietnam, where they are processed into kernels and then re-exported to Europe and USA where they are finally roasted, salted, and packed to be sold to consumers (ACA, 2016). Currently, Viet Nam is by far the main exporter of cashew kernels and accounted for 65% of global exports in 2021.

Figure 4: Main cashew nuts producers (2022)



Source: authors' elabouration on FAOSTAT data

3.1.1.3 Cashew and cocoa production in Ghana

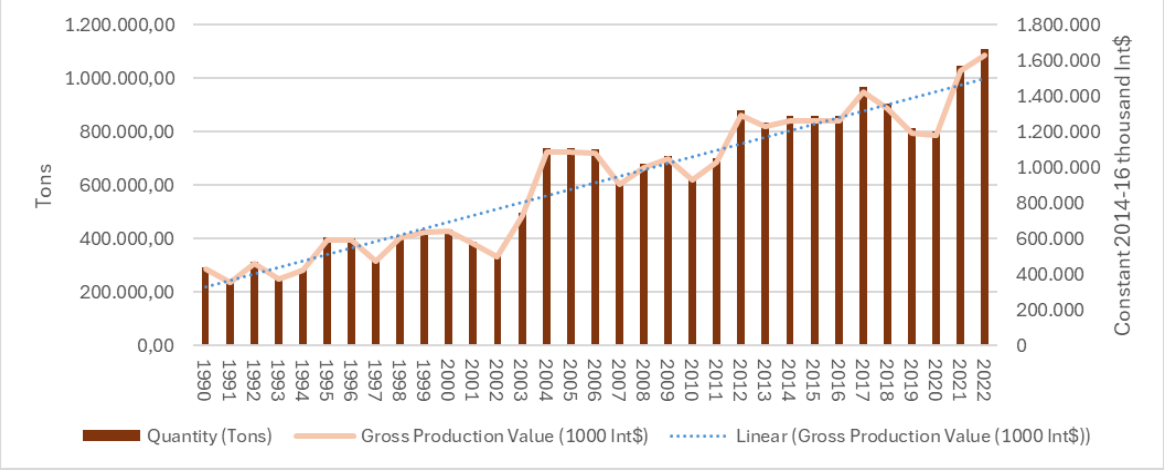
The cocoa and cashew value chains differ significantly in structure, production processes, and economic impact.

First of all, cocoa has been produced for many years: large-scale cultivation of cocoa was started by the Spanish in the 16th century in Central America. It spread to Brazil in the 18th century and was then taken to São Tomè and Fernando Pó (Western Africa islands) in 1840; and from there to other parts of West Africa, notably the Gold Coast (now Ghana), Nigeria and the Ivory Coast (Ghana Cocoa Board).

Since cocoa was introduced to Ghana, its cultivation has experienced significant periods of growth and decline. After emerging as one of the world's leading producers of cocoa, Ghana experienced a major decline in production in the 1960s and 1970s, and the sector nearly collapsed in the early 1980s. However, production began to recover steadily in the mid-1980s thanks to nationwide economic reforms. By the 1990s, a revival was underway, culminating in cocoa output nearly doubling between 2001 and 2003 (Kolavalli et al.,2014).

These fluctuations are intrinsic to cocoa production since cocoa is strongly influenced by environmental factors such as availability of land, the spread of diseases and socio-economic factors such as migration (Ruf et al.,1995).

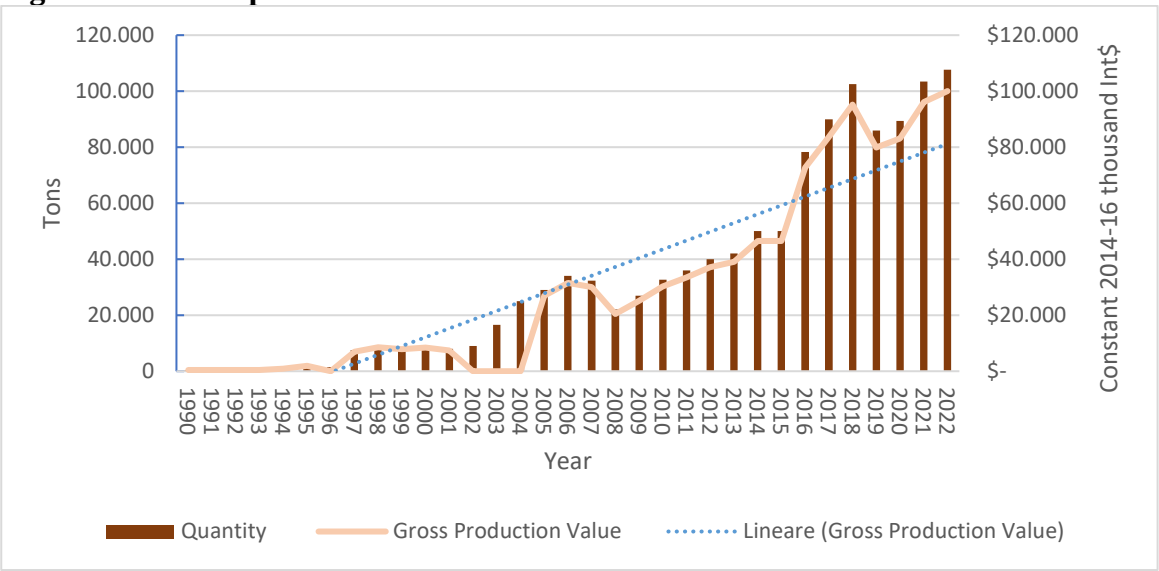
Figure 5: Cocoa production from 1990 to 2022



Source: Author's elabouration on FAOSTAT data

Cashew production, compared to cocoa is relatively new in Ghana. The decision to start producing this commodity was driven by the global market (Boafo et al., 2019). In the early 1990s, Ghana launched an Economic Recovery Programme (ERP) to boost cashew production as part of efforts to diversify the country's export base (African Cashew Initiative, 2010). Subsequently, after the positive results of a study on its potential commissioned by the Ghanaian Ministry of Food and Agriculture, in 2002 the government launched the Cashew Development Project to boost its production across five regions. As illustrated in figure 6, RCNs' production in Ghana began in in the early 90s and has grown significantly ever since, reaching 107,677.98 tonnes in 2022. This production was achieved with an average yield of 532.9 kilograms per hectare across a harvested area of 202,056 per hectares (FAOSTAT, 2023).

Figure 6: Cashew production from 1990 to 2022

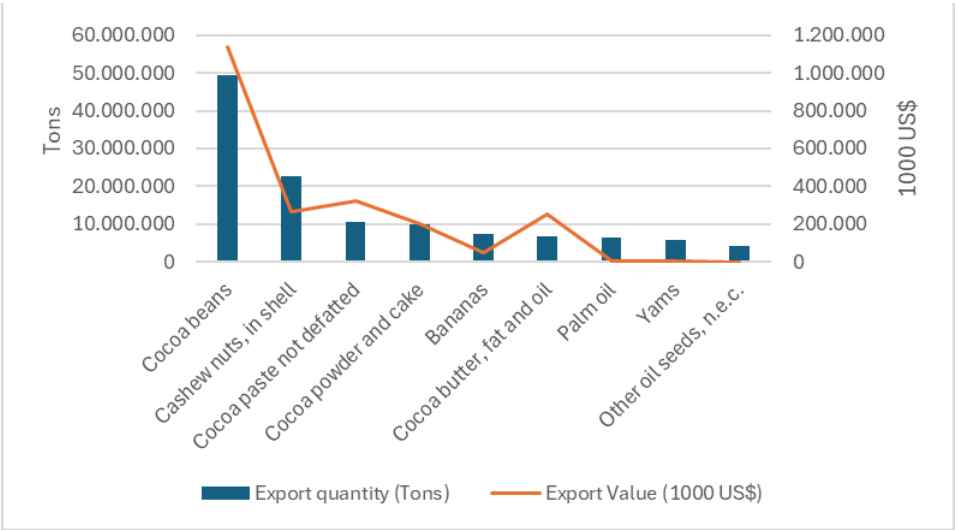


Source: Author's elabouration on FAOSTAT data

3.1.1.3.1 Export

Figure 7 illustrates the relationship between the quantity of exports (in tons) and the export value (in thousands of dollars) for main Ghanaian agricultural products. Cocoa and cashew were the two main exported crops in Ghana in 2022, with Cocoa and its derivatives standing out as key export commodities. Furthermore, the chart highlights that processed products (e.g., cocoa butter, cocoa paste) generally have higher export values compared to raw materials (e.g., cocoa beans).

Figure 7: Top 10 exported products from Ghana to the world (2022)



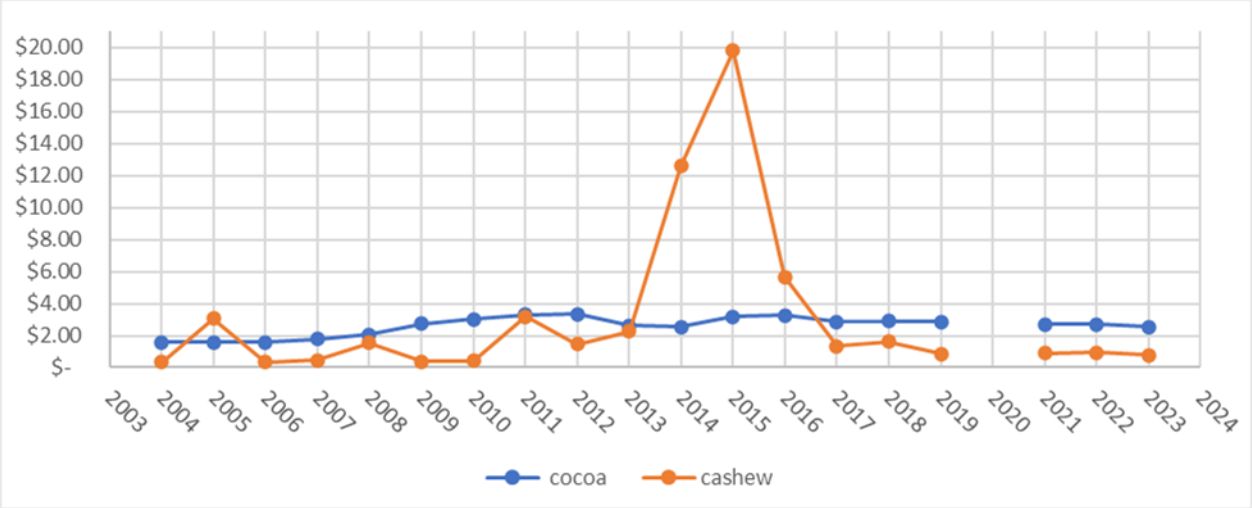
Source: Authors' elabouration on ITC data

The cocoa and cashew value chains are very different in terms of price regulation. The cocoa sector is strongly regulated in terms of selling price. The FOB (Free on Board) price indicates the cost of goods including transportation to a specified point, typically a shipping port of cocoa is indeed set at the beginning of each production year by the PPRC, the Producer Price Review Committee, which includes individuals representing government, the COCOBOD, farmers' representatives, LBCs (Licenced Buying Company), cocoa transport operators, Bank of Ghana, and University of Ghana.

This system of cocoa sales protects farmers from price volatility, as both buyers and sellers are obligated to adhere to the price stipulated in the contract (Send Ghana, 2019). The same committee decides which % of the FOB goes to farmers (farm-gate price). In the 2022/2023 season the farm-gate price represented about 70% of the FOB price, namely GH₵ 800 per 64-kilogram bag (roughly 125 USD/bag) (Ghana Cocoa Board, 2022).

The same price setting system does not apply to cashew, as the selling price depends on the volatility of the international market (Figure 8). The farm gate price for cashews is negotiated between leading farmers and local buying agents, using international market rates serving as a benchmark (Boafo, 2019). The Tree Crops Development Authority (TCDA) set the minimum farmgate price at GHS 8.455 (equivalent to 0.55 USD) per kilogram for the 2023 crop season.

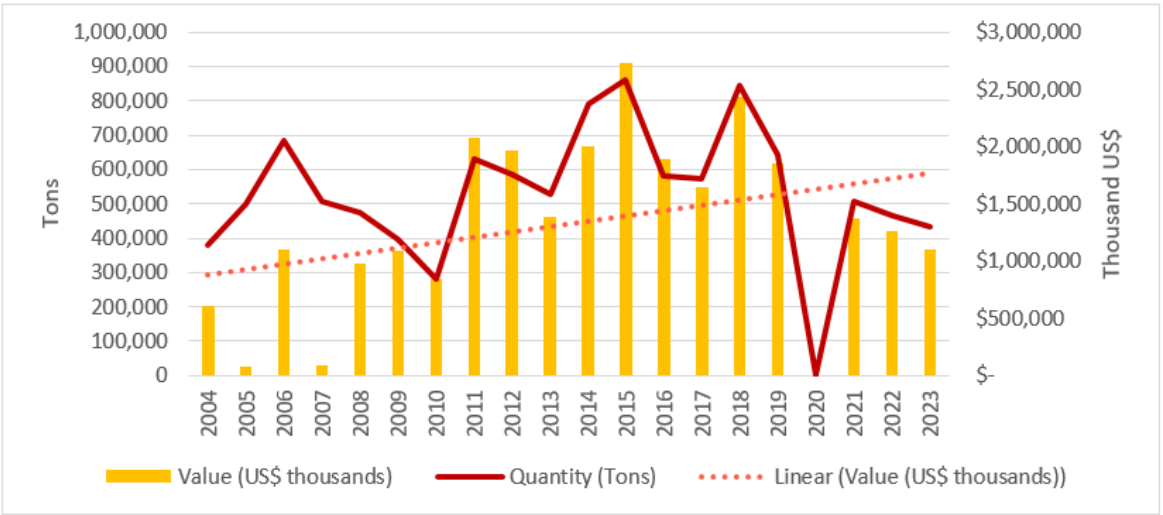
Figure 8: Cocoa and cashew price changes 2003-2024 ($/kgs)



Source: Authors' elabouration on ITC data

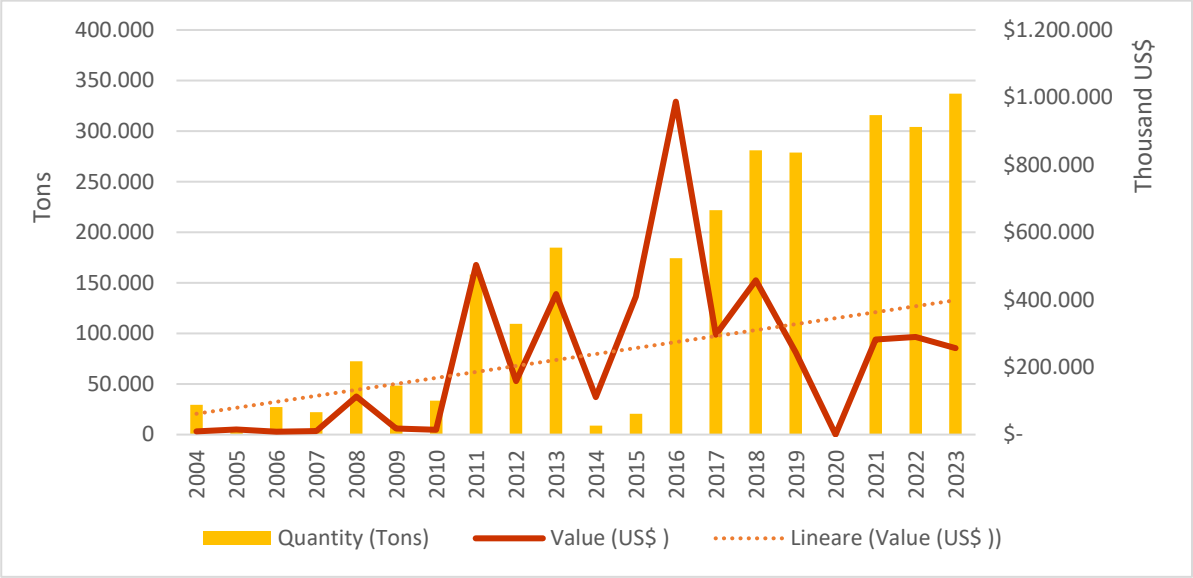
This difference in price-setting systems has also influenced the price trends of cocoa and cashew over the years, as illustrated in Figure 9 and 10. Due to the rise in global demand and government programs aimed at diversifying agricultural exports and reducing dependence on cocoa, cashew exports have seen a remarkable increase over the past decade. Cashews, being less affected by climatic fluctuations than cocoa (highly vulnerable to droughts), show a more consistent trend in export volume. However, as both agricultural commodities, they are still subject to volatility in international markets.

Figure 9: Ghana exports of cocoa



Source: Authors' elabouration on ITC data

Figure 10: Ghana exports of cashew



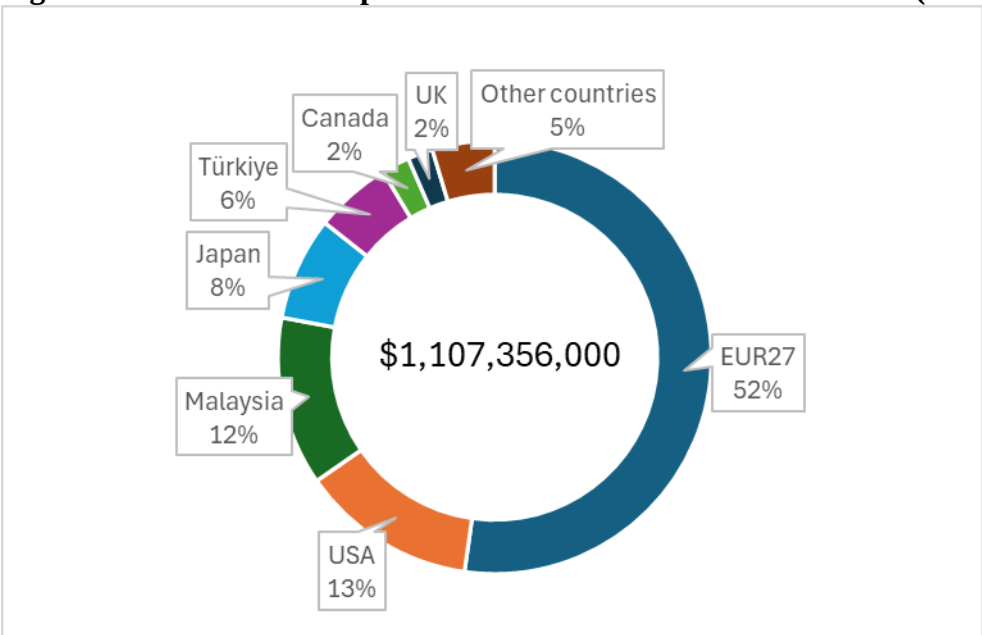
Source: Authors' elabouration on ITC data, 2024

3.1.1.3.2 Main importers of Ghanaian cocoa and cashew

Cocoa

As shown in Figure 11, most of the cocoa beans exports in 2023 are direct to the EU.

Figure 11: Cocoa beans exported from Ghana to the world in 2023 (trade value in US$)



Source: Authors' elabouration on ITC data, 2024

The following tables (Table 1 and 2) show details about the exported quantity and value of exports for international and European trade partners.

Europe appears to be the main world importer with 236.732t of raw cocoa beans imported in 2023 (54.64% of the total exported cocoa beans from Ghana), followed by the United States of America

(12.96%) and Malaysia (10.91%). Among European importers, the Netherlands stand out with 41.66% share of total European imports, followed by Belgium and France.

Ghana's cocoa exports are valued at an average of 2.55 USD per kilogram, with Europe paying slightly less than the average (2.44 USD/Kg) and USA slightly more, namely 2.58 USD per kilogram.

Table 1: Trade value and quantity of cocoa beans (2023)

Partner	Quantity (Tons)	Quantity (%)	Trade Value (1000 US$)	Trade value %
World	433,288.00		1,107,356.00	
Europe	236,732.00	54.64%	578,328.00	52.23%
United States of America	56,136.00	12.96%	145,170.00	13.11%
Malaysia	47,286.00	10.91%	139,501.00	12.60%
Japan	31,612.00	7.30%	85,502.00	7.72%
Türkiye	24,046.00	5.55%	63,216.00	5.71%
Canada	9,013.00	2.08%	23,208.00	2.10%
United Kingdom	6,990.00	1.61%	20,861.00	1.88%

Source: Authors' elabouration on ITC data, 2024

Table 2: Main EU countries importers of Ghanaian cocoa

European country	Quantity (Tons)	Quantity (% of total European inports)	Trade Value (US$)	Trade value (% of total European imports)
Europe	236,732.00		578,328.00	
Netherlands	98,615.00	41.66%	264,359.00	45.71%
Belgium	50,146.00	21.18%	130,705.00	22.60%
France	28,104.00	11.87%	41,642.00	7.20%
Spain	24,164.00	10.21%	60,959.00	10.54%
Germany	21,702.00	9.17%	42,020.00	7.27%
Italy	13,499.00	5.70%	37,402.00	6.47%
Bulgaria	502.00	0.21%	1,241.00	0.21%

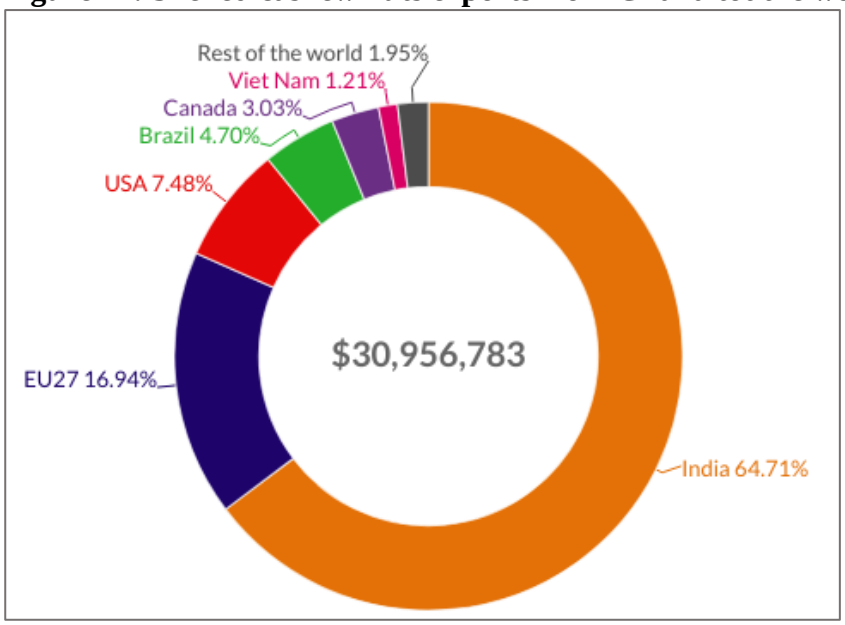
Source: Authors' elabouration on ITC data, 2024

Cashew

India and Vietnam are the primary importers of Ghanaian cashew, together accounting for more than 93% of Ghana's global cashew exports in 2023 (Figure 12). During the same year, trade with the EU reached approximately $3.5 million (1.58% of total exports). Ghana's cashew exports are valued at an average of $0.77 per kilogram, with Vietnam paying slightly more and India slightly less, at $0.73 per kilogram. In contrast, EU countries paid a significantly higher price, averaging $4.99 per kilogram.

India is also the primary destination for Ghanaian shelled cashew nuts, accounting for 93% of the total exports. Meanwhile the EU accounts for only 2% of the exported quantity but contributes nearly 17% of the total export value.

Figure 12: Shelled cashew nuts exports from Ghana tot the world (trade value in US$)



Source: Authors' elabouration on ITC data, 2024

Table 3: Main importers of Ghanaian cashew in 2023

Partner	Quantity (Kg)	Quantity (%)	Trade Value (US$)	Trade value (%)
World	290,871,814		$ 225,666,015	
India	171,253,973	*58.88%*	$ 125,239,810	*55.50%*
Viet Nam	109,762,842	*37.74%*	$ 85,920,750	*38.07%*
EU27	716,291	*0.25%*	$ 3,575,956	*1.58%*
United Arab Emirates	3,511,230	*1.21%*	$ 3,295,958	*1.46%*
China	2,477,552	*0.85%*	$ 3,269,019	*1.45%*

Source: Authors' elabouration on ITC data, 2024

Furthermore, the two value chains also differ significantly in terms of value-added generation. Even though most of both products is sold on the international market as unprocessed, cocoa partially undergoes some transformation stages after the harvest, contrary to cashew that is exported mainly in-shell. After the harvest, raw cocoa beans are fermented, dried and for 64% bagged and sold on the international market with no further transformation. The remaining part is, however, sold as semi-processed products, such as cocoa paste, butter and powder while only 1.25% is sold as chocolate (Table 4).

Table 4: Cocoa and cocoa preparations exported by Ghana (2023)

Product	Exported quantities (Tons)	Exported quantities (% of all cocoa products)	Exported value (1000 US$)	Exported value (% of all cocoa products)
Total cocoa products	678,449.00	-	1,873,613.00	-
Cocoa beans whole or broken raw or roasted	433,288.00	63.86%	1,107,356.00	59.10%
Cocoa paste whether or not defatted	125,684.00	18.53%	413,072.00	22.05%
Cocoa butter fat and oil	60,200.00	8.87%	234,826.00	12.53%
Cocoa powder not containing added sugar or other sweetening matter	37,486.00	5.53%	112,579.00	6.01%
Cocoa shells husks skins and other cocoa waste	13,286.00	1.96%	3,037.00	0.16%
Chocolate and other food preparations containing cocoa	8,505.00	1.25%	2,743.00	0.15%

Notes: *Values for *"Cocoa butter fat and oil"* refer to year 2022
Source: Authors' elabouration on ITC data, 2024

3.1.1.4 Governmental support

Being cocoa a well-established production, it is strongly regulated and subsidized by the government. The Government of Ghana introduced the Ghana Cocoa Board (COCOBOD) in 1947, in order to support and facilitate the production, processing and marketing of cocoa, coffee and sheanut. The COCOBOD is responsible for the purchasing, marketing and export cocoa and cocoa products produced in Ghana (Ghana Cocoa Board, 2024).

Until the early '90 the COCOBOD's subsidiary Producer Buying Company (PBC) was the sole buyer of cocoa. In 1993 the sector underwent a partial liberalisation through the introduction of LBCs as competitors to the PBC (World Bank, 2011).

Despite this, PBC still remains the main buyer of cocoa with 29.15% share of the market (GCB Strategy & Research Deptartment., 2022) and Ghana remains the only cocoa producing country in the world without a fully liberalised marketing system.

Thus, COCOBOD and its divisions play a central role in the sector, by regulating the activities along the value chain, especially concerning external marketing, managed by the COCOBOD's division Cocoa Marketing Company (CMC) and quality control carried out by the Quality Control Company (QCC). Cocoa is prepared for sale at farm level and transported to the community buying centre, where a representative from a LBC (including the governmental PBC) purchases it on behalf of the company.

The product is then moved from the purchasing clerk sheds to the district depot, where the QCC carries out quality control checks on cocoa beans before they are handed to the custody of CMC. At the takeover points all cocoa arrivals are check-sampled by QCC port staff and eventually stored in port warehouses, ready for sale on the international market (EU REDD, 2021).

The Ghana Cocoa Board carries out many other activities aimed at supporting the cocoa sector, such as scientific researching focused on enhancing the quality of cocoa (through the Cocoa Research

Institute of Ghana) and initiate programmes aimed at controlling pests and diseases, such as the CODAPEC programme (Mass Spraying), started in 2001/2002 to control black pod disease and mirids (Ghana Cocoa Board, 2024).

With regard to cashew, considering the growing relevance of crop in the Ghanaian economy, several development projects and initiatives that support the production have been implemented. Some of the most relevant ones are listed below:

- The Cashew Development Project (CDP), funded by the African Development Fund (ADF), was implemented by the Ministry of Food and Agriculture (MOFA) from 2002 and 2010. The project aimed to increase cashew production in Ghana and support small farmers through initiatives such as training, credit, and technical assistance.
- The Africa Cashew Alliance (ACA), founded in 2006 with funding from USAID and headquartered in Accra, is as an association of African and international businesses. With almost 130 members, it aims to boost growth and investment in the African cashew industry by fostering partnerships, advocating for the sector, providing market connections, offering technical support, and promoting global networking.
- During the last decade, several programs and groups has been established to support cashew production in the country. Some of these: the Cashew Producer Association of Ghana (CPAG), Association of Cashew Processors of Ghana (ACPG), African Cashew Initiative (Aci), ADRA, Cashew Industry Association of Ghana (CIAG).
- The government established the TCDA as a body to regulate and develop the production, processing, and trading of six tree crops, including cashew.
- In 2020, the Cashew Council Ghana (CCG) was established as an umbrella organization by stakeholders of the cashew sector. It serves as a platform for cashew producers, processors, and traders to advocate for policy reforms and coordinate with government bodies like the TCDA. The CCG aims to enhance the sector's development by providing a unified voice for all actors, facilitating policy advocacy, and improving sectoral coordination. The Council also established a working committee that will have, among other things, to formulate a pricing module for pricing in Ghana that will have to be later approved by the TCDA.

3.1.1.5 Cocoa and Cashew producing regions, climatic conditions, and latitude

Both cocoa and cashew are evergreen perennial tree plants, which however have different growth conditions.

Cocoa trees grow exclusively in areas that meet certain specific characteristics. Temperatures should range from 18 to 30 degrees Celsius Cocoa can be cultivated up to approximately 1,000 meters above sea level, although most cocoa is grown at altitudes below 300 meters (European Cocoa Association, 2024).

Moderate to high rainfall, from 1,000 to 1,500 mm (Abu I., 2021), is vital for the growth and development of cocoa trees. Ghana's cocoa-growing regions meet these conditions in Ghana, but as analysed by Adjei-Nsiah S. et al. there was a clear rise in temperature between 1960 and 2000 with a simultaneous decline in rainfall.

Furthermore, climate change projections indicate a reduction in annual rainfall by 10.9%, and 18.6% for the years 2050 and 2080, respectively, alongside an increase in temperature of 2.0°C and 3.9°Cover the same periods (Adjei-Nsiah S., 2012). These projected changes are expected to reduce soil moisture levels during the dry seasons, thereby increasing the vulnerability of cocoa production to the adverse effects of climate change.

Cocoa harvesting happens in two different time frames: the main season, from October to June (main crop) and the minor season, from July-August (light crop) (Collabourative Africa Budget Reform Initiative, 2013). With proper care, most cocoa trees begin producing pods in their fourth or fifth year and can continue to do so for up to 30 more years (Cocoa Life, 2024).

Cashew trees are evergreen perennials that can grow up to 12 meters tall and are a key species in agroforestry. They begin producing fruit at about four years of age, with peak yields occurring between 10 and 30 years. The harvesting season in Ghana typically spans from February to July.
Cashew is a versatile crop with multiple uses. Cashew nutshell liquid (CNSL) serves as a raw material in industries such as paint, wood, lubricants, and lightweight plastics, as well as in agriculture for producing fungicides, herbicides, and pesticides against termites. Cashew apples repel leaf-feeding pests and their juice has medicinal properties, including anti-scorbutic and diuretic effects, useful in treating kidney diseases and cholera (Telascrêa et al., 2014). The kernel and shell oils also have medicinal applications: kernel oil is used as an antidote for irritant poisons, while shell oil acts as a mild purgative and is effective in treating cracked feet, warts, and leprous sores (Mensah et al., 2021).
Cashew trees thrive at altitudes of up to 1,000 meters above sea level and require an annual precipitation range of 1,000–2,000 mm for good yields (Sys et al., 1993). They are highly resilient due to their deep root systems, which make them drought-resistant and tolerant of temperatures up to 40°C. Optimal yields are achieved in temperatures ranging from 24 to 30°C, though they can perform well between 15 and 35°C (Dendena & Corsi, 2014). These attributes make cashew an ideal cash crop for northern Ghana, where conditions are unsuitable for crops like cocoa (Bass, 2013). As shown in Figure 13, cashew in Ghana not only grows in areas where cocoa is cultivated (Brong Ahafo, Ashanti and Volta) but also in areas where the climatic conditions are harsher, such as Northern and Upper West Regions.

Figure 13: Cocoa and Cashew Producing Regions in Ghana

Source: authors' elabouration from Ghana Cocoa Board & Center for Studies and Project LLC data

3.1.1.6 Cocoa value chain's structure: from farm to consumer

The importance of cocoa in the Ghanaians' livelihoods is clear: more than 800,000 families are involved in cocoa production (Ghana Cocoa Board).
Ghanaian farmers take care of all the production stages up to the sale of cocoa beans on the international market. The main production stages carried out by farmers are listed below:

- *Harvesting*: The cocoa is harvested by cutting the ripe pods from the trees, which are then carefully opened to extract the beans.

- *Fermentation*: The beans undergo fermentation for 6 to 7 days, with two or three turnings.
- *Drying*: the beans are then dried in the sun for roughly 7 days.
- *Bagging*: lastly the beans are bagged, graded, and sealed for export (Ghana Cocoa Board)

Most of the cocoa (64%) production is bagged and sold on the international market with no further transformation. The remaining part is, however, sold as semi-processed products, such as cocoa paste, butter, and powder (Table 4).

Byomolt et al. (2018) estimate that approximately 15% of cocoa farmers in Ghana are members of cooperatives. These cooperatives play a crucial role in providing agricultural extension services access to markets while also facilitating access to farmers for commercial and institutional actors. Once the product is exported, three multinational grinding companies -Barry Callebaut, Cargill and Olam- dominate the industry, with over 60% of the total cocoa processing and the same trend is followed by the manufacturing companies, with Mars Wrigley, Ferrero Group and Mondelēz International leading the market (Grumiller et al., 2022).

The overmentioned multinationals take care of all the stages that turn cocoa beans into final products, namely:

- *Roasting*: The beans are roasted at different temperatures depending on the desired flavour characteristics, typically ranging between 120°C and 150°C. This step brings out the rich chocolate flavour and facilitates the separation between cocoa nibs and their shells.
- *Cracking and Winnowing*: The outer shell of the cocoa beans is removed through winnowing. This process separates the nibs, contain the essential cocoa solids and cocoa butter, from the husk.
- *Grinding*: The cocoa nibs are ground into a thick paste which then, due to the action of the heat generated by the process which causes the cocoa butter in the nibs to melt, turns into a liquid substance called "chocolate liquor".
- *Mixing*: The chocolate liquor is then mixed with other ingredients such as sugar, milk powder, vanilla and lecithin, depending on the type of chocolate being made.
- *Refining and conching*: the chocolate mixture is passed through refining rollers to reduce the size of the particles before being conched. Conching improves the texture and flavour, reducing any harsh or acidic flavors and allowing the chocolate to achieve a smooth, creamy consistency.
- *Tempering:* this process allows the conched chocolate to be carefully cooled and reheated to specific temperatures, in order to ensure that the chocolate solidifies with a glossy finish and a smooth texture
- *Molding and packaging:* the tempered chocolate is poured into molds to form the desired shapes and, once it is cooled and solidified, it is removed from the molds and packaged for distribution (ICCO, 2024).

3.1.1.7 Cashew: from national border to final consumer

During the cashew harvest, farmers typically sell their produce to buyers (often middlemen who take a commission), directly to processors, or through bulk sales via farmer-based organizations, which is generally regarded as the most favourable option (Pohlmann, 2012).
According to Bannor et al. (2019), together with cashew producers, the main actors in the cashew value chain are:

- *Input suppliers:* They provide essential supplies to various stakeholders in the chain, including seedlings, pesticides, herbicides, fertilizers, processing machinery, and packaging materials like jute bags.

- *Traders*: this category comprises different actors that play different roles. Cashew nuts reach international market through two main channels: (a) exporters and buying companies, who aggregate and export cashew nuts via contract suppliers and village agents, earning procurement commissions; or (b) wholesalers and retailers, who operate independently, purchasing nuts directly from producers and reselling them at an added margin. Cashew trade often includes basic processing such as drying and packaging, with limited quality testing conducted by only a few buying companies.
- *Cashew processors*: processing firms activities focus on the conversion of RCN into finished products such as kernels or extracts like cashew oil. The quantity of cashew they process in infinitesimally small compared to the one that is exported and processed outside the country.
- *End-users:* consumers mainly located in developed economies.

In the cashew value chain, processing stage is composed of different stages that are mostly carried out outside the country, mainly to India and Vietnam that convert RCN in plain kernels, subsequently re-exported in bulk to markets.
More than 90% of Ghana's cashew exports are in the form of RCN. Cashew processing methods, that concern the extraction of the kernel from the shell, take place outside the country mainly in India and Vietnam. Shelling cashew nuts presents challenges due to the nut's irregular shape, the tough outer shell, and the CNSL, which must be carefully managed to prevent contamination of the kernel and protect the operator's health.
The five processing steps of cashew are as follows:

1. *Preparation of the in-shell*. Cashew apples fall on the ground and are handpicked by farmers, who separate the RCNs from the fruit. The nuts are collected in buckets and taken to the village, where they are sun-dried for 2-3 days. This drying process reduces moisture and prevents mould formation, allowing the nuts to be stored for several months before processing. Then there is a cleaning phase to remove any impurity, followed by a calibration grouping nuts of similar size that can be evenly processed afterwards. This step ensures the selection of the right blade for the shelling machines at a later stage in the process. Once calibrated, cashew nuts are then treated to increase the brittleness of the shell and loosening of the kernel from the shell (steam cooking in Africa).
2. *Removal of the shell*. Shelling is the core of cashew processing and the most delicate step, as it requires extracting the kernel without breaking it to avoid contamination from CNSL or causing burns and blisters to workers' hand. While small-scale processing firms still use perform the extraction manually, using traditional methods using a penknife, large-scale plants have transitioned to mechanized operations (Dendena & Corsi, 2014).
3. *Peeling*. In its raw form, the kernel is encased in a thin brown seed coat known as the testa, which must be carefully removed. After shelling, the cashew kernel must be dried to brittle the testa and easier to peel. Following oven drying, the kernels are transferred to a steam boiler that can be even powered by cashew nut shells. Finally, cashew kernels are peeled using machines that employ air pressure and friction to remove the testa.
4. *Grading*. Kernels are classified into one of 26 grades according to size, color, and shape. Grade classification is important for meeting international standards.
5. *Packing*. Cashew kernels then subject to antimicrobial treatment to remove or neutralize pathogens such as Salmonella, Aflatoxins, E. coli, and Listeria. This process, which involves both thermal and ultraviolet (UV) treatment, is crucial, as even minimal contamination can pose significant health risks. The kernels are cleaned with aspirators usually available also in small processing firms and packed by vacuum packing and gas flushing to extend the shelf life of the processed nuts (Fitzpatrick 2011). Further processing includes roasting, salting, or seasoning, followed by packaging, labelling, and branding.

3.1.1.8 Economic sustainability of the value chains

3.1.1.8.1 Cocoa

As mentioned in the previous section more than 800,000 families are involved in cocoa production in Ghana (Ghana Cocoa Board). The average farm size of Ghanaian cocoa farms is 2,6 hectares (Cocoa Barometer, 2015) and according to a survey conducted by Bymolt et al. (2018), nearly 80% of cocoa-producing agricultural households produce cocoa as their household's most important crop and primary source of income.

Despite the relevant role of the cocoa value chain in Ghana, it is still characterised by severe economic challenges which lead to high vulnerability to poverty among cocoa farmers. It is estimated that many households (30–58%) earn a gross income below the World Bank extreme poverty line (van Vliet et al., 2021). Moreover, the majority of them (73–90%) do not reach the Living Income threshold, which measures, according to Living Income Community of Practice, the minimum income needed to have access to a decent standard of living which includes the access to sufficient food, water, housing, education and healthcare, and other essential needs including provision for unexpected events.

Overall, the Cocoa Barometer (2015) estimated the average income of cocoa farmers in Ghana to be 0,84 $/day. Multiple factors contribute to this condition, first of all, the low farm-gate prices. As mentioned in Section 1, Ghanaian cocoa is sold on the international market through forward contracts: private companies buy cocoa at the beginning of each production year at a set FOB price*, reflecting anticipated prices in the global cocoa market (SEO Amsterdam Economics, 2016). Even though farmers have the largest relative income among the cocoa beans industry players, by receiving 70% of the FOB sharing of the net cocoa FOB price, the income base for cocoa farming in Ghana is low due to the small-scale nature of cocoa farms and low farm yields per hectare. As reported by FAOSTAT the average yield of Ghanaian cocoa farms is 552.3 kg/ha. Despite this, a survey conducted by the Cocoa Barometer (2022) pointed out an overestimation of the actual median production capacity of cocoa farms, which more realistically produce around 350 kilo per hectare (Cocoa Barometer, 2022).

Furthermore, the productivity of cocoa farms has strongly been impacted by the spread of the cocoa swollen shoot virus disease (CSSVD), one of the most economically damaging diseases of cacao trees, first identified in Ghana in 1936. The spread of the virus, which can only be limited through a "cutting-out-approach", can reduce the yield by approximately 30-50% (Muller, 2016). A recent analysis held by the Cocoa Health and Extension Division of Ghana Cocoa Board has detected an area of 570.000 ha affected by CSSVD outbreaks (Ameyaw et al., 2023). This phenomenon, combined with prolonged droughts and illegal mining has led to a severe drop in the cocoa production. Low yield of cocoa plantation is also connected to several other factor such as the ageing of trees, infertile soil and outdated production method and a lack of affordable inputs and credit. In addition, the rising costs of living as well as of agricultural inputs leaves most of the cocoa producers stuck in a circle of low investments, low productivity and consequent low farm-gate prices (van Vliet et al., 2021).

Low farmgate prices are however not the only determinant of poverty among cocoa farmers. Market power also plays an important role in influencing value distribution. Contrary to the first steps of the production, characterised by many farmers taking care of small sized farmlands, cocoa grinding and manufacturing is, as pointed out in section 1, highly concentrated . This structure of the VC results in poor bargaining power of farmers on the international market, contributing to low farm-gate prices which are neither enough to cover production costs, nor sufficient to leave a margin for a decent livelihood to farmers.

Moreover, most of the cocoa beans are sold on the international market as unprocessed, therefore most of the value added is generated outside the country and accrues to other stakeholders, particularly manufacturers and retailers. The chocolate-confectionary industry is highly concentrated, and it is estimated that only 6,6 % of the added value generated along the value chain is related to the farmers, while manufacturers and retailers get more than 70% of it (Cocoa Barometer Consortium, 2015). The over-mentioned economic constraints of the VC are considered as the root cause of the environmental and social issues of cocoa production in Ghana.

3.1.1.8.2 Cashew

Today, the crop provides the main source of income for about 125,000 smallholder farmers (ComCashew, 2019), who face low opportunity costs and cultivate an average of 0.8 to 2.5 hectares (Bromley and Foltz, 2011) with an average yield of 400 kg per hectare (ACA Cashew Barometer, 2021).

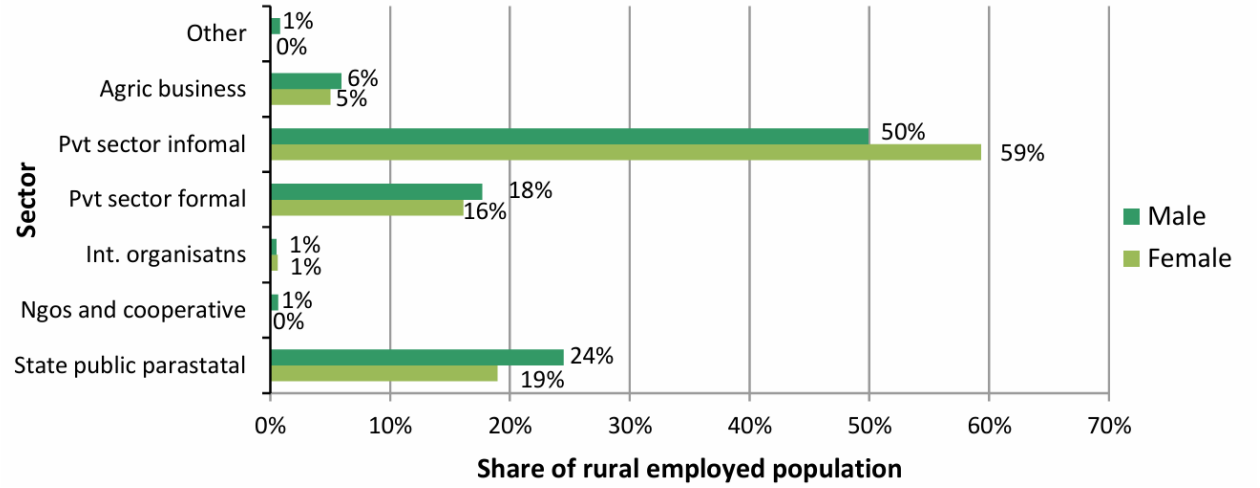
Cashew trees, which do not require yearly planting, offer farmers a stable income alongside subsistence crops like yam, maize, and millet. Some scholars acknowledge that cashew farming has therefore the potential to help reducing poverty in Ghana (Evans et al 2014, Peprah et al 2018, Yeboah et al. 2023). However, it does not provide a consistent year-round income, as earnings are limited to the cashew harvesting season. In a study by Peprah et al. (2018), cashew producers in the Boho region were asked to identify the factors they believe contribute to their poverty after the harvest. The farmers highlighted several challenges, including fluctuating RCN prices, land tenure issues, high borrowing costs, limited access to agricultural extension services, large household sizes leading to a high dependency ratio, expensive farm inputs, a lack of cashew-processing facilities to offer off-season employment, low levels of education (illiteracy), and inadequate income from cashew farming.

3.1.1.9 Social sustainability of the value chains

Roughly 40% of Ghana's population is employed in the agricultural sector, making it a critical component of the country's economy (World Bank, 2024).

According to FAO, 52% of the total agricultural workforce works under informal contractual terms. This condition is stronger for female workers, who operate under informal worker conditions in the 59% of the cases (FAO, 2012)

Figure 14: Rural formal employment by sector, total and by gender, in 2015



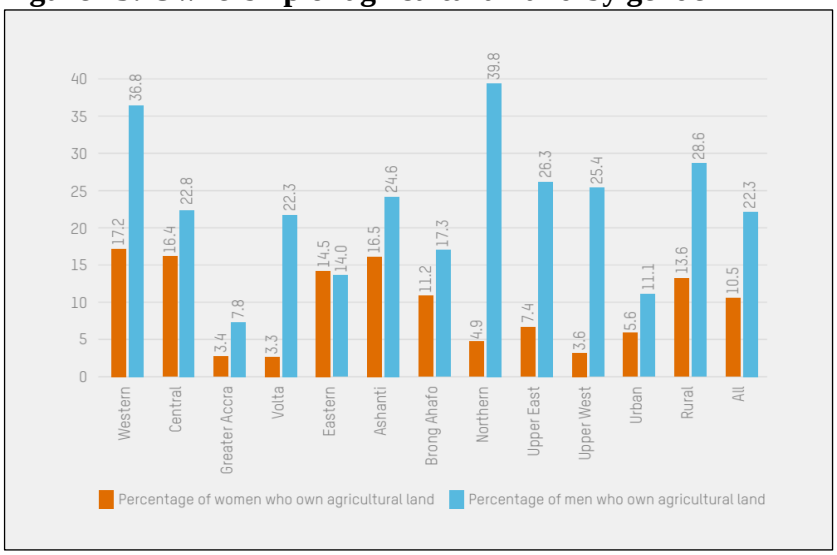
Source: FAO, 2012

Informal employment in the Ghanaian agricultural sector manifests especially in landowner–caretaker relations such as ‘Abunu’ and ‘Abusa’. These sharecropping systems consist in the landowner’s concession of land to a tenant farmer in exchange for a share of the cocoa-deriving income.
In the case of *Abunu* the caretaker and the landowner divide the profits from cocoa sales equally. Furthermore, the sharecropper has complete decision-making independency over the harvest of additional food crops grown alongside cocoa.
On the other hand, in the *Abusa* sharecropping system only one-third of cocoa-deriving profits goes to the to the farmer tenant and the landowner is responsible for covering all production costs and retains the authority to make production decisions (USAID, 2016).
Abusa sharecropping systems has historically relied predominantly on migrant workers which are part of the poorest rural workforce (Agyapong et al., 2024).
Abusa sharecroppers are highly vulnerable to labour exploitation since their bargaining power is limited due to restricted access to information and social class and identity constraints. Furthermore, the seasonal nature of cocoa work makes labour withdrawal a non-option strategy for negotiating for better working conditions, especially for migrant workers who frequently travel long distances to cocoa-growing regions during the peak harvesting season (Kissi et al. 2024).
Furthermore, many income measurements done by companies don't consider sharecroppers in their calculations, resulting in distorted estimates of farmers’ income. Moreover, since *Abusa* sharecroppers lack decision-making authority regarding farm management and do not participate in sustainability programmes, hindering the implementation of this kind of initiative on farms under the over-mentioned sharecropping systems (Cocoa Barometer, 2022).

3.1.1.9.1 Gender inequality

As pointed out in the Gender and Agricultural Development Strategy II (2015) women are at the core of the economies of Sub-Saharan Africa, accounting for about half of the agricultural labour force and producing around 70% of Ghana’s food crops.
Despite this, women are more likely to be exposed to poverty (Akua et al., 2004) .
This condition is the result of women’s unequal access to economic opportunities, trainings and production factors, especially land (Ministry of gender, children and social protection, 2022)
Secure land rights are widely recognized as having a substantial positive impact on poverty alleviation. They provide landowners with greater control over their labour, encourage investment in land and crops, enhance access to agricultural extension services, and strengthen their bargaining power (Akua et al., 2004).
As illustrated in Figure 15, women across all regions of Ghana have a significantly lower percentage of land ownership compared to men (OXFAM, 2018). This disparity highlights persistent gender inequalities in access to land resources and property rights, which has been, through history largely influenced by customary law and traditional/cultural factor limiting the role of women in the acquisition and leadership on land (Amu, 2008).
Even when the household is female-headed, condition that applies to 30% of the country’s households (Gender and Agricultural Development Strategy II, 2015), the incidence of poverty is notably higher among female-headed households (27.0%) compared to male-headed households (23.0%) (UN, 2020).
Furthermore, women engage in many domestic activities, such as cooking and taking care of their children and are required to combine these activities with their regular work, exposing them to overload of work.
It is estimated that if women farmers had the same access to productive resources as men, they could increase farm yields by 20–30%. This improvement could boost Ghana's total agricultural output by 4%, potentially reducing hunger by 17% (SEND Ghana, 2014).

Figure 15: Ownership of agricultural land by gender



Source: OXFAM, 2018

Cocoa

According to the African Develpment Bank (2015) women make up about 68% of the labour force in the cocoa sector. Despite this cocoa farming in Ghana is often associated with patriarchal structures, where women, despite their significant contributions to production phases which strongly impact the quality of the final product, such as fermentation and drying, still face significant disadvantages, including limited access to land, resources, and decision-making power (OXFAM, 2020).

It is estimated that only 25% of the Ghanaian cocoa farming land is owned by women, since most of them work under unclear remuneration systems on the plots owned by their husbands or other family members (Fairtrade International, 2020).

The person who holds the passbook (registry book where the quantities of cocoa sold to purchasing companies are noted) is officially recognised as landowner, even if they don't directly work on the farm themselves (Barrientos et al., 2016). Hence, women may farm on land owned by their husbands or male relatives without having access to cocoa-deriving profits, cooperative membership, agricultural inputs, training, premium payments and credits. This condition pushes them into looking for additional sources of income, adding up to their workload, with serious implications for their wellbeing as well as their children's (Ahrin, 2022)**.**

Cashew

In the cashew sector, men are more involved in the pruning and spraying while picking and collection of nuts are the tasks carried out by women. Traditionally, in the post-harvesting phases, women in cashew production have been primarily confined to the activities of transporting, sorting, and drying the cashew fruit (Peprah et al., 2018).

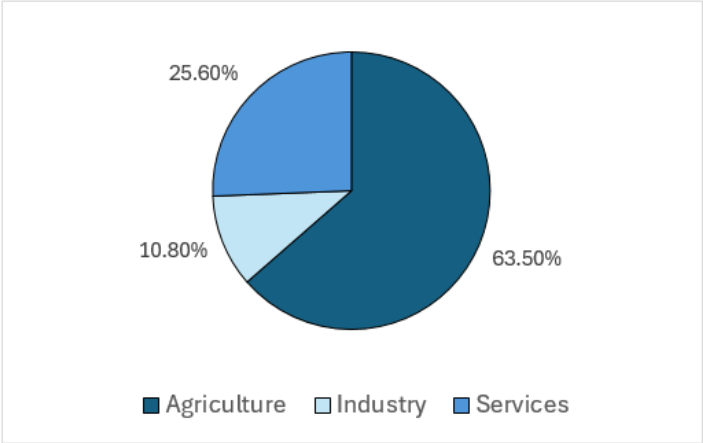
In Ghana, women play a significant role in cashew production and, although less frequently than men, they own and manage cashew farms. On the one hand, when women are the owners of the farm, they usually sell the cashew nuts independently, keeping or contributing the income to the household. On the other hand, when men own the farm, women may be involved in selling the nuts, but men typically handle the sales when both partners are at home, as women are often occupied with household chores (Pohlmann, 2012).

Finally, cashew farming does not require many machines and tractor services (usually controlled by man in the area).

3.1.1.9.2 Child labour

In Ghana, approximately 1.9 million children aged 5 to 17 years—representing about 22% of this age group—are part of the workforce. Strong differences have been observed between genders and rural and urban areas. Boys are more likely to be involved in child labour than girls, and the phenomenon is more widespread in rural areas (30% against 12% in urban areas) (World Bank, 2016). As Figure 16 shows the agricultural sector is the most affected by child labour, with the 63,50% of working children being involved in such field (U.S Department of Labour, 2023).

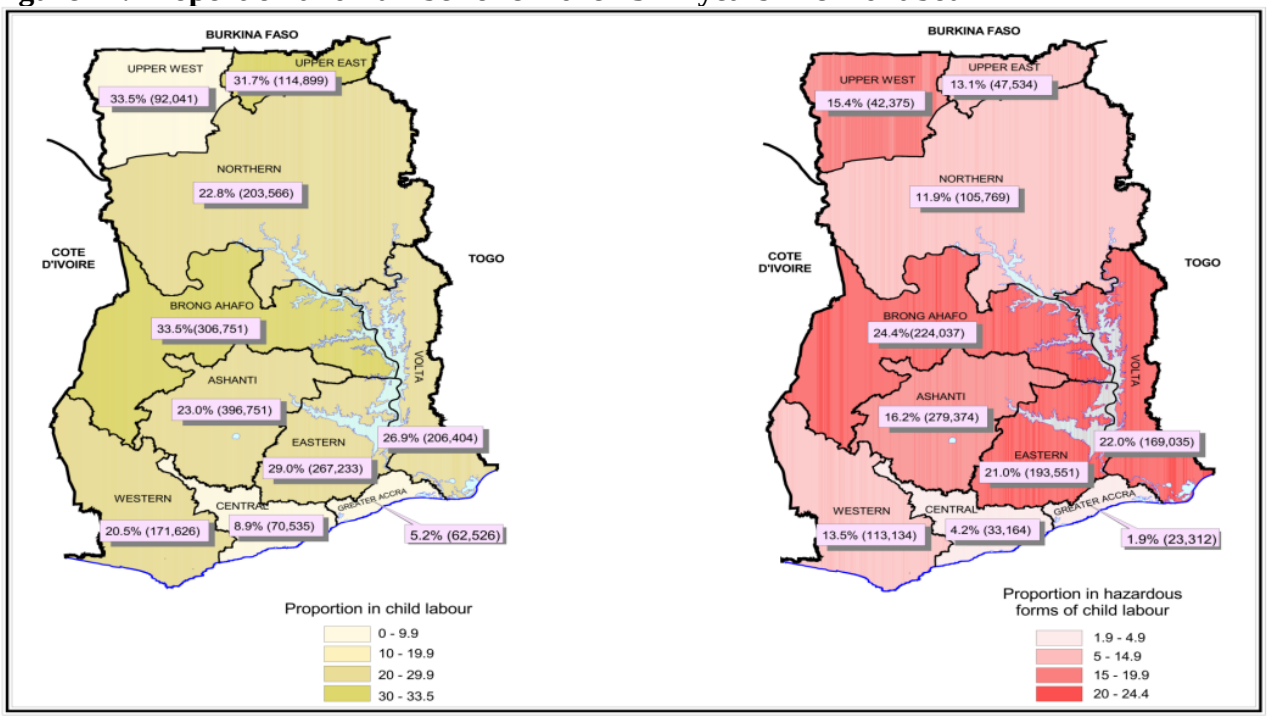
Figure 16: Working children by sector (Age 5-14)



Source: U.S. Department of labour, 2023

Child labour varies by region with Brong Ahafo being not only the region with the highest rate of child labour (33,5%), but also the one with the highest proportion of children being involved in hazardous activities (24,4%) and Greater Accra being the less interested by the phenomenon (5,2%) (Ghana Statistical Service, 2014)

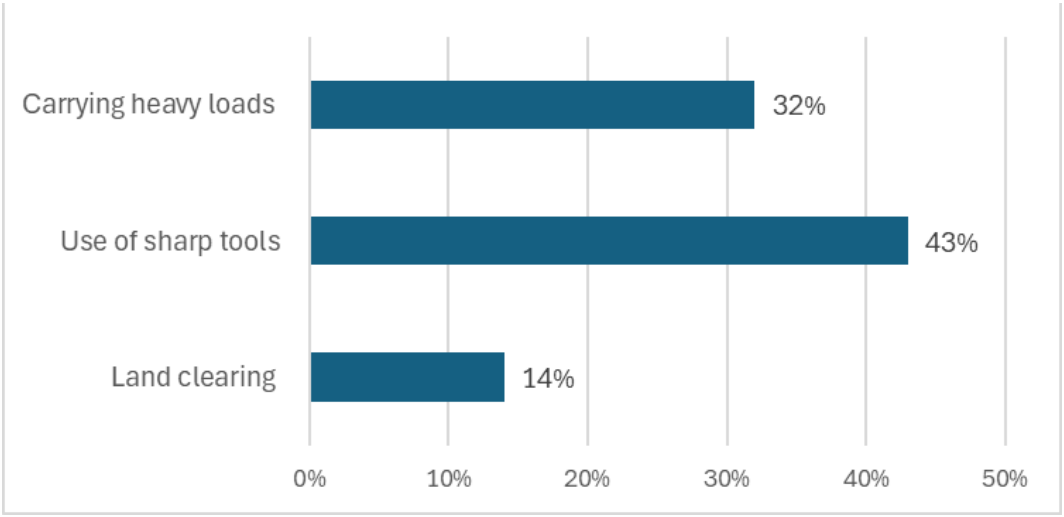
Figure 17: Proportion and number of children 5-17 years in child labour



Source: Ghana Statistical Service, 2014

Child labour is still very common in the cocoa sector; roughly 770.000 children in Ghana work on cocoa farms, 57% of which are boys and 43% are girls (European Commission, 2021). Of these, 51% are exposed to hazardous work (International Cocoa Initiative, 2018). Figure 18 shows the main hazardous activities children working in cocoa plantations are exposed to (European Commission, 2021).

Figure 18: Prevalence of main hazardous child labour tasks among children in cocoa producing areas



Source: European Commission, 2021

Even though socio-cultural factors play a role in the phenomena, as the participation of children in cocoa cultivation is often seen as an important part of their upbringing, it is also connected to economic factors. Cocoa cultivation in Ghana is largely family-based and especially at the peak of the cocoa harvest, the demand for workforce increases. Due to the high cost of hired labour, the whole household may be involved in the farm activities, leading to child labour (Abdul-Mumuni et al., 2019).

3.1.1.9.3 Pesticides and human health

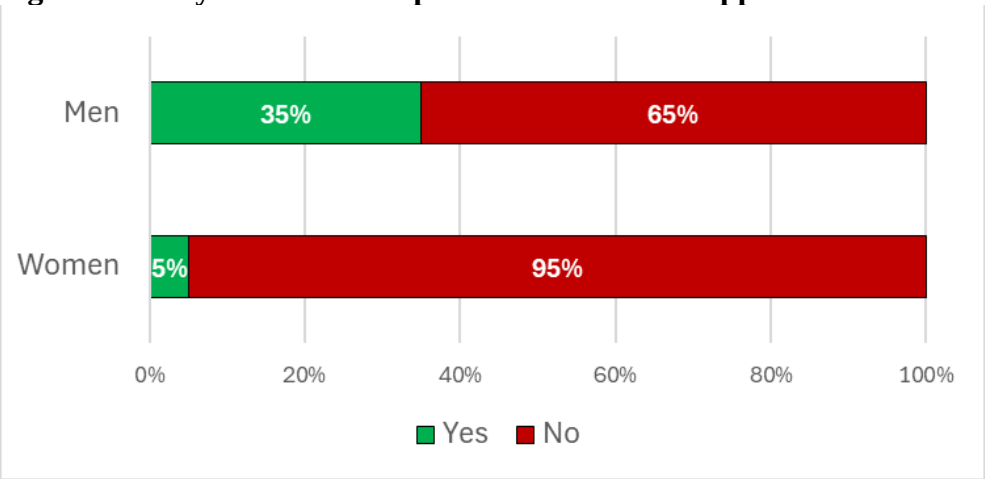
Modern agriculture heavily relies on effective chemicals for crop protection, enhancing yields, and ensuring cost-efficient production. In West Africa pesticide use increased by 177 percent between 2005 and 2015. In the same period the three largest agricultural markets of the area -Ivory Coast, Ghana, and Nigeria- tripled their total pesticide imports. As for Ghana, pesticide application is more concentrated in cocoa (which is particularly susceptible to pests and diseases), oil palm, cereals, vegetables and fruits sectors (Pesticides Atlas, 2022).
The overuse of agrochemicals represents a threat both for human health and the environment. Boedeker et al., 2020 calculated that roughly 34 million people per year get poisoned with agrochemicals in Western African.

Several studies have confirmed the link between exposure to pesticides and diseases such as Parkinson's, childhood leukemia, liver and breast cancer, Type 2 diabetes, obesity and endocrine disorders (Trasande et al., 2016). Health-related risks are aggravated by the limited use of personal protective equipment (PPE). A study from Miyittah et al. (2020) highlighted that even though Ghanaian farmers are aware of the environmental and health impacts of pesticide use, this awareness does not translate into practices that effectively minimize pesticide exposure, such as the use of PPE, as also highlighted by Okoffo et al. (2016). Notably, over 70% of the farmers interviewed in the overmentioned study by Miyittah et al. stated that they don't use gloves, goggles, oral/nose masks or coverall, during pesticide application.

The same study identified as main reasons for the scarce use of PPE, limited access to training on the topic and the unaffordability of said equipment. The correlation between education levels and hazard awareness is pointed out by a study from the Conservation Alliance (2021). More than 80 percent of male cocoa farmers in the sample possess at least a primary school education certificate, while almost half of female workers at cocoa farms in Ghana have no formal education at all.

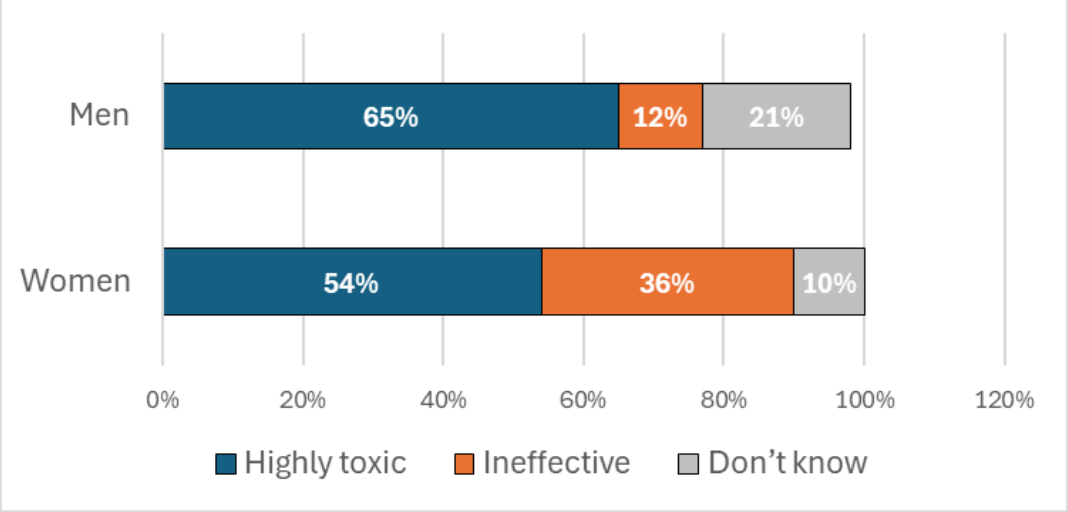
When asked about unapproved pesticides and consequent restrictions of their use, as shown in Figures 19 and 20, strong discrepancies among genders were highlighted, underlying women's limited knowledge on the subject.

Figure 19: Do you know some pesticides that are unapproved for use?



Source: Conservation Alliance, 2021

Figure 20: What do you think were the reasons for restricting these pesticides?



Source: Conservation Alliance, 2021

These results are alarming since the exposure to pesticides can be particularly problematic for women, who tend to have a higher proportion of body fat, making them more likely to store pollutants that bioaccumulate in fat tissue. Additionally, they have a greater amount of hormonally sensitive tissue, which increases their vulnerability to pesticides, particularly those that disrupt the endocrine system (Heinrich Böll Foundation, 2023).

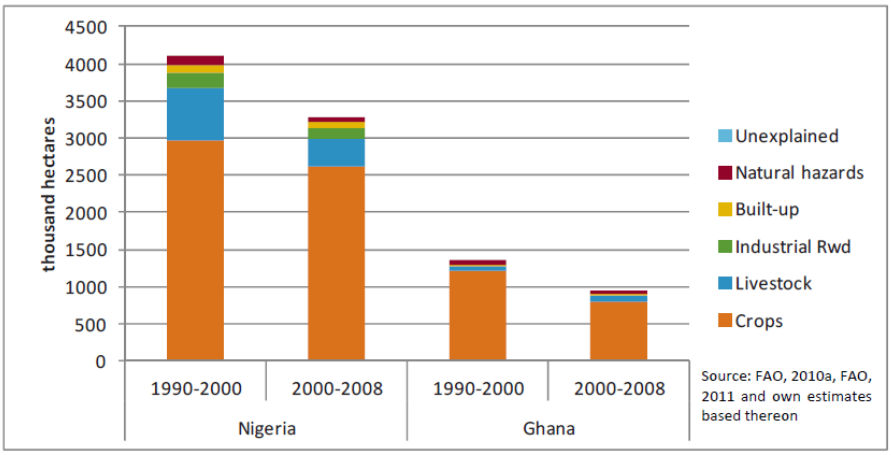
3.1.1.10 Environmental sustainability of the value chains

3.1.1.10.1 Deforestation

From the environmental sustainability point of view, deforestation represents one of the main challenges connected to agriculture in Ghana.

According to a report for the Ghana RED++ Strategy (2016) the country lost, between 1950 and the early 2000s, approximately 2.7 million hectares of forests, namely over 60% of its total forest cover. An analysis by the European Commission (2013), identified cropland expansion as the main driver for deforestation from 1990 to 2008, accounting for about 80% of total deforestation (Figure 21).

Figure 21: Deforestation by main sectors in Nigeria and Ghana, 1990-2008

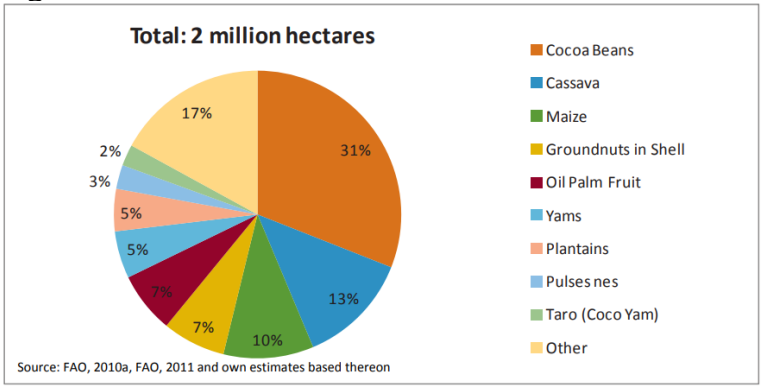


Source: Technical report by the European Commission, 2013

Forests play a crucial role in providing ecosystem services and functions that underpin Ghana's predominantly agrarian economy. The ongoing loss of forest ecosystems significantly disrupts the sustainable supply of essential goods and services for local communities that rely on forest resources for their livelihoods. Furthermore, deforestation contributes substantially to global climate change by increasing CO_2 emissions. Being Ghana particularly threatened by climate change, due to the rising temperatures and changes in rainfall patterns, the effort to mitigate and adapt to climate change is of critical importance for all Ghanaians (Ghana REDD++ Strategy, 2016). The EU is a considerable driver of deforestation and forest degradation on a global scale and according to the European Parliament (2022) the largest share of Union-driven deforestation is linked to seven commodities, among which cocoa, accounting for 7,5% of EU-driven deforestation.

As shown in Figure 22, over a total 2 million hectares of forests lost between 1990 and 2008 in Ghana, 31 % of it is attributable to cocoa cultivation (European Commission, 2013).

Figure 22: Hectares of forests lost between 1990 and 2008 in Ghana



Source: European Commission, 2013

Deforestation in cocoa-growing regions in Ghana is caused by several factors including government policies promoting production increases, the absence of clear land and weak legal systems. This is further exacerbated by a substantial decline in cocoa productivity per hectare in the last years, caused by the ageing of trees, poor farm management practices and the spread of swollen shoot virus disease, as mentioned in Section 1. Efforts to boost cocoa production in Ghana has therefore been at the expense of encroachment into forest reserves (Hansen et al., 2009), where soil is more fertile and therefore appealing to farmers, leading to land degradation, biodiversity loss and desertification patterns.
Furthermore, climate suitability for cocoa cultivation will decrease substantially due to changing climate, endangering other forested areas (Laderach et al., 2013).
Cashew production, like other crops that have significantly contributed to the widespread degradation of tropical forests globally, is predominantly carried out in large-scale, full-sun monocultures. Therefore, it is important to include such emerging crops with high deforestation potential in the list of commodities covered by the newly proposed EU anti-deforestation regulation.

3.1.1.10.2 Pesticides and water pollution

As highlighted in section 3, pesticides overuse and misuse is widely spread in Ghana. Measurements from a study conducted in the cocoa-growing Dormaa West District detected synthetic pyrethroid pesticide residues in 32 soil and 64 drinking water samples from cocoa farms (Mensah et al., 2015). This phenomenon not only has health implications on communities that rely on these water sources for drinking and irrigation, but also has serious environmental implication. The runoff from chemical fertilizers and pesticides, with concentrations peaking during the rainy season, can indeed lead to soil and water pollution, affecting local ecosystems and posing risks to aquatic and land life and biodiversity.
Pesticides intended to control cocoa pests also harm non-target species such as birds, reptiles, pollinators (Okoffo et al., 2016) and soil organisms which are fundamental for soil fertility (such as earthworms, bacteria and fungi) weakening ecological balance and increasing the prevalence of secondary pests that were previously controlled naturally (Boafo et al., 2016).
Reduced soil health and loss of pollinators, also leads to long-term economic impacts, due to the progressive loss of soil fertility with consequent lower productivity.
In the absence of proper pest management systems, cashew farmers in Africa apply pesticides uniformly across entire fields (blanket approach) rather than targeting specific areas affected by pests or diseases. Furthermore, pesticides are applied on a fixed schedule (calendar-based system) instead of being guided by actual pest or disease activity. These practices can result in inefficiencies, increased costs, environmental damage, and potential health risks (African Cashew Alliance, 2023).

3.1.1.10.3 National and international sustainability initiatives

Many initiatives were carried out over the years to address the sustainability challenges of the cocoa value chain, both on the international and national level:

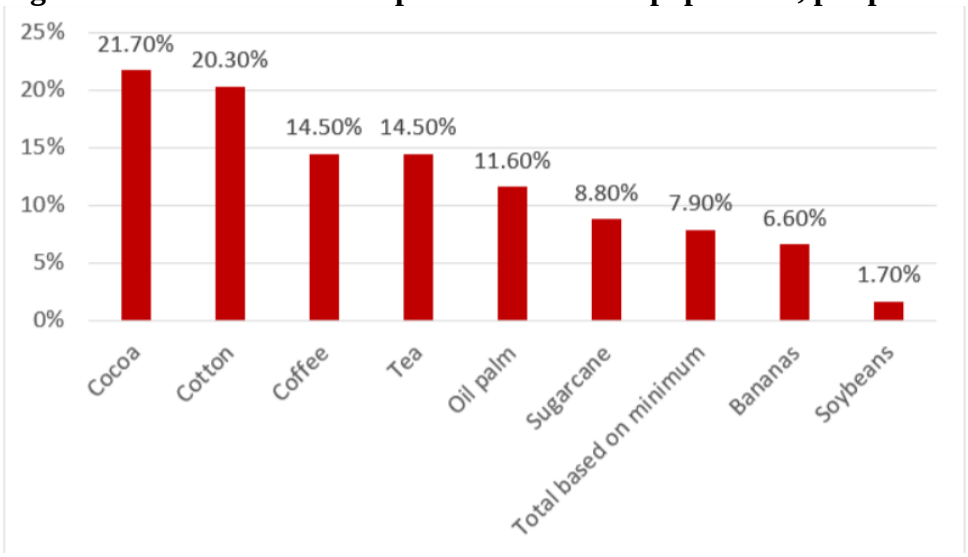
- **Private initiatives: Corporate sustainability programmes**
  In response to the increasing consumer's awareness on sustainability and their demand for transparent and detailed information regarding the production process of the goods, private manufacturing companies have developed their own sustainability labels and trademarks (EU REDD, 2021). They typically focus on creating a more ethical, environmentally friendly, and economically viable supply chain, while also seeking profitability by differentiating their products on the market.
  Some examples are Nestlé Cocoa Plan, Cocoa Horizons by Mars and Sustainable in a Generation by Barry Callebaut.

As company-specific initiatives not independently verified by a third-party certifier like Voluntary Sustainability Standards, Corporate Sustainability Programmes often raise questions about accountability and transparency (Oxfam, 2017).

- **Voluntary Sustainability Standards**

  Voluntary Sustainability Standards are sets of criteria or guidelines that companies, farmers, and producers voluntarily choose to follow to promote sustainable practices. These standards are typically established by independent organizations and often involve third-party audits to ensure compliance, focusing on areas such as environmental impact, social responsibility, and economic development (UN Trade and Development, 2023). As Figure 23 shows Cocoa is the world most certified product, followed by Cotton and Coffee.

