IMPACT OF TEMPORARY INCREASES IN EU OFFICIAL CONTROLS OF FOOD PRODUCTS (REGULATION (EU) 2019/1793)

Part I: Case studies: Kenyan beans and Vietnamese dragon fruit

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Executive summary

Under the EU-funded AGRINFO programme, COLEAD commissioned Q-Point to conduct a study to understand the trade, practical and institutional implications of increased controls and emergency measures under Implementing Regulation (EU) 2019/1793 on actors in low- and middle-income countries with a view to raising awareness of the consequences, as well as identifying potential mitigating actions and accompanying measures.

This Regulation aims to enhance food safety by placing products identified with potential health risks related to contaminants or pesticide residues under increased scrutiny. While necessary for consumer protection, these measures can have significant implications for exporting countries, potentially disrupting trade and impacting livelihoods. This study focuses on the bean value chain in Kenya and the dragon fruit value chain in Vietnam, and provides an in-depth analysis of the experiences and challenges faced by stakeholders in these value chains.

The objectives of this study are to:

- document and analyse the impacts and consequences of the increased controls under Regulation 2019/1793 impacting actors in the selected value chains in Kenya and Vietnam
- identify strategies and mitigating actions adopted by exporting countries in order to maintain access to the EU market and address compliance challenges
- provide recommendations on improving the implementation of and communication about the Regulation for low- and middle-income countries to enhance their capacity to meet the requirements.

The research encompassed two distinct value chains:

- **Kenya bean value chain**: Beans from Kenya were listed in Annex I of Regulation 2019/1793 in October 2019, requiring a 5% frequency of physical and identity checks at EU border control points. This frequency increased to 10% in May 2020.
- **Vietnam dragon fruit value chain**: Dragon fruit from Vietnam was listed in Annex II of the Regulation in October 2019, initially requiring a 10% frequency of checks. This was increased to 30% in July 2024.

A mixed-methods approach was employed, combining desk research with qualitative data collection through semi-structured interviews.

- Desk research provided background information on the EU regulatory framework, the selected value chains, and the historical context of trade between the EU and the selected countries.

- Semi-structured interviews were conducted with a diverse range of stakeholders in Kenya and Vietnam. This included exporters, farmers, competent authorities, laboratories, certification bodies, governmental bodies, and business member organizations (BMOs). Sixteen stakeholders were interviewed for the bean value chain in Kenya, and six for the dragon fruit value chain in Vietnam. Interview guides were developed to ensure consistency and capture a comprehensive understanding of the issues.

Key findings

The research highlighted the following key impacts of regulatory changes on the two value chains.

Kenya: bean value chain

- Increased official controls led to **increased costs**: for exporters, for increased testing in Kenya and capacity-building initiatives; and for importers, who sometimes pay part of the testing costs in the EU.
- Farmers have incurred costs associated with the switch to more expensive pesticides to meet EU requirements. These costs have not been reflected in bean prices, leading to **reduced profit margins**.
- As a result of the high costs of compliance and risks associated with export, some exporters and farmers have decided to **exit the EU export market** for beans.
- In addition to costs, increased testing can have an impact on **produce quality**, for example, longer waiting times for laboratory analyses limit the shelf-life of exported beans.
- Additional controls have **disparate impacts** on different types of operator:
    - Risk profiling of farmers, introduced by exporters to manage risk effectively, removes many smallholder farmers from the EU export value chain, negatively affecting their farm income and position in the value chain.
    - Exporters who have successfully managed the transition reported general improvements in the management of food safety and more stringent compliance. They also reported added value from investments, and strengthened relations with EU clients. However, for other operators, the additional costs associated with the controls created a financial burden that deterred investment in quality control and the hiring of technical staff, ultimately impacting the overall viability of operations.
- Operators participating in private standards such as GLOBALG.A.P. were better placed to align with new demands, building on existing experience with managing food safety practices. In general, **improved traceability** throughout the supply chain would help exporters and farmers to comply with EU requirements.
- Initiatives necessitated by increased controls led to greater overall **awareness of food safety**, with positive impacts on local production.
- Greater cross-chain collaboration, more rigorous government checks in exporting countries, sharing of testing results, and clear communication could have **prevented** the need for the EU to introduce additional controls.
- Greater **clarity of communication from the EU** regarding the risks of being listed, the reasons for decisions, and the timeline for action would help operators to manage and mitigate the impacts of additional controls.

Vietnam: dragon fruit value chain

- For operators not primarily focused on the EU market, the added costs and requirements associated with increased controls did not justify continued access to the EU market, and led these operators to focus on **alternative export destinations**. Alternative markets tend to be associated with more fluctuating demand and prices, and can therefore lead to **reduced income for farmers** supplying these operators.
- Farmers and exporters focused primarily on the EU market generally had systems in place to respond to and mitigate the impacts of increased controls. With the market exit of less EU-oriented market players, the Vietnamese dragon fruit export market saw a consolidation of the position of the **focused EU exporters**.

- If producers minimize **pesticide use** to meet EU requirements, this could have an effect on the quality of their products and jeopardize their access to alternative export markets that have particular quality demands.
- **Resource constraints**, including personnel shortages and limited access to certified laboratories, complicated the process of meeting new demands for analysis, and some challenges were reported regarding the capacity of Vietnamese authorities to undertake identity and physical checks.
- There are challenges related to the **communication** of changes to EU Regulations – a lack of transmission of information from government authorities to stakeholders, and a resulting lack of coordinated response to compliance issues within the value chain.

Implications and recommendations

These two case studies analysed different value chains, in different countries, with differing capacities and structures for managing food safety, and thus identified varying impacts. Based on these findings, the following recommendations identify actions that should be taken to enhance the effectiveness and minimize the negative impacts of Regulation 2019/1793.

- **Improve communication and information dissemination**: Information on potential and upcoming increases in additional controls often does not reach operators sufficiently early for them to respond adequately and put in place measures to prevent or limit the impacts of additional controls. This could be improved by:
  - earlier and clearer communication from the EU on the possibility of future increased controls, the timescale for these measures, and the findings that underlie these decisions
  - greater coordination between the competent authorities that receive information from the EU and the affected supply chains
  - more systematic review and circulation of information regarding RASSF notifications (as an early warning to potential future measures) and changes to EU regulations (e.g. pesticide maximum residue levels).
- **Pool information on sampling and testing**: Increased controls inevitably result in more analysis of pesticides (or contaminants) by the affected value chains. Regular testing (reported to be limited prior to increased controls), and the systematic sharing of testing results across the supply chain, would provide a stronger framework for identifying and addressing emerging compliance risks.
- **Support technical assistance and capacity building in pesticide analysis**: Increased controls expose existing weaknesses in laboratory capacity, thus exacerbating the impacts of controls through delays and damage to product quality. EU technical support, and where possible financial assistance, to build expertise and capacity in pesticide residue analysis would reinforce the reported beneficial impacts of increased controls in terms of greater awareness of and investment in food safety systems.
- **Support small farmers**: Increased controls have led to progress, however the benefits are not evenly distributed. Risk profiling of farmers, introduced by exporters to manage risk effectively, removes many smallholder farmers from the EU export value chain, negatively affecting their farm income and position in the value chain. Technical assistance for training farmers and extension services in compliant pesticide use could help mitigate the risk of exclusion from the EU export market.
- **Identify affordable alternatives to pesticides**: Meeting EU requirements entails costs and potential reductions in produce quality that are not compensated by market prices. As with the case of information sharing, these challenges require a cross-supply-chain response involving public and private actors, and could be another focal point for technical assistance.

Acronyms

AAK	Agrochemicals Association of Kenya	Kenya
AFA	Agriculture and Food Authority	Kenya
BMO	business member organization	–
CGFED	Centre for Gender, Family & Environment in Development	Vietnam
COLEAD	Committee Linking Entrepreneurship-Agriculture-Development	–
CPAM	Community-based Pesticide Action Monitoring	Vietnam
DPP	Department of Plant Protection	Vietnam
ECS	Electronic Certification System	–
EU	European Union	–
EFSA	European Food Safety Authority	–
EVFTA	EU–Vietnam Free Trade Agreement	Vietnam
FAO	Food and Agriculture Organization of the United Nations	–
FPC Kenya	Fresh Produce Consortium of Kenya	Kenya
FPEAK	Fresh Produce Exporters Association of Kenya	Kenya
GAP	good agricultural practices	–
GDP	gross domestic product	–
GSP	Generalized System of Preferences	–
HCAS	Horticultural Competent Authority Structure	Kenya
HCD	Horticultural Crops Directorate	Kenya
ICIPE	International Centre of Insect Physiology and Ecology	–
IDH	IDH (Sustainable Trade Initiative)	–
IPM	integrated pest management	–
IPSARD	Institute of Policy and Strategy for Agriculture and Rural Development	Vietnam
KALRO	Kenya Agricultural and Livestock Research Organization	Kenya
KEBS	Kenya Bureau of Standards	Kenya
KEPHIS	Kenya Plant Health Inspectorate Service	Kenya
KEPROBA	Kenya Export Promotion and Branding Agency	Kenya
KNBS	Kenya National Bureau of Statistics	Kenya
Ksh	Kenyan Shilling	Kenya
LOD	limit of determination	–
MARD	Ministry of Agriculture and Rural Development	Vietnam
MALD	Ministry of Agriculture and Livestock Development	Kenya
MCNV	Medical Committee Netherlands–Vietnam	Vietnam
MOST	Ministry of Science and Technology	Vietnam

MRL	maximum residue level	–
MT	metric tonnes	–
NEMA	National Environment Management Authority	Kenya
NHT	National Horticulture Taskforce	Kenya
NPPO	National Plant Protection Organization	–
PAN AP	Pesticide Action Network Asia and the Pacific	Vietnam
PPP	plant protection product	–
PCPB	Pest Control Products Board	Kenya
PPD	Plant Protection Department	Vietnam
RASFF	Rapid Alert System for Food and Feed	
RCRD	Research Center for Rural Development	Vietnam
SOFRI	Southern Horticultural Research Institute	Vietnam
SPS Vietnam Office	Vietnam Sanitary and Phytosanitary Notification Authority and Enquiry Point	Vietnam
SRD	Centre for Sustainable Rural Development	Vietnam
VCCI	Vietnam Chamber of Commerce and Industry	Vietnam
VND	Vietnamese dong	
VFU	Vietnam Farmers Union	Vietnam

1. Introduction

1.1 COLEAD and the AGRINFO Programme

COLEAD is a non-profit, interprofessional association whose main objective is to develop an inclusive and sustainable trade in agricultural and food products (fruits and vegetables in particular), with priority given to African, Caribbean and Pacific (ACP) States, between ACP States, and between these countries and the European Union.

The European Commission has entrusted COLEAD with the programme "AGRINFO – towards a fair, healthy and environmentally friendly food system: addressing compliance with EU regulatory and non-regulatory measures" (FOOD 2021/427-777), to provide data and knowledge to developing and emerging countries on EU policies and on regulatory measures, standards and market trends that have potential impacts on the competitiveness, market access and trade dynamics of agricultural value chains linked to the EU market.

1.2 Background

Regulation 2019/1793 establishes increased controls for certain products where potential risks to public health are identified in relation to contaminants or pesticides. A decision to introduce increased controls can be taken, for example, in the case of repeat interceptions at EU border controls due to the presence of contaminants or pesticide residues in produce from an exporting country. For recent examples see AGRINFO: Temporary official controls on foods from certain countries – 2025 update.

The European Commission has the power to place products on:

- Annex I of the Regulation, which lists products and their countries of origin that are subject to a temporary increase of official controls at EU border control posts and control points;
- Annex II, which lists products and their countries of origin that are subject to special conditions for entry into the EU.

Annex I listing can result in increased costs for operators along the supply chain. The increased controls have to be conducted by EU border authorities, and in most Member States the costs of this, as well as any associated storage or disposal costs, are generally charged to the importer. In turn, the importer may pass on all or part of these costs to operators in exporting countries.

In the case of **Annex II** listing, in addition to increased controls, there are further special measures: competent authorities in the exporting country are required to carry out identity and physical checks on all export consignments, including sampling and laboratory analyses. This creates additional burdens in terms of official inspections, documentation, and certification. Annex II listing therefore not only implies further costs for operators, but also places demands on the public authorities, which can be challenging, especially in countries where resources are scarce. The situation for exporting countries is particularly problematic if there are no suitable national facilities with the required accreditation for the analysis of contaminants and pesticide residues (ISO/IEC 17025).

To date, only 35 of the 146 low-and middle-income countries covered by the AGRINFO programme have been listed under Regulation 2019/1793. However, the impacts on these countries can be significant.

Exporting countries may not always be aware of the serious consequences of being listed. Providing evidence for the trade disruption and economic impacts that this can cause should help to alert exporting countries to the need for close monitoring of pesticide residues and contaminants, including the systematic review of EU Rapid Alert System for Food and Feed (RASFF) interceptions. It may also encourage action to be taken at an early stage to prevent any further exports of contaminated consignments.

COLEAD commissioned Q-Point to conduct a study that aims to understand the trade, practical and institutional implications of increased controls and emergency measures under Implementing Regulation (EU) 2019/1793 on actors in low-and middle-income countries with a view to raising awareness of the consequences, as well as identifying potential mitigating actions and accompanying measures.

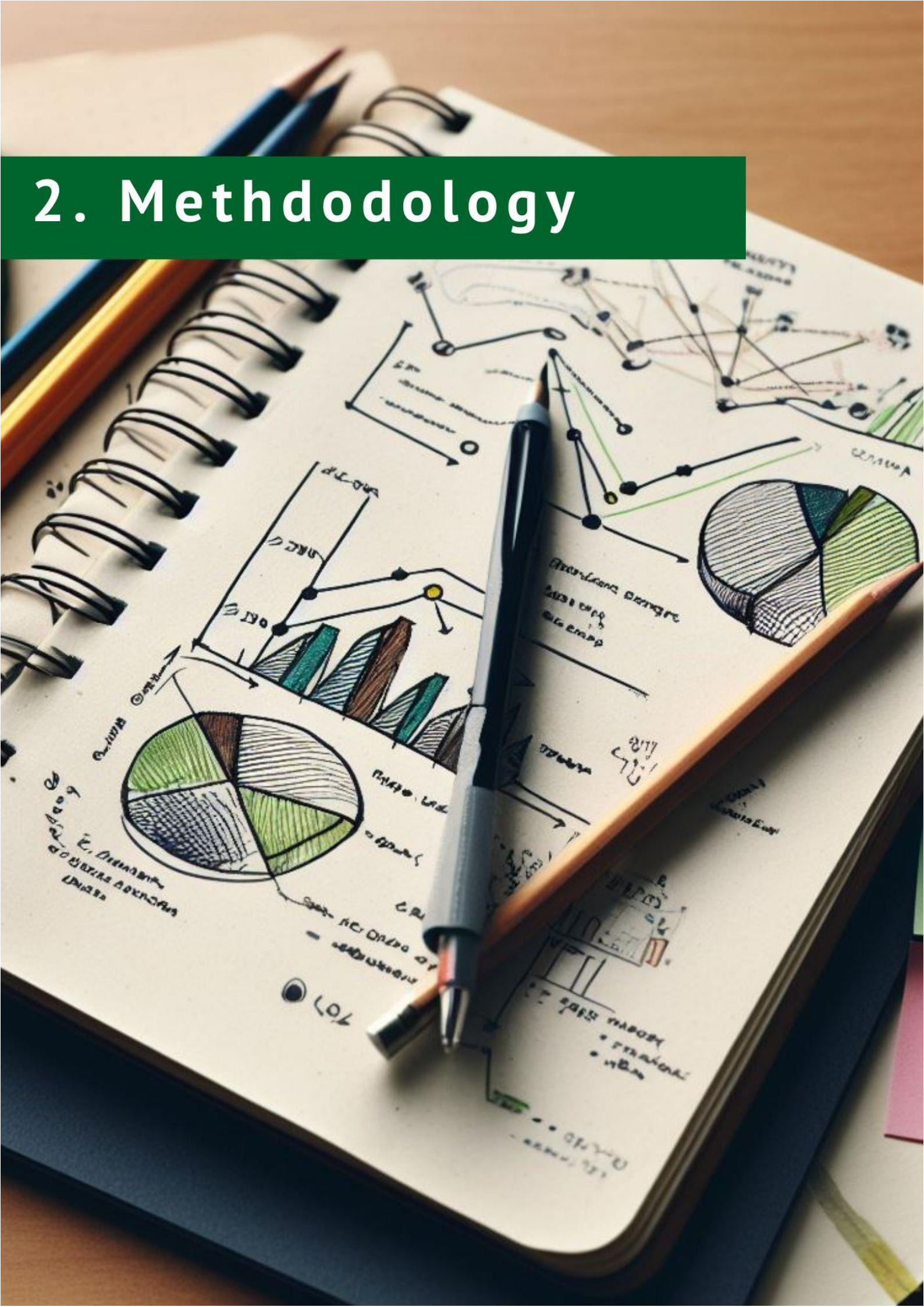
Depending on the findings of the impact study, potential follow-up actions to be taken by COLEAD would be to:

- provide information to low-and middle-income countries to explain the process and implications of being listed under the Regulation
- identify strategies that can help countries avoid being listed under this Regulation/mitigate the effects of listing
- identify ways the Regulation could be implemented/communicated to low-and middle-income countries in a way that could enhance their capacity to fulfil the necessary requirements.

This study aims to document and analyse the experiences and implications for key stakeholders in sample exporting countries, in this case in Kenya and Vietnam.

Analyses are performed for beans exported from Kenya, and dragon fruit exported from Vietnam. Beans from Kenya appeared in Annex I of Regulation 2019/1793 in October 2019, with a required frequency of physical and identity checks of 5%. Since May 2020, this frequency increased to 10%. Dragon fruit (pitahaya) from Vietnam appeared in Annex II of the Regulation also in October 2019, with a frequency of 10%. In February 2022, the frequency of physical and identity checks increased to 20%.

2. Methdodology



2.1 Analyses

The study includes the following analyses.

- Functional analysis: a description of pertinent aspects of the value chains under scrutiny, that helps contextualize the introduction of temporary controls.
- Critical and evaluative analysis: identification of those aspects of temporary increases in official controls that created challenges or benefits (short- and long-term) for public and private sectors involved in the selected value chains in those countries, and an evaluation of the impacts and consequences for the sectors concerned.
- Constructive analysis: consideration of what steps (policy, technical assistance, practical) could be taken to exploit the benefits or mitigate the risks associated with increased controls and emergency measures under Regulation 2019/1793.

2.2 Methods

Descriptions of pertinent aspects of the value chains were drafted by performing desk research, and validating the illustrated value chains during interviews. For the critical and evaluative analysis, and the constructive analysis, semi-structured interviews were held with stakeholders along the value chain. The aim was to interview 20 stakeholders per national value chain. The stakeholder list was drafted based on the network of Q-Point and suggestions from partners in the target countries.

For Kenya, advice for stakeholders was provided by COLEAD's Kenya office and by the Embassy of the Netherlands in Kenya. The selection of stakeholders to be interviewed was carried out purposefully to include a variety of perspectives in the study, from both private sector operators and intermediate support structures. Private sector operators consisted of a farmer and several exporters with different characteristics, representing exporters with their own production sites, those with numerous smallholder outgrowers, and those with larger outgrowers (see Table 1).

*Table 1. Overview of interviewed exporters in the Kenyan bean value chain (*Vigna *spp.,* Phaseolus *spp.)*

Exporter	Year	Export crops	Main markets	Number with own farm	Number of smallholder outgrowers[1]	Number of larger outgrowers[2]
A	2000	French beans, passion fruit, tenderstem broccoli	France, United Kingdom (UK), Kenya	**2**	**240**	–
B	2014	Fine beans, snow peas, sugar snaps, baby corn, garden peas, soya	European Union (EU), UK, Kenya	–	**327**	–
C	2005	French beans, snow peas, sugar snaps, baby corn, chillies	UK, Netherlands, France, Germany, Israel	–	**2**	**7**
D	2001	French beans, snow peas, sugar snaps, chillies, passion fruit, avocados	Germany, Netherlands, UK, Switzerland, Qatar, Hong Kong	–	**288**	**13**
E	1996	French beans, snow peas, broccoli, Asian vegetables	Belgium, UK	**3**	**270**	**2**
F	1988	Fine beans, sugar snaps, tenderstem broccoli, snow peas, baby corn, chillies	EU, South Africa, Middle East	**2**	**100**	–

[1] < 5 ha
[2] > 5 ha

Selected intermediate support structures included competent authorities, certification companies, and business member organizations (BMOs). For an overview see Table 2.

*Table 2. Overview of interviewed intermediate support structures in the Kenyan bean value chain (*Vigna *spp.,* Phaseolus *spp.)*

Intermediate support structure	Type of structure
A	Competent authority
B	Laboratory and certification body
C	Competent authority
D	Business member organization (BMO)
E	BMO
F	Laboratory and certification body
G	Competent authority
H	Governmental body
I	Development partner

After 15 interviews with stakeholders in the Kenyan bean value chain, no additional issues or insights were identified in the final interviews, signifying that an adequate sample size had been reached.

For Vietnam, advice for stakeholders was provided by the Research Institute for Climate Change of Can Tho University. Stakeholders to be interviewed were again selected purposefully to include a variety of perspectives in the study, from both private sector operators and intermediate support structures. All private sector operators were exporters with a range of characteristics, representing exporters with their own production site, those with numerous smallholder outgrowers, and those with larger outgrowers (see Table 3).

Table 3. Overview of interviewed exporters in Vietnam's dragon fruit value chain

Exporter	Year	Export crops	Main markets	Number with own farm	Number smallholder outgrowers[1]	Number larger outgrowers[2]
Exporter A	2012	Dragon fruit, pomelos, limes, coconuts	Europe, Asia-Pacific, Middle East, USA, Vietnam	**186**	**171**	**15**
Exporter B	2016	Dragon fruit, coconut, rambutan	EU, UK, China, USA, Australia	**–**	**5**	**2**
Exporter C	2012	Dragon fruit	EU	**2**	**–**	**1**

[1] < 5 ha

[2] > 5 ha

Selected intermediate support structures were a governmental body, a laboratory, and a project lead (see Table 4).

Table 4. Overview of interviewed intermediate support structures in the dragon fruit value chain in Vietnam

Intermediate support structure	Type of support structure
A	Governmental body
B	Laboratory
C	Project lead

For the dragon fruit value chain in Vietnam, a total of six stakeholders were interviewed.

For the semi-structured interviews, four interview guides were developed (see Appendix):

- I Kenya – intermediate support structures
- II Kenya – private sector operators
- III Vietnam – intermediate support structures
- IV Vietnam – private sector operators

The guides for private sector operators were drafted for exporters and farmers in the value chains. The guides for intermediate support structures were targeted at stakeholders such as governmental bodies, certification bodies, laboratories, and BMOs. The interview guides contained five topics: (1) introduction, (2) validation of value chain, (3) listing of products, (4) adaptations after listing, and (5) closing of the interview.

Topic 2, the validation of the value chain, was part of the functional analysis. Topic 3 focused on the critical and evaluative analysis, and identified the temporary increases in official controls that created challenges or benefits for both public and private sectors. It also included questions on the impacts and consequences for the sectors concerned. Topic 4 was related to this, and included questions relevant to the constructive analysis – about looking back at the situation, elements already in place in the value chain, and types of assistance or support helping businesses.

Most questions contained triggering words which were used only in cases where the respondent did not answer the question, or when the question was perceived as unclear. Many questions also provided follow-up questions for use by the interviewers. Since it was a semi-structured interview, the interviewer had the flexibility to ask different follow-up questions when something was unclear, or when the interviewer wanted to dive more deeply into the topic addressed by the respondent.

2.3 Limitations

The relatively small sample size included in this research leads to the risk of reduced generalizability. This limitation has been mitigated by taking a qualitative research approach, where lower sample sizes are required; and by increasing the sample size until no additional issues or insights were identified, signifying that an adequate sample size has been reached. The wide range of stakeholders included in the interviews, from both public and private sectors, ensured diverse perspectives were captured.

The results and conclusions were not validated by stakeholders after completing the survey. Engaging with stakeholders to be interviewed required more time than expected, leaving limited time to perform the validation. The interviews were recorded, offering the possibility to listen back to parts of the interview where questions came up during reporting. Discussions took place between researchers to ensure their interpretations of the results were aligned, limiting the risk of reporting incorrect conclusions.

The exporters included in the study may not be fully representative of all exporters in the selected value chains. The willingness of these exporters to be included in the study could indicate that they are among the businesses that implemented appropriate mitigation measures to retain access to the EU market, and therefore were willing to share their story. The inclusion of intermediate support structures in the study provides an external perspective, offering broader insights into the impacts on private sector operators. This helps to balance the potential bias by incorporating viewpoints beyond just those of the participating exporters.

Interviewing stakeholders in the Vietnamese dragon fruit value chain proved difficult. Throughout the study, it became evident that stakeholders were reluctant to be interviewed, and only six dragon fruit value chain actors agreed to be interviewed. During interviews, more questions were raised about the purpose and confidentiality of the interviews and study, compared to the interviews performed in Kenya. This suggests that the topic is sensitive in Vietnam, causing stakeholders to be hesitant to be interviewed. However, the interviewed stakeholders were as diverse as possible, ensuring that most perspectives were taken into account.

3. Analysis Kenya: beans value chain

3.1 Functional analysis

The agriculture sector in Kenya plays a vital role in its economy, and contributes 33% of the gross domestic product (GDP), plus another 27% through indirect links with other sectors (FAO, 2023). Kenya's exports focus mainly on agricultural products, with 65% of export earnings accounted for by the agricultural sector (Government of Kenya, 2020). Most vegetable exports are exported to the UK (58%), the Netherlands (20%), and France (11%) (Kingdom of the Netherlands, 2017a). When exporting agricultural products, producers and exporters have to comply with requirements for food safety; product quality; and social, environmental, and business compliance.

3.1.1 Role of horticulture production and exporters

Kenya's horticultural sector continues to be a crucial part of the economy, generating around Ksh 157 billion in 2023 from the export of fruits, flowers, and vegetables. According to 2024 data from the Agriculture and Food Authority (AFA) and Horticultural Crops Directorate (HCD), the value of horticultural exports rose from Ksh 147.08 billion in 2022 to Ksh 156.69 billion in 2023. This 7% increase is attributed to an additional 76,931 metric tonnes (MT) of produce exported.

In 2023, vegetable exports saw a 115.5% surge, rising from Ksh 23.59 billion to Ksh 50.86 billion. Fruit exports also grew by 64.9%, increasing from Ksh 19.63 billion to Ksh 32.37 billion, contributing 52% to the total horticulture value. In 2022, flowers made up 47% of horticultural exports, while vegetables and fruits contributed 32.5% and 21%, respectively. Kenya exported a total of 3,388 tonnes of vegetables in 2023. The leading counties in vegetable production in 2023 were Nyandarua (11.2%), Meru (8.8%), Nakuru (7.1%), and Narok (5.2%), followed by Kiambu, Kirinyaga, Machakos, Murang'a, and Taita Taveta.