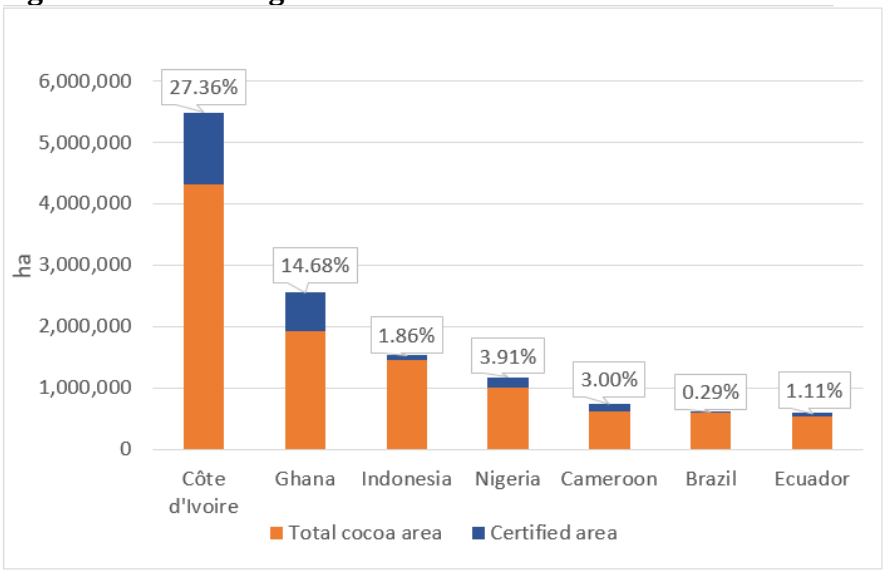
Figure 23: Share of certified product over total population, per product



Source: Author's elabouration of Standard Map data

As Figure 24 shows Ghana is the second cocoa-producing country in terms of share of land cultivated under certification schemes, with the 14,68% of the cultivated covered by certification.

Figure 24: Percentage of cocoa land cultivated under certification schemes



Source: Author's elabouration over Standard Map and FAOSTAT data

The most applied Voluntary Sustainability Standards in the cocoa sector are:

- *Fairtrade*: It focuses on ensuring fair wages and safe working conditions, by also guaranteeing a minimum price for cocoa and a premium for social projects (Fairtrade International, 2020)
- *Rainforest Alliance:* It focuses on promoting sustainable agricultural and forestry practices, biodiversity conservation, soil health with the overall goal of improving environmental, social, and economic outcomes for farmers and workers (Rainforest Alliance, 2019)
- *Organic*: as outlined by USDA this certification ensures that products are produced without synthetic pesticides or fertilizers. It also requires more sustainable farming practices that protect biodiversity and soil health.

As shown in Table 5, most of the certified cocoa land in Ghana is under the UTZ certification scheme. It is however worth noting that UTZ and Rainforest Alliance joined in 2018.

Table 5: Cocoa certification distribution

Certification	Certified area (ha)	% of area certified	Number of producers (n)
UTZ	632,884.00	57.40%	207,309.00
Fairtrade	282,113.95	25.59%	112,809.00
Rainforest	170,829.33	15.49%	52,184.00
Organic	16,700.00	1.51%	n/a

Source: Author's elabouration over Standard Map and FAOSTAT data

- **International Cocoa Initiative:** multi-stakeholder partnership mostly operating in West Africa and Latin America, aimed at improving the sustainability of the cocoa sector, addressing critical challenges such as child labour, low farmer incomes, environmental sustainability, and poor living conditions for cocoa farming communities (World Cocoa Foundation, 2024). It brings together industry players, including cocoa companies, farmers, civil society organizations, and certification bodies, to discuss the challenges and opportunities within the cocoa sector to work toward sustainable solutions for the cocoa supply chain (ICI, 2020).
- **EUDR:** the European Union Deforestation Regulation was proposed by the European Commission on 17th November 2021, in order to tackle global deforestation and forest degradation by controlling the trade of certain high-risk commodities, including cocoa (European Parliament, 2022). This regulation will require companies to implement robust due diligence systems to verify the origin of their cocoa to ensure that their supply chains are deforestation-free and will push cocoa producers to adopt more sustainable farming practices. While this will raise sustainability standards, it may also pose challenges for smallholder farmers, who may need additional support to meet these new requirements (European Commission, 2021).
- **LID:** from the joint efforts of the Ghana Cocoa Board and the Côte d'Ivoire Coffee and Cocoa Council, Ghana and Ivory Coast introduced in 2020 the Living Income Differential (LID). The LID is an additional payment of $400 per metric ton of cocoa, designed to supplement the price farmers receive for their cocoa and help close the income gap and ensure that farmers can cover their living costs and improve their livelihoods. Even though the LID is seen as a critical step toward addressing the income disparities faced by cocoa farmers, its long-term effectiveness remains dependent on the full cooperation of all stakeholders in the cocoa industry (Boysen et al., 2021).

3.1.2 Qualitative analysis for cocoa and cashew

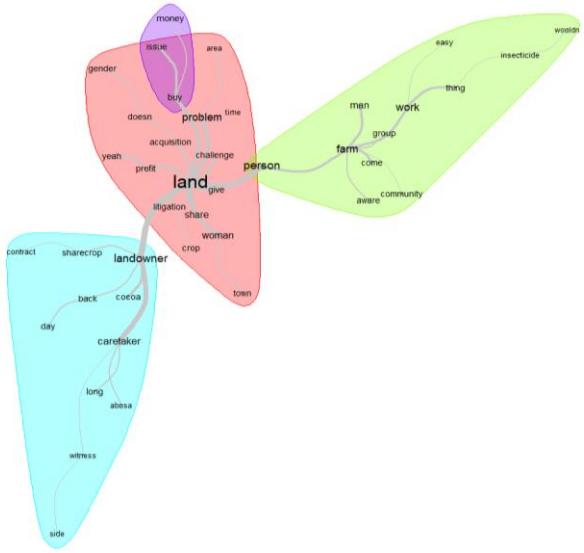
3.1.2.1 Farmers' organizations' representatives (FOs)

SDG 1

FOs representatives report the legal ownership of land being a serious issue, especially for women. The main problem is access to land, for different reasons: uncertain property rights, administrative and bureaucratic issues, inheritance issues. There is a high rate of litigiosity, especially for legal and inheritance reasons. Another relevant issue is the cost of land, which turns to be not accessible to many farmers. Some people rent land, but this is also quite unsafe in legal terms.

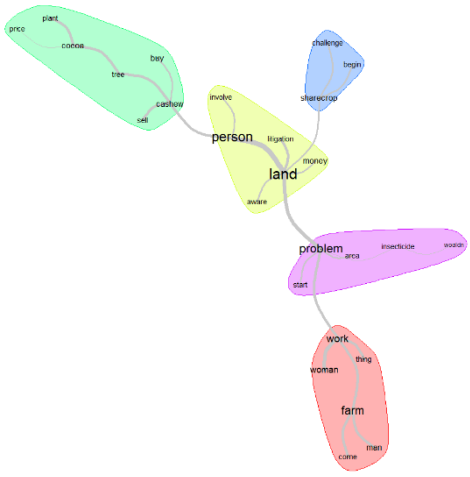
Regarding tenure rights and gender gaps, FOs declare the non-existence of special provisions discriminating against gender and women have the same rights of men to access land. As long as people have money for buying (or renting) agricultural land, everybody can have access to it. Women are also seen as "*strong workers*" and they often carry kids with them, who represent a heavy burden for them. In relation to sharecropping practices in the cocoa and cashew sectors, FOs confirm their wide variation of practices and rules across the country and between crops. However, what is crucial is to clearly agree upon responsibilities and schedules. In the case of cocoa, sharecropping can be done in two ways: "*Abusa*" and "*Abunu*". With "*Abusa*" method, the profit is divided into three parts between the landowner and the caretaker, when the cocoa trees are already planted.

Figure 25: SDG1 similarity analysis cocoa FOs



So, a farm acts as a caretaker, the landowner will take 2/3 of the share while the caretaker will take 1/3. On the other hand, with "*Abunu*" method, the caretaker plants the cocoa trees and shares the profits equally with the landowner. Sharecropping agreements are also accessed by women. However, they are sometimes discriminated in terms of labour required and duties to fulfil, due to the power of the landlord to set the rules (Figure 25 and 26).

Figure 26: SDG1 similarity analysis cashew FOs



SDG 2

Among FOs representatives, opinions on how trade opportunities expansion with the EU could impact the income of small cocoa and cashew producers in Ghana are various. Many respondents highlighted the importance of being directly involved in the farm activity to have a proper impact on the income of small producers. Specifically, in the case of cashew farmers, proper training is seen as having an impact on income. In the case of cocoa, the product price is expected to increase, with a direct effect on incomes. In particular, the expanded trade is expected to have a direct effect on the premium price farmers receive from the traders.

Responses on which actors would benefit the most from trade expansions are quite heterogeneous. Farmers believe all actors might benefit from an increase in trade opportunities; however, some think it is the EU that would benefit the most and others believe Ghana should gain the largest benefits. Even in this case, some respondents underline how the main beneficiaries would be the processors rather than the growers.

The main challenges experienced by small-scale cocoa and cashew farmers in Ghana volve all around financial issues and lack of adequate support. During the production season financial support should be addressed to the produce care, such as weeding and other growing practices. However, the most sensitive issue about challenges is the off-season part of the year, when farmers struggle to cater for the family. Some forms of income stabilization, reducing its seasonality, would benefit them.

A clear difference between cashew and cocoa sectors exists in terms of involvement of smallholders' farmers in organizations or cooperatives. In the case of cashew, respondents do not seem to be aware of a specific organization supporting farmers in terms of strengthen of their revenues or bargaining power, whereas for cocoa the situation is different. Joining farmers' organisations for cocoa producers bring several support services, such as free inputs, nurseries for small plants, training, and so on. However, premium price paid to farmers is linked to the quantity of production, so for small farmers that could be a serious constraint.

Regarding climate change and natural conditions, the most relevant issues are weather fluctuations and water scarcity. If the dry season prolongs ("harmattan season", from the name of a dry wind), then it becomes a problem for both cocoa and cashew growers. However, there is a difference between cocoa and cashew because cashew trees hardly grow in overly fertile land and they prefer rocky dry soils, so in this case an excess of water could even be a disaster in terms of fruit quality.

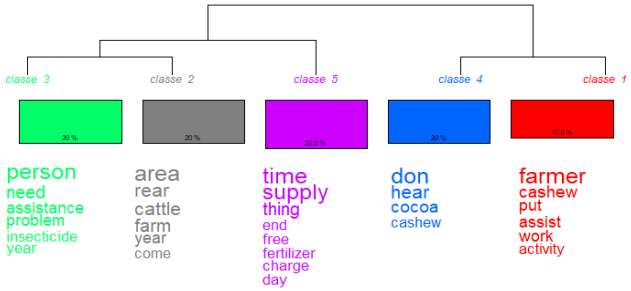
The possible improvement of EU-Ghana trade is seen as an opportunity for farmers in two main ways: mores services and education for farmers but also more efficiency in production, so to increase total produce and revenues for farmers. On the other hands, the environmental conditions might even get worse because of trade improvement, so in the end the respondents show mixed feelings about this issue.

FOs respondents are not aware of specific agri-environmental scheme in the sectors under study, except from some pesticides and weed control product support, mainly supplied by the cooperatives (ABOCFA). Pruning and afforestation should be improved as schemes, because they are very relevant issues for both cocoa and cashew. At the same time, farmers have growing issues with other new activities which are growing fast in the regions involved, especially livestock grazing, which compete with traditional crops and especially cashew, or with producers who do not respect the production protocols (organic) and damage the whole sector (non-members of the ABOCFA cooperative).

Loss of biodiversity is not seen as a dramatic threat right now, except for the loss of wildlife (but not always seen as a problem for farmers – see SDG 15). The perception of risks is more connected to the wrong use of the inputs, including chemical product and pest control, and water management - both water scarcity and water abundance (Figure 27 and 28).

Figure 27: SDG2 dendogram cocoa FOs

Figure 28: SDG2 dendogram cashew FOs



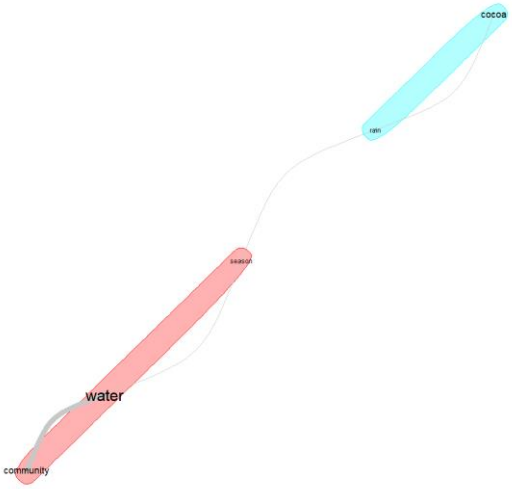
SDG 5

FOs respondents did not provide any answers related to this specific SDG. For some considerations on the issue of the gender gap and gender equity, some details are gathered within SDG1.

SDG 6

For FOs, there are serious concerns about water management, not so much for water availability but for water management. However, if the dry season is longer than expected, water becomes an issue. Drinkable water is made available by ABOCFA, but the lack of water in the fields might delay and reduce production, especially cocoa. Water is often at risk of poisoning when treatments are done on the trees, so that is a very sensitive issues and ABOCFA supports farmers in avoiding pollution risks. Evidence is made mainly by cocoa farmers. (Figure 29).

Figure 29: SDG6 similarity analysis cocoa FOs



SDG 8

On the theme of informal labour, questions featured very different reactions from FOs representatives, with the share of informal jobs evaluated from 10 to 40% of the total. In some cases, the respondents referred to part-time and multi-workers, engaged also in other sectors outside agriculture (mostly government jobs).

Looking at the opportunities of trade improvement on informal employment, the main issue highlighted is the income increase again, which is considered a pre-condition for income stabilisation and formal work. This issue seems particularly relevant for the cashew sector, more than for the cocoa value chain.

Analysing specifically the child labour issue, this theme has been faced with some caution by the respondents. FOs interviews highlight the essential absence of child labour, at least in the region interested by the interviews, also thanks to the training and education of farmers. On the other hand, it is also acknowledged that single female parenthood is relatively diffused among female farmers and for this reason sometimes children are informally involved in some on-farm activities.

Children might be involved in light jobs, especially during weekends, when they are free from school. Typically, in cocoa farms they can pick cocoa pods from the ground. Children are kept away from harder or potentially dangerous jobs like weeding or harvesting.

Child labour has negatively affected youngster education in the past so more recently controls are more frequent and more effective. For this reason, it is usually only in the off-school time that children might be involved in some light on-farm work. In any case, most respondents are aware of the possible troubles with justice implied in that. NGOs and fair traders are involved in controlling this issue.

Trade as seen as an antidote to child labour, especially in the case of EU because many NGOs are involved with more comprehensive programmes and children receive several benefits, not only for schooling but also for nutritional aspects and clothing.

Finally, with regards to labour rights ant their implementation in Ghana, the most relevant topic emerged from FOs is that most contracts are informal and based on personal agreements. This is also due to the fact the hired workers come from the local community and there are often kin relationships. Only in the case of sharecropping contracts are written and follow shared rules (see above).

Trade improvement with EU might have discordant effects. For some respondents it will generate a growth of cocoa bag prices and, accordingly, an increase in wages and rights for labourers. For others, there isn’t a direct link between international trade and local labour condition, which will remain substantially unchanged.

Regarding work safety, respondents stressed the need of insurance to protect farmers form main work accidents, considering that many of them use dangerous tools in tough conditions. Insurances in agriculture are not common and this is an issue also for access io public health and hospitals. Another aspect stressed is the need of appropriate equipment, such as gloves, boots and so on.

Regarding the relationships with immigrant labourers, the answers highlight two different issues: the internal migrants and the ones coming from abroad. The respondents stress the relevant aspect of training, which is often necessary, and fair wages to all. Motivation is key for migrant labourers, which can take different forms, not only higher wages but also social support, training, family are and so on. Most migrants are day workers, so if the business expands, not only more day workers will be needed, but they will be better paid and get better conditions (Figure 30 and 31).

Figure 30: SDG8 dendogram cocoa FOs

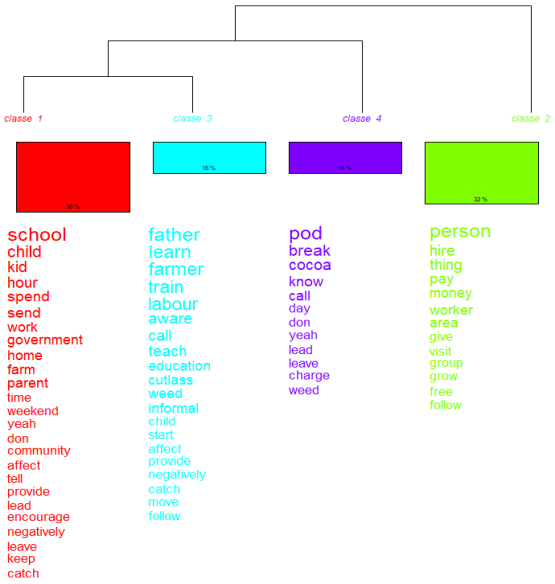
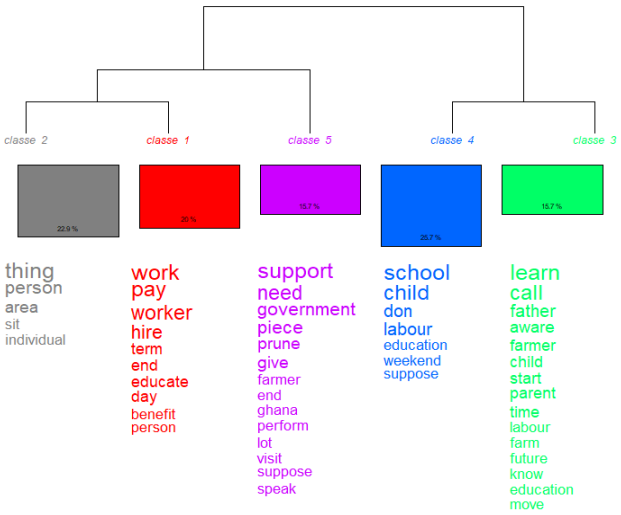


Figure 31: SDG8 dendogram cashew FOs



SDG 15

The issue of deforestation is a very relevant one for FOs, however it is felt as something happened in the past because now local communities do not have or manage any forest. The domination of cocoa and cashew productions prevent any other crop to expand, and that is seen as a possible risk in terms of diversification and staples. Improvement in EU-Ghana trade will improve sustainable standards in terms of keep more biodiversity, reducing or forbidding more tree cuts (deforestation) and allow staple foods on the land, which is good for farmers during the dry season. Cocoa and cashew growing have already heavily influenced biodiversity, not only vegetable on but also animal one. Wildlife has been killed or tends to move away from the areas cultivated and more into the forest. Many species are extinct now because of the improvement of cultivated land, or at least disappeared from the territories involved in cultivation (Figure 32 and 33).

Figure 32: SDG15 similarity analysis cocoa FOs

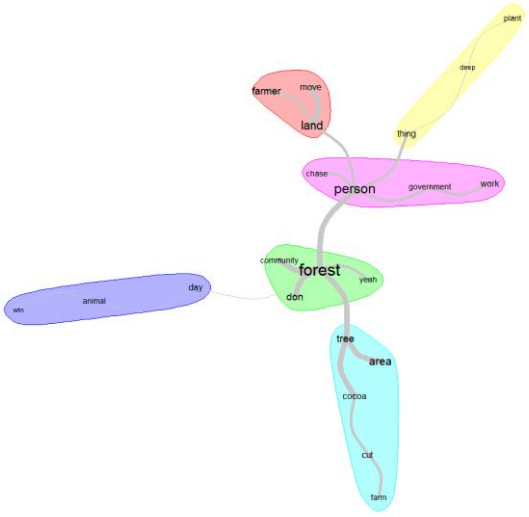
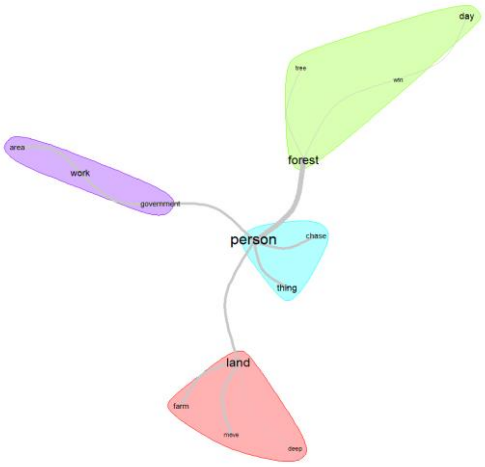


Figure 33: SDG15 similarity analysis cashew FOs



SDG 17

According to FOs, in terms of voluntary standards and labels, the most common ones are those related to organic farming and fair trade. The standards are set and managed via the ABOCFA and Cocoa Life for the cocoa, while in the case of cashews they are mostly overlooked by foreign trading companies and NGOs. All these entities supply also specific training in these fields, so farmers can be more aware of the economic, social and environmental implications of voluntary standards, including the positive effects on incomes.

For interviewed FOs, increasing trade with EU is seen also as an opportunity for enhancing the role of voluntary standards in Ghana, especially organic products. Also, respondents expect an increase in the number of farmers joining local cooperatives once they realise that voluntary standards increase the value of the product and the quality of the technical assistance (Figure 34 and 35).

Figure 34: SDG17 similarity analysis cocoa FOs

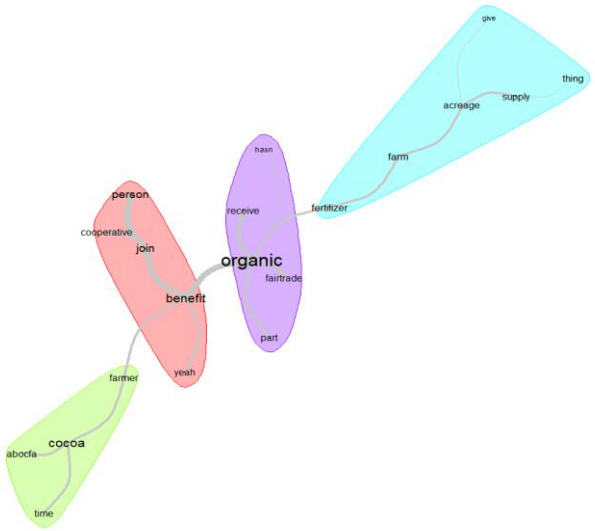
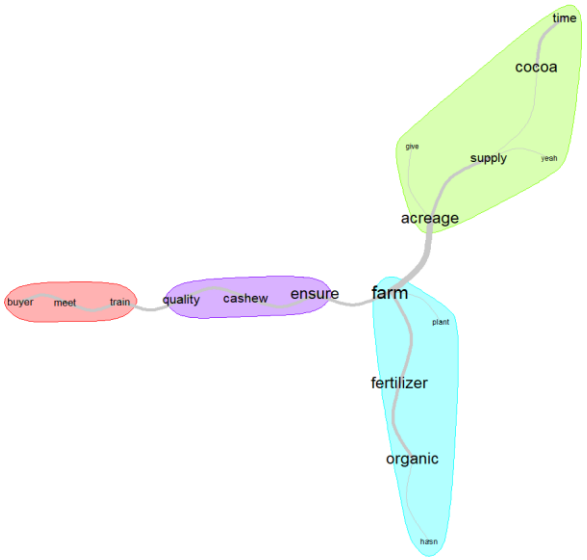


Figure 35: SDG17 similarity analysis cashew FOs



3.1.2.2 Policy Makers' representatives (PMs)

SDG 1

PMs had few comments in relation to the statistical proportion of farmers (both in cocoa and cashew sectors) having secure tenure rights with legally recognized documentation differentiated by gender. For cocoa, it seems that most farms are owned by men (64%) and the other 36% belongs to women. In terms of workforce, respondents underline that gender difference depends on the work typology needed in the farm. In general terms, some PMs underline the importance of the new 2020 Land Act which consolidates previous land enactments into a single law, aiming at achieving sustainable and efficient land tenure, administration and management. Yet another contribution points out that land in Ghana is tied to hereditary, so where there is strong paternal or patrilineal inheritance, women struggle to own farming lands. Even though they can have access to it, ownership is not so smooth in most of the cases. Suggestions from a PM in this sense is to focus more on the post-production segment of the value chain, where women seem having more space. Through the Cocoa Management System, for example, PMs registered all cocoa farmers and mapped their accounts with GPS. In Ashanti region, they found out that there are a lot of women owning land, probably driven by the cultural system for which woman inherits the land following female line.

PMs report different feelings about main policy shortcomings on farmers' land tenure rights in both sectors. Ghana cocoa sector seems living a series of land system's issues which affect both farmers and investors and which are related more in general to the difficulties of political and economic system of the country. In some jurisdictions, for example, the land is fully owned by the government, whereas in some others it is owned by traditional people or local inhabitants. What emerge is a mosaic background in which if you succeed to do commercial farm you are one step ahead. It seems that an expectation from the ongoing land reforms will be the transition from a small-scale shareholder farming into something better, from which all agribusiness value chains will benefit, not only the cocoa one. What emerge is, indeed, that it is a matter of a general development and not just agribusiness. In addition, it seems that due to growing urbanization, lands for farming are becoming more competitive and, in places like Accra, people cannot do farming like before. Due to overpopulation, some areas usually devoted to farming are now inhabited (i.e. Ejuso, in the Ashanti region). Suggestions indicate the need to improve people's awareness on exploiting those lands for farming, through education, capacity building, stakeholder engagement and negotiation with the landowners, as well as using those lands which remain "traditionally unused" to contribute to community development (i.e. "*set up a park*"). This issue of land banks is also underlined as something to be attentive to.

Some PMs report that shortcomings relate more to implementation processes than policy themselves. Land regulations and policies exist, but implementation procedures are *cumbersome* and *frustrating,* not easy to understand and undertake especially for rural populations and representing an obstacle also for external investors. One of the key aspects underlined is ensuring that investors have a very smooth and seamless system of registering their businesses, acquisition, and so on. This is what Business Resource Centers try to do across Ghana, with the intention of giving to investors all the requisite information and spaces to direct their business without encountering many issues. Since most farmers are smallholders, people often negotiate for lands doing informal agreements which are acceptable within a given context. The need to find a right way to formalize these simple arrangements is stressed. The biggest challenge in these socio-cultural deals is that the rights over the land you use continue to exist only when trees are on that land. Once trees are removed, the rights are lost, and farmers must renegotiate. Even if documenting these relations would bring an additional cost, both farmer and landowner will be willing to pay, and this would enhance the system. This already exist in the reported cocoa management system, where the mapping of cocoa farms let sector's stakeholders know and understand each other.

Concerning Ghanian sharecropping land tenure systems (Abunu and Abusa) PMs underline that their management differs from region to region. In some areas, land is divided into two or three parts by imaginary lines, in all sorts of shapes and arrangements. These differences in sharecropping probably exist because farmers don't have initial capital to acquire land. These arrangements are informal and acceptable within the local communities, well known and not abused, according to some interviewed PMs. People have their own way of using rural arrangements, sometimes bringing some family members as witnesses when decisions need to be taken. It is surprising how far some of these deals have gone for generations. Farmers and landowners involved have their own localized justice administration, filled with culture and practice, religiosity and spirituality. Moreover, some PMs state that this kind of agreements seem not present discriminating traits in terms of gender, but rather it is culture that often moves the dynamics of these arrangements, for example when a woman is married, she will tend to be guided in these processes by her husband.

Contractualization of farmers (also migrant workforce), in terms of both verbal and written contracts represent another issue to be mentioned. For verbal ones, the main risk is that at any time they can be stopped with any kind of insurance for workers. Written contracts seem being also risky because often they are not clear, so trust issues can come up. A way of integrating Abunu and the other systems in

a more codified and formal one, could be a good way to maintain cultural customs and place more value on land, as well as introducing clearer rental allowance for fairer returns on investments for producers (Figure 36 and 37).

Figure 36: SDG1 dendogram cocoa PMs

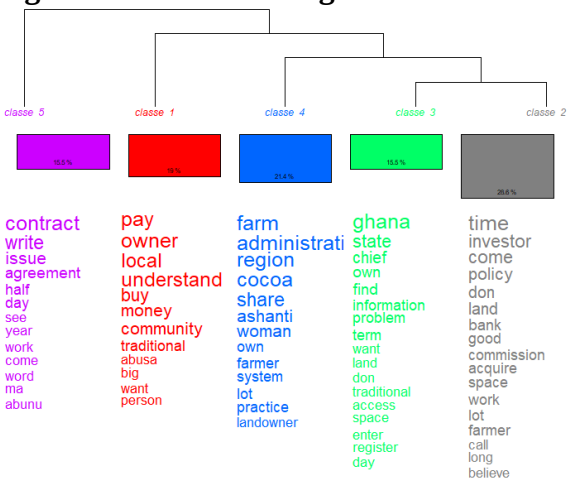
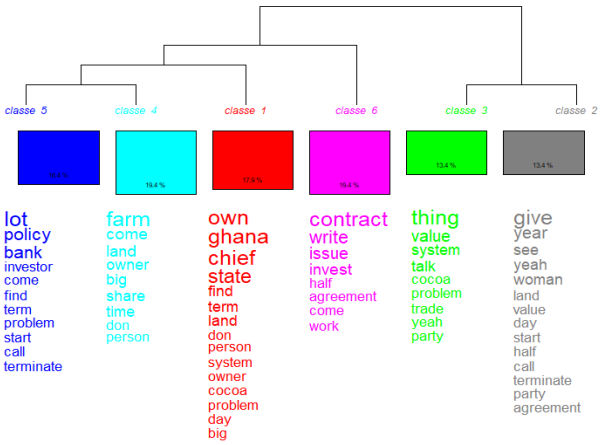


Figure 37: SDG1 dendogram cashew PMs



SDG 2

PMs seem agree about the variety of inputs driving small-scale farmers' income, which is reported being falling compared to some decades ago. Farmers now seem barely live on cocoa production, whereas before it represented a secure source of income. For young generations the sector is not considered sustainable or viable, meaning that generational turnover is tough and there are labour shortages in the sector, often filled by migrant work. PMs underline the possibilities that the implementation of the EU deforestation regulations could open in terms of cocoa sustainability, especially for the possible improved price in European markets which would translate into a higher living income for producers.

Issues identified as drivers of income changes are: farm size, which means that economic sources are limited; low and old technology affecting productivity and making Ghanian production much lower than that of Asia, for instance; the cost of inputs, even though it's subsidized by the cocoa board, represent still a high percentage of their earnings; producers' bargaining power and market assets are volatile, and farmers are obligated by law to sell cocoa beans to the state agency which in turns sell the product on the international market for all Ghanaian cocoa farmers. The news of the possibility to add a "*living income*" could boost their economic situation.

Also, certification standards have a role in driving growth. Sometimes, when farmers use the rainforest certifications, they can make a premium on it. Some of them use their farms not only for cocoa production, but also for ecotourism. Of course, this is not a common action, since not everyone has the means to afford compliance and structure costs. Climate issues are also considered an income variable. It seems that farmers faced a lot of problems with rains last year, which occurred at the wrong time. This affected the productivity in terms of quality and quantity, and, consequently, prices. A respondent underlines an interesting aspect related to considering farming a proper employment or not. Indeed, it often seems that in developing countries agriculture and related issues are not necessarily considered "employment". People dedicate to farming while hoping to get another meaningful job or something which they can proudly identify in as fully employed. This brings out the lack of awareness of the opportunities that an agricultural activity can provide and one of the reasons why these activities (cocoa included) are not fully integrated into trade. The right knowledge of the value chain could enhance farmers' decision to upscale and find a place in trading space.

Two productivity enhancement programs have been started some years ago by the cocoa board, with the idea of improving cocoa farm productivity in same piece of land as a way of discouraging farmers from expanding into the forest or into new areas. The idea was to grow from 450 kg/ha to 600 kg/ha, until 1,000 kilos per hectare by 2026/27. The first goal of 600 kg/ha has been achieved, while rehabilitating unproductive farms: over 40% of Ghanian cocoa trees were found to be unproductive. 17% are affected by the swollen shoot barrier disease, which can only be controlled by cutting and treating. A massive pruning has been also carried out to improve on the aeration of the farm to reduce incidence of pests and diseases, together with hand pollination in a portion of the farms. In this regard, farmers have been also trained to continue the work by themselves. These interventions have contributed to farmers' additional income. Subsidized fertilizers distribution has also been made. Some respondents underline that on the price side, the influence of national entities on international market is low (20%): market seems usually being influenced by non-market fundamentals more than market ones.

About the main challenges experienced by small-scale cocoa producers in Ghana and the impact on their income of a possible increase of trade with the EU, PMs underline the difficulties exporters meet in terms of SPS and other standards in entering the EU market, despite the Economic Partnership Agreement (EPA) implementation since 2016. These affects Ghanian exports in general, with issues encountered also in the cosmetics sector – an important one which could be internationally boosted. To train and give awareness to producers and local standards authorities and institutions, especially the Ministry of Trade and Industry (MOTI), about EPA and related trade facilitation, a program called "Compete Ghana" has been carried out aiming also to enhance local authorities to train, in turn, producers and citizens about it. Moreover, there is the possibility to discuss soon with Ghana the negotiation of a Sustainable Investment Facilitation Agreement (SIFA) which brings element of sustainability not still present in the EPA, since the TSD chapter is not included in the agreement.

Challenges in these terms faced by farmers – cocoa ones included – are various and structural. They relate to low salaries, infrastructure and roads affecting transportation of products, health and education facilities access, which contribute to the risk of child labour because often schools are too far from home and, consequently, too costly. Poverty, at the very basis, drives farmers' daily challenges. For farmers, revenue side seems being affected both by the yield and the price that they get, while the expenditure side seems being influenced by the cost of inputs. Trade is reported being a key development asset by PMs, but support systems measures are needed broadly.

PMs also suggest the presence of the Ghana Cocoa Traceability System, a very well-advanced digital system providing data and information to private sector stakeholders as well as the intention to set up an African regional standard for cocoa. The capacity building mechanism conceived within the EPA should be coming into force soon, consisting of some money supporting infrastructure and transportation investments in many areas, cocoa included. Ports, for instance, will be a focus. Trainings, as previously underlined, have been made for stakeholders involved in cocoa and agriculture focusing on export and related issues though the EPA. Ongoing capacity development should be useful also to improve farmers' workforce, together with the Due Diligence Act came into force recently. The latter, whose intentions seem promising, could be of difficult implementation or comprehension for local farmers, especially for cultural reasons behind some agricultural practices (i.e. children helping families with farm business, but not avoiding education).

Some data reported by the Fair Labour Association estimates that women comprise 58% of the workforce in the cocoa farming industry but they are reported to earn only 20% of the generated income. Women are earning less in cocoa farming than their male counterparts: for those involved in caretaking work, for example, women workers' average yearly earnings are 1610 Ghana cedis ($298.15), compared to an average of 2356 Ghana cedis ($436.30) for male workers. According to

some respondents, the traditional land system has its role in this: women usually don't inherit land contrary to men, which makes men the employers most of the time. Also, women's work is often unpaid because is seen as compensated in other way (the house where they live after married, and so on). In rural areas educational level of men might be higher compared to that of women. Indeed, even in the case women could have some land, they struggle in capturing the value in terms of training or certifications. This is also underlined in terms of association membership: what is evident often is that women's associations (producers or marketers) are part of bigger men's association which remain at the front and capturing more value along the chain.

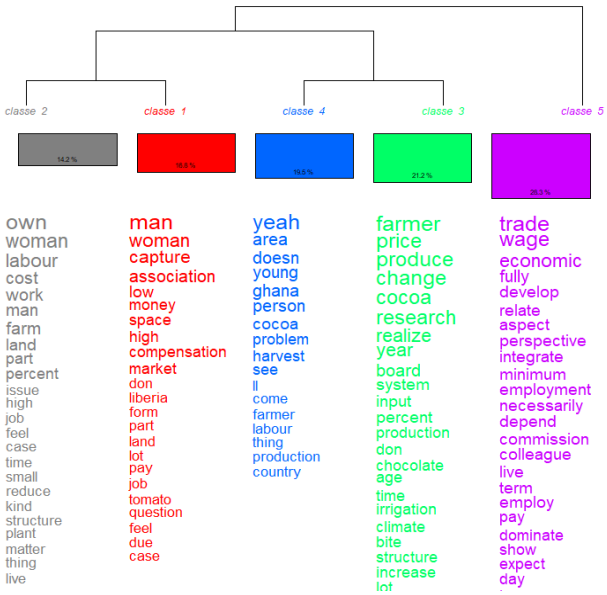
Some other PMs focus the attention on different job typologies in the farm done by men and women as well as working hours, underlining that with equal roles, there is no distinction in earnings among them. 36% of cocoa farms owned by women have the same land use rights of 64% of men owned cocoa farm. Differences in pay arise because of the kind of job done within the farm gate and for the hours spent by working – a woman, for example, will not do usually long hours, since she has a caregiver role at home.

Concerning patterns characterizing the small households' income or gender income issues in Ghanian cashew and cocoa sector, some PMs report that many Village Savings and Loan Associations (VSLAs) – simple, accountable community-based systems for groups having not a ready access to formal financial services – are run by women and succeed in sustain themselves, while generating empowerment. Some of them could be linked to some cashew communities. Other finance tools, like matching grants, or sometimes direct grants when people are in extreme poverty conditions, seem also being transformative. Trade is again stressed as having cultural, social and economic traits, but in terms of economic ones, no gender discrimination relating to fair wages seems being identified.

Regarding the impact on small-scale cashew producers of a possible increase of trade with the EU, no answers have been collected.
The main challenges concerning water and soil, and in general the environment, for cashew and cocoa sectors in Ghana have been also investigated to understand the proportion of sustainable and productive agricultural area. Deforestation, pollution and supply of water as well as soil erosions – due to agrochemical uses – are the major threats affecting the environment and local people's health when referring to these productions. Monocropping is slowly giving way to a new dynamic farming approach where different kinds of trees (cocoa and other species) contribute to avoid soil erosion. Planting timber trees or trees like cashew which are higher than the cocoa tree, could bring a bit of shade, additional revenue and increased living income. PMs dealing directly with cocoa farmers report paying attention to recommend to farmers agrochemicals to be used on cocoa (with minimal residual effects) after having undergone tests and validation at Cocoa Research Institute. There is a lot of sensitizations going on, even if some infractions persist not on a large scale. Raising awareness on the benefit of cocoa farming and the harm illegal mining causes to the community and the local economy in the long run is part of this capacity process, which stakeholders are promoting also through the creation of the Cocoa Protection Unit.
No specific data about hectares submitted to sustainable agriculture schemes in cocoa and cashew sectors as well as trade's role in favouring sustainable agriculture have been gathered.
Entities like Food and Drugs Association (FDA) or the Ministry of Health are reported to be in the frontline to secure and ensure food assessments in terms of quality and trade. The EU could help with trade policy and technical assistance on crop resilient varieties as part of the agreement with Ghana, offering technical assistance especially in terms of phytosanitary measures. Experiences of commercial valorisation and protection (on the PDO/PGI model) of local varieties in the two sectors are undertaken even though challenging, with appreciation for the efforts reported from PMs (Figure 38 and 39).

Figure 38: SDG2 cluster analysis cocoa PMs PMs

Figure 39: SDG2 cluster analysis cashew



SDG 5

Different contributions have been collected from PMs concerning the role of trade in helping or undermine gender inequality. Initiatives like “Aid for Trade”, managed by the World Trade Organisation (WTO), which focuses on programmes that support trade policies and regulations, the training of trade officials and the development of industrial infrastructure, have been reported. Within this context, the West Africa Competitiveness Programme (WACOMP) supports value chains such as cassava, tropical fruit (mango and pineapple) and shea, a sector dominated by women. Many of the businesses supported are micro and small women-owned enterprises, receiving training, subsidies and other opportunities to expand their trade.

Trade and international agreements could be a vector to fight patriarchy and promote women’s inclusion, not only in commercial space, but also in economic resource access and training. An intentional component should be included within international trade agreement to ensure women can fully benefit from the advantages of trade, accessing training, credit and capacity building. A pivotal role in this sense is embodied by policies and programs contrasting gender inequalities. The real challenge seems therefore not only to redistribute domestic tasks and consider women more than just caregivers, but to address inequalities related to ownership and control of economic resources.

Education is a key factor in changing patriarchal mentalities, and through awareness-raising training, trade could help an active participation of women in economic activities, particularly through their skills improvement. It is emphasised that women can benefit economically if they develop skills enabling them to add value to products during the post-production phase. Indeed, post-production is a longer and more complex part of the value chain than simple production (usually predominated by men), and if women manage to strategically insert themselves in that phase, they can achieve

significant gains, included the case of cash crops, agricultural crops intended for export or sale. The promotion of industry and trade is seen as a way to foster instruments of economic development, which must create opportunities for all, regardless of gender. A right approach would then ensure that economic measures and trade policies are inclusive and beneficial to all citizens, women included (Figure 40 and 41).

Figure 40: SDGs dendogram cocoa PMs

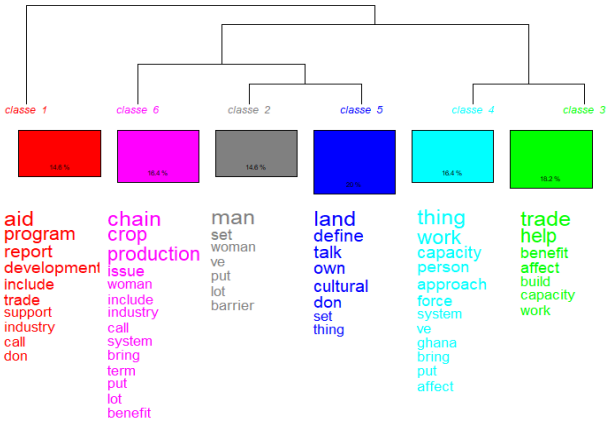
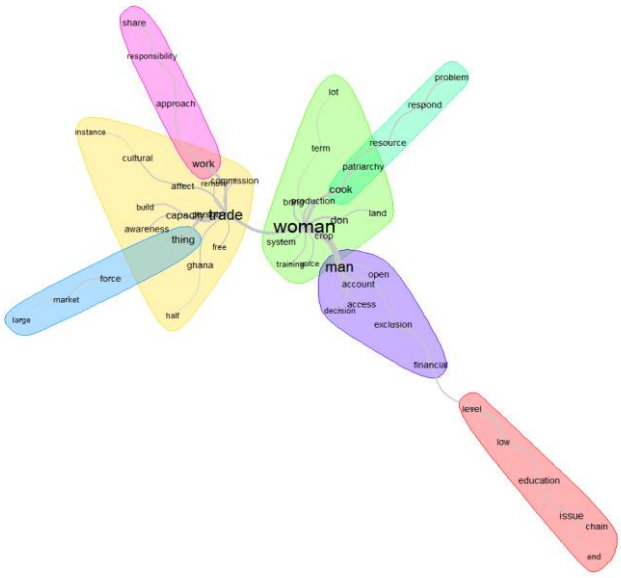


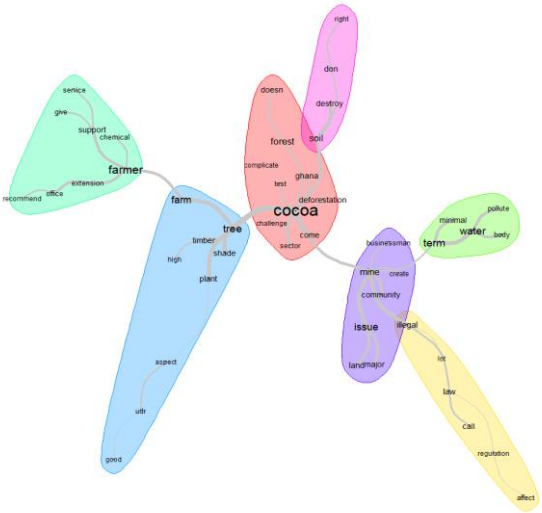
Figure 41: SDGs similarity analysis cashew PMs



SDG 6

PMs reflections about this topic indicate contamination by unsafe water used to irrigate fields as a significant obstacle to food safety as well. This is evident in Ghana and in Africa in general, where challenges in terms of food quality and agricultural exports are recurrent. Of course, food safety does not only concern exports, but also the health (i.e. E. coli contamination) and welfare of local consumers, prompting reflection on how to improve production and consumption patterns of agricultural products. Ghana has been protagonist of a "green label" initiative used to ensure the quality of vegetables for export, even though it seems turned back due to persistent contamination issues. The EU is aware of these problems and monitors them, worrying that products may be rejected in international markets if unsafety persists. Same worries concern the local level, for the health issue that agrifood consumption causes to local people (Figure 42).

Figure 42: SDG6 similarity analysis cocoa PMs



SDG 8

Analysing PMs interviews, what emerge is that informal work in cocoa and cashew sectors seem to be prevalent. Ghana, following a broader trade agenda, is trying to move from informal to formal trade, with more transparent exchanges. The adoption of modern payment systems – such as the Ghana Interbank Payment and Settlement System (GhIPSS) – and the promotion of data collection are seen as essential tools in this transformation to reduce informality and promote a regulated and competitive trading environment.

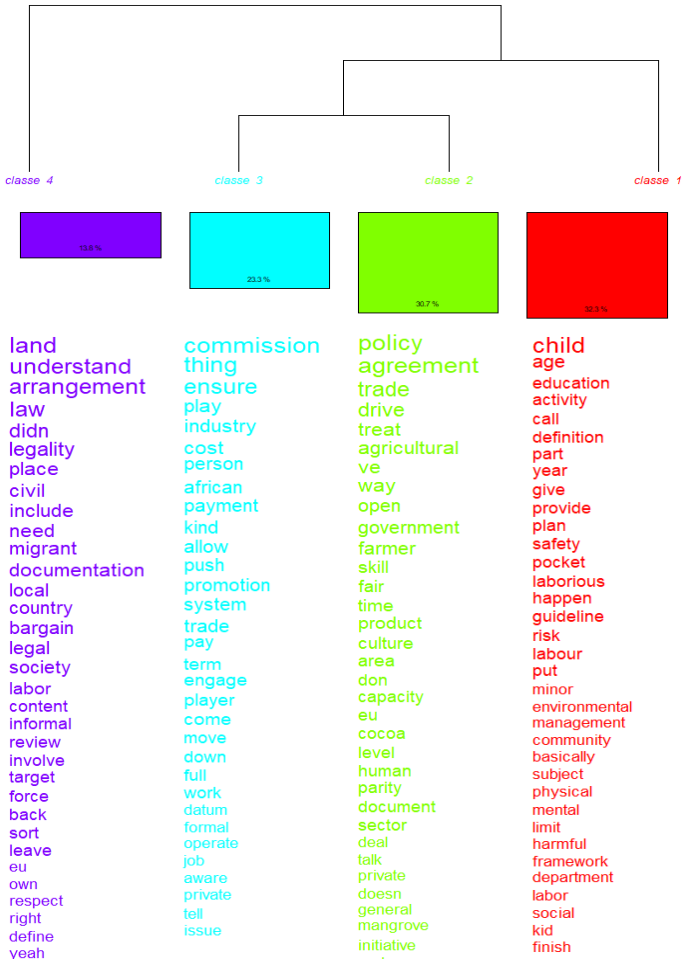
Trade standards could support formal employment practises in cocoa and cashew sector very similarly to what Rainforest Alliance and Fair-Trade certifications do, by enhancing sustainable and fair practices of trading partners.

Child labour is a big, intricated topic (Figure 43 and 44). Its definition in Ghana refers to work considered dangerous or harmful to children, which exclude them of their education, and impacts their mental, physical, or moral development. Those under 18 years old are globally considered as children, in Ghana as well. The core Ghanian definitions are built on international standards (i.e. ILO conventions) but they are further elabourated following local practices and working culture.
PMs stress the complicated issue affecting cocoa sector, in which children traditionally help their family at the farm after school. This sometimes can be interpreted differently depending on cultural and legal norms, creating confusion or difficulties in the implementation of child labour laws, trying to understand if it is a matter of proper child exploitation or not. Addressing the problem is crucial also to contextualise both policies and laws, considering specific needs of local communities and families. In fact, even though PMs agree on the importance of children mandatory attendance at school, they underline the possibility for them to help their families during the holidays or after school, for example, which should not be considered automatically as child exploitation, since quite often this happens in socioeconomic fragile context where a collective support is needed, for example during peak seasons. Moreover, it could be seen as a trade/job learning opportunity for children interested in that kind of family/parental activity. That is why is very important to carefully address the issue, distinguishing between what is a supportive/learning job and what is a harmful experience for them.

Ghana is making some efforts in addressing the ongoing issues affecting especially cocoa farming, for example through the Accelerated Action Plan against child labour. These kinds of initiatives have been developed also to respond to international pressure, from the EU included, ensuring the engagement in reduction or elimination of child exploitation in key sectors. The plan annexes include guidelines and protocols for establishing child labour free zones.
Moreover, as other PMs underlines, Ghanian cocoa sector is being approached with a so-called "hazardous activity framework" which ensure that work done by children is not violating laws or children themselves, considering the importance of context differences to define what is acceptable and what is not for children's rights, contributing also to build the national definition of child labour. Within the Cocoa Management System (CMS) – a work in progress tool developed with international funders and partners to track farmers households' characteristics within the cocoa sector – a Child Labour Risk Assessment model has been developed to collect and monitor specific data. The model has been piloted in one district, with the intention to be used at national level, to determine the risk and incidence level of child labour broadly. The backbone of this tools is built through social studies with local communities, including interviews with selected sample and need assessment exercises to target the right interventions. PMs stress the need to redefine the narrative around the topic, since a lot of misunderstanding and negative narrations exist around child labour in cocoa sector. A redefined narrative based on real collected data and statistics could be the good start for a successful intervention where needed.

Some other national bodies dedicating efforts to this cause are reported to be the Social Protection Unit under the Ministry of Social Protection and the Directorate of Extension Services.

Figure 43: SDG8 dendogram cocoa PMs



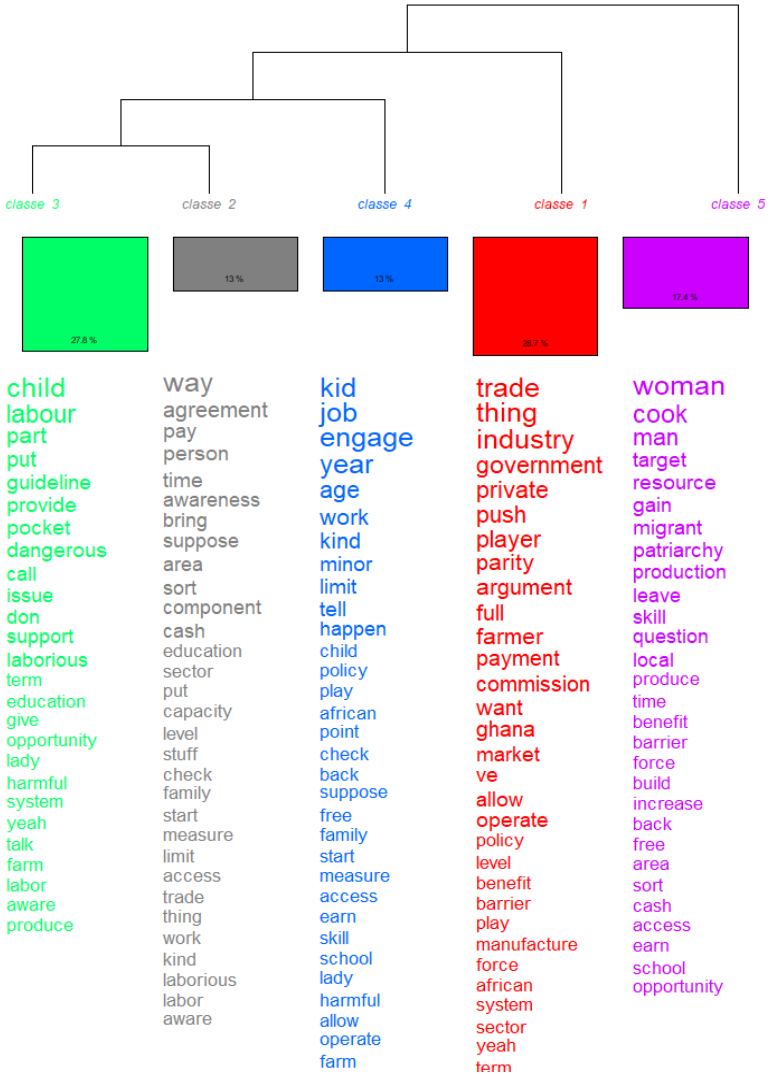
Trade standards, like what they can do for formal working practices support, could enhance children rights contrasting forms of child labour by interpreting global standards through the lens of local cultural norms and socioeconomic realities. This ideal integration could allow to achieve international duties set by conventions and organizations while respecting local culture and human rights.

In terms of filling the gaps of formal contracting in Ghanian cocoa and cashew sector, contributions mainly focus on cocoa one. PMs highlight the difficulties in formalising contracts, criticising the idea of systematically imposing formal practices in a context where deep-rooted informal traditions and methods exist and where informal work is not prohibited by law. Lacking access to the resources to formalise contracts legally, many local farmers do operate under agreements that often involve third parties, and this is often viewed by civil society in a misguided way, referring to these agreements as “forced labour”, when it is not coercion. To be noted is that often many inhabitants do not possess formal land titles, even in urban areas like Accra. In this sense, the PMs highlight the importance of improving farmers' negotiation skills so that better results can be achieved.

Labour costs, lack of knowledge and poor implementation of specific laws to improve the working and living conditions of farmers are also highlighted. Several issues are raised, starting with the gap between international cocoa prices and what local farmers earn. Reference is also made to the lack of awareness regarding the correct laws or techniques to treat crops and the tendency of some farmers to cut costs, for instance by using improper pesticides. Despite being aware of the problem no clear policies or specific laws seem directly address these issues. The national sugar policy is cited, where an objective on the creation of well-paid agricultural and industrial jobs is mentioned, but remains generic.

Trade standards linked to cocoa and cashew international trade could enhance the companies involved to ensure that specific requirements are met having an impact on labour rights in both sectors. The difficulty of finding a balance between regulating working conditions and letting market forces operate freely is underlined.

Figure 44: SDG8 dendogram cashew PMs



In terms of workers' safety and health standards conditions, for small-scale agriculture, which is mainly informal, there might be national safety regulations that companies must follow. However, no concrete examples or specific laws are given by PMs. Other industrial sectors are, instead, already subject to national safety and health regulations and operating standards.

Other PMs indicate the Environmental and Social Management Plan (ESMP) dealing with social and environmental risks, the effectiveness of which depends mainly on raising awareness and educating farmers about occupational safety and the use of protective measures. Indeed, occupational safety seems to be a fundamental part of this plan, with preventive measures such as the use of personal protective equipment (PPE), which, however, are not always used correctly by farmers. The main difficulty lies in the fact that many farmers do not recognise their importance, often preferring not to use it, especially in difficult climatic conditions (if it is too hot, for example).

Other PMs indicate the existence of occupational and safety associations but leave open the question as to whether these regulations are actually applicable in the cocoa sector.
PMs seem not aware about State policy, legislation, or farmers' scheme for enhancing work safety in the cocoa and cashew sectors. Some of them underline that, instead, industries such as oil, gas, timber and mining seem being supported by legislation regulating these practices.

Migrant workers in cocoa and cashew sectors are identified by some PMs mainly as local migrants coming from different regions of Ghana, particularly from the northern areas (Kroboland and Volta). Others come also from Somalia. Many of them are born and raised in the same areas where they migrate (i.e. Akyim areas) living there with their families. Some PMs focus the attention on general migrants' condition working in these sectors: although they can benefit from these agricultural opportunities for themselves and families, their conditions should be holistically analysed, considering all aspects involved. The importance of an integrated approach that considers migrants as an active part of society and the agricultural economy, enabling them to contribute to the production of healthy and local food, is stressed. The "Fulani" women involved in local cheese production are reported as an example, with the aim of improving food quality and safety by including these *Wagashi* cheese producers in the process of promoting local, healthy food.

Finally, some PMs put forward their vision in which the private sector plays a key role in the innovation and growth of the cocoa sector, arguing that liberalisation and the active participation of private companies should occur: "*it's high time that we stop making cocoa look like if cocoa board doesn't speak, the cocoa sector cannot move. It's high time we allow maybe, for the promotion of trade, we allow persons who are also private individuals who may want to, it's all about liberalizing the whole economy in terms of entry of players"* (Figure 43 and 44).

SDG 15

PMs stakeholders did not provide any contribution on this topic.

SDG 17

The role of certification is stressed by PMs in terms of existing national-level policy promoting sustainable food systems. Even if agricultural certifications are implemented, like that of Rainforest Alliance, their adoption in the cocoa sector seems not being widespread: "*Only a small portion of cocoa is actually certified".* Some PMs mention that these certifications mainly aim at improving farmers' income and environmental protection, acknowledging, however, that they did not have had a significant impact so far. That is why the response of countries and authorities has therefore been to intervene directly with policies and laws to boost sustainable agricultural and environmental practices.

For sure, the ethic and sustainability aspects are increasingly important in cocoa production, especially to respond to the emerging regulatory documents requirements (i.e the EUDR which is a key tool to ensure cocoa producers meet deforestation and legality requirements, human and labour rights, environmental protection, land use rights, etc.). Other cited examples are the German Supply Chain Due Diligence Act of 2023 and other upcoming regulations like the EU Corporate Social Responsibility Directive, the UK Forest Commodity Risk Act, some acts from the USA on labour and human rights. In this context what is clear is that to continue to trade cocoa in these regions worldwide, local producers must meet the required sustainability standards avoiding any possible market exclusion. Also, a project led by the Ministry of Food and Agriculture (MOFA) and supported by the World Bank (WB) is reported being focused on food security and resilience for a series of products, but it remains unclear if cocoa specifically is included or not. In relation to voluntary standards, some PMs stress their role in improving the product quality, sustainability and appeal. Business use them in different ways, for example to differentiate their products or to create a specific taste experience (for fruit, for instance) which can be attributed to production areas or methods (Figure 45 and 46).

Figure 45: SDGs17 similarity analysis cocoa PMs

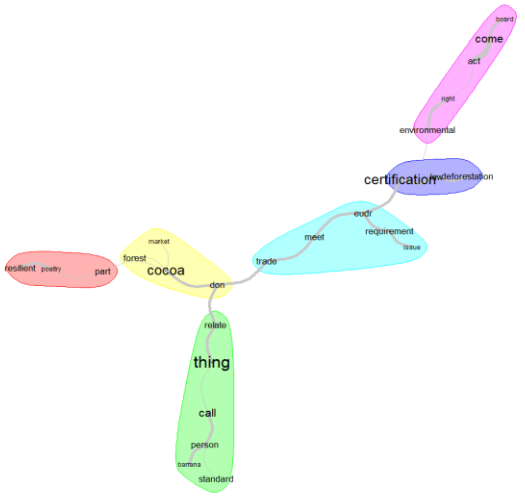
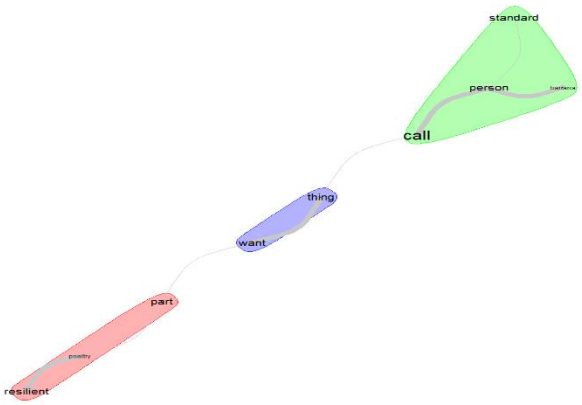


Figure 46: SDGs17 similarity analysis cashew PMs



3.1.3 Quantitative analysis for cocoa and cashew value chains

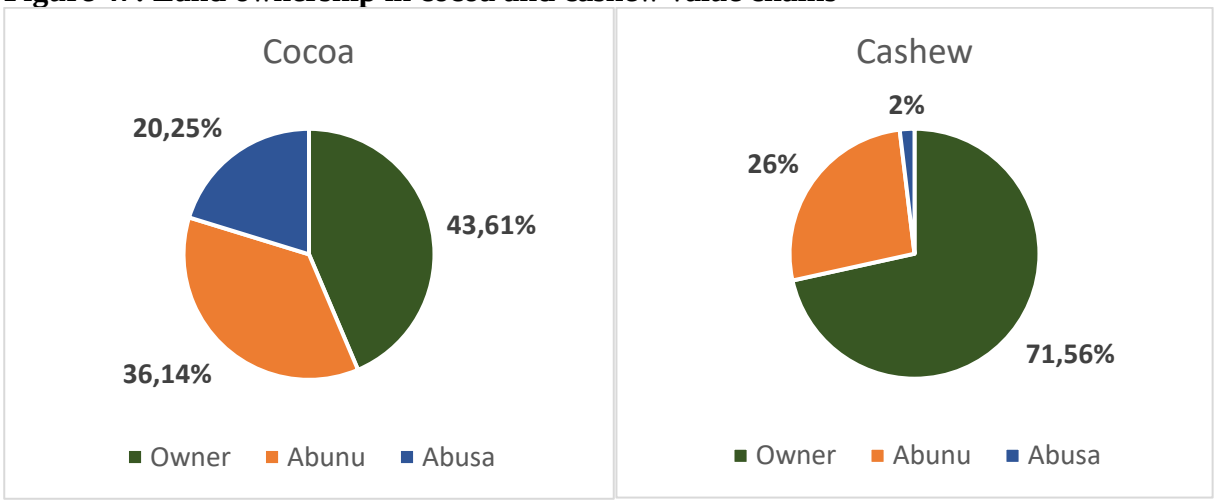
Detailed information about the adopted analysis technique is provided in the subsection 2.4.2.

SDG1

Ownership structures and revenue generation differ significantly between cashew and cocoa farming systems. These distinctions highlight varying levels of farm management practices and their impact on earnings for farm owners and non-owners.

In the cashew sector, 71.56% of respondents reported being farm owners, compared to only 43.61% in cocoa farming. The use of the Abusa system is minimal in cashew farming (only 2%), whereas approximately one-fifth of cocoa farmers rely on this system.

Figure 47: Land ownership in cocoa and cashew value chains

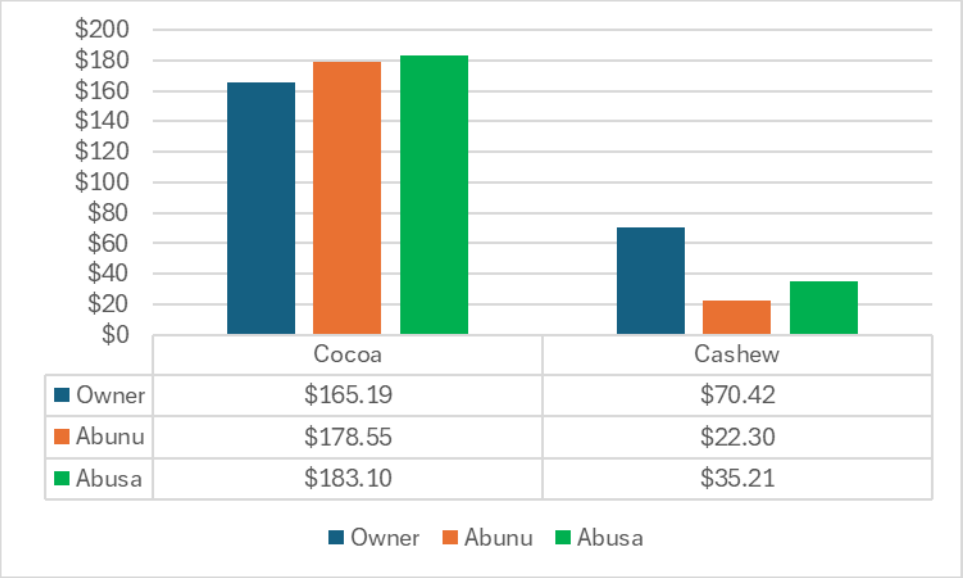


Source: Authors' elabouration on primary data

While no significant differences were observed between ownership categories (Owner, Abunu, Abusa) in terms of average farm size and price, a significant contrast emerges when considering average revenue per hectare between cashew owners and non-owners.

While cocoa revenues are relatively stable across ownership types, with Abusa achieving the highest revenue per hectare, highly significant differences (1% level of significance) were found between cashew owners and non-owners with a mean of 102.83 USD/ha for owners and 46.39 USD/ha for non-owners (Abuna and Abusa). This result suggests that ownership in the cashew sector provides critical advantages: it may encourage a long-term approach to land use, improving yield sustainability and profitability.

Figure 48: revenue per hectare, by crop and kind of land ownership



Source: Authors' elabouration on primary data

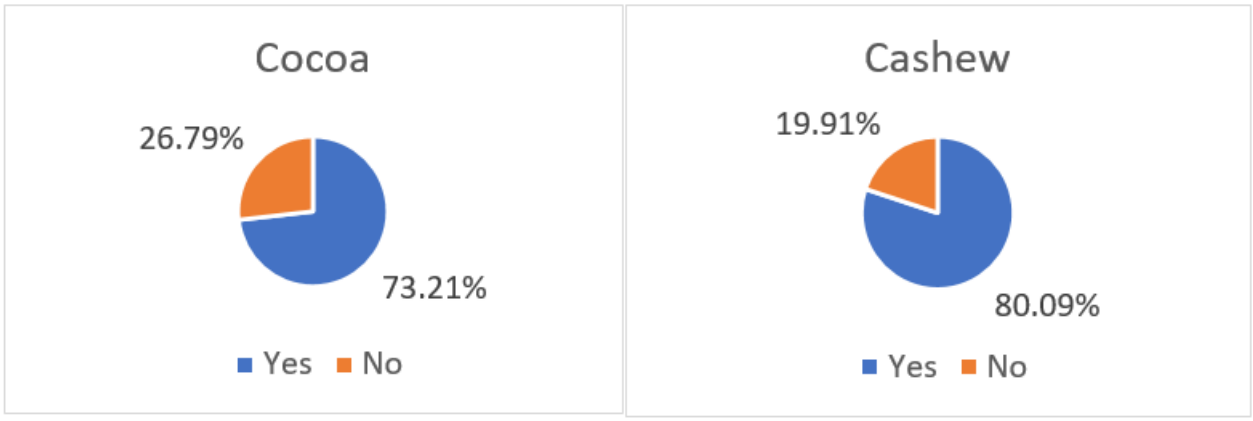
When farmers were asked whether the income from their main crop was sufficient to support themselves and their families, the majority reported that it was not. This issue is particularly acute for cashew producers, where over 97% of respondents, regardless of ownership type, stated that their income was insufficient to meet their needs. For cocoa producers, a slightly more positive trend was observed: 20% of owners and 16% of non-owners reported that their income was sufficient to meet their needs.

SDG2

We found that there is no big difference between crops in terms of yield per hectare, as cocoa farmers produce an average of 2.47 bags (64 kg each bag) per hectare, while cashew farmers produce 2.16 bags per hectare.

As shown in Figure 49, when asked if respondents have other sources of income other than farming, most of the farmers, for both selected crops, answered that agriculture is their only source of income.

Figure 49: Is agriculture your only source of income?



Source: Authors' elabouration on primary data

When asked if the gained income from their main crop is sufficient to sustain themselves and their families, 81.93% of cocoa farmers answered that it is not, while the percentage increased up to 97.63% for cashew farmers.

Table 6 shows median[12] values of main farm-level economic indicators for both crops, highlighting the following differences and similarities. Cocoa farming exhibits significantly greater profitability than cashew farming, with a median gross income of $259.35 per season compared to $79.80 for cashew. Despite comparable farm sizes (1.62 hectares) and average farmer ages (53 years), cocoa achieves superior yields (2.47 bags per hectare) and revenue per hectare ($173.24), outperforming cashew yields (2.16 bags per hectare) and revenue per hectare ($56.33).

Table 6: Characteristics of farmers and farming practices in the cocoa and cashew sectors

	Cocoa	Cashew
	Median value	
Age	53	53
Number of household members	5	6
Farm size (ha)	1.62	1.62
Yield per ha (64-kg-bag/ha)	2.47	2.16
Gross Income (USD- season 2022/2023)	259.35	79.8
Revenue/ha (USD/ha)	173.24	56.33

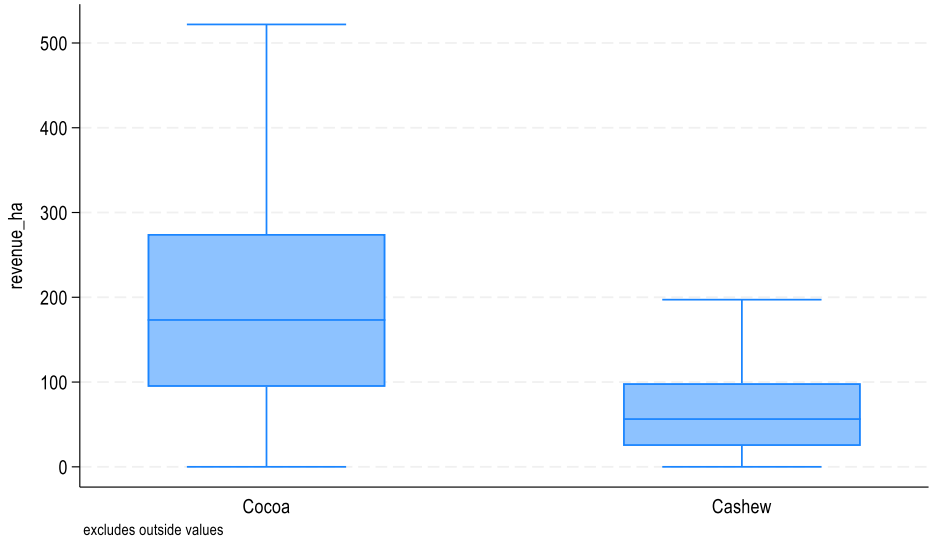
Source: Authors' elabouration on primary data

Poverty in the cocoa and cashew value chains

The Living Income for Ghanaian cocoa growing areas, intended as the minimum income needed to have access to a decent standard of living which includes the access to sufficient food, water, housing, education and healthcare, and other essential needs including provision, for unexpected events for a family of 2 adults and 3 children, is 2,324 Ghanaian Cedis, which is 298 USD per month (The Living Income Community of Practice, 2022). Moreover, the international poverty line, defined as the minimum income level required to meet basic human needs, such as food, shelter, and clothing, was defined at 2.15 USD/day by the World Bank (2022).
Our data highlights that the revenues derived from the main crops, cocoa, and cashew, do not allow farmers to reach neither the International Poverty Threshold nor the Living Income Threshold as they earn, 259.35 USD/year (0.71 USD/day) and 79.8 USD/year (0.21USD/day), respectively. In greater detail, a comparison of revenues per hectare (Figure 50), reveals significant differences between cocoa and cashew farming, highlighting the greater economic challenges faced by cashew farmers.

[12] We use the median value instead of the average as it is not influenced by extreme values (outliers) and offers a more accurate representation of the central tendency.

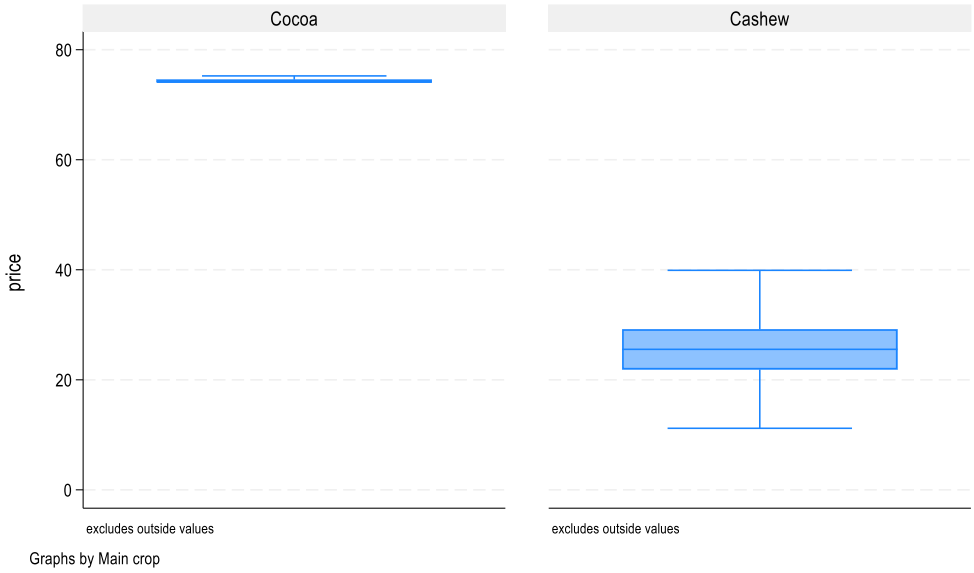
Figure 50: Boxplot of revenue per hectare for cocoa and cashew



Source: Authors' elabouration on primary data

The average price at farm level for a maxi bag of 64 kg of cocoa is 74.1$, as shown in figure 51. This price remains stable due to regulatory measures. Controversely, cashew price ranges more, with a median price of 25.54$ per maxi bag, considerably lower than cocoa.
As highlited in the literature review section, the price producers are paid for cocoa (farm-gate price) is currently set at the beginning of the harvest season for the entire crop year. In the 2022/2023 season the farm-gate price represented about 70% of the FOB price, namely GH₵ 800 per 64-kilogram bag (roughly 125 USD/bag) (Ghana Cocoa Board). Our data highlights that the average selling price for a 64 kg maxi bag of cocoa in our sample is 74.1 USD, which is significantly below the threshold established for the 2022/2023 season (125 USD/bag).
The situation in even more critical for cashew farmers who not only face lower selling prices but also struggle due to the absence of a price-regulation system, which causes the selling prices to fluctuate significantly.

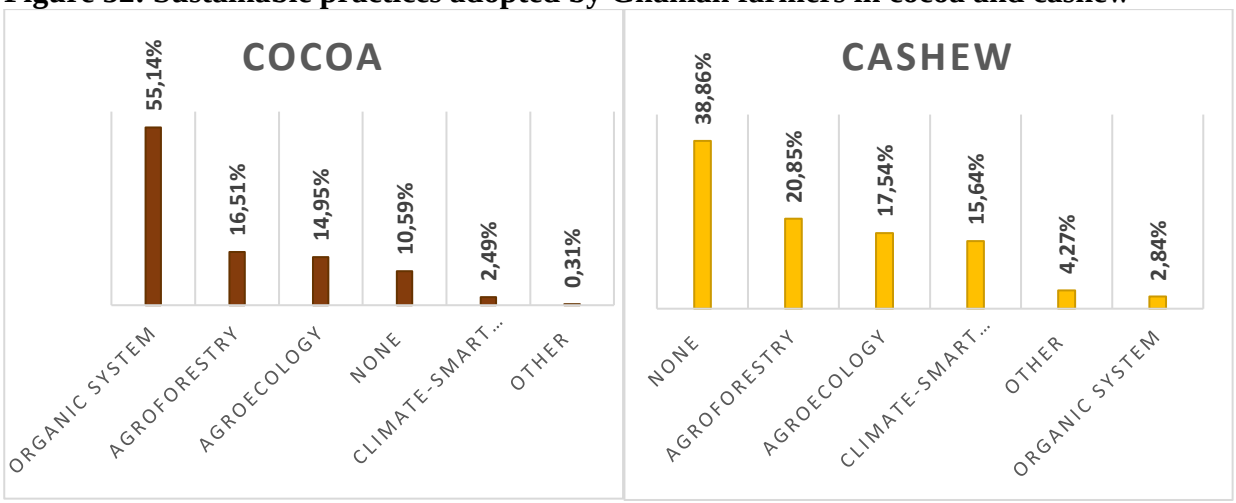
Figure 51: Boxplot of price distribution for one maxi bag (64 kg) of cocoa and cashew



Source: Authors' elabouration on primary data

Target 2.4 of SDG 2 emphasises the need to develop food systems that are not only economically sustainable but also respectful of the environment. For this reason, we investigated whether the interviewed farmers implement sustainable practices on their farms. Results show that more than 55.14% of the sample in the cocoa sector applies organic systems and only 10.59% answered that they do not apply any environmentally sustainable approaches (figure 52). For the cashew sector the picture is quite different as 38.86% of the farmers answered that they do not use any sustainable approach. The most applied approach is agroforestry (20.85%), followed by agroecology (17.54%). Only 2.84% of farmers apply organic systems in farms where cashew is the main crop.