Figure 1 shows that the major vegetables produced included French beans, tomatoes, cabbages, kale, garden peas, bulb onions, and spinach. There was also a significant increase in the export of French beans in 2023, compared to 2019–2022. This difference may be accounted for by the global Covid-19 pandemic – the horticulture sector experienced a notable decline in activity during the pandemic, with exporters operating at just 25–30% of their usual capacity (FAO, 2020).

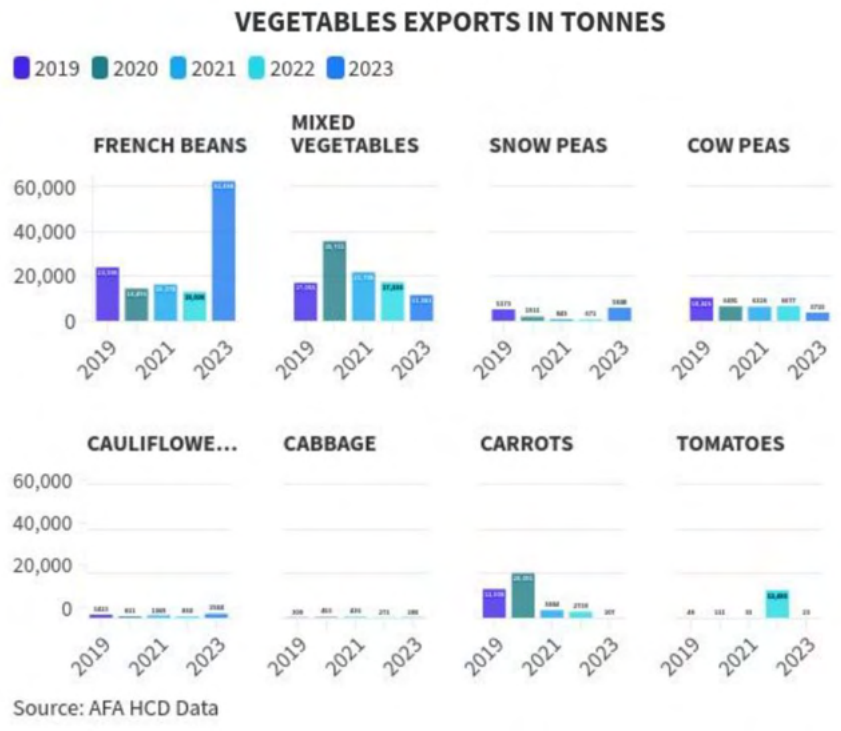


Figure 1. Kenya's vegetable export 2019–2023 (tonnes). Source: TechTrends, 2024.

The annual value of beans exported (*Vigna* spp. and *Phaseolus* spp.) is US$121 million, which is based on an export quantity of 69,546 MT of these beans in 2023, reflected by the total exported in Figure 2.

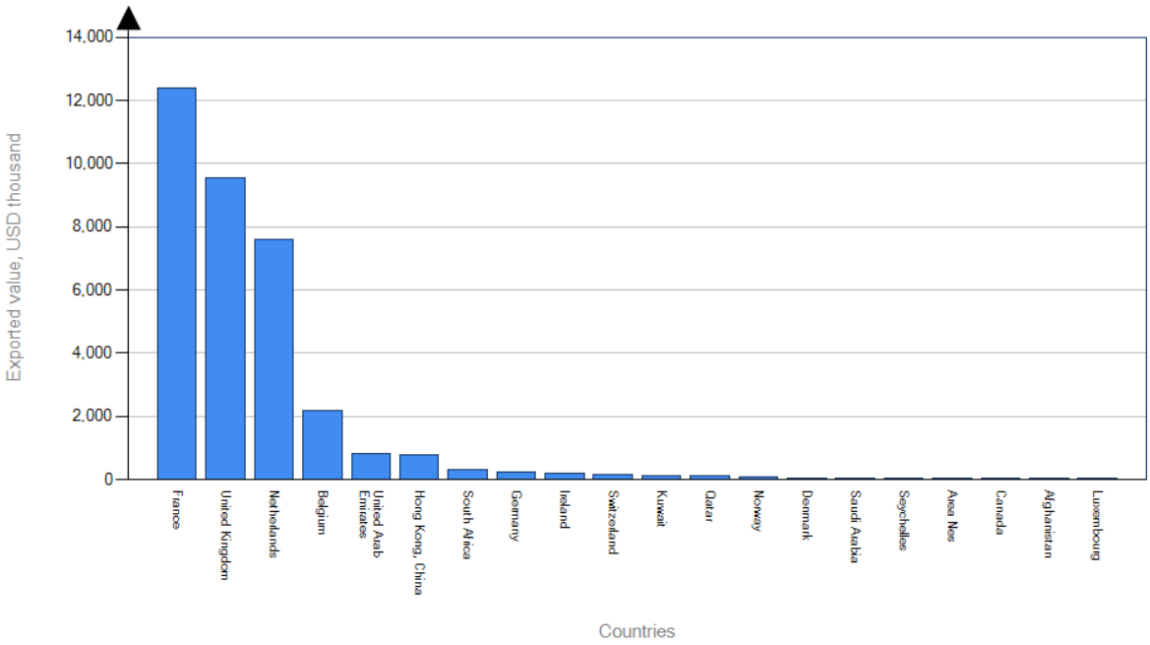


Figure 2. Importing markets for green beans from Kenya. Source: ITC Trade Map.

The main export markets for these beans are France, the UK, and the Netherlands. Table 5 summarizes the market dynamics from 2019 to 2023, showing a decline in the value of bean exports to the UK, while quantities to France and Belgium increased.

Table 5. Top four importing markets for beans[1] from Kenya. Source: ITC Trade Map, ITC calculations based on Kenya National Bureau of Statistics (KNBS) data.

Importers	Value exported in 2023 (thousand US$)	Share in Kenya's exports (%)	Quantity exported in 2023 (MT)	Growth in exported value between 2019–2023 (% pa)	Growth in exported quantity between 2019–2023 (% pa)
World	34,773	100	16,645	–4	0
France	12,376	35.6	5,720	2	6
UK	9,560	27.5	5,044	–11	0
Netherlands	7,611	21.9	3,975	1	0
Belgium	2,181	6.3	707	0	4

[1] 70820 Fresh or chilled beans "*Vigna* spp., *Phaseolus* spp.", shelled or unshelled.

Also, Table 6 shows that between 2019 and 2024 there is growth in exported quantities of beans in other smaller markets, such as the United Arab Emirates, Ireland, Qatar, and Saudi Arabia, which are relatively small, but nevertheless worth mentioning.

Table 6. Growth markets for beans[1] from Kenya".". Source: ITC Trade Map.

Importers	Value exported in 2023 (thousand US$)	Share in Kenya's exports (%)	Quantity exported in 2023 (MT)	Growth in exported value between 2019–2023 (% pa)	Growth in exported quantity between 2019–2023 (% pa)
United Arab Emirates	818	2.4	420	1	10
Ireland	202	0.6	93	5	17
Qatar	110	0.3	30	28	23
Saudi Arabia	37	0.1	14	117	103

[1] HS code 70820 Fresh or chilled beans "*Vigna* spp., *Phaseolus* spp.", shelled or unshelled.

3.1.2 Bean production

In the following sections the term "beans" i refers to the HS code70820 "Fresh or chilled beans "*Vigna* spp., *Phaseolus* spp.", shelled or unshelled".

The production of beans in Kenya can be split into two different markets: the fresh export market, and processing. Beans are particularly attractive to farmers due to their short life cycle (maturing in 45–60 days) and frequent harvesting. Kenya offers ideal production conditions because of its suitable soil, temperature, altitude, and rainfall. These conditions are primarily found in the Mount Kenya region, such as the counties Kirinyaga, Murang'a, and Meru, which supply over 80% of the beans Kleih *et al*. (2018).

Production risks include adverse weather and management challenges, necessitating formal risk assessments for producers linked to exporters. Modern farming requires investments in irrigation, machinery, waste management, and training to optimize production and comply with buyer requirements. Record-keeping is essential for traceability, though many farmers lack adequate documentation (Kleih *et al*., 2018).

The production stages and activities are generally similar for the different types of beans. Beans intended for the fresh produce market are the key product that shapes the value chain. Core functions in the production process include sourcing inputs and supplies, primary production, agro-processing, and trade. The value chain is largely buyer-driven, with a few dominant actors playing a key role (Kleih *et al*., 2018).

The farming system primarily involves smallholder farms (<2 ha) alongside medium and large-scale farms. The bean value chain promotes inclusive growth, particularly benefiting smallholder producers and a predominantly casual workforce, with women often comprising the majority of the labour force involved in production and processing. Smallholder farmers present in the value chain often form producer groups to achieve economies of scale and maintain market relationships, frequently entering into contracts with buyers that specify production conditions and quality. However, many farmers operate outside formal contracts, leading to persistent issues in meeting contractual obligations. Knowledge and skills for bean production are provided by field agronomists, and training is organized by county governments and the AFA (Kleih *et al*., 2018).

Farms face various challenges in the management and use of inputs. Overall, good agricultural practices in bean production should be based on better recording of actual practices and input use. Regarding pesticide use, a few forbidden substances are still used, and pest management practices are not always optimal (Kleih *et al*., 2018).

3.1.3 Value chain description

Kenya's export vegetable value chain involves various actors across different levels. At the micro level, private sector participants include input providers, producers, brokers, transporters, wholesalers, processors, and exporters. The meso level consists of farmer associations, business organizations such as the Agrochemicals Association of Kenya (AAK), and government institutions such as the AFA and Kenya Plant Health Inspectorate Service (KEPHIS). At the macro level, policy-related actors include government ministries and development partners, which shape the regulatory environment for the value chain. Overall, stakeholders in the horticultural industry encompass the public and private sectors, along with development partners and their projects.

The main stakeholders in the value chain of beans in Kenya are summarized in Figure 3.

Table 7 lists various stakeholders from the public and private sectors and development partners, each playing a distinct role in shaping, informing, and regulating Kenya's green bean value chain. A brief discussion of each sector follows in the next section.

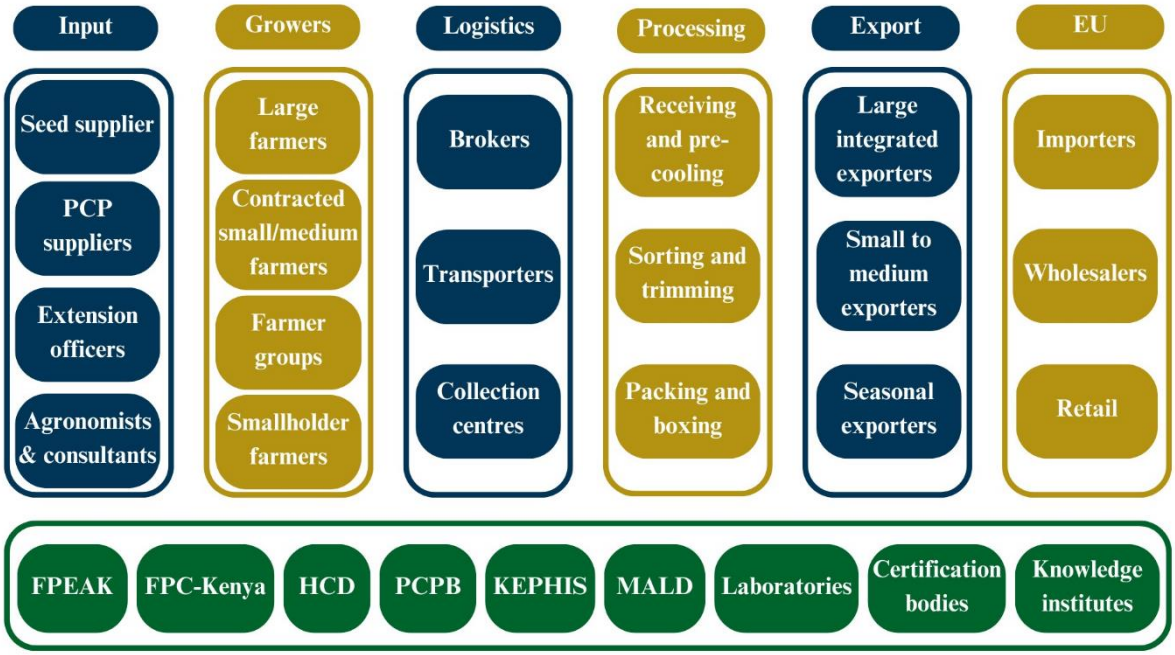


Figure 3. The main actors in the bean value chain in Kenya focused on the export market. Source: Interviews conducted by the authors.

Table 7. Overview of public sector, private sector, and development partners in the bean value chain in Kenya.

Public sector	Private sector	Development partners
• Ministry of Agriculture and Livestock Development (MALD) • Agriculture and Food Authority (AFA) • Horticulture Crops Directorate (HCD) • Kenya Plant Health Inspectorate Service (KEPHIS) • Pest Control Products Board (PCPB) • Kenya Bureau of Standards (KEBS) • Kenya Agricultural and Livestock Research Organization (KALRO) • National Environment Management Authority (NEMA) • County government	• Farmers • Outgrowers • Fresh Produce Exporters Association of Kenya (FPEAK) • Fresh Produce Consortium of Kenya (FPC Kenya) • Exporters • Packhouses • Traders/brokers • Agrovet dealers • Agrochemicals Association of Kenya (AAK) • Cargo companies • Importers • Certifying bodies • Laboratories	• COLEAD • EU Delegation • International Centre of Insect Physiology and Ecology (ICIPE) • SNV Netherlands Development Organisation • CABI

3.1.4 Public sector

- The Ministry of Agriculture and Livestock Development (MALD), through Kenya's State Department of Agriculture, coordinates the horticultural value chain and promotes food security, agricultural exports, agro-based industries, and sustainable land use.
- The Agriculture and Food Authority (AFA), established by the Agriculture and Food Authority Act of 2013, oversees agricultural regulation and promotion, excluding livestock and fisheries. Its mandates include administering the Crops Act, promoting best practices, maintaining data, determining research priorities, and advising governments on agricultural levies.
- The Horticultural Crops Directorate (HCD), under the AFA, regulates the horticulture export industry and enforces contract farming. It also provides market information and conducts annual data validation on the horticulture sector's performance for planning and investment purposes. The Authority is the driving force behind the Kenya Standard (KS) 1758, the National Horticulture Code of Practice developed by the KEBS. AFA-HCD ensures that horticultural producers comply with the standards outlined in KS 1758, the National Horticulture Code of Practice promoting safe and high-quality horticultural practices across the industry (AFA, 2024).
- The Kenya Plant Health Inspectorate Service (KEPHIS), established in 1996, ensures quality control of agricultural inputs, plant health, and plant variety protection. As Kenya's National Plant Protection Organization (NPPO), it regulates plant imports, inspects horticultural exports, and serves as a focal point for phytosanitary matters.
- The Pest Control Products Board (PCPB) regulates plant protection products, overseeing their import, registration, use, and disposal in Kenya.
- The Kenya Bureau of Standards (KEBS) is responsible for setting and implementing national standards, and is Kenya's contact for the World Trade Organization (WTO) Agreement on Technical Barriers to Trade (TBT), and for Codex standards.
- The Kenya Agricultural and Livestock Research Organization (KALRO) coordinates agricultural and livestock research. Its strategic objectives include promoting technology and innovations, developing markets, advocating policy, and enhancing knowledge and research capacity for agricultural value chains. Universities also contribute to agricultural research and development.
- Large-scale producers that want to be certified for KS 1758are required to apply for National Environment Management Authority (NEMA) licences to grow vegetables. Large-scale farmers whose farming activities can affect the environment are required to have an environmental impact assessment. This is aimed at ensuring sustainable farming and conservation of the environment, and applies only to farmers who are certified under KS 1758 (AFA, 2024).
- Kenya's 2010 Constitution introduced county governments, decentralizing resources and functions. Officially launched in 2013, 47 counties now manage agricultural departments, promote value chains, and deliver extension services locally, with a national senate representing them.

3.1.5 Private sector

- Bean farmers in Kenya can be classified into three categories based on farm size:
    - Smallholders: farms under 2 ha (5 acres) with bean production on one to five plots of around 200 m^2 each. Smallholder farmers play a key role in Kenya's bean value chain, with an estimated 3,600,840 smallholder farmers engaged

in production, mostly on small farms under 2 acres (COLEAD, 2022). Most smallholder farmers engaged in bean production are contracted or closely linked to export companies, but others, especially in remote areas, rely on brokers or intermediaries, leaving them more vulnerable to exploitation (Kleih *et al*., 2018).

  - Medium-scale producers: farms between 2 and 10 ha, with bean production on 0.1 to 1–2 ha.
  - Large-scale producers: farms with more than 10 ha dedicated to bean production.

- Outgrowers in the value chain can include smallholder, medium, or large-scale producers. Smallholders are often organized into self-help groups, making it easier for export companies to work with them. These companies and farmers enter into contracts that outline each party's responsibilities, specify the produce to be supplied, and detail the terms of the transaction.
- The Fresh Produce Exporters Association of Kenya (FPEAK) was founded in 1975. The Fresh Produce Consortium Kenya (FPC Kenya) originated in 2013 as the Kenya Association of Fruits and Vegetable Exporters, and rebranded in 2018 to FPC Kenya. Both BMOs represent growers, exporters, and service providers in the horticulture industry. FPC Kenya also represents traders, in addition to producers and service providers. Both associations support members with technical and marketing information, training, and advocacy to boost sector competitiveness.
- Exporters of horticultural produce are key to Kenya's economy, serving as large employers and generating significant foreign exchange. They govern the value chain through strong links with importers in Europe and elsewhere. Exporters source products from smallholder, medium, or large-scale farms and ensure compliance with food safety and pesticide application regulations. Exporters may also grow vegetables, provide inputs and extension services, operate packhouses, and handle the export process. HCD issues export licenses to clients planning to export high-quality horticultural produce to various markets. Before applying for a licence, applicants must establish a market and have contacts with potential importers.
- Packhouse operators are crucial players in the value chain, serving as the primary category of exporters of beans destined for Europe and other markets. Packhouse operators are typically members of the BMOs. They are required to pay for export licences issued by the HCD, and to coordinate inspections of their produce conducted by KEPHIS.
- Traders, brokers, and intermediaries fall under the category 'Marketing Agent' of HCD. They liaise between horticultural producers and buyers, selling to exporters as well as supplying supermarkets, hotels, and grocery stores. All interactions with horticultural growers take place through contract farming. The registration of these agents is governed by the Crops Act 2013, sections 61(1) and (11), to ensure traceability and adherence to quality standards (HCD, 2021). Traders, brokers, and intermediaries often step in when farmers lack close relationships or contracts with export firms. In such cases, farmers depend on these intermediaries to purchase their produce and sell it to exporters. Brokers sometimes buy produce on credit, hoping to sell it to exporters; however, there have been instances where they failed to do so, leaving farmers with little or no income. Additionally, there have been reports of brokers disappearing with farmers' produce, resulting in loss of income. Traders unable to meet export quality standards may decide to supply the domestic vegetable market instead (Kleih *et al*., 2018). Produce in the domestic market can come directly from farmers, or be sourced from packhouses or factories.

- In all key horticultural production regions, agro-vet shops provide producers with essential inputs, including seeds, chemicals (such as pesticides, herbicides, and fungicides), fertilizers, and tools for cultivation. As Kenya is a hub for horticultural production, there is a diverse array of inputs available, sourced both locally and through imports. The Agrochemicals Association of Kenya (AAK) is a BMO representing manufacturers and distributors of plant protection products (PPPs). It advocates for its members' interests, and serves as the national representative for the global association CropLife International.
- Cargo companies are essential for smaller exporters in Kenya who lack their own export networks, whereas larger exporters often have dedicated cargo-handling staff at Nairobi's international airport. Fresh beans are mainly air-freighted to Europe and other markets, with passenger airlines offering cargo services at the airport.
- Importers in overseas markets handle fresh produce by managing import formalities, repacking, or processing before delivering to large retailers. Some exporters also manage imports through their own branches abroad. A portion of fresh produce goes to smaller retailers, restaurants, and institutions such as hospitals and schools.
- Certifying bodies are independent organizations responsible for auditing and certifying the systems of farmers and exporters, playing a key role in ensuring quality and food safety standards throughout the value chain.

3.1.6 Development partners

- Development partners also play a significant role in the bean value chain in Kenya. An example is COLEAD (previously COLEACP), which has been active in Kenya through a series of EU-funded technical assistance programmes, focusing on food safety and increasingly on environmental and social standards. To tackle the challenges of pesticide residue exceedances and phytosanitary noncompliance in Kenya's horticulture sector, particularly with peas and beans, which prompted stricter EU controls, COLEAD has provided training, established a pesticide residue monitoring plan for vegetables (including French beans), and assisted in enhancing lab capabilities for pesticide residue analysis. These efforts aim to improve compliance with maximum residue levels (MRLs) and enhance Kenya's export capabilities.
- The Delegation of the European Union to Kenya supports the country's agricultural sector through both direct and indirect initiatives. This includes assistance to the Government of Kenya for its Agricultural Sector Development Support, alongside other development partners. Additionally, the EU has provided targeted support through programmes implemented by COLEAD over the past 2 decades: PIP, EDES, Fit for Market (FFM), FFM SPS and, most recently, NExT Kenya (New Export Trade), funded by the Delegation of the European Union to Kenya. All support has been developed and implemented in close collaboration with Kenyan stakeholders.
- The International Centre of Insect Physiology and Ecology (ICIPE) focuses on agricultural pests and diseases, and has developed a pocket manual for green bean farmers. It provides guidance on integrated pest management (IPM) to help control pests and diseases while meeting stricter pesticide residue regulations from importers such as the EU.
- SNV implemented the HortIMPACT project (2015–2019) to address challenges in Kenya's horticulture sector, including food safety for the domestic market.
- CABI has collaborated with the Standard Implementation Committee of KS 1758 to create a simplified, illustrated manual detailing KS 1758: Horticulture Code of Practice for Kenya, aimed at helping more farmers produce safe food (CABI, 2024). .

3.1.7 Historical summary of the interceptions

Between 2009 and 2012, Kenyan exports of peas and beans to the EU faced increased interceptions, leading to EU-imposed controls. In January 2013, Kenyan beans were classified as “high risk” under Regulation (EC) 669/2009, leading to heightened testing requirements at EU entry, set at a 10% rate. Increased controls in turn led to multiple rejections of consignments at the EU border: **Error! Reference source not found.** 56 border rejections related to MRLs in 2013, and 47 in 2014.

Table 8 presents the hazardous substances detected in border rejections of Kenyan beans and peas during the period from 2013 to 2016. Most of these substances (in bold type) were unauthorized in the EU.

Table 8. Hazardous substances detected in border rejections on beans and peas for the period 2013–2016 (substances unauthorized in the EU in bold type). Source: KEPHIS data (2016).

Hazardous substances	
Acephate	**Folpet**
Acetamprid	**Hexaconazole**
Azaconazole	**Imidacloprid**
Carbendazim	Mandipropamid
Carbofuran	**Metalaxyl**
Chloronthraniliprole	**Methamidophos**
Chlorothalonil	**Methomyl**
Chlorpyrifos	Methoxyfenozide
Diafenthiuron	**Omethoate**
Dimethoate	Oxydemeton-methyl
Famoxadone	**Profenofos**
Fenpropathrin	Propamocarb
Fenthion	**Tetradifon**
Fluopicolide	**Trifloxystrobin**

The additional challenges created by increased controls are reflected in the export volumes of beans and peas, as Figure illustrates.

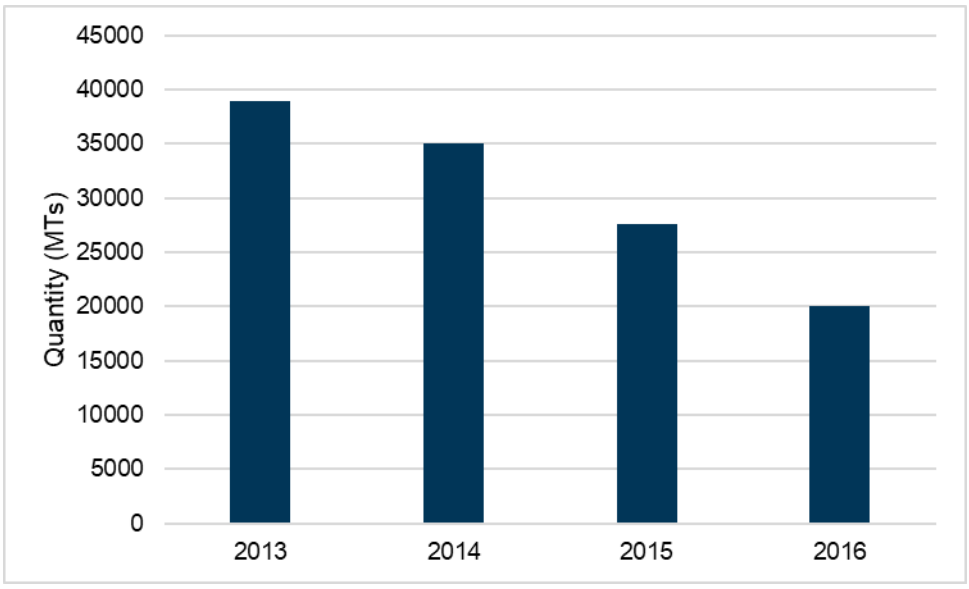


Figure 4. Trend in export volumes of beans and peas in pods. Source: KEPHIS (2016).

In the past 5 years, there still have been border rejections of beans due to pesticide residue notifications, with 12 rejections in 2022, 17 in 2023, and 22 in 2024(Figure 5). Please note that for 2024, only notifications until October were known at the time of writing.

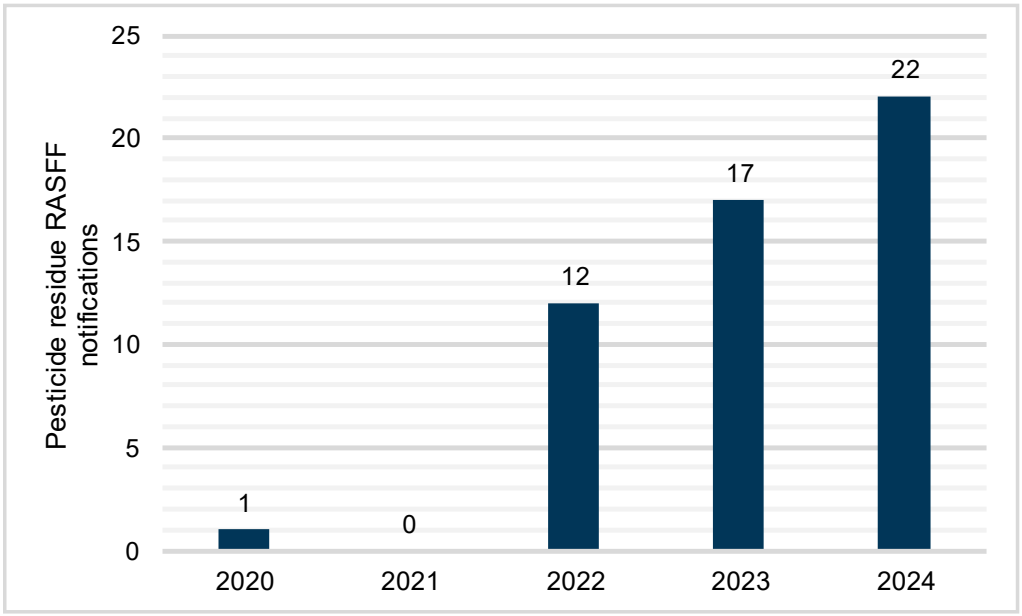


Figure 5. RASFF notifications of pesticide residues in Kenyan beans. Source: RASFF 2024 data.