Figure 52: Sustainable practices adopted by Ghanian farmers in cocoa and cashew



Source: Authors' elabouration on primary data

The median yield per hectare obtained through different sustainable farm practices has been then calculated. In cocoa production the highest value for yield per hectare is reached through agroforestry practices, followed by agroecology. Controversy, in cashew production the highest yield is obtained when applying climate smart agricultural practices. This data indicates that the implementation of certain sustainable practices may have positive economic outcomes as well. In both cases the lowest yield is obtained with organic agriculture, in cocoa the value is slightly lower than when no specific practice is applied, while in cashew considerably lower. However, it is important to note that these results present some limitations such as the small number of observations and lack of data on the degree of implementation of these techniques.

Table 7: Yield (espressed in 64 kg bags/ha) obtained through different sustainable farm practices

	Cocoa	Cashew
None	1.99	1.93
Agroforestry	3.09	1.79
Agroecology	2.96	3.08
Climate-smart agriculture	2.41	3.46
Organic system	1.97	1.02

Note: *The yield is expressed in 64 kg bags/ha
Source: Authors' elabouration based on primary data

When asked if they feel that producing cash crops for export is limiting land for food crop production, 85.71% of the sample replied that they have enough land for both activities and 6.58% replied that they easily buy food for personal consumption from other farmers/local markets. Only 7.71% of respondents affirm that they do not have enough land for both activities and they struggle to find alternative sources of food supply.

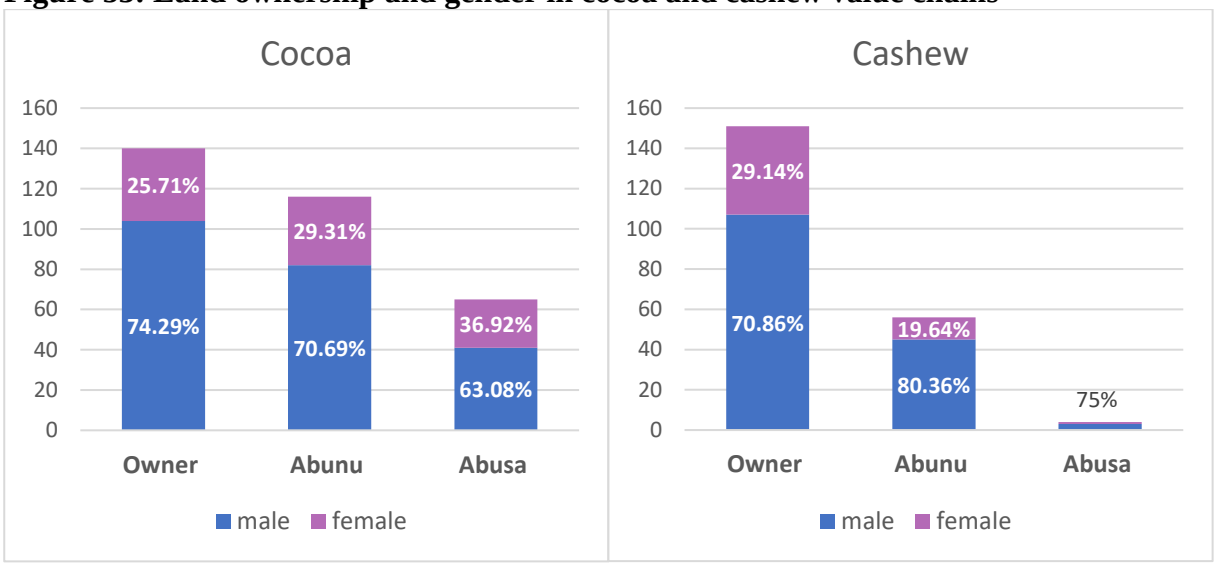
SDG5

Achieve gender equality and empower all women and girls

Results from our survey show that in both value chain women manage smaller farms compared to men: in cocoa farms led by women are on average 1.53 ha while men 2.48 ha; in cashew production the difference is even bigger with the average size of a farm managed by a woman of 1.36 ha and 2.9 ha for men (statistical significance 1% for cocoa and 10% for cashew). Additionally, we found that women earn less than men in cocoa but not in cashew, with a difference of almost 100$ in cocoa and approximately 32$ in cashew.

No significative differences are found between female and male farmers concerning farm level prices in both crops. Moreover, it is noteworthy that the percentage of female owners is higher in the cashew sector compared to the cocoa sector. Conversely, the percentage of female owners is lower among Abunu farmers (Figure 53)

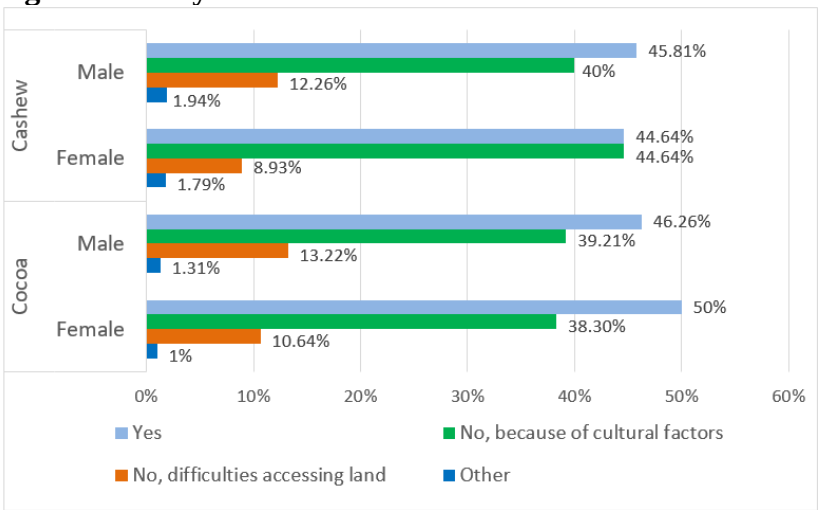
Figure 53: Land ownership and gender in cocoa and cashew value chains



Source: Authors' elabouration on primary data

As shown in Figure 54, 42.37% of the sample does not perceive that woman have more difficulties at becoming landowners; while 43.93% think that women face more challenges due to cultural beliefs and 12.46% attributes the challenges to national law.

Figure 54: Do you feel women and men have the same ease at becoming landowners?



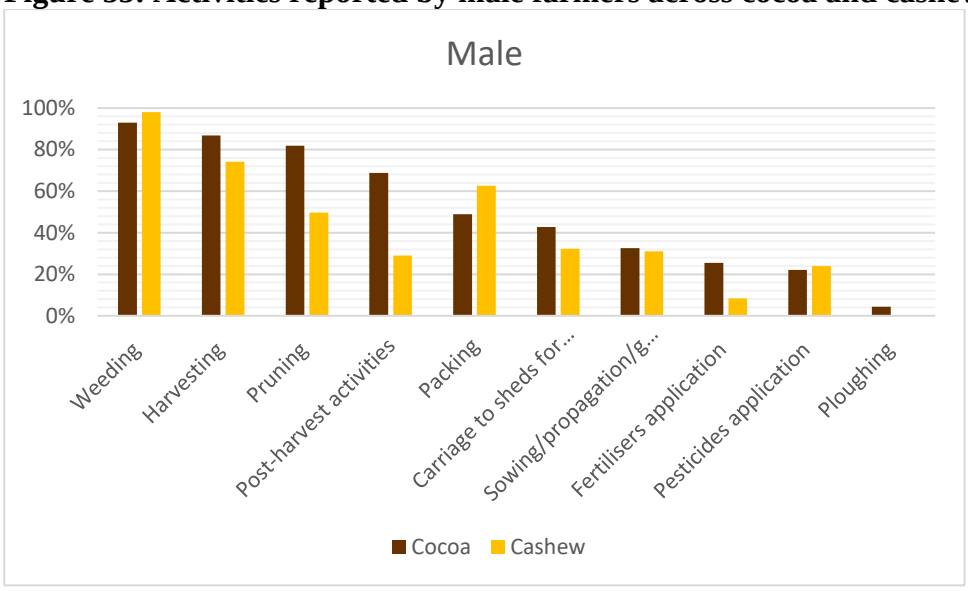
Source: Authors' elabouration on primary data

Women generally perform fewer tasks than men. Specifically:

a) In the cashew sector, like men, women primarily engage in weeding, harvesting, and packing. However, men perform significantly more pruning and pesticide application.
b) In the cocoa sector, both men and women are heavily involved in weeding and harvesting. However, women are more engaged in post-harvest activities, whereas men, similar to the cashew sector, take on the majority of pruning, as well as fertilizer and pesticide application.

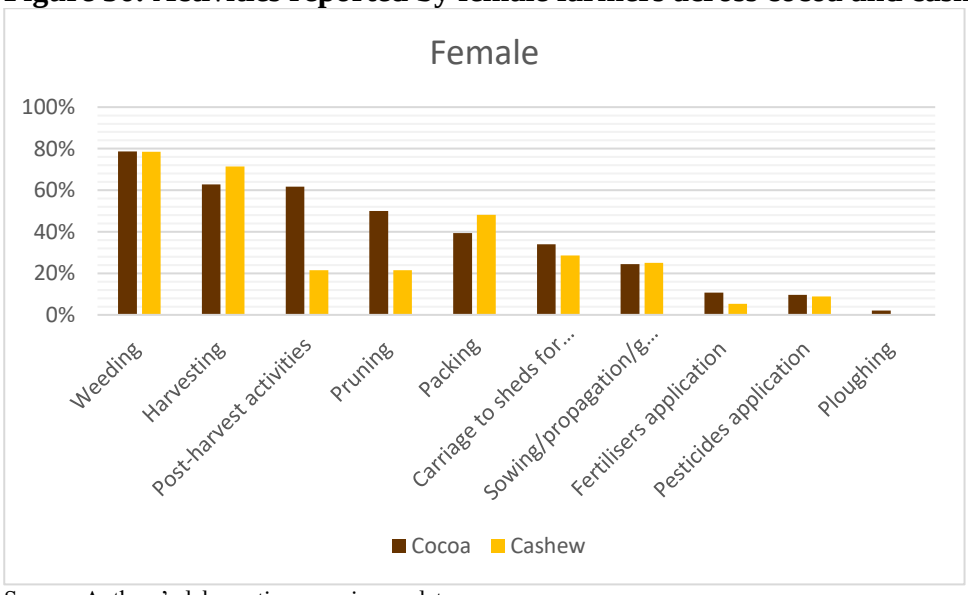
Overall, it is worth noting that in the cashew sector, there is limited involvement in post-harvest activities and less frequent application of fertilizers.

Figure 55: Activities reported by male farmers across cocoa and cashew value chains



Source: Authors' elabouration on primary data

Figure 56: Activities reported by female farmers across cocoa and cashew value chains

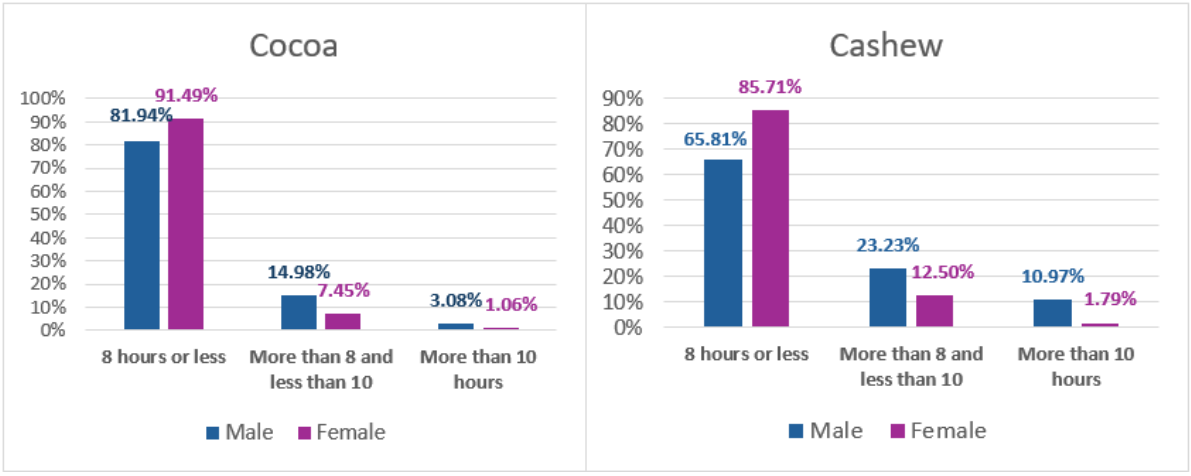


Source: Authors' elabouration on primary data

When comparing farm working hours between men and women, the results align with the literature (Figure 57). Women tend to work fewer hours per day on the farm compared to men. However, as

highlighted in the literature, women may be overburdened with work because, in addition to farm activities, they also take on responsibilities such as household chores and childcare.

Figure 57: Working hours of farmers in the cocoa and cashew sectors, by gender



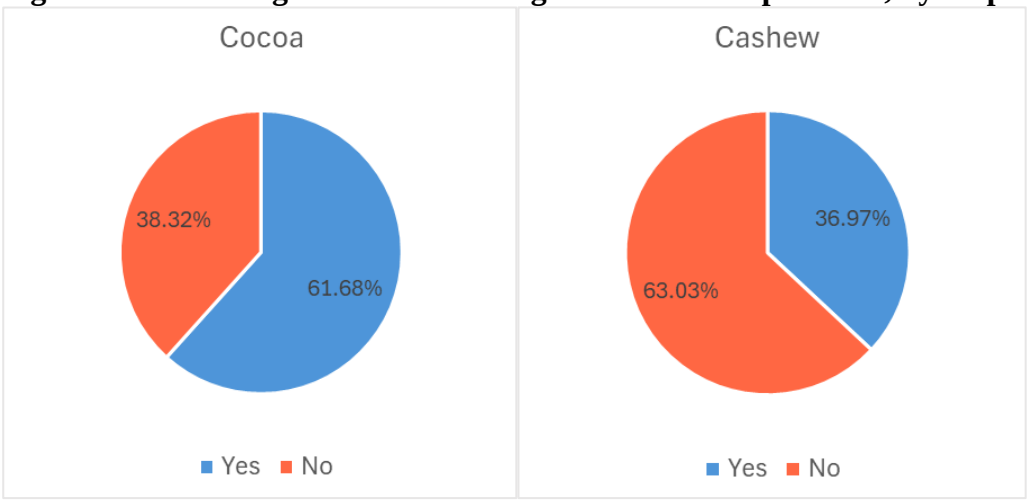
Source: Authors' elabouration on primary data

SDG 6

The percentages shown in the pie charts (Figure 58) suggest that cocoa farmers are more likely to implement water-efficient practices compared to cashew farmers.

This difference could be attributed to different factors, among which different water requirements among the two crops. Cocoa is indeed a water-intensive crop and thrives in humid, shaded environments. As a result, cocoa farmers may be more conscious of water management and motivated to adopt water-efficient practices to ensure consistent yields. Cashew, on the other hand, is more drought-resistant and less dependent on frequent watering, which may reduce the perceived need for water-efficient techniques

Figure 58: Percentages of farmers using water-efficient practices, by crop

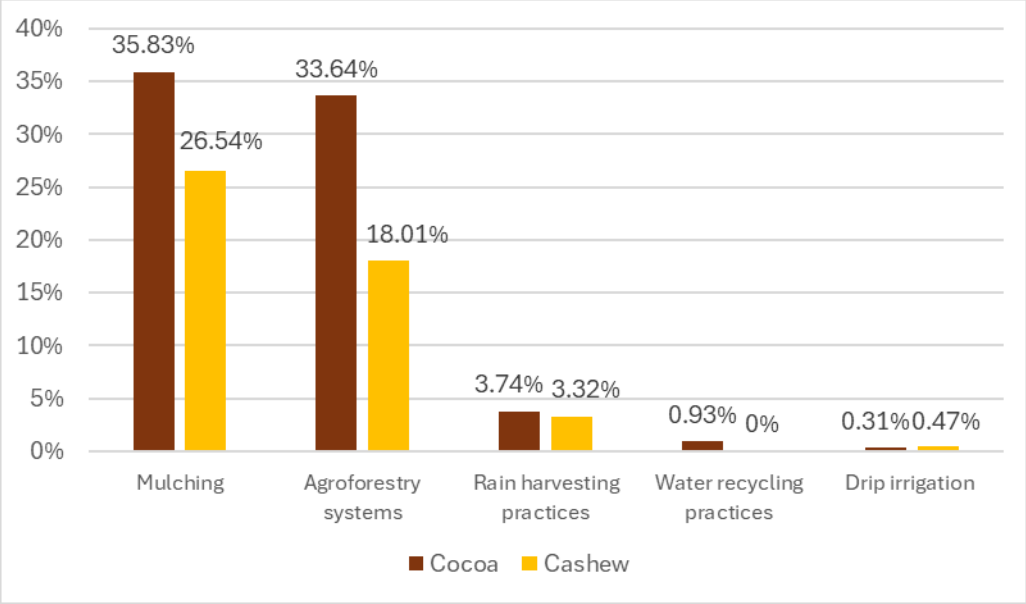


Source: Authors' elabouration on primary data

When farmers who use water-efficient techniques were asked which kind of practices they implement on their farms, results show that the most used ones among both cocoa and cashew farmers are mulching and agroforestry systems (Figure 59). In both cases these technics are more frequently used by cocoa farmers. On the other hand, very few farmers for both value chain adopt advanced methods

like rain harvesting, water recycling, and drip irrigation, suggesting a need for improved access to training, resources, and financial support for both groups.

Figure 59: Water-efficient practices implemented by farmers



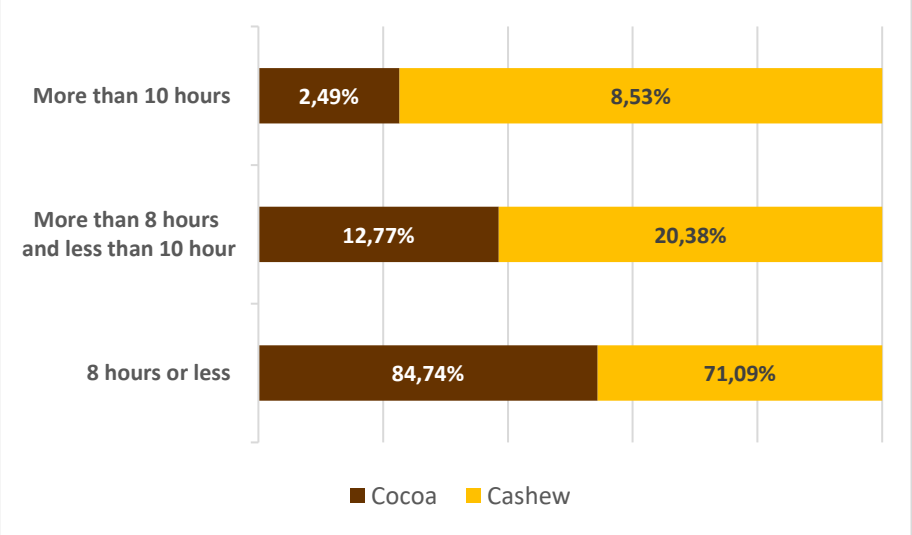
Source: Authors' elabouration on primary data

SDG 8

Working conditions

Figure 60 compares the working hours of farmers in the cocoa and cashew sectors. In both crops, the majority of farmers work less than 8 hours a day, with percentages of 84.74% in cocoa and 71.09% in cashew. However, one-fifth of respondents in the cashew sector report working between 8 and 10 hours a day, compared to 12.77% in the cocoa sector. Additionally, 8.53% of cashew farmers work more than 10 hours a day, whereas only 2.49% of cocoa farmers do, which might be linked to the lack of certification in the cashew sector.

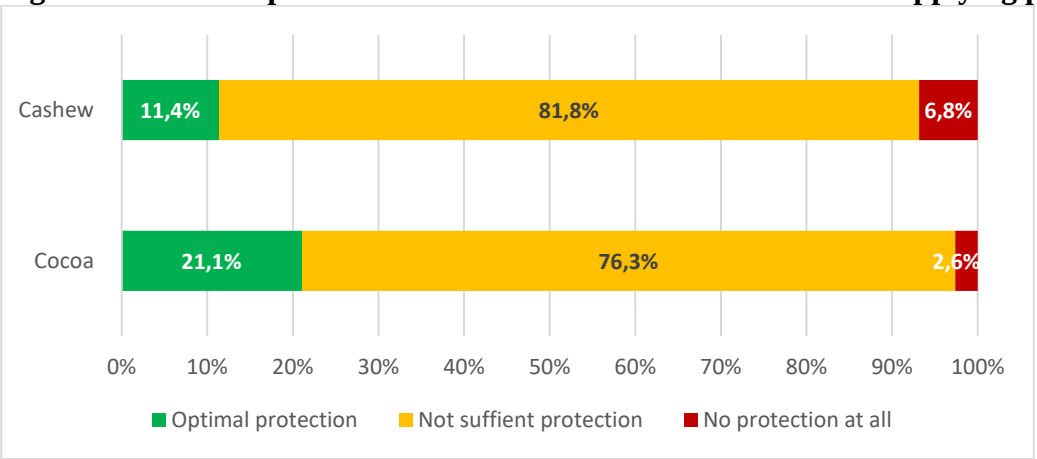
Figure 60: Working hours of farmers in the cocoa and cashew sector



Source: Authors' elabouration on primary data

In light of the health risks associated with the use of pesticides and fertilizers, farmers were surveyed regarding their use of personal protective equipment (PPE) during these applications. Among cocoa farmers, 21.1% reported using all the PPE deemed necessary for optimal protection, compared to only 11.4% of cashew farmers. The majority of respondents reported using some essential PPE; however, they do not employ all the equipment considered fundamental for adequate protection.

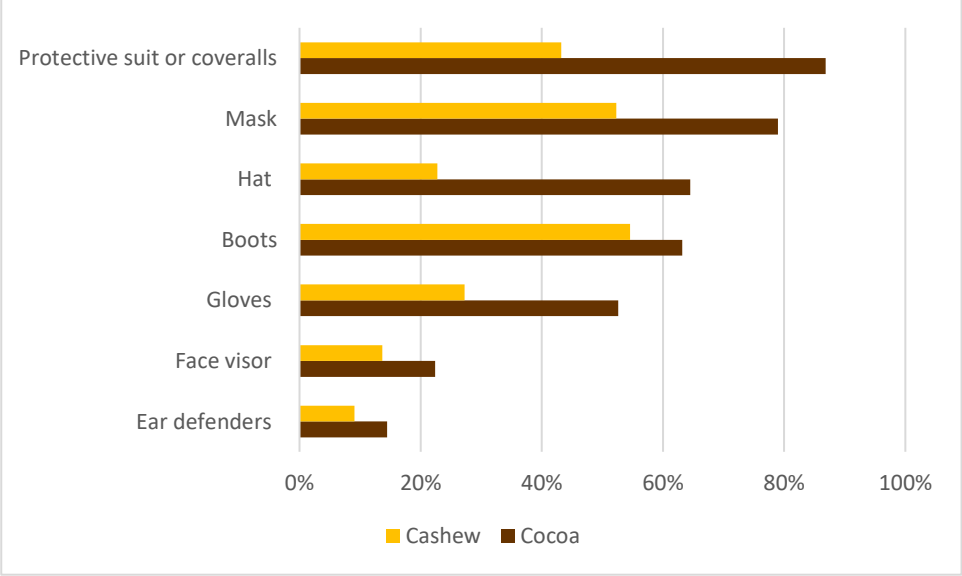
Figure 61: Level of protection of cocoa and cashew farmers when applying pesticides



Source: Authors' elabouration on primary data

Figure 62 highlights notable differences in the use of personal protective equipment (PPE) between cocoa and cashew farmers. Protective suits or coveralls and mask are among the most commonly used items by cocoa farmers, with significantly higher adoption rates than cashew farmers. Gloves and hats are also more frequently used by cocoa farmers, while cashew farmers show lower adoption of these items as well. Boots are moderately used by both groups, though they remain more common among cocoa farmers. Finally, both cocoa and cashew farmers rarely use face visors and ear defenders.

Figure 62: Type of equipment farmers use when applying pesticides

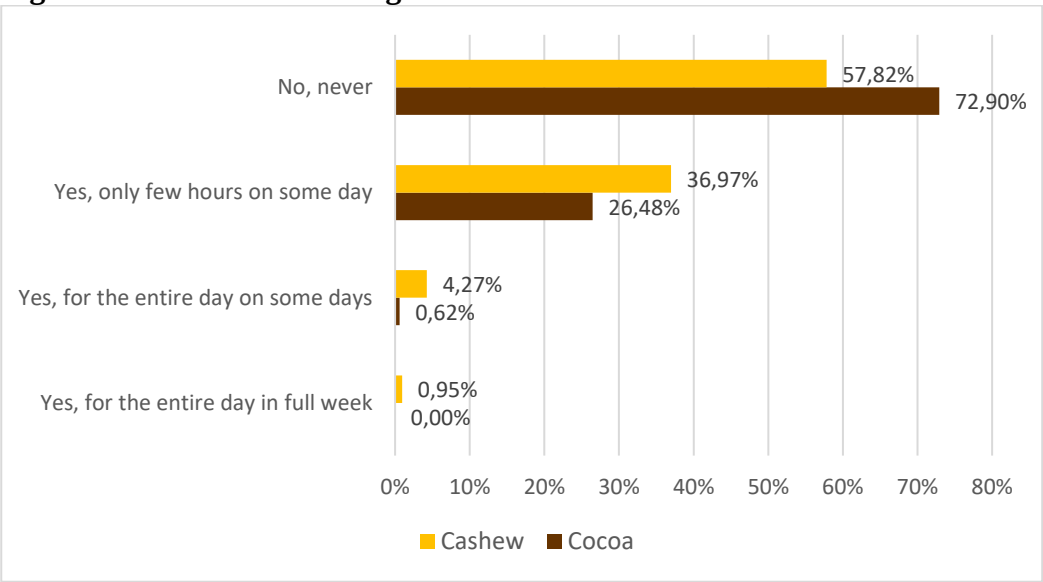


Source: Authors' elabouration on primary data

Child labour

According to the data child labour in cocoa and cashew farms is limited in most cases to a few hours on some days (26.48% for cocoa and 36.97% for cashew). Most of the cocoa farmers (72.9% for cocoa and 57.82% for cashew) declare that children do not get involved in the farm activities at all while, just in the case of cashew, 5% of the respondents seem to involve children for the entire day on some days or, just in a couple of cases, full time for the whole week (Figure 63).

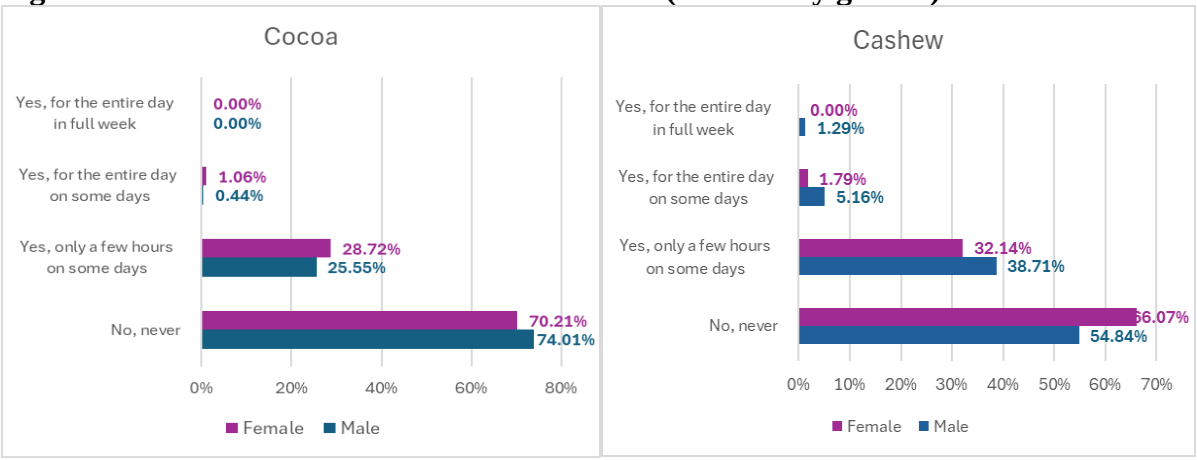
Figure 63: Do children ever get involved in farm activities?



Source: Authors' elabouration on primary data

Going into detail of how the phenomenon is declined between female and male interviewees, women seem to engage children slightly more in the farm activities, as 28.72% of them declared that children are indeed involved in farm activities for a few hours on some days as opposite to 25.55% of men responses. On the other hand, the results reveal a different pattern among cashew farmers, with male respondents being less likely than female respondents to report that they never involve children in farm activities (66.07% for females compared to 54.84% for males).

Figure 64: Children involment in farm activities (answers by gender)



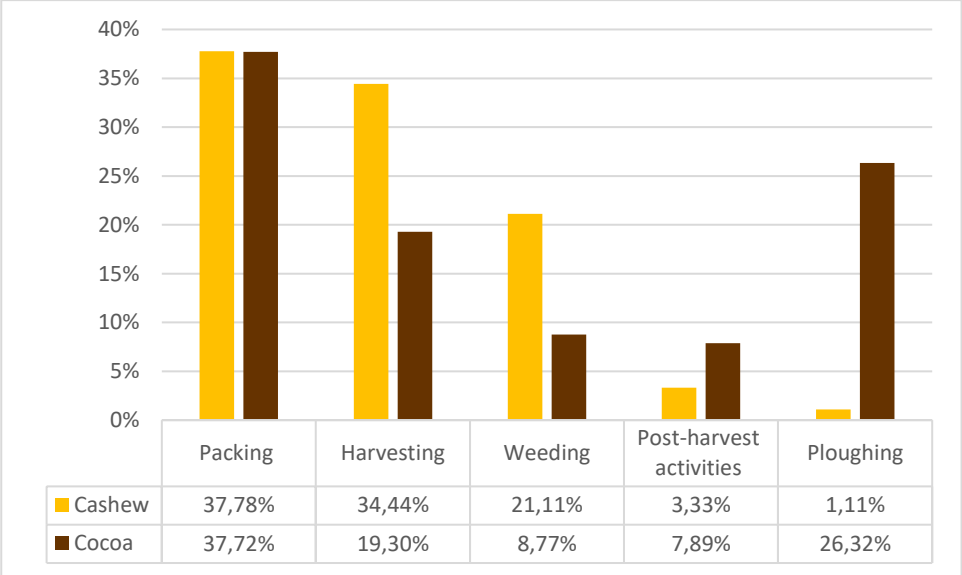
Source: Authors' elabouration on primary data

Regarding the type of activities, the results indicate that they are not involved in sowing, pruning, application of pesticides and fertilizers or carriage of the product to sheds for sale, in either the cocoa or cashew sectors. On the other hand, it appears that children are more frequently involved in activities

such as packing, harvesting, and weeding, playing a significant role in these stages of the production process (Figure 65). A striking difference between crops is however observed for ploughing: 26.32% of the cocoa-producing respondents selected that when children get involved in the farm activities, they carry out this kind of task. On the other hand, only 1% of cashew farmers selected this option.

For cashew cultivation, the fruit is left to fall naturally and then collected from the ground, whereas cocoa pods are harvested by cutting them directly from the tree. Consequently, it is reasonable to expect lower involvement of children in cocoa harvesting activities.

Figure 65: Farm activities in which children are mostly involved in cocoa and cashew sector



	Packing	Harvesting	Weeding	Post-harvest activities	Ploughing
Cashew	37,78%	34,44%	21,11%	3,33%	1,11%
Cocoa	37,72%	19,30%	8,77%	7,89%	26,32%

Source: Authors' elabouration on primary data

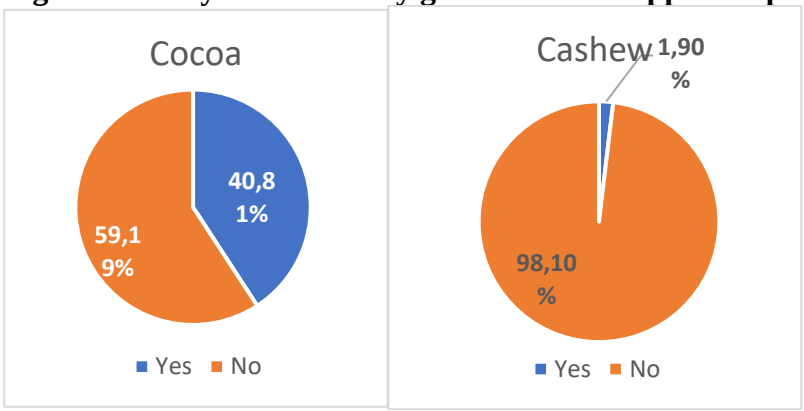
Children's involvement in farm activities seems to be less frequent when the interviewee owns the farm (assessed through statistical ttest - level of significance 10%).
Regarding migrant workers, approximately 62% of the sample reports not hiring them, 28.20% states that they hire migrants during peak season, and 9.21% responds that they hire migrant workers without a formal contract. Less than 1% reports hiring migrants under a formal contract. This appears to be a national trend, as no significant differences are observed in terms of the supply chain.

SDG 15

Governmental support

As emphasised in the literature, cocoa is a historically significant export sector for Ghana. Consequently, it is reasonable that it benefits more from government initiatives. Indeed, nearly 41% of the respondents reported receiving support. By contrast, almost all cashew farmers indicated that they do not receive any form of assistance.

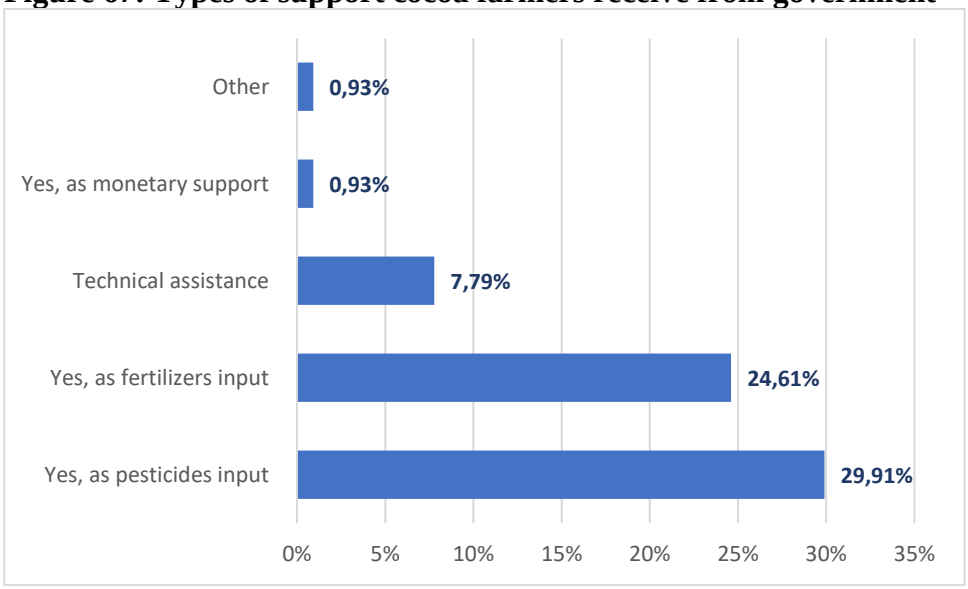
Figure 66: Do you receive any governmental support to produce your main crop?



Source: Authors' elaboration on primary data

Farmers were asked which kind of support they received from the government. Results suggests that government or institutional support is heavily skewed toward providing material inputs, such as pesticides and fertilizers, while technical training or financial support is relatively neglected (Figure 67). This distribution may indicate a focus on increasing immediate agricultural productivity rather than building long-term capacity or financial resilience among farmers.

Figure 67: Types of support cocoa farmers receive from government

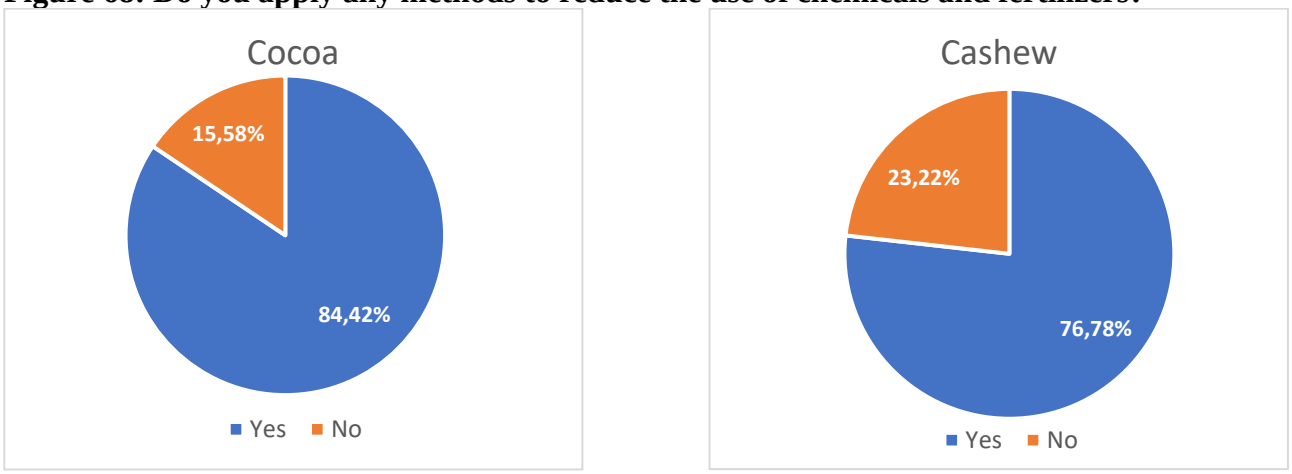


Source: Authors' elaboration on primary data

Pesticides and fertilizers

In both the analysed value chains, most of respondents reported the use of methods to reduce chemical and fertiliser usage à(84.42% for cocoa and 76.78% for cashew).

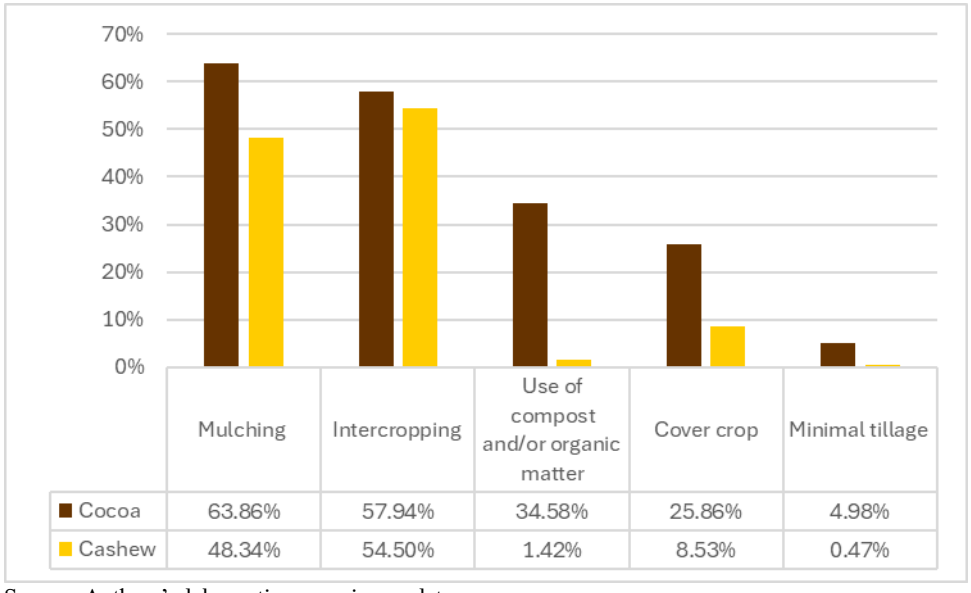
Figure 68: Do you apply any methods to reduce the use of chemicals and fertilizers?



Source: Authors' elabouration on primary data

Farmers were then surveyed to identify the techniques they employ to reduce pesticide and fertilizer use in their agricultural practices. None of the farmers reported practicing crop rotation. In both value chains, the most commonly employed methods to reduce pesticide and fertilizer use are mulching and intercropping. Additionally, cocoa farmers also indicated the use of compost and/or organic matter, as well as cover crops, as part of their sustainable practices.

Figure 69: Techniques employed by cocoa and cashew farmers in Ghana to reduce pesticides and fertilizers

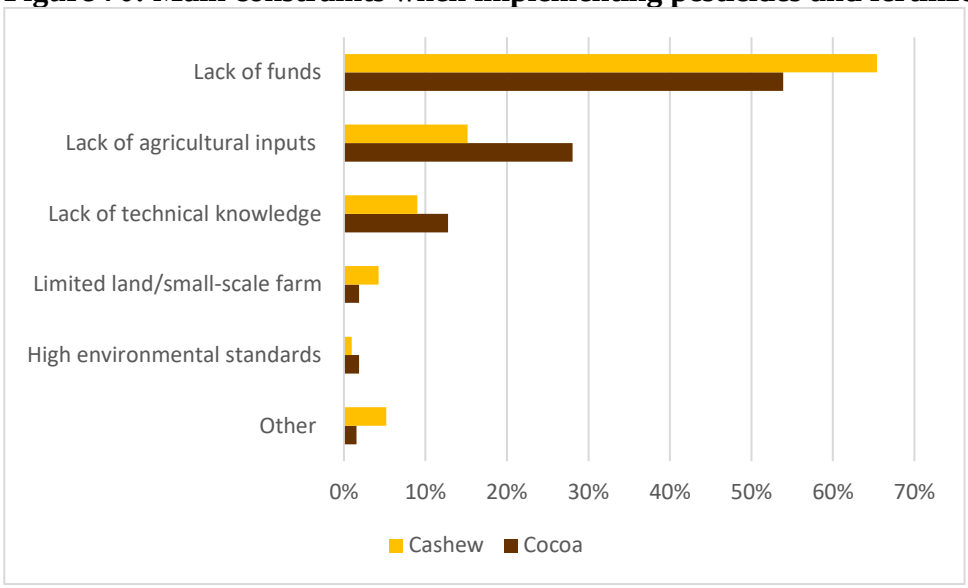


	Mulching	Intercropping	Use of compost and/or organic matter	Cover crop	Minimal tillage
Cocoa	63.86%	57.94%	34.58%	25.86%	4.98%
Cashew	48.34%	54.50%	1.42%	8.53%	0.47%

Source: Authors' elabouration on primary data

The main barrier to the implementation of sustainable farming practices according to farmers for the cocoa and cashew value chains appears to be the lack of funds, followed by lack od agricultural inputs and lack of technical knowledge (Figure 70).

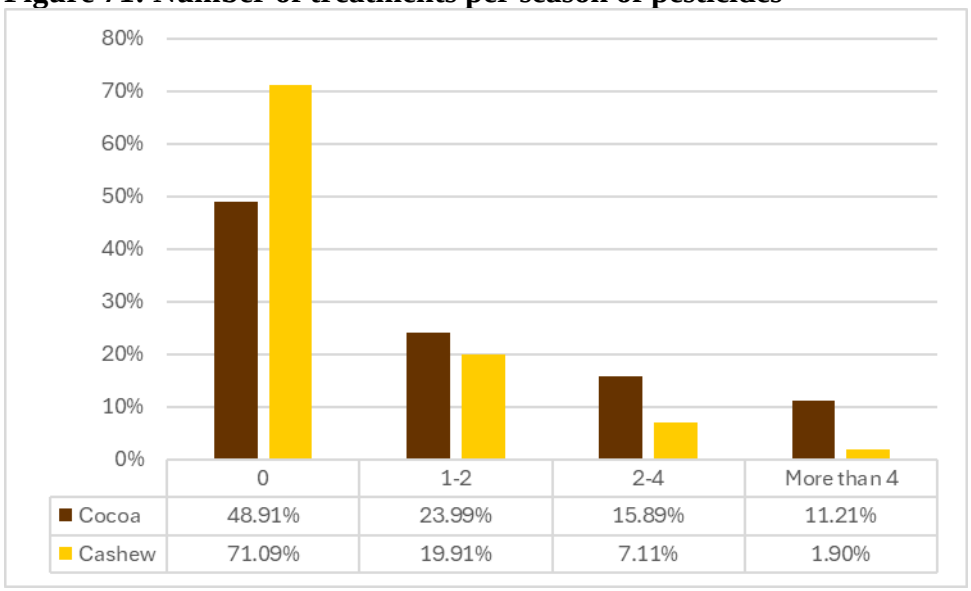
Figure 70: Main constraints when implementing pesticides and fertilizers reduction methods



Source: Authors' elabouration on primary data

Both the analysed crops do not undergo multiple treatments, with most respondents reporting they do not apply any pesticide treatment (Figure 71). Only 11.2% cocoa farmers and less than 2% of cashew farmers assessed that they apply more than 4 treatments of pesticides per season.

Figure 71: Number of treatments per season of pesticides

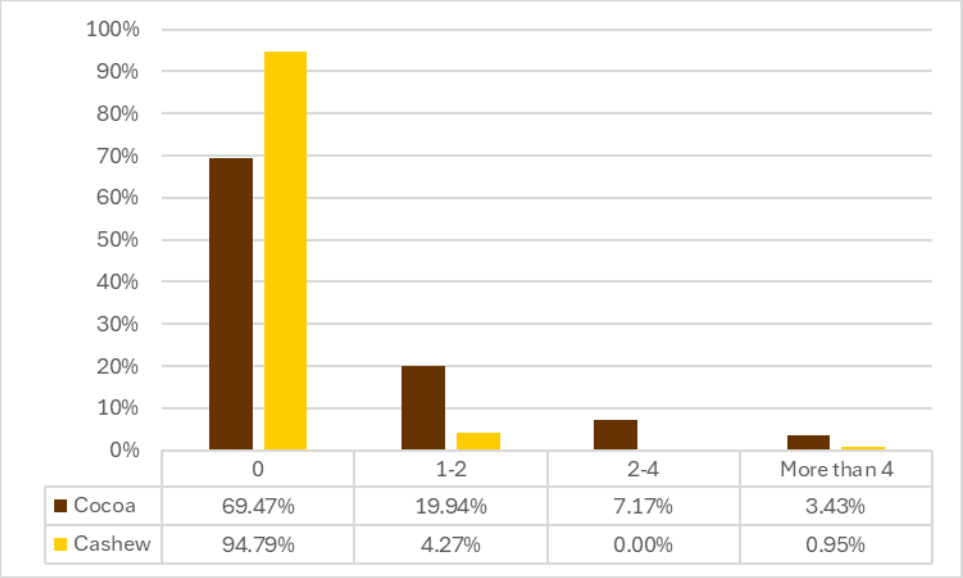


	0	1-2	2-4	More than 4
Cocoa	48.91%	23.99%	15.89%	11.21%
Cashew	71.09%	19.91%	7.11%	1.90%

Source: Authors' elabouration on primary data

A very similar picture comes out from the analysis of fertiliser applications, with farmers replying the perform even less treatments per season.

Figure 72: Number of treatments per season of fertilizers



Source: Authors' elabouration on primary data

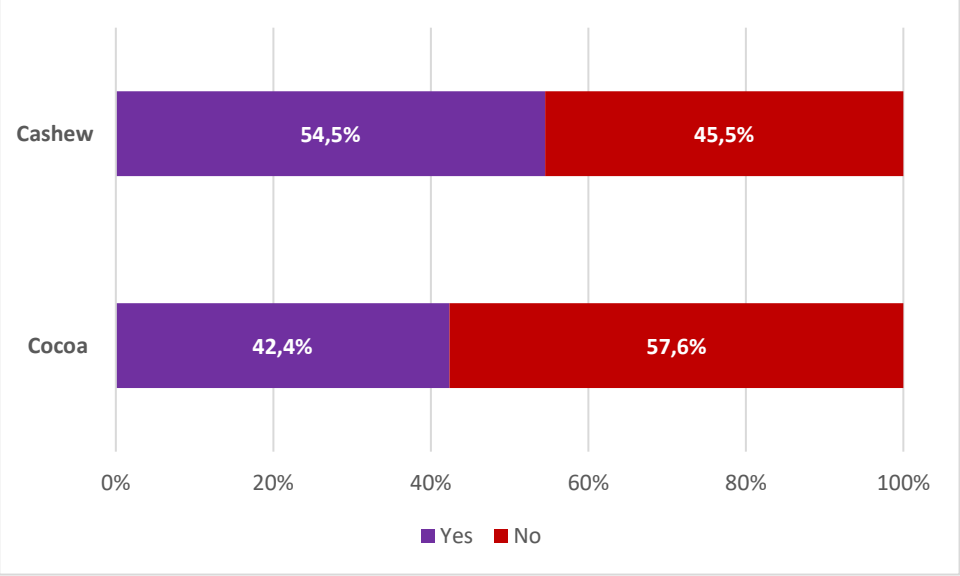
SDG17

To better understand the perception of farmers about the potential positive role of trade on the three dimensions of sustainability (social, environmental and economic) interviewees were asked some questions about this topic.

Trade and gender equality

When asked whether they believe international trade can help reduce gender disparities, cashew farmers appear to be more optimistic about the potential role of trade, with 54.5% providing positive responses compared to 42.4% of cocoa farmers (Figure 73).

Figure 73: Do you think that international trade can help reducing disparities between women and men?



Source: Authors' elabouration on primary data

Farmers who answered positively to this question were asked to specify how they believe trade could promote gender equality in the value chain. Respondents provided a variety of answers, which can be grouped into thematic areas, as shown in the following tables.

Table 8: Cocoa farmers suggestions on how trade could help enhancing gender equality in the cocoa value chain

Inclusion of women in decision-making processes
"We have to encourage women and involve them in decision making and cocoa production"
"We should motivate women to compete with the men? Ensure fair representation of men and women in organisations"
Access to opportunities and inputs
"What men can do women can also do. We just have to work together"
"Women are equally knowledge and as such they need to be given the opportunity when the need be"
"They should help the women with inputs to make their work easy"
"Women should given opportunities"
"We should encourage women into cocoa farming"
"Women are equally competent so they should be encouraged"
"It will provide both male and female farmers with enough money to cater for themselves and families"
Role of the government
"Government allocated some of the trade profit to support female farmer"
"When the government provide the needed support for cocoa farms"
"It depends on the leaders having the interest of the farmers at heart"
Other
"They women should be helped and encourage by the men"
"It's all about understanding each other"
"Everyone has a say regardless of their gender"
"we should motivate women to compete with the men? Ensure fair representation of men and women in organisations"
"I just believe they can help but i can't suggest a way"
"We have to help each other"
"It depends of the organisations"
"Both gender should respect each others views and opinions"
"What men can do women can also do so women should have equal opportunities as men"

Source: Authors' elabouration on primary data

These answers highlight that, according to farmers, trade could enhance gender equality in the cocoa value chain mostly through ensuring the inclusion of women in decision-making processes, by facilitating the access to inputs and economic resources for female farmers and by implementing the governmental support.

Table 9: Cashew farmers suggestions on how trade could help enhancing gender equality in the cashew value chain

Education
"They should educate farmers"
"We should educate people that women are equally competent"
Access to opportunities and inputs
"They should educate the men on need to encourage and give women the opportunity to also serve and work"

"Women can equally deliver when given the opportunity, so men ought to help the women"
"They should give females more opportunities to serve"
"We can equally do farming with the help of labourers"
Role of the government
"Government provide financial support for the female farmers"
"Government buying the cashew to trade will help both male and female farmers"
Compliance with international standards
"If we keep trading with the internationals, we will be forced to equal with each other"
Other
"Both gender needs to work together"
"Both gender needs to respect each other"

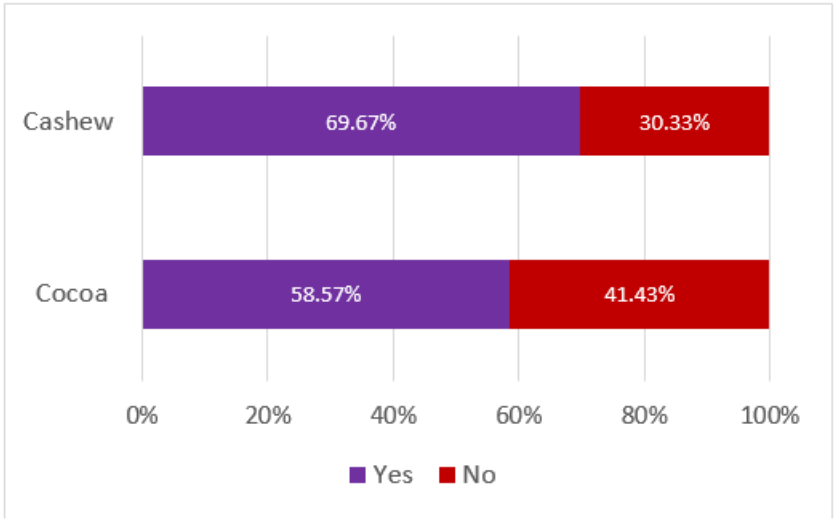
Source: Authors' elabouration on primary data

Cashew farmers insights on the topic emphasise several key areas of focus. Farmers highlighted the importance of raising awareness among both men and women about gender equality and women's capabilities. This underscores that shifting societal attitudes is fundamental to achieving equal opportunities.
Furthermore, as also highlighted by cocoa farmers in Table 8, cashew farmers underline the need to provide women with more opportunities and resources to thrive in agriculture. Ensuring access to inputs, encouraging men to support women and fostering collabouration were seen as critical for breaking traditional barriers in both value chains.

Trade and bargaining power

Farmers were then asked whether they think trade could help enhance their bargaining power. Cocoa farmers appeared more optimistic, with 58.6% of respondents answering "Yes," compared to only 41.4% of cashew farmers.

Figure 74: Do you think that international trade can help raise farmers' bargaining power?



Source: Authors' elabouration on primary data

Farmers who answered positively to this question were asked to specify how they believe trade could enhance their bargaining power. Respondents provided a variety of answers, which can be grouped into thematic areas, as shown in the following tables.

Table 10: Cocoa farmers suggestions on how trade could help enhancing their bargaining power

6)	**Role of cooperatives**
	"Through Abofa who can speak on our behalf"
	"They should that with our Cooperative leaders"
6)	**Role of the government**
	"They should compel government to buy the cocoa beans from farmers at a certain fixed price"
	"They should compel government to increase the price when necessary"
	"The government must be compelled to increase the prices"
	"The LBCs should be the best people to help"
	"Government will demand more cocos"
	"It depends on the leaders having the interest of the farmers at heart"
	"When the government provide the needed support for cocoa farms"
6)	**Farmers' representation in decision-making processes**
	"Farmers should have one voice"
	"They should listen to our plea"
	"They can speak on our behalf"
6)	**Valorisation of the quality of Ghanaian cocoa**
	"We the farmers need to produce quality cocoa beans"
	"The farmers need to produce quality cocoa beans"
	"They should look at the quality of the cocoa we produce"
	"They should look at the quality of the cocoa we produce and pay as accordingly"
6)	**Market dynamics**
	"They should inform the stakeholders of our hard work for them to increase the price"
	"It depends on the buyers"
	"They have to look at the demand at the world market and reward us accordingly"
	"It will help us determine our own price for the cocoa sale"
6)	**Other**
	"We the farmers should work hard"
	"They should look at how hard we are working and increase the price for us"
	"They should look at our hard work and do that for us"
	"They should consider our hard work"

Overall, the responses suggest that Ghanaian cocoa view international trade as a potential tool for improving their bargaining power, but only if it is accompanied by structural reforms, fair pricing, and greater representation. Farmers see cooperatives as crucial intermediaries capable of advocating on their behalf and call for the government to play a more active role in regulating prices and ensuring fair compensation. Furthermore, many farmers highlight their desire for greater participation in decision-making processes.

Table 11: Cashew farmers suggestions on how trade could help enhancing their bargaining power

1)	**Quality of cashew**
	"There should be sincerity among farmers when it comes to producing quality cashew"
	"They should help us with farms inputs to help us produce quality cashew"

2) Price setting regulation
"The cashew prices are not good so they should help us"
"They should look upon our hard work and set a uniform price level"
"Middlemen are supposed to be controlled and compelled to pay a better price"
3) Other
"They should look at our responses and our suffering and help us"

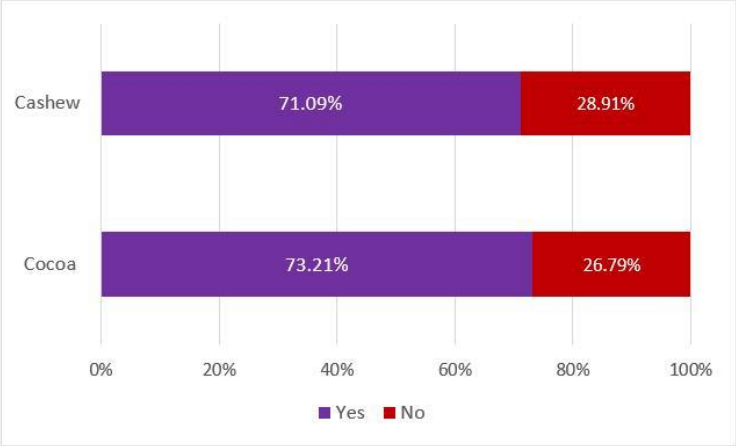
Source: Authors' elabouration on primary data

The responses suggest that cashew farmers see international trade as a potential lever to improve their bargaining power, but only if accompanied by greater transparency and structural reforms.

Trade and environmentally friendly practices

Farmers were then asked whether they think trade could help implementing the application of environmentally friendly farming practices. The answers were strongly positive for both cocoa and cashew farmers.

Figure 75: Do you think that international trade can favour environmentally friendly agricultural practices?



Source: Authors' elabouration on primary data

Farmers who answered positively to this question were asked to specify how they believe trade could promote environmentally friendly practices in the value chain. Respondents provided a variety of answers, which can be grouped into thematic areas, as shown in the following tables.

Table 12: Cocoa farmers suggestions on how trade could promote environmentally friendly practices

6) Implementing sustainable agricultural practices
"Not applying chemical fertilizers"
"We will apply chemical fertilizers"
"Desisting from using chemical fertilisers"
"We won't use chemicals on the land"
"We will not use chemical fertilisers but use organic systems"
"Not applying chemical fertilizers"
"We will use organic fertilisers"
"It will help to practice intercropping"
"We will use organic fertilisers"

"It will help affect climate change positively"
"They force them to use methods that don't harm the environment"
"Rules and regulations on how to farm sustainably"
"Because we sell to the international people, we will be forced to use environmentally friendly practices"
6) Providing Training
"Through Education"
"Through training and education"
"Through teachings and trainings"
"They should educate farmers to stop"
"Through training and education"
"Through training and education"
"Training"
"Training"
"Training"
"Through Education"
"They should improve on the training and education on the need to protect the environment"
6) Role of regulation and monitoring
"They should place embargo on importation of those chemical fertilisers"
"Offenders of bad environmental practices should reported and sanctioned"
"Rules and regulations on how to farm sustainably"
"Inspection on regularly basis and educate farmers"
6) Assistance
"They should help the farmers in their farming activities"
"They should provide help to the cocoa growing areas"
"Get support from the government to plant trees within the cocoa farm and provide proper seedling"
"They should help with inputs with less negative impact on the environment"
"They should help us with the needed inputs and train us on how to use them"
6) Economic advantages of sustainable production
"Farmers will get more money to practice the organic system"
"We will receive more money to invest into our farms, buy organic fertilizers and environmentally friendly chemicals"
"They should count and moment the number of trees in the farms and pay premium to farmers who keep theirs"
"Because the pay more for the organic than the other ones, people will be incentivized to use good practices"
6) Other
"It all depends on the government"
"It helps in keeping farmers healthy"

Source: Authors' elabouration on primary data

When cocoa farmers were asked to propose ways in which international trade could promote environmentally friendly practices, a significantly higher number of interviewees were able to offer suggestions compared to other discussed topics.
Many farmers emphasised that trade favours the adoption of sustainable agricultural practices, such as avoiding chemical fertilizers, using organic inputs, and employing methods like intercropping to protect the environment and combat climate change. Farmers also stressed the need for education and

training programs to build awareness and capacity for sustainable farming techniques. Additionally, they called for stronger regulatory measures, including the enforcement of sustainable farming rules and regular inspections. Furthermore, financial incentives were identified as a strong motivator, with farmers noting that higher premiums for organic cocoa and support with environmentally friendly inputs encourage them to adopt sustainable practices.

Table 13: Cashew farmers suggestions on how trade could promote environmentally friendly practices

6) Implementing sustainable agricultural practices
"Reduced the usage of harmful chemicals to the land"
6) Providing Training
"Through training"
"Through education"
"Through special training"
"Through training and education"
"Education and training"
6) Role of regulation and monitoring
"Laws and regulations to sanction farmers who indulge in bad practices"
6) Economic advantages of sustainable production
"Yeah, because we will make sure to follow the standards that will help then sale of our products"
6) Other
"It will keep the environment"

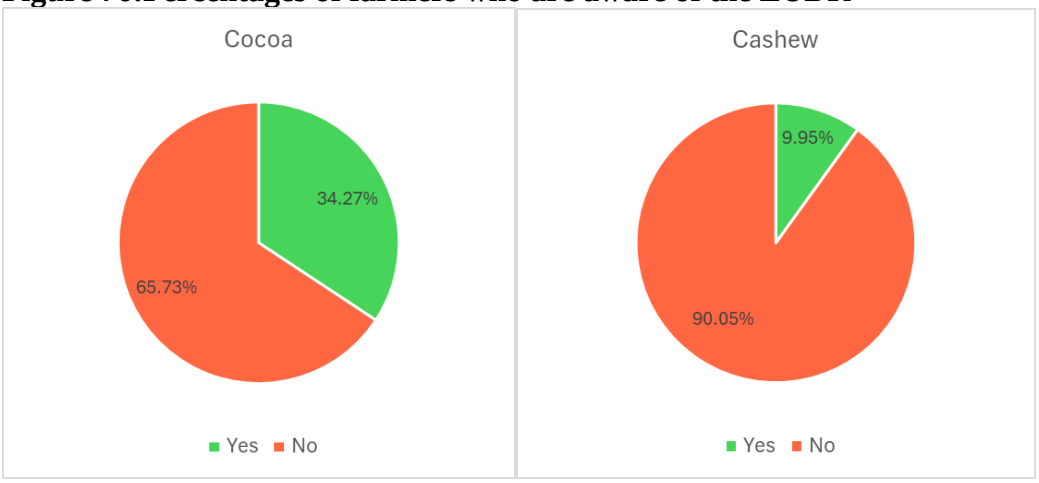
Source: Authors' elabouration on primary data

Even though the suggestion from cashew farmers were very limited compared to cocoa farmers (n.8 respondents) some interesting insights were given. The interviewees highlighted the importance of education and training, advocating for specialized programs to equip farmers with the knowledge and skills required for eco-friendly methods. One of the farmers also stressed the necessity of implementing laws and regulations to sanction harmful practices and encourage sustainable ones. Furthermore, it was noted that adhering to international standards not only benefits the environment but also improves the marketability of cashew products, providing strong economic motivation for sustainability.

Farmer's awareness about the EU- Deforestation Regulation

The data reveals that a relatively small percentage of farmers are aware that, in the near future, their crops will have to be deforestation-free in order to be sold on the EU market. Specifically, only 34.27% of cocoa farmers and 9.95% of cashew farmers are aware of this requirement. This gap between crops could be attributed to the larger-scale discussions and initiatives surrounding deforestation and sustainability in the cocoa industry. Despite this, results for both crops are still far from optimal, indicating that many farmers remain unaware of this regulation. Addressing this gap is crucial to ensure farmers will be able to maintain their access to the European markets and to promote sustainable agricultural practices.

Figure 76:Percentages of farmers who are aware of the EUDR

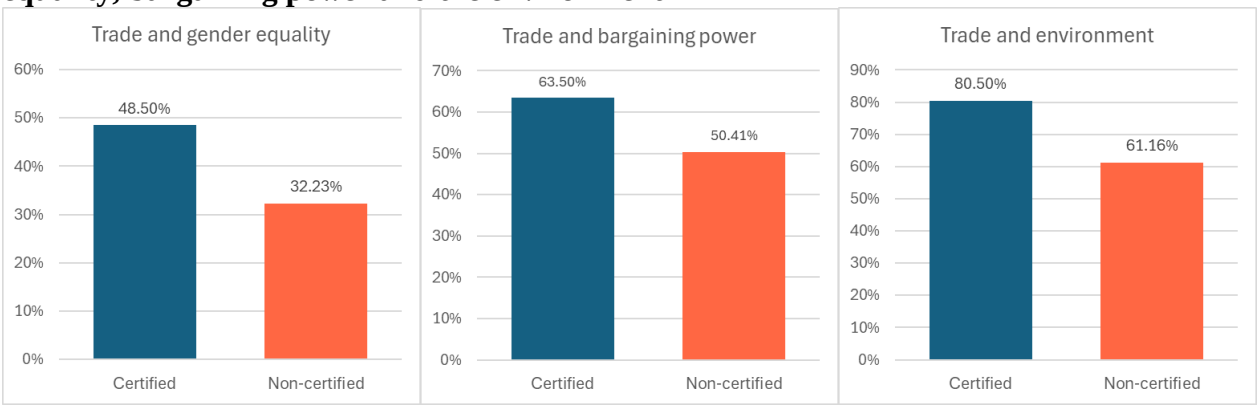


Source: Authors' elabouration on primary data

Certification and perception of trade

Figure 77 represent the proportion of farmers who believe that trade can have a positive impact on their bargaining power, gender equality and the environment for cocoa farmers, by certification status. The same analysis was not applied to cashew farmers since the sector currently lacks certification schemes. For each of the three topics interviewees were asked about, the effect of the certification status over the perception of the potential of trade, was positive. The perception of trade as a way to favour environmentally friendly farming practices was particularly strong, with a difference of - 19.34% between certified and non-certified farmers.

Figure 77: Proportion of cocoa farmers who think trade can have a positive effect on gender equality, bargaining power and the environment



Source: Authors' elabouration on primary data

3.1.4 Conclusions

Cocoa and cashew farming play crucial roles in Ghana's agricultural sector, though with distinct histories and challenges. Cocoa, cultivated since the early 20th century, has been a cornerstone of the economy but has caused significant environmental challenges, including deforestation and pesticide pollution. Cashew, a newer crop, offers opportunities for sustainable growth due to its resilience to climate change and reduced need for pesticides. Given the shared nature of cocoa and cashew as perennial crops primarily cultivated for export, it is crucial to ensure that the development of the cashew sector avoids replicating the environmental damage caused by cocoa monocultures.

Despite cocoa's long-standing economic contribution, it no longer provides sufficient income for farmers, and the sector is losing its appeal to younger generations. Cashew farming, while growing in importance, also fails to meet the income needs of farmers. Both crops generate incomes below

international poverty and living income thresholds, highlighting systemic economic challenges in the agricultural value chains (SDG2).
Land tenure issues present additional obstacles, deeply entwined with cultural and socio-economic factors (SDG1). Traditional systems like *Abuna* and *Abusa* sharecropping are widespread in cocoa farming due to limited access to land. Policy makers emphasise the need to formalize these agreements to improve reliability while respecting cultural traditions. Additionally, women's limited land inheritance rights reflect deep-rooted patriarchal norms, which require targeted cultural and policy interventions to ensure gender equity (SDG5).
Concerning gender equality, in addition to difficulties in inheriting land, women often face lower income, limited access to agricultural inputs and restricted economic opportunities. The quantitative data emphasises that women tend to manage smaller farms and earn less than men in cocoa farming, while the cashew sector seems to offer slightly better economic opportunities for women. Furthermore, women's contributions are concentrated in post-harvest tasks and less hazardous activities, which reflect traditional gender roles but also cover seasonal peaks of work demand and limit their access to higher-value agricultural tasks.
Many efforts have been made to eradicate child labour in the country, yet there remains a nuanced debate shaped by contrasting perspectives (SDG8). While there is often a negative narrative surrounding child labour, confirmed by the declaration of respect of the tight legislation about work under legal age, some stakeholders argue that involving children in farm activities can be seen as a valuable aspect of their upbringing, provided it does not interfere with school attendance. Despite this, isolated cases of children participating in hazardous tasks like weeding highlight the need for continued vigilance and awareness to ensure compliance with international standards.
Regarding occupational safety, the agricultural sector would benefit from the diffusion of insurance cover and wider use of personal protective equipment (PPE), as a large proportion of farmers currently lack adequate protection during pesticide application.
At the same time, addressing environmental sustainability is critical to ensuring the long-term viability of the sector (SDG15). Both cocoa and cashew farming must navigate the delicate balance between improving productivity and minimizing environmental impact. On the one hand, many Ghanaian farmers lack access to essential agricultural inputs, which may partly explain the low adoption of agrochemicals in these sectors. On the other hand, the misuse of pesticides and fertilizers continues to pose significant risks to biodiversity, human health, and trade viability. To address these issues, promoting the adoption of more sustainable pest management systems, as opposed to “conventional 'business as usual' practices, is essential.
Another relevant issue is water availability, particularly for cocoa, which is highly sensitive to climate change (SDG6). The adoption of water-efficient techniques, such as mulching and agroforestry systems, is a positive step but needs to be scaled up through training and awareness programs. Sustainable agricultural practices, like intercropping cashew with cocoa, could mitigate soil erosion and reduce environmental degradation.
Finally, trade and certification schemes offer opportunities to enhance economic outcomes for farmers while promoting environmental sustainability (SDG17). However, trade agreements must include provisions for gender equity and capacity building to ensure inclusive benefits. The adoption of voluntary sustainability standards (VSSs) remains limited but increasing farmer awareness of their advantages could encourage participation.

3.1.5 Policy recommendations

Cocoa and cashew farming are vital sectors of Ghana's economy, providing livelihoods for millions of smallholder farmers and contributing significantly to export revenues. However, these sectors face numerous challenges, including economic instability, environmental degradation, gender inequities, and, especially for cocoa farming, high vulnerability to climate change. Addressing these issues is critical to advancing Ghana’s progress toward achieving the Sustainable Development Goals (SDGs).

This policy framework outlines actionable strategies to enhance the sustainability, equity, and economic resilience of the cocoa and cashew industries. By aligning interventions with SDG priorities—such as eradicating poverty, ensuring food security, promoting gender equality, safeguarding natural resources, and fostering global partnerships—these recommendations aim to create a transformative impact on farming communities while preserving Ghana's agricultural traditions.

SDG 1: No Poverty

- Formalize land tenure systems: Recognize and formalize traditional land agreements, like *Abuna* and *Abusa*, ensuring they provide clearer, more reliable terms for farmers. This would support the agricultural traditions while offering better security and fairer returns on investments.
- Diversify income sources: Promote diversification of income sources in cocoa and cashew farming to mitigate economic vulnerability. Encourage the introduction of alternative crops, agroforestry practices, and value-added products to provide farmers with more reliable and higher income streams.
- Income stabilization programs: Introduce income stabilization mechanisms for farmers, such as crop insurance or savings programs, to protect against fluctuating commodity prices and weather-related shocks.
- Access to financial support: Improve access to financial services, including low-interest loans and grants, to enable farmers to invest in more sustainable and profitable farming practices.
- Work conditions: Improve technical skills, deseasonalise work, improve work division among hounsold members.

SDG 2: Zero Hunger

- Improve farmer education and capacity building: Provide farmers with training on sustainable agricultural practices to improve both food security and environmental sustainability.
- Promote local product transformation: Develop targeted initiatives to establish and expand local cashew processing facilities in Ghana, focusing on the minimal infrastructure required to produce finished products. This approach would enable Ghanaian producers to retain greater value within the country by reducing reliance on intermediary processing in India or Vietnam.
- Promote agroecological practices: Support sustainable farming practices that prevent soil erosion and improve land productivity, including agroecological approaches such as intercropping, agroforestry, and soil fertility management to maintain biodiversity, increase resilience to climate change and improve food security in cocoa and cashew farming areas.

SDG 5: Gender Equality

- Promote gender-equitable land rights: Ensure that women have equal access to land ownership and inheritance rights. This could involve revising traditional inheritance practices and creating legal frameworks that support women's land rights.
- Enhance women's participation in decision-making: Encourage women's active participation in decision-making processes at the farm and community levels. This includes supporting women's organizations and ensuring women have access to leadership training and roles in agricultural cooperatives.
- Support women's access to resources: Improve women's access to agricultural inputs, finance, and technology to empower them in both cocoa and cashew farming. Provide targeted support for women in processing, marketing, and other value-added activities where they can increase their income**.**

- Promote gender equality through the cashew sector: Cashew could represent a business opportunity for women and a platform to implement gender-oriented initiatives in a sector that is still developing and not yet consolidated.

SDG 6: Clean Water and Sanitation

- Promote sustainable water management practices: Support the development of water management systems that ensure a reliable water supply for farming communities, especially in cocoa-producing areas vulnerable to droughts and reduced rainfall. Training programs should be implemented to ensure widespread adoption of these practices.
- Reduce agrochemical pollution: Implement policies to minimize water pollution from pesticides and fertilizers by promoting organic farming and integrated pest management systems. Provide incentives for farmers to adopt safer, more sustainable agricultural practices that prevent contamination of water resources.

SDG 8: Decent Work and Economic Growth

- Increase access to training and safety equipment: Provide training for farmers to raise awareness on the importance of proper use of personal protective equipment (PPE) and ensure that safety equipment is accessible, especially for pesticide application.
- Promoting agricultural insurance: promote the adoption and implementation of agricultural insurance schemes to protect farmers from potentially hazardous activities such as pesticide application.
- Support farmers' organizations: Strengthen farmers' organizations, especially for cashew, where the lack of such organizations currently hinders growth and efficiency. Farmers' organizations should advocate for better working conditions, improved access to resources, and fairer trade terms.

SDG 15: Life on Land

- Address deforestation: Integrating cocoa and cashew cultivation within agroforestry systems can yield significant benefits by combining economic profitability with environmental sustainability, helping to maintain forest cover while enhancing farmers' income.
- Restore degraded land: Promote land restoration programs that focus on reforestation, soil conservation, and the rehabilitation of land damaged by unsustainable farming practices, such as excessive pesticide use and monocropping.
- Promote sustainable agricultural practices, rationalising the use of chemical inputs and water ad improving farmers skills on these matters with the support of cooperative systems and associations.

SDG 17: Partnerships for the Goals

- Foster collabouration with international partners: Strengthen partnerships with international organizations, development agencies, and the private sector to promote sustainable agricultural practices, improve farmer income, and enhance market access for cocoa and cashew farmers.
- Encourage gender-sensitive trade policies: Integrate gender considerations into trade agreements and policies to ensure that women benefit equally from trade opportunities. This includes access to training, financial services, and capacity building that helps women become more competitive in global markets.
- Increase support for Voluntary Sustainability Standards (VSSs): Expand support for VSSs in the cocoa sector and promote their creation and implementation in the cashew sector to enhance both the environmental and economic outcomes of the value chains. Increase awareness and adoption of these standards through farmer education and technical assistance.

3.1.5.1 Trade-specific sustainability concerns for cocoa and cashew value chains

By granting greater access to the European market, the EU-Ghana iEPA has had a positive impact on poverty alleviation for cocoa farmers in Ghana. At the same time, the expansion of cocoa plantations driven by high global demand and the use of unsustainable agricultural practices has placed significant pressure on natural resources, particularly primary forest. While farmers are currently able to generate income from cocoa, it remains insufficient to ensure a sustainable living wage. Additionally, they are likely to face further challenges in the future due to the adverse effects of climate change.
This can be attributed to the iEPA's primary focus on economic sustainability, neglecting environmental and social concerns. Regarding environmental sustainability, cocoa imported into the EU will soon require proof of being deforestation-free, ensuring it does not come from recently deforested land or contribute to forest degradation. In contrast, the UE currently lacks specific regulations on social issues, such as the inclusion of women and the prevention of child labour. As a result, VSSs are the primary market tool for addressing these challenges.
In this context, the EU should raise consumer awareness by encouraging the purchase of sustainably produced food products, while ensuring that the VSSs in place are both reliable and effective. Furthermore, efforts should focus on promoting the wider adoption of these standards by cocoa farmers, with the aim of extending them to the cashew sector as well.

Moreover, a key challenge limiting the socio-economics development of both the cocoa and cashew value chains is the minimal level of local processing. These products are predominantly exported in their raw form to international markets, significantly limiting opportunities for generating added value within their countries of origin. Addressing this issue requires a combination of short- and long-term measures, with trade potentially playing a pivotal role in driving the process. In the short term, trade agreements and policies can support technology transfer and capacity-building initiatives to strengthen local capabilities. In the longer term, structural changes to the value chains are necessary, including significant investments in infrastructure to establish and expand local processing facilities. This would enable the production of higher-value goods, such as cashew kernels, cocoa butter, or chocolate.
In this context, trade relations with the EU can play a key role in attracting foreign direct investment (FDI), which can further support the development of local processing industries and unlock their economic potential. Specifically, the local processing of cashew, being less complex than that of cocoa, offers the potential for direct trade with the EU, eliminating the need for intermediaries such as India and Vietnam. Such direct trade would foster the production of high-quality, sustainable products while enabling the country to retain a greater share of the added value within its economy.

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3.2 Vietnam: Rice, tea and dragon fruit production sustainability

3.2.1 Rice value chain

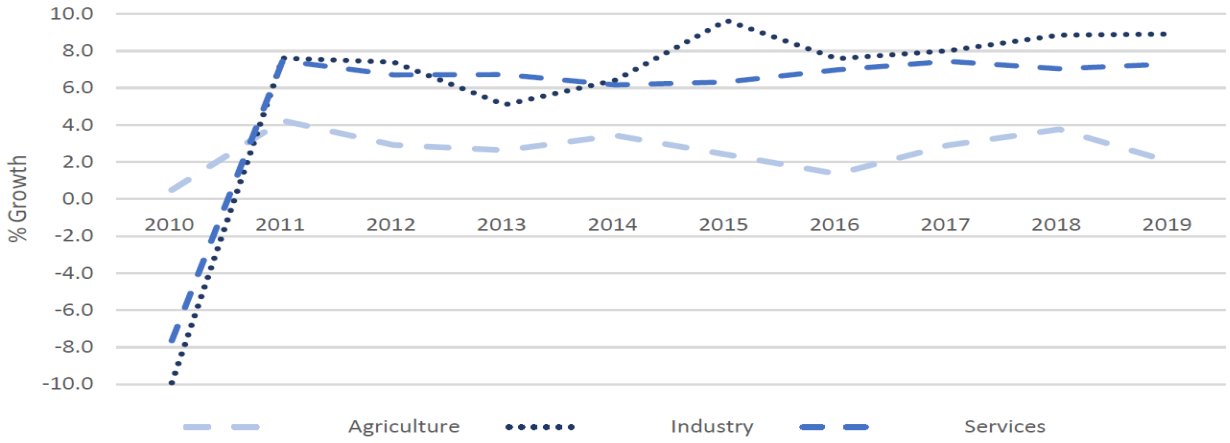
3.2.1.1 Literature review

3.2.1.1.1 Economic overview of the agricultural sector

3.2.1.1.1.1 Gross domestic product and employment: the rice sector

Since the start of the Doi Moi reforms[13], Vietnam's has undertaken several economic and political changes that have affected its economy and society. The agricultural sector experienced significant transformation, driven by reforms that dismantled restrictions on private economic activities and integrated farms into markets (Coxhead et al., 2010; McCaig and Pavcnik, 2016). Moreover, state price controls were removed, and the public procurement system was reformed (Coxhead et al., 2010; McCaig and Pavcnik, 2016). Vietnam's reforms also abolished collective farming in favour of a system where individual farmers or households were granted long-term use rights over agricultural land, opened the national market to greater international competition, and established the conditions that allowed the agricultural sector to capitalize on rising international demand for commodities. Vietnam has undergone robust economic growth. This progress has occurred alongside the country's shift towards an open-market economy. From 2010 to 2019, Vietnam's gross domestic product (GDP) increased at an average annual rate of 6.3% with the following share: 7.7% by the industry and construction sector; 6.9% by services sector; and 2.9% by the agriculture and natural resources sector (Figure 1) (ADB, 2022).

Figure 1: Vietnam growth rates by sector: 2010−2019.



Source: ADB (2022)

Agriculture's share of Vietnam's economy has diminished over time as the industry and service sectors have expanded in terms of GDP and employment contribution. As reported by the OECD (2022), the agriculture sector, including natural resources, contributed over 40% to Vietnam's GDP in 1991, but this share decreased to 14% in 2017. Similarly, agriculture's share of employment fell from more than 75% in 1991 to 37% in 2017. However, agriculture sector remains key for economic growth and development. According to the Vietnam's General Statistics Office (GSO, 2018), over 51% of the rural workforce was employed in the sector, making it the largest source of income for a significant share for rural households.

Between 1990 and 2019, agricultural output more than tripled, increasing by 230%, transforming Vietnam into a leading exporter of various commodities (OECD, 2022). As suggested by Coxhead et al. (2010) and Rillo and Sombilla (2015), this increased production was driven by several factors: i) expansion of agricultural land; ii) increased use of inputs like fertilizers and pesticides; iii) widespread

[13] Doi Moi refers to the economic reforms launched in Vietnam in 1986, aimed at establishing a socialist-oriented market economy.

adoption of high-yielding crop varieties, especially for rice cultivation; and iii) improvements in infrastructure (e.g., irrigation systems).
Agricultural output growth has slowed in recent years. In the 2010s, the average annual growth rate was 2.5%, with declines in 2016 and 2019. Over the past decade, crop production grew faster than livestock, averaging 2.6% per year compared to 2.2% for livestock. The composition of agricultural output has also shifted, moving from staple foods like wheat, potatoes, and cassava to other commodities, particularly perennial crops such as coffee, pepper and rubber. Despite these changes in production quantities and composition, rice remained the dominant crop, accounting for approximately 28% of agricultural production value in 2019 (Table 1). According to FAOSTAT (2024), Vietnam rank in the 5th position as worldwide producer.

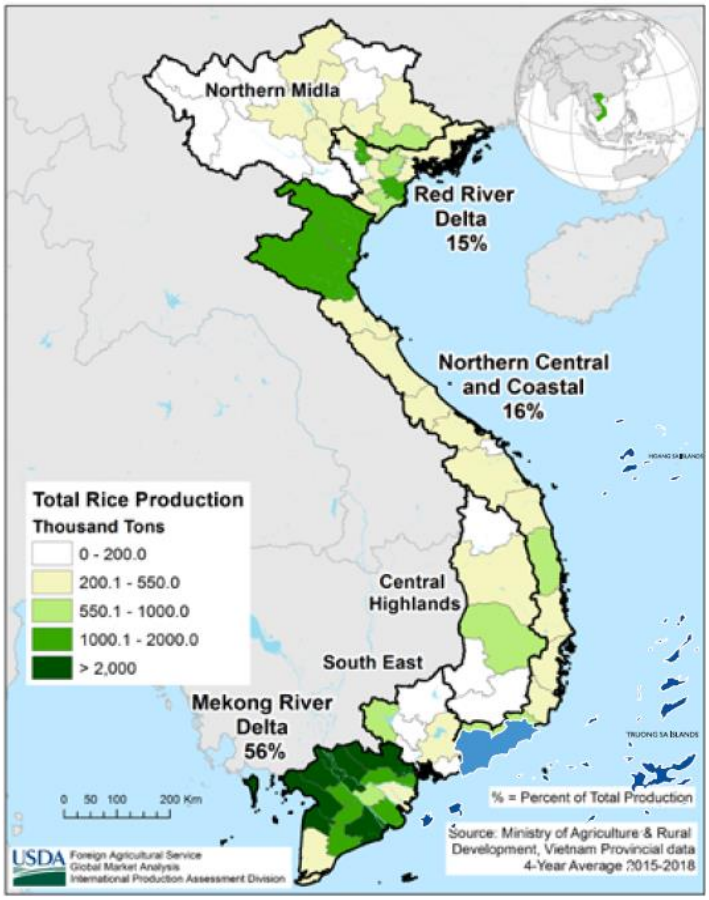
Table 1: Vietnam's crop production: 1990 -2019 (%)

Crop	1990	2000	2010	2019
Rice, paddy	42.7	41.8	32.3	27.5
Coffee, green	1.1	5.6	4.9	5.8
Pepper	0.7	1.8	2.3	4.5
Cassava	2.7	1.3	3.6	3.4
Rubber, natural	0.6	1.7	2.7	3.3
Maize	1.6	2.8	4.0	3.3
Sugar cane	1.8	2.9	2.0	1.5
Cashew nuts, with shell	1.2	0.3	1.0	0.7
Tea	0.1	0.1	0.2	0.2
Other	23.7	16.6	15.3	15.3
Total	76.9	74.9	68.2	65.5

Source: Authors' elabouration based on OECD (2022).

According to FAOSTAT (2024), Vietnam ranks as the fifth-largest producer of rice globally following China, India, Bangladesh and Indonesia. Vietnam's rice cultivation covered around 7.1 million hectares in 2023 (VietnamPlus, 2023). The average yield was 6.7 tons per hectare, with total output estimated at over 43.1 million tons, showing an increase of more than 452,000 tons compared to 2022 (VietnamPlus, 2023). This production aims to meet both domestic needs and export demands, with the Mekong Delta (MKD) contributing to 56% of the country's rice output and over 90% of its rice exports (Tho & Umetsu, 2022) (Figure 2). According to the WB (2022), the MKD contributed, on average, about 56% of the total rice production between 2015 and 2018. During the same period, the Red River Delta (RRD) and the Northern Central and Coastal regions contributed around 15% and 16%, respectively (Figure 2). The MKD is home to 20% of Vietnam's population, and over 80% of its residents are engaged in rice farming with more than 1,600 rice varieties cultivated (WB, 2022).

Figure 2. Rice production in Vietnam by major geographical areas from 2015 to 2018 (%)



Source: WB (2022)

3.2.1.1.1.2 Total export and the eu-vietnam trade agreement

Between 2012 and 2019, the agricultural sector's export value increased from $22.8 billion to $33.8 billion, even though its share of total exports declined from 20% to 13% during the same period (ADB, 2022). This growth in value was primarily driven by fresh and processed vegetable and fruit products (Table 2).

Table 2: Export value of selected agricultural products from Vietnam: 2012-2019 (USD million)

Crop	2012	2015	2019
Fresh & processed vegetables & fruit	828	1,839	3,747
Cashew nut	1,470	2,398	3,288
Coffee	3,672	2,671	2,854
Tea	224	217	236
Pepper	793	1,259	714
Rice	3,673	2,796	2,805
Cassava & cassava products	1,352	1,321	966
Total	**12,012**	**12,501**	**14,610**

Source: Authors' elabouration based on ADB (2022).

In terms of total volume, rice led Vietnam's agricultural exports, with over 6.3 million tons in 2019 (ADB, 2022) (Table 3). However, rice was often sold at lower prices on international markets due to its lower quality.

Table 3: Export volumes of selected agricultural products from Vietnam: 2012−2019 (tons)

Crop	2012	2015	2019
Cashew nut	221,483	353,268	455,563
Coffee	1,732,156	1,442,007	1,653,265
Tea	146,708	139,785	137,102
Pepper	116,826	214,885	283,836
Rice	8,016,100	5,789,240	6,366,469
Cassava	4,227,568	3,899,825	2,533,711
Total	**14,460,841**	**11,839,010**	**11,429,946**

Source: Authors' elabouration based on ADB (2022)

According to the OECD (2022), Vietnam faced several challenges in international markets, including: i) rising rural labour costs as workers transitioned from agriculture to industrial and service sectors; ii) low labour productivity in agriculture; iii) higher standards required by importing countries, such as product traceability and sanitary and phytosanitary requirements; and iv) increasing consumer demands for sustainable certifications in North American and EU markets. However, the agriculture sector remained the only sector that consistently maintained an export surplus in recent years playing several key roles: i) serving as a pillar of macroeconomic stability; ii) driving sustainable development; iii) generating income for rural households; iv) providing foreign exchange, which was crucial for importing goods needed for the country's industrialization; and v) contributing to food security (Coxhead et al., 2010; Luu Ngoc Luong, 2017; OECD, 2020).

On 30 June 2019, the European Union and Vietnam signed a bilateral free trade agreement (EC, 2024), which entered into force on 1 August 2020. The agreement aimed to eliminate 99% of all tariffs on both sides within ten years (EC, 2024). The EU's sensitive agricultural products, such as rice, sugar and baby corn, were subject to duty-free tariff rate quotas (TRQs). Additionally, Vietnam will progressively eliminate duties on EU products such as, chicken, dairy, beef, pasta, apples, wheat, and olive oil, among others. By the end of the implementation period, an average tariff of 1.1% will apply to agricultural goods from Vietnam and 2.1% to processed agricultural products, while the average tariff for EU agricultural exports will be 2.6% (OECD, 2020). Under the agreement, Vietnam will also recognize 169 EU geographical indications (GIs), while the EU will protect 39 Vietnamese GIs, with the possibility of including additional GIs in the near future (OECD, 2020; EC, 2024).

The EU fixed duty-free TRQs for rice at: i) 30,000 tons of milled rice; ii) 20,000 tons of husked rice (in product weight, equal to 13,800 tons milled equivalent); and iii) 30,000 tons of fragrant rice (EU, 2019). The tariff on broken rice will be gradually removed over a five-year period, starting with a 50% reduction (EU, 2019). Vietnam's rice exports to the EU showed mixed trends between 2021 and 2022. Exports of rice in the husk stopped entirely in 2022, while broken rice exports declined significantly. In contrast, husked or brown rice exports rose sharply from 1,461 to 5,389 tons, and semi-milled or wholly milled rice saw a substantial increase, maintaining its status as the most

exported category. This shift reflected a growing demand for higher-quality rice products in the EU market.

Figure 3: Vietnam's rice exports to the European Union (EU 27) by year (tons)

Product label	2021	2022
Rice in the husk, "paddy" or rough	25	0
Husked or brown rice	1,461	5,389
Semi-milled or wholly milled rice, whether or not polished or glazed	62,302	77,119
Broken rice	140	53

Source: Authors' elabouration based on Trade Map ITC (2024)

3.2.1.1.1.3 Government policies in agriculture and support for rice producers

The Master Plan for Economic Restructuring (2013–2020)[14] aimed to enhance the quality, efficiency and competitiveness of Vietnam's economy. Beyond expanding economic activities, the Master Plan focused on modernizing agricultural production and increasing its added value while promoting sustainability, innovation, and efficiency. Key measures included: i) maintaining 3.8 million hectares of rice land to ensure national food security; ii) implementing green development strategies and addressing climate change; iii) ensuring the sustainable use of natural resources; iv) preserving watersheds and specially designated forests;

v) introducing innovative forest management mechanisms; vi) converting existing forests into production forests to improve the livelihoods of forestry workers; vii) managing breeding areas for environmental protection and food safety; and viii) investigating and monitoring marine resources and catch volumes.

The Socio-Economic Development Strategies (SEDS) 2011-2020 and the Socio-Economic Development Plans (SEDP) 2011-2015 objectives were implemented through various policy initiatives, such as the agricultural restructuring scheme adopted by the Prime Minister's Decision No. 899/QD-TTg on 10/06/2013. This scheme promoted the development of the agricultural sector toward value-added and sustainable production, aligned with the three dimensions of sustainability (Table 4).

Table 4: Alignment of Vietnamese agricultural policy objectives "Prime Minister's Decision No. 899/QD-TTg of 10/06/2013" with the three dimensions of sustainability.

Sustainable dimension	Agricultural restructuring scheme (No. 899/QD-TTg of 10/06/2013)
Economic	Sustain strong agricultural growth and enhance the sector's competitiveness by focusing on productivity improvements, greater efficiency, value addition, and better alignment with consumer needs and preferences.
Social	Continue to increase farmer incomes and improve rural living standards, reduce rural poverty rates, and ensure food security at both household and national levels.
Environmental	Enhance natural resource management, minimize environmental impacts, achieve environmental benefits, and strengthen the capacity to manage weather-related and other natural hazards in Vietnam.

[14] The Prime Minister signed Decision 339/QD-TTg approving the Master Plan on February 19, 2013.

Source: Authors' elabouration based on OECD (2022)

Built on the 2013 Master Plan, the Resolution No. 16/2021/QH15 on the Socio-Economic Development Plan (2021–2025) envisioned Vietnam's transformation into a green, sustainable and modern industrialized nation. This strategy underscored the country's commitment to fostering an economy with a strong emphasis on sustainability, innovation and the efficiency of the agricultural sector (ADB, 2022).

Resolution No. 63/NQ-CP, dated 23/12/2009, set specific targets for the rice sector: i) maintaining 3.8 million hectares of rice land, and ii) establishing a farm-gate price for rice that ensured growers achieved a profit 30% above production costs. This resolution was later amended by Resolution No. 34/NQ-CP on 25/03/2021, which focused on ensuring national food security until 2030. Resolution No. 34 aimed to secure a sufficient food supply for domestic consumption while allowing for exports and increasing incomes. Specific goals for the rice sector include: i) stabilizing 3.5 million hectares of rice production land; and ii) achieving an average profit of 35% above production costs for rice farmers in large-scale production areas. Moreover, according to Decision No. 124/2012/QD-TTg, rice producers received payments to protect and enhance cultivated rice land, and any conversion of this land to other uses required approval from relevant governmental agencies (OECD, 2022).

Two key policy instruments were adopted by the government to ensure that rice producers maintained a profit margin over production costs: i) when rice prices fell too low, the government provided concessional loans to enterprises for the temporary storage of rice during the harvest; ii) the government purchased a specified quantity of rice to be used as a national reserve, primarily allocated to food distribution programs for poor households. Other measures included relatively modest budgetary transfers to producers, such as subsidies for exemptions from irrigation service fees (ISF). Direct payments per hectare to rice producers for maintaining land in rice production were issued only between 2012 and 2019 (OECD, 2022).

3.2.1.1.2 Labour market conditions

3.2.1.1.2.1 The nexus: agriculture, informality and poverty rate

According to the ILOSTAT (2024), Vietnam's score on SDG indicator 8.8.2, which measures the level of national compliance with labour rights, is 8.2, indicating a low level of compliance with these labour rights[15]. Based on the GSO (2022), Vietnam had 33.6 million informal workers, representing 68.5% of the employed population in 2021. Although this percentage was lower than in regional countries such as Cambodia, Indonesia and Myanmar, it remained high on a global scale. In 2021, 42 out of 63 provinces reported informal employment rates exceeding 70%, with 26 provinces surpassing 80% (GSO, 2022). Additionally, a positive correlation was observed between informality and the share of workers in agriculture, forestry, and fishery (AFF) sectors, as well as provincial household poverty rates. Provinces with high poverty rates and a large proportion of AFF workers typically experienced greater informality and significant poverty levels (GSO, 2022). Conversely, provinces with more developed industrial sectors tended to have lower informality rates and lower poverty levels (GSO, 2022).

In Vietnam, informal workers were mainly distributed across three densely populated agricultural regions: the Red River Delta (RRD), Northen Central and Coastal and the MKD. These regions accounted for about 87% of rice production and hosted 64.8% of the national informal labour force (GSO, 2022; WB, 2022). The main specialized production areas are RRD in the North and the MKD in the South of Vietnam (López Jerez, 2020). Most of the rural workers in MKD and RRD were self-

[15] This value refers to SDG indicator 8.8.2, which measures the level of national compliance with fundamental labour rights, specifically freedom of association and collective bargaining (FACB). It ranges from 0 to 10, with 0 representing the highest level of compliance with FACB rights and 10 representing the lowest level of compliance.

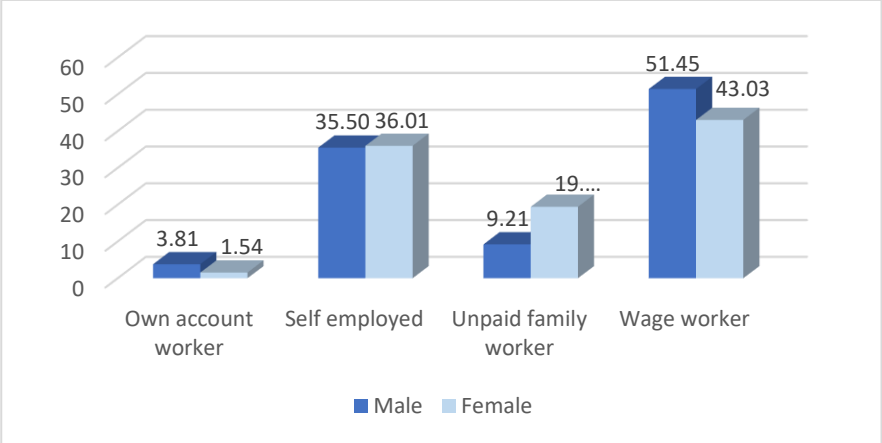
employed and unskilled, often lacking labour contracts and experiencing occupational diseases and accidents due to poor working conditions and safety regulation violations (VUSTA, 2011). Rice farmers in Vietnam face significant exposure to extreme heat during their daily farming activities. According to Tran et al. (2022), 46.2% of rice farmers reported working between 2 to less than 4 hours per day in the heat, while 29.3% spent 4 hours or more working outdoors under direct sunlight between 8 a.m. and 4 p.m. Only 24.5% of farmers worked for less than 2 hours during this peak heat period. These prolonged working hours, coupled with the physically demanding nature of rice cultivation, place farmers at heightened risk of heat-related illnesses. Tran et al. (2022) emphasised the need for strategies such as adjusted work schedules, shorter work intervals, and increased hydration to safeguard the health of rice farmers in Vietnam.

Dollar and Glewwe (1998) reported that rural poverty, measured by the headcount ratio, was higher in the RRD (58.9%) and the MKD (50.6%) than in other regions of the country. According to Edmonds (2004), rising rice prices were associated with a reduction in child labour, particularly in households with more extensive landholdings. This price increase is estimated to have accounted for nearly half of the decline in child labour during the 1990s, illustrating how greater market integration, driven by higher rice prices, significantly reduced child labour in Vietnam (Edmonds, 2004). Despite this progress, over 1 million children aged 5 to 17 were still engaged in child labour, representing 5.4% of the population in this age group in the country (UNICEF, 2024). Of these children, more than half were involved in hazardous work, and nearly half did not attend school, with 1.4% never having enrolled.

3.2.1.1.2.2 The role of women: key challenges in the labour market

The total employed population in Vietnam grew over time, reaching 54.6 million in 2019, comprising 28.8 million men and 25.8 million women (GSO, 2021). Despite a shift in the labour structure, with the labour force moving from agriculture, forestry and fisheries to the industry and service sectors, data on employment status reveal a notable inequality between men and women: only 43% of employed women were wage workers[16], compared to 51.5% of employed men (GSO, 2021) (Figure 4). Moreover, while only 9.2% of men were unpaid family workers, the proportion for women was double, at 19.4% (GSO, 2021) (Figure 4). Women disproportionately carried out household burdens[17] compared to men, particularly those aged 25-39, who were more likely to undertake these activities (GSO, 2021).

Figure 4: Proportion of employed population by sex and employment status in 2019 (%)

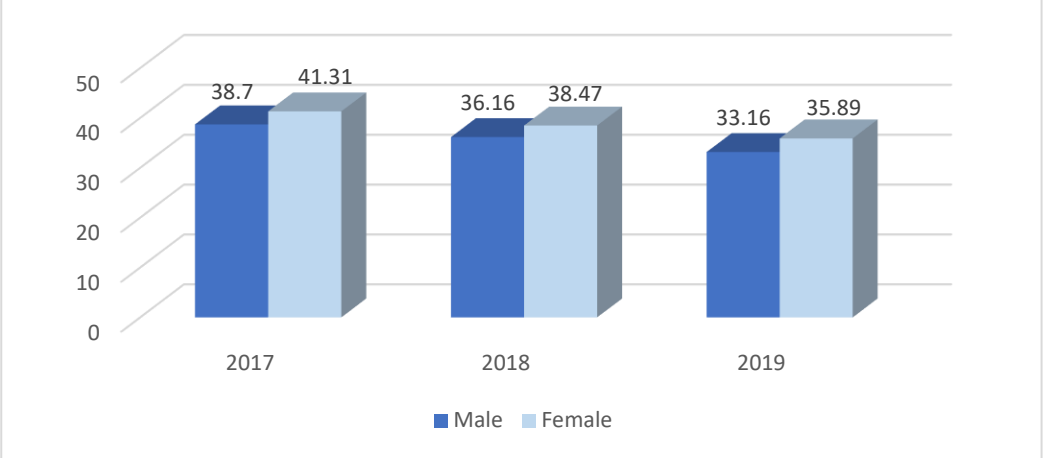


Source: Authors' elaboration based on GSO (2021)

[16] The wage worker category is generally considered a more secure occupation compared to other types of employment.
[17] Main household activities typically include cooking, cleaning, child and elderly care among others.

Despite a decreasing share of the labour force in the agricultural sector between 2017 and 2019, women still represented a significantly higher proportion, accounting for 35.9% compared to 33.2% for men in 2019 (GSO, 2021) (Figure 5).

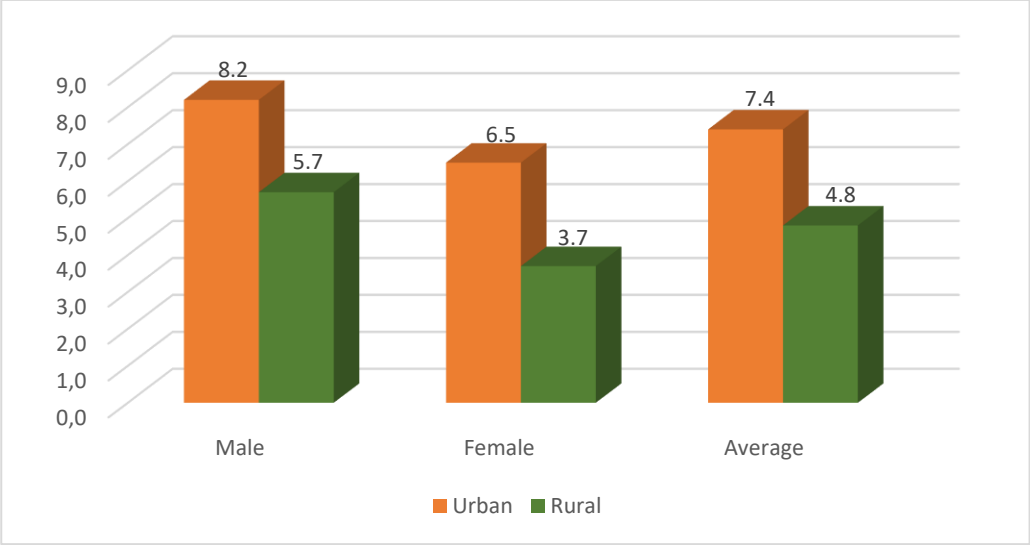
Figure 5: Proportion of employed population in agriculture, forestry and fishery by sex: 2017-2019 (%).



Source: Authors' elaboration based on GSO (2021)

Although the labour force participation rate was high in Vietnam, only 22.6% of the employed population had received any professional training (GSO, 2021). As highlighted by the GSO (2021), there were gender disparities in access to training opportunities: 25% of employed men had received training, compared to only 20% of employed women (GSO, 2021). This rate was particularly low for women employed in rural areas, with only 12.3% having received training in 2019 (GSO, 2021). Additionally, the average income for women was lower than for men in Vietnam. In 2019, the average income for an employed person was 5.6 million Vietnamese Dong (VND)[18], with men earning 6.5 million VND and women about 4.6 million VND, while the average income for female workers in rural areas was the lowest, corresponding to 3.7 million VND (GSO, 2021) (Figure 6).

Figure 6: Income for employed population by sex and urban/rural area in 2019 (VND million)

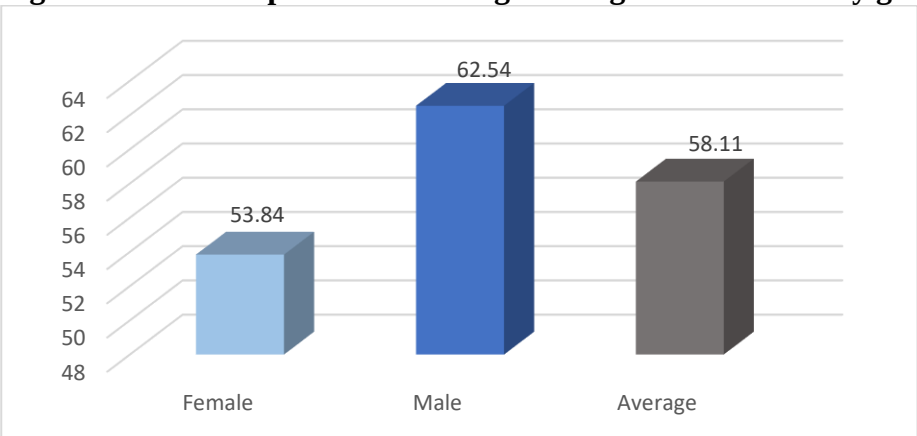


Source: Authors' elaboration based on GSO (2021)

[18] 5.6 million Vietnamese Dong (VND) corresponds to about 205,13 Euro (30/09/2024).

The Land Law (1993) in Vietnam granted equal land rights to both women and men and required that both spouses' names be registered on Land Use Rights Certificates (LURCs). However, women's land rights were not fully realized in practice (USAID, 2016). In 2020, 58.1% of adults in agricultural households nationwide had ownership and transfer rights (GSO, 2021). Of these, 62.5% were men, and 53.8% were women (Figure 7) (GSO, 2021).

Figure 7: Ownership and transfer rights of agricultural land by gender in 2020 (%)



Source: Authors' elaboration based on GSO (2021)

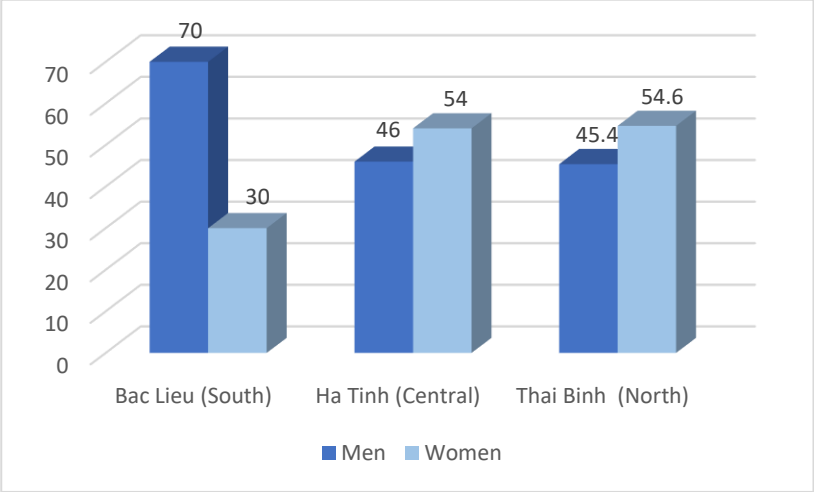
Additionally, women frequently received smaller plots compared to men (USAID, 2016). The lack of secure land rights for women affected their economic empowerment, limited their access to extension and financial services, and hindered their ability to make decisions and invest in sustainable agricultural practices. Ethnic minority groups practising patrilineal succession reported only 4.2% joint certification for non-residential land (USAID, 2016).

3.2.1.1.2.3 Factors affecting women's role and decision-making differences in rice production

According to Kabber and Anh (2000), women's involvement in rice production depended on several factors, including irrigation methods, household income, male migration and mechanization. In Bac Lieu province in the South of Vietnam, where farm sizes averaged 1.4 hectares, farmers grew three rice crops per year. Men dominated labour in rice farming, contributing 70% of total labour inputs per hectare (ha), compared to women's 30% (Duyen et al., 2021) (Figure 8).

In contrast, in the irrigated rice areas of Thai Binh (North Vietnam) and Ha Tinh (Central Vietnam), where average farm sizes were smaller, 0.33 ha and 0.18 ha respectively, women contributed more labour than men, providing about 54% of the total labour inputs (Duyen et al., 2021) (Figure 8).

Figure 8: Gender involvement in rice production by percentage in three provinces: Bac Lieu (South Vietnam), Ha Tinh (Central Vietnam), and Thai Binh (North Vietnam)



Source: Authors' elabouration based on Duyen et al. (2021)

In Bac Lieu, rice was the main source of income, and high levels of mechanization reduced the need for manual labour, resulting in men leading farming activities while women were more involved in livestock raising and off-farm work. However, in Thai Binh and Ha Tinh provinces, 16.8% and 22.6% of male household heads had migrated due to poor income from rice and harsh farming conditions, leaving women responsible for most rice-related tasks (Duyen et al., 2021). In these provinces, women often took on hazardous tasks, such as pesticide spraying, traditionally performed by men.

Beyond the gender-based division of labour, men and women in Vietnam also had distinct roles in decision-making. Rapid economic transformation and high levels of labour out-migration have shifted traditional gender roles (VUSTA, 2011). Men's and women's participation in decision-making on farm and household matters depended on several factors, such as the husband's absence, women's participation in training programs, and access to agricultural extension services and productive inputs. In Bac Lieu province, women had limited involvement in rice production decisions but played a more significant role in animal husbandry and cash investments (Duyen et al., 2021). This lower participation in rice production decisions was attributed to their limited engagement in rice farming and their reduced access to capacity-building initiatives, such as agricultural training programs. In contrast, women in Ha Tinh and Thai Binh provinces, especially in households where men had migrated, were more empowered in making decisions related to crop selection, farm management and post-harvest activities (Duyen et al., 2021).

3.2.1.1.3 Environmental sustainability in rice cultivation

3.2.1.1.3.1 Policy and legal framework to protect and restore ecosystems

According to the MNRE (2011), Vietnam had one of the most advanced policy and legal frameworks for biodiversity conservation in Southeast Asia, reflecting the government's commitment to international treaties such as the Convention on Biological Diversity (CBD), the Convention on Wetlands of International Importance (Ramsar Convention), and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The Biodiversity Action Plans (BAPs), including those from 1995 and 2007, were central to this framework, coordinating biodiversity conservation efforts from the national to the local levels. Additionally, the government implemented various strategies and plans related to biodiversity conservation and development, such as the Project for Protecting and Developing Coastal Forests to Mitigate Climate Change (2015-2020), which aimed to: i) protect 310,695 hectares of existing coastal forests; ii) plant 46,058 hectares of new forest; iii) increase the total coastal forest area to 356,753 hectares by 2020; and iv) raise forest cover from 16.9% in 2014 to 19.5% by 2020. As part of broader efforts by Vietnamese authorities to address environmental challenges while promoting economic growth, particularly in rural and ecologically sensitive regions, several provincial-level initiatives have been undertaken. One such initiative is Decision No. 2447/QD-UBND by the People's Committee of Lang Son Province, which approved the Special-use Forest Planning for the province. This decision focuses on the conservation and management of the Mau Son special-use forests, with a plan extending to 2025 and a vision toward 2030, representing a significant step towards biodiversity conservation and sustainable development (Hue et al., 2024).

Vietnam boasted significant agricultural biodiversity (MNRE, 2011). Situated within one of the Vavilov Centers of Origin for domesticated plants, the country was home to approximately 40 domestic livestock breeds. Over centuries, local crop varieties and livestock breeds were developed, often exhibiting valuable traits such as resistance to diseases and pests. More than 6,000 rice varieties and genotypes were recorded in Vietnam (MNRE, 2011). Additionally, Vietnam had a diverse range of agro-ecosystems, from upland undulating plateaus and mountainous areas in the west to a relatively narrow coastal strip where most of the rice was grown. However, population growth and the expansion of commodity markets led to the broadening of agricultural frontiers and the intensification of cultivation methods, posing serious threats to biodiversity.

In 2023, the SDG 15.5.1, corresponding to the Red List Index[19] calculated by the International Union for Conservation of Nature (IUCN), was 0.71 for Vietnam, indicating concerns about the country's treatment of biodiversity (UN, 2024). In the Mekong Delta (MKD), particularly in Dong Thap Muoi and the Long Xuyen Quadrangle, nearly all natural grasslands were converted into intensive rice cultivation (MNRE, 2011). This shift affected the habitats of several endangered species and caused the erosion of vital wild genetic resources. Intensive rice cultivation, combined with increased agrochemical use, led to a decline in beneficial birds and wild pollinators in rural and suburban areas, while also triggering pest outbreaks. Furthermore, the rapid expansion of industrial catfish and basa farming in the MKD caused organic pollution in many interconnected water ecosystems, negatively impacting natural environments and aquatic communities.

3.2.1.1.3.2 Unsustainable rice practices

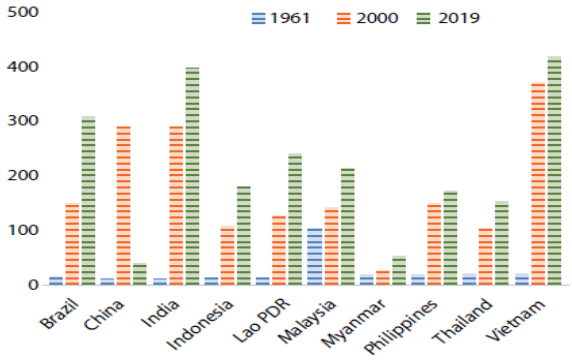
The World Bank (2022) reported that the agriculture sector was the second largest source of greenhouse gas (GHG) emissions in Vietnam, accounting for approximately 19% of total emissions in 2020. Within this sector, rice cultivation was responsible for almost 50% of the GHG emissions, highlighting its significant role.

[19] The Red List Index (RLI) measures change in aggregate extinction risk across groups of species. It is based on genuine changes in the number of species in each category of extinction risk. It is expressed as changes in an index ranging from 0 to 1: the value of 1.0 equates to all species qualifying as Least Concern (i.e.,not expected to become Extinct in the near future); an RLI value of 0 equates to all species having gone Extinct.

From 2008 to 2017, emissions from rice cultivation rose from nearly 40 million tons of CO2 equivalent (tCO2e) and were estimated to reach 44 million tCO2e by 2020 (WB, 2022). This sharp increase was potentially due to intensified rice production practices. Contributing factors included increased water usage (3,000–5,000 liters per kilogram of rice) and higher application rates of nitrogen, phosphorus, and potassium (NPK) fertilizers (approximately 400 kg per hectare), which led to greater carbon intensity in rice production in Vietnam.
Rice cultivation also accounted for over 75% of agricultural methane emissions (WB, 2022). Grown under flooded conditions, rice fields created an anaerobic environment that promoted methane production by bacteria decomposing organic matter, mainly rice straw residue (Earth Security Group, 2019). Additionally, the inefficient absorption of nitrogen-based fertilizers by rice plants, often overused by farmers, resulted in nitrous oxide emissions. Vietnam's methane emissions (0.9 tCO2e) surpassed those of China (0.8 tCO2e) and India (0.7 tCO2e) (WB, 2022).

The WB (2022) identified five main drivers of increased GHG emissions in Vietnam's rice production: a) unsustainable agricultural intensification and deforestation; b) excessive fertilizer use; c) high water use for irrigation; d) inefficient management of rice residues; and e) nonrenewable energy use in agriculture.
a) Unsustainable agricultural intensification and deforestation: Vietnam had a high level of land use intensity, with rice farmers harvesting two to three times annually. Agricultural land in the country was among the most fragmented in Southeast Asia, with over 65% of farmers working on less than 1 hectare of land (WB, 2022). Many farmers grew multiple crops per year on these small plots, leaving little to no fallow periods to restore soil fertility. The pressure to expand agricultural land led to the conversion of marginal lands previously considered unsuitable for farming, as well as increased deforestation practices among farmers (WB, 2022). Based on data from the Global Forest Watch (GFW, 2024), between 2002 and 2023, Vietnam experienced a loss of 756,000 hectares of humid primary forest, accounting for 22% of the total tree cover loss. Overall, the area of humid primary forest in Vietnam decreased by 11% in the same period (GFW, 2024).
b) Excessive fertilizer and pesticide use: the high rice yields have largely been driven by heavy use of fertilizers and pesticides, far exceeding the rates applied in other countries in the region. Fertilizer application rates in Vietnam are among the highest in East Asia, slightly surpassing those of India, with average NPK application exceeding 400 kg per hectare (WB, 2022) (Figure 9).

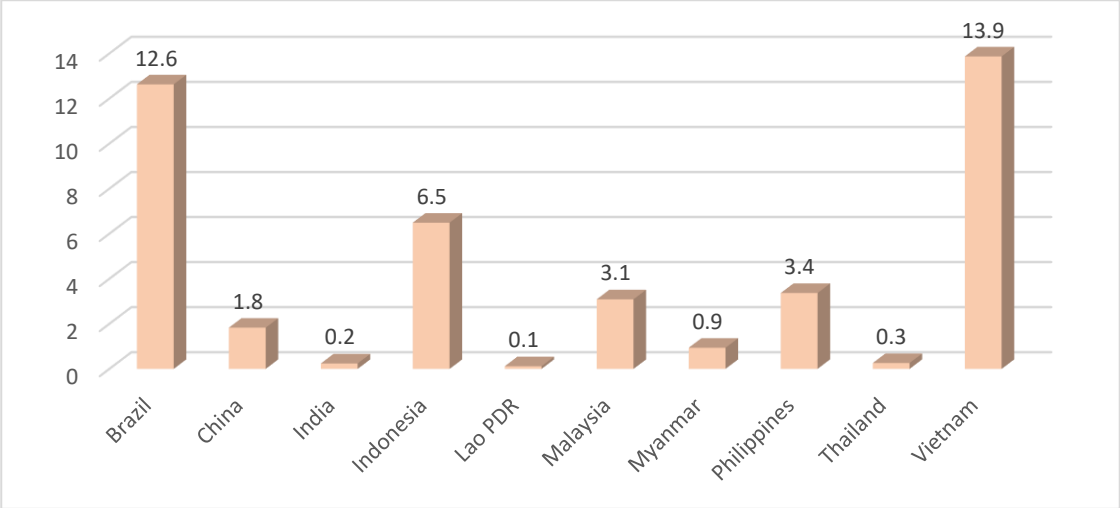
Figure 9. Average use of NPK fertilizer between 1961-2019 (kg/ha)



Source: WB (2022)

In 2022, Vietnam reported a pesticide use of 13.9 kg/ha per area of cropland, which is notably high compared to other countries, surpassing Brazil's usage of 12.6 kg/ha and significantly higher than China and Indonesia, with 1.8 kg/ha and 6.5 kg/ha, respectively (Figure 10). The high pesticide application in Vietnam may reflect the country's intensive agricultural practices aimed at maximizing crop yields but also raises concerns about potential environmental impacts and human health risks associated with pesticide exposure.

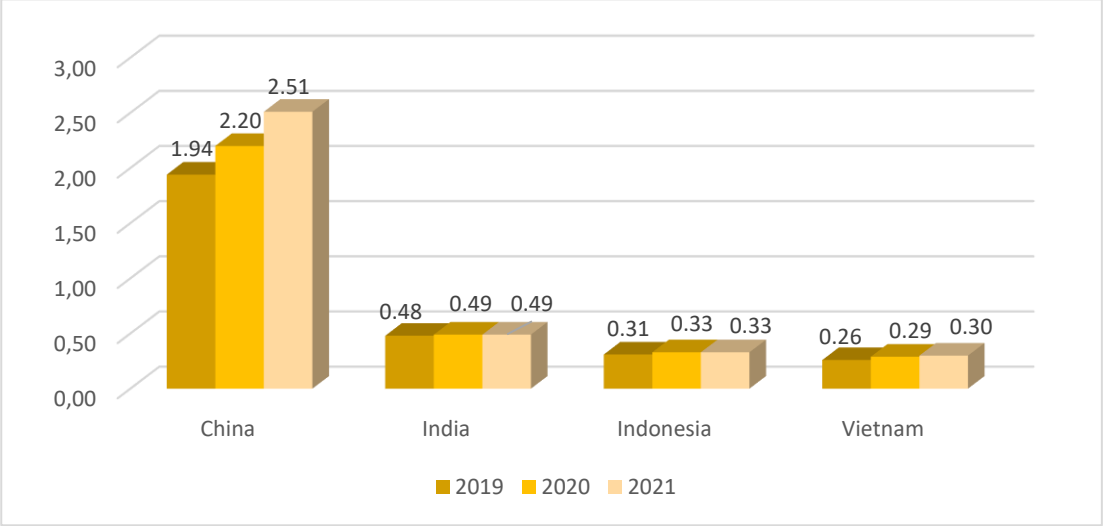
Figure 10. Pesticide use per hectare of crop land in 2022 (kg/ha)



Source: Authors' elabouration based on FAOSTAT (2024)

c) High water use for irrigation: water use for irrigation is significantly higher in Vietnam compared to other countries in the region, especially for rice production, which requires a considerable amount of water[20]. Between 2019 and 2021, Vietnam's irrigated agriculture water use efficiency showed a modest improvement, increasing from 0.26 US$/m³ in 2019 to 0.30 US$/m³ in 2021. This indicates a gradual enhancement in the economic output derived from water used in agriculture, albeit remaining significantly lower than that of neighbouring countries like China, which reached 2.51 US$/m³ in 2021 (Figure 11).

Figure 11. Water use efficiency in irrigated agriculture across selected countries (US$/m³)

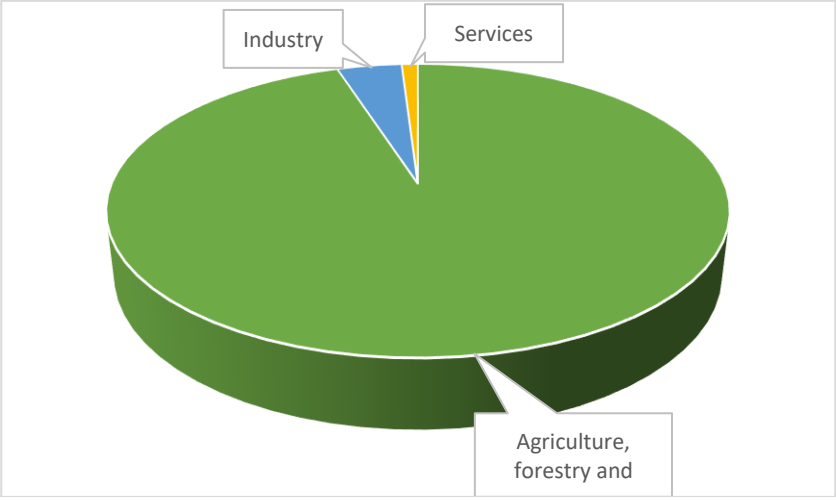


Source: Authors' elaboration based on AQUASTAT (2024)

In Vietnam, the high demand for water, coupled with decreasing freshwater availability, poses a serious challenge to the expansion of rice cultivation and the maintenance of current production levels. Moreover, government subsidies for ISF exemptions hinder efficient water use in rice farming, while increasing water demand from the industrial and service sectors further intensifies competition for water resources among sectors (Figure 12).

[20] To produce 1 kilogram of rice requires between 3,000–5,000 liters of water.

Figure 12: Share of total water withdrawal in Vietnam by sector (%)



Source: Authors' elaboration based on UN-Water (https://www.sdg6data.org/en)

d) Inefficient management of rice residues: in the MKD, up to 98% of rice residues, such as straw and husks, were burned directly in the field, as burning is the quickest method to prepare the land for the next crop season (Gadde et al. 2009). However, burning rice straw in the fields contributes to severe air pollution such as CO2 as well as releasing suspended particulate matter (PM2.5 and PM10) and toxic gases, which have harmful effects on human health (Gadde et al. 2009). Additionally, burning destroys natural habitats and reduces the organic matter in soil, which supports beneficial soil microorganisms and insects.

e) Nonrenewable energy use in agriculture: based on a study conducted by the WB (2022), energy-related emissions from agriculture in Vietnam increased significantly, rising from approximately 1.5 million tCO2e in 2000 to over 5 million tCO2e in 2018. The reliance on nonrenewable energy sources in agriculture, including rice farming, contributed to this rise in greenhouse gas emissions. The adoption of renewable energy sources, such as solar and wind, in agricultural production remains limited, especially in key phases such as planting, harvesting, weeding, seeding, and irrigation, which primarily depend on diesel, gasoline, and coal.

3.2.1.1.3.3 Sustainable rice farming methods

In alignment with the Socio-economic Development Plan (2021–2025), which aims to transform Vietnam into a green, sustainable and modern industrialized nation, several sustainable rice farming approaches have been implemented by farmers to mitigate environmental harm, reduce greenhouse gas emissions, conserve biodiversity and promote food security (MNRE, 2020, 2022). The most widespread sustainable practices in Vietnam's rice cultivation are outlined below.

One Must Do, Five Reductions (1M5R): developed by the International Rice Research Institute (IRRI), 1M5R aims to lower farmers' total input use in rice production, including seeds, fertilizers, pesticides and water (IRRI, 2024). Since its implementation in 2013, this technology package has been widely applied in the country, contributing to an increase in farmers' net income by boosting yields, reducing input costs, and minimizing post-harvest losses (WB, 2022). The 1M5R program was certified by Vietnam's Ministry of Agriculture and Rural Development and was established as a national strategy to promote best management practices in lowland rice cultivation. Its core principle is the use of high-quality or certified seeds reducing seed rates, pesticide use, fertilizer inputs, water consumption, and post-harvest losses (Tho et al., 2021). According to Tho et al. (2021), the 1M5R package has also helped farmers reduce production costs by 10%, increase rice paddy prices by 4.5% per kg, and achieve 10% higher profits compared to business-as-usual scenarios). Additionally, it showed a reduction in greenhouse gas emissions by 20–30% compared to rice conventional practices (WB, 2022).

Alternate wetting and drying (AWD): as water scarcity became a growing concern in Asia, implementing water-saving methods, including large-scale adoption of AWD, became a priority to reduce freshwater consumption in agriculture. AWD was first introduced in China and India in the 1980s and 1990s as a promising, water-saving, and economically viable alternative to conventional rice farming methods (Mushtaq et al., 2006). In the AWD method, the field is allowed to remain 'non-flooded' for a variable number of days before irrigation, ranging from 1 to more than 10 days. Overall, AWD reduced total water inputs by 25–70%, CH4 emissions by 11–95%, arsenic in rice grains by 13–90%, and mercury by 5–90%, while maintaining or even improving paddy yields by 10–20% compared to conventional methods (Ishfaq et al., 2020). Despite these benefits, farmer adoption of AWD in Vietnam remained low due to high initial investment costs, such as infrastructure and labour (WB, 2022). Additionally, large-scale adoption faced challenges as farmers experienced heavy weed growth due to changing soil water regimes and perceived the practice as a yield-reducing technique (Ishfaq et al., 2020).

System of rice intensification (SRI): SRI is an agroecological methodology designed to enhance rice production by altering the management of plants, soil, water, and nutrients (Peace Corps, 2015). On average, SRI led to a 24% increase in grain yields compared to traditional flooded rice methods in China (Zhao, Wu, Dong, & Li, 2010). Uphoff, Rafaralahy, and Rabenandrasana (2002) emphasised that SRI aimed to achieve higher productivity from land, labour, capital and water in rice production, benefiting farmers, particularly those in lower-income groups. According to HLPF (2018), in Vietnam, 29 provinces adopted SRI, covering 395,000 hectares and achieving in high yields while reducing greenhouse gas emissions. A study conducted by Tong et al. (2022) estimates that Vietnam could produce an additional 4 million tons of rice with the same water supply if 20% of its provinces adopted SRI. However, considerable debate surrounded SRI due to its increased labour demands, with the finding that labour costs for transplanting under SRI were more than double those of conventional flooded rice method (Ceesay, Reid, Fernandes and Uphoff 2006; FAO, 2016).

Integrated farming system (IFS): the practice of growing fish in rice fields has a long history in Asia, featuring diverse designs and extensive experimentation. In Vietnam, rice-fish culture has proven to be a low-investment and entry-level method suitable for resource-poor farmers (Yifan et al., 2023). IFS comprise three main components: aquaculture, agriculture and household activities (Zajdband, 2011). In this system, fish feed on organisms such as insects, rice pests, and weeds, while their foraging activity disturbs the sediment, enhancing nutrient cycling (Lua, 2021). A study by Thakur, Mohanty, Singh, and Patil (2015) demonstrated that integrating aquaculture and horticulture with SRI method enhances yields and net water productivity, providing smallholders with opportunities to increase income while improving food security. In 2012, rice-fish cultivation proved effective in Vietnam's Yen Bai Province, where about 5% of the province's rice fields (approximately 695 ha) were dedicated to IFS (Wangpakapattanawong et al., 2017). IFS offers a sustainable alternative to intensive rice monocropping, reducing environmental and health impacts on farmers and aligning with government efforts to promote more sustainable farming systems in the MKD (Berg et al., 2023). As highlighted by Lua (2021), producing high-quality products for local and national markets remains a significant challenge, particularly for poor farmer

3.2.1.1.4 Sustainability standards in the rice value chain

3.2.1.1.4.1 Sustainable certification initiatives in Vietnam

Consumers in Northern markets, such as the EU and USA, increasingly prefer products that meet standards for worker safety, environmental sustainability and health. Although several voluntary sustainable standards (VSSs) aimed at producing certified rice have been implemented in Vietnam, the market for sustainable rice remains limited and underdeveloped (Stuart et al., 2018).

We focused on the four major certifications: the Sustainable Rice Platform (SRP), Vietnamese Good Agricultural Practices (VietGAP), Global Good Agricultural Practices (GlobalGAP) and Organic.

These certification schemes aim to promote sustainable business models, enabling farmers to access better resources, technologies and market opportunities that align with the environmental and social

standards required by international markets. Moreover, they also promote value chain integration, strengthening farmers' connections and productivity while enhancing the overall sustainability and efficiency of the rice value chain in Vietnam.

Sustainable rice platform (SRP): the SRP is a global, multi-stakeholder alliance launched in 2011 by the United Nations Environment Programme (UNEP), the International Rice Research Institute (IRRI) and the German Agency for International Cooperation (GIZ) (UNEP, 2023). It was the world's first voluntary sustainability standard for rice, addressing critical issues in rice production, such as inefficient resource use, high greenhouse gas emissions and low farmer incomes. The SRP standard includes a comprehensive framework of 12 performance indicators that measure the social, environmental and economic outcomes of sustainable rice farming (Rikolto, 2024). These indicators cover areas such as productivity, profitability, greenhouse gas (GHG) emissions, biodiversity, health and safety and gender empowerment. This holistic framework allows comparisons of sustainability outcomes across different rice production systems, enabling farmers and stakeholders to adopt best practices tailored to their local conditions.
SRP also supports sustainable sourcing contracts, such as offtake agreements, and developing financial mechanisms while collaborating with the private sector (WB, 2022). For example, millers and processors can establish long-term relationships with farmers, offering stable demand and access to finance. These contracts help mitigate risks for farmers by guaranteeing a certain price for their rice, which enables them to secure loans from banks.
In 2018, Rikolto[21] piloted an integrated rice-fish farming system with 112 local farmers, primarily women and youth, in An Giang region (Rikolto, 2024). Another key player is Olam International[22], a global agribusiness collabourated with nearly 3,000 farmers to adopt SRP standards in MKD (WB, 2022). Vietnam, a major rice producer and one of the world's top exporters, has significant potential to move towards a sustainable rice sector by adopting SRP standards. However, the adoption rate in Vietnam remains low, with only 8% of farmers meeting SRP criteria (WB, 2022).

Vietnamese Good Agricultural Practices (VietGAP): VietGAP was established under Decision N. 99/2008/QD-BNN on 15/10/2008, by the Minister of Agriculture and Rural Development (QUACERT, 2024a). Its primary aim is to enhance agricultural practices in Vietnam, particularly in producing clean and safe products. VietGAP was developed in response to Vietnam's accession to the World Trade Organization (WTO) and aligns with ASEAN Good Agricultural Practices (AseanGAP) and international standards such as GlobalGAP to meet the agricultural sector's export requirements. Key areas covered by VietGAP include:
1) production and resource management (e.g., land and water management);
2) input management (e.g., responsible use of fertilizers and chemicals);
3) harvest and post-harvest practices (e.g., traceability and food safety measures);
4) labour safety and documentation (e.g., highlighting safety standards and recordkeeping).
The Vietnamese Ministry of Agriculture and Rural Development actively supports the nationwide adoption of VietGAP and is working to integrate it more closely with international standards like GlobalGAP. According to Vu et al. (2021), farmers who adopted VietGAP experienced reductions in input costs (including seeds, fertilizers, and pesticides), increased rice yields by approximately 2%, and raised farmer profits by about 28%. Furthermore, the Government of Vietnam is supporting training programs to expand certified rice production in the country (ITC, 2024). Currently, VietGAP has gained recognition primarily within Vietnam and in certain markets within the Association of Southeast Asian Nations[23] (ASEAN), such as Thailand and Malaysia.

[21] An international NGO working with farmer organisations and food chain stakeholders across Africa, Asia, Europe and Latin America.
[22] A global food and agri-business, which is member of the Better Rice Initiative Asia (BRIA).
[23] The Association of Southeast Asian Nations (ASEAN)is a regional intergovernmental organization established on August 8, 1967, comprising ten countries in Southeast Asia. The primary goals of ASEAN are to promote political and economic cooperation, regional

Global Good Agricultural Practices (GlobalGAP): It was established in 1997, GlobalGAP is one of the most widely recognized voluntary sustainable standards for agricultural products worldwide. It provides a framework that aligns agricultural practices with international standards, focusing on food safety, traceability, environmental sustainability, and worker welfare (GlobalGAP, 2024).

GlobalGAP is becoming increasingly relevant in Vietnam as it enables rice producers to meet the stringent requirements of high-value international markets. The standard covers critical areas, including:

1) Integrated pest and disease management: promoting responsible pesticide use;
2) Soil and water conservation practices: mitigating environmental impacts;
3) Worker health and safety: focusing on fair labour practices and social equity;
4) Traceability systems: ensuring transparency throughout the supply chain.

While the adoption of GlobalGAP in Vietnam remains limited compared to local standards like VietGAP, its adoption is growing, particularly among producers aiming to access premium export markets. For instance, in Kien Giang province during the 2022-2023 winter-spring season, 27,187 hectares of rice were produced adhering to standards such as SRP, organic, VietGAP and GlobalGAP, specifically targeting export markets in the EU, the United States and Japan (Vietnam Agriculture News, 2023).

The Vietnamese government and private sector are working together to integrate GlobalGAP certification into national agricultural policies. Pilot programs supported by international donors and trade partners have enabled some Vietnamese rice farmers to achieve GlobalGAP certification, facilitating their entry into higher-value global markets (QUACERT, 2024b). GlobalGAP provides farmers with access to advanced training and resources for implementing best practices. However, challenges remain due to the high costs associated with certification and compliance with social and environmental standards.

Organic: The organic rice sector in Vietnam has witnessed steady progress in recent years, driven by increasing consumer demand for safe and sustainable agricultural practices. Organic agriculture has been gaining momentum globally, with Vietnam establishing its foundation through the Vietnam Organic Agriculture Association (VOAA) in 2012 (Van et al., 2019). Since then, the certified area for organic farming has expanded, growing from 43,000 hectares in 2014 to 118,000 hectares by 2016 (Van et al., 2019).

In the MKD, Ca Mau province has emerged as a significant hub for organic rice production. The province has prioritized organic agriculture as part of its Agricultural Development Plan for 2020–2030. Specific districts like Tran Van Thoi and Thoi Binh have adopted organic rice farming systems, focusing on high-quality rice varieties such as ST24, ST25, and Jasmine (Dat et al., 2023). These varieties are carefully cultivated using organic methods, including the application of organic fertilizers, scientific irrigation, and zero chemical inputs like synthetic pesticides and fertilizers.

While the economic benefits of organic rice are evident, with higher selling prices nearly double those of conventional rice, initial productivity challenges persist during the transition phase from conventional to organic farming. Farmers often face higher production costs due to labour-intensive practices, organic certification fees, and the need for technical knowledge (Dat et al., 2023). However, profitability remains favourable in the long term due to increasing consumer willingness to pay for healthier and environmentally friendly products (Dat et al., 2023).

Government initiatives have played a crucial role in promoting organic farming. Policies such as Decree 109/2018/ND-CP provide incentives for cooperatives, small enterprises, and farmers, including funding for organic certification and technical support (Van et al., 2019). Additionally, efforts to develop domestic production of organic fertilizers aim to reduce reliance on imports and lower production costs (Van et al., 2019). Despite these advancements, challenges remain, such as

stability, and cultural exchange among its member states. The ten member countries of ASEAN are: Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam.

limited market access, insufficient technical training, and weak farmer experience with organic methods (Dat et al., 2023).

3.2.1.2 Qualitative analysis

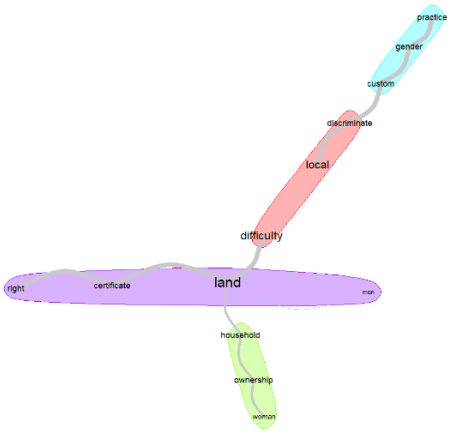
3.2.1.2.1 Farmer organizations' representatives (FOs)

A total of six stakeholders from farmer organizations and cooperatives involved in the rice value chain were interviewed for this study, with questions addressing several SDG-related topics[24]. These stakeholders held diverse roles, including agricultural officers, hamlet heads and cooperative members, with responsibilities ranging from technical to managerial aspects of rice production. They were based in Long An and Tien Giang provinces, key rice-producing areas within the MKD region. The stakeholders provided valuable insights into the challenges and opportunities associated with promoting sustainable farming practices in the rice value chain, emphasizing the importance of cooperative development, community engagement, and addressing economic barriers to adopting sustainability standards within the context of trade exchanges.

SDG 1 and SDG 5

Based on farmers' opinions, the Land-Use Rights Certificate (LURC) system has been effectively implemented in the country, with most respondents reporting no significant difficulties in accessing land. LURCs have been widely issued, and the process of obtaining or transferring them is described as straightforward, reflecting the government's strong commitment to ensuring land rights. Overall, the land system appears to function efficiently, though a few farmers mentioned issues, such as infrastructure project development (e.g., roads), which may result in reductions in the cultivated plot (Figure 13).

Figure 13: Similarity graph of rice farmers' opinions on SDG1 and SDG5



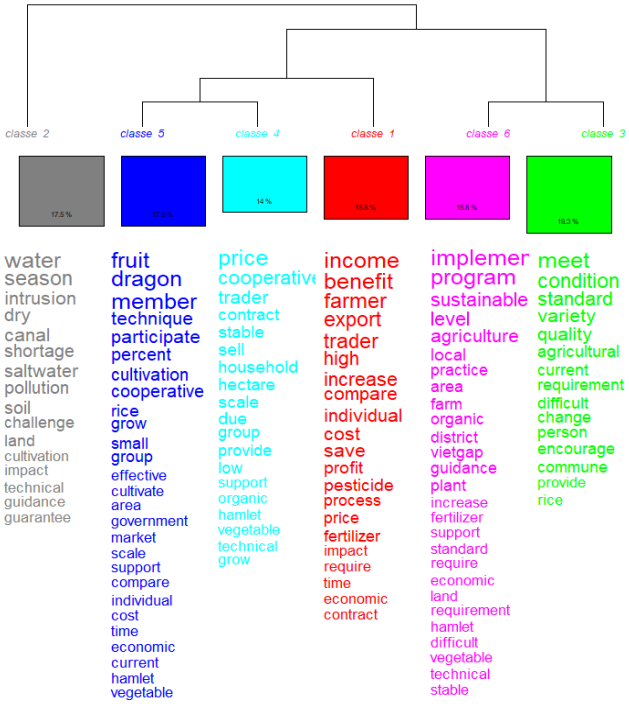
The majority of farmers interviewed confirmed that there are no practices discriminating against land rights, as Vietnamese law allows joint ownership between husbands and wives. However, cultural norms persist in the country. As a consequence, assets, including land, are often divided unequally, favouring sons over daughters. Additionally, the responses indicate that traditional roles still prevail, with men more commonly listed as heads of household and land managers, while women are often responsible for household duties (Figure 13).

[24] Detailed information about the qualitative analysis and techniques adopted is reported in the Methodology section.

SDG 2

Farmers acknowledged the potential of Voluntary Sustainability Standards (VSSs), such as GlobalGAP, to enhance productivity and meet export requirements. However, the adoption of VSSs remains limited due to high costs and the complex procedures required for implementation in the rice sector. Farmers also noted that using certified high-quality seeds is critical for increasing rice productivity and meeting the quality standards required by the EU. While high-quality seed varieties are available, many rice farmers continue to reuse seeds from previous harvests as a common practice. Similarly, organic farming methods are not widely practised in rice production. This limited adoption is primarily attributed to financial barriers, including the higher cost of organic inputs compared to conventional fertilizers and pesticides. Logistical challenges, such as the limited availability of organic inputs, insufficient access to market channels that reward sustainable practices, and inadequate training, further hinder the widespread use of sustainable methods in the rice sector (Figure 14).

Figure 14: Dendrogram of rice farmers' opinions on SDG 2



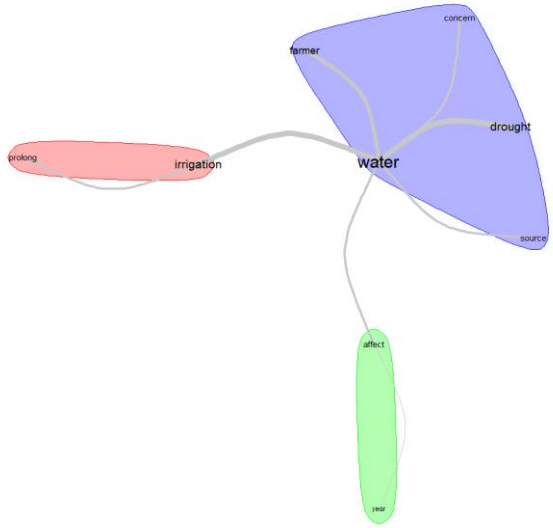
Farmers emphasised the positive role of cooperatives in facilitating knowledge sharing and improving production processes: rice producers benefit from shared cultivation techniques and collective resources, such as equipment and input supplies, which help reduce individual costs and improve farming efficiency. However, cooperatives often lack the bargaining power to negotiate fair prices with intermediaries, leaving farmers vulnerable to market price fluctuations. According to the rice producers, the expansion of trade opportunities with the EU could boost smallholders' incomes, but most of the benefits currently accrue to traders and exporters (Figure 14).

Environmental challenges such as water shortages, saltwater intrusion, and soil degradation have emerged as significant issues for farmers, particularly in the rice sector. Seasonal droughts with prolonged dry spells deplete water resources, while salinity further threatens soil fertility, especially in the Mekong Delta (MKD). In this regard, farmers highlighted the need for better technical advice and government support to improve irrigation systems and mitigate environmental risks to ensure sustained productivity (Figure 14).

SDG6

According to the farmers interviewed, water scarcity and prolonged droughts have emerged as significant concerns in the rice sector, underscoring the need for a more reliable irrigation system. Farmers noted that drought conditions, often worsened by delayed or insufficient rainfall, make it challenging to access adequate water sources during critical rice growing periods. Prolonged dry spells, coupled with saltwater intrusion in some areas, further restrict the availability of irrigation water, threatening rice yields and overall productivity. Despite local government initiatives, such as to construct canal systems for collecting water, these measures remain insufficient to fully address the severity of water shortages during drought periods (Figure 15).

Figure 15: Similarity graph of rice farmers' opinions on SDG 6

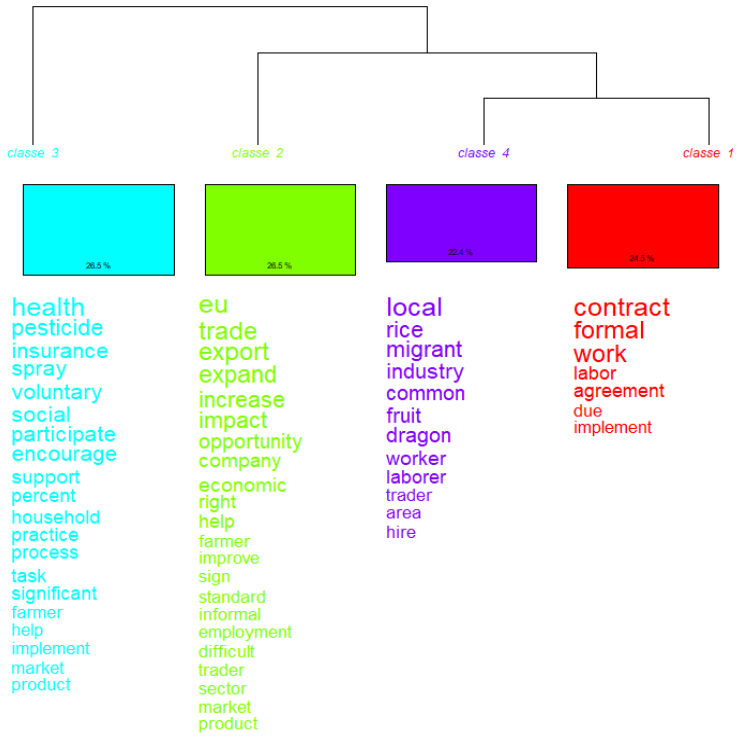


Unpredictable rainfall patterns and water availability for agricultural use were identified by farmers as key factors affecting harvests from season to season. While some farmers reported being able to adapt during normal weather conditions, extreme events such as prolonged droughts pose significant challenges for them. These conditions interfere with planting schedules, reduce irrigation capacity, and, in some cases, force farmers to abandon their fields. Finally, farmers emphasised the need to enhance water management systems and increase technical support to strengthen agricultural resilience to the effects of climate change (Figure 15).

SDG8

Trade opportunities with the EU were highlighted as having the potential to significantly boost economic opportunities for farmers and workers in the rice value-chain by providing access to higher-value markets and increasing the demand for rice. Respondents suggested that exports could improve farmers' incomes by offering better prices for their crops and encouraging the adoption of formal labour practices, particularly in meeting the stringent standards required by international markets. However, they also noted that the immediate impact of trade on informal employment in small-scale farming is limited, as larger exporting companies handle most trade activities (Figure 16).

Figure 16: Dendrogram of rice farmers' opinions on SDG 8



Farmers emphasised the importance of improving workplace safety. According to the farmers, although the Vietnamese government has encouraged participation in voluntary social and health insurance schemes, their participation remains weak. At the same time, farmers acknowledged advancements in chemical usage, primarily through the use of drones for pesticide spraying. However, challenges persist in ensuring the proper use of protective equipment when performing agricultural tasks (Figure 16).

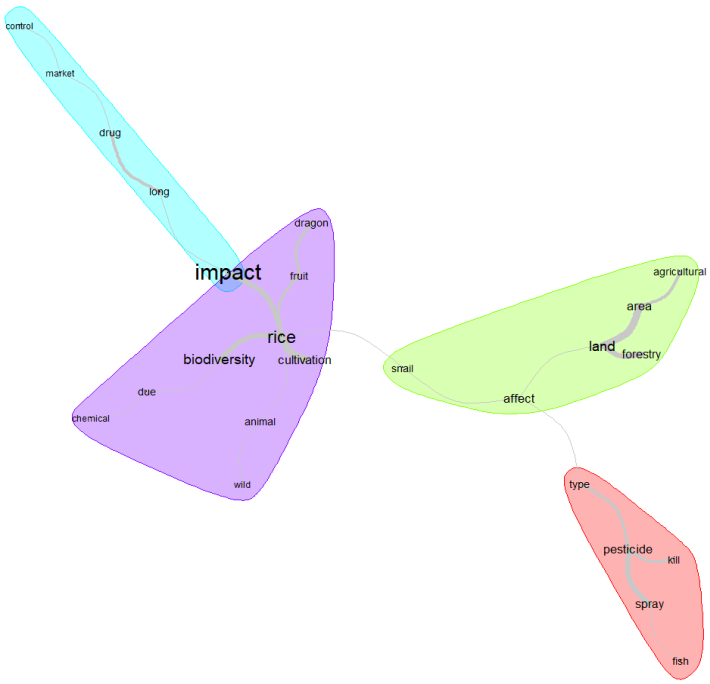
Children occasionally assist parents with light tasks, such as weeding, during weekends or school holidays, but their involvement in farming activities does not interfere with their education or well-being. Farmers emphasised that children primarily focus on their studies, with their participation in farm work being rare and entirely voluntary. Mechanization in the agricultural sector, including the use of drones and automated equipment, has significantly reduced the need for manual labour, further decreasing reliance on children for farming tasks. Additionally, according to a few farmers, improved economic conditions and greater awareness of international labour standards have contributed to discouraging child labour. The expansion of trade opportunities with the EU, which prioritizes compliance with labour regulations, is expected to further reinforce these positive trends (Figure 16).