These border rejections primarily involved unauthorized substances in the EU, with many notifications related to the same substances from the MRL crisis period of 2013–2014 (highlighted in bold in Table 9). Acephate and methamidophos were detected multiple times – 30 and 23 instances, respectively. Also, the unauthorized substance chlorpyrifos was found seven times on beans in the past few years.

*Table 9. Hazardous substances detected on beans 2020–2024 (substances unauthorized in the EU in bold type; *, notifications related to the same substances from the MRL crisis in 2013–2014). Source: RASFF 2024 data.*

RASFF list of hazardous substances 2020–2024	Number of notifications	EU notification Values in mg/kg bw/day (ADI, AOEL); mg/kg bw (ARfD)
Acephate*	30	Unauthorized substance
Bupirimate	1	Approved substance, 0.05 (ADI & AOEL)
Captan	1	Approved substance, 0.25 (ADI), 0.9 (ARfD), 0.25 (AOEL)
Carbendazim*	3	Unauthorized substance, 0.02 (ADI, ARfD, AOEL)
Carbofuran	1	Unauthorized substance, 0.00015 (ADI & ARfD), 0.0003 (AOEL)
Chlorfenapyr	1	Unauthorized substance, 0.015 (ADI & ARfD)
Chlorothalonil*	1	Unauthorized substance, 0.015 (ADI), 0.05 (ARfD), 0.003 (AOEL)
Chlorpyrifos-ethyl*	7	Unauthorized substance
Dimethoate	1	Unauthorized substance
Dimethomorph	2	European Commission decided not to renew approval on 20 May 2024; dimethomorph maximum residue levels (MRLs) to 0.05 (ADI), 0.6 (ARfD), 0.15 (AOEL) in 2025
Famoxadone	1	Unauthorized substance, 0.006 (ADI), 0.1 (ARfD), 0.0024 (AOEL)
Flutriafol	1	Unauthorized substance, 0.01 (ADI), 0.05 (ARfD & AOEL)
Hexaconazole*	2	Unauthorized substance, 0.005 (ADI)
Indoxacarb	1	Unauthorized substance, 0.005 (ADI & ARfD), 0.003 (AOEL)
Methamidophos*	23	Unauthorized substance, 0.001 (ADI), 0.003 (ARfD)
Profenofos*	2	Unauthorized substance, 0.03 (ADI), 1.0 (ARfD)
Sulfoxaflor	1	Approved substance, 0.04 (ADI), 0.25 (ARfD), 0.06 (AOEL)

ADI, acceptable daily intake; AOEL, acceptable operator exposure level; ARfD, acute reference dose.

Table 10 outlines EU regulatory adjustments for Kenyan beans from 2013 onwards. Initially subjected to 10% control checks in 2013, Kenyan beans were removed from Annex I in 2015. However, they were re-listed with 5% controls in early 2019, which remained until late 2019 under a revised Regulation. In 2020, the control percentage was increased back to 10%, highlighting the shifting EU monitoring requirements for this export product.

Table 10. Listing of beans from Kenya under various EU Regulations.

Date	Alteration	Regulation
1 Jan 2013	Listed in Annex I for controls at 10%	669/2009
1 Jul 2015	Delisted from Annex I	669/2009
14 Jan 2019	Re-listed in Annex I for controls at 5%	669/2009
29 Oct 2019	Listed in Annex I for controls at 5%	2019/1793
27 May 2020	Controls increased to 10%	2019/1793

From 2010 COLEAD (then COLEACP), through the EU-funded Strengthening Food Safety Systems through SPS measures (EDES) programme, provided training in risk assessment and official controls. Kenyan authorities developed a coordinated national action plan with training provided through the Pesticides Initiative Programme (PIP) for growers, exporters, and extension services. Efforts included trials on pesticide residue levels and the development of alternative pesticides. COLEAD (COLEACP) supported the implementation of the national action plan and collaboration with other agencies and donors. An MRL troubleshooting mission was organized to assess good agricultural practices (GAP) across 37 companies, focusing on pest management challenges. Technical staff were trained and coaching sessions were conducted, particularly with spraying teams, followed by ongoing support. On the public sector side, assistance has been provided to KEPHIS, PCPB, KALRO, and HCD, including laboratory support and training sessions (Kleih *et al*., 2018).

As a result of monitoring by EU authorities of both public and private sector initiatives, Kenyan green beans were delisted in 2015 from Annex I, as Table 10 illustrates (Kleih *et al*., 2018).

3.1.8 Regulatory agencies' responses 2013–2020

The regulatory agencies served two key functions. First, they oversaw the exporters' capacity for self-regulation and their management of smallholder compliance. Second, during crises, they acted to halt further contamination leading to the lifting of export bans on Kenyan produce.

A study by Ajwang (2020) found that Kenyan state regulators have tended to be reactive rather than consistently proactive in their regulatory duties. Ajwang argues that during non-crisis periods, regulatory agencies remained passive, becoming more active only in response to contamination crises, and that this lack of consistent proactivity has contributed to recurring issues with MRLs in the value chain. The reactive approach of Kenyan regulators was largely due to limited financial resources, particularly since 2013. This forced them to prioritize their regulatory activities.

When contamination occurred, notifications were issued to KEPHIS by either the European Food Safety Authority (EFSA) or retailers (Ajwang, 2020). For isolated contamination cases, European retailers would notify KEPHIS, as in 2016, while large-scale contamination in 2013 and 2014 triggered EFSA notifications. These alerts included details about the source and responsible exporter. Upon receiving a notification, KEPHIS suspended the exporter's access to the market, affecting all farmers linked to that exporter. Following that, KEPHIS and other agencies then used the GLOBALG.A.P. traceability system to track the source of contamination and to audit the affected farm and the exporter's facilities. For widespread contamination, as in 2013, EFSA conducted audits of Kenyan regulators, including KEPHIS, HCD, and PCPB, while smaller issues were managed locally. Once the audit process was completed and issues were addressed, the exporter's Electronic Certification System (ECS) would be reinstated. However, suspending an ECS was typically a measure of last resort, used primarily for widespread non-compliance, as seen in 2013. Regulators favoured

dialogue and training as initial responses, resorting to sanctions only when issues were pervasive or if an exporter did not adequately address regulatory concerns. Exporters understood that regulators could impose penalties for non-compliance, which led them to adhere to regulations with minimal coercion. This regulatory approach relied on relationship signalling, effectively stating, “if you comply, I won’t sanction you”. There was no evidence of the HCD suspending any exporter’s business licence. The regulators’ hesitance to impose sanctions was also influenced by the significant role the fresh fruit and vegetable sector played in the Kenyan economy (Ajwang, 2020).

3.1.9 Regulatory changes in response to the 2013 MRL crisis

The MRL crisis in 2013 prompted three regulatory changes in Kenya’s value chain. First, the HCD introduced licensing for intermediaries to formalize their role, as they had continued to operate informally. At that time, exporters often portrayed intermediaries as pariahs, blaming them for the 2013 MRL crisis (Ajwang, 2020). Second, exporters were required to renew their licences annually, instead of every 5 years, to allow better oversight. Third, the Horticultural Competent Authority Structure (HCAS) was created to provide a public–private regulatory platform, comprising both governmental bodies (PCPB, KEPHIS, HCD, KALRO) and private organizations (FPEAK, AAK), aimed at preventing future contamination issues. This crisis highlighted regulatory gaps and led to stricter oversight from both EFSA and Kenyan agencies (Ajwang, 2020).

Following the 2013 MRL crisis there was a further regulatory change: the pesticides industry regulator, PCPB, imposed a ban on all chemicals containing dimethoate, which were identified as responsible for the MRL issues. However, chemical manufacturers, represented by their association AAK, challenged the ban in court, leading to it being lifted (Ajwang, 2020). During the establishment of HCAS, this issue was discussed among the members, leading to a restriction on chemicals with dimethoate rather than a complete ban. A restriction means that the chemical can be sold, but is subject to strict regulations that prohibit its use on food crops. In return, the chemical manufacturers offered to enhance training for smallholders on the safe use of chemicals. While HCAS effectively addressed this issue, which would have been time-consuming and costly to resolve through the judicial process, its overall effectiveness was called into question. Farmers were still able to obtain restricted chemicals from certain pesticide sellers due to insufficient oversight from state regulators. Although this regulatory action was more cost-effective, it ultimately fell short of its objectives due to inadequate monitoring systems (Ajwang, 2020).

The implementation of regulations within HCAS was facilitated by FPEAK and AAK, which relayed regulatory decisions to their members, and employed influence and peer pressure to promote compliance. When a member did not adhere to these regulations, FPEAK and AAK informed HCAS, prompting state agencies to impose sanctions to ensure compliance. HCAS demonstrated responsive regulation through dialogue and peer pressure, with sanctions used only as a last resort for non-compliance. Key factors for adherence included communication, peer influence, and established relationships. However, HCAS faced several challenges, including the lack of farmer representation and unclear power dynamics, particularly regarding the influence of private organizations such as FPEAK and AAK compared to state agencies that could enforce sanctions. Implementing agreed regulatory decisions proved difficult, as shown by the issues related to dimethoate-containing chemicals. Tensions between intermediaries and exporters also limited the involvement of intermediaries in the process (Ajwang, 2020).

The introduction of Kenya’s Horticultural Crops Authority Bill in 2024 established a new regulatory framework for stakeholders in the horticultural industry. However, the Bill has yet to be presented in Parliament. This targeted legal framework aims to significantly impact the entire value chain by promoting the growth and development of the horticulture sector. If enacted, the Horticultural Crops Authority Bill will apply to all horticultural produce and products grown, processed, and marketed in Kenya, as well as those imported to or exported

from the country, covering both communal and privately held farms (Parliament of Kenya, 2024).

3.1.10 Private sector responses 2013–2020

The private sector response, involving retailers, exporters, certifying bodies, and farmers, centred on enforcing food standards, with retailers using their market control to ensure compliance (Ajwang, 2020). Exporters self-regulated to meet standards, maintaining positive relationships with retailers through voluntary compliance, driven by market access and financial capacity. Examples of voluntary third-party standards include GLOBALG.A.P., IFS Food Standard, and BRC Global Standard for Food Safety. However, smallholders often struggle to meet requirements for standards due to financial limitations, leading to challenges in their relationship with exporters. Farmers were selective in choosing buyers based on their responsiveness to broader concerns, such as contract terms and pricing. Exporters often outsourced smallholders' compliance with GLOBALG.A.P., but the quality of the farmer-exporter relationship, shaped by governance issues, greatly influenced overall compliance. The MRL crisis and listing in Annex I (EC 669/2009) led to the expansion of bean production on large-scale farms owned by exporters or large-scale outgrowers, which are easier to for the export sector to control, to some extent at the expense of smallholder farmers (Kleih *et al.*, 2018).

KS 1758 is the National Horticulture Code of Practice developed by KEBS in collaboration with the horticulture industry. KEBS is the custodian of the standard, AFA-HCD is the driving force behind it, and the industry is the user. KS 1758, originally released in 2004, saw limited implementation until 2014, when more re-occurring food safety issues were reported. Since its voluntary adoption that year, the standard has been instrumental in enhancing food safety and quality among certified producers. A significant challenge in the Kenyan horticultural sector is ensuring the quality and safety of locally produced fruits and vegetables. With 95% of produce consumed within the country, there is a widespread perception that local safety measures lag behind those applied to exports, which adhere to strict production and handling protocols (AFA, 2024). The introduction of KS 1758 aims to address this disparity by ensuring that locally consumed products meet the same safety standards as are required for exports. It is important to highlight that global standards have considerably stricter requirements. KS1758 was adapted from these global standards to fit local conditions. Although the introduction of KS 1758 brings several advantages, it also poses challenges, especially for smallholder farmers. The expense associated with certification can be a significant obstacle. Costs for certification vary based on the certifying body and the farmer's compliance level. To assist small-scale farmers, AFA and industry players are seeking support from development partners and promoting group certification to reduce individual costs.

Kenya's National Horticulture Taskforce (NHT), a public–private partnership, has been strengthened to enhance its role in supporting the horticultural sector. Private sector members include organizations such as FPEAK, FPC Kenya, KFC, and AAK. Government representation comes from the MALD, Ministry of Health, State Department for Trade, and National Treasury, along with key agencies including HCD, KEPHIS, PCPB, KALRO, and the Kenya Export Promotion and Branding Agency (KEPROBA). The Council of County Governors is also included in the Task Force.

3.1.11 Summary – functional analysis

Kenya's horticultural sector is vital to the economy, generating about Ksh157 billion from exports in 2023. The value of exports increased from Ksh147.08 billion in 2022, driven by a 115.5% rise in vegetable exports and a 64.9% increase in fruit exports, while flower exports declined significantly.