Migrant labour was reported to play a minimal role in the rice sector, as the workforce is predominantly composed of local residents. However, when migrants are employed, their work is typically short-term, and they often face unstable incomes and limited support, including restricted access to healthcare and social insurance. Formal labour contracts remain largely uncommon in the agricultural sector, with most agreements made verbally only (Figure 16).

SDG 15

As highlighted by farmers, rice cultivation has minimal direct impact on deforestation and biodiversity in the surveyed areas (MKD), as the province was historically converted entirely to agricultural use. Respondents noted that no recent deforestation has occurred in cultivating rice (Figure 17).

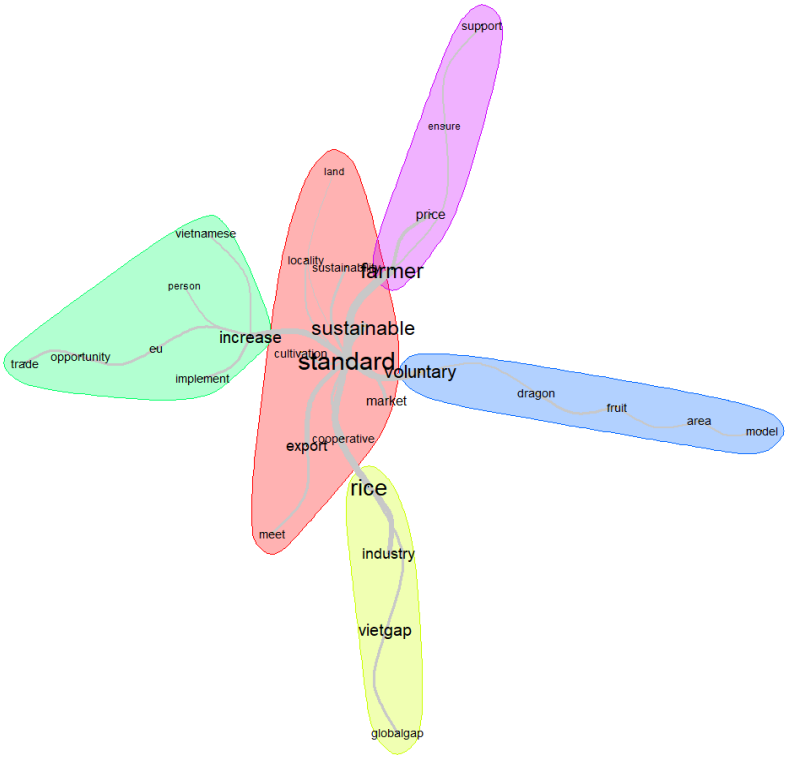
Figure 17: Similarity graph of rice farmers' opinions on SDG 15



Moreover, farmers reported that the regulated use of pesticides, guided by Vietnamese laws banning hazardous chemicals, has significantly reduced negative impacts on wildlife. Respondents also highlighted strict government controls on pesticides and fertilizers, including regular inspections to prevent the use of unregulated substances. These policy measures have helped protect natural predators and maintain rice fields as habitats for various species, such as crabs, frogs, and insects. Nonetheless, concerns persist that increased production to meet international trade demands may incentivize the overuse of regulated chemicals, potentially harming local ecosystems (e.g., grassland). While Vietnamese laws have tightened the market for hazardous agricultural products, the pressure to maximize yields could still impact aquatic and terrestrial ecosystems (Figure 17).

SDG17: The adoption of Voluntary Sustainability Standards (VSS), such as VietGAP, remains limited at the local level but is gaining momentum in Vietnam's rice industry, driven by export opportunities to high-value markets like the EU. Farmers emphasised that certification is often a prerequisite for accessing international markets, encouraging producers to shift toward sustainable farming practices. However, challenges such as fragmented landholdings and the prevalence of small-scale agricultural models hinder the widespread implementation of VSS in the rice sector. Larger cooperatives, with their capacity for collective action, cost-sharing, and improved market access, are better equipped to adopt and promote these standards (Figure 18).

Figure 18: Similarity graph of rice farmers' opinions on SDG 17



Overall, farmers emphasised that increased trade opportunities with the EU could play a significant role in promoting the adoption of VSSs across agricultural sectors, thereby advancing sustainability in the country. The international market demand for sustainable and high-quality products has motivated the Vietnamese government and local authorities to adopt policies and implement training programs aimed at supporting VSS adoption, such as VietGAP and GlobalGAP. Furthermore, national policies have been introduced to foster the establishment of cooperatives, which can support farmers in collectively meeting export standards and fulfilling international market requirements (Figure 18).

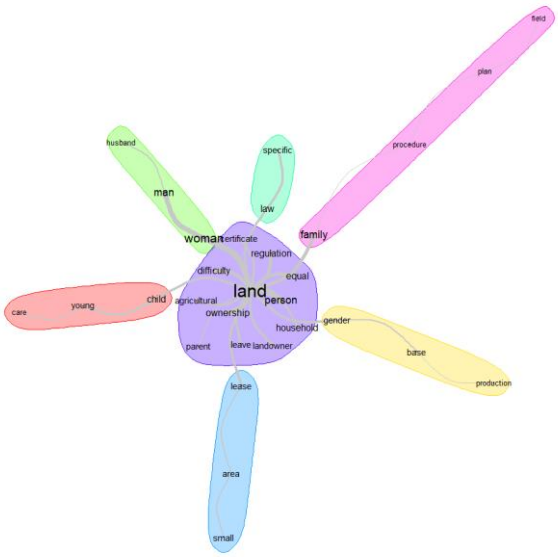
3.2.1.2.2 Policymakers Representatives (PMs)

A total of five policymakers working on the rice value chain were interviewed for this study, with questions addressing several SDG-related topics. Among them, four were male and one was female. All held senior positions, such as Head of Department or Director within government agricultural departments, underscoring their significant role in decision-making for the rice sector. These policymakers were based in Long An province, part of the Mekong Delta region, a key area for rice production in Vietnam. Their insights offered valuable perspectives on sustainability challenges, policy implementation, and strategies to maximize the benefits of trade opportunities within the rice value chain.

SDG 1

According to the interviewed policymakers, the issuance and management of Land Use Rights Certificates (LURCs) in Vietnam are critical for ensuring land ownership and promoting efficient land use. Overall, the process of acquiring and renewing LURCs is straightforward and managed by the Ministry of Natural Resources and Environment. However, administrative requirements, such as preparing legal documents, can be complex and time-consuming, particularly when converting agricultural land for other purposes, such as residential use. Additionally, leasing land has become a common practice, especially in the rice sector, when landowners are unable to cultivate their land. Despite these developments, small and fragmented landholdings remain a significant obstacle to increasing rice production, as coordinating among multiple landowners is often poor (Figure 19).

Figure 19: Similarity graph of policymakers' opinions on SDG 1



Insights from the interviewed policymakers highlight significant progress by the Vietnamese government in addressing gender disparities in land ownership. Notably, legal reforms now allow both spouses' names to be included on LURCs, marking a positive step toward promoting gender equality in land access. However, traditional norms continue to reinforce men's dominant role as family heads. While these customs do not explicitly discriminate against women, they still influence land distribution, often resulting in women inheriting less. Cultural norms and administrative barriers remain prevalent, particularly in rural areas (Figure 19).

SDG2

Policymakers highlight that the standards required for exports to the EU have significantly influenced the adoption of sustainable agricultural practices in Vietnam. They emphasised that sustainability certification systems (e.g., GlobalGAP), which mandate adherence to optimal fertilizer application, pesticide management, and traceability systems, play a crucial role in facilitating rice exports. While compliance enhances product quality and enables access to premium international markets, thereby boosting farmers' incomes, adopting these standards remains challenging, particularly for smallholder farmers. Limited financial resources and technical expertise are significant barriers to certification uptake and access to the EU market, especially for them (Figure 20).

Figure 20: Dendrogram of policymakers' opinions on SDG 2

Soil degradation and water salinization are critical environmental challenges facing Vietnam's rice sector. According to the policymakers, intensive farming practices and the excessive use of chemical fertilizers have significantly depleted soil nutrients and contributed to widespread pollution. Additionally, water salinization, particularly in coastal and delta regions of the Mekong River, poses a direct threat to rice production and productivity. To address these issues, the government is promoting sustainable practices such as crop rotation, the application of organic fertilizers and AWD techniques. While these methods enhance resource efficiency and environmental sustainability, their adoption remains limited due to high initial costs and a lack of immediate economic incentives for farmers (Figure 20).

Gender disparities persist in Vietnam's agricultural labour market, particularly in rice production. Women often engage in lighter tasks, such as weeding and trimming, while men take on more physically demanding roles, such as pesticide spraying and fertilizer application. This division of labour leads to men earning slightly higher daily wages, typically around 115,000 VND more per day[25]. Additionally, women face greater exposure to health risks than men, both directly through crop handling and indirectly when assisting men with tasks like pesticide application, often without the use of protective equipment (Figure 20).

[25] 115,000 VND corresponds to approximately 4.89 USD.

SDG5

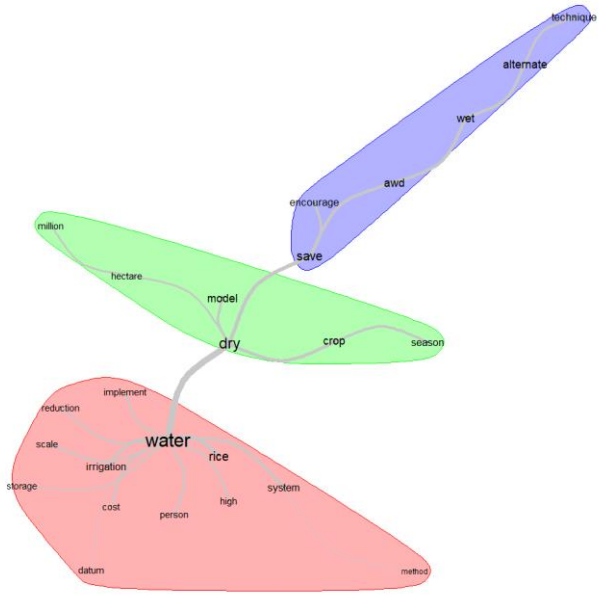
According to the respondents, the overall impact of trade on gender inequality in Vietnam's rice sector remains unclear. While most participants indicated that there are no significant challenges or barriers to gender equality in land ownership and female empowerment, other respondents attributed minor disparities to local customs and traditional practices. Overall, respondents suggested that gender equality is steadily improving in the country, with trade unlikely to have a decisive positive or negative influence on existing dynamics (Figure 21).

Figure 21: Word cloud of policymakers' opinions on SDG 5

SDG 6

According to the policymakers, rice is a highly water-intensive crop, requiring several cubic meters of water per kilogram of production, which makes it particularly vulnerable during the dry season. Water scarcity, compounded by salinity intrusion in coastal areas, significantly reduces yields and increases irrigation costs, especially in the Mekong Delta (MKD). Policymakers observed that current irrigation systems are often inefficient, and individual water storage solutions are not convenient for smallholder farmers. Instead, they identified large-scale water storage in canals and ditches as a more viable solution. To address water availability challenges, the government has promoted sustainable irrigation techniques, such as AWD. While policymakers emphasised that this method reduces water usage while maintaining productivity, its adoption remains limited due to the need for infrastructure upgrades and capacity-building initiatives for farmers (Figure 22).

Figure 22: Similarity graph of policymakers' opinions on SDG 6



Based on the insights provided by policymakers, financial support, including subsidies for water pumping costs, has been implemented through targeted government programs. However, this support primarily benefits larger-scale operations and farmer cooperatives rather than individual smallholders. Additionally, investments under these programs are directed toward redesigning irrigation channels to prevent saltwater intrusion during the dry season and enhance water storage capacity. Policymakers emphasised that while notable progress has been made in improving water management, further efforts are needed to expand the adoption of sustainable practices and strengthen resilience against the impacts of climate change (Figure 10).

SDG8

According to the policymakers, informal employment remains prevalent in Vietnam's rice sector due to the seasonal nature of farming activities and reliance on oral agreements rather than formal contracts. These challenges are deeply rooted in cultural practices, with farmers prioritizing short-term gains—such as immediate payment for their produce or wages—over the potential long-term benefits of formal labour arrangements. Furthermore, this preference is reinforced by the seasonal nature of rice farming, which depends on crop cycles, and the need for quick financial returns to meet daily living expenses. Additionally, most rice farmers operate on a small scale and are not part of larger agricultural cooperatives, which could facilitate the adoption of formal labour contracts. While the government has enacted cooperative laws to promote labour contracts and participation in social insurance schemes, their implementation remains limited across the country (Figure 23).

Figure 23: Dendrogram of policymakers' opinions on SDG 8

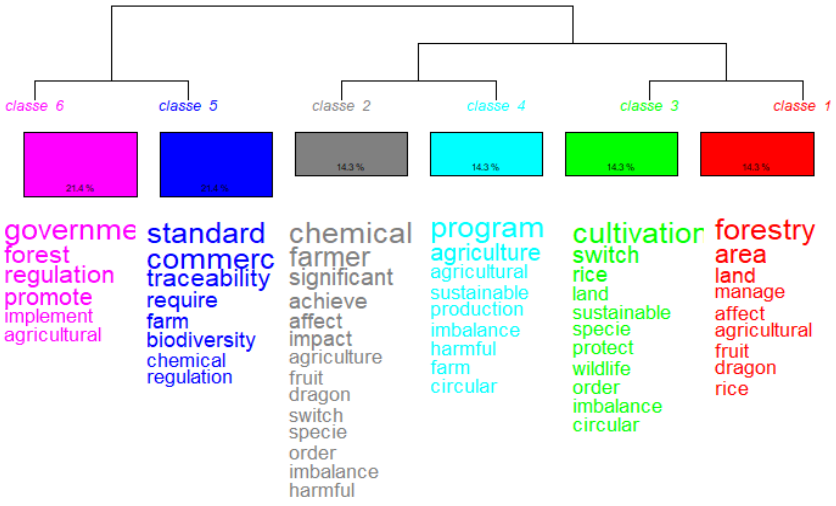
Overall, work safety in rice cultivation remains a significant challenge. According to the policymakers, farmers frequently face health risks due to insufficient use of protective equipment when handling pesticides and fertilizers. While the government has introduced campaigns to raise awareness about work safety, their implementation and adoption have been inconsistent, particularly among seasonal labourers hired during peak planting and harvesting periods. These workers often lack formal agreements and access to safety training, leaving them more vulnerable to accidents and health risks associated with hazardous chemical use. At local level, the Long An province is currently implementing a groundbreaking program with the application of high technology in agriculture. At the local level, Long An province is currently implementing a pioneering program focused on high-tech applications in agriculture. This includes support for equipment such as drones, organic applications, and biological products, which have the potential to reduce injuries and health-related issues among farmers (Figure 23).

Policymakers emphasised that child labour involvement in rice production is minimal and typically limited to children assisting their families during school holidays. In line with international commitments, Vietnam's laws prohibit child labour. However, enforcement of these laws remains inconsistent across the country. International trade standards, as well as sustainability certifications, such as GlobalGAP, have been identified as potential tools to address this issue by mandating strict adherence to labour regulations as a prerequisite for export eligibility in the EU market (Figure 23).

SDG15

According to the policymakers, rice cultivation in Vietnam generally adheres to established agricultural and forestry land-use plans, limiting direct impacts on forested areas. However, in some provinces, such as Long An, smallholder farmers have converted Melaleuca plantations to rice fields when rice prices are high. Policymakers acknowledged significant difficulties in consistently enforcing land-use regulations across the country, particularly when economic pressures drive farmers to prioritize immediate financial benefits over environmental compliance. These challenges are further exacerbated by fluctuating market conditions (e.g., price changes), which often prompt smallholder farmers to convert forest or marginal lands into agricultural use despite existing legal restrictions (Figure 24).

Figure 24: Dendrogram of policymakers' opinions on SDG 15.



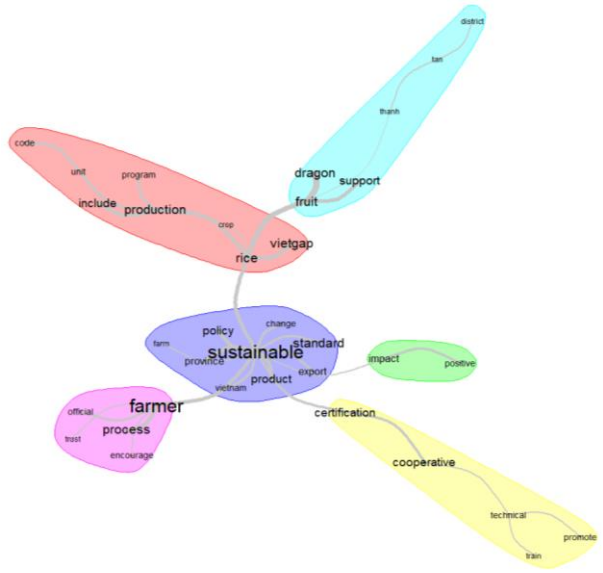
Policymakers emphasised that conventional rice farming, particularly the intensive use of chemical fertilizers and pesticides, significantly impacts biodiversity. Chemical runoff harms species living in irrigation canals and disrupts aquatic ecosystems within rice fields. While programs promoting environmentally friendly practices, such as Integrated Pest Management (IPM), organic farming, and precision agriculture, are being implemented, their adoption remains low due to economic constraints and limited enforcement of Vietnamese regulations. Specific challenges include insufficient monitoring of chemical use, weak penalties for non-compliance, and inadequate support for farmers transitioning to sustainable practices (Figure 24).

Sustainability standards, such as GlobalGAP, have been identified by the interviewed policymakers as key tools for promoting environmental sustainability in the rice sector. These standards emphasise traceability, prohibit the use of hazardous chemicals, and encourage biodiversity-friendly practices. Additionally, sustainable agricultural approaches promoted by the government, such as integrated rice-fish farming, are gaining attention for their dual benefits of enhancing productivity and promoting biodiversity at the farm level. Policymakers further highlighted that adopting certifications, alongside other sustainable agricultural practices, could help mitigate environmental harm by integrating conservation measures into farming systems (Figure 24).

SDG17

According to the policymakers, Vietnam has implemented various policies to promote sustainable food systems in the rice sector, particularly through the adoption of VietGAP-certified production, which is supported by the government. These policies focus on providing technical training, such as soil and water analysis, and issuing certifications to help farmers meet sustainability criteria. In Long An province, Decision 20 has been introduced to encourage VietGAP rice cultivation. Cooperative development is regarded as central to these efforts, with 81 rice cooperatives established in the Thap Muoi Plain area of Long An province to facilitate the adoption of sustainable practices and foster collaboration among smallholder farmers. These policies also aim to enhance traceability and compliance with sustainability standards, which are critical for accessing export markets. However, as policymakers noted, a significant barrier remains the minimal price differential between VietGAP-certified and conventional rice, often only 100–200 VND per kilogram. This low price premium discourages many farmers from transitioning to certified production despite its potential to reduce environmental harm (Figure 25).

Figure 25: Similarity graph of rice farmers' opinions on SDG 17



Policymakers identified VietGAP and GlobalGAP as key tools for promoting environmental sustainability in rice farming. According to the policymakers, the Vietnamese government also supports initiatives such as Protected Designation of Origin (PDO) to safeguard the geographical identity of rice varieties and ensure adherence to quality standards. Policymakers emphasised the importance of VSSs and PDOs in benefiting not only producers but also consumers who demand safer and healthier products. While sustainability standards and geographical indication systems present opportunities to enhance environmental outcomes, such as biodiversity conservation, policymakers acknowledged that significant challenges persist. For example, the minimal price premium differential between conventional and certified rice remains a major barrier to broader adoption. Aligning these standards with economic incentives is essential to delivering tangible benefits and ensuring the long-term sustainability of the rice sector (Figure 25).

3.2.2 Tea value chain

3.2.2.1 Literature review

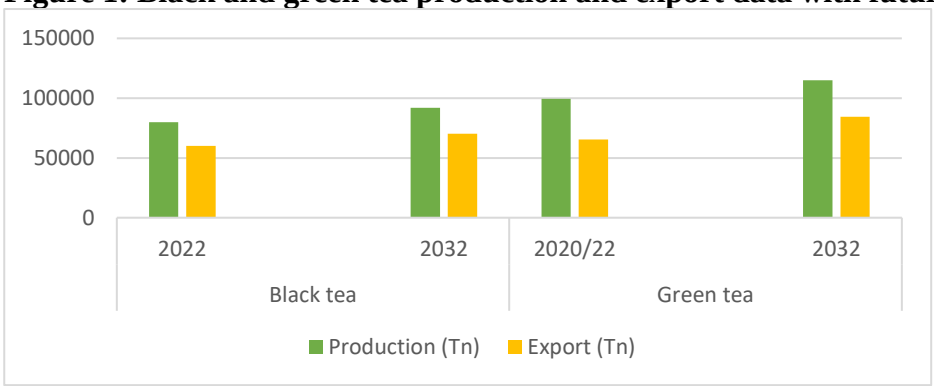
3.2.2.1.1 Tea production and trade: opportunities and challenges

Being one of the oldest drinks consumed in the world, tea is one of the long-standing cultivated crops in Vietnam. Playing a pivotal role in its domestic socioeconomic development and representing a source of income especially for rural smallholders' farmers, who almost totally own its production, tea makes Vietnam one of the top current and projected leading exporters of this commodity at the global level (FAO, 2022; Le et al., 2023; Le et al., 2021; Van Der Wal, 2008; Caro, 2020).

This good is widened produced across the country, with some outstanding provinces that are remarkable for quantity and quality in the northern and midland areas, whose names have also become actual tea brands (Nguyen et al., 2020a; Le et al., 2021; Van Der Wal, 2008; Vu et al., 2020). According to FAOSTAT (2024), tea leaves yield per hectare in 2022 was 9952.8 kg, steadily growing over the years (i.e. in 2015, it was estimated to be 8597 kg/ha; in 2020, 9715.3 kg/ha).

Indeed, starting from the 90s, a significant increase in terms of land used for growing tea crops as well as tea productivity has been registered (Nguyen et al. 2020a; Caro, 2020) and, as shown in Figure 1, recent data and projections confirm Vietnam's expected increase in production and export, with a growth rate of respectively 0.9% and 2.5% for black tea and 1.5% and 2.6% for green tea.

Figure 1: Black and green tea production and export data with future projections



Source: Authors' elabouration from FAO (2024).

Compared to 2022, 2023 was a more difficult year for Vietnamese tea exports, mainly due to market restrictions applied in import countries and a weak market demand. A down in both volume and value of almost 17% and 11% respectively, has been reported in 2024 by the Vietnamese Chamber of Commerce and Industry (VCCI) with a consequent average export price estimated to increase by 7.3%. In mid-august 2024, preliminary annual statistics for exported Vietnamese products report tea having reached 83,580 exported tons for a value of 145,410,665 USD, with Pakistan, Taiwan and China as major import destinations (Ministry of Finance of Vietnam, 2024a and 2024b).

The 2023 slowdown is also confirmed by data from ITC, with an exception for product 090230, as visible in Table 1. In analysing the trend, it should be noted that data for 2023 are provisional.

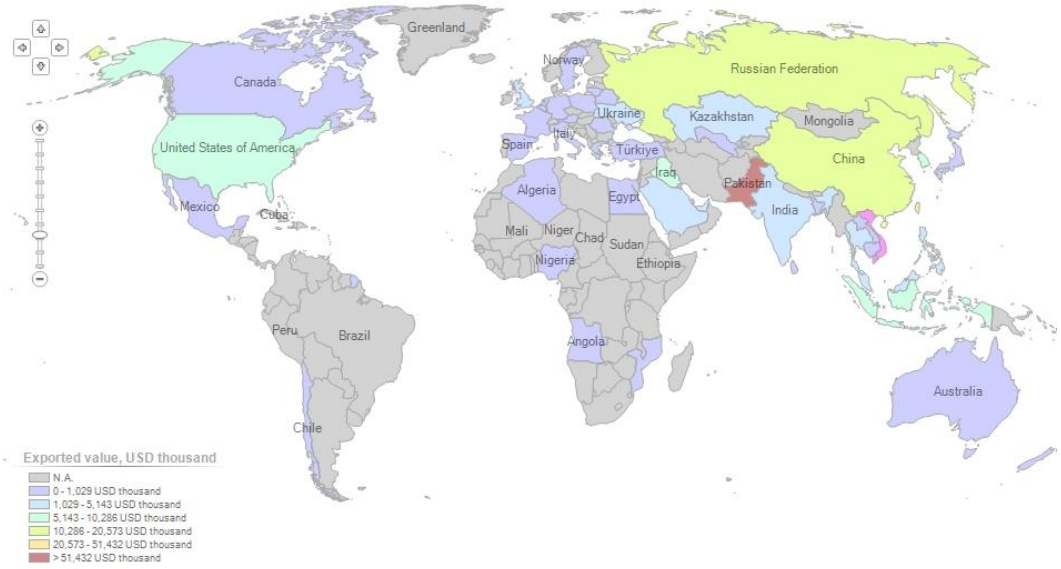
Table 1: Vietnamese exports to the world for the period 2019-2023 for the product 0902 "Tea, whether or not flavoured" and subcategories (Value: USD, thousand)

	2019	2020	2021	2022	2023
0902 (tea, whether or not flavoured)	230,740	198,926	204,127	223,087	85,625
090220 (green tea >3 kg)	135,173	107,654	116,469	131,774	33,042
090240 (Black partly and fermented tea > 3 kg)	94,274	89,601	85,114	83,279	47,444
090210 (Green tea <= 3 kg)	353	516	1,174	6,891	2,620
090230 (Black partly and fermented tea <= 3 kg)	940	1,155	1,370	1,144	2,412

Source: own elabouration from ITC data (2024)

Vietnamese tea (0902) main importing partners in 2022 reflect the current outlook described above, with Pakistan, Taipei and China as major markets as visible in Figure 2.

Figure 2: Importing countries for the product "0902 Tea, whether or not flavoured" from Vietnam in 2022, considering the product exported value (USD thousand)



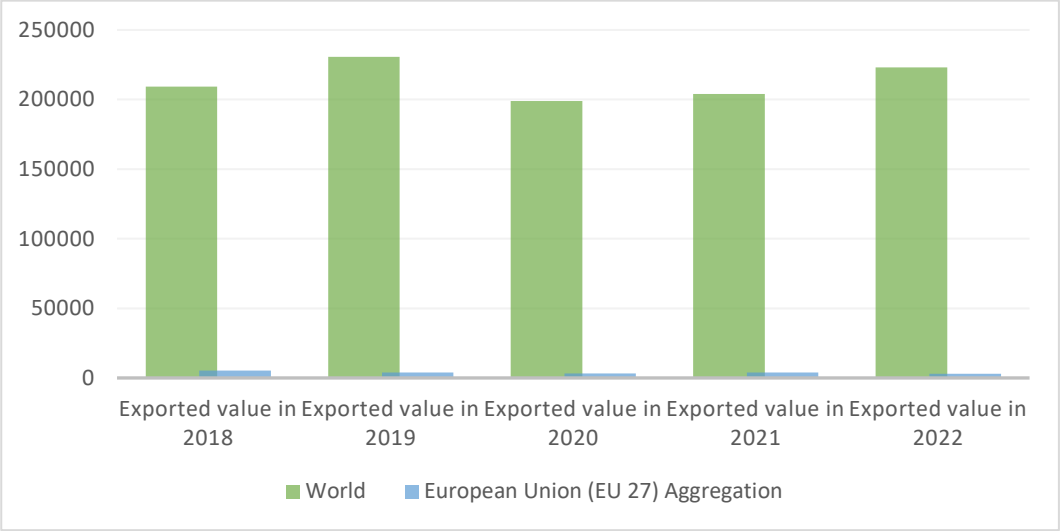
Source: ITC, 2024

In relation to the European market, the EU-Vietnamese trade relations are regulated by a Free Trade Agreement (EVFTA) entered into force in August 2020, after approximately ten years of negotiations. The EVFTA deals with a variety of issues, including, among others, the elimination of tariff and non-tariff measures, market access for trade in goods, sustainable development promotion and attention to labour difficulties, commitments for trade liberalisation in services, support to Vietnamese main global value chains (Oger, 2023; Ngo & Nguyen, 2022). Trade relations between the two parties have been successful not only because of the implementation of the agreement, but also for the general economic development the country has undertaken in recent years. For the period 2019-2023, the product category "coffee, tea, cocoa and spices" is ranked first among the fifteen most imported agri-food goods in the EU from Vietnam. The country ranks 12th in the list of agri-food import partners in the EU in 2023, with a value of more than 3 billion euros, of which the category represents 56%, namely more than 1.7 billion euros (DG AGRI, 2024).

Studies analysing EVFTA impacts at local level, especially concerning Vietnamese exports, show that agricultural products have been positively affected and the agreement seems have increased both import and export volumes of these goods (Trang et al., 2023; Oger, 2023). However, Nguyen et al. (2020b) point out that EVFTA opportunities could bring also negative shifts to agricultural products management, with risks related to price competition in the internal market. In addition, Trang et al., (2023) report the need for Vietnamese businesses to focus on innovation to avoid being left behind. The local agricultural industry is, indeed, small and still challenged by a series of technical and environmental issues which burden the gain opportunities brought by the EVFTA in terms of exports promotion. Similarly, Hoang & Ngan (2021), studying the possible effects of the agreement on Vietnamese agricultural exports to the EU, suggests a continuous improvement in terms of process and product quality, allowing domestic business to meet international agricultural exports standards. Offering a suitable framework to boost quality products import within the EU, the agreement includes the recognition and protection of many Vietnamese geographical indications (GIs), among which the tea of Mộc Châu, one of the key tea-producing area in the northern part of the country (EEAS, 2019). Tea is traded abroad mainly through state enterprises, joint ventures or foreign businesses, and private businesses, with the private sector becoming increasingly dominant (Nguyen at al., 2020a; Nguyen et al., 2015). To be underlined is that most of tea exports are currently sold as raw material, this means that the added value for tea exporters remains low, despite the product is sold in numerous countries worldwide (VCCI, 2024).

According to the VCCI (2024), although the registered export drop of 2023, the local tea industry has an important market potential to be exploited, which need to be supported by a series of measures concerning product safety and quality, technology and sustainable cultivation methods, marketing and product diversification. Concerning the EU, because of its dependence on tea imports from outside its borders and thanks to the EVFTA in place, it should be considered a market to significantly focus on. In fact, tea is among those products which should take advantage of the agreements' effects on rates, even if data about exports to the EU are not yet the intended ones. Non-tariff measures (NTMs), as well as Sanitary and Phytosanitary measures (SPS) and technical barriers to trade (TBT) are among the main challenges identified by the VCCI (2024) for agricultural products, tea included. This is also evident from a study recently conducted by Vu et al., (2024), which reports that the European severe obligations on SPSs, TBTs, and other trade measures represent severe obstacles to the fruition of the preferential tariffs to which Vietnam is entitled. The negative impact of TBT on Vietnam's tea exports is also underlined by Nguyen et al. (2021), who stress how the measures imposed by developed countries impact more than those of developing countries, which in fact remain among the main importers in traditional markets with low requirements (Van Ho et al., 2019). This trend is also confirmed by ITC data on Vietnamese tea trade with the EU: in 2022, the exported value to the EU represented only 1.3% of the global tea exports, keeping a decreasing course with previous years as visible in figure 3.

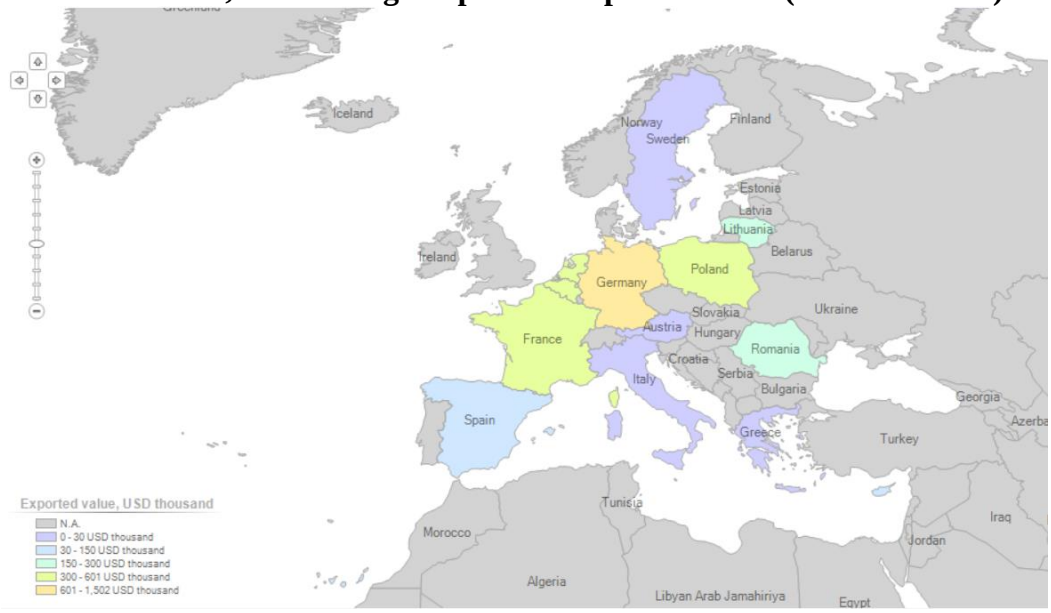
Figure 3: Comparison between Vietnamese exports to the world and the EU (27) for the period 2018-2022 for the product 0902 "Tea, whether or not flavoured" (Value: USD, thousand)



Source: own elabouration from ITC data (2024)

Taking the year 2022 as a reference and focusing on trade within the EU, data show us that only a few countries are importers of Vietnamese tea, most notably Germany, the Netherlands and France, as visible in Figure 4.

Figure 4: Importing EU countries for the product "0902 Tea, whether or not flavoured" from Vietnam in 2022, considering the product exported value (USD thousand)



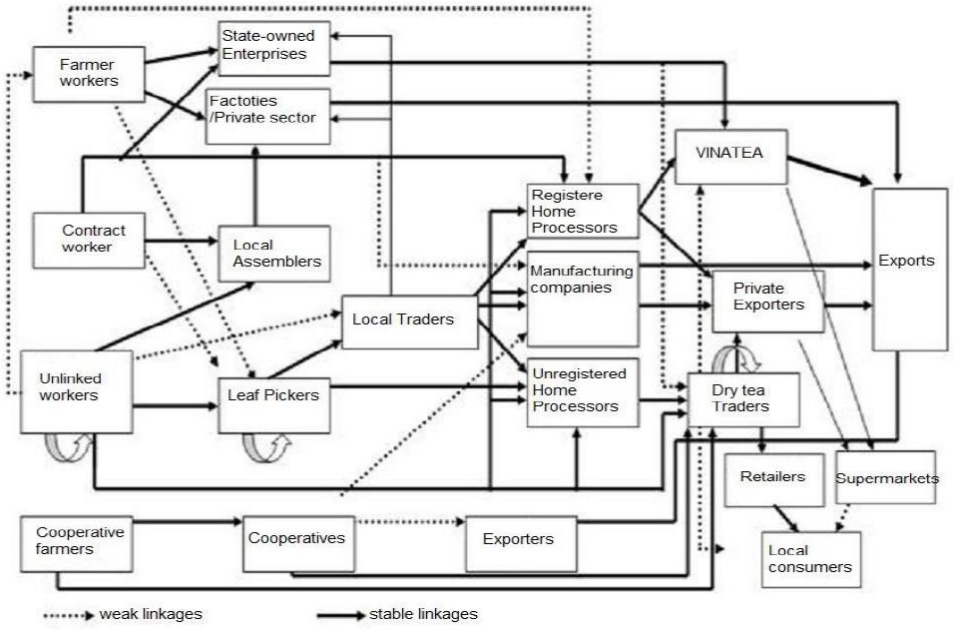
Source: ITC 2024

Within this context, evidence from local stakeholders reported in literature show a low interest from farmers in investing in tea value chain, due to a list of several factors covering all the three sustainability issues. These include poor quality and efficiency of the overall sector, resulting in prices decline and falling exports earnings, but also external environmental factors related to weather conditions affecting soils health and crops' quantity and quality, which are also threatened by a careless use of chemical fertilizers (FAO, 2024; Bermudez 2024). As reported by Bui and Nguyen (2021), this latter aspect is also evident in farmers' hesitation in implementing organic tea production methods, despite the suitable environmental conditions in specific areas and the national and

international support given by government and organizations on this direction. Confirming this trend, also Le et al. (2019) report evidence from the second-biggest tea producer province in the country, Thai Nguyen, which is also known as the most active site for the development of tea certifications in Vietnam (Tran & Goto, 2019). Despite being strategic for the local productivity, tea industry undergoes challenges related mainly to farming practices and production processed, which are not yet fully regulated and, instead, still follow mainly a knowledge-based approach with unrestricted use of phytosanitary products, hindering production's sustainability and threatening the compliance with global standards in terms of food safety. It is worth remembering that in this province, tea provides livelihoods for almost half of rural residents and nearly the totality of tea production is intended for domestic consumers.

Even though involving only three main activities, thus production of leaves, processing of dry tea and selling of it, the Vietnamese tea value chain has a series of complex relationships among stakeholders, as specifically reported by Nguyen et al. (2015) in Figure 5. Each kind of actors involved is here classified into various groups. For example, four types of producers animate the supply chain, starting from the left above of the figure: worker farmers, contract farmers, unlinked farmers, and cooperative farmers. Also processors and retailers are differentiated into various profiles, as visible in the scheme below. Interesting to be noted is the nature of the the linkages undergoing among all of them, which make clear the dynamics and issues that the tea supply chain experiences.

Figure 5: Vietnamese tea value chain and stakeholders' interactions



Source: Nguyen et al, 2015.

3.2.2.1.3 Tea economic sustainability: implications and prospects

Delving deeper into the economic dimension, as previously mentioned, Vietnam has witnessed an important economic growth in the last decades, mainly due to the wide reforms' commitment started in the 80s, which has allowed Vietnamese economy also to strongly face socioeconomic shocks, for example during the pandemic period (OECD, 2023). This transformation has allowed the country to evolve from a poor to a middle-income status by 2019, with exports capacity going from 10% to 101% of GDP and a continuous promising ability to be ranked among the main growing countries worldwide by 2026 (Oger, 2023).

In this context, also the tea value chain has known a series of transformations in terms of increased production areas and tea productivity, playing an important double role: a strategic commodity used for domestic rural livelihood and one of the most important cropped plants exported for economic development.
Despite its strategic role, some internal and external economic dimensions issues affect at the core the supply chain both at domestic and foreign level. Among them, we can cite small scale production with an average of 0.2 ha/household, price fluctuations or unstable markets, not well-standardized farming practices still linked to the use of polluting pesticides and relying mainly on old varieties of tea with low productivity, high international food safety standards, or again insufficient post-harvesting technology and lack of marketing promotion, but also outdated product processing technologies with the greater part of the amount of exported tea sold as raw material. All this contributes to exacerbate the local tea production and management systems, threatening the market power of both tea farmers and processors (Le et al., 2021; Nguyen et al., 2020; Nguyen et al., 2015; Le, 2018; Thuy & Anh, 2021; Le et al., 2019; PSAV, 2024).

Moreover, Caro (2020) raises the issue of tea supply chain's wages, which seems to be unable to keep pace with the country's wage growth. In fact, average salaries in the sector run well behind the average wages of both the country as a whole and those in agriculture, with an average monthly salary for employees of around $96. Also, an estimation of the company size distribution is presented for the sector, which brings out a very poor portion of workers classified as employees (2,4%), with the greater part being own-account workers. The same study reports bigger companies being linked to higher salaries, productivity, and skilled jobs. In this sense, as underlined by Bermudez et al., (2024), another benefit of larger farms is the facilitated possibility to access certifications, which imply investments and technology not easily affordable for small rural producers, who generally have a lower bargaining power both when selling their commodity and when buying inputs.

The different economic issues affecting the tea sector threaten a fair, inclusive and sustainable growth for all. At the same time, some of the already existing practices such as the creation of cooperatives or the adoption of sustainability standards, the spreading of contracting farming, but also the implementation of specific development projects promoted by international organizations with the active participation of local businesses, farmers and civil society can be considered as working in the right direction to boost, among others, smallholders' farmers income. In this sense, it is worth emphasizing the role of associations in progressing small farmers' conditions.
They are identified as key economic promoter in Vietnamese tea value chain, helping members in increasing their income and productivity, but also encouraging export and boosting the domestic trade activity, creating synergies and cooperation with institutional, civil and international bodies. A mix of governmental, civil society and private promoted associations are present in the tea industry and reported by Vu et al. (2020) as promoters of producers' technical, technological and economic support, key players in providing a more equitable allocation of benefits among their stakeholders. Studying the determinants of households' income, the same authors underline that the positive impact of association membership is statistically evident. Being part of a cooperative seems also affect positively tea production in terms of technical efficiency, with better results for members compared to non-associated producers. Tea cooperatives are also known as key players in helping farmers increasing their income through a series of capacity-building actions ranging from technical and machinery capability, marketing and financial knowledge, relations with other chains' actors and training on various topic, among which planting techniques or correct use of pesticide (Nguyen & Yabe, 2015).

In terms of certifications, sustainability certification standards are reported by Tran & Goto (2019) as allowing smallholder green tea farmers to obtain a higher selling price with an improved net farm income, despite some raising costs occurring in terms of hired workforce in their businesses, due

mainly to the specific needs in the harvesting and processing phases. Certification reported as being majorly adopted are UTZ, a famous mark following strict international standards, and the Vietnamese Good Agricultural Practices (VietGAP), a voluntary standard package promoted by the national Ministry of Agriculture and Rural Development since 2008, which concerns different agricultural commodities, tea included. A study conducted by Van Ho et al. (2019) in northern Vietnam on profit efficiency of tea production practices in the area, demonstrated that farmers applying VietGAP succeeded in having greater yields and profits compared with conventional tea producers. However, despite a wide promotion done with a shared commitment by the government and various NGOs, its coverage remains very low (Tran & Goto, 2020).

Some interesting projects conducted by international bodies in cooperation with local business, organizations and government can be cited as working for securing the global sustainability of the tea value chain and the economic wellness of small holder tea farmers in different areas of Vietnam. An example is the successful completed project guided by Rikolto and Rainforest Alliance[26] on sustainable management of tea landscapes, which allowed farmers to reduce the amount of chemicals used in tea leaves production, improving their quality, and increasing their prices, creating an income increase of about 30% for targeted farmers in three provinces (Rikolto, 2018). Another evidence could be the Partnership for Sustainable Agriculture in Vietnam (PSAV) which brings together public, private and financial bodies with civil society and farmers groups to boost smallholder farmers' market position and increase their productivity and profits. The 2021 report of PSAV' task force on tea reported an increase of 10% in farmers net income with around 14.800 farmers having obtained the Rainforest Alliance certification and more than 6.400 having received training.

3.2.2.1.3 Tea production's environmental issues and coping strategies

Deepening the environmental dimension, as already suggested from the information reported so far, impacts of tea industry in terms of environment are considerable, especially for the copious use of pesticides that has always characterized the conventional tea production which, of course, negatively affect the wider environment in terms of water pollution, soil biodiversity, product quality and, consequently, consumers' health (Wan der Val, 2008; Le et al., 2023; Le et al., 2021; Le et al., 2019). The main reasons behind the immoderate use of chemicals and inappropriate production techniques are attributed to lack or low level of farmers education in some remote areas, weather and ground conditions especially in the north of the country, rising production costs and lower productivity, prompt availability of conventional pesticides in remote market areas at cheaper prices (Nguyen et al. 2018; Le et al., 2019; Le et al, 2021).
According to data reported from the Vietnamese Ministry of Finance (2024c), by September 2024 the volume of fertilizers imported (Urea, NPK, Diammonium phosphate (DAP), Ammonium sulphate (SA), potassic fertilizers) reached more than 3.5 million tons, for a value of more than 1 billion USD, confirming the diffusion of the traditional approach despite the existing efforts put in place to increase and sustainably evolve the tea value chain.

Vietnamese agricultural sector, the second largest GHG contributor in the country (WB, 2022), is also consistently affected by climate change transformations in different ways, threatening all the food value chain steps (UNDP, 2024) and with forecasted harmful effects in the short and long run (Ahn et al. 2023).
Climate change is a pivotal player in exacerbating also tea cultivations worldwide, as their optimal growth depend heavily on weather conditions (Han et al., 2018). In fact, a factor plaguing tea

[26] Rikolto is an international NGO with decades of experience working with farmers organisations and food actors across the globe. Rainforest Alliance is an international non-profit organization dealing with the sustainability and responsibility of businesses while working to protect ecosystems and communities, promote human rights, improve farmers and rural communities' livelihoods, and adapt to climate change.

production in Vietnam which is worsened by climate change is water scarcity, with a water demand predicted to strongly increase in the country by 2100. Small-scale irrigation schemes are implemented then to support farmers, who are reported being inefficient in these terms probably because of the improper price mechanism on irrigation water, demonstrating that bettering their water management capacity can save an important percentage of irrigation water without compromising the final production (Hong & Yabe, 2017).

These implications resulted in the need for a paradigm shift in terms of management practices allowing to reach better socio-economic and environmental conditions as well as product efficiency and quality. It is indeed crucial to underline that tea cultivation methods have been object of transformation in recent years, with many examples cited in literature in terms of transition from conventional to alternative agroecological practices, among which organic agriculture and agroforestry, but also from a governmental perspective, with specific policies implementation and quality standards promotion.

For instance, Le et al. (2023) report the results of a study conducted in Northern Vietnam in recent years on tea agroecological production effects, underlying the increased sustainability in both economic and environmental terms for the agroecological targeted farmers, with increased incomes and bettered soil biological parameters, despite lower tea yields compared to conventional ones. According to data reported by the Southeast Asian Network for Agroforestry (SEANAFE) in 2008, tea has been included in different agroforestry practical models in Vietnam, with positive results in terms of productivity and trade opportunities in some areas. The tea plantations being intercropped and close to forested land also positively influenced the disposal of pesticides reduces, which is another important element contributing to sustainability achievement.

The VietGAP standards, as previously mentioned, have strongly been promoted by the national government with policies in support of tea growers, but farmers applying it are still few, with a rate of less than 10% (Sik et al., 2023; Nguyen at al., 2024). Yet, according to a study of Van Ho et al. (2019) farmers applying VietGAP standards have higher profit efficiency compared to conventional tea producers albeit incurring higher costs per ha, they also make a wider use of organic fertilizers justified by lower prices and they have a broader knowledge and understanding about their sustainable effects for both farm products and environment. This is also underlined by Nguyen et al. (2024) who report that tea growers under VietGAP become more familiar with the standard process after at least two years, developing a clear understanding of detrimental effects that conventional methods produce at product, community, and environmental level. This social responsibility also makes them able to maintain their production under the VietGAP tea instead of returning to conventional methods, as often happens.

As widely reported by Le et al. (2021), agroecology in tea farming generates a series of benefits in relation to the environmental dimension. Among these, we can cite the reduced soil erosion and soil's water retention capacity that recover the constant challenge of soil erosion typical of most tea plantations in Vietnam due to the mountainous location in which they grow. Also, physical and chemical properties of soils benefit from these practices, thanks both to specific crop management types and utilization of organic fertilizers. This of course is reflected in the quality of the final product, which can be sold at higher prices in the market to a broader and attentive consumer audience.

Being aware of these critical issues and feasible solutions to enhance tea supply chains' sustainability and, more generally, that of the agricultural sector, Vietnam's central government as well as association and organizations have been engaged in policy development and project interventions with various national and international stakeholders. Their activities in these terms can be directly linked with SDGs 8 and 15, concerning the promotion of productive and inclusive growth and the

protection and restoration of ecosystems. We can cite the "*Accelerating Private Sector Engagement in Climate-Resilient and Low-Emission Investment Opportunities in Viet Nam's NDC 2019-2023*" a recent project launched and implemented by the Ministry of Agriculture and Rural Development (MARD) and UNDP in response to climate change challenges faced by the agricultural sector, focused on the capacity of agricultural companies and cooperatives to accelerate the Vietnamese path to achieve Nationally Determined Contributions (NDC)[27] goals (UNDP, 2024).
As already mentioned, the MARD is also responsible for the development and sharing of VietGAP, accompanied by a series of specific policies in support of its implementation in the different agrifood sectors covered. Other kinds of GAPs are implemented in Vietnam, promoted by international organizations and involving key national products, tea included, such as GlobalGAP, UTZ and Rainforest (Anh et al., 2019). Delving into organic farming, some important associative examples working to boost it at national level are the Organic Agriculture Association (VOAA) and the Vietnam Organic Specialty Tea Alliance (VOSTEA). The latter was created within VOAA in 2020, gathering producers of organic specialty tea from the major Vietnamese productive regions, paying particular attention in the inclusion of cooperatives and enhancing quality certifications procurement (Nguyen & Tran, 2022; VOAA, 2024; VOSTEA, 2024). As latest example, a private-public partnership called the tea program and led by IDH (Sustainable Trade Initiative) worked on responsible agrochemical farming and management practices with positive results in terms of tea yields responsibly produced and farmers' training on certifications and innovative model for agrochemical spraying (IDH, 2018).

3.2.2.1.4 Social benefits and controversies of the tea value chain

Being the three sustainability dimensions interdependent, the above mentioned economic and environmental threats also cross the social sphere, especially in terms of production methods' quality and their effects on health and farmers' quality of life (IDH, 2018). At the same time, tea has been fundamental for livelihoods and market opportunities of rural smallholders' farmers in remote regions, offering remarkable development opportunities, providing employment to more than one million people and embodying a solid cultural role as traditional daily beverage (Caro, 2020; Le et al., 2021).

Sustainability's social dimension of Vietnamese tea sector has been investigated by many authors and organizations, covering aspects such as understanding of the composition of the value chain and the role of the different actors, gender issues, labour and wages, level of education of stakeholders involved in the sector, among others. The different activities producing and valuing tea involve a range of actors who have been listed in literature considering specific case studies in regional or provincial tea production sites. Input suppliers, different types of farmers (i.e. own-account, contract farmers, cooperative farmers, etc.), collectors, processors, wholesalers, retailers, consumers, associations, finance and political institutions are identified among the main players contributing to production and domestic and foreign tea trade (Wan der Val, 2008; Nguyet, 2015; Chinh et al., 2021).

Social positive effects are underlined if some types of agricultural practices are adopted, when a cooperative system is joined or whether a certification system is implemented. Indeed, we can cite the social implications of agroecological systems leading to positive effects in terms of producer and consumer health, generating specific jobs and increasing producer income (Nguyen et al, 2018; Le et al., 2023). Also, the benefits of being an associated farmer in socioeconomic terms can be considered vectors for poverty alleviation, with easier access to financial and technical support that generally

[27] NDCs are goals established in each country having signed the Paris Agreement, which concern climate change response through their implementation.

improves the lives of members in the community (Vu et al, 2020). Similar effects occur when sustainable certification schemes are applied (Tran & Goto, 2019).

An interesting social feature of Vietnamese tea sector is the prevalence of women. As pointed out by Caro (2020), up to 60% of women are employed in tea industry, without distinction between being employees or own-account workers. This trend reflects the one reported by FAO (2019) for the agricultural sector, where women are employed for the majority in small farms producing subsistence crops, while also facing the burden of a series of limits traditionally imposed. In fact, women's work in plantations is often categorized as family help, without being paid. Gender inequalities characterizing the sector as well as food and nutrition security achievement can be found in women limited possibility to access resources like land, finance, training, labour and extension services. The monthly gender gap reported by Caro (2020) is 37,5%, without making distinction of worker types (i.e. employed or own-account). General tea workers' educational level results being higher compared to other Asian countries like India and Indonesia, with almost 60% of farmers owning secondary education.

In terms of child labour, according to surveys from ILO and the Vietnamese Ministry of Labour (2020) undertaken in 2018, more than 1.7 million children participate in economic activities across the country, among whom the majority (more than 1 million) is engaged in child labour. Despite this data, it is worth remembering that Vietnam is one of the ratifying countries of ILO Convention 182 on "*The Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labour"* and joined also the Convention 138 concerning *"Minimum Age for Admission to Employment"*. According to the U.S. Department of Labour (2024), some documents report children aged 5 to 17 involved in tea cultivation. A national survey of 2012 then published in 2014 stress that almost 6 thousand (5,933) child labourers were occupied in tea growing activities. Around 22.9% of them appeared to be under 15 years old, the Vietnamese threshold for being employed. 13.2% are 5-11 years old, 9.7% are 12-14 years old, and the majority 77.1% are aged 15-17. According to the survey, children are considered "employed" in the sector if they work an excessive number of hours per week considering their age, or if they are doing a type of work for which they are considered "*underage employees*".

A final controversial aspect concerns trade unions, as emerged from the analysis of Wan der Val (2008). In fact, any independent labour rights organizations seem exist in the country, with the Vietnam General Confederation of Labour (VGCL) as the sole national trade union centre dealing with workers' rights. As reported by Buckley (2022), in 2019 the establishment of worker organisations (WOs) became legal, a type of business-level association with a limited power compared to that of unions. This kind of reform has actually triggered a series of pressures, resulting in workers' strikes and warnings from parties involved in international agreements with specific chapter on sustainable development, like the EVFTA. Indeed, in 2023, a statement coming from the EU Domestic Advisory Group under the EVFTA urged Vietnam to ratify the ILO Convention on Freedom of Association without additional delay, while also encouraging the timely application of the Work Plan on Labour Rights and the adoption of the decree on workers' representation and collective bargaining. Tea sector related representations are reported by Wan der Val (2008) as existing under the umbrella of the Vietnamese National Union of Agricultural and Rural Development Workers. Despite their well-organized functioning in terms of social activities, some overlapping positions of power raise the question of whether these are actually working for labourers' rights.

A series of political and practical actions are put in place to achieve social sustainability targets, both in terms of government effort in meeting social needs demanded at domestic and international level, but also in terms of practical projects and initiatives that include tea stakeholders for a bottom-up achievement of a global sustainability of the sector.

The Sustainable agriculture development strategy for 2021-2030 and vision to 2050 of the Vietnamese government is an example, with a strong focus on the importance of rural people as a driver of economic and society development, a particular interest in life's quality improvement and boosting of communities' role in natural resource management, but also for the preservation and enhancement of good cultural traditions (Tran, 2021; Socialist Republic of Vietnam, 2022). International entities are embarked into projects in support of tea sector's sustainable inclusive and equal growth, among which we can cite Rikolto, Rainforest Alliance and UNEP, with programs built with and for farmers on a range of topics aiming at increasing technical and practical capabilities, while securing their livelihoods and decreasing their vulnerability (Bermudez et al, 2024). Another reference can be made to a project delivered by the NGO Care International on transforming the livelihoods of ethnic minority women farmers in the tea sector, fighting the issue of lower economic returns, previously underlined. Working on market system approaches and improving women farmers' social nets and skills while creating a fair ecosystem of public policy implementation and market services, the project allowed them to have an increased income, stronger capabilities and better access to extension and financial services (CARE International, 2020).

3.2.2.2 Qualitative analysis

3.2.2.2.1 Farmers' organizations representatives (FOs)

In the case of Tea, two stakeholders from farm organisations and cooperatives were interviewed. They are agricultural officers, hamlet heads, and cooperative members mainly based in Lam Dong Province, the southernmost mountainous province in the Central Highlands region, central Vietnam. The economy is primarily based on agriculture, with tea, coffee and vegetables being the primary agricultural products. The stakeholders shared valuable insights by emphasising gaps and challenges; they also shared ideas for opportunities to promote the sustainability of the tea value chain.

SDG1

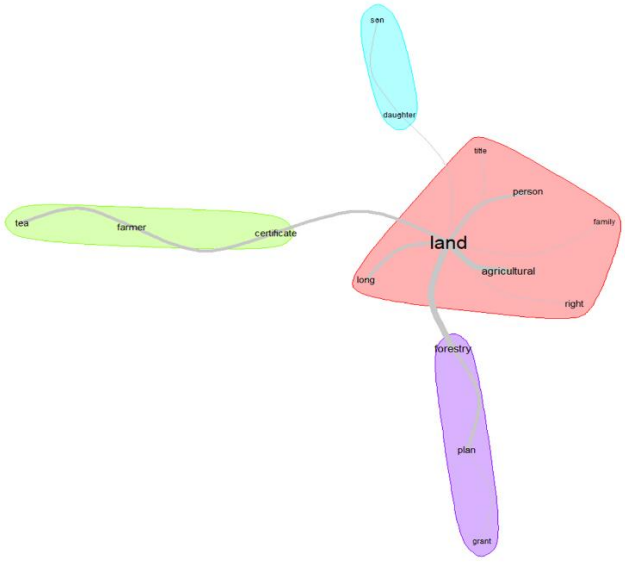
Several critical points are highlighted, ranging from the difference between residents with and without a land use certificate to granting title deeds, which often makes it difficult for farmers with titles to work together. One crucial challenge concerns farmers who farm on land intended for forestry planning and do not receive certificates. Another essential point of particular concern was the exploitation of agricultural land when there were no strict regulations on deforestation. Now, strict rules have allowed for the reduction of land use.

The system of "Land-Use Right Certificates" (LURCs) plays a relevant role in distinguishing residents based on their legal claims to land. On the one hand, some people hold a Land Use Rights Certificate (LUR), which formally recognises their land usage. On the other hand, some residents lack this important document. In the context of agricultural practices and forestry, many farmers have been cultivating land designated for forestry purposes for many years. Although not claimed by the government, this land remains without official titles, particularly in areas marked for forestry planning. Thus, many farmers find themselves in a limbo where their long-standing agricultural activities occur without formal recognition. Land titles are commonly issued in residential neighbourhoods, and land-use certificates are allocated for land leased to farms in the long term. Under these agreements, the situation is mixed: some farmers enjoy the security of tenure while others do not, creating inequalities in land ownership and use rights. When all legal measures have been taken, the government issues land-use certificates for agricultural land, providing legitimacy to farmers. However, land intended for forestry planning faces obstacles as it does not receive these crucial certificates. This can become a challenge, especially when agricultural land has been exploited for generations, and it becomes an even more important problem when regulations against

deforestation are lax or non-existent. Therefore, the absence of clear certificates and qualifications complicates the relationship and balance between agricultural development and environmental sustainability. The province is currently implementing a plan to classify forests into three types. For example, if farmers maintain stable agricultural production, they will be excluded from forest land designations.

The discussion on land ownership rights for farmers and gender discrimination revealed a mixture of traditional customs, legal equality and practical considerations regarding inheritance and land ownership. Typically, sons receive most of the land due to local customs, while daughters, particularly in wealthier families, may inherit land but usually in smaller proportions than their brothers. Notably, there is no legal distinction between men and women regarding land ownership rights. Land ownership can be registered in the name of either the husband or the wife (but only one person) for practical reasons, such as simplifying future transfers (figure 6).

Figure 6: Similarity graph of TEA farmers' opinions on SDG 1



SDG 2

In discussing SDG2, FOs highlighted several aspects. Starting from the analysis of trade opportunities, what emerges is that expanding trade opportunities with the EU would provide a significant advantage for farmers, allowing them to sell their products at higher prices and potentially boosting their incomes. However, the winners are export and production companies facilitating these products' entry into the international market. Farmers grow and collect fresh tea leaves, which they sell to merchants or larger companies. Unfortunately, their profits are often limited, as they have to cover various costs before seeing a financial gain. Additionally, farmers cannot export their tea directly; they rely on intermediaries to handle the processing of their leaves to meet the strict standards required for international export. This system favours intermediaries and companies, allowing them to reap the most significant benefits. At the same time, farmers face problems related to price volatility and market demands. As a result, although trade expansion may seem promising, it often reinforces existing imbalances, with traders and larger corporations emerging as the primary beneficiaries.

Market stability is another important issue; indeed, small tea farmers claim that market stability is a major issue. Farmers point to the close interconnectedness between their production and the presence

of a reliable market; in fact, only a few families are willing to adopt advanced technologies and techniques for growing tea. Recent market instability has exacerbated the problem, leading to substantial financial losses due to high investment costs. In addition, farmers selling tea to farms are bound by farm prices without the possibility of negotiation. They must also comply with the company's guidelines on fertilisers and pesticides, limiting their autonomy. Tea prices, ranging from 10,000 to 32,000 dong depending on the type, are controlled mainly by intermediaries, leaving farmers vulnerable and with little bargaining power.

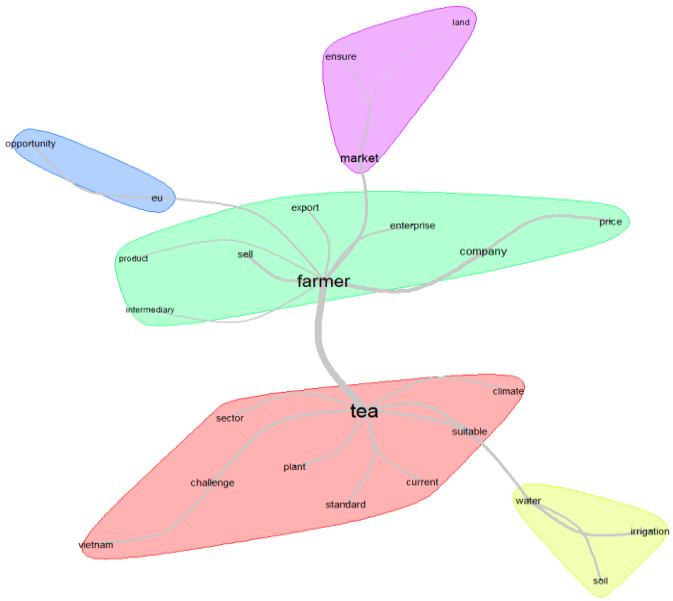
Additionally, small-scale producers are not involved in farmers' organisations as cooperatives, even though it is difficult for farmers in this province to secure markets. Some households cultivate crops independently and sell their products to traders, while others collaborate with enterprises to ensure stable market access and farmers have no authority to influence the prices set by these companies.

Farmers in Vietnam report no significant challenges related to limited genetic diversity in tea cultivation. The country has a wide range of tea varieties, which have been carefully researched and selected to be appropriate for diverse climate conditions and meet market demand. These well-adapted cultivars guarantee high productivity and quality, allowing farmers to be confident in their ability to address varying requirements without facing pest infestations, disease resilience, or quality loss. Concerning the environmental challenges, the FOs stated that the tea sector in Vietnam faces no significant water, soil, or environmental concerns. Both farmers and tea enterprises have effectively adapted to climate variability by creating large reservoirs for irrigation during dry seasons. Additionally, farmers ensure that the water sources used for irrigation are not polluted and have implemented various agricultural practices to prevent soil degradation.

The environmental conditions in the tea-growing regions are also favourable for tea cultivation. Irrigation water is sourced from wells or large lakes, with adequate reserves available during dry periods and FO stress that tea plants are well-suited for water-saving irrigation practices. No indication of water pollution exists, and land degradation is minimal due to ongoing soil improvement processes. As trade opportunities with the EU increase, farmers are encouraged to adopt approaches which help protect water resources. Furthermore, the EU's regulations regarding pesticides and fertilisers are making a positive impact on water conservation. Voluntary sustainable standards encourage farmers to adopt land improvement practices. Enhancing export opportunities to the EU market can help in preserving agricultural land (figure 7).

Finally, the FO stresses the importance of sustainable and responsible agricultural practices in the tea sector as in the case of certification. Sustainable practices promote sustainable, safe and transparent farming methods, ensuring environmental protection, worker safety and high product quality. The FO affirm and compare different systems such as VietGAP and GlobalGAP. The VietGAP (Good Agricultural Practices in Vietnam) system requires farmers to comply with procedures such as keeping accurate records, controlling the use of pesticides and chemical fertilizers, maintaining clean gardens for environmental protection, Ensure the health and safety of workers. GlobalGAP focuses mainly on reducing the consumption of chemicals and protecting the environment. It also provides safe working conditions, guarantees the origin of products and promotes sustainable management of diseases and pests. Finally, the production unit code (PUC) allows for quality management and product traceability by meticulously recording production activities (Figure 7).

Figure 7: Similarity graph of TEA farmers' opinions on SDG 2



SDG6

No challenges emerge at the current state regarding water management, water availability, changing rainfall patterns, and the quality of water resources.

SDG8

Concerning informal jobs, stakeholders highlight the informality and lack of worker protections in seasonal agricultural labour, specifically in tea-picking jobs. Small farming households and freelance workers operate without formal labour contracts, leaving workers without legal protections or benefits like insurance. Additionally, seasonal tea-picking jobs are temporary and depend on harvest schedules, leading to unsteady and unreliable employment for many, highlighting economic vulnerability. Some contrasts between freelance and formal employees emerge as well. Indeed, while company employees have official labour contracts, freelance and seasonal workers do not, creating a disparity in rights and protections. Respondents also underscore seasonal agricultural workers' challenges securing stable, legally recognised, protected employment (figure 8).

Additionally, the shift towards regulated markets, such as the EU, requires reforms to protect informal workers in the tea sector. Stakeholders stress that the effects of temporary trade expansion on informal employment in the tea industry have not yet been assessed. Moreover, challenges are related to the stricter regulatory standards that intermediary recruitment and work units must adhere to. Therefore, stakeholders emphasise the importance of addressing informal work issues to align with international trade standards and protect workers' welfare.

FOs highlighted that child labour is no longer a pressing issue within the tea sector, thanks to a series of technical, economic, and social advancements that have transformed the industry. From the interviews, it is clear that "child labour" is non-existent, and the reasons for this are multifaceted; firstly, the harvesting tasks involved in tea production require skill and technical knowledge beyond children's capability. The overall improvement in the economic conditions of farming households has played a crucial role in this positive trend. Parents can increasingly support their families through

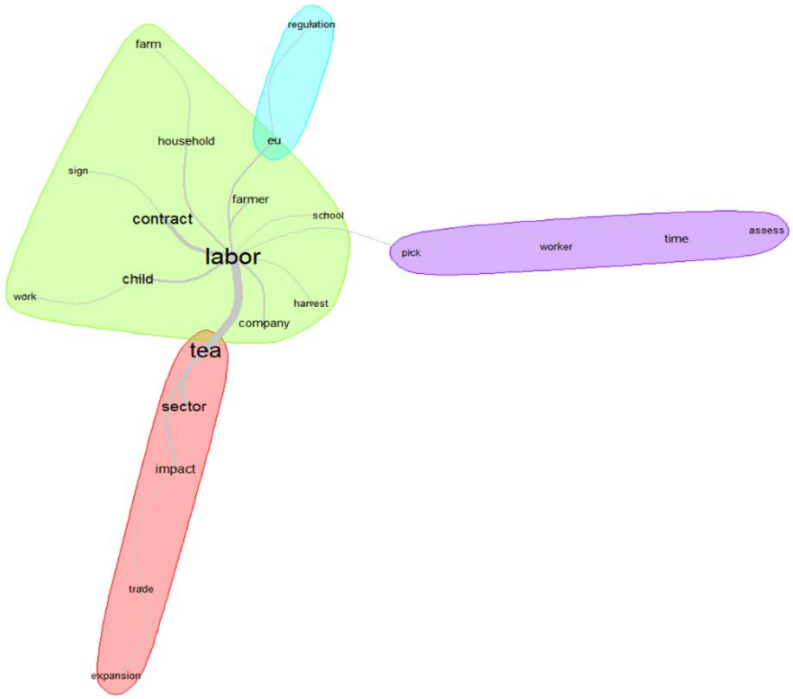
work, allowing their school-aged children to prioritise education over farm labour. As a result, children are attending school instead of working in the fields, fostering a generation that values formal education. Furthermore, there have been no reported issues related to children being employed on farms, nor any adverse effects on their educational pursuits tied to the tea industry. The expansion of trade opportunities with the EU has not affected child labour practices in the tea sector in Vietnam, as child labour is already absent, demonstrating a commitment to ethical practices within the industry (figure 8).

As noted above, most farming households operate independently and do not have formal labour contracts. Products are sold to traders, and only a few have contracts with tea companies. Contracts with household-scale farmers in the tea industry are rare and mostly found in larger farms. However, what is relevant is that trade opportunities with the EU could encourage more labour contracts, as the EU market requires such export arrangements. Consequently, exporting companies may start signing more contracts with farmers to comply with these regulations, possibly expanding signed contracts in the future.

Regarding the safety of operators in tea, the interviews show that there are no critical issues with pesticide use as pesticides are controlled and all workers wear appropriate protection. There are also specific measures that the workers are not concerned about. Moreover, harvesting the tea foliage is not particularly critical since farmers are not subjected to particular loads, and the collection and arrangement of the tea leaves take place in light packages. There is a clear safety risk for workers in the rainy season, as tea leaves can be very slippery. Workers' falls were recorded, but no serious accidents were detected.

Migrant labour is not a significant issue in the tea sector, as it primarily relies on local workers. Therefore, it is impossible to evaluate whether expanding trade with the EU would affect the conditions of migrants working in the tea industry (Figure 8).

Figure 8: Similarity graph of TEA farmers' opinions on SDG 8



SDG15

Farmers working on previously forested land struggle with the complex legal processes of securing land use rights. This situation poses significant challenges for them as they seek to formalise their claims and ensure sustainable agricultural practices. On a positive note, it is worth noting that the harmful practice of deforestation, which involves converting forested areas into agricultural land, has stopped, marking a crucial step toward environmental preservation.

Stakeholders stressed the significant role that EU standards play in combating deforestation by mandating compliance with sustainable practices and highlighting the importance of forest conservation. These standards often include various certification programmes to encourage responsible land use and supply strategies to prevent the conversion of wooded areas for other purposes. They also include stringent rules prohibiting agricultural activities' expansion into forested regions. Consequently, these trade standards are essential in fostering environmental sustainability within the tea sector. The urgency of preventing deforestation cannot be overstated, as its occurrence can jeopardise farmers' livelihoods, making it increasingly challenging for them to market and sell their products effectively.

Different opinions emerged about the role and concept of biodiversity. While the first interviewer claims that the tea sector does not affect biodiversity, the second one goes the opposite, emphasising that tea cultivation plays a crucial role in shaping the country's biodiversity. In the past, approximately 100 hectares were dedicated to ancient tea trees and high-yield plantations, each rich in unique genetic varieties that contributed to a diverse ecosystem. However, this landscape has undergone a significant transformation. In recent years, companies have acquired these traditional tea-growing areas and replaced them with cultivating higher-quality tea varieties. These new cultivars are specifically chosen for their potential in foreign markets, prioritising export quality over preserving the region's rich agricultural heritage. As a result, the shift alters local farming practices and challenges the biodiversity that once thrived in these ancient tea estates (figure 9).

Figure 9: World Cloud graph of TEA farmers' opinions on SDG 15

SDG17

The main certifications for tea cultivation are VietGAP, GlobalGAP, and Organic. Stakeholders believe that Voluntary Sustainable Standards (VSSs) can assist farmers in adopting safer and more environmentally friendly practices, which would reduce harmful substances in production. These standards also ensure the safety of both workers and consumers. Tea that complies with sustainable

standards can be sold at higher prices, increasing farmers' incomes. Therefore, the potential for expanded trade with the EU may encourage farmers to implement more sustainable practices in their cultivation and voluntarily adhere to VSSs to boost their export opportunities (figure 10).

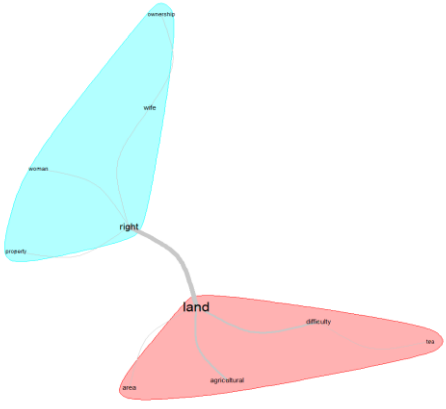
Figure 10: World Cloud graph of TEA farmers' opinions on SDG 17

3.2.2.2.2 Policymakers results' representatives (PMs)

SDG1

LURCs certificate Land Use: Policymakers' perceptions of land use in tea cultivation often reflect a general understanding of current practices but may oversimplify complexities. While tea cultivation is primarily on agricultural land, overlaps with forestry areas could occur due to unclear land boundaries, especially in regions where smallholder farmers lack formal land titles. Addressing bureaucratic hurdles in converting land for specialised uses, like greenhouses, is crucial to fostering agricultural innovation, requiring streamlined processes and support systems. Vietnam's robust legal framework ensures gender equality in property rights, yet practical barriers—such as limited education and mobility for rural women—can hinder equitable access and participation. Policymakers highlighted that the absence of gender-disaggregated statistics on land ownership is a notable gap. Therefore, collecting gender-disaggregated data and empowering women through education and administrative support can close these gaps and enhance equity in the tea industry. Broader integrated policies are also needed to address market access, sustainability, and climate resilience, ensuring long-term development for tea cultivation. Another critical point is that women in rural areas often have lower education levels than men, underscoring a crucial area for policy focus. While this may not directly affect their legal land rights, it likely limits their ability to advocate for themselves or navigate complex administrative systems. Furthermore, integrated policies are needed to tackle broader issues like market access, environmental sustainability, and climate resilience. Support from international organisations, fair pricing mechanisms, and strong governance can incentivise farmers to remain in tea cultivation and embrace sustainable, high-quality production practices.

Figure 11: Similarity graph of TEA policymakers's opinions on SDG 1



SDG2

The policymaker highlights a lack of comprehensive and specific data regarding farmer income and detailed tea production metrics. Official statistics primarily come from the General Statistics Office, and existing figures on tea cultivation are mostly estimates. Tea plantations are often intercropped with other plants, such as coffee and durian. This diversification, along with varying levels of investment and care between small-scale farmers and companies, makes it difficult to evaluate income and productivity uniformly. Coffee remains the dominant crop in Lam Dong province, with tea cultivation occupying a relatively minor area. This creates challenges in isolating tea-specific economic data, such as income or productivity trends.

Impact of Prices and Market Structures: Price fluctuations and intermediary-driven market structures indirectly influence tea income. Small-scale farmers typically sell their produce through intermediaries rather than directly to exporters, limiting their ability to benefit from value-added opportunities. This has a Limited Direct Impact on Farmers: the indirect nature of market transactions means a minimal direct impact on smallholder farmers. However, the policymaker expresses optimism about the potential for positive impacts in the future, particularly as market dynamics evolve.

Another relevant point concerns the role of intermediaries and exporters; large importers handle European orders, and farmers have limited engagement in these transactions. This system reinforces the indirect nature of the tea market's impact on farmers' incomes. However, policymakers claim that while direct benefits are limited currently, more significant positive impacts are expected in the future, possibly as market practices and investment opportunities improve.

As in the case of FOs, even for policymakers, a stabilised market is really prominent. Stable markets can significantly enhance local communities' incomes. Generally, an increase in exports is associated with positive economic growth, providing new opportunities for small-scale producers to expand their reach and profitability. However, the introduction of enhanced bilateral trade agreements can present a myriad of challenges for farmers. These agreements often impose higher standards and strict requirements that may be difficult for smaller operations to meet. As a result, many farmers may struggle to adapt to new production methods and regulatory expectations.