Fresh green beans alone brought in approximately US$121 million from 56,201 MT exported in 2023, with main markets including the UK, France, and the Netherlands. Despite a decline

in exports to the UK, quantities to France and Belgium increased, and new markets such as Ireland and Saudi Arabia are emerging.

The historical context of Kenyan bean exports reveals significant challenges, starting around 2012 when increased interceptions by the EU led to stricter controls. In January 2013, Kenyan beans were designated as “high risk”, resulting in a 10% testing requirement at EU entry due to rising notifications of MRLs for pesticides. This situation escalated, with notable border rejections – 56 in 2013 and 47 in 2014 – due to unauthorized substances such as methamidophos and chlorpyrifos.

These MRL notifications had a detrimental impact on export volumes, a trend that persisted in subsequent years. In response to these issues, the EU implemented a series of regulatory changes between 2013 and 2020. Initially, Kenyan beans faced a 10% control check, but they were delisted in July 2015. However, they were re-listed in January 2019 with a reduced control rate, which was later increased back to 10% in May 2020.

To address the rise in MRL notifications, through the EDES and PIP programmes, COLEAD (COLEACP) provided training for growers and exporters, the development of national action plans, and enhanced support for regulatory bodies such as KEPHIS. Regulatory agencies often acted reactively, primarily in response to contamination crises, rather than taking proactive measures, largely due to limited resources. Notifications from the EU triggered immediate responses, including suspensions of market access for affected exporters.

Post-crisis regulatory changes included the introduction of licensing for intermediaries, annual licence renewals for exporters, and the establishment of the HCAS to improve oversight. On the private sector side, compliance with voluntary standards such as GLOBALG.A.P. became a focus, although smallholders struggled to meet these requirements due to financial constraints.

The introduction of the National Horticulture Code of Practice (KS 1758) aimed to ensure that local products met the same safety standards as exports. However, the costs associated with certification posed significant challenges for smallholder farmers, prompting initiatives to promote group certification as a cost-effective solution.

Additionally, the National Horticulture Taskforce was strengthened as a public–private partnership to support the sector, bringing together various stakeholders to collaboratively address industry challenges. These developments reflect ongoing efforts to enhance food safety and compliance within Kenya’s horticultural exports, particularly in light of previous difficulties with pesticide residues and EU regulations.

Over the past 3 years, there still have been multiple border rejections of Kenyan beans due to pesticide residue notifications, with 12 rejections in 2022, 17 in 2023, and 22 in 2024. These rejections primarily involved substances that are unauthorized in the EU, many of which were linked to the MRL crisis of 2013–2014. Notably, acephate and methamidophos were detected multiple times, with 30 and 23 instances, respectively, raising significant concern. Additionally, the unauthorized substance chlorpyrifos was found in beans seven times in recent years.

3.2 Critical and evaluative analysis

3.2.1 Communication process

The communication flow regarding the initial listing in 2013 of beans from Kenya on Annex I of the regulation is visualized in Figure 6.

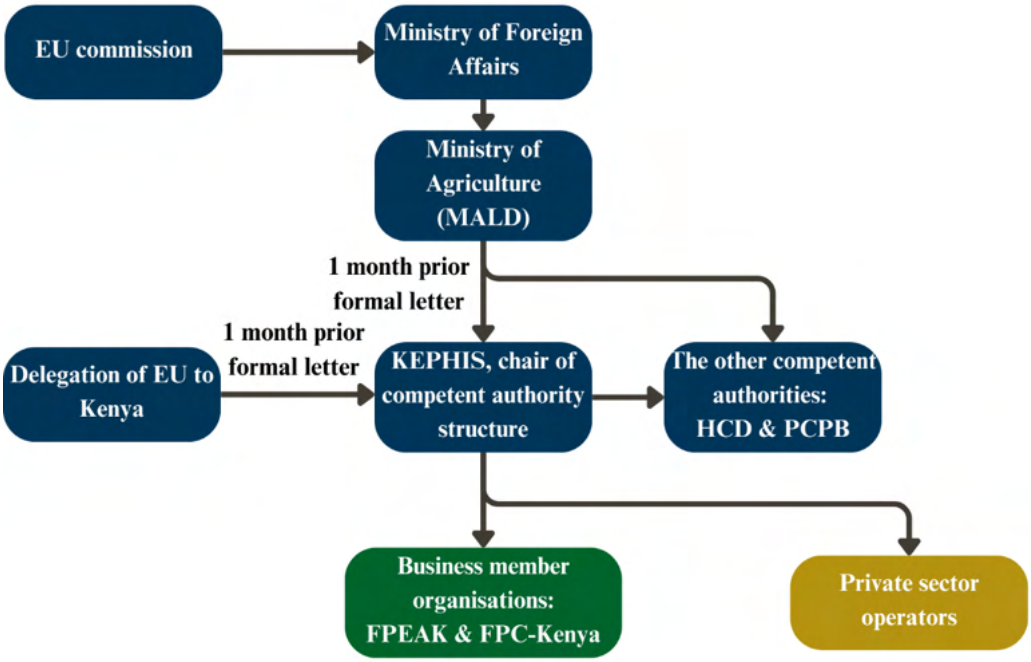


Figure 6. Communication flow of listing of beans on Annex 1 of Regulation 669/2009. Source: Interviews conducted by the authors.

The European Commission shared information with the Kenyan Ministry of Foreign Affairs, which then passed it to the MALD. Interviewees were not able to give more information regarding the timing of this communication. However, intermediate support structures noted that MALD sent a formal letter to KEPHIS 1 month before the 2013 listing, copying in other authorities. KEPHIS was also informed by the EU Delegation in Kenya 1 month prior to the listing and subsequently informed other competent authorities.

Additionally, KEPHIS communicated the initial listing information to BMOs and private sector operators through a formal letter. All six exporters interviewed confirmed they received this information from KEPHIS, including an invitation to a meeting for further discussion. While they acknowledged receiving the information before the listing, their accounts varied regarding the exact timing, with Exporters A and B stating it was 1 week prior.

Throughout the interviews, it became clear that current updates under Regulation (2019/1793 were shared following the same communication flow as indicated in Figure 6.

Exporters A, B, and C and Support structures A, B, and D mentioned that they were already aware earlier of a possible increase in temporary controls due to the number of MRL-related notifications that had occurred, indicating potential weaknesses in the value chain.

Support structure C, a competent authority, stated that the 1-month advance notice was considered sufficient, though they emphasized a preference for earlier notifications to better plan their response.

Information sharing about the implications

KEPHIS, COLEAD, and BMOs are key players in sharing information about the implications of regulations. All six exporters interviewed noted that KEPHIS organized meetings and awareness sessions to explain the implications, stakeholder actions, and the current status of notifications. Exporters C and E observed increased information sharing from competent authorities following the listing, facilitated by regular meetings.

COLEAD contributed by strengthening the NHT, which drafted an action plan and provided quarterly updates communicated through BMOs via email, WhatsApp, and physical meetings. Exporters C, E, and F, along with Support structure D, noted that COLEAD organized information sessions and offered free training for companies facing repeated interceptions. BMOs including FPEAK and FPC also provided training and technical assistance for implementing GAP.

While several parties shared information regarding the implications, one exporter reported not receiving it. Exporter A mentioned being informed about the listing, but did not receive follow-up details on its implications. Exporter E suggested that outdated email lists might be a reason for this, as information or invitations may not always reach the appropriate person within private sector operators in the bean value chain. Exporter A also indicated that the information received was too technical and lacked clarity about the impacts on private sector operators.

3.2.2 Case studies reflecting impacts and consequences for exporters

Exporter B			
Year of establishment:	2014	Number of own farms:	–
Export crops:	Fine beans, Snow peas, sugar snaps, baby corn, garden peas, and soya	Number of smallholder outgrowers (<5 ha):	327
Main markets:	EU, UK, Kenya	Number of larger outgrowers (>5 ha):	–

Exporter B, established in 2014, primarily exports to the EU and the UK, while also catering to the Kenyan market. The company relies entirely on smallholder outgrowers, sourcing from a network of 327 farmers. Due to the reliance on smallholder outgrowers, Exporter B performed **risk profiling** and reviewed their outgrowers. Based on the risk profiling, some perceived high-risk outgrowers were dropped. Exporter B also decided to increase the **testing and sampling** frequency, shifting from once a year to an average of twice a month, although they took a long time to make this shift.

Given that testing by laboratories in Kenya can sometimes take up to 48 hours, Exporter B recognized the need to **extend the shelf-life** of their produce. To address this, they invested further in their cold chain, upgrading their cold rooms with humidifiers to maintain a low-temperature and controlled-humidity environment. This structural change took about 2 years to complete.

Another mitigation measure taken by Exporter B was investing in **training and capacity-building initiatives** for both their employees and outgrowers, focusing on improving knowledge about pesticide management and residue control. However, Exporter B recognized that these initiatives required time to bring about a change in how employees and farmers operated. They experienced that realigning their smallholder outgrowers took about 3 years. As a result, in the adaption period some produce still contained pesticide residues and was rejected in the market, leading to lost revenues. Exporter B felt that they were not given sufficient time to fully adapt to the new requirements, nearly forcing them to shut down.

With persistence to continue investing in the established mitigation measures, Exporter B managed to retain access to the EU market, and currently the value and volume of their produce has increased over time, especially due to the upgrading of their cold chain. Looking back at the situation, Exporter B feels that their company was born out of the crisis, since they can provide a link between smallholder farmers and exporters, which they perceive to be increasingly important.

Exporter C

Year of establishment:	2005	Number of own farms:	–
Export crops:	French beans, snow peas, sugar snaps, baby corn, chillies	Number of smallholder outgrowers (<5 ha):	2
Main markets:	UK, Netherlands, France, Germany, Israel	Number of larger outgrowers (>5 ha):	7

Exporter C, established in 2005, primarily exports to the UK, the Netherlands, France, Germany, and Israel. They source predominantly from seven large outgrowers, with additional supplies from two smallholder outgrowers. Exporter C recognized that, in order to remain competitive in the industry, adapting to the new situation was essential. Understanding this, they became willing to invest in the required mitigation measures.

Given their complete reliance on outgrowers, Exporter C invested in **training and capacity-building initiatives** for their farmers, focusing on pesticide management and residue control. Through this training, they found it necessary to **drop many smallholder outgrowers**. The exporter observed that managing these smallholders was more challenging compared to larger outgrowers due to the complexity of dealing with numerous small-scale actors. The exporter also indicated that the smallholder outgrowers had more difficulty in adhering to residue levels, partly because smallholder farmers are generally more likely to face financial constraints and thus have limited access to the required pest control products. In general, it was perceived that outgrowers needed time to internalize the knowledge. When contracting new farmers, the exporter now is clearer about their expectations for the farmer, and shares the required way of working more effectively.

Another mitigation measure taken by the exporter is **increased sampling and testing** to ensure that what they are supplying meets the standards. Testing is now performed on a monthly or biweekly basis, instead of the previous situation where hardly any testing was performed before exporting. Exporter C also invested in **hiring extra technical assistance**; one time they hired an additional five technical assistants to train outgrowers.

With all these mitigation measures in place, Exporter A was able to maintain access to the EU market, though at a **higher business cost**.

The exporter perceived a challenge in the complexity of the value chain, primarily due to the numerous actors involved. Exporter C highlighted that changing the mindset of people, including outgrowers, takes time. Shifting long-established practices can be difficult, especially when people are accustomed to working in a certain way. According to the exporter, expecting to transform mindsets within just 1 year is unrealistic.

The exporter feels that integrity in the entire value chain is important because, as an exporter, you cannot fully control the agro-vet or the farmer – your scope of influence ends with training. Hence their investments in training and capacity-building initiatives.

Exporter D

Year of establishment:	2001	Number of own farms:	–
Export crops:	French beans, snow peas, sugar snaps, chillies, passion fruit, avocados	Number of smallholder outgrowers (<5 ha):	288
Main markets:	Germany, Netherlands, UK, Switzerland, Qatar, Hong Kong	Number of larger outgrowers (>5 ha):	13

Exporter D, established in 2001, mainly exports to Germany, the Netherlands, UK, Switzerland, Qatar, and Hong Kong. Besides sourcing from 288 smallholder outgrowers, it also sources produce from 13 larger outgrowers.

One mitigation measure Exporter D implemented was to establish a new testing and sampling programme, whereby they **increased the sampling and testing** of their products before exporting. Prior to the temporary increased official controls, Exporter D sampled and tested produce from various outgrowers on a monthly or bi-monthly basis. They have now increased testing to a bi-weekly schedule for each outgrower, and when onboarding a new farm, the produce is tested first before contracting. This necessary measure was perceived to be implemented within a short timeframe, but was experienced as costly due to the testing fees of Kenyan laboratories. Another challenge perceived by Exporter D was the limited capacity of the laboratories. When paying a higher fee to obtain test results within 24 hours, the exporter did not always receive the results within this timeframe, a challenge that still persists.

Despite the perceived challenges with increased sampling and testing, Exporter D recognized this change was required to retain access to the market. The exporter was able to put in place the new sampling and testing schedule almost immediately as they perceived it to be mainly a matter of rescheduling.

To enable outgrowers to produce beans that meet the required standards, Exporter D invested in **training and capacity-building initiatives**. Exporter D's technical advisors were trained first to ensure they had the necessary skills and knowledge to train the outgrowers effectively, focusing on pesticide management and residue control. Exporter D recognized that these initiatives would take time to bring about changes in how the farmers operate. During the transition period, the exporter observed a **decrease in production** from some of their smallholder outgrowers.

A consequence was a **decrease in quality** due to the required waiting times for testing at laboratories in Kenya. Exporter D perceived that this did not affect their relationship with the EU client, as the client was primarily focused on receiving products that met the required MRL standards.