While the shift to high-tech and sustainable farming practices can increase farmers' incomes by increasing efficiency and market access, it also introduces some barriers. Farmers must familiarize themselves with these techniques and ensure that products comply with the evolving standards set by these trade agreements.

If the market stabilizes, it will indeed improve people's incomes. In general, increased exports have a positive impact. However, even strengthened bilateral trade agreements pose challenges for farmers. As trade agreements often include higher standards and requirements, there is a risk that farmers may have difficulties adapting to these new production methods and standards. While sustainable, high-tech agriculture can increase farmers' incomes, it challenges them to meet evolving standards and adopt new practices.

Once again, it emerges that the climate conditions for tea cultivation are pretty favourable. Tea plants have methods for conserving water, such as drip irrigation, which ensures a reliable year-round water supply. However, these methods have not been widely adopted because they don't provide immediate economic benefits.

Soil degradation is a common issue in agriculture, mainly when excessive chemical fertilisers are used. In the case of tea plants, soil degradation does occur but is not significant, as farmers typically enhance the soil each year with organic fertilisers. Nevertheless, to achieve higher productivity, many farmers still rely on chemical fertilisers, which can lead to some degree of soil degradation in tea-growing areas, though it remains minimal. Overall, the tea industry faces very few difficulties.

The core message is that the tea industry is relatively stable and well-supported by favourable environmental conditions, with manageable localised issues that do not pose significant threats.

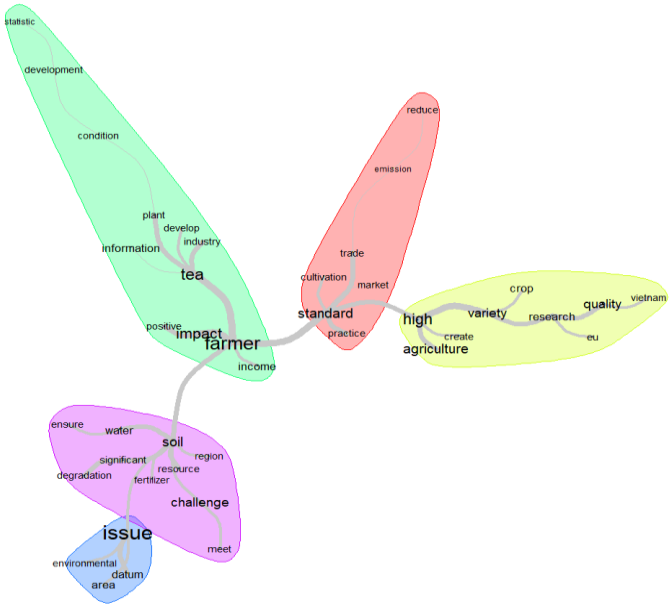
In terms of sustainable agricultural practices, the biggest challenge facing the Vietnamese tea sector currently is achieving a stable output. When farmers can maintain a consistent economic output, they will be better positioned to adopt trade standards effectively. This shift will enable the Vietnamese tea industry to transition to a sustainable cultivation model. Adhering to higher trade standards helps reduce environmental impact. For instance, new certifications, such as carbon certifications and emission reduction targets, aim for zero emissions by 2030. This creates a motivating factor for individuals to lower their emissions. Furthermore, engaging in international trade raises awareness of environmental issues. These trade standards positively impact Vietnam's water and land resources, as they require implementing cultivation practices that safeguard soil and water quality. Farmers must comply with these standards to meet the set requirements.

Policymakers pointed out that the challenges are related to two prominent categories. The first consists of high-quality tea varieties sourced from Taiwan. These teas are imported into Vietnam and are not subject to local cultivation controls, adding an air of exclusivity and distinction to this selection. In contrast, the second category encompasses a range of hybrid tea varieties meticulously developed within Vietnam, particularly in the scenic region of Lam Dong, where the “Center for Forestry and Agriculture” has spearheaded the creation of numerous innovative hybrids. These varieties are engineered to yield high quantities while preserving the rich quality tea connoisseurs' value. The seed sources for these hybrids are being carefully maintained and progressively developed, addressing vital issues related to genetic diversity and the sustainability of the crop gene pool. This ongoing effort not only enhances the resilience of tea cultivation but also fortifies the future of the industry in Vietnam. They also highlighted that the Ministry of Agriculture approved a 2020 program on developing research and production of seeds for agriculture, whose main focus is to protect high-value original seed varieties.

Concerning the issues related to Trade policy & technical assistance, PMs recognise that leveraging EU Expertise in Research and Development is essential. The EU, indeed, is recognised as a leader in research, and its expertise could play a key role in supporting the development of the tea sector. Policymakers see the potential for collaboration with the EU to meet the quality standards required for market entry. They also point out the need for technical assistance from the EU to help improve the quality of tea production, ensuring it aligns with international standards, mainly for export to EU markets. Additionally, they observe an active role of the EU in helping the tea sector by funding projects that research and develop high-yield and high-quality crop varieties suited to specific regional climates and soil conditions. Also, training programs to improve farmers’ technical skills, help them adopt new technologies, and boost productivity are relevant actions. Policymakers indicate that EU financial support could enable partner countries to conduct research and use new technologies, promoting sustainable farming practices and innovation in the tea sector. Working with the EU can lead to developing crop varieties and practices that fit local environmental conditions, encouraging long-term growth in the industry.
Exploiting local varieties is equally essential and beneficial, but guidelines are needed to ensure transparency for the benefit of both consumers and producers. The respondents accentuate that

traceability through blockchain has been implemented, allowing for no tampering and fraud reduction.

Figure 12: Similarity graph of TEA policymakers's opinions on SDG 2



SDG5

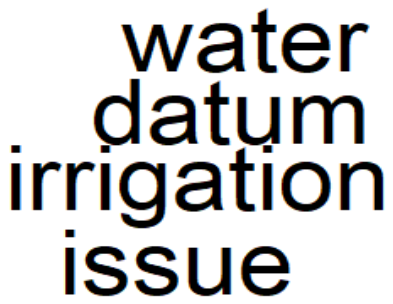
In Vietnam, property ownership laws emphasise equality between spouses. Regardless of who is listed as the property owner, both husband and wife are considered joint owners. The legal system explicitly safeguards property rights for both genders, emphasising more robustly protecting women's property rights. This demonstrates a commitment to gender equality in family and property matters, aligning with broader principles of equity. Export criteria in tea production focus on gender equality, including ensuring female workers receive insurance benefits and guaranteeing equal treatment and opportunities for female and male workers, monitoring and achieving balanced ratios of female to male staff. Based on these criteria, international trade can encourage businesses to adopt gender-equitable practices to meet export standards. In synthesis, the policy-makers believe these gender-focused export criteria positively affect gender issues. By requiring equality, they encourage systemic changes in workplace practices; however, uncertainty about the extent or nature of the broader impact of trade in reducing the gender gap emerges.

Figure 13: World Cloud graph of TEA policymakers's opinions on SDG 5

SDG 6

According to policymakers, in various training programs and hands-on technical workshops, farmers receive comprehensive guidance and encouragement to adopt water-saving irrigation practices to safeguard valuable water resources. These initiatives often feature exemplary models of efficient water-use techniques, such as tea gardens' innovative drip irrigation systems. Furthermore, the government has established targeted policies to facilitate effective irrigation planning across distinct regions, including the lush Southeast, the elevated Central Highlands, and the picturesque Central Coastal areas. However, a significant lack of specific data on forestry, which has implications for resource management, emerged. The economic inefficiencies associated with current practices resulted in no considerable encroachment of tea plants into forestry lands, thereby maintaining a stable balance between agricultural and forested areas.

Figure 14: World Cloud graph of TEA policymakers's opinions on SDG 6



SDG 8

According to the policymakers, women are the primary labour force in tea harvesting, one of the most labour-intensive tasks in the tea industry. Men typically handle heavier tasks like ploughing and planting, but the recurring nature of tea harvesting highlights women's dominant role in this process. The only exception is when machinery is used for high-yield tea harvesting, where men may also participate.

Concerning informal labour, policymakers pointed out that the tea industry strongly relies on informal labour due to the seasonal nature of work, especially during harvest periods. Companies often hire workers based on harvest output (measured in kilograms) rather than offering long-term contracts. Workers engaged in cyclical tasks like high-quality tea picking every 45 days are typically employed under verbal contracts rather than formal agreements. Contracts in agriculture, including the tea industry, are often seasonal and reflect the discontinuous nature of agricultural activities. For example, labourers may be hired only for one or two days during harvests, further entrenching informal labour practices. Therefore, seasonal labour is common and often lacks insurance coverage because such benefits are only extended to workers employed for over 12 months. This reflects the temporary and output-based hiring practices in the tea industry (figure 15).

Policymakers emphasised that about 70% of tea production units in Vietnam are small-scale farming households. While companies and cooperatives exist, legal entities in agriculture are limited, reinforcing smallholders' dominance. The head of a farming household is typically responsible for most tasks, hiring seasonal labour only for harvest periods.

Concerning national policy, policymakers declare that labour laws in Vietnam require that formal contracts be made necessary for workers engaged with a company, ensuring that both parties are protected and aware of their rights and obligations. However, these contracts are frequently not upheld in practical scenarios, particularly within family-run enterprises and seasonal agricultural work. Instead, many agreements exist solely as verbal understandings, which can lead to ambiguity and a lack of security for workers. Despite this, it remains crucial for all parties involved to adhere to labour regulations as set forth by the applicable laws.

Furthermore, since most contracts are informal, Vietnam has established comprehensive policies to strengthen cooperatives. Cooperative law plays a pivotal role in merging small farming families, allowing them to pool their capital and resources. This collaborative effort creates formal legal entities that protect informal workers' rights. Cooperative law encompasses a range of provisions about human resources, credit access, insurance options, infrastructure development, and beyond.
An interesting point raised by policymakers is the government initiative focusing on vocational training for farmers, emphasising the importance of attaining university degrees and developing a skilled workforce in the agriculture sector. This program aims to produce 'farm workers' with the high technical skills necessary for modern agricultural practices. Furthermore, specific programs are designed to empower women entrepreneurs alongside a particular fund to foster women's economic development.

Policy makers stress that the implementation of production standards such as VietGAP, GlobalGAP and organic certifications is crucial to improving the quality of tea products and promoting formal trade. However, a significant challenge stems from the disconnection between the investments needed to meet these standards and the selling prices farmers can get. While government agencies provide technical guidance and certify production inputs, they do not control export prices driven by market forces. Consequently, a risk that farmers may abandon standard-compliant practices if they fail to see a sufficient return on investment emerges.
In order to address this issue, international organisations, particularly the EU, can play a key role by committing themselves to buying certified products at fair prices, ensuring profitability for farmers. This would encourage compliance with trade rules and support the sustainability of tea cultivation. In addition, adherence to higher standards can help formalise labour practices, reduce informal work and secure workers' rights through regulated employment contracts. In a free market environment, however, farmers tend to give priority to profitability and without guaranteed premiums they can switch to other crops or less rigorous production methods.

Policymakers first point out the close connection between standards and market stability, which can have a specific influence on the incomes of tea industry farmers. While there is no immediate guarantee of increased income and expansion of production areas, compliance with sustainable standards can lead to developing high-quality tea-producing regions. This, in turn, can attract buyers and stabilise the market, with the possibility of price increases. The importance of organic farming was also stressed, as it naturally improves product quality and can attract new buyers by creating market opportunities. Therefore, improving product quality and actively exploring market prospects are essential to ensure a stable and higher income for farmers, and these trade rules can have a positive impact.

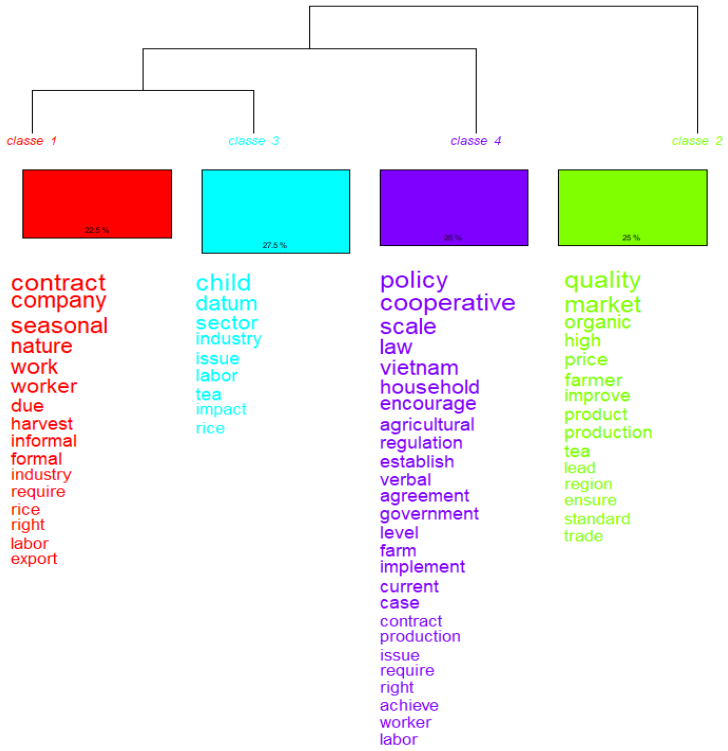
There is no significant issue with children working in tea plantations, and absenteeism from school is minimal. Cases of child labour are rare and mainly occur in northern mountainous provinces, while in the southern regions, it is virtually nonexistent.

An awareness campaign has been launched on this debated topic. Although some child labour may exist, it typically involves family activities and does not severely impact education. In the tea sector, child labour is minimal, particularly among companies operating in international markets, which adhere to strict global standards against it.
Tea harvesting requires specific skills and physical capabilities, typically found in adults. The labour-intensive process is primarily machine-operated, necessitating strength and height that children generally do not possess. There is no significant problem with children being used in tea plantations; therefore, there is no problem with absence from school. If there are cases, they are rare and insignificant and cannot be considered a widespread problem. Child labour is more common in the northern mountainous provinces, with significant challenges. In the southern regions, it is virtually non-existent (figure 15).

As regards the conditions of workers, what emerges clearly from interviews is the absence of specific data on occupational safety in the tea sector. The tea sector is perceived as less physically demanding than other industries like coffee farming, where a load of coffee can weigh 50-70 kilograms. However, in the tea sector, it is only 20 kilograms; therefore, the impact on joints is really low. Protective equipment use remains limited due to cost and ingrained habits. Although the government discourages chemical use by providing training and technical education to ensure productivity while improving quality, farmers still rely heavily on chemicals such as urea fertiliser to boost yields, especially for high-quality, high-yield tea. This practice is concerning because it compromises tea quality and could negatively impact market demand if chemical residues are detected. However, only small areas monitored by the government or companies have reduced chemical use. The policy focuses on building models within agricultural areas. Specifically, for every 100 hectares, the state budget will be allocated to create 1-2 hectare models in that region. The government encourages farmers to replicate these models rather than providing comprehensive support. The agricultural promotion centre is encouraging alternatives, but adoption has been slow. Another important point related to economic incentives and market risks is the lack of price differentiation between tea produced with and without chemicals, discouraging farmers from adopting sustainable practices. Policymakers are aware that excessive use of chemicals can lead to long-term market rejection and loss of income for farmers. The government actively promotes awareness through workshops and training programmes, which aim to reduce the use of chemicals by making farmers more aware of the risks to health, income and marketability.

There is no policy or programme to improve the conditions of migrant workers, not least because work is seasonal. Despite initiatives in some regions encouraging citizens to take out health insurance under the new rural development programme. Migrant workers often do not have permanent housing and are usually unable to rent a house and receive no insurance. As in the coffee sector, tea requires an interactive contract between the parties to ensure trade and labour migration. Stakeholders also stress the issue that policies addressing workers' rights must also consider the distinctions between local and migrant workers. Improvements in workers' rights are expected (figure 15).

Figure 15: Dendrogram graph of TEA policymaker's opinions on SDG 8



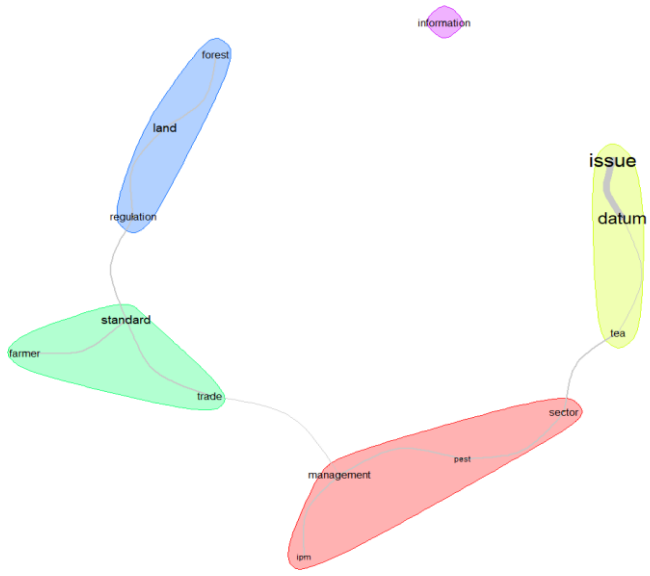
SDG15

According to the policymakers, Vietnam has established laws and regulations to safeguard forestry land and prevent deforestation, mandating that forest areas should not be reduced without severe justification, such as obtaining government approval and replanting equivalent regions elsewhere. Although these policies demonstrate a strong commitment to forest protection, violations continue to occur, and the government is actively addressing these issues. Trade opportunities, particularly in markets like the EU, could be powerful drivers for stricter adherence to forest protection standards. Many trade agreements and export requirements include criteria prohibiting forest land cultivation and aligning economic incentives with environmental sustainability. These standards promote the preservation of forest areas and encourage farmers to adopt sustainable practices, provided there is a stable and profitable market for their products. Exploiting these trade incentives could help Vietnam strengthen its forest management while improving the competitiveness of its global market.

In recent years, training programs focusing on integrated pest management (IPM) have been implemented across various agricultural sectors, extending beyond tea cultivation. Approximately five years ago, during significant growth in the tea industry, a specialised program tailored specifically for tea farmers was in place. However, the current approach has shifted to a more general framework for multiple crops. Provincial crop protection departments now play a crucial role in enforcing strict IPM strategies, ensuring farmers effectively manage pests and responsibly use chemicals. The success of trade is a vital factor in maintaining consistent agricultural production, especially in the tea sector. An increase in trade leads to enhanced profitability for farmers by meeting rigorous standards and positions the Vietnamese tea industry favourably for sustainable development.

Farmers can contribute to preserving wildlife and protecting biodiversity by adhering to these standards. Moreover, effective resource management is essential to business operations, as it fosters a healthy ecosystem and promotes positive outcomes for biodiversity within agricultural practices (figure 16).

Figure 16: Similarity graph of TEA policymaker's opinions on SDG 15

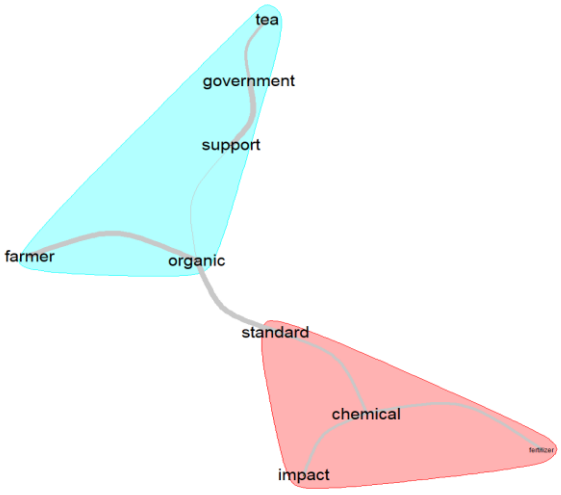


SDG 17

Policymakers emphasise the importance of providing farmers with training and technical guidance on agricultural practices that adhere to VietGAP, GlobalGAP, and organic standards. Building model systems for farmers to follow is also encouraged to facilitate the transition to more sustainable practices. They also stress that farmers are encouraged to adopt drip irrigation systems to conserve water resources and are advised to use environmentally friendly pesticides. There is also a push to reduce reliance on chemical fertilisers by promoting organic alternatives, further contributing to sustainability goals. Policymakers also underline the role of government in providing support, including certification, when farmers can meet sustainability standards. One example is Decree 98 of 2018, which offers support for linking farmers and agricultural sectors, and the government also facilitates the issuance of Geographic Indications and Production Unit Codes (PUC) for crops like tea, rice, and dragon fruit.

Another key point is the role of VietGAP, GlobalGAP, and organic certifications on health worker conditions, particularly in reducing exposure to harmful chemicals. Additionally, the implementation of sustainable farming practices improves tea quality, reduces the use of toxic chemicals, and minimises soil degradation. This enhances environmental sustainability and supports farmers' incomes by improving the marketability and value of their products. Policymakers stress the fact that adopting these standards has the potential to significantly change traditional farming practices, moving towards more sustainable and environmentally responsible methods. This shift is key to long-term agricultural sustainability (figure 17).

Figure 17: Similarity graph of TEA policymaker's opinions on SDG 17



3.2.3 Dragon Fruit value chain

3.2.3.1 Literature review

3.2.3.1.1 Production

Dragon fruit, also called pitaya or pitahaya, originates from Central and South America and has become popular globally for its high nutritional value and multiple medicinal properties (Luu *et al.*, 2020).

Dragon fruit was introduced in Vietnam in the 20th century and until the late 1980s was not grown for commercial purposes. The production on a commercial scale started by the late 1990s, accelerating in the first decade of the 21st century (Son *et al.*, 2020; Minh and Son, 2020).

Genetic improvement and technical research have led to high-quality varieties and increased productivity. Dragon fruit is considered easy to grow and climate resilient; furthermore, thanks to its year-round production capacity, recognized prices on export markets, and a high share of suitable product for export, it is a profitable product (Minh and Son, 2020). Both production and export have grown dramatically since mid-2010.

From 2017 to 2021, the fruit-growing area grew at an average rate of 6.2% per year, reaching 1.18 million hectares in 2021. Dragon fruit is the second most produced fruit after banana and before grapefruit (Phong, 2022).

In 2023, the cultivated area extends over almost 55,000 hectares [1] [9] (after having reached the record of 71,300 hectares in 2021 (ITC, 2023a)) with a production of 1,2 million tons [9], most of which is for export. The areas of greatest production are in the south-east and the Mekong River Delta (in the south-west). The three provinces concentrating cultivation, production and specialised in large-scale cultivation are: Binh Thuan (62.5% of the cultivation area), Long An (18.7%) and Tien Giang (17%) [1] [9] (Luu *et al.*, 2020; Nguyen, 2024). Other Provinces of production are Tay Ninh, Dong Nai, some Central Highlands provinces and Northern Provinces (Hien, 2019). While white-fleshed dragon fruit varieties are grown primarily in Binh Thuan, red-fleshed dragon fruit varieties are mainly grown in Long An, Tien Giang and Dong Nai [9].

The production season extends from April to October, but the largest production is obtained from May to August. However, due to technical progress – an innovative lighting technology developed

and introduced by the Southern Fruit Research Institute (SOFRI), used at night to manage flowering -off-season production is increasing so that dragon fruit production is present all year round (Hien, 2019; Son *et al.*, 2020).

Dragon fruit is characterised by densely concentrated cultivation areas without intercropping. Due to its ability to adapt to different temperatures, rainfall levels, droughts and salinity levels, dragon fruit thrives in Vietnam's diverse environment, climates and soils. This plant is easy to grow and, therefore, suits the cultivation capacity of smallholder farmers. However, its production needs a large initial investment per hectare, approximately 10-fold higher than the average income per capita in rural areas in 2017 (Son *et al.*, 2020). It has been estimated that the average initial investment when starting dragon fruit production is approximately 1/5 of the average annual sale value of the fruits (Sakata and Takanashi, 2018).

Although dragon fruit is highly resistant to drought (Luu et al., 2021), prolonged drought reduces the plant's growth and yield, as it causes the flowers to fall. Plants need water, especially during flower budding, flowering, and fruit production. The rain requirement for plants is 800 - 2000 mm/year. An excess of water, however, is poorly tolerated, leading to the loss of flowers and fruit rot [22].

Due to climate change, the Mekong Delta, the main production area of dragon fruit, has become susceptible to drought, resulting in acid sulfate soil exposure and acidification and salinity intrusion in the dry season (USDA, 2021). Dragon fruit is a moderately salt-sensitive plant. The salinity condition of the water used in irrigation negatively affects plants with effects depending on the vegetative stage and the level of salinity (Cavalcante *et al.*, 2007; Kenanoglu *et al.*, 2023; Oliveira *et al.*, 2024).

Production is dominated by the conventional plant management system, often called "Mop Top" because of the shape of the plants. In this system, the production unit is represented by 4 or 6 plants growing along a concrete post. The posts are usually placed at 2.8-3 metres from each other. When the plant reaches the top of the concrete post it produces cladodes. The production of new cladodes occurs at the top of the plant, covering the older cladodes, so the plant grows in height. As a result, a plant can have a mass of over 350 cladodes of different ages, but only a small portion of the plant, the first 20-30 outer cladodes, is productive. Vegetative growth is difficult to control, because pruning of non-productive cladodes is difficult and risky and requires a lot of labour, so the plant becomes a refuge for pests and diseases[28]. While older cladodes are redundant for production purposes, they still use nutrients and water, significantly reducing production efficiency and resulting in relatively low yields per hectare. This is because the rapid growth of dragon fruit and continuous flowering (in and off-season) requires high nutrients at every stage of growth. Therefore, nutrient deficiency is immediately reflected in the flowering and fruiting of dragon fruit. (Truc *et al.*, 2018; Campbell, 2015; Hang *et al.*, 2014). To maximise production, distances between production units are reduced, making normal plantation management operations even more difficult. Modern plantations, although with higher establishment costs, would allow for the mechanisation of production, greater ease of orchard management and reduction of labour costs while ensuring higher yields and better quality of the fruit (Truc *et al.*, 2018).

3.2.3.1.2 Trade

Vietnam is the world's largest exporter of dragon fruit. In 2023, Vietnam's fruit and vegetable export revenue reached USD 5.6 billion, up 66% from 2022, with durian overcoming dragon fruit as the most exported product [19]. The increase in fruit and vegetable export revenue continued in early

[28] For an outlook of the major pests and diseases in dragon fruit production causing losses both in the field and postharvest and management strategies developed, see Hieu et al. (2016).

2024, up 28.1% from the same period in 2023, with dragon fruit exports increasing by 4.9% and durian exports by 63.3% [20].

The most important destination market is China, which accounted for over 90% of Vietnam's dragon fruit exports in 2020 (ITC, 2023a), followed by India [2]. Due to the large share of production exported (an estimated 80% of the total dragon fruit production volume of Vietnam (Son et al., 2020)) and the prevalence of the Chinese market, the production of dragon fruit is affected by Chinese policies. In fact, from 2019 to 2022 production and exports of dragon fruit declined, mainly due to the strict border control policy implemented by China after the COVID-19 pandemic (Wen and Liu, 2024). In addition, in the last years, China has rapidly increased the area planted to dragon fruits, replacing Vietnam as the world's largest producer.

In 2021, China reached 67,000 hectares and the production 1.6 million tons, a volume below the estimated demand of Chinese dragon fruit [7] [9] (about 2 million tons yearly [3]). However, the Chinese demand for Vietnamese dragon fruit is expected to stay high for the next few years [7] (almost all of the dragon fruit consumed in China comes from Vietnam [4]) for its high quality [8]. Moreover, the growing global recognition of the health properties of dragon fruits coupled with product differentiation with increased availability of dragon fruit-based products, like juices, jams, and dried snacks [5], are conquering new markets for Vietnamese exports (the USA, Europe - UK, Germany, France [6] -, Japan [5]).

Dragon fruit is always present among exports to the top 4 destination markets for fruit and vegetables by value (China, the US, Japan, and Australia and New Zealand (Phong, 2022).
Over the latest years, the request by importing countries for quality, safe and healthy dragon fruits is increased. Vietnamese exports must comply with a complex set of technical regulations, Sanitary and Phytosanitary Measures (SPSs), voluntary standards and shipment controls. Some of these requirements are country-specific (although, not product specific) (Son *et al.*, 2020). The compliance to these requirements emerged in literature as "standards as barriers" or "standards as catalysts" (Tennent and Lockie, 2013; Sakata and Takanashi, 2018).

To be eligible for exports to certain markets the dragon fruit production and packaging need to be identified and tracked so the demand for codes of planting areas (Production Unit Code - PUC) and packing facilities code (Packing House Codes - PHC) is growing over the years [14]. The establishment and granting of plantation area code and packing facility code are mandatory requirements for export to certain markets in order to comply with food safety, phytosanitary, and traceability regulations, at the same time meeting market needs and quality stabilization [10]. The implementation of dragon fruit growing area coding allows for monitoring and controlling production, pursuing standardization of cultivation processes, disease management, tracing the origin of product as well as controlling the correct use of permitted pesticides [14]. This helps to improve quality and reputation of the product, thus increasing consumer confidence and expanding markets [10]. The granting of codes is assigned to local Sub-Departments of Crop Production - Plant Protection who receive the dossiers, carry out inspections, verifications and issue the codes. The dossiers are then transferred to the Plant Protection Department first and sent to the importing countries. After the applications are approved, they are returned to the localities for management [11].

The implementation and management of growing area code and packing facility code are difficult due to the lack of awareness of operators regarding the correct application of rules and compliance with the legislation. Therefore, the role of local authorities is important, increasingly aimed at creating product chain links among operators along the supply chain and strengthening training, monitoring and supervision of growing area codes.

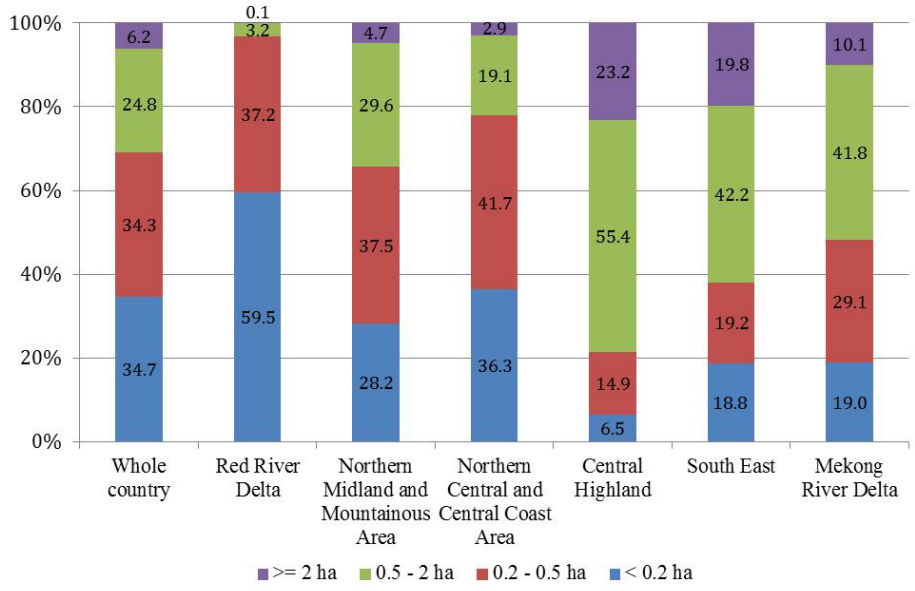
3.2.3.1.3 The standard certifications and the role of policies

Many markets of destination require compliance with Good Agricultural Practice (GAP) standards. The public GAP (as VietGAP) certification is often considered as the first step toward private certification (as GlobalGAP), since the constraints are less stringent, as highlighted by the higher number of hectares certified by VietGAP compared to those certified as GlobalGAP (see below) (Freckleton, 2022). Moreover, as public GAP programmes provide incentives for producers to adopt public GAP, the incentive for private GAP is of a market nature (Hoang, 2018).

Both development organizations and government departments (Ministry of Agriculture and Rural Development - MARD and Department of Agriculture and Rural Development - DARD) have supported smallholder farmers in upgrading production to higher quality standards. The first acted to enhance knowledge of food safety and sanitary requirement, the latter aimed to improve compliance with national and international food safety regulations. In both cases the results obtained were the fruit of the actors' ability to demonstrate the benefits of higher standards, without forcing small farmers to participate in the projects (Freckleton, 2022).

Examples of donor initiatives to support the dragon fruit industry has been supported also by some donor initiatives in developing GAP certification, as in the case of "AusAID CARD (Collabouration for Agriculture and Rural Development)" Projects. The first project aimed to develop a GAP System for dragon fruit producers and exporters in Binh Thuan and Tien Giang; the second, to extend export opportunities to small-plot dragon fruit growers through GAP. The projects have been implemented by the New Zealand Institute of Plant and Food Research Limited (Plant and Food Research, PFR) through the SOFRI. The aim of the donor support was to improve the livelihoods of Vietnam small-holder dragon fruit growers by accessing to high value export markets (EU) by achieving compliance with EUREPGAP standard. According to the 2013 Census a large portion of dragon fruit growers in Vietnam have between 0.2 and 5 hectares in production (Figure 1) (Campbell *et al.*, 2015).

Figure 1. Household proportion by agricultural land size (%)



Source: Campbell *et al.*, 2015

Taking into account the difficulties of involving small farms (complex documentation required and high compliance costs), the first project (2005-2007) developed a "Pilot Model" in collabouration with dragon fruit growers, post-harvest operators and exporters of significant size (in terms of production volume and scale of activity to make compliance and certification costs not prohibitive). A key criterion adopted to select the actors was the presence of medium and small-holder contracted

growers as suppliers. This allowed to demonstrate the financial benefits of complying with the standards required by export markets and the resulting benefits flowing to contracted growers (Campbell *et al.*, 2015). The second project (2008-2009) was a continuation of the first with the aim of enhancing the national capacity developed in the first project and expanding the scope of action to the broader dragon fruit sector and potentially other crops. In addition, the second project developed a collabouration with national authorities for the development of the VietGAP standard for Vietnamese horticulture (Campbell *et al.*, 2015)

The VietGAP certification was established in January 2008. GAP quality systems for dragon fruit involve MARD, which provides and directs policies to support local authorities in producing according to GAP standards (Hoa *et al.*, 2020a). VietGAP is based on crop-specific principles, ranging from soil management to water use, pesticide safety, postharvest management and farm record keeping. However, literature highlight as only a little share of the total area for vegetables and fruits is certified VietGAP (0.4% and 13%, respectively, in 2017) as farmer find difficult to comply and to find a market for certified products, as most consumers buy fruits and vegetables from the wet market (Asian Development Bank, 2023).

In 2015, the VietGAP/GlobalGAP certified area for dragon fruit reached 8,284 hectares (24.5% of the dragon fruit production area), and in 2019, 11,170 hectares were certified (Hoa *et al.*, 2020b; Hoa *et al.*, 2016).

Table 1. Dragon fruit producing and GAP's certificated area

Province	Cultivated area		GAP certificated area		Note
	(ha)	(%)	(ha)	(%)	
Binh Thuan	30,654.31	59.4	10,156.0	92.0	VietGAP
Long An	11,841.98	23.0	593.5	5.4	VietGAP
Tien Giang	9,070.03	17.6	294.2	2.7	VietGAP
Total	**51,566.32**	**100.0**	**11,043.7**	**100.0**	VietGAP

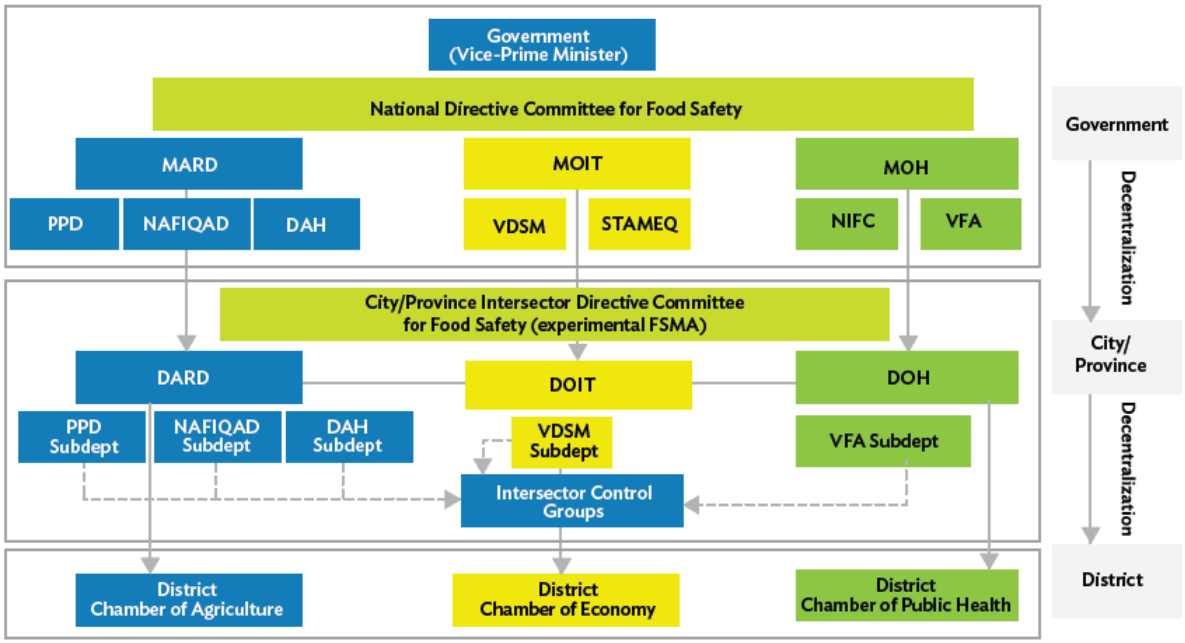
Source: Hoa *et al.*, 2020b and Authors' elabouration.

The certified product normally obtains higher prices than the non-certified one and presents greater stability even in periods of greater production. Compliance with GAP standards and the establishment of regional cultivation codes, together with greater collaboration and partnership among supply chain actors, are considered key factors to improve product quality and technology upgrading in the food industry and increase exports, responding to the stringent regulation of importing countries. This allows a repositioning of the national supply chain on international markets, although there is uncertainty about the fair distribution of these benefits between large and small producers (Tennent and Lockie, 2013). Alongside this view of "standards as catalysts", the view of "standards as barriers" has emerged in the literature, focusing on compliance costs for farmers, especially smallholders. Tennent and Lockie (2013) highlighted that smallholder farmers do not have sufficient financial resources to make the necessary changes to their farms. This makes farmers financially dependent on collectors (traditional market intermediaries) who provide financial support or advance payment for the sale of the entire crop in the pre-harvest phase. At the same time, researchers found a lack of knowledge about quality standards in production among smallholders. If individual compliance is difficult, group participation can also be costly. Not only the availability and access to capital limit participation, but also the inadequate availability of institutional and scientific capacity to support compliance activities.

Finally, the fragmentation of the control of certain aspects of food safety among ministries, department or agency of each ministry and different territorial level, is considered source of confusion

among stakeholders (Asian Development Bank, 2023). In figure 2, the Vietnam's National Food Control System is displayed.

Figure 2 - Vietnam's National Food Control System



DAH = Department of Animal Health; DARD = Department of Agriculture and Rural Development; DOH= Department of Health; DOIT = Department of Industry and Trade; FSMA = Food Safety and Modernization Act; MARD = Ministry of Agriculture and Rural Development; MOH = Ministry of Health; MOIT= Ministry of Industry and Trade; NAFIQAD = National Agro-Forestry Fisheries Quality Assurance Department; NIFC = National Institute for Food Control; PPD = Plant Protection Department; STAMEQ = Directorate for Standards, Metrology and Quality of Viet Nam; VDSM= Viet Nam Department of Survey and Mapping; VFA= Viet Nam Food Administration.

Source: Asian Development Bank, 2023.

3.2.3.1.4 Production across the major provinces

At the end of 2023, in the Binh Thuan Province there are about 27,000 hectares of dragon fruit cultivation area with an annual production of over 570,000 tons [13] [9]. However, growing area and production are decreasing, exceeding 33,700 hectares in 2020 and 2021, with a production of 650,000/700,000 tons [13] [11], and reaching 26,977 hectares by the end of 2022, with a production of more than 600,000 tons [12].

The Binh Thuan Department of Agriculture and Rural Development reports 8,503 hectares of dragon fruit cultivation area certified under the VietGAP standard. The aim of local authorities is to reach 10.500 hectares by the end of 2024 and to cover between 70% and 75% of the dragon fruit cultivation by 2030. Currently, another 400 hectares meet the GlobalGAP certificate and 30 hectares produce organic dragon fruit [15] [16]. In the Province are present 653 dragon fruit growing area codes [9], of which 596 are operational (24% of export codes each to New Zealand and Australia, 20% to South Korea, 16% to China, 14% to the US and 2% to Japan) [10].

There are approximately 325 dragon fruit packing facilities codes for export [9], of which 249 are operational, most of which (225) are for exports to China [10]. In addition, there are 13 processing facilities for the production of dried and dehydrated dragon fruit, juice, wine and dragon fruit candies, with a total processing capacity of about 37,800 tons/year [9]. Moreover, "Bình Thuận dragon fruit" gained the protection of geographical indication in the EU and Japan. The image and brand have been registered and protected by 13 countries and territories: the US, the UK, Germany, France, the Netherlands, Japan, South Korea, China, Malaysia, Indonesia, Taiwan, Singapore, and Thailand [16] [21]. In recent years, Bin Thuan Province is implementing a "green" dragon fruit value chain through

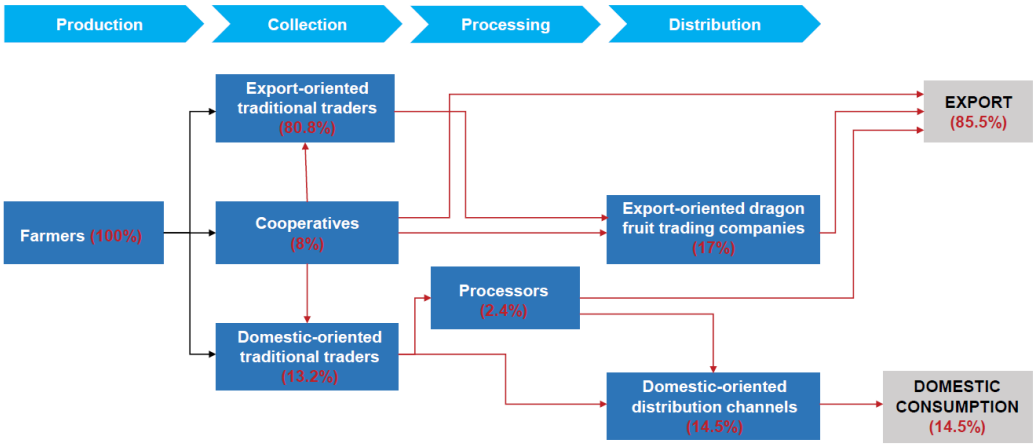
an electronic traceability system that allow to track, by a QR code, the origin and "carbon footprint" of each dragon fruit produced. This system fits into the broader context of the green transition of Vietnamese agriculture. In addition, it also allows to respond to the growing demands of consumers in high-value markets for quality products and meet international standards and certification requirements, avoiding non-tariff barriers to trade [14] (ITC, 2023b).

In Tien Giang Province there are 80 dragon fruit growing area codes with an area of around 6,200 hectares. The Province has built specialized areas for growing dragon fruit for exports, covering an area of nearly 8,600 hectares. Moreover, 2,196 hectares are certified as VietGAP and 110 ha are certified as GlobalGAP, with the aim to reach 3,600 hectares of dragon fruit certified whit GAP standard by 2025 [17]. Long An Province has about 230 dragon fruit growing area codes granted for exports [17] [18]. Both Provinces (Tien Giang and Long An) are working to organizing large-scale production for export, encouraging the formation of cooperatives, building concentrated commodity production areas, promoting high-tech dragon fruit farming and modern equipment in the post-harvest stage to process and pack dragon fruit for export [17].

3.2.3.1.5 The dragon fruit value chain

The Vietnamese dragon fruit value chain is composed by several actors, operating at diverse stage of the chain. The literature highlights the different speeds at which the various stages of the value chain are evolving, with post-harvest management and cold chain technologies keeping pace with the increased demands of a growing exports market while production methods are still rooted in conventional plant management systems.
However, the small size of dragon fruit export enterprises and farmers and the inefficient post-harvest phase lead to waste issues. It is estimated that post-harvest losses are around 41% of the income potentially obtainable from a median production for exports. These losses are due to both discarded fruits (10% of the total harvest) and those that do not reach high quality standards (around 63% of the saleable production) (Phong, 2019).
The analysis of the value chain has been carried out taking into account the two markets of references: those for exports and those for domestic consumption (Minh and Son, 2020; World Bank, 2022) (Figure 3).

Figure 3 - The dragon fruit value chain in Vietnam



Source: World Bank, 2022.

The production stage

The dragon fruit production in Vietnam is supplied by three main actors: smallholder farmers, cooperatives and producers that are also exporters (Minh and Son, 2020).

Smallholder farmers dominate dragon fruit production both in terms of volume of production, number of producers and area covered. The average size of the farm is of 0.8 hectares for approximately 50,000 smallholder farmers. The production is labour intensive especially for pruning the branches, flowers and young fruit and for the stroking the tail phase (to make the product more appreciated by consumers). Each hectare of dragon fruit requires two full-time family workers. Therefore, unlike producers of other crops, dragon fruit growers mostly work full-time in their orchards. A survey conducted in 2018 in the Quon Long Commune of Cho Gao District (in the Tien Giang Province) highlighted that on 100 households randomly selected, 21 did not employ any outside labour, only 3 households employed year-round, and the rest employed seasonal workers (for the harvest season) (Sakata and Takanashi, 2018). Moreover, 31 households purchased land use rights, increasing the area over that inherited, and 13 households rented the land (Sakata and Takanashi, 2018).
Most smallholder farmers do not keep agricultural records or follow any good agricultural practices, despite the government's efforts to introduce the VietGAP certification program in the three major provinces, Binh Thuan, Tien Giang and Long An. It is estimated that in Binh Thuan province, only 50% of farmers trained in VietGAP (free of charge) apply for certification for the first time, and half of those who apply do not return for a second certification. Only 30% of the dragon fruit area of Binh Thuan and 4% of Long An and Tien Giang combined have VietGAP certificates. Smallholder farmers do not apply GlobalGAP or a traceability system unless forced by cooperatives or exporters. However, 92% of the production area in the three major provinces has PUC for exports to China, only 8% has PUC for other markets (Minh and Son, 2020).
In Binh Thuan Province, according to a study conducted by the World Bank (2022), 80% of the total production of smallholder farmers sells dragon fruit to export-oriented traditional traders. For this channel, it is estimated that 80% of the smallholder farmers do not have a contract and there is no advance communication. Therefore, they depend on traders, having no possibility to negotiate quantities and prices. About 8% of the production of smallholder farmers is sold to cooperatives and about 12% to domestic-oriented traditional traders.

Cooperatives. The increasing development of cooperatives is traced back to the preference of buyers to source from more professional suppliers, with legal status, legitimate trading documents and considerable production. In Binh Thuan, Tien Giang and Long An Provinces there are about 40 dragon fruit cooperatives composed of small farmers. They produce according to an agreed plan and sell part of their production to the cooperatives. The cooperative members are assisted and monitored by an experienced farmer or a technical staff by the cooperative to ensure that they comply with the agreed production process and quality requirements (Minh and Son, 2020). Cooperatives often purchase dragon fruit from non-member farmers and farmer groups who must meet the same quality specifications as members (World Bank, 2022).
Overall, cooperatives do not purchase large volumes of produce, but they do contribute to its distribution. In Binh Thuan (World Bank, 2022), cooperatives sell an average of 8% of the province's production (about 81% is sold by export-oriented traditional traders and the remaining 13% by domestic-oriented traditional traders). Of this 8%, 65% is exported directly (with the support of export services provided by individuals or companies), 15% is sold to domestic-oriented traditional traders, 10% is sold to export-oriented traditional traders, and another 10% is distributed to export-oriented dragon fruit trading companies. Most cooperatives in Binh Thuan province are small, with an average of only 22 members per cooperative (Minh and Son, 2020). Cooperatives typically apply quality standards (VietGAP or GlobalGAP) and/or traceability systems to sell to foreign markets (World Bank, 2022). In this they are assisted by central authorities (DARD), which manage the quality of agricultural products, and local authorities, which build models of farmers' organizations, such as cooperatives or group farmers, to bring together smallholder farmers to grow dragon fruit according to the same standards such as GlobalGAP or VietGAP (Hoa *et al.*, 2018).

Producers/Exporters. The survey conducted by Minh and Son (2020) revealed the presence of producers that operate also as exporters. These are large farms which produce for their own exports, with a cultivation area of dragon fruit ranging from 6 to 600 hectares. Consequently, production generally complies with the international standards of the destination countries (GlobalGAP, traceability system and/or PUC). These farms employ full-time workers who are trained on-the-job to ensure quality production processes and products. Workers are organized into groups, each with a specific task. These farms are overlooked by an agronomist who takes care of the technical aspects and pest management in accordance with certifications. The study found that the main problem of these farms is not compliance with the requirements on pesticide residues (Maximum Residue Level - MRL) but rather the emergence of diseases that lower the yield and quality of production (size of the fruit and quality of the peel).

The collection stage

The collection stage is where the critical mass is formed. In the three main Provinces of production, statistics report 500 *collectors* (Minh and Son, 2020). Collectors can be based in the same area of production or come from abroad. In the first case, usually, they have a fixed location in the production area. They buy from smallholder farmers and cooperatives and sell to processors, exporters or export directly. They purchase all dragon fruit regardless of whether there are quality requirements or a traceability system and select the fruit based on size, appearance and good agricultural practices, assigning them to markets based on their quality level (Grade 1, 2, 3 or off-grade). No sample testing is done on MRL criteria. The quality of shipment is subject to buyers' check across the borders. Collectors have great experience and are able to identify farmers who meet the necessary certifications when a market requires it. Collectors from other provinces than the production ones do not have a fixed location in the production area, purchase the production regardless of quality requirements or traceability system, and sell to the domestic wet market. When selling to processing exporters, the latter often have to purchase the entire shipment unsorted and therefore without any quality control.

The *exporter-oriented traditional traders* play a pivotal role in the dragon fruit supply chain, linking production to export markets. According to statistics there are 16 traders in the three main Provinces of production (Minh and Son, 2020). They purchase the product, pack it in the packing houses and send it to importers by sea or air. They ensure quality from two sides: from the food safety side by acquiring food safety standards related to the packing house (ISO 22000, HACCP, BRC, etc.) and from the fresh fruit quality side. The actions they take to ensure the safety and quality of the fruit depend on how stringent the regulations are in the destination markets. In a few cases, and especially in Binh Thuan province, exporters have integrated the processing stage (to process dried or frozen products) (Minh and Son, 2020).

The *domestic-oriented traditional traders* cover the share of production not intended for export. In Binh Thuan Province they manage 13.2% of the production: 12% comes from farmers and 1.2% from cooperatives (corresponding to 15% of the dragon fruit volume of these actors) distributing it within Binh Thuan province and other parts of Vietnam (World Bank, 2022).

The processing stage

The *processors* purchase dragon fruit from exporter-oriented traditional traders and domestic-oriented traditional traders. In Binh Thuan Province the share of dragon fruit managed by processors is 2.4% of the total dragon fruit produced locally. The 90% of the semi-processed and processed products is for domestic consumption and the remaining is distributed to external markets (World Bank, 2022).

According to statistics there are about eight processed fruit exporters in the three main Provinces (Binh Thuan, Long An and Thien Giang). They process the pulps into puree or cut, then freeze or dry the processed product to sell on export markets. They buy mainly from collectors, so they have less control over the quality of the product. Unlike exporter-oriented traditional traders, however, the

concerns are not about the quality of the peel, but rather pesticide residues and diseases in the pulp. Like fresh fruit packing plants, processing plants must acquire food safety standards. Processed products often stay in the processing plant for 40-45 days and can then be stored in good quality for up to two years at -18°C (Minh and Son, 2020).

Distribution stage

This stage is dominated by two actors: *export-oriented dragon fruit trading* and *domestically oriented distribution channels*. The former function as intermediaries between the collectors operating in the area of production and the importers (mainly Chinese one). They own facilities with large cold chain storage warehouses. They handle 17% of the total dragon fruit produced in Binh Thuan. Another 14.5% is handed by the domestically oriented distribution channels (companies, traditional traders and wholesale) that serve the internal market (World Bank, 2022).

3.2.3.1.6 Challenges and opportunities in the dragon fruit value chain

The dragon fruit value chain is long and populated by fragmented actors (Sakata and Takanashi, 2018). The distribution of benefits along the supply chain is asymmetrical due to the lack of written contracts between farmers and collectors and between farmers and exporters. Farmers are therefore unaware of the possible benefits in terms of higher prices resulting from higher quality and compliance with standards and therefore have no interest in investing. Instead, they focus on increasing the quantities produced, both in the main season and in the off-season, by using pesticides and plant growth regulators that reduce the plants' resistance against pests and decrease the quality of the product, while increasing costs and losing competitiveness (Hoat *et al.*, 2018 Sakata and Takanashi, 2018). According to the 2016 Census of Rural, Agriculture and Fisheries, in Vietnam 94.1% of dragon fruit growing area use pesticides (General Statistics Office, 2021).

Only professional exporters offer a written annual contract to their farmers, to whom they also provide support and monitoring of production. In the domestic market, wet market distribution channels do not offer any guarantees to farmers in terms of price and quantity, while supermarkets include very onerous supply clauses, for example, in terms of quantities to be supplied periodically.

The cooperative model can help the supply chain to evolve towards higher quality production. On the one hand, cooperatives technically and financially support their member farmers; on the other hand, they deal with downstream stakeholders from a position of greater negotiating power than the individual farm (Minh and Son, 2022).

Sustainable development of dragon fruit production in Vietnam requires strengthening efforts to increase the level of cooperation among farmers and between farmers' cooperatives and upstream and downstream actors in the value chain. A safe and reliable value chain helps farmers plan production in quantity and quality, which can then benefit from the higher prices recognized for certified products.

The dependence of a very large part of production on exports and in particular on a single country, China, requires a strategy of market diversification and training of farmers to comply with the regulation of import markets. International organisations and national and local governments play a fundamental role in building stable relationships between the actors of the value chain and in strengthening the certification and control processes to ensure traceability and environmental sustainability and increasing productivity and product quality. The role of research towards sustainable production is fundamental to develop advanced agricultural practices considering the ongoing climate change.

3.2.3.2 Qualitative analysis

3.2.3.2.1 Farmer's organization representatives (FOs)

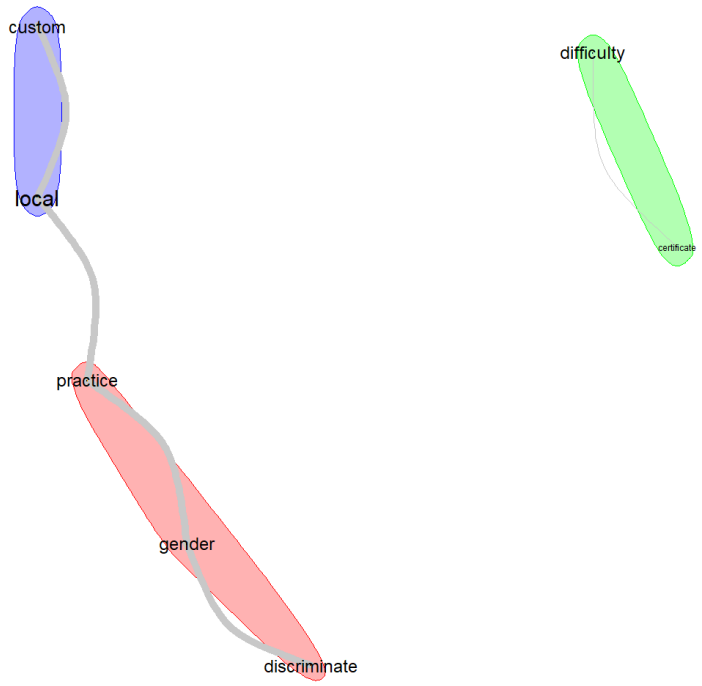
Concerning respondents from Dragon Fruit (DF) farmer organizations (FOs) in Vietnam, 2 were specific for DF, 2 responded for DF and rice. Stakeholders were all males, with leading roles in their

respective organisations, (one of whom Director of a Dragon fruit cooperative) and coming from 4 different provinces of the country.

SDG 1

According to most respondents, there are no particular difficulties in accessing land and the Land Use Certificate System works well. Land is centrally planned by the State as agricultural land or industrial land, and that works quite effectively.
With regards to gender discrimination, there is no specific customs or practices against discrimination; however, there is not even perception of ongoing discrimination regarding land ownership and legal contracts. Land is usually bought jointly by spouses and ownership is usually legally represented by the "head of the household".

Figure 38: Similarity graph of Dragon Fruit Farmer's organization opinions on SDG 1



SDG 2

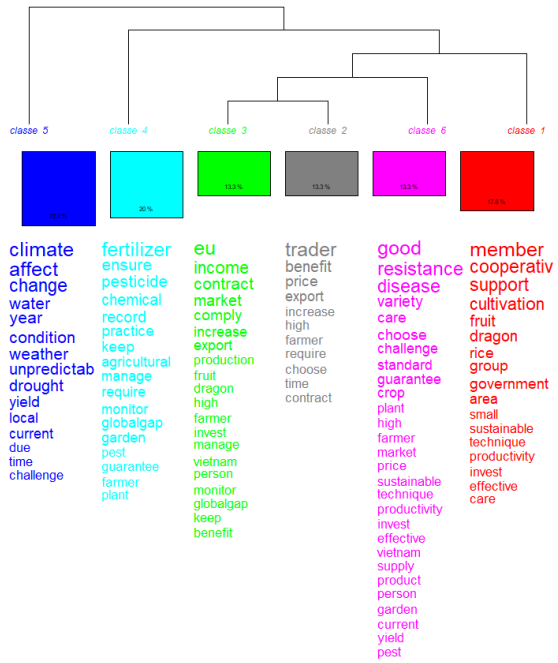
The main opportunity, for both dragon fruit and rice growers, is in the higher prices received by farmers as an effect of trade expansion with EU. However, benefits would expand also to small traders and exporters. According to some respondents, it is traders who benefit more from a trade growth, because traders impose contracts on farmers, and they will take advantage of the higher market process.
Regarding small farmers, respondents stressed how dragon fruit market is still quite unstable, being a relatively new product at the international level. One of the main problems is the low intensity genetic research and agronomic techniques for the dragon fruit, with dases easily spread and also lack of resilience to climate changes and natural shocks. This is particularly true for non-cooperative farmers. Recently, some financial support is provided to farmers for water storage, traditionally only for rice farmers but more recently also for dragon fruits growers.

In the area interested by the study, there is only one cooperative set, but not particularly effective, so that only 52 farmers join in, equal to 1% of the growers of the area, even if it is growing since 2012, when it started. With only 12 members. Many growers do not have even idea of the cooperatives and how they work, so they totally ignore advantages to join a cooperative.

Regarding environmental issues, the most relevant is seen to be water, especially running water, very instable and with many losses. Most respondents prefer to take water from wells or from basins deep in the ground. Luckly, dragon fruit is quite resistant to drought, so shortage of water is not perceived as the main environmental issue. However, sometimes there can be an issue of salinity, and that is bad since dragon fruit is quat sensitive to salt.
The growth in trade relationships with the EU will improve farmers' revenues and, as a consequence, water storage and irrigation efficient systems will improve, even if at the moment it is hard to see advantage from trade.
Moving to sustainable agricultural schemes, there are very few schemes only implemented locally. Global GAP an Viet GAP certification programmes offer farmers lists of products which are valid for sustainable and certified products.
The organic farming practice guidance program has been implemented locally, offering also technical support for farmers. However, the implementation process faces many challenges due to farming habits and the high standards of sustainable agriculture practices. Therefore, farmers are unwilling to change their farming habits.

Concerning agro-biodiversity, currently that is not an issue for dragon fruit growers. H14 is the most popular variety and is sufficently resistant to the most common pests. Other varieties coming from the East are not as productive as H14 and are less resistant to climate and soil conditions.

Figure 39: Dendogram Dragon Fruit Farmer's organization opinions on SDG 2

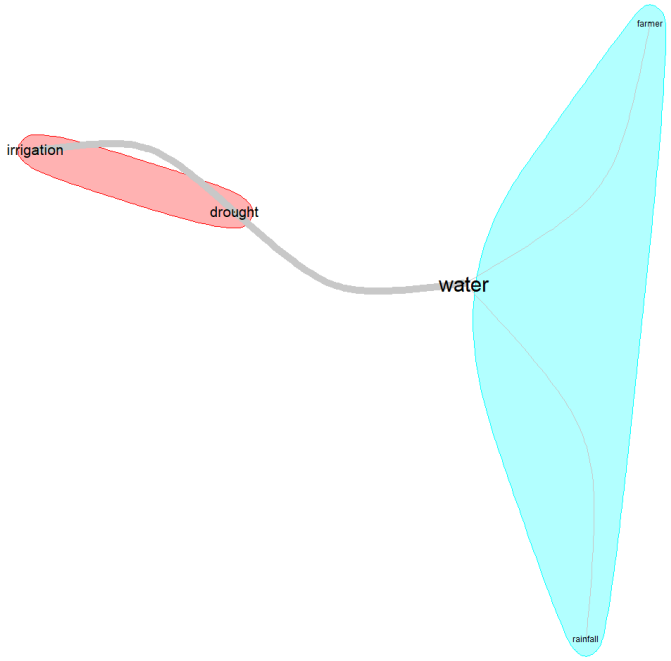


SDG 6

There is competition between the use of water, and since there are many residuals in basins and wells, water can only be used for irrigation. The problem is particularly evident during summer, when water

is scarce. This is also a major factor for cropping land abandonment. Local authorities have proactively implemented water storage in channels; however, prolonged drought may still not guarantee irrigation water.

Figure 40: Similarity graph of Dragon Fruit Farmer's organization opinions on SDG 6



SDG 8

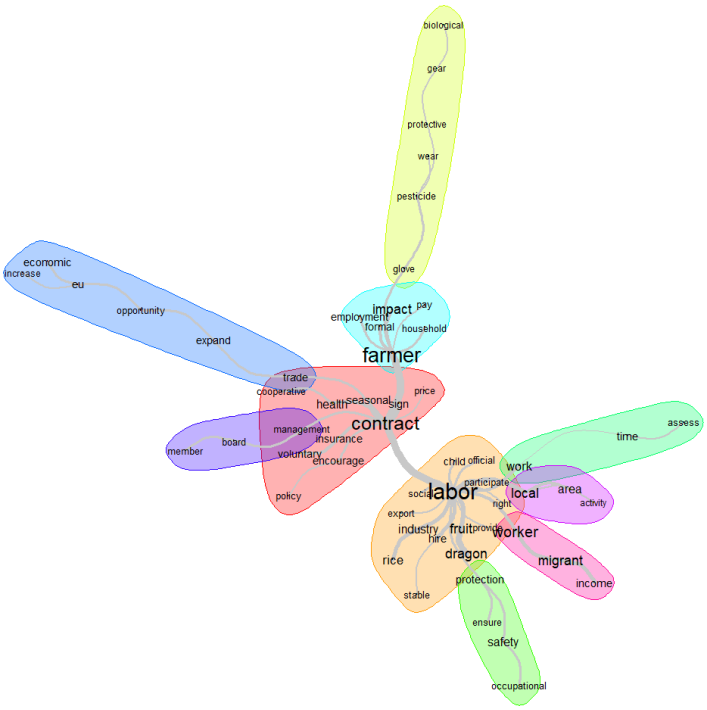
With regards to labour social standards, due to dominant farming practices, there are no labour contracts regulating the activity. This is mainly due to the seasonality of labour needs (mainly the "ear-stroking" – a practice for keeping the colour of the fruit green and in a certain shape - and the harvesting). Generally speaking, health insurance is only available to very poor households. In the case of dragon fruit cooperative, however, members do have access to insurance and regular contracts, even though they are encouraged to get insurance and health care from the State.
Respondents also believe that the improvement of EU-Vietnam dragon fruit trade would improve the standards of contracts and reduce informal relationships, improving at the same time social benefits and safety standards for workers.

With regards to child labour, respondents agreed on the fact that children are kept away from fields and the primary education rate is very high, thanks also to the improved conditions of farmers. If additional work is needed, during harvesting season especially, occasional workers will be hired.

Safety for workers is ensured by the use of proper technical tools such as gloves, boots, gas masks for treatments and so on. At the same time, the improvement of organic techniques and products reduces significantly exposure to health risks.

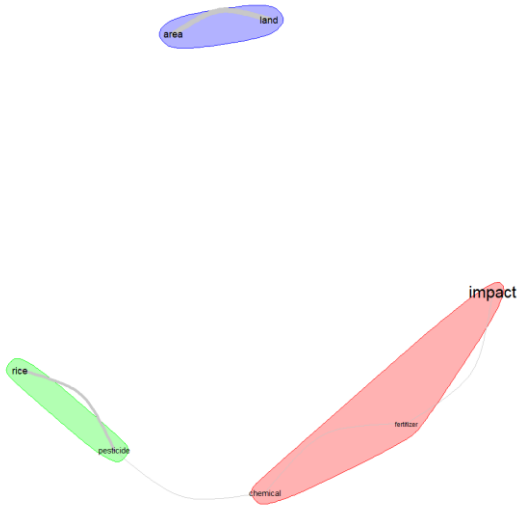
Labour relationships are quite informal also along the value chain. Farmers can sell their products to traders without any contract. Only the management board in the cooperatives has official contracts, health insurance, and social insurance.

Figure 41: Similarity graph of Dragon Fruit Farmer's organization opinions on SDG 8



Farmers who only work seasonally do not have official labour contracts as well as other cooperative members. Farmers are the weakest link, since they work is mainly seasonal, so even if there was some improvement in trade, social benefits would mainly go to other components of the value chains rather than farmers.

Figure 42: Similarity graph of Dragon Fruit Farmer's organization opinions on SDG 15



SDG 15

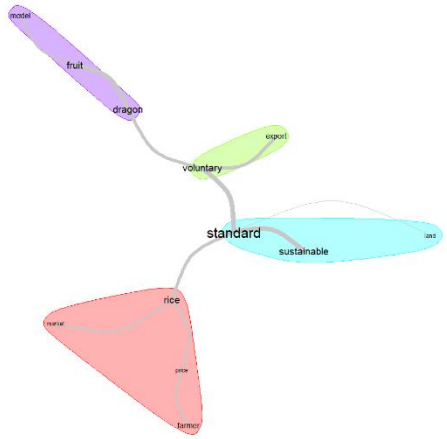
According to respondents, there is no competition between land devoted to dragon fruit and forests. The area has been always used for agricultural purposes and forests are concentrated in other parts of the country. For this reason, also a possible expansion of dragon fruit trade would not have any significant impact on forests.

The impact on biodiversity is quite low at the moment and even lower if farmers join VietGAP or other initiatives based on safe and organic protocols, so the risk becomes practically none, if not for some insects and snails.

SDG 17

The main voluntary standards are the VietGAP and the GlobalGAP. However, in the case of dragon fruit the share under these standards is quite low (unlike rice, where standards are much more known and diffused), especially because dragon fruit farmer prices are very unstable.
Interestingly enough, these standards are mandatory for exporting to the EU market, so an improvement in trade would turn into an improvement of certified production too, and hopefully into more stable process for farmers.

Figure 43: Similarity graph of Dragon Fruit Farmer's organization opinions on SDG 17



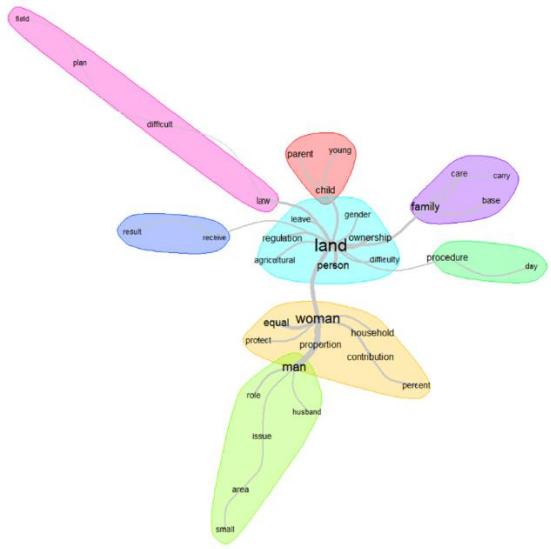
3.2.3.2.2 Policy makers representatives (PMs)
Concerning respondents from Dragon Fruit (DF) main policy makers (PMs) in Vietnam, out of 9 respondents 5 were interested in the DF: 1 specific for DF and 4 responding for DF and rice. Policy makers 2 respondents were female, and all of them had leading roles in their respective institutions (head of Department or Director) and coming from 2 different provinces of the country.

SDG 1

In general, farm size in Vietnam is very small and in the district of Tan Tru farmers mainly grow rice and vegetables. Women participate in the field work with some specific aims, but overall, there is no significant unbalance between gender loads of work. Women are usually specialised in some DF specific (labour intensive) operations, such as ear stroking and fruit-picking. The only official statistics come from the National Statistics Department and from the Ministry of Finance, which do not provide detailed data based on gender. However, on average salaries and revenues are higher for males than for females. For DF, income data are quite unstable, due to the dependency on the Chinese purchases, that were quite significant in the past but recently have slowed down.
Another relevant issue is the access to land. Legally, there are no discrimination against women when it turns to legal access to land; however, daughters usually inherit smaller plots than sons. In Mekong Delta region there is a practice to leave more land to the last-born child, regardless its gender, so the hild will have more assets to take care of parents and ancestors.
In general, there is a small difference in the ratio between men and women working in agriculture. About 10 years ago, land was only allocated to one person and most of them were men as owners. However, to ensure gender equality, the government now issues land use certificates based on

households, with both the husband and wife's names on them. In fact, spending and management within the family are equal between men and women.

Figure 44: Similarity graph of Dragon Fruit Policymakers' opinions on SDG 1



SDG 2

With regard to the district of Tan Tru, the main income is from rice cultivation, besides crop rotation of vegetables and watermelon. Farms are very small; therefore, most people have off-farm activities. The main task for men is to spray fertilizers, while women mainly trim, mow, and weed. Men earn higher wages per day than women due to the specific nature of their work in fertilizing and spraying pesticides. Women may face health limitations and are more susceptible to health issues. However, overall, according to the respondents there is not a significant difference in total income between men and women.

One interesting point highlighted is that there is a progressive "professionalization" of farmers, with higher skills and training, so wages are growing, both for men and women. However, there is still a lack of formal information sources and data and also proper robust statistics.
According to the respondents, an expansion of trade opportunities with the EU as a consequence of new trade agreements would have a positive impact also on small farmers, since international prices will grow compared to domestic prices, both for rice and DF. DF's trade to EU is only a very small share (less than 5%), but with a good agreement this can improve significantly. Cooperatives will have a crucial role in this trade expansion, since they can negotiate between farmers and traders for better conditions, because traders will try to get the highest benefits from the expansion of trade with EU.

DF market is still quite unstable, especially because production varies a lot and quality standards are too low for international markets. However, farmers tend to overuse pesticides and fertilizers to try to push production and this, combined with the effect of climate change (alternance of water scarcity and floods) does not really help production as well as quality. At the same time, costs rise, especially to cover expenses during off-season (for lighting for example).
Cooperatives can play a crucial role in the faming system and in fostering market relationships. However, in the case of DF, the number of farmers joining the only existing cooperative is reducing,

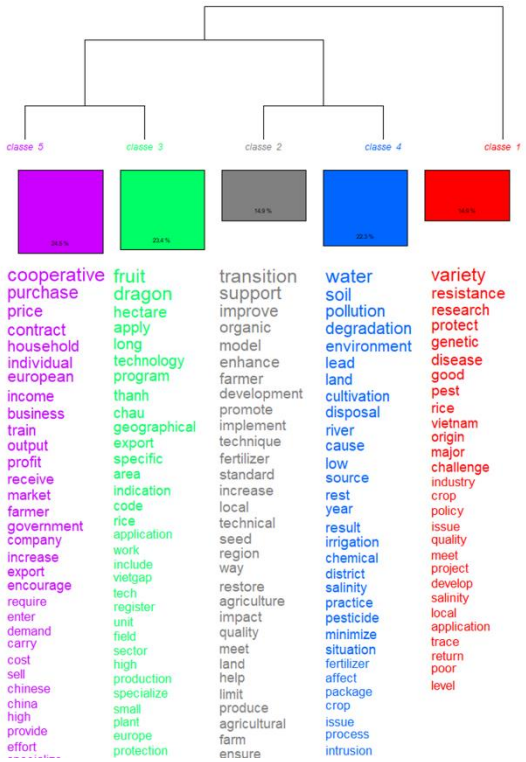
mainly because of the adverse economic conditions due to the current bad relationships with the Chinese market.

With regards to the conditions of natural resources, the soil is still fertile and has not been degraded. However, farmers go for 7 crops continuously in 2 years, rather than the 2 in 1 year recommended by the government.

Water is sometimes difficult to get, especially during droughts when there is not enough water for DF, primarily due to changing climate. However, DF is relatively resistant to water scarcity and droughts. Domestic water supply is still not fully guaranteed. People mainly rely on well water and deep groundwater, while water from canals and ditches cannot be used due to concerns about agricultural pesticides and waste. Another relevant issue is the concentration of salt int the soil, although generally soil conditions are good and the land is quite fertile.
Residuals from chemical inputs' use is becoming a relevant polluition issue (packages and so on), as well as the material resulting from tree pruning, in the case of DF.
One of the positive effects of a possible expansion of trade with the EU is the improvement in technology, especially for water use, shifting to a more efficient system of water use such as drip irrigation. Another relevant issue is the production protocols enforced by GlobalCAP, especially regarding pesticides and fertilizers use, which are considered safe. Farmers are required to follow the protocols, and any initiative will be considered as a disrespect to the agreements. According to some respondents, the small size of DF farms will be a serious constraint to any improvement, while for others there will be more investments and more sustainable production according to international standards.

About diversity, the problem is specifically linked to rise cropping, because the practice of reseeding is very common. As for DF, the main issue is the brown spot disease, and resistant varieties are becoming dominant. There is an objective lack of genetic diversity in Vietnam about the major crops, and the government is trying to improve it with specific lows. On this matter, many training courses and information are organized. Technical support from the EU as an effect of trade improvement is also advocated by stakeholders.
Regarding IGs, the country is focusing mostly on rice, since DF is mainly in the hands of exporters, who see IGs as costly and an effort, so they prefer to stay out of them. They do not see the importance of IGs as a long-term strategy.
Some interesting experiments are working well with Chau Thanh dragon fruit in Long An province. However, farmers and exporters often receive the label but do not stick them on fruits.

Figure 44: Dendogram graph of Dragon Fruit Policymakers' opinions on SDG 2



SDG 5

No responses to questions related to this indicator. The general feeling is that there are no specific challenges linked to land ownership for women but that improving trade with Europe will do good to shorten gender distances.

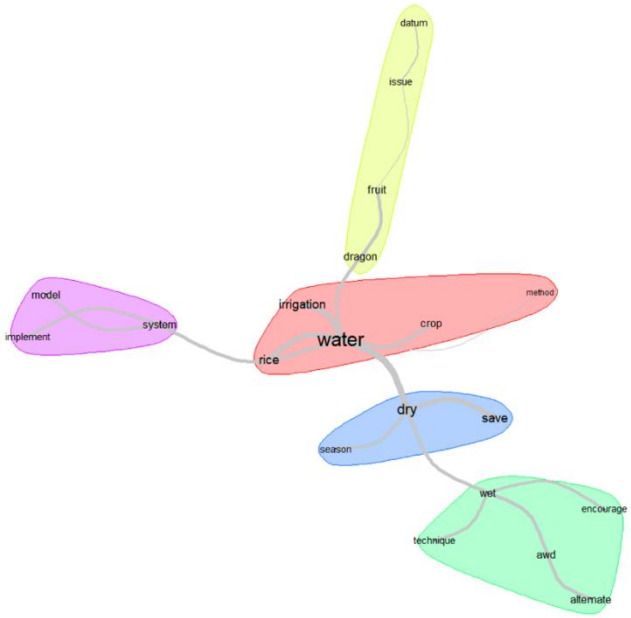
Figure 44: World Cloud graph of Dragon Fruit Policymakers' opinions on SDG 5

SDG 6

Respondents are quite positive about sustainability standards set at the international level and adapting consequently their production systems to those standards. However, the priority needs to remain proper living conditions for farmers.
Improving exports to Europe means setting the bar of standards higher, especially in terms of pesticide use and growth stimulants. For these reasons, farmers are already modifying their protocols, often in disagreements with cooperatives and GlobalCAP.

As for water use policies, there are some specific protocols ("1 must, 5 reductions" model; "alternate wetting and drying" scheme) which give strict indication about the use of water and the volumes to be used. However, this is especially good for environmental reasons, since water is abundant, and farmers tend to waste it. For DF in particular, drip irrigation is spreading, and that is more efficient than traditional irrigation systems, so it helps to save waste.

Figure 45: Similarity graph of Dragon Fruit Policymakers' opinions on SDG 6



SDG 8

In terms of social organization, the main aspect highlighted by respondents is the lack of stronger cooperative organization in the DF sector, such as those in rice cropping. The gender gap is still relevant especially because men are preferred to women because the can perform different on-farm tasks, while women are also more dedicated to childcare in the families. Other respondents pointed out that women are on average less skilled and rained for specific on-farm jobs, so they can only be hired for unskilled jobs like harvesting or some specific crop operations.

Some farmers join the poverty reduction program, and they are also encouraged to join State health insurance and training courses. Moreover, there are loan schemes with facilitated access to small farmers. Cooperatives can play a crucial role in linking poor and small farmers to these social programs, and also, they can improve the adhesion to training programs.
As for trade standards, respondents see them as a tool to improve labour standards in agriculture to the extent that they might improve volumes traded and that will have an effect of the conditions of formal labour in the long run.

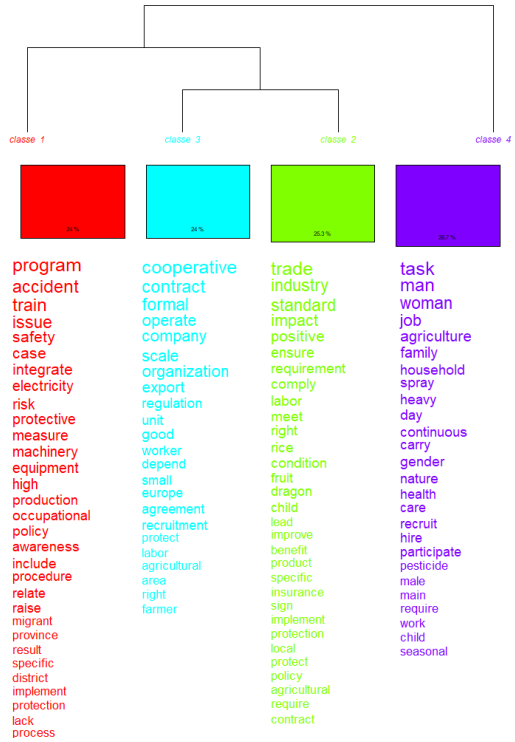
According to most respondents, there are no official statistics about under legal age work. However, the problem is limited, if ever, to 16-17 yea old children and only for occasional jobs. For primary school children they are kept out of the labour market. Official contacts are all over 18 years of age.

Consequently, improvement of trade with EU can only improve strict controls on illegal work behavior.

Legal contracts are not very common, at least in rice and DF sectors. As a consequence, there is no access to insurance and safety standards for workers. However, statistics are not very good on this matter. Cooperatives have a crucial role in trying to implement legal contracts ensuring safer conditions for workers. For DF, in particular, farms in the cooperatives are relatively aware of contracts and safety standards, while small farms not joining cooperatives are generally not guaranteed.
One issue highlighted by respondents is the negative role of intermediaries on contracts and safety matters. In this sense the improvement of trade standards with the EU might affect local standards too and the reduction of the role of intermediaries.

The use of protections and in farming activities in not widespread because of costs and also for traditional habits. Courses and training about protection use and risks connected to bad habits are increasing in the country for all the crops, and cooperatives and FOs have a crucial role in this. Most accidents are linked to pesticide treatments (dizziness) but electricity traps can be lethal.
According to respondents, currently there is no specific legislation about labour safety and protection. There are some general norms which are applied to all production sectors. However, exports in Europe require certain safety standards for workers.
Immigrant workers usually have lower wages than local ones, and they are not covered by contracts. However, the use of migrant workers is limited to the seasonal picks, for jobs that require unskilled workers. Most of the migrant work is controlled by intermediaries so there are fees which lower the average wages paid to workers. Migrant workers are often offered housing and child facilities.
If commercial standards are applied and trade with the EU improves, the need for migrant workers may decrease as local labour might be prioritized.

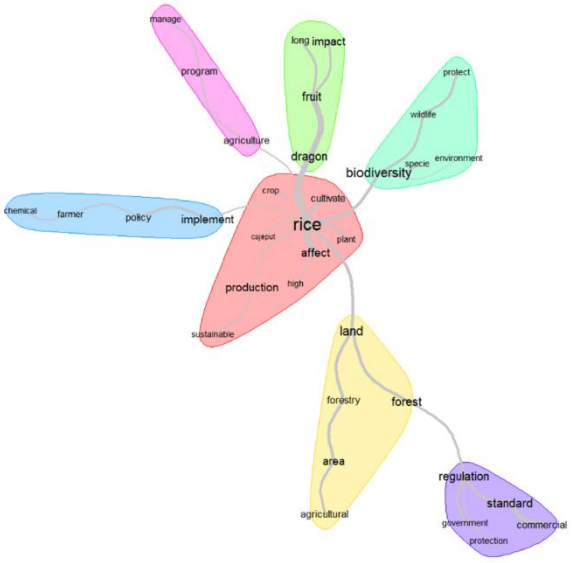
Figure 46: Dendogram graph of Dragon Fruit Policymakers' opinions on SDG 8



SDG 15

About forest conditions, according to respondents the problem is more related to rice cultivation than DF. Respondents also specify that forests in Long An are made by only one tree species (cajeput), so it is not of particularly high quality and biodiversity is low. Anyway, data are very scarce on this matter, but there is a strict legislation about deforestation and land use is strictly planned and under central control. The improvements of trade with the EU and the set-up of quality standards could improve control on deforestation and forestry damages.

Figure 47: Similarity graph of Dragon Fruit Policymakers' opinions on SDG 15

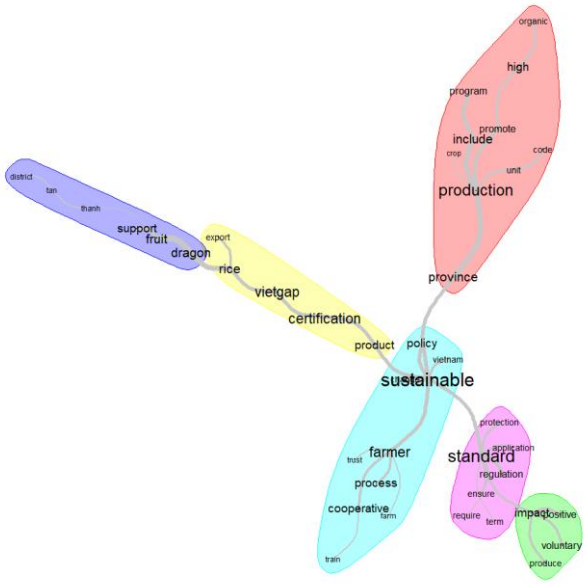


SDG 17

Policies on sustainable farming generally face initial resistance from farmers, mainly because prices initially do not meet their expectations. Many farmers, and even officials, still do not understand the meaning and content of sustainable farming; they do not see any practical advantages in terms of better revenues or cost reduction. Organic regulation is becoming popular in the country because farmers and traders fully understand that concept, and market conditions are more precise for farmers.

Standards might have a very positive impact, as consumer demand and knowledge increase daily on these matters. Consequently, farmers are also encouraged to cultivate according to standards when adequately trained and informed.

Figure 48: Similarity graph of Dragon Fruit Policymakers' opinions on SDG 17



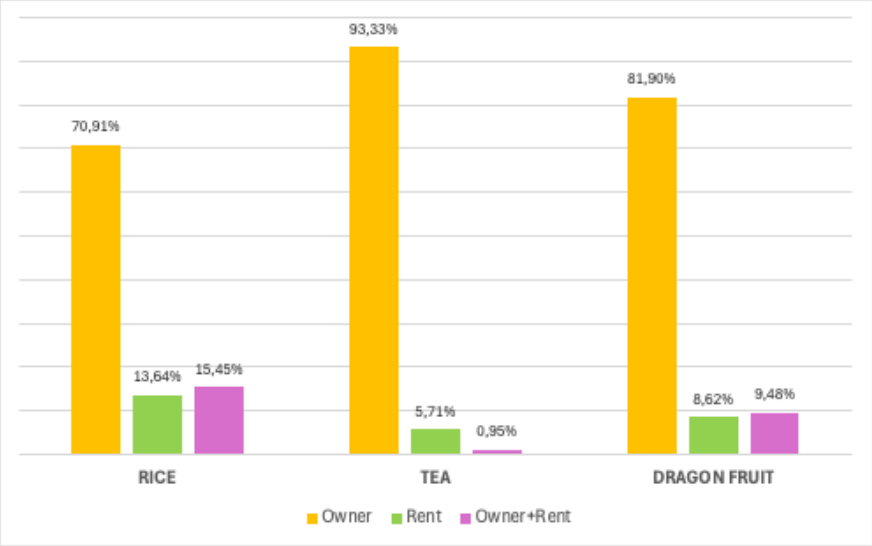
3.2.4 Quantitative analysis results for rice, tea and dragon fruit value chains

Detailed information about the analysis technique adopted is provided in the subsection 2.4.2.

SDG 1

As highlighted in the previous sections, access to land does not appear to be a significant issue in Vietnam. Among the respondents, 71% in the rice sector, 93.3% in the tea sector and 81.9% in the dragon fruit sector own their farms. The rice sector has the highest proportion of renters (13.6%), followed by dragon fruit (8.6%) and tea (5.7%). Notably, rice also has the largest percentage of farmers who both own land and rent additional land (15.4%).

Figure 1: Land ownership typologies for rice, tea, and dragon fruit



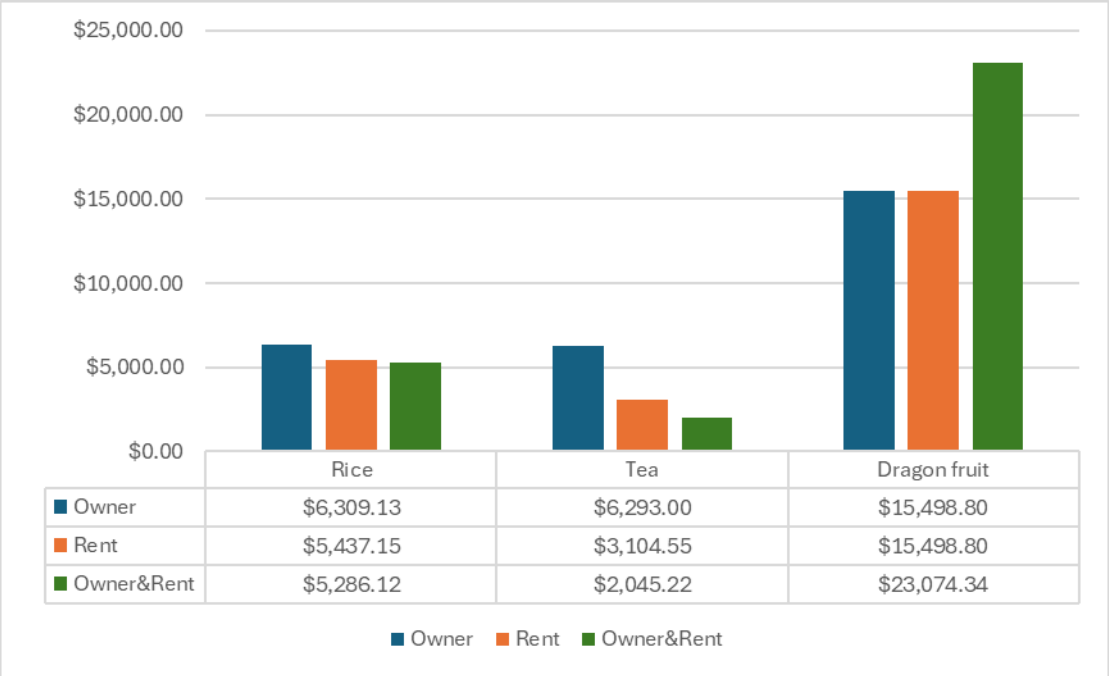
Source: authors' elabouration on primary data

Land ownership and revenue per hectare

As Figure 2 shows, the revenue patterns across the three ownership models vary significantly for different crops:

- Rice production revenues are relatively close across all kinds of ownership models, with farm owners getting the highest revenue per hectare.
- Regarding tea production, the revenue contrast between Owners, Renters and the combination of the two is is much sharper, with a revenue difference of +4,248 USD/ha between farmers who only own land and the once who also rent some additional land.
- For dragon fruit the combination of land ownership and rent stands out, producing dramatically higher revenues (+7,575 USD) compared to the other two.

Figure 2: Revenue/ha per kind of ownership



	Rice	Tea	Dragon fruit
Owner	$6,309.13	$6,293.00	$15,498.80
Rent	$5,437.15	$3,104.55	$15,498.80
Owner&Rent	$5,286.12	$2,045.22	$23,074.34

Source: Authors' elabouration on primary data

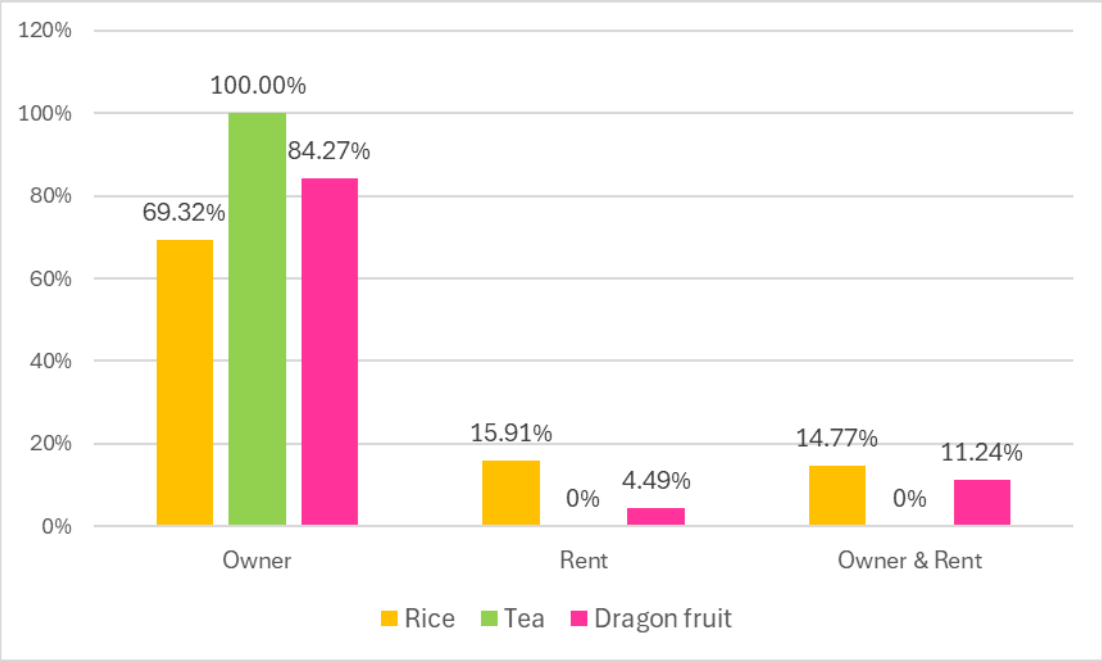
Land ownership and living conditions

When farmers were asked whether the income deriving from their main crop is sufficient to provide for themselves and their families, data reveals a notable disparity across the different value chains. Rice and dragon fruit producers report a higher percentage of satisfaction with the income generated from their crops (80% and 76.92% respectively), while a lower percentage, namely 44.76% of tea producers affirms the same. This percentage suggests that tea producers face bigger challenges reaching a living income.

Further analysis of how responses to this question vary based on land ownership (Figure 3) shows that landowners are more likely to report a sufficient crop-derived income. In contrast, farmers who rent land or who own some and rent others, appear to face more challenges in achieving a sufficient income.

It is important to note that the results for tea production are not influenced by the distribution of interviewees among the different types of land ownership. As shown in Figure 1, the sample of tea farmers is predominantly made up of landowners, a group that, according to our findings, is generally better off in terms of income sufficiency. This consideration confirms that tea farming may present greater financial challenges.

Figure 3: Percentage of farmers who think the revenue from the main crop is enough to support their families



Source: Author's elabouration on primary data

SDG2

The median[29] characteristics of farmers and farming practices in the rice, tea, and dragon fruit sectors reveal notable differences (Table 1). The median age of farmers is highest in the rice sector (59 years), followed by dragon fruit (52 years) and tea (50 years). Household sizes are similar across sectors, with a median value of 4.5 members for rice and 4 for both tea and dragon fruit. Farm sizes are largest for rice (0.8 ha), slightly smaller for tea (0.7 ha), and smallest for dragon fruit (0.5 ha). However, yield and revenue per hectare show significant variation. Dragon fruit achieves the highest yield (30 tons/ha) and revenue per hectare (USD 17,900.09), while rice and tea yield 18.47 tons/ha and 13 tons/ha, respectively, with revenue per hectare of USD 6,160.15 for rice and USD 5,873.46 for tea.

Table 1: Characteristics of farmers and farming practices in the rice, tea, and dragon fruit sectors

	Rice	Tea	Dragon fruit
	Median value		
Age	59	50	52
Number of household members	4.5	4	4
Farm size (ha)	0.8	0.7	0.5

[29] We use the median value instead of the average as it is not influenced by extreme values (outliers) and offers a more accurate representation of the central tendency.

Yield per ha (tons/ha)	18.47	13	30
Gross income (USD-season 2022/2023)	5034.4	3222	7132.069
Revenue/ha (USD/ha)	6160.15	5873.46	17900.09
Price (USD/Kg)	0.33	0.38	0.61

Source: Authors' elabouration on primary data

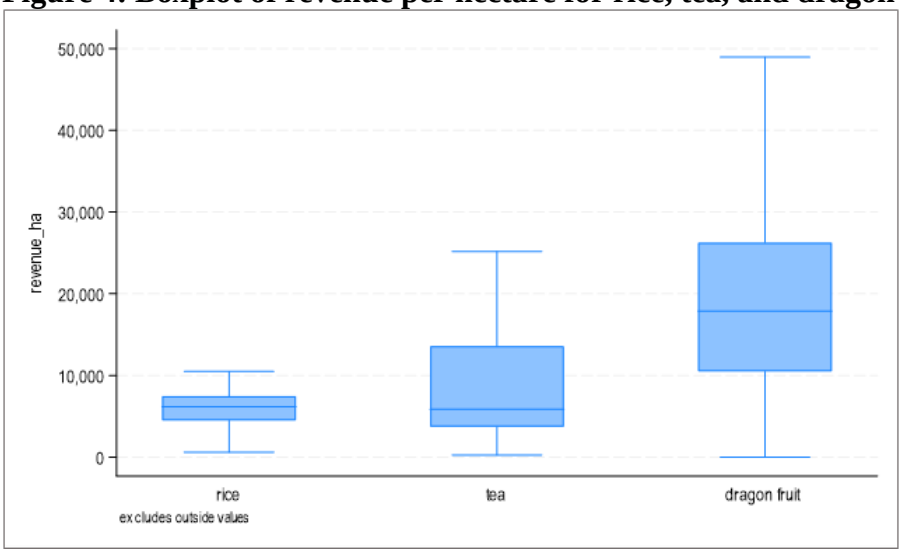
Poverty in the rice, tea and dragon fruit value chains

According to an estimation of the Global Living Wage Coalition, the cost of decent standard of living for a family in rural Vietnam is VND 7,729,194 per month, namely 333 USD per month (2020). On the other hand, as reported in the literature review section, the average income in rural areas of Vietnam in 2019 was 5.6 VND (220 USD). Our data highlights that the gross total revenues derived from the selected crops in the 2022-2023 season are on average 5,034 USD (419.5 USD/month) for rice, 3,222 USD (268.5 USD/month) for tea and 7,132 USD (594,3 USD/month) for dragon fruit. While rice and dragon fruit farming seem to provide sufficient revenue for reaching the estimated threshold of 333 USD/month that allows decent living conditions, tea farmers do not reach this level of income. This result is in line with SDG1-section 4, assessing that tea producers might be facing harsher financial conditions than the other selected value chains.

Revenues per hectare

The boxplot (Figure 4) illustrates the distribution of revenue per hectare for the three analysed value chains, showing clear differences in profitability and variability. Overall, dragon fruit shows the greatest profitability but also higher variability, while rice remains the most stable but least profitable crop. More specifically, rice has the lowest median revenue and the narrowest interquartile range, indicating limited variability and generally lower returns, with values concentrated below 10,000 USD/ha. Tea shows a higher median and greater variability, with some higher revenue values extending up to 25,000 USD/ha. Dragon fruit outperforms both crops, exhibiting the highest median revenue and the widest spread, with some values approaching 50,000 USD/ha.

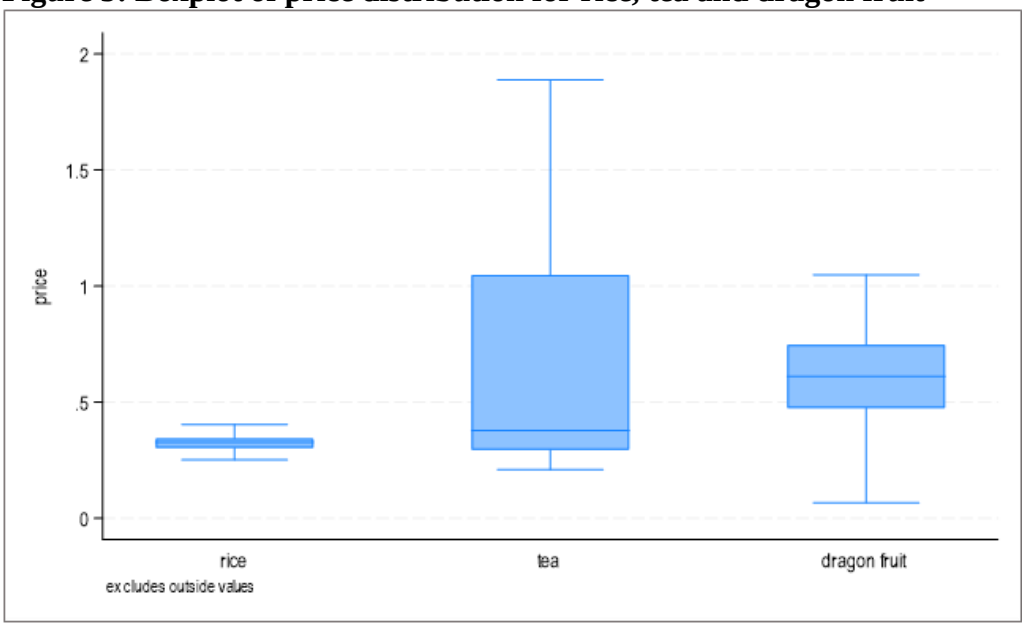
Figure 4: Boxplot of revenue per hectare for rice, tea, and dragon fruit



Source: Authors' elaboration on primary data

We then generated another boxplot to display the price distribution for rice, tea, and dragon fruit (Figure 5). The price per kilogram of tea is comparable to that of rice and dragon fruit, but the significant difference in the effort required to produce one kilogram of tea could explain why tea farmers are struggling financially (Figure 5). Rice shows the lowest and most stable prices, with a narrow interquartile range and values concentrated around 0.3 to 0.4 USD/kg. Tea exhibits the widest variability in prices, with a median price near 0.4 USD/kg but a large spread, including values reaching up to 2 USD/kg. Dragon fruit shows higher median prices compared to rice and tea, ranging between 0.5 and 0.8 USD/kg, with moderate variability.
The differences in revenue per hectare are closely linked to price variations, with dragon fruit achieving both higher prices and profitability, while rice remains stable but limited in both price and revenue, and tea shows significant variability in both aspects.

Figure 5: Boxplot of price distribution for rice, tea and dragon fruit

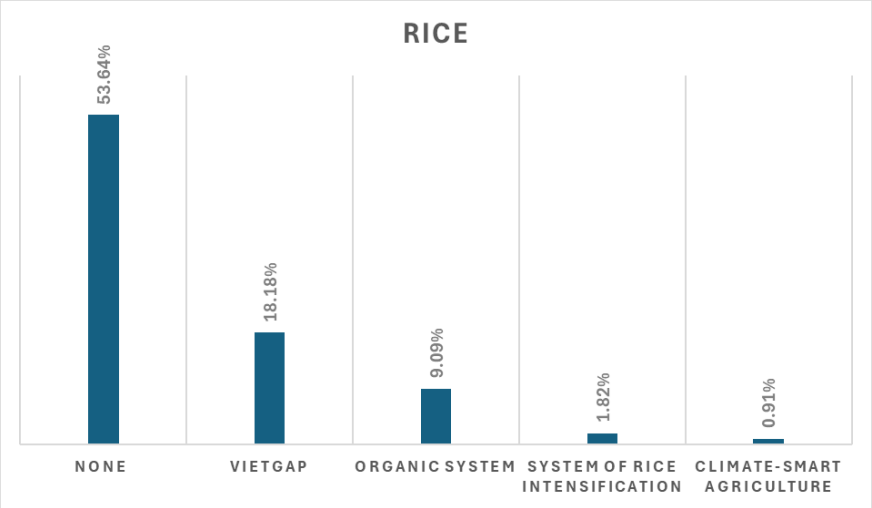


Source: Authors' elaboration on primary data

Sustainable farming practices

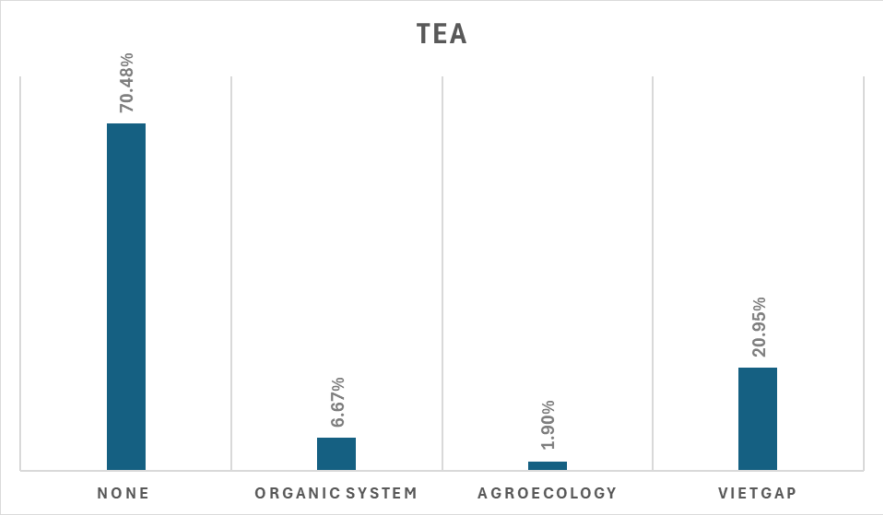
Most respondents do not implement sustainable practices across the three value chains (Figure 6, 7 and 8). The highest percentage of non-application is observed in the tea value chain (70.48%), followed by rice (53.64%) and dragon fruit (46.15%). When sustainable practices are adopted, they are mainly associated with VietGAP certification, a standard for "Good Agricultural Practices" established by the Vietnamese Ministry of Agriculture and Rural Development. Furthermore, fewer than 10% of respondents in any value chain report adopting organic practices.

Figure 6: Sustainable farming practices applied in the rice sector



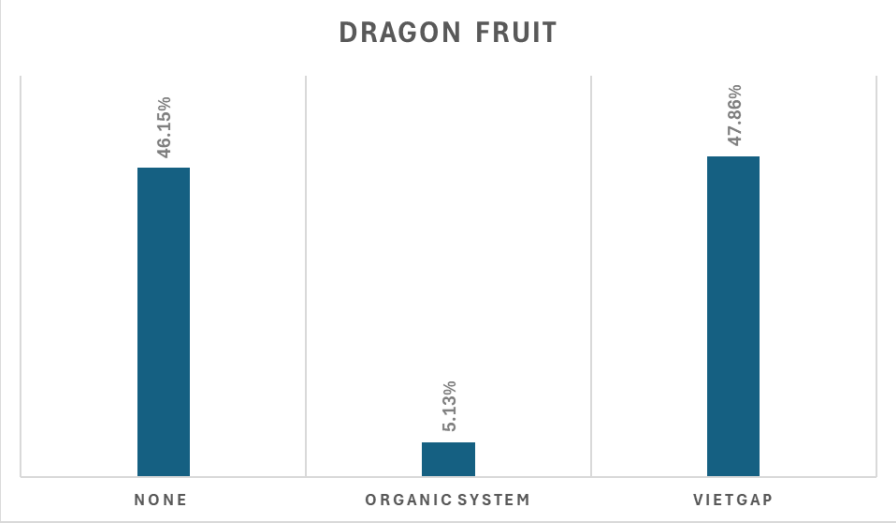
Source: Authors' elaboration on primary data

Figure 7: Sustainable farming practices applied in the tea sector



Source: Authors' elaboration on primary data

Figure 8: Sustainable farming practices applied in dragon fruit sector



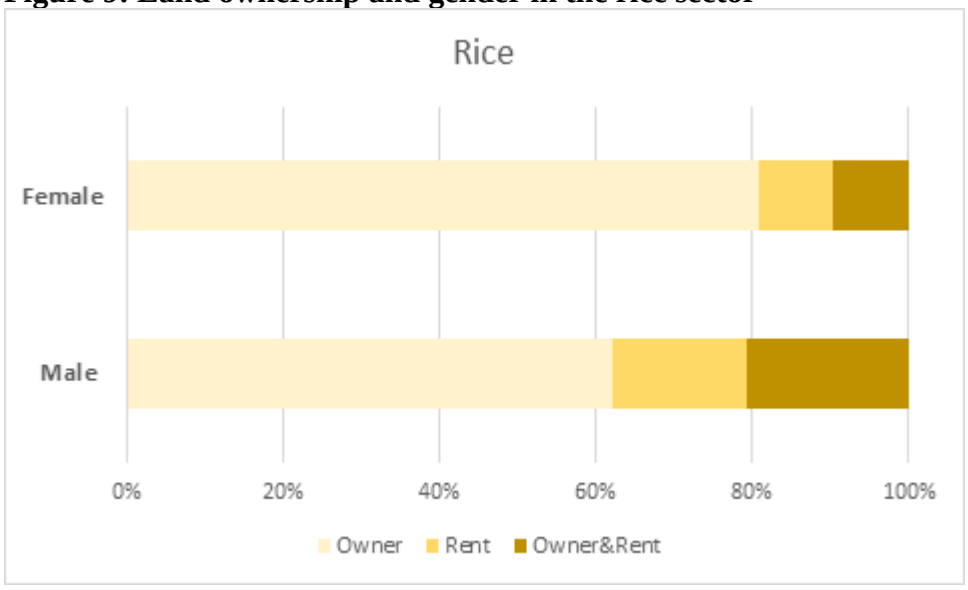
Source: Authors' elaboration on primary data

SDG5

In all value chains women manage smaller farms compared to men: in rice farms led by women are on average 0.92 ha while men 1.45 ha (significance at 10%); in tea production women have farms with an average size of 0.66 ha, while men have bigger farms, of an average of 1.28 ha (significance at 1%).
Lastly female dragon fruit farmers manage farms with an average size of 0.54 ha and men manage farms with an average size of 0.77 ha (significance at 10%). Additionally, we found that women earn less than men in tea but not in rice and dragon fruit value chains. In the tea sector the average difference between revenues is 5347.42$ with a level of significance at 0.05.
Results show that the average selling price is 0.31$ per kg lower when women manage the farm (significance at 1%). The is a difference also in the dragon fruit sector, even if smaller, 0.08$ per kg (significance at 10%).

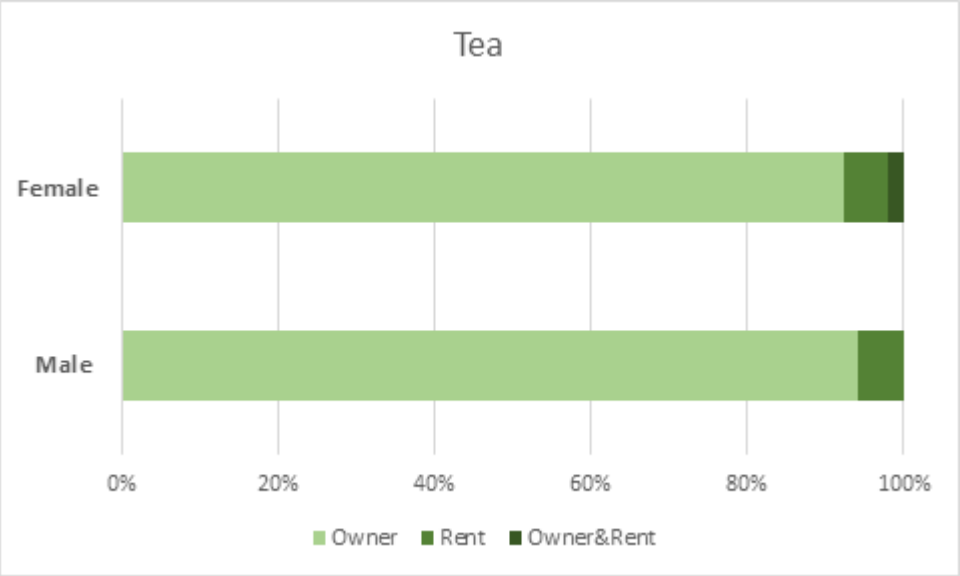
To identify gender-based differences in land ownership we analysed land tenure types (Owner, Rent, and Owner & Rent) among male and female farmers. Across all three value chains—rice, tea, and dragon fruit—land ownership is the predominant form of tenure regardless of gender. However, there are notable differences in renting and mixed tenure. In the rice sector, male farmers show a higher proportion of renting and mixed tenure compared to females (Figure 9). In the tea sector, a very small proportion of both genders engage in renting or a combination of ownership and renting, as indicated by the darker sections at the end of the bars (Figure 10). In the dragon fruit sector, renting and mixed tenure are more balanced between genders. However, male farmers show a slightly higher proportion of mixed tenure (Owner & Rent) compared to females (Figure 11). Overall, rice farmers display the most diversity in tenure types, while tea farmers are the most uniform, focusing almost exclusively on land ownership.

Figure 9: Land ownership and gender in the rice sector



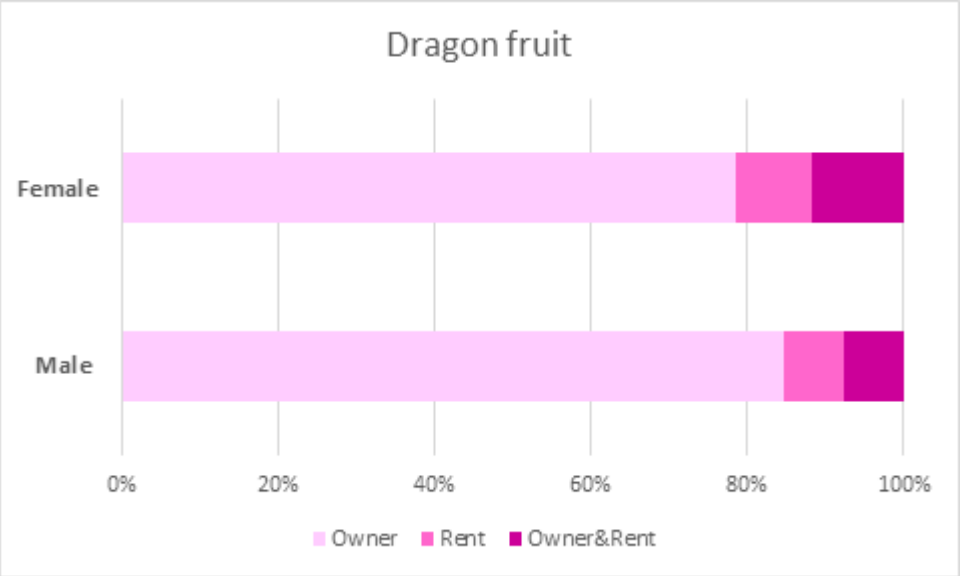
Source: Authors' elaboration on primary data

Figure 10: Land ownership and gender in the tea sector



Source: Authors' elaboration on primary data

Figure 11: Land ownership and gender in the dragon fruit sector



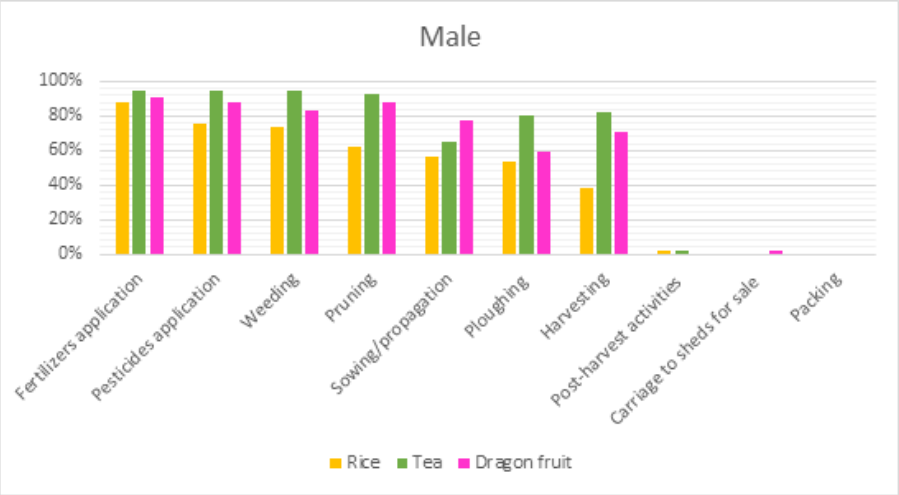
Source: Authors' elaboration on primary data

According to our data, there is no gender disparity regarding access to land. In all value chains, more than 95% of respondents answered "Yes" to the question "Do you believe women and men have the same ease in becoming landowners?"

When analysing the tasks carried out in the farms with gender differentiation, women seem to be more frequently involved in hazardous activities such as pesticides and fertilizer application, in each one of the selected value chains. On the other hand, men predominantly carry out tasks such as pruning and ploughing for tea and rice production.

Figures 12 and 13 illustrate the activities reported by male and female farmers across the three value chains. No significant differences emerge between the activities performed by gender. In the tea and dragon fruit value chains, nearly all male respondents reported undertaking activities such as the application of fertilisers and pesticides, weeding and pruning.

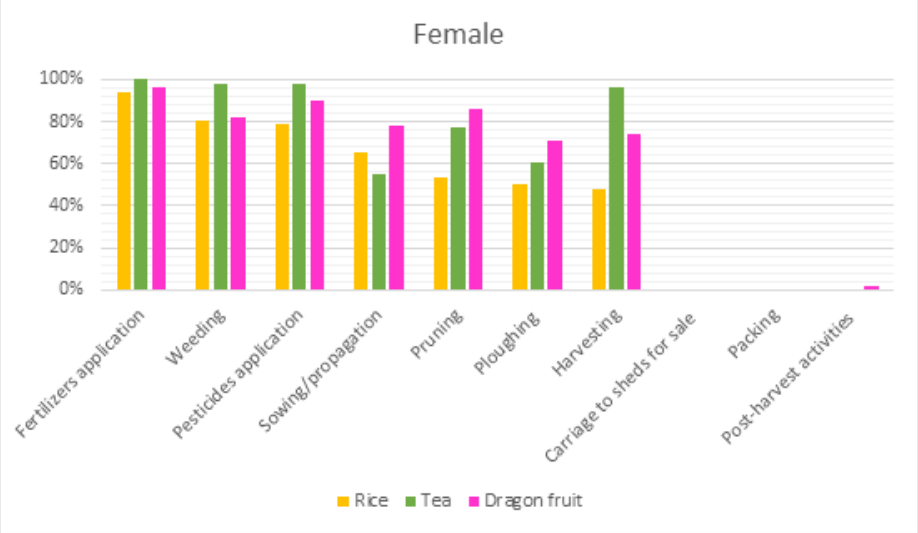
Figure 12: Activities reported by male farmers across rice, tea, and dragon fruit value chains



Source: Authors' elaboration on primary data

For women, in the tea value chain, almost all reported engaging in the application of fertilisers and pesticides, weeding and harvesting. In the tea and rice value chains, more men than women reported engaging in ploughing, whereas the opposite appears to be the case in the dragon fruit value chain.

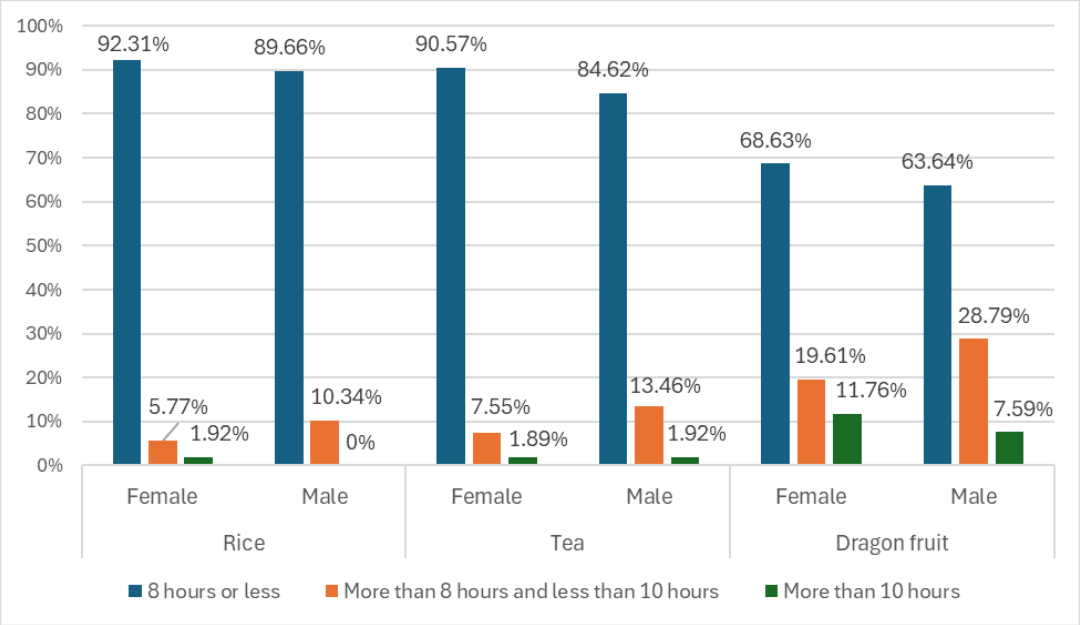
Figure 13: Activities reported by female farmers across rice, tea, and dragon fruit value chains



Source: Authors' elaboration on primary data

Focusing on working hours by gender, both women and men seem to work less than 8 hours per day on average for every value chain. Despite this, dragon fruit reports a much higher percentage of farmers stating to work more than 8 hours a day (more than 30 % compared to 6-10% for the rice and tea value chains). A difference in terms of gender can be observed concerning workdays exceeding 8 hours: while men declared more often than women to be working for more than 8 hours but less than 10 hours, the proportion of women working more than 10 hours is higher, with 11.76% of female dragon fruit farmers selecting this option, compared to 7.59% of men selecting the same answer (Figure 14).

Figure 14: Working hours, per gender

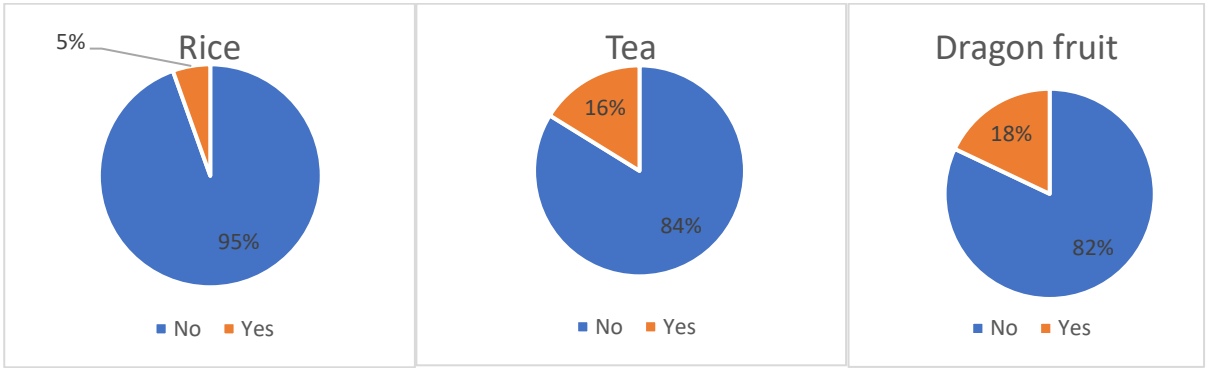


Source: Authors' elaboration on primary data

SDG 6

Results show that water-efficient practices are not applied in Vietnam (Figure 15): 94.55% of rice producers, 83.81% of tea producers and 82.05% of dragon fruit producers stated that they do not apply any of them.

Figure 15: Percentages of farmers using water-efficient practices, by crop

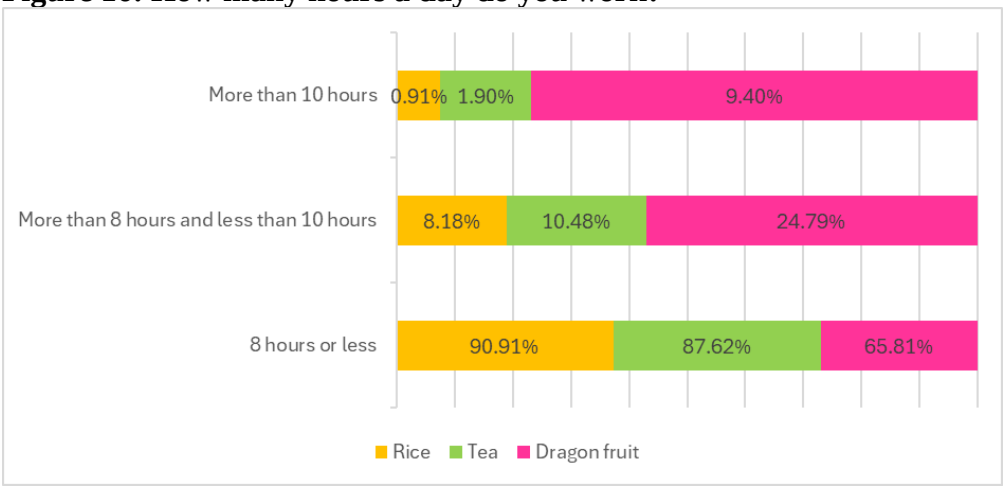


Source: Authors' elaboration on primary data

SDG 8

Figure 16 shows the working hours of farmers in the three analysed value chain in Vietnam. The majority of respondents in the rice sector (90.9%) and the tea sector (87.6%) reported working 8 hours or less. In contrast, 24.8% of farmers in the dragon fruit value chain stated that they work between 8 and 10 hours, while 9.4% reported working more than 10 hours.

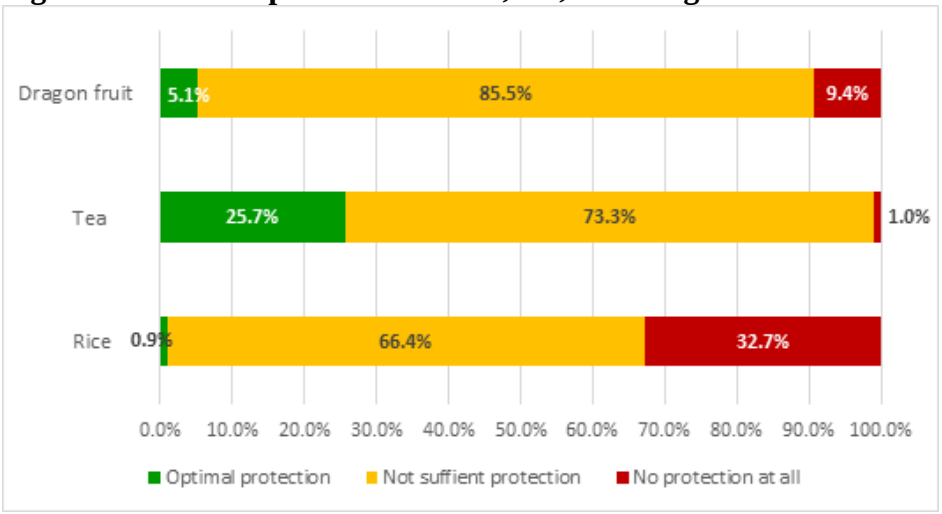
Figure 16: How many hours a day do you work?



Source: Authors' elaboration on primary data

Across all three value chains analysed, the majority of respondents reported not wearing sufficient protection when applying pesticides (Figure 17). Specifically, 32.7% of tea farmers stated that they do not use any form of personal protective equipment (PPE). This percentage is notably lower among dragon fruit farmers (9.4%) and almost negligible among tea farmers (1%). Conversely, 25.7% of tea farmers reported wearing all necessary protective equipment—including a mask, safety glasses or face visor, gloves, a protective suit, and boots—whereas only 5.1% of dragon fruit farmers and less than 1% of rice farmers reported doing so.

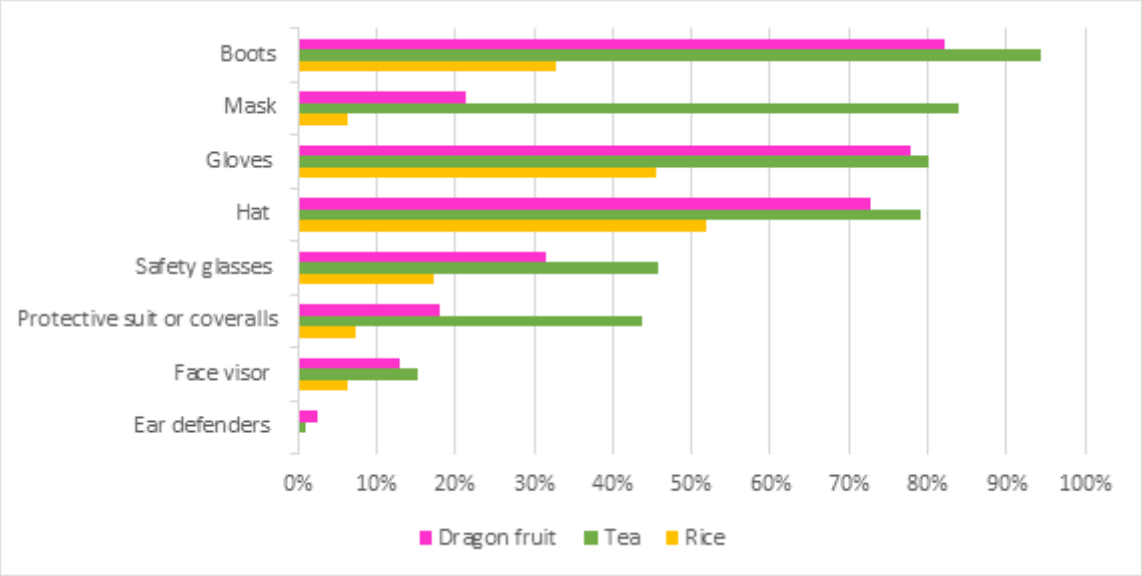
Figure 17: Level of protection of rice, tea, and dragon fruit farmers when applying pesticides



Source: Authors' elaboration on primary data

As illustrated in Figure 18, the most used self-protection devices vary by crop: for dragon fruit, these include boots, gloves, and hats; for tea, they consist of boots, masks, and gloves; and for rice, they are hats, boots, and gloves.

Figure 18: Type of equipment farmers use when applying pesticides



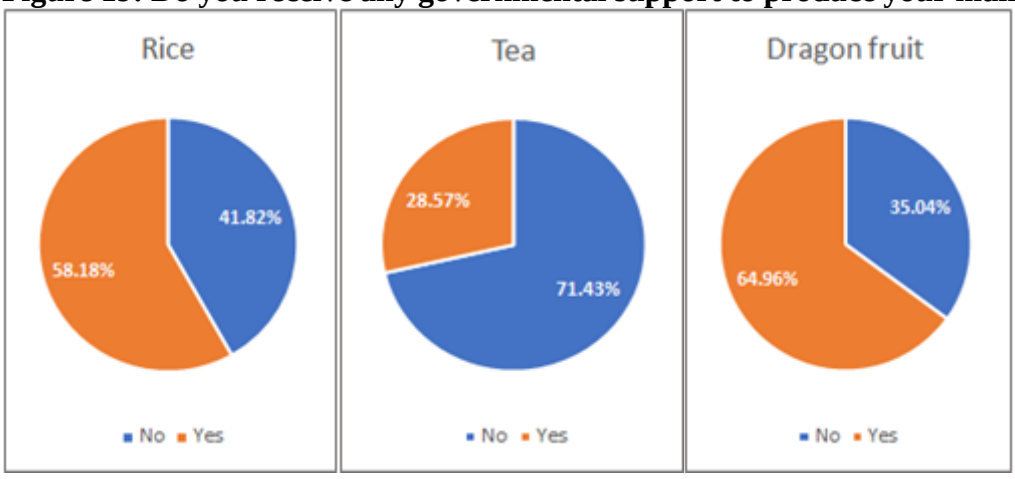
Source: Authors' elaboration on primary data

The analysis of the three value chains in Vietnam—rice, tea and dragon fruit—revealed no evidence of migrant workers being employed in any of the sectors studied. Additionally, there were no reported cases of child labour across these value chains.

SDG 15

Governmental support varies significantly across the different value chains (Figure 19). Dragon fruit receives the highest level of support, with nearly 65% of respondents reporting governmental assistance, followed by rice (slightly over 58%). In contrast, tea farmers appear to receive minimal support from the government.

Figure 19: Do you receive any governmental support to produce your main crop?



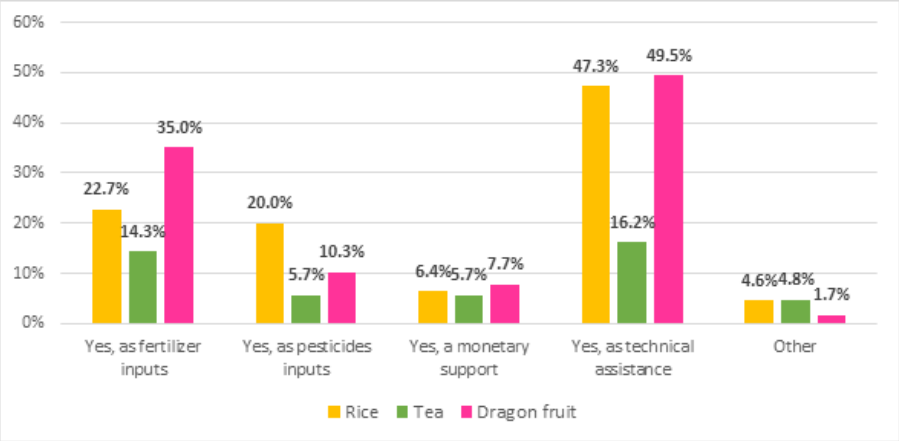
Source: Authors' elaboration on primary data

Type of governmental support

Figure 20 illustrates the types of governmental support received by Vietnamese farmers in the three value chains. Dragon fruit farmers are mainly supported through technical assistance (49.5%) and fertilizer inputs (35%). Rice farmers also receive notable support, with 47.3% benefiting from

technical assistance and 22.7% receiving fertilizer input support. In contrast, tea farmers receive the least assistance across all categories, with only 16.2% receiving technical support and minimal help for fertilizers (14.3%) and pesticides (5.7%). Monetary support is limited for all crops, with dragon fruit farmers receiving the highest share (7.7%).

Figure 20: Type of governmental support received by Vietnamese farmers in the three value chains

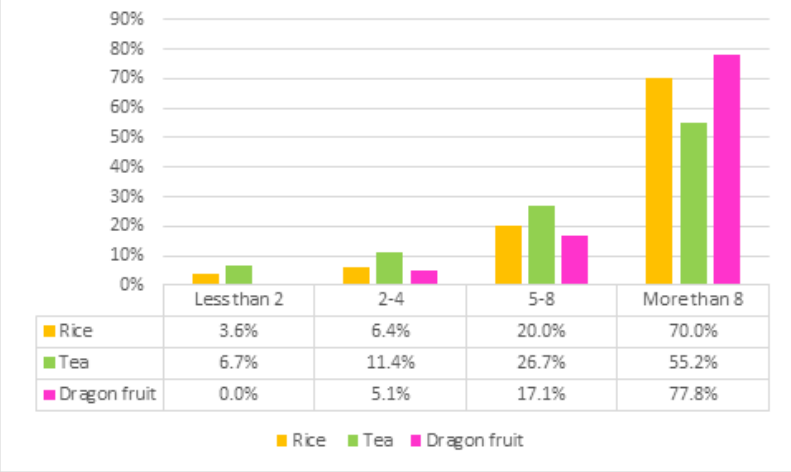


Source: Authors' elaboration on primary data

Pesticides

Although an agreement on environmental conditionality exists between Vietnam and the EU, and most farmers adopt sustainability voluntary standards, such as GlobalGAP and VietGAP, all three analysed crops undergo multiple treatments, with most respondents reporting that they apply more than eight treatments per season (Figure 21). Among the crops, dragon fruit receives the highest number of treatments, with nearly 78% of the sample applying more than eight pesticide treatments per season, and 17.1% applying between five and eight. Similarly, 70% of rice farmers reported applying pesticides more than eight times per season, while 20% applied treatments between five and eight times. In the tea value chain, a smaller percentage of farmers (55.2%) applied pesticides more than eight times per season, while a larger proportion fell into the five-to-eight treatment range.

Figure 21: Number of pesticide treatments in rice, tea, and dragon fruit



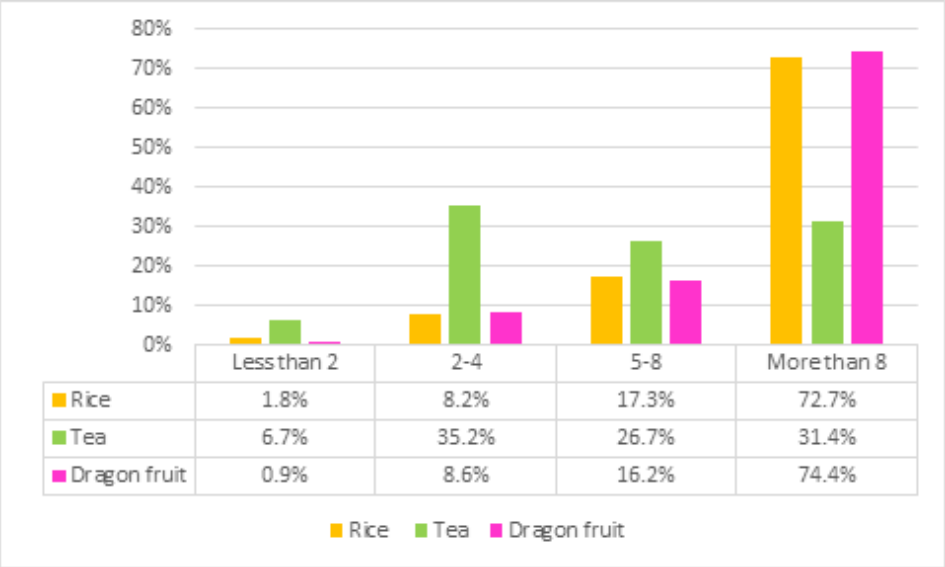
	Less than 2	2-4	5-8	More than 8
Rice	3.6%	6.4%	20.0%	70.0%
Tea	6.7%	11.4%	26.7%	55.2%
Dragon fruit	0.0%	5.1%	17.1%	77.8%

Source: Authors' elaboration on primary data

The analysis of fertiliser applications revealed similar trends in application frequency for rice and dragon fruit (Figure 22). In contrast, tea showed fewer fertiliser applications, with 35.2% of farmers

applying fertilisers between 2 and 4 times, 26.7% applying them between 5 and 8 times and 31.4% applying them more than 8 times.

Figure 22: Number of fertiliser treatments in rice, tea, and dragon fruit

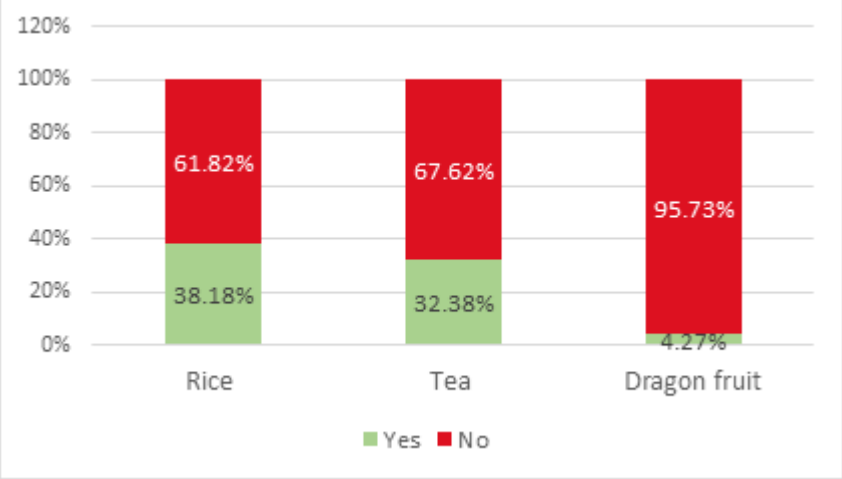


	Less than 2	2-4	5-8	More than 8
Rice	1.8%	8.2%	17.3%	72.7%
Tea	6.7%	35.2%	26.7%	31.4%
Dragon fruit	0.9%	8.6%	16.2%	74.4%

Source: Authors' elaboration on primary data

Rice is the value chain with the highest proportion of farmers reporting the use of methods to reduce chemical and fertiliser usage (e.g., crop rotation and use of compost and/or organic matter), followed by tea, where slightly more than one-third of farmers indicated adopting such practices. In contrast, over 95% of dragon fruit farmers stated that they do not implement any of the methods listed in the questionnaire (Figure 23).

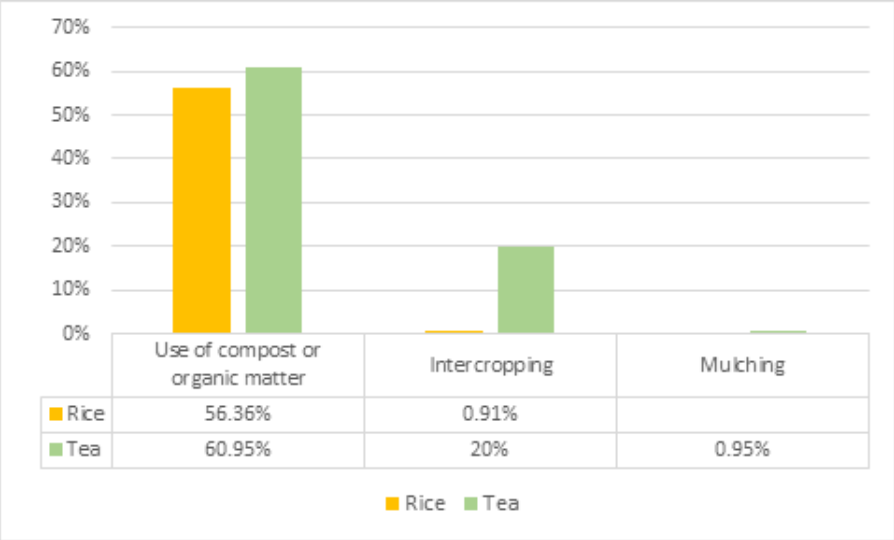
Figure 23: Percentage of farmers who apply methods to reduce pesticide and fertilizer application, by crop



Source: Authors' elaboration on primary data

The following percentages refer to farmers in the rice and tea sectors who adopted methods to reduce pesticide and fertilizer application. The most common practices adopted by farmers is the application of compost and/or organic matter. Additionally, 20% of tea farmers reported practicing intercropping.

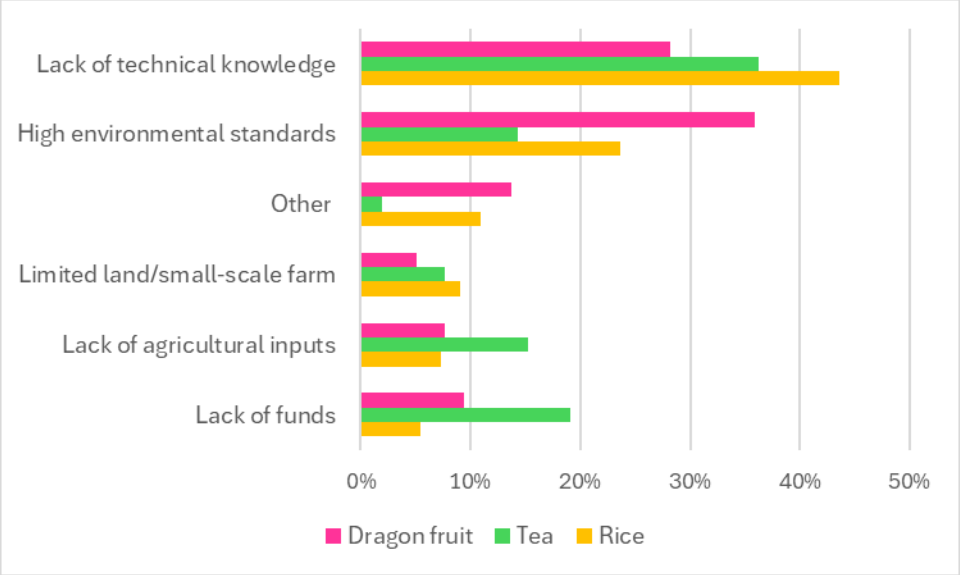
Figure 24: Methods applied by Vietnamese farmers to reduce the use of chemicals and fertilizers



Source: Authors' elaboration on primary data

The main barrier to the implementation of sustainable farming practices for the rice and tea value chains appears to be the lack of technical knowledge (Figure 25): 44% and 36% respectively. On the other hand, dragon fruit farmers seem to struggle more with the high environmental standards (36%), followed by the lack of technical knowledge (28%).

Figure 25: Main constraints to the implementation of sustainable farming practices, by crop



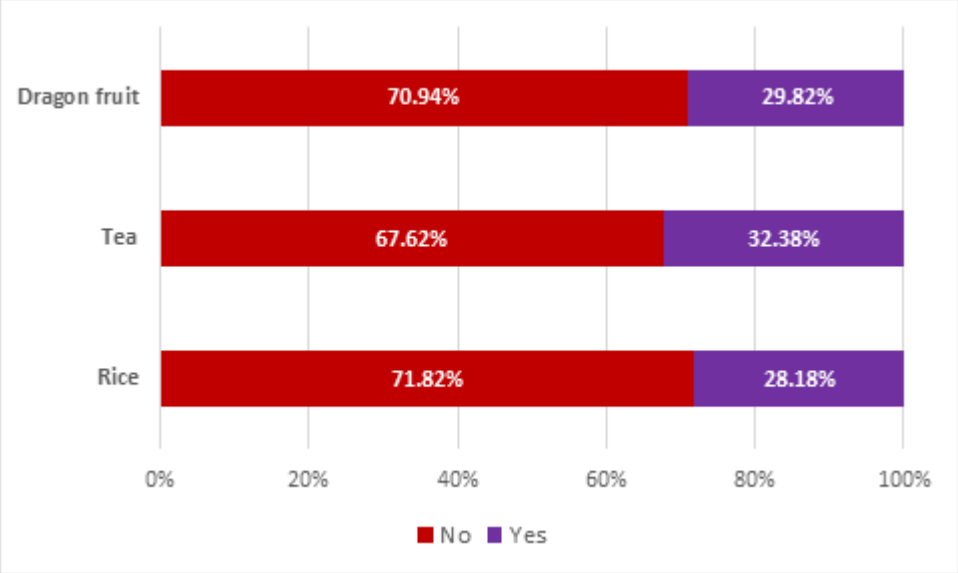
Source: Authors' elaboration on primary data

SDG 17

Farmers were asked whether they believe trade has the potential to enhance gender equality within the value chain (Figure 26), improve their bargaining power (Figure 27), and promote environmentally sustainable practices (Figure 28). On the one hand, the feedback on bargaining power and environmentally sustainable practices was positive for most respondents of each value

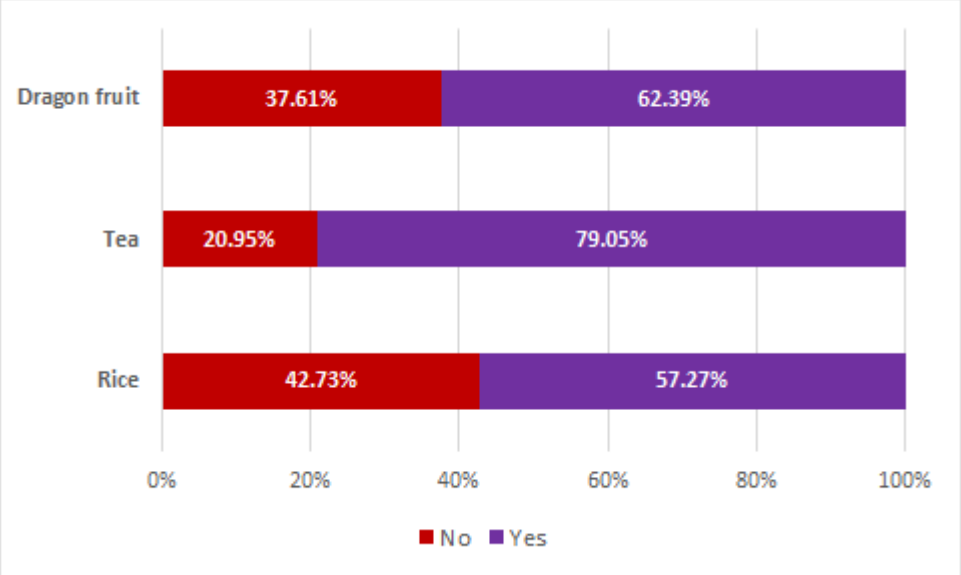
chain, especially for the tea value chain. On the other hand, around only 30% of the respondents for each value chain stated that they believe trade could have a positive influence on gender equality. This result suggests that while farmers recognize the potential of trade to improve their bargaining power and promote sustainability, they are less optimistic about its role in advancing gender equality. This could reflect the perception that gender inequality is more deeply rooted in social and cultural structures, which may not be easily addressed through trade alone.

Figure 26: Farmers' perception on the potential of trade to enhance gender equality, by crop



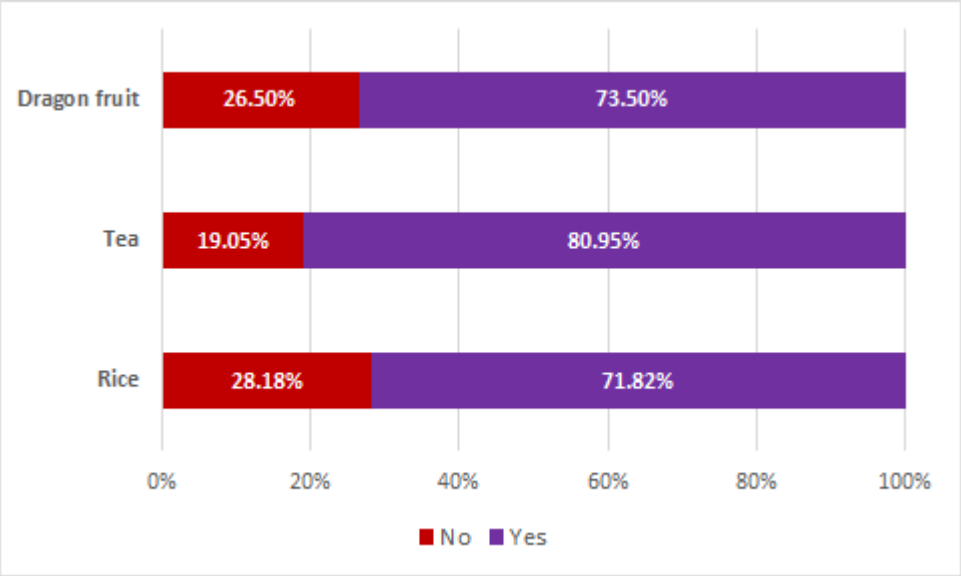
Source: Authors' elaboration on primary data

Figure 27: Farmers' perception on the potential of trade to enhance their bargaining power, by crop



Source: Authors' elaboration on primary data

Figure 28: Farmers' perception on the potential of trade to implement environmentally sustainable practices, by crop



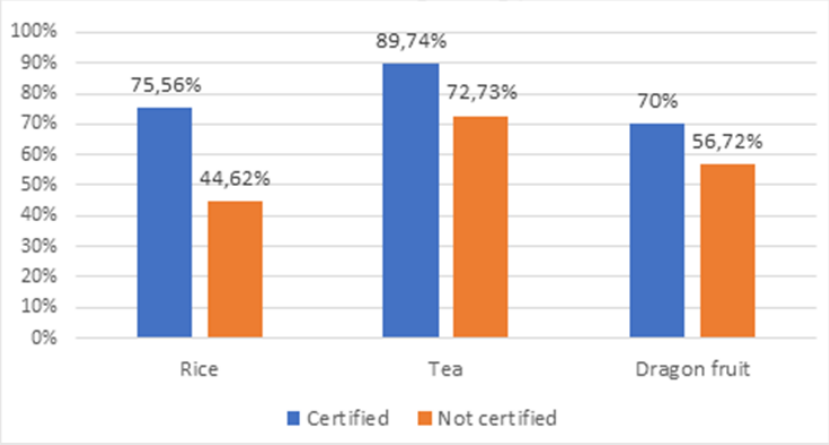
Source: Authors' elaboration on primary data

Certification and perception of trade

The following graphs represent the proportion of farmers who believe that trade can have a positive impact on their bargaining power (Figure 29), on gender equality (Figure 30) and on environmentally sustainable practices (Figure 31), categorized by product type (rice, tea, and dragon fruit) and certification status.