Exporter E

Year of establishment:	1996	Number of own farms:	3
Export crops:	French beans, snow peas, broccoli, Asian vegetables	Number of smallholder outgrowers (<5 ha):	270
Main markets:	Belgium, UK	Number lof arger outgrowers (>5 ha):	2

Exporter E was established in 1996 and exports mainly to Belgium and the UK. They source produce from a variety of farmers, having three farms, and sourcing from 270 smallholder outgrowers and two larger outgrowers.

One of the first mitigation measures taken by Exporter E was to perform **risk profiling** of their farmers, dropping the areas or farmers that were perceived to be high-risk. Given the large number of smallholder outgrowers supplying Exporter E, the exporter employed **additional technical staff** to supervise the outgrowers and their application of PPPs more closely.

Exporter E initiated several internal and external training programs for both farmers and technical staff, thus increasing the amount of **capacity building and training initiatives,** focusing on pesticide management and residue control. While these training efforts helped improve compliance, they also came at a high cost, consuming both time and financial resources. These initiatives were not one-off events but continuous, with retraining occurring whenever a new outgrower joined or when new challenges, pests, or diseases emerged. Exporter E benefited from training programs supported by COLEAD, which provided both individual and group training.

Another mitigation measure was the **increase in sampling and testing** of produce before export. Testing occurred more frequently, that also enabled the exporter to verify that the established protocols were working and/or followed.

Export E perceived that the main challenge was to manage the many smallholder outgrowers, given the complexity of dealing with numerous actors, which is often more time-consuming. Even when monitoring these outgrowers extensively, it is not possible to have a 100% control over the PPPs that are used.

As a consequence of the situation, Exporter E indicated that some of their clients in the EU shifted to alternative markets. This, in combination with the costs associated with mitigation measures, resulted in a **decrease in the export volume** of Exporter E.

Exporter F

Year of establishment:	1988	Number of own farms:	2
Export crops:	Fine beans, sugar snaps, tender stem broccoli, snow peas, baby corn, chilli	Number of smallholder outgrowers (<5 ha):	100
Main markets:	EU, South Africa, Middle East	Number of larger outgrowers (>5 ha):	–

Exporter F, established in 1988, exports mainly to the EU, South Africa, and the Middle East. It owns two production sites and also sources produce from 100 smallholder outgrowers.

A key adjustment was the overhaul of Exporter F's monitoring and traceability systems. The exporter **increased testing and sampling** of its produce before export, ensuring that the beans met the required MRL standards. At first, the exporter perceived the increased testing and sampling only as an obstacle, but now Exporter F recognizes the added value because it enables them to monitor their produce and to retain access to the EU market. The exporter also indicated that the entire adaptation process led to a **strengthened relationship** between the exporter and their client in the EU.

Exporter F also hired **additional technical staff**, such as agronomists, and expanded the traceability team to oversee the entire supply chain. Exporter F recognized the importance of closely monitoring its smallholder outgrowers to ensure compliance, therefore starting **capacity building and training initiatives** focusing on pesticide management and residue control. These initiatives were aimed at both farmers and the technical staff. Changing the smallholder outgrowers' way of working was time consuming. Exporter F recognized that shifting long-established practices can be difficult, especially when people are accustomed to working in a certain way. The process of fully adapting their systems took around two growing seasons, approximately 6–8 months.

Aspects that created challenges in the adaption process were **increased costs** due to the additional testing and sampling, expanding the team, and performing the capacity-building and training initiatives. Another perceived challenge was the waiting times for testing results from the laboratories, causing the remaining shelf-life of the exported beans to be more limited, **decreasing the products' quality**.

3.2.3 Consequences and mitigation measures

Exporters' perspective

Table 11 and Figure outline the key consequences and mitigation measures for exporters resulting from the listing of beans from Kenya in Annex I. Exporters A, B, C, and D reported dropping smallholder outgrowers due to risk profiling linked to the listing. In response, Exporter A expanded their own production, Exporter B invested in enhancing their cold chain facilities, and all six exporters interviewed increased their testing and sampling frequencies. Additionally, Exporter E highlighted the government's focus on local certification under the KS 1758 standard to improve food safety awareness and address pesticide concerns. Exporters are facing multiple challenges, including uncertainty about EU buyer response to temporary controls, high costs for testing and training, lengthy testing times leading to declining quality and customer losses, difficulties in hiring technical staff, and the need to change smallholder farmers' practices.

Table 11. Consequences experienced by bean exporters in Kenya of listing in Annex I of Regulation 2019/1793. Source: Interviews conducted by the authors.

Can you describe any consequences of the listing of the product in Annex I on your organization?	
Conducting risk profiling, dropping smallholder outgrowers	Exporters A, B, C, and D dropped smallholder outgrowers due to risk profiling. Exporter A: "The biggest impact was on small-scale farmers, as established farmers dropped a large percentage of them." Exporter B: "The highest risk comes from smallholder farmers, so we had to review our partnerships and drop some of them. Smallholder farmers are losing contracted supply opportunities because many exporters are moving away from them due to the risks associated with residues. This increases costs, as we need to monitor their inputs for PPPs. Additionally, the EU's Regulations on residues continue to impact our operations, particularly regarding environmental concerns." Exporter C: "Small-scale growers are more challenging to manage than larger farmers. Many smallholders were dropped because they couldn't adapt to new practices. If they are too small, they lack the flexibility to change their methods. For instance, understanding why a knapsack sprayer can be used for maize but not for beans, despite both being consumed by people, is difficult. Moreover, traceability is much easier for large-scale growers compared to small-scale ones."
Expanded their own production	Exporter A
Started recruiting larger outgrowers	Exporter A
Invested more in the cold chain	Exporter B, the newest organization established in 2013, has invested significantly in its cold chain, implementing a cold room with humidifiers to extend product shelf-life and accommodate laboratory testing that can take up to 48 hours. As a result, their volumes have steadily increased, particularly due to the improvements in their cold chain facilities. According to Exporter B, "While the overall industry is seeing a decline in volume and value, our company is experiencing the opposite. The value and volume of our products have both increased thanks to our investment in cold chain facilities."

Increased testing and sampling	All exporters have increased testing and sampling. Exporter B mentioned that testing frequency has increased from once a year, as required by food standards, to nearly twice a month. Exporter C noted that testing is now conducted monthly or biweekly, compared to the minimal testing done previously before export. Exporter D also confirmed a shift to a biweekly testing schedule for each outgrower.
Investing in training and capacity-building initiatives	Exporters B, C, D, E, and F have invested in training programmes for their employees and for farmers. Exporter D noted that technical advisors were trained initially to ensure they possessed the necessary skills and knowledge to effectively educate the outgrowers, particularly in pesticide management and residue control.
Hired additional technical staff	Exporters A, C, and F have hired additional technical staff, including agronomists and experts in traceability.
Streamline traceability	Exporter F has invested in their traceability system.
Increased awareness of food safety	Exporter B: “One significant advantage is that the entire population is now more aware of food safety, including for the domestic market. For instance, if a substance is banned in the EU market, why is it being sprayed on local vegetables? This increased awareness has particularly impacted local production. Those involved in export crops are now treating food safety with greater importance.”
KS 1758 Standard	Exporter E: “The government initiated a local certification process based on the KS 1758 Part 2 standard. Our challenge with small-scale growers was that the only ones expressing concerns about pesticide usage were the exporters, while this issue received little attention in the local market. However, the government has started to focus more on the local certification system. As part of our licence application, we must show that we conduct both internal and external training on this standard to ensure that food safety is a priority throughout our operations.”
Challenges	Exporters faced several challenges. Exporter A expressed uncertainty about how EU clients would manage temporary controls, while Exporters C and D highlighted the high costs of testing, sampling, and training initiatives. Exporter D also mentioned that lengthy testing times led to a decline in quality, loss of customers to other countries, and decreased export volumes, compounded by the limited capacity of laboratories to provide timely results. Exporter F noted challenges in hiring additional technical staff and the difficulties in changing smallholder farmers’ practices. Exporter A observed that many businesses shifted away from exporting to the UK (at the time still part of the EU) due to transparency issues and rising costs, opting instead for more reliable markets. The situation in the Netherlands was similar, with some ambiguity surrounding the costs.

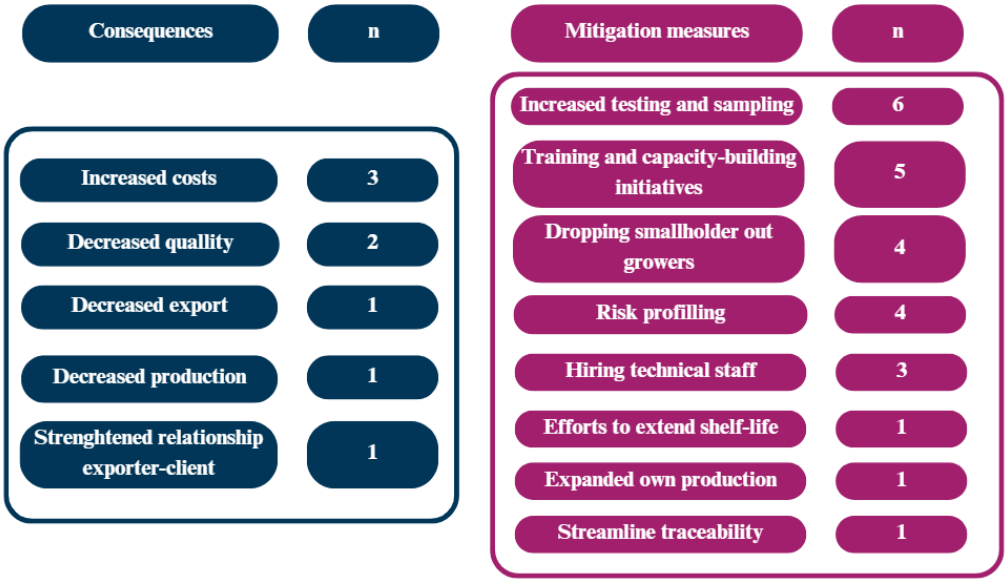


Figure 7. Consequences for bean exporters in Kenya of the listing in Annex I of Regulation 2019/1793, including mitigation measures that were put in place. Numbers indicate how many of the six exporters interviewed mentioned the consequence or measure. Source: Interviews conducted by the authors.

Table 12 shows the length of time exporters needed to implement the necessary measures following the listing of beans in Annex I. The timeline for adapting to market requirements varied significantly among exporters: Exporter A required about 6 months, while Exporter B took approximately 3 years to realign their smallholder outgrowers, during which time they also invested in their cold chain. Exporter C pointed out the challenges in altering long-established practices and mindsets among outgrowers, noting that such changes often take time and cannot be hurried. This highlights the necessity of establishing clear timeframes for adaptation to prevent creating trade barriers.

Table 12. Time needed for exporters to put in place necessary changes. Source: Interviews conducted by the authors.

How much time did your organization need to put in place these changes?
Exporter A: about 6 months to implement the necessary changes to maintain market access.
Exporter B: around 3 years to realign their smallholder outgrowers.
Exporter C: changing people's mindsets, particularly among contracted and smallholder farmers, is a slow process, as long-established practices are hard to alter. Expecting mindset changes within a year is unrealistic, and implementing new practices can be challenging. Without a clear timeframe for adaptation, such changes could become a barrier to trade.

The increased official controls resulted in increased costs for exporters to continue exporting beans from Kenya, as shown in Table 13.

Table 13. Cost implications for exporters in the beans export value chain to adhere to Regulation 2019/1793. Source: Interviews conducted by the authors.

Cost item	Costs (Ksh)	Additional information
Testing in Kenya	382,500 per year	Ksh 16,000–35,000 per testing moment On average, exporters tested 15 times more per year
Additional technical staff	180,000 per year	Average of three additional technical staff members Average salary of technical staff is Ksh 50,000 per month
Capacity building (trainer costs and compensation for farmers)	15,000 per day per trainer 2,500 per day per farmer	Average per year cannot be determined as it is highly dependent on the number of farmers and their current knowledge and skill level
Testing at EU border	100,000 per average consignment	Average per year can not be determined as it is highly dependent on the amount of consignments Two exporters mentioned that these costs are split evenly between client in EU and Kenyan exporter None of the exporters indicated that (part of) these costs are passed on to outgrowers
Interceptions at EU border	800,000 per average consignment	Costs are combined for disposal, testing, and logistics costs One exporter who had experienced an interception mentioned that the farmer causing the interception was requested to cover the costs of the raw materials (beans) and thus was not paid for the beans Average per year cannot be determined as it is highly dependent on the amount of interceptions

Intermediate support structures' perspective

The perspectives of intermediate support structures on the consequences of the listing in Annex I are outlined in Table 14 and Table 98. Support structure A, a competent authority, indicated that the stringent regulation for Kenyan beans led to a negative perception of Kenyan beans in the market and affected the reputation of regulatory bodies. Support structure C, another competent authority, highlighted resource strains due to heightened sampling and the need for follow-ups on non-compliance, alongside developing a risk profiling system for monitoring. Support structure G, another competent authority, pointed to product reviews and necessary training for spray service providers to manage MRLs. Structures B and F, both laboratories and certification bodies, reported that exporters became more cautious, resulting in increased testing demands and improved quality controls. Support structure D, a BMO, enhanced member systems through risk-based training and audits, while structure E, another BMO, focused on communication and training to develop good practice guides. Overall, collaboration and training emerged as essential responses to the challenges posed by the listing.

Table 14. Consequences of the listing in Annex I of Regulation 2019/1793 at organizational (micro) level from the perspective of Intermediate support structures. Source: Interviews conducted by the authors.

If you go back to the moment of the listing, can you describe any consequences of the listing of the product in Annex I on your organization? (micro level, organization)	
Competent authorities	Support structure A noted that the listing increased business costs for exporters due to more frequent testing, which ultimately affected smallholder farmers by pushing them out of the value chain and leading to a decline in bean exports to the EU. This created a negative perception of Kenyan beans in the market and impacted the image of regulatory bodies. Support structure C highlighted the increased sampling and testing levels for exporters, which strained organizational resources. They emphasized the need for follow-up with non-compliant exporters and the necessity of training technical personnel. Additionally, they developed a risk profiling system to focus monitoring efforts on high-risk food business operators. Support structure G mentioned several implications, including the review and dropping of certain products based on risk assessments; the encouragement of low-risk product usage; and the need for training spray service providers due to MRL exceedances. They also pointed out the challenges in convincing farmers to adjust to new Regulations, and the ongoing development of draft Regulations for licensing spray service providers.
Laboratory and certification bodies	The listing of the product in Annex I led to increased caution among exporters, as noted by Support structure B, which reported more frequent testing of produce before harvest and rigorous monitoring of pre-harvest intervals. This heightened demand for testing translated into a greater workload for laboratories. Support structure F observed that, while their certification processes were not directly impacted, KEPHIS increased inspections for bean exporters significantly. Exporters responded to the new Regulations by restructuring their operations, implementing stricter controls over the chemicals used, and enhancing their quality systems. Overall, the listing prompted a shift towards more stringent compliance and improved quality management practices within the export sector.
BMOs	In response to the listing, Support structure D took proactive measures by informing members and enhancing their systems based on risk analysis. They organized training sessions for high-risk companies, focusing on pest control and compliance improvements. This included internal audits and training technical teams to understand inspection criteria better. They also collaborated with organizations such as CABI and KEPHIS to strengthen these initiatives. Support structure E emphasized the importance of communication and organized training, contributing to the development of a good practice guide for beans and peas. Their training efforts were supported by COLEAD and conducted by KEPHIS and PCPB officers, targeting companies that had experienced repeated interceptions. Overall, both BMOs highlighted collaboration and training as key strategies for adaptation.

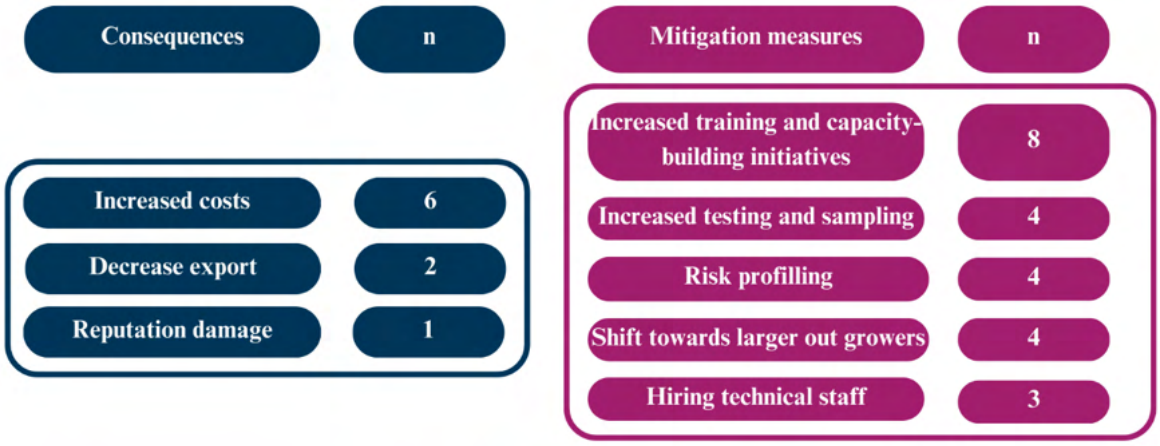


Figure 8. Consequences found for stakeholders in the bean value chain in Kenya because of the listing in Annex I of Regulation 2019/1793, including mitigation measures that were put in place. Numbers indicate how many of the intermediate support structures interviewed mentioned the consequence or mitigation measure. Source: Interviews conducted by the authors.

The Support structures were also asked to reflect on the impacts of the listing on the wider value chain on a macro level (see Table 15). Support structure A, a competent authority, reported that many smallholder farmers were pushed out of the global market, leading them to switch to other crops, while exporting companies faced reduced volumes and profits, with some exiting the EU market due to compliance challenges. Support structure C, another competent authority, noted a 25% drop in export volumes. Support structure B, a laboratory and certification body, highlighted that large exporters imposed testing costs on outgrowers, deterring many from participating, and reducing volumes of bean export. Additionally, support structure D, a BMO, observed immediate panic among exporters, prompting some to remove beans from their export lists and seek alternative markets, while structure E, another BMO, noted a significant export decline of around 30% for some companies due to high compliance costs.

Table 15. Consequences of the listing in Annex I of Regulation 2019/1793 on a macro level, from the perspective of intermediate support structures. Source: Interviews conducted by the authors.

If you go back to the moment, can you describe any consequences of the listing of the product in Annex I within the broader context of the bean supply chain? (macro level, value chain or sector)	
Competent authorities	Support structure A noted that many smallholder farmers were pushed out of the bean value chain, leading them to shift to other commodities. Exporting companies faced reduced trading volumes and profits, with some exiting the EU market due to compliance challenges, negatively affecting all players in the value chain, including farmers and transporters. Support structure C highlighted that while exporters implemented food safety systems, many avoided working with smallholder farmers due to the difficulties in establishing these systems. This shift from smallholders to larger farms has exacerbated the decline in bean volumes, with a reported 25% drop in export volumes and value. The increased costs associated with certification and regulation have further strained small-scale farmers. Support structure G pointed out the ongoing challenges posed by pests and diseases, noting that the limited availability of alternative products makes compliance difficult for farmers. This situation has created economic strain for smallholders, especially as neighbouring countries continued to trade with the EU, highlighting the unique challenges faced by Kenyan farmers. Overall, the Regulation has led to a significant downturn in the bean value chain, particularly affecting smallholder farmers.
Laboratory and certification bodies	The listing in Annex I had notable repercussions for the bean supply chain. Support structure B indicated that large exporters, by subcontracting growers, imposed testing costs that ultimately deterred many growers from participating, leading to a reduced supply of beans. Support structure F added that exporters faced challenges in meeting the new Regulations, resulting in shipment delays and rejections, which contributed to a decline in bean exports. Overall, these factors have negatively affected the availability and export volume of beans in the market.
BMOs	The listing led to immediate panic among exporters, resulting in some removing beans from their export lists, and a decrease in export requests. Support structure D noted that this situation prompted a search for alternative markets and diversification of product lines, along with increased in-country testing and engagement with laboratories for faster results. However, there was a lack of feedback from the EU market regarding improvements in results. Support structure E highlighted a significant drop in exports, estimated at around 30%, with some companies stopping bean exports due to the stress and high costs associated with compliance, including testing fees at the EU border.

Table 16 presents an analysis of how well support structures could anticipate the listings. The various responses indicate that there was insufficient time for adaptation. Support structure G, a competent authority, highlighted that the length of the EU's review process for active ingredients is a crucial factor, as evaluating alternatives is also necessary, which complicates and prolongs the identification of approved solutions for specific pests or diseases.

Table 16. Anticipation of the listing in Annex I of Regulation 2019/1793 from the perspective of support structures. Source: Interviews conducted by the authors.

To what extent could the value chain anticipate any needed changes, and did the value chain have the time to make such changes if needed?	
Competent authorities	Support structure A acknowledged that repeated notifications created a sense of urgency regarding compliance, though many exporters still struggled to meet standards in time. Some companies adapted by moving away from relying on smallholder farmers to acquiring or contracting larger farms for better control. Support structure C noted that larger farms found it easier to implement changes, while smaller operations faced ongoing challenges, particularly in establishing necessary infrastructure such as HACCP packhouses. Support structure G highlighted a lack of time to adapt, pointing out that the lengthy EU review process for active ingredients made it difficult to find compliant alternatives for pest control.
BMOs	Support structure D expressed that there was not enough time to adjust. They emphasized the need for a review and dialogue with the EU to facilitate changes. Support structure E noted that time was insufficient to anticipate. As mitigation measures, they indicated that some companies abandoned smallholder farmers in favour of larger companies, while others have increased their technical staff to adapt to the situation.

The responses from competent authorities and industry bodies indicate that existing structures in Kenya aided adaptation to new Regulations (see Table 17). Support structure A, a competent authority, noted that the NHT fostered collaboration, while support structure C, another competent authority, highlighted the role of farmer-based organizations and BMOs in facilitating communication among regulators. This prior experience with processes such as GLOBALG.A.P. certification contributed to the sector's maturity and readiness for change. Additionally, Support structure G, a competent authority, mentioned ongoing efforts to streamline low-risk product registrations. Structure B, a laboratory and certification body, emphasized that financial incentives motivate quick compliance, allowing stakeholders to regain market access. The BMOs (structures D and E) underscored that the established frameworks and existing compliance with standards such as GLOBALG.A.P. eased the transition to new Regulations.

Table 17. Structures already in place that helped adapt to the listing on Annex I of Regulation 2019/1793 from the perspective of intermediate support structures. Source: Interviews conducted by the authors.

To what extent do you feel there was anything already in place in Kenya or the value chain that helped you adapt to the Regulation?	
Competent authorities	Support structure A noted that the NHT provided a collaborative framework for addressing challenges. Support structure C highlighted the role of farmer-based organizations and BMOs as effective communication channels, enabling a unified approach among regulators under the horticulture authority. This prior collaboration was crucial, given that many farmers were already familiar with processes such as GLOBALG.A.P. certification, reflecting a certain maturity in the sector. Additionally, Support structure G mentioned that efforts to fast-track low-risk product registrations and a transition to a risk-based assessment approach were already under way, which further supported adaptation to the Regulations.
Laboratory and certification bodies	Support structure B emphasized that financial incentives play a crucial role in motivating stakeholders to respond quickly to regulatory changes. They noted that participation leading to increased revenue encourages swift compliance, as it enables stakeholders to regain market access and continue their business operations promptly.
BMOs	Support structure D noted that the existing framework provided by the NHT and national competent authorities facilitates effective engagement and adaptation to new Regulations. Drawing on past experiences, such as the challenges faced in 2013, this established structure aids in navigating current changes. Support structure E added that exporters already complying with standards such as GLOBALG.A.P. have measures in place that align with new Regulations, making it easier to adapt since they can simply build on existing food safety practices.

The analysis of benefits resulting from increased official controls reveals a mixed picture, as Table 18 illustrates. Support structure A, a competent authority, highlighted the collaborative efforts necessary to enhance food safety, focusing on improving domestic standards and ensuring safe local consumption. Structure C, also a competent authority, observed that food business operators are now better informed and equipped to meet both local and export requirements due to improved laboratory capabilities. While structure B, a laboratory and certification body, expressed concern over the costs and limitations imposed on growers, it acknowledged a greater awareness of food safety in the domestic market. Support structure F, a laboratory and certification body, pointed out that stricter Regulations can lead to higher quality products, although local systems to maintain these standards are lacking. Structures D and E, both BMOs, identified opportunities for system refinement and a decrease in pesticide residue interceptions, respectively, underscoring the potential for improved compliance and safety in the sector.

Table 18. Benefits or opportunities that resulted from the increased official controls from the perspective of intermediate support structures. Source: Interviews conducted by the authors.

To what extent do you see any benefits or opportunities that resulted from the increased official controls?	
Competent authorities	Support structure A saw the increased official controls as a catalyst for collaboration, emphasizing that addressing food safety challenges requires a collective approach involving farmers, food business operators, and consumers. This shift has prompted a focus on improving domestic food safety standards, ensuring that locally consumed food is safe. Support structure C noted that food business operators are now more informed and better equipped to implement necessary systems, thanks to enhancements in laboratory capabilities and capacity-building efforts. These improvements not only help meet export requirements, but also position the country to compete more effectively in the EU market.
Laboratory and certification bodies	Support structure B viewed the increased official controls primarily as a negative development, as they imposed limitations on growers and raise costs due to heightened sampling requirements. However, there was a positive outcome in the heightened awareness of food safety issues, which has also influenced the domestic market. Similarly, structure F recognized that strict Regulations can lead to higher quality products, resulting in increased income, though they noted that local systems for ensuring these standards are lacking. Overall, while there are some benefits in terms of awareness and product quality, the challenges posed by increased controls are significant.
BMOs	Support structure D saw increased official controls as an opportunity to refine and update their systems, enhance capacity building, and foster collaboration among various stakeholders, including public and private institutions. Structure E noted that the frequency of pesticide residue interceptions has decreased as a result of these controls, indicating that the sector is taking measures to ensure compliance and improve safety. Overall, there are clear benefits in terms of system improvement and reduced interception rates.

Farmer's perspective

The farmer interviewed learned about the Annex I listing through training from their exporter agronomist. Since the listing, production costs have risen due to more expensive pesticides and stagnant prices for French beans, leading to tighter profit margins. Some farms are now shifting to crops such as capsicum and chilli, reducing their French bean acreage. Rising fuel and labour costs add to the financial challenges, and while exporters cover testing fees, they do not compensate for produce during interceptions.

Table 19. Consequences of the listing in Annex I of Regulation 2019/1793 from the perspective of a farmer. Source: Interviews conducted by the authors.

Interview question	Farmer's perspective
By whom were you first informed about the addition of beans from Kenya to Annex I?	The farmer learned about the listing through training from the exporter's extension officer (agronomist). The agronomist visits weekly and more frequently during emergencies, offering advice on cultivation and pesticide use, including a spraying programme and a list of approved pesticides. They guide farmers