Across all products, certification significantly improves perceptions of trade as an enhancer of bargaining power, likely due to better market access, fairer prices, or stronger trade networks for certified producers (Figure 29).

Figure 29: Percentage of farmers who answered positively to question D.9, certified VS not certified (Trade and bargaining power)

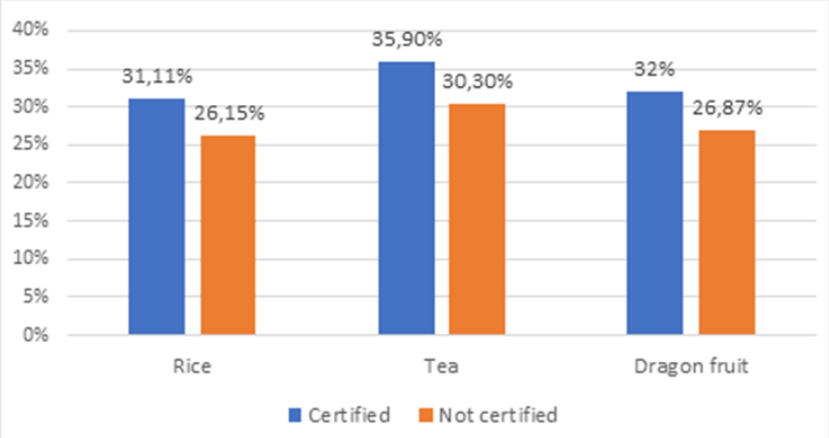


Source: Authors' elaboration on primary data

Tea farmers, both certified and non-certified, seem to be more trustful in the potential role of trade on bettering their bargaining power compared to rice and dragon fruit producers, suggesting that trade structures for tea may be better organized or producers more empowered compared to other products. The largest gap between certified and non-certified exists in the rice sector, where only

44.62% of non-certified producers see a benefit, compared to 75.56% of certified producers. This highlights a need for improved support for non-certified rice producers.
On the other hand, while certification positively influences farmers' perception of trade as a way of enhancing both bargaining power and gender equality, its impact on bargaining power is far more substantial. In gender equality, the percentages are lower, ranging between 31% and 36% (Figure 28). This suggests the need for more targeted efforts to reduce gender disparities within trade systems.

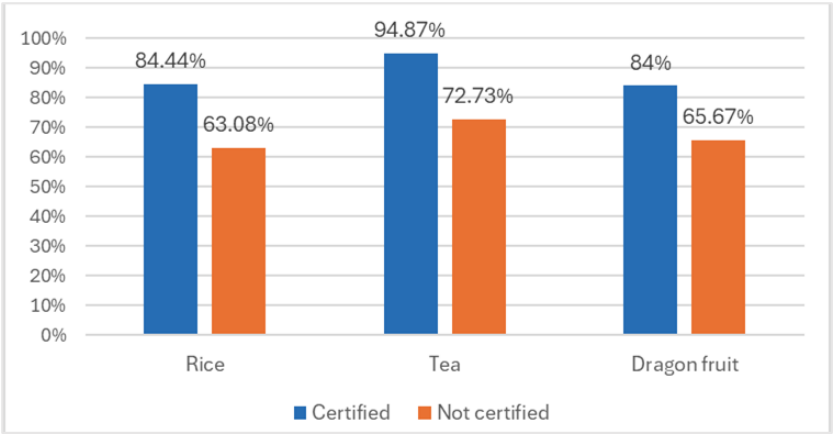
Figure 30: Percentage of farmers who answered positively to question D.8, certified VS not certified (Trade and Gender Equality)



Source: Authors' elaboration on primary data

When asked if trade can favour environmentally friendly agricultural practices the certified farmers seem to be more positive about trade's potential, than their non-certified counterpart (Figure 29). Also in the case, tea shows the most significant perception gap between certified and non-certified interviewees.

Figure 31: Percentage of farmers who answered positively to question D.10, certified VS not certified (Trade and Environment)



Source: Authors' elaboration on primary data

3.2.5 Conclusions

Rice value chain

The transformation of Vietnam's economy, rooted in the Doi Moi reforms, has positioned the country among the top rice producers worldwide, but persistent challenges threaten its long-term sustainability.

The rice sector remains vital for Vietnam's rural economy, employing a significant share of the population and providing stable incomes. With 80% of surveyed rice farmers reporting sufficient income to sustain their families and a median income of USD 5,034 during the 2022-2023 season, the sector demonstrates its potential to combat rural poverty (SDG 1). However, structural barriers, such as excessive land fragmentation limits productivity and efficiency, reducing farmers' bargaining power in markets.

Rice remains central to food security, with median yields of 18.47 tons per hectare in the surveyed areas of the MKD (SDG 2). However, reliance on chemical inputs and the limited adoption of sustainable practices pose risks to long-term productivity. Furthermore, the effects of climate change are exacerbating water scarcity and salinity intrusion, threatening rice harvests.

Women contribute significantly to the rice value chain but face challenges in farm size ownership (0.92 ha for women vs. 1.45 ha for men) and often perform hazardous tasks such as pesticide application, without adequate training (SDG 5). Despite having equal land access rights under the LURC system, cultural norms continue to influence land distribution and decision-making processes, often disadvantaging women. Furthermore, women remain underrepresented in leadership roles within cooperatives, limiting their influence in the rice sector.

Conventional rice cultivation methods negatively impact water availability (SDG 6). Despite governmental programs to support the adoption of water-efficient practices such as 1M5R, AWD, and the SRI, their implementation remains low in the country. Furthermore, challenges such as water scarcity and salinity intrusion continue to threaten rice yields, particularly in the MKD.

Informal labour practices persist in the rice sector, with about 33% of surveyed farmers not using any protective equipment, increasing health risks during the application of pesticides and fertilizers (SDG 8). Moreover, the seasonal nature of rice farming and reliance on oral agreements limit workers' access to social protection schemes. No evidence of child labour was specifically reported.

Conventional rice farming shows significant detrimental effects on ecosystems, including high GHG emissions and biodiversity loss caused by chemical-intensive inputs (SDG 15). Despite the potential of IFS and organic methods to conserve the environment, their adoption remains limited in the country. The intensive use of fertilizers in rice monocropping systems further exacerbates soil degradation and harms aquatic species.

Certification schemes such as VietGAP, GlobalGAP, and the SRP play a pivotal role in meeting export requirements and international market demands for Vietnamese rice (SDG 17). Certified rice farmers reported higher optimism regarding trade benefits, as certification significantly enhances perceptions of trade by improving bargaining power. This is likely due to better market access, fairer prices, and stronger trade networks available to certified compared to non-certified farmers. However, barriers such as high certification costs, limited value added for certified products, and fragmented landholdings hinder the broader adoption of VSSs.

Although Vietnam's government has made significant progress in promoting sustainability in the rice value chain, several gaps persist, including the widespread adoption of sustainable farming practices, empowering women, labour standards and work safety, limited market development for certified products. The future of the sector relies on integrated policies that comprehensively address these challenges. In this context, the EVFTA offers opportunities to incentivize the production of high-quality rice for both domestic and export markets.

Tea value chain

Production of tea in Vietnam is something historical, being one of the oldest cultivated crops in the country. Tea has a fundamental role in Vietnamese rural economy since smallholders' farmers own almost entirely its production, but challenges in terms of socioeconomic and environmental sustainability affect its fair development.

Despite a slowdown in 2023, the tea sector has been growing steadily since the 1990s in terms of productivity and exports, which is also projected to continue in the next future, representing the potential of local tea industry to be sustainably exploited, driving especially rural incomes (SDG1). However, this enhancement could not be achieved without specific interventions on product safety and quality, improvement of cultivation systems and off-farm services, boosting the general little scale production of 0.2 ha/household. This could also help meet the EU market standards which are difficult to comply with at present, due to structural and technical shortcomings in the sector.

In Thai Nguyen province, the country's second-biggest producer area, tea provides incomes for almost half of rural residents and almost the totality of the production is consumed at home here, underlying its strategic for local productivity and, consequently, for food security (SDG2). But challenges affecting the still knowledge-based tea industry like, among others, the reliance on fertilizers and chemical inputs, weather conditions threatening soils and crops quality and prices fluctuations, are making lower the interest of farmers in investing in tea value chain or in implementing organic production methods.

The presence of women in tea sector is prevalent, with up to 60% of women employed (SDG5). However, gender inequalities persist and concern mainly salaries (with a monthly gender pay gap of 37,5%), limited access to finance, credit and training.

Conventional tea cultivation methods negatively impact water, soil, product quality and people's health (SDG6). The effect on the environment is significant, especially because of the excessive use of chemicals inputs with inappropriate production techniques. Climate change is worsening water scarcity, a problem already threatening the tea sector, which foresees an increasing predicted water demand.

Vietnam is one of the ratifying countries of ILO Convention on child labour, but some reports estimate the presence of children involved in tea growing activities. Workers' representation in trade unions or organizations emerge as a controversial aspect, tea sector included. Positive social implications are underlined when adopting some specific agricultural practices, when a cooperative system is joined or if a certification system is implemented (SDG8).

Vietnamese agricultural sector is the second largest GHG contributor in the country and at the same time it faces climate change effects in various way. The tea sector suffers from issues related to soil quality and water availability, deeply affected both by weather conditions and conventional practices involving a thoughtless use of polluting inputs, justified mainly by cheaper prices, prompt availability and educational lack of some farmers. That is why a great institutional effort in shifting tea production

to alternative agroecological practices has been initiated and whose expansion seems to be increasingly necessary (SDG15).

National and international certification schemes such as VietGAP, GlobalGAP, UTZ and Rainforest are supported by a series of national policies dedicated to tea growers and promoted by international organizations (SDG17). Yet farmers applying standards are still few, with a rate of less than 10% applying VietGAP, despite higher profit efficiency and sustainability education resulting for those applying it. Organic tea farming is also gaining associative space, with organizations working to enhance it at national level, such as the Organic Agriculture Association (VOAA) and the Vietnam Organic Specialty Tea Alliance (VOSTEA).

Being aware of the criticalities affecting tea sector in Vietnam, the engagement in specific policies and projects as well as the effective implementation of those already existing and promoted by the central government and civil society is pivotal for achieving a productive, inclusive and sustainable growth. What is evident is that the transformation recently started in the tea sector in terms of cultivation methods transitioning from conventional to alternative agroecological practices (i.e. organic agriculture and agroforestry) has gathered positive results in terms of productivity, trade opportunities, environmental and consumers' health. In this framework, the EVFTA could then offer the right opportunities to enhance this revolution, while helping to fill the persisting gaps concerning gender equality, certification and quality standards adoption, and price stability in domestic and foreign markets.

Dragon fruit value chain

The production of dragon fruit in Vietnam is relatively recent, becoming the second most produced fruit after banana in just a few decades. The production is concentrated in three provinces, among which Binh Thuan represents over 60% of the cultivated area.
It is estimated that 80% of domestic production is intended for export: the main market is by far China, which accounts over 90% of Vietnamese dragon fruit exports, but other destinations are expected to grow (Europe included). The strong dependence on the Chinese market represents a critical point, as the development of the supply chain is affected by the policies implemented by China (the block on imports due to the COVID 19 pandemic has led to a decrease in the cultivated area in Vietnam) and by China's growing attention to the development of its own production which in the future will lead to a decrease in purchases of dragon fruit from Vietnam. Consequently, to maintain production profitability and take full advantage of its potential, Vietnam is almost forced to expand exports to other foreign markets, including the EU. However, access to these markets, especially those of the richest countries, depends on the supply chain's ability to meet international standards, which are increasingly stringent in terms of sustainability, quality and traceability (SDG1 and 2).

As emerged from the interviews, both producers and policy makers welcome the respect of higher standards because it brings benefits to workers, improves the quality of production, advances technology, making prices more stable and therefore improving the living conditions of farmers. At the same time, from literature reviews it emerges that compliance with higher standards is limited by the high presence of smallholder farmers in dragon fruit production who have difficulty respecting them and understanding their potential in terms of higher prices resulting from higher quality. Consequently, they focus on increasing the quantities produced, while increasing costs (by using pesticides, fertilizers and plant growth regulators) and losing competitiveness (SDG 8, 15 and 17).

Although production requires a large initial investment per hectare, dragon fruit is easy to grow, adapts to different temperatures, rainfall levels, drought and salinity levels and therefore is well suited to the cultivation capacity of smallholder farmers. For these reasons, despite the fast spread in

concentrated areas of the country, at the moment there have been no critical situations in terms of pollution and biodiversity losses (SDG6 and 15).

The literature review shows the crucial role played by cooperatives in the dragon fruit system, to plan production from quantitative and qualitative point of view, to technically and financially support cooperative members (predominantly small farmers) to ensure that they comply with the agreed production process and quality requirements and deal with downstream stakeholders from a position of greater bargaining power than the individual farm (SDG 1 and 8). However, respondents to the interviews point out the lack of a strong cooperative organization in the dragon fruit sector, compared to rice cultivation. In fact, the desk analysis highlights the limited number of dragon fruit cooperatives, mainly of small size.
However, cooperatives typically apply VietGAP or GlobalGAP standards and/or traceability systems to sell to foreign markets, which are the main destination of the dragon fruit they manage, forcing their members to apply the relevant standards.

Cooperatives and farmer associations can play a significant role also in terms of improving labour skills, educating and training farmers about specific practices linked to the dragon fruit crop (SDG8). This can be particularly relevant for women, since at the moment they are especially limited to simpler activities, mostly connected to fruit pickling and post harvesting practices. The role of cooperation can be crucial also for a more sustainable and efficient use of production factors, especially chemicals and water, and at the same time could help the diffusion of organic farming, quality certifications.

Finally, farmers have expectations on work safety and legal contracts too by joining cooperatives.
Sustainable development of dragon fruit production in Vietnam requires strengthening efforts to improve knowledge of quality standards in production among smallholders, keeping in mind that they have insufficient financial resources to make necessary changes to their farms and are faced with inadequate availability of institutional and scientific capacity to support compliance activities. The desk analysis highlighted the fragmentation of institutional level with competences overlapping between ministries, department, agency of each ministry at different territorial level, considered source of confusion among stakeholders (SDG17).

Another aspect highlighted is the presence of several actors, operating at diverse stages of the supply chain, with a significant presence of intermediaries (collectors) and little use of written contracts, resulting in an asymmetric distribution of benefits (SDG8). The interviews also revealed the large presence of informal relationships along the value chain, although this is not a specific characteristic of dragon fruit sector, which make farmers unaware of the possible benefits in terms of higher prices resulting from higher quality and compliance with standards. In this sense, strengthening cooperation among farmers and between farmers' cooperatives and the actors upstream and downstream in the value chain can help build a safe and reliable supply chain, capable of allowing everyone to benefit from the higher prices recognized for certified products (SDG17).

3.2.6 Policy recommendations

The following policy recommendations are directed at the EU to strengthen sustainability in Vietnam’s rice, tea and dragon fruit value chains. These recommendations are based on a comprehensive analysis of the literature, interviews with various stakeholders—including government institutions, farmers’ associations, and cooperatives—and quantitative data at the farmer level. This multi-faceted approach incorporates diverse perspectives. The key interventions aim to address several identified constraints that require action to develop more sustainable value chains, particularly within the context of the EU-Vietnam Free Trade Agreement (EVFTA). Specific areas

of focus include labour standards, environmental sustainability, climate change mitigation, forest management, and trade incentives.

3.2.6.1 Policy recommendations for promoting sustainability in the rice value chain

SDG 1: No poverty

Enhancing livelihoods and reducing poverty in agricultural communities:

- Promote fair wages and secure formal contracts for seasonal and vulnerable workers in value chains, ensuring compliance through collaboration with Vietnamese authorities and stakeholders.
- Support smallholder farmers by improving access to trade incentives and market opportunities, particularly for certified sustainable products.
- Facilitate partnerships with cooperatives and NGOs to enhance smallholders' integration into value chains, reducing poverty through equitable value distribution.

SDG 2: Zero hunger

Ensuring food security and sustainable agricultural practices:

- Promote EU-Vietnam knowledge-sharing initiatives to advance climate-smart agricultural innovations like precision agriculture.
- Scale up sustainable farming techniques such as the SRI and organic farming to boost productivity while maintaining environmental health.
- Encourage adoption of VietGAP and GlobalGAP certification to improve production standards and marketability.
- Support capacity-building initiatives to improve knowledge of efficient farming practices, enhancing resilience to pests, diseases, and market fluctuations.

SDG 5: Gender equality

Empowering women and promoting gender equity in agriculture:

- Strengthen women’s leadership through targeted capacity-building programs and create opportunities for women in decision-making roles in cooperatives and farmer associations.
- Promote gender-inclusive training on the safe use of pesticides, fertilizers, and tools to improve workplace safety for women.
- Encourage gender-responsive policies within value chains to address the specific needs of women farmers and workers.

SDG 6: Clean water and sanitation

Promoting sustainable water management:

- Support public-private partnerships to improve irrigation systems and ensure water-efficient practices, such as AWD.
- Provide technical assistance to address water scarcity and salinity intrusion through infrastructure investments in canals and small ditches.

- Facilitate adoption of low-emission farming techniques to reduce water pollution from chemical inputs and protect water resources.
- Support Vietnam's climate adaptation efforts by addressing drought and salinity intrusion with technical assistance and infrastructure investments.

SDG 8: Decent work and economic growth

Advancing labour standards and economic opportunities:

- Align labour standards with the ILO Decent Work Agenda to improve conditions for all workers, ensuring fair wages and workplace safety.
- Strengthen monitoring systems to track compliance with labour rights across the rice, tea, and dragon fruit value chains.
- Collaborate with exporters and cooperatives to create more economic opportunities for smallholder farmers through value-added initiatives.

SDG 15: Life on land

Conserving ecosystems and promoting biodiversity:

- Encourage integrated rice-fish systems to boost productivity while conserving natural habitats, offering technical and financial support.
- Strengthen enforcement of land-use regulations to limit the conversion of biodiversity-rich areas into agricultural fields.
- Support restoration of degraded farmland through reforestation and sustainable land-use practices.

SDG 17: Partnerships for the goals

Strengthening global partnerships for sustainable value chains:

- Collaborate with Vietnamese authorities to establish certification systems for sustainable practices and promote technologies like blockchain for traceability.
- Build capacity for Vietnamese enterprises and authorities to ensure compliance with EU sustainability regulations, such as the Regulation on Deforestation-Free Products (EUDR).
- Develop an integrated digital platform to improve data sharing, supply-demand management, and market transparency within the value chains.
- Facilitate access to climate finance for adopting low-emission technologies, such as 1M5R and AWD, to reduce methane emissions.

3.2.6.1.1 Trade-specific sustainability concerns for rice value chain

The EU-Vietnam Free Trade Agreement presents an opportunity to strengthen sustainability in Vietnam’s rice sector by improving market access, while ensuring environmental and social responsibility.

A critical step is to expand the role of voluntary sustainability standards, such as the Sustainable Rice Platform, GlobalGAP and organic certifications, in shaping trade relations between the EU and Vietnam. Additionally, VietGAP should be better aligned with other international certifications, to ensure full recognition in global markets, particularly in the EU and USA. While the EU has

established tariff rate quotas for Vietnamese rice, a more ambitious approach would involve linking tariff preferences to sustainability performance, thereby incentivizing exporters and farmers to adopt certified practices. To support this transition, the EU should facilitate capacity-building programs that provide Vietnamese farmers with the knowledge and financial resources needed to comply with these standards. Promoting training on sustainable farming techniques, such as alternate wetting and drying and the system of rice intensification, could significantly improve environmental outcomes by reducing methane emissions and water use.

Beyond certification, enhancing market access and value addition is crucial to ensure that Vietnam moves beyond exporting raw rice at low prices. Currently, Vietnamese rice often struggles to compete in high-value EU markets due to quality concerns and limited branding strategies. Moreover, EU consumers are often unaware of the geographical indications of Vietnamese rice, limiting its recognition and potential premium pricing in European markets. To address this, EU support should focus on rice processing and quality improvement, allowing Vietnam to export premium, high-value rice varieties rather than primarily raw milled rice. The EU should also foster direct partnerships between Vietnamese cooperatives and EU buyers, reducing reliance on intermediaries who retain a disproportionate share of profits. Strengthening trade linkages at the cooperative level will allow smallholder farmers to benefit from price stability and better bargaining power in international markets.

Despite the Government of Vietnam promoting a voluntary social security program, Vietnam's rice sector still faces challenges related to informal labor, including precarious working conditions, lack of social protection, and unsafe work environments. The EU should integrate stronger labor and social standards within the trade framework to ensure that rice exports to Europe comply with ILO conventions on fair wages, safe working conditions, and worker rights. Additionally, gender disparities persist in wages, access to resources, and decision-making roles within the sector. The EU should support gender-responsive policies that promote training, financial incentives, and leadership opportunities for women. Special attention should be given to women's participation in farms and cooperatives, ensuring they receive targeted assistance in meeting export standards.

Another pressing concern in the rice value chain is environmental sustainability, particularly regarding water use, greenhouse gas emissions, and biodiversity loss. Rice production in Vietnam is a major source of methane emissions and relies on unsustainable water consumption. The EU should require exporters to report on environmental impacts and promote best practices through sustainability-linked trade incentives. Additionally, EU support for climate finance mechanisms could help farmers transition to low-emission rice production, ensuring compliance with international climate commitments (e.g., the Paris Agreement). The promotion of eco-friendly packaging and sustainable supply chain logistics could further reduce the environmental footprint of Vietnamese rice exports. Furthermore, the EU should prioritize sustainable procurement policies, encouraging European retailers and public institutions to source rice that meets high environmental and social standards.

Finally, strengthening EU-Vietnam cooperation on sustainable rice trade would benefit from the establishment of a Sustainable Rice Taskforce, bringing together policymakers, businesses, and farmer cooperatives to monitor progress and address emerging challenges. This task force could also support the Public-Private Partnership Taskforce on Rice, launched by the Vietnamise Ministry of Agriculture and Rural Development, by aligning efforts to enhance sustainability, strengthen farmer partnerships, and improve compliance with market requirements.

3.2.6.2 Policy recommendations for promoting sustainability in the tea value chain

SDG 1: No poverty

Enhancing livelihoods to reduce inequalities in rural agricultural communities:

- Support secure and formal contracts to overcome the current informal arrangements to ensure both national and migrant workforce stability and working rights.
- Enhance cooperatives' membership to facilitate smallholders' farmers integration into national and foreign markets, supporting their access to training, in-farm and off-farm services.
- Build smallholder farmers capacity by facilitating access to trade incentives and market opportunities as well as by upgrading their technical skills in terms of cultivation methods, thus working on the market instability issue.

SDG2: No hunger

Agricultural sustainability as vector for improving food security:

- Develop a set of policies and practical tools to reverse the negative trend regarding the interest of farmers in investing in the tea industry, fighting the dependence on chemical inputs and enhancing organic production methods improving the environment, product and consumers' health.

SDG5: Gender equality

Empowering women's right in tea industry:

- Strengthen women's access to credit and finance tools through targeted capacity-building actions and policies to create equal opportunities and lower the gender salary gap.

SDG6: Clean water and sanitation

Promoting sustainable water management:

- Create strong partnerships among stakeholders to improve irrigation systems and ensure water-efficient practices in view of the future predicted water demand due to climate change.
- Provide technical assistance to smallholder's farmers to adapt and address water scarcity through infrastructure investments, as well as boosting sustainable farming techniques to reduce the impacts of chemicals on water and soils.

SDG8: Decent work and economic growth

Enhance labour standards and farmers' representation:

- Reinforce the implementation of labour standards aligning with the ILO Decent Work Agenda, especially those related to child labour, while improving wages and contracts conditions for all workers.
- Strengthen workers' representation within workers' organizations to effectively bring forward the real demands and needs of tea workers at institutional level.

SDG15: Life on land

Conserving ecosystems and promoting biodiversity through sustainable agricultural shift:

- Strengthen the shift already underway in the agricultural sector toward agroecological practices through targeted tools and policies, financial aid and technical capacity building addressed to all producers, especially smallholders' ones.
- Combine the institutional effort to shift tea production to alternative agroecological practices with technical partnerships and bottom-up approaches that include the different stakeholders in the sector.

SDG17: Partnership for the goals

Strengthening institutional and technical partnerships for sustainable tea production:

- Collabourate with national authorities to enhance quality and sustainability standards application, also through information campaigns and training to farmers on the benefits of the enforcement in terms of profit efficiency, product quality and awareness of sustainability issues.
- Build capacity for Vietnamese institutions, authorities, cooperatives and farmers to ensure compliance with EU sustainability regulations as well as international safety and sustainability standards through technical training.
- Enhance institutional and scientific cooperation between Vietnam and the EU to improve linkages and integration into the policy measures and standards required by the European market.

3.2.6.2.1 Trade-specific sustainability concerns for tea value chain

Enhancing trade relations between Vietnam and the EU through a sustainable and fair implementation of the EVFTA will imply, in the short-medium run, an export alteration from least developed countries, which confirm themselves as main importers of Vietnamese tea due to low entry market requirements. An opportunity that could boost the already recognized and protected GIs (i.e. tea of Mộc Châu) imports within the European market, improving their visibility and quality recognition.

Since tea is mainly exported as raw material with the private sector gaining space as trade vector, a stronger link between the two economies should enhance the implementation of required measures bettering product safety and quality, as well as marketing and product diversification processes, which could boost producers' and exporters' added value.

A sustained bilateral trade would mean also a major improvement effort for local tea industry, especially in terms of sector technology and spreading of sustainable cultivation methods, since unsustainable practices and pesticide use remain among the most important challenges to be addressed. In the medium-long term, this would help overcome the stumbling block of SPS measures, which are among the main obstacles to the export of Vietnamese agricultural products to the EU.

The general improvement expected in the long-run and due to the systematic measures and policies to be adopted locally should contribute to all the three sustainability dimensions, implying a strong institutional involvement and effort. Thanks to the expected and required increased technical skills of workers and the expanded commercial relationships, workers' salaries and land productivity could improve, addressing challenges like small-scale producers' low bargaining power. Forms of cooperation should be vital in this sense, since they are already identified as pivotal in improving workers' conditions and product positioning in the market. Likewise, the implementation of

certification systems should gain space, reflecting the benefits enjoyed to date by only a small proportion of producers adhering so far to the various standards in place.

During the whole process, the speed of the transformations required at the local level will have to be considered, trying not to leave behind those who are already experiencing the difficulties of agricultural sector and those specific of the tea supply chain. A controlled growth expansion would let local institutions to pay attention to the needs of small-scales farmers, the majority of tea producers, avoiding uncertain effects on local production and processing industry and preventing benefits to be experienced, instead, by a small group of larger companies. At the same time, this could also help avoiding the intensification of inputs' use in response to a required higher production.

An additional effect of reinforced bilateral trade relations should positively concern workers' representation and collective bargaining, focusing the attention on the functioning of WOs and their engagement in fairly promoting labourers' rights.

3.2.6.3 Policy recommendations for promoting sustainability in the dragon fruit value chain

SDG 1: No poverty

- Enhance farmers' capacity building in terms of training, with particular attention to women, so to include them in the job chain with higher skills and awareness.
- Reinforce the establishment of formal contracts and appropriate extension service to fight poverty and unskilled labour, also through cooperatives' role.
- Improve trade through specific technical and economic actions to enhance farmers' income and consequently reduce poverty.

SDG 2: Zero hunger

- Support a more transparent framework of rights in terms of land inheritance practices and women roles, as a vehicle for fighting hunger at the household level.
- Ensure diverse forms of support to small farmers, as well as their integration and fair relationships with the sectoral value chain through specific policy at local and national level.

SDG 5: Gender equality

- Promote gender equality in terms of land right access, currently linked mainly to inheritances and marriages, while securing training and skills growth in favour of women involved in agriculture.
- Encourage fair labour division within households to help women self-determination and contribution to the family management.
- Strengthen skill labour through technical training and educational programs to improve dragon fruits' farmers skills required for the production and picking of the fruits.

SDG 6: Clean water and sanitation

- Encourage water management distribution taking into account that dragon fruit is a good draught-resistant crop and adapts relatively well to salinization. Specific measures could be adopted to make water rationally distributed though the year.

SDG 8: Decent work and economic growth

- Enhance the implementation of written and formal contracts, with the support of cooperatives and farmers association, to help framing the legal background.
- Support smooth product and process certifications to enhance quality outputs, securing better prices and larger sales on the markets.
- Reduce bureaucratic burdens on local farmers and traders, making legal work transparent and efficient and ensuring proper institutional support to all the actors of dragon fruit value chain.
- Encourage sectoral growth and quality improvement through a better work organization, including improvement in the value chain links and in the post-harvesting efficiency.
- Collabourate for the development of a local processing industry for juices and soda drinks, where second choice and undersized fruits could be better utilized. This would help also to differentiate destinations and market segments.

SDG 15: Life on land

- Implement policies enhancing the role of cooperatives for a better and more efficient use of production factors, so to reduce the risk of biodiversity reduction.
- Build capacity to reduce pollution deriving from overuse and irrational use of chemical products to ensure a more rational land use.
- Support the spread of organic production, which at the moment is rather limited but has a large potential both in the fresh and processed market.

SDG 17: Partnerships for the goals

- Enahnce dialogue and cooperation among old and new partners, as well as international donors, in order to improve the setting up and the adoption of quality and geographical certifications. Standard adoptions could ensure access to richer markets while contributing to better life and work conditions, both as consequences of improved revenues from the dragon fruit crop.
- Support policies that improve the conditions for farmers to join and follow the agreed protocols on good practices, so to make their participation more stable and avoid the current trend of good practices abandoning.
- Ensure measures to improve a higher level of fairness along the value chain of the dragon fruit to make farmers less weak and exposed to price and market fluctuations.

3.2.6.3.1 Trade-specific sustainability concerns for dragon fruit value chain

The likely and to a certain extent desirable increase of dragon fruit exports towards the EU will imply, at least in the short-medium run, a diversion from exports towards China, which at the moment is by far the largest customer for dragon fruit. As a consequence, there will not be a sudden increase of the production, also due to the limited capacity in terms of land availability and skilled resources. At the same time, trade with the EU will imply better economic conditions and a favouable trend toward the upscaling of the quality of the fruit, which are expected to improve prices and incomes for farmers.

In the longer run, skills and training for workers in the value chain are supposed to grow as an effect of the improve of commercial relationships with the EU, which imply better work conditions for all categories, and especially for women, who are at the moment cut out of the most skilled labours. In this case the potential role of cooperatives is key, especially for small farmers who are the weakest link in the value chain.

Trade growth within the implementation of specific agreements with the EU might imply a revision of the support mechanism of the domestic production, as well as a change in the quality standards of the production, which might have uncertain effect of the local production. Besides, a fast improvement in trade might weaken the chance to build a domestic processing industry.

Finally, a uncontrolled growth of trade might also imply an intensification and an irrational use of chemicals and water in the production process. This will aggravate pollution and water management in the country, with undesirable impacts on environment and natural resource uses.

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4. Annexes

4.1 Qualitative questionnaire: farmers' organizations and cooperative members (Ghana)

PARTICIPANT DETAILS

Name: ……
Surname: …..
Gender: Male or Female
Full organization name: ……

INTRODUCTION

The objective of the "qualitative" questionnaire is to collect data and information relating to the cocoa and cashew sectors in Ghana from representatives of agricultural organizations and cooperatives. The involvement of these actors is considered a key aspect to complete the information that will be collected through the "quantitative" questionnaire distributed to farmers.
As regards the structure of this questionnaire, reference was made to the SDGs (and respective indicators) according to the aims of the project, selecting the most relevant ones and classifying them into four macro areas (economic, environmental, social, certification).
The list of SDGs considered is as follows:

- *SDG 1. End poverty in all its forms everywhere.*
- *SDG 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture.*
- *SDG 5. Achieve gender equality and empower all women and girls.*
- *SDG 6. Ensure availability and sustainable management of water and sanitation for all.*
- *SDG 8. Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all.*
- *SDG 15. Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.*
- *SDG 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development.*

A. ECONOMIC SECTION

SDG Indicator 2.3.2: Average income of small-scale food producers, by sex and indigenous status.

1. In your opinion, how could an expansion of trade opportunities with the EU impact the income of small cocoa and cashew producers in Ghana?
2. Which actors would benefit the most?
3. Please, inform on main challenges experienced by cocoa and cashew small-scale farmers in Ghana.
4. In your sector (cocoa and cashew) to which extent small-scale producers are involved in farmers' organizations (such as cooperatives) to strengthen their bargaining power and revenues?

B. SOCIAL SECTION

SDG Indicator 1.4.2 Proportion of total adult population with secure tenure rights to land, (a) with legally recognized documentation, and (b) who perceive their rights to land as secure, by sex and by type of tenure.

1. Which are the main challenges that the farmers' community is facing towards land tenure rights?
2. Concerning farmers' land tenure rights, are there in place different provisions (or practices) based on gender (i.e., women discrimination)?
3. Please refer to the main issues (challenges) regarding sharecropping practices in the cocoa and cashew sectors.

SDG Indicator 5.a.2 Proportion of countries where the legal framework (including customary law) guarantees women's equal rights to land ownership and/or control.

See questions for SGD 1.4.2

1. Which are the main challenges that the farmers' community is facing towards land tenure rights?
2. Concerning farmers' land tenure rights, are there in place different provisions (or practices) based on gender (i.e., women discrimination)?
3. Please refer to the main issues (challenges) regarding sharecropping practices in the cocoa and cashew sectors.

SDG Indicator 8.3.1 Proportion of informal employment in total employment, by sector and sex.

1. Which is the proportion of informal employment over the total employment in your sector (cocoa and cashew)?
2. In your opinion, how an expansion of trade opportunities with the EU would impact informal employment in Ghanian cocoa and cashew sectors?

SDG Indicator 8.7.1 Proportion and number of children aged 5-17 years engaged in child labour, by sex and age.

Overall prevalence of child labour in cocoa producing areas in Ghana has not substantially decreased over the last 10 years. A Report by the European Commission states that roughly 770.000 children in Ghana work on cocoa farms, 57% of which are boys and 43% are girls. Dangerous forms of child labour (particularly the use of agrochemicals products) concern 55% of Ghanaian households.

1. According to your experience, how much frequent is child labour in your farm?
2. Do your children help on the farm (e.g., how many hours a day during the season, how often)? and which are the biggest challenges that children working on farms are currently facing?
3. Has child labour in cocoa and cashew sector also an impact on children schooling?
4. In your opinion, how an expansion of trade opportunities with the EU would impact child labour in Ghanian cocoa and cashew sectors?

SDG Indicator 8.8.2 Level of national compliance with labour rights (freedom of association and collective bargaining) based on International Labour Organization (ILO) textual sources and national legislation, by sex and migrant status.

Workers in vulnerable employment are the least likely to have formal work arrangements, social protection, and safety nets to guard against economic shocks; thus, they are more likely to fall into poverty.

1. Can you provide information on the situation concerning labour rights (contracting) of workers involved in cocoa and cashew sectors in Ghana?

2. In your opinion, how an expansion of trade opportunities with the EU would impact labour rights in Ghanian cocoa and cashew sectors?

SDG Indicator 8.8.1 Fatal and non-fatal occupational injuries per 100,000 workers, by sex and migrant status.

1. According to your experience which are the most common issues when it comes to the work safety of operators in the cashew and cocoa sectors in Ghana?
2. Can you describe how much the use of migrant workers is spread in cocoa and cashew sectors? Which challenges, difficulties, migrants commonly face according to your experience?
3. In your opinion, how an expansion of trade opportunities with the EU would impact the condition of migrants working in Ghanian cocoa and cashew sectors?

C. ENVIRONMENTAL SECTION

SDG Indicator 2.4.1 Proportion of agricultural area under productive and sustainable agriculture.

1. Which are the main challenges concerning water and soil, and in general the environment, in your sector (cashew and cocoa)?
2. In your opinion, how an expansion of trade opportunities with the EU would impact agricultural output and consequently water and soil conditions in Ghanian cocoa and cashew sectors?
3. Are you aware of any national sustainable agricultural schemes applied to your sector (cashew and cocoa) in Ghana? If yes, please indicate which schemes and the respective agronomic commitments that farmers must respect.
4. Is your production threaten by the activities of other/ nearby economic agents? If yes how?

SDG 6 Ensure availability and sustainable management of water and sanitation for all.

1. Concerning your sector (cocoa and cashew plantations) are you experiencing concerns on water management, water availability, changing rainfall patterns, and quality of water resources?
2. Could the source of water of your cocoa farm be threatened by nearby economic activities (eg. Mining, factory etc)?

SDG Indicator 15.2.1 Progress towards sustainable forest management.

1. According to your experience, do the crops you are cultivating (cocoa and cashew) currently have an impact on forestry land (i.e. any forestry area recently converted into plantations)?
2. In your opinion, how can an expansion of trade with the EU would impact deforestation in Ghanian cocoa and cashew sectors?

SDG Indicator 15.5.1 Red List Index.

1. According to your experience, do the crops you are cultivating (cocoa, cashew) currently have an impact on wildlife biodiversity?

D. CERTIFICATION SECTION

SDG Indicator 2.5.1 Number of (a) plant and (b) animal genetic resources for food and agriculture secured in either medium- or long-term conservation facilities.

1. Are you experiencing specific challenges (productivity, low resilience to infestation of pests and diseases, loss of quality) originating from limited genetic diversity (variety set) in your sector (cashew or cocoa)?

SDG Indicator 17.14.1 Number of countries with mechanisms in place to enhance policy coherence of sustainable development.

1. How many Voluntary Sustainable standards (such as 4C, Fairtrade International, Global G.A.P) are spread across your sector (cocoa and cashew)?
2. In your opinion, how an increase of trade opportunities with the EU would impact on the diffusion of Voluntary Sustainable standards in Ghanian cocoa and cashew sectors?

4.2 Qualitative questionnaire: policy makers, researchers and NGOs (Ghana)

PARTICIPANT DETAILS

Name: …..
Surname: …..
Gender: Male or Female
Full organization name: …..

INTRODUCTION

The objective of the "qualitative" questionnaire is to collect data and information relating to the cocoa and cashew sectors in Ghana from institutional policy makers, researchers and NGOs. The involvement of these actors is considered a key aspect to complete the information that will be collected through the "quantitative" questionnaire distributed to farmers.
As regards the structure of this questionnaire, reference was made to the SDGs (and respective indicators) according to the aims of the project, selecting the most relevant ones and classifying them into four macro areas (economic, environmental, social, certification).
The list of SDGs considered is as follows:

- *SDG 1. End poverty in all its forms everywhere.*
- *SDG 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture.*
- *SDG 5. Achieve gender equality and empower all women and girls.*
- *SDG 6. Ensure availability and sustainable management of water and sanitation for all.*
- *SDG 8. Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all.*
- *SDG 15. Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.*
- *SDG 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development.*

A. ECONOMIC SECTION

SDG Indicator 2.3.2: Average income of small-scale food producers, by sex and indigenous status.

According to FAO, in cocoa sector the estimated farmer income is $ 0,84 a day. Consequently, the incomes of 73% to 90% of cocoa farming households do not reach the level of a ''living income'.

1. Which are according to your knowledge/experience the main drivers behind such trends?
2. Please inform as well about the main challenges experienced by small-scale cocoa producers in Ghana and the impact on their income of a possible increase of trade with the EU.

The Fair Labour Association estimates that women comprise 58% of the workforce in the cocoa farming industry. Nevertheless, they are reported to earn only 20% of the generated income. Results indicate that women are earning less in cocoa farming than their male counterparts: for those involved in caretaking work, for example, women workers' average yearly earnings are 1610 Ghana cedis ($298.15), compared to an average of 2356 Ghana cedis ($436.30) for male workers.

1. According to your experience/knowledge which are the main drivers behind such trends?
2. Which is according to your experience/knowledge the current situation concerning cashew farmers' income?
3. Please inform if there are specific data/patterns concerning the small households' income or gender income issues in Ghanian cashew and cocoa sector.
4. Which would be according to you the impact on small-scale cashew producers of a possible increase of trade with the EU?

B. SOCIAL SECTION

SDG Indicator: 1.4.2 Proportion of total adult population with secure tenure rights to land, (a) with legally recognized documentation, and (b) who perceive their rights to land as secure, by sex and by type of tenure.

1. Which is the statistical proportion of farmers (both in cocoa and cashew sectors) having secure tenure rights with legally recognized documentation? Please also provide a stratification by gender.
2. Concerning Ghanaian customary practices and legal provisions in force (both in cocoa and cashew sectors), which are the main policy shortcomings on farmers' land tenure rights?
3. Please provide statistical proportion of the sharecropping practice both in cocoa and cashew sectors.
4. Concerning Ghanian sharecropping land tenure systems (Abunu and Abusa) which are the most critical issues to be highlighted according to your experience?

SDG Indicator 5.a.2 Proportion of countries where the legal framework (including customary law) guarantees women's equal rights to land ownership and/or control.

Ghana took important steps towards reinforcing gender equality in the agricultural sector (i.e., Implementation of the "Gender Mainstreaming Strategy Action Plan"). The Ministry of Food and Agriculture (MOFA) has also developed a Gender and Agricultural Development Strategy (GADS). Even though there have been significant land tenure changes within the last two decades, the general sense is that access to secure land is still endangered due to socio-cultural restrictions against women.

1. According to your experience which are the most important challenges or issues still hindering gender equality in land ownership and female empowerment in the cocoa and cashew sector in Ghana?
2. How could trade help or undermine gender inequality?

SDG Indicator 8.3.1 Proportion of informal employment in total employment, by sector and sex.

1. Please provide available information (data) on % of informal employment in cocoa and cashew sector.

2. Are you aware of any national policy, legislation or farmers' scheme contrasting such issue in cocoa and cashew sectors in Ghana?
3. How could trade standards support formal employment practises in cocoa and cashew sector?

SDG Indicator 8.7.1 Proportion and number of children aged 5-17 years engaged in child labour, by sex and age.

Cocoa and cashew production are among the most child labour prone productions, due to the labour-intensive demands of cultivation and limited availability of labour force, especially during the harvesting season.

1. According to your knowledge/experience, can you provide any data concerning the negative impact on schooling of child labour in cocoa and cashew sectors?
2. Are you aware of any State policy, current legislation or farmers' scheme contrasting child labour in Ghana cocoa and cashew sectors?
3. Please provide as well national definition of child labour.
4. How could trade standards have an impact on child labour in Ghanian cocoa and cashew sectors?

SDG Indicator 8.8.2 Level of national compliance with labour rights (freedom of association and collective bargaining) based on International Labour Organization (ILO) textual sources and national legislation, by sex and migrant status.

Studies reveal that informal labour arrangements continue to play a significant role in cocoa production in Ghana. The weak bargaining position of workers in these setups is often due to a lack of access to information and transparency. This has serious implications for the sustainability of Ghana's cocoa sector. Vulnerable employment among women is 78.2% and among men is 62.5% in Ghana for 2021.

1. Are you aware of national legislation, public campaigns, farmers' schemes, or trade-unions actions aimed at reducing information asymmetry and the lack of formal contracting in Ghanian cocoa sector?

In many units in West Africa, cashew nut processing work is temporary, providing employment only for a limited number of months per year. Contracting conditions differ per type of job. Please provide for any available data on labour rights of cashew workers.

1. Are you aware of national legislation, public campaigns, farmers' schemes, or trade-unions actions aimed at reducing information asymmetry and the lack of formal contracting in Ghanian cashew sectors?
2. How could trade standards have an impact on labour rights in Ghanian cocoa and cashew sectors?

SDG Indicator 8.8.1 Fatal and non-fatal occupational injuries per 100,000 workers, by sex and migrant status.

The predominant occupational hazards and injuries faced by the cocoa and cashew farmers during pre-planting, planting, post-planting, and post-harvest operations include injuries from stumps/thorns and cutlass, insect bite (red ants bite), headache, severe fever, back/waist pains, and bee/warp sting.

1. According to your knowledge/experience, can you provide any data concerning workers' safety conditions in cocoa and cashew sectors?
2. Are you aware of any State policy, current legislation, or farmers' scheme for enhancing work safety in the cocoa and cashew sectors?

Cocoa and cashew farmers have low financial capacities to hire the required labour, therefore, most farmers use cheaper sources of labour, which the most used is migrants. Most migrants suffer bad working conditions such as poor remuneration, unsafe working environments, discrimination, no freedoms, and rights. They also experience long hours of work, lack of bargaining power, poor wages, and other forms of bad conditions concerning their work safety.

1. According to your knowledge/experience, can you provide any data concerning migrants' conditions in cocoa and cashew sectors?
2. Are you aware of any State policy, current legislation, or farmers' scheme for improving migrants' conditions in the cocoa and cashew sectors?
3. How could trade standards improve migrants' rights and their working conditions in Ghanian cocoa and cashew sectors?

C. ENVIRONMENTAL SECTION

SDG Indicator 2.4.1 Proportion of agricultural area under productive and sustainable agriculture.

1. According to your working experience or research activity, which are the main challenges concerning water and soil, and in general the environment, for the cashew and cocoa sectors in Ghana?
2. Can you provide for any recent data?
3. Please inform about statistical proportion, empirical evidence, or data concerning hectares in Ghana submitted to sustainable agriculture schemes in cocoa and cashew sectors (including their typology, commitments for farmers and funding: voluntary/private, international donors, State interventions).
4. How could trade standards favour sustainable agriculture in Ghanian cocoa and cashew sectors?

SDG 6 Ensure availability and sustainable management of water and sanitation for all.

The management of water resources in Ghana is regulated by the Water Resource Commission (WRC) of Ghana. The WRC of Ghana was established by an Act of Parliament (Act 522 of 1996) with the obligation to regulate and manage Ghana's water resources and co-ordinate government policies in relation to them.

1. Please provide for available data on water use and related issues concerning the cocoa and cashew sectors.
2. Are you also aware of specific governmental policies to improve the management of water resources or reduce the costs of irrigation in the cocoa and cashew sectors?
3. Could the source of water of cocoa farms be threatened by nearby economic activities (eg. Mining, factory etc)?

SDG Indicator 15.2.1 Progress towards sustainable forest management.

Historically, degradation and deforestation in Ghana's High Forest Zone has been driven by low-yielding, expansive agriculture, predominantly cocoa farming, coupled with the progressive growth of extractive industries.

1. Do you have any data on the current (recent) impact of cocoa and cashew cultivation on forestry areas of Ghana?
2. Do the Ghanian authorities set up State-intervention or farming schemes to limit the use of forestry areas by cashew and cocoa plantations?

3. How could trade standards prevent deforestation in Ghanian cocoa and cashew sectors?

SDG Indicator 15.5.1 Red List Index.

The conversion of natural forest to cocoa farmlands and subsequent intensification of the agricultural activity impacts negatively on forest tree species diversity. The loss of tree species within the cocoa farmlands may affect the conservation of other biodiversity such as birds, insects, and rodents. Furthermore, cashew expansion in West Africa may represent a serious threat to biodiversity conservation, particularly if it contributes to losses in woodland habitats. Farming strategies, such as sustainable development schemes and integrated pest management (IPM), provide sustainable options to decrease the agricultural impacts on the environment and biodiversity.

1. Please provide data on the current impact of cocoa and cashew on wildlife biodiversity in Ghana.
2. Are you aware of any State-funded conservation scheme to limit the impact on wildlife of cocoa and cashew cultivation?
3. How could trade standards protect wildlife biodiversity in the case of Ghanian cocoa and cashew sectors?

D. CERTIFICATION SECTION

SDG Indicator 2.5.1 Number of (a) plant and (b) animal genetic resources for food and agriculture secured in either medium- or long-term conservation facilities.

According to available research or data on Ghanian cashew and cocoa sectors, please refer if specific challenges (productivity issues, low resilience to infestation of pests and diseases, loss of quality) originating from limited genetic diversity (variety set) are present.

1. If yes, which policies/actions are currently set to contrast at national level such challenges in the cocoa and cashew sectors?
2. How do you think the EU could help with trade policy and technical assistance on crop resilient varieties?
3. Do you think that commercial valorisation and protection (on the PDO/PGI model) of local varieties could be a realistic path to undertake for the cocoa and cashew sector in Ghana? in this regard, are there already any experiences undertaken in this direction?

SDG Indicator 17.14.1 Number of countries with mechanisms in place to enhance policy coherence of sustainable development.

1. Are you aware of any existing national-level policy that promotes sustainable food systems, such as legislation on organic farming, integrated production systems for traceability or Voluntary Sustainable Standards in cocoa and cashew sectors?
2. How could Voluntary Sustainable standards have an impact on Ghanian cocoa and cashew sectors?

4.3 Qualitative questionnaire: farmers' organizations and cooperative members (Vietnam)

PARTICIPANT DETAILS

Name: ……
Surname: …..
Gender: Male or Female
Full organization name: …..

INTRODUCTION

The objective of the "qualitative" questionnaire is to collect data and information relating to the rice, tea, and dragon fruit sectors in Vietnam from representatives of agricultural organizations and cooperatives. The involvement of these actors is considered a key aspect to complete the information that will be collected through the "quantitative" questionnaire distributed to farmers.
As regards the structure of this questionnaire, reference was made to the SDGs (and respective indicators) according to the aims of the project, selecting the most relevant ones and classifying them into four macro areas (economic, environmental, social, certification).
The list of SDGs considered is as follows:

- *SDG 1. End poverty in all its forms everywhere.*
- *SDG 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture.*
- *SDG 5. Achieve gender equality and empower all women and girls.*
- *SDG 6. Ensure availability and sustainable management of water and sanitation for all.*
- *SDG 8. Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all.*
- *SDG 15. Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.*
- *SDG 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development.*

A. ECONOMIC SECTION

SDG indicator 2.3.2. Average income of small-scale food producers, by sex and indigenous status.

1. In your opinion, how an expansion of trade opportunities with the EU would impact the income of small producers (tea, dragon fruit and rice sectors) in Vietnam? Which actors would benefit the most?
2. Please inform about the main challenges experienced by small-scale producers in Vietnam in the tea, dragon fruit and rice sectors.
3. In your sector (tea, dragon fruit or rice) to which extent small-scale producers are involved in farmers' organizations (such as cooperatives) to strengthen their bargaining power and revenues?

B. SOCIAL SECTION

SDG indicator 1.4.2 Proportion of total adult population with secure tenure rights to land, (a) with legally recognized documentation, and (b) who perceive their rights to land as secure, by sex and by type of tenure.

Level A) Farmers' organisations, cooperative members.

1. Which are the main challenges that the farmers are facing towards the statal Land-Use Right Certificates (LURCs) system?
2. Concerning the land tenure rights of farmers, are there in place local customs or practices discriminating on gender (i.e., women discrimination)?

SDG indicator 5.a.2 Proportion of countries where the legal framework (including customary law) guarantees women's equal rights to land ownership and/or control.

See questions for SGD 1.4.2

SDG indicator: 8.3.1 Proportion of informal employment in total employment, by sector and sex.

1. According to your experience on the ground, which is the proportion of informal employment over the total employment in your sector (rice, tea, and dragon fruit)?
2. In your opinion, how an expansion of trade opportunities with the EU would impact in Vietnam the informal employment in rice, tea, and dragon fruit sectors?

SDG indicator 8.7.1 Proportion and number of children aged 5-17 years engaged in child labour, by sex and age.

1. According to your experience, how much frequent is child labour in your farm? do your children help on the farm (e.g., how many hours a day during the season, how often)?
2. Which are the biggest challenges that children working in farms are facing?
3. Has child labour in rice, tea, and dragon fruit sector also an impact on children schooling?
4. In your opinion, how an expansion of trade opportunities with the EU would impact child labour in Vietnamese rice, tea, and dragon fruit sectors?

SDG indicator 8.8.2 Level of national compliance with labour rights (freedom of association and collective bargaining) based on International Labour Organization (ILO) textual sources and national legislation, by sex and migrant status.

Workers in vulnerable employment are the least likely to have formal work arrangements, social protection, and safety nets to guard against economic shocks; thus, they are more likely to fall into poverty.

1. Can you provide information on the situation concerning labour rights (formal contracting) of workers involved in tea, rice, and dragon fruit sectors in Vietnam?
2. In your opinion, how an expansion of trade opportunities with the EU would impact labour rights in Vietnamese tea, rice, and dragon fruit sectors?

SDG indicator 8.8.1 Fatal and non-fatal occupational injuries per 100,000 workers, by sex and migrant status.

1. According to your experience which are the most common issues when it comes to work safety of operators in rice, tea, and dragon fruit sectors in Vietnam?
2. Can you describe how much the use of migrant workers is spread in rice, tea, and dragon fruit sectors? Which challenges, difficulties, migrants commonly face, according to your experience?
3. In your opinion, how an expansion of trade opportunities with the EU would impact the condition of migrants working in Vietnamese rice, tea, and dragon fruit sectors?

C. ENVIRONMENTAL SECTION

SDG indicator 2.4.1 Proportion of agricultural area under productive and sustainable agriculture.

1. Which are the main challenges concerning water and soil, and in general the environment, in your sector (tea, dragon fruit, rice)?

2. In your opinion, how an expansion of trade opportunities with the EU would impact agricultural output and consequently water and soil conditions in Vietnamese rice, tea, and dragon fruit sectors?
3. Are you aware of any sustainable agricultural scheme applied to your sector in Vietnam (tea, dragon fruit and rice)? If yes, please indicate which schemes and the respective agronomic commitments for the farmers.

SDG indicator 6 Ensure availability and sustainable management of water and sanitation for all.

1. Concerning your sector (dragon fruit, rice, and tea plantations) are you experiencing concerns on water management, water availability, changing rainfall patterns, and quality of water resources?

SDG indicator 15.2.1 Progress towards sustainable forest management.

1. According to your experience the crop that you are cultivating (rice, tea, dragon fruit) has an impact on forestry land (i.e. forestry area recently converted into plantations)?
2. In your opinion, how an expansion of trade with the EU would impact deforestation in Vietnamese rice, tea, and dragon fruit sectors?

SDG indicator 15.5.1 Red List Index.

1. According to your experience the crop that you are cultivating (rice, tea, dragon fruit) has an impact on wildlife biodiversity?

D. CERTIFICATION SECTION

SDG indicator 2.5.1 Number of (a) plant and (b) animal genetic resources for food and agriculture secured in either medium- or long-term conservation facilities.

1. Are you experiencing specific challenges (productivity issues, low resilience to infestation of pests and diseases, loss of quality) originating from limited genetic diversity (variety set) in your sector (tea, dragon fruit or rice)?

SDG indicator 17.14.1 Number of countries with mechanisms in place to enhance policy coherence of sustainable development.

1. How much Voluntary Sustainable standards (such as 4C, Fairtrade International, Global G.A.P) are spread across your sector (tea, rice, and dragon fruit)?
2. In your opinion, how increased trade opportunities with the EU would impact on the diffusion of Voluntary Sustainable standards in Vietnamese rice, tea, and dragon fruit sectors?

4.4 Qualitative questionnaire: policy makers, researchers and NGOs (Vietnam)

PARTICIPANT DETAILS

Name: ….
Surname: ….
Gender: Male or Female
Full organization name: ….

INTRODUCTION

The objective of the "qualitative" questionnaire is to collect data and information relating to the rice, tea, and dragon fruit sectors in Vietnam from institutional policy makers, researchers, and NGOs. The involvement of these actors is considered a key aspect to complete the information that will be collected through the "quantitative" questionnaire distributed to farmers.

As regards the structure of this questionnaire, reference was made to the SDGs (and respective indicators) according to the aims of the project, selecting the most relevant ones and classifying them into four macro areas (economic, environmental, social, certification).

The list of SDGs considered is as follows:

- *SDG 1. End poverty in all its forms everywhere.*
- *SDG 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture.*
- *SDG 5. Achieve gender equality and empower all women and girls.*
- *SDG 6. Ensure availability and sustainable management of water and sanitation for all.*
- *SDG 8. Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all.*
- *SDG 15. Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.*
- *SDG 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development.*

A. ECONOMIC SECTION

SDG indicator 2.3.2. Average income of small-scale food producers, by sex and indigenous status.

1. Please inform, according to your experience/knowledge, on data/patterns concerning the income of small-scale producers in the Vietnamese tea, dragon fruit and rice sectors. Any stratification data available on female farmers' income for these sectors?
2. How an increased trade with the EU could impact small-scale farmers' income for the sectors considered (tea, rice, dragon fruit)?

B. SOCIAL SECTION

SDG indicator 1.4.2 Proportion of total adult population with secure tenure rights to land, (a) with legally recognized documentation, and (b) who perceive their rights to land as secure, by sex and by type of tenure.

1. Concerning the statal Land-Use Right Certificates (LURCs), are there shortcomings about the criteria and procedures for extending or allocating these rights?
2. Which is the statistical proportion women's names included in LURCs? Are there any specific challenges concerning women land rights in tea, dragon fruit and rice sectors?

SDG indicator 5.a.2 Proportion of countries where the legal framework (including customary law) guarantees women's equal rights to land ownership and/or control.

"According to the Land Law (2003 and 2013)", certificates of land and housing use rights must include the names of both husband and wife. This policy was crucial for addressing gender inequality in accessing social resources, ensuring equal rights for women in owning houses and land. The law also dictates equal inheritance rights for daughters and sons in acquiring their parents' property. Even though there have been significant land tenure changes within the last two decades, the general sense is that access to secure land is still endangered due to socio-cultural restrictions against women.

1. According to your experience which are the most important challenges or issues still hindering gender equality in land ownership and female empowerment in Vietnam for these sectors (Tea, Dragon Fruit, Rice)?
2. How could trade help or undermine gender inequality?

SDG indicator 8.3.1 Proportion of informal employment in total employment, by sector and sex.

According to ILO and national statistics, in Vietnam almost all agricultural employment is informal. Employment status data show a significant disadvantage for women as the percentage of women who have access to secure jobs is lower than that of men.

1. According to your knowledge, which are the main drivers behind these trends?
2. Are you aware of any national policy, legislation or farmers' scheme contrasting such issue in rice, tea, and dragon fruit sectors?
3. How could trade standards support formal employment practises in rice, tea, and dragon fruit sectors?

SDG indicator 8.7.1 Proportion and number of children aged 5-17 years engaged in child labour, by sex and age.

According to the results of the National Child Labour Survey conducted by the Vietnamese Government child labour is widespread in agriculture, especially in the tea and rice sectors. Children from poorer households, with mothers having lower education levels, and those belonging to ethnic minority groups are more prone to engaging in child labour. Among ethnic minority groups, Mong children face a significantly higher risk of participating in child labour than the national average (25.5% compared to 6.9%).

1. According to your knowledge/experience, can you provide any data concerning the negative impact on schooling of child labour in rice, tea, and dragon fruit sectors?
2. Are you aware of any State policy or current legislation or farmers' scheme contrasting child labour in Vietnamese tea, rice, and dragon fruit sectors? Please provide as well national definition of child labour.
3. How could trade standards have an impact on child labour in Vietnamese rice, tea, and dragon fruit sectors?

SDG indicator 8.8.2 Level of national compliance with labour rights (freedom of association and collective bargaining) based on International Labour Organization (ILO) textual sources and national legislation, by sex and migrant status.

Most rural workers in Vietnamese rice, tea and dragon fruit sectors are self-employed and unskilled workers without labour contracts. Therefore, they do not enjoy the social welfare benefits for employees such as health insurance or social insurance.

1. Can you provide any data on contractual conditions of workers in tea, rice, and dragon fruit sectors?
2. Are you aware of national legislation, public campaigns, farmers' schemes, or trade-unions actions aimed at improving the contractual conditions of workers in tea, rice, and dragon fruit sectors in Vietnam?
3. How could trade standards have an impact on labour rights in Vietnamese rice, tea, and dragon fruit sectors?

SDG indicator 8.8.1 Fatal and non-fatal occupational injuries per 100,000 workers, by sex and migrant status.

Research shows widespread occupational health hazards, including musculoskeletal injuries from carrying heavy loads, insufficient and inadequate protection in the Vietnamese agricultural sector. Sharp objects, poisoning, falls, sun/heat stroke, animal bites/attacks, traffic accidents and carrying heavy loads are the causes of injuries for farmers (for tea and rice sectors), in which sharp objects are the main cause. Occupational accidents occur mainly also due to lack of protective equipment and initial technical investment. Using electricity to illuminate dragon fruit trees has for instance caused many deaths due to electric shock.

1. According to your knowledge/experience, can you provide any data concerning workers' safety conditions in tea, rice, and dragon fruit sectors in Vietnam?
2. Are you aware of any State policy, current legislation, or farmers' scheme for enhancing work safety in tea, rice, and dragon fruit sectors in Vietnam?
3. According to your knowledge/experience, can you provide any data concerning migrants' conditions in tea, rice, and dragon fruit sectors in Vietnam?
4. Are you aware of any State policy, current legislation, or farmers' scheme for improving migrants' conditions in the tea, rice, and dragon fruit sectors?
5. How could trade standards improve migrants' rights and their working conditions in Vietnamese rice, tea, and dragon fruit sectors?

C. ENVIRONMENTAL SECTION

SDG indicator 2.4.1 Proportion of agricultural area under productive and sustainable agriculture.

1. According to your experience or research activity, which are the main challenges concerning water and soil, and in general the environment, for the tea, dragon fruit and rice sectors in Vietnam?
2. Please inform on statistical proportion, empirical evidence, or data concerning hectares in Vietnam submitted to sustainable agriculture schemes for the tea, dragon fruit and rice sectors (including their typology, commitments for the farmers and funding: voluntary/private, international donors, State intervention).
3. How could trade standards favour sustainable agriculture in Vietnamese rice, tea, and dragon fruit sectors?

SDG indicator 6 Ensure availability and sustainable management of water and sanitation for all.

1. Please provide for available data on water use and related issues concerning the dragon fruit, tea, and rice sector in Vietnam.
2. Are you also aware of specific governmental policies to improve the management of water resources or reduce the costs of irrigation, in dragon fruit, rice, and tea sectors?

SDG indicator 15.2.1 Progress towards sustainable forest management.

1. Do you have any data on the impact of rice, tea, and dragon fruit cultivation on forestry areas?
2. Do the Vietnamese authorities set up a State-intervention or farmers' schemes to limit the use of forestry areas by tea, rice, and dragon fruit plantations?
3. How could trade standards prevent deforestation in Vietnamese tea, rice, and dragon fruit sectors?

SDG indicator 15.5.1 Red List Index.

Farming strategies, such as sustainable development schemes and integrated pest management (IPM), provide sustainable options to decrease the agricultural impacts on the environment and biodiversity.

1. Please provide data on the impact of rice, tea, and dragon fruit on wildlife biodiversity.
2. Are you aware of any State-funded conservation scheme to limit the impact of rice, tea, and dragon fruit cultivation on wildlife?
3. How could trade standards protect wildlife biodiversity in the case of Vietnamese rice, tea, and dragon fruit sectors?

D. CERTIFICATION SECTION

SDG indicator 2.5.1 Number of (a) plant and (b) animal genetic resources for food and agriculture secured in either medium- or long-term conservation facilities.

1. According to available research or data on the Vietnamese rice, tea, and dragon fruit sectors, please refer if there are present specific challenges (productivity issues, low resilience to infestation of pests and diseases, loss of quality) originating from limited genetic diversity (variety set).
2. If yes, which policies/actions are currently set to contrast at national level such challenges in the rice, tea, and dragon fruit sectors?
3. How do you think the EU could help with trade policy and technical assistance on crop resilient varieties?
4. Do you think that commercial valorisation and protection (on the PDO/PGI model) of local varieties could be a realistic path to undertake for the tea, rice, and dragon fruit sectors in Vietnam?
5. In this regard, are there already any experiences undertaken in this direction?

SDG indicator 17.14.1 Number of countries with mechanisms in place to enhance policy coherence of sustainable development.

1. Are you aware of any existing national-level policy that promotes sustainable food systems, (such as legislation on organic farming, integrated production systems for traceability or Voluntary Sustainable Standards) in tea, rice, and dragon fruit sectors?
2. How could Voluntary Sustainable standards have an impact on Vietnamese rice, tea, and dragon fruit sectors?

4.5. Quantitative questionnaire: small-scale producers (Ghana and Vietnam)

SMALLHOLDER FARMERS SURVEY

Countries: Ghana and Vietnam
Target of the survey: Smallholder farmers cultivating cocoa and cashew in Ghana, and rice, tea, and dragon fruit in Vietnam

INTRODUCTION

The following questionnaire is an important part of a European project called TRADE4SD, which aims to foster the positive linkages between trade and sustainable development.
Trade has many advantages for all the involved countries: it can bring richness, enhance occupation and boost living conditions in producing countries, and it can give access to a wide range of products, otherwise unavailable for the buying countries.
On the other hand, if not well managed, trade can have negative outcomes in terms of pressure on natural resources and human welfare.
That's why the most recent trade agreements comprise environmental and social obligations for the involved parties.
In this perspective, the purpose of this questionnaire is to learn how trade affects your wellness and your land and to understand how you think it could be improved to better safeguard human rights and well-being and protect the environment.

DESCRIPTIVE SECTION

Farmer Name and Surname: …
Age: …. years
Gender: Male or Female
Main crop: Cocoa or Cashew or Rice or Tea or Dragon fruit
Ownership of the farm: Yes or No
Farm size: …. hectares (ha)
Number of household members: …
Geographical area (commune/village): …

A. ECONOMIC SECTION

A.1) What was the yield of your main crop in 2023 (in kilograms)?

Please specify ....

A.2) What gross total revenue did you get from your main crop in the 2022-2023 season?

Please specify ....

A.3) Was the earned amount sufficient to cover basic needs for you and your family?

- No
- Yes

A.4) Do you feel that producing cash crops for export is limiting land for food crop production? Please select only one option

- No, I have enough land for both activities
- Yes, but I can easily buy food for personal consumption from other farmers/local markets

- Yes, I don’t have enough land for both activities and it’s getting difficult to find alternative sources of food supply

A.5) Do you have other sources of income? Please select only one option

- No
- Yes, secondary crop
- Yes, other work activity outside the farm
- Other (please specify) …

A.6) What is the main criterion you consider in choosing the best variety to grow? Please select only one option

- High yield
- Product quality
- Availability of seeds at local/national level
- National/international market demand
- Low cost
- High sale price
- Other (please specify) …

A.7) Do you receive any governmental support to produce your main crop? Please indicate more than one option if needed

- No
- Yes, as fertilizer inputs
- Yes, pesticide inputs
- Yes, a monetary support
- Technical assistance
- Other (please specify) …

A.8) In which market do you sell your crop? Please indicate more than one option if needed

- National market
- International market

A.9) Who is the main buyer of your crop? Please select only one option

- I don’t know.
- The government
- Private buying companies. Please specify in the following table which companies buy your crop and the share of product they buy.

A.10) Which is the main driving factor behind produced volumes in you sector? Please select only one option

- Market's request
- Yield of the plantations
- Farm size
- Climatic conditions
- Others (please specify)

B. SOCIAL SECTION

B.1) Are you a member of a cooperative?

- Yes
- No

B.2) Do you have a formal contract? Please select only one option

- Yes, written contract.
- Yes, verbal contract.
- No

B.3) How many hours a day do you work? Please select only one option

- 8 hours or less
- More than 8 hours and less than 10 hours

Company	Company name	Please indicate percentage (%) of total sales
N.1		
N.2		
N.3		
Company	**Company Name**	**Please indicate percentage (%) of total sales**
N.1		
N.2		
N.3		

- More than 10 hours

B.4) Do you manage the farm budget? Please select only one option

- Yes
- No, my spouse does.

- No, a female family member does.
- No, a male family member does.
- Other (please specify) …..

B.5) What kind of activities are you carrying out on the farm? Please indicate more than one option, if needed.

- Ploughing
- Sowing/propagation/graft
- Weeding
- Pruning (e.g. mistletoe cutting)
- Pesticides application
- Fertilizers application
- Harvesting
- Post-harvest activities (e.g. fermentation, milling, drying)
- Packing
- Carriage to sheds for sale.
- Other (please specify) …..

B.6) When applying pesticides, do you use self-protection equipment? Please indicate more than one option, if needed.

- Hat
- Face visor
- Safety glasses
- Mask
- Boots
- Gloves
- Ear defenders
- Protective suit or coveralls
- Other (please specify) …

B.7) Do children ever get involved in farm activities? Please select only one option

- No, never.
- Yes, only few hours on some day.
- Yes, for the entire day on some days.
- Yes, for the entire day in full week.
- Other (please specify) …

B.7.1) If yes, in which activities are children mostly involved? Please indicate more than one option if needed.

- Ploughing
- Sowing/propagation/graft
- Weeding
- Pruning (e.g. mistletoe cutting)
- Pesticides application
- Fertilizers application
- Harvesting
- Post-harvest activities (e.g. fermentation, milling, drying)
- Packing

- Carriage to sheds for sale
- Other (please specify) …

B.8) Do you feel women and men have the same ease at becoming landowners? Please select only one option

- Yes
- No, there are difficulties in accessing land due to national law.
- No, because of cultural factors.
- Other (please specify) ….

B.9) Do you ever hire migrants (internal migrants or from other countries)? Please indicate more than one option if needed.

- Yes, under formal contract.
- Yes, only during the peak season, under formal contract.
- Yes, without formal contract.
- Yes, only during the peak season, without formal contract.
- No, I don't hire migrant workers.

C. ENVIRONMENTAL SECTION

C.1) Which of the following sustainable approaches do you apply the most on your farm? Please select only one option

- None
- Organic system
- Agroecology
- Climate-Smart Agriculture
- System of rice intensification (only rice)
- Agroforestry
- Integrated aquaculture systems (only rice)
- Viet GAP
- Other (please specify) …

C.2) Do you apply any of the following methods to reduce the use of chemicals and fertilizers? Please indicate more than one option if needed.

- None
- Intercropping
- Use of compost and/or organic matter
- Cover crop.
- Mulching
- Crop rotation.
- Minimal tillage
- Other (please specify) ….

C.3) Which are the main constraints when implementing the above-mentioned sustainability practices? Please select only one option

- Lack of funds
- Lack of technical knowledge
- Lack of agricultural inputs
- High environmental standards

- Limited land/small-scale farm
- Other (please specify) …

C.4) How often do you apply chemical pesticides? Please select only one option

- 0
- 1-2 treatments per season
- 2-4 treatments per season
- 4-6 treatments per season
- 6-8 treatments per season
- >8 treatments per season
- Other (please specify)…

C.5) How often do you apply chemical fertilizers? Please select only one option

- 0
- 1-2 treatments per season
- 2-4 treatments per season
- 4-6 treatments per season
- 6-8 treatments per season
- >8 treatments per season
- Other (please specify)…

C.6) Are you using water-efficient practices in your farm? Please indicate more than one option if needed.

- No
- Yes, drip irrigation
- Yes, mulching
- Yes, agroforestry system
- Yes, water recycling practices
- Yes, rain harvesting practices
- Other (please specify) …

C.7) What do you do if the productivity of your exported crop decreases? Please select only one option

- I apply deforestation practices such as slush and burn
- I apply sustainable practices (e.g. use of compost and/or organic matter, crop rotation)
- I apply increasing chemicals (e.g. NPK formulation)
- I do nothing
- Other (please specify) …

C.8) Are you aware that in a short time your crop will have to be deforestation free in order to be sold on the EU market?

- Yes
- No

C.9) Is your agricultural production threatened by any other activity (illegal mining, urban expansion, grazing of livestock)?

- No
- Yes

If yes, please specify…

C.10) Has the activity you specified in question C.9 affected your production? Please indicate more than one option if needed.

- No
- Yes, lowering farm yield
- Yes, delaying production
- Yes, lowering crop quality
- Other (please specify)…

D. CERTIFICATION SECTION

This section refers to Voluntary Sustainable Standards (VSSs) intended as certification schemes that require products to meet specific economic, social, and environmental sustainability metrics.
The requirements can refer to product quality, but also to production and processing methods. The adoption of VSSs allows the access to commercial channels which valorise sustainably produced goods, with consequent economic advantage on the conventionally produced goods.
Examples of VSSs: Fairtrade, Rainforest Alliance, Organic, 4C, etc.

D.1) How many Voluntary Sustainable Standards (VSSs) do you apply in your crop production? Please select only one option

- None (0)
- 1
- 2
- More (>2)

D.2) If the answer to Question D.1 is None (0), can you tell the reason why you do not adhere to a Voluntary Sustainable Standards (VSSs)? Please select only one option

- High cost to adhere to a certification scheme
- Low revenues and profits related to certified products
- Difficulty complying with VSS requirements
- Absence of technical assistance
- Other (please specify)…

D.3) Can you provide the names of the Voluntary Sustainable Standards you adhere to? Please indicate more than one option if needed

- 4C
- Fairtrade
- Organic
- GlobalG.A.P
- Rainforest Alliance/UTZ
- Viet GAP
- Protected Designation of Origin (PDO)
- Protected Geographical Indication (PGI)
- Others (please specify)…
  If not applicable, please leave blank

D.4) What are the main benefits associated with the Voluntary Sustainable Standards? Please select only one option

- Increased yield

- Increased profit
- Better extension services provision
- Empowerment of women
- Increased health
- Environmental protection
- Other (please specify)…
  If not applicable, please leave blank

D.5) What is the total cost to adhere to the VSS certification annually? If not applicable, please leave blank.

Please provide the cost for each certification you have, and try to quantify the total annual cost as precisely as possible in the following table:

Certification name	Total annual cost (National currency)

D.6) What is the main challenge when you decide to adhere to VSS? Please select only one option

- Comply with labour standards (e.g., formal contracts, no child labour)
- Comply with environmental standards (e.g., afforestation, buffer zones, prohibition of slash-and-burn practices)
- Comply with sustainable production standards (e.g., limited use of pesticides and fertilizers, use of manure, drip irrigation)
- Other (please specify)…
  If not applicable, please leave blank

D.7) Is the price premium[30] shared with you? Please indicate more than one option if needed

- Yes, as a monetary compensation
- Yes, as technical assistance
- Yes, in the form of social services (e.g., establishment of community schools, training programs, etc.)
- Yes, as capital assets (e.g., new equipment and tools)
- Other (please specify)…

D.8) Do you think that international trade can help reducing disparities between women and men?

- No
- Yes
  If yes, how? (optional)….

D.9) Do you think that international trade can help raise farmers' bargaining power?

- No
- Yes
  If yes, how? (optional)….

[30] Price premium refers to the additional amount of money earned by the producers for adhering to VSS when selling a certified product respect to a price benchmark.

D.10) Do you think that international trade can favour environmentally friendly agricultural practices?

- No
- Yes

If yes, how? (optional)….

UNIVERSITY OF GHANA

Trade 4 Sustainable Development

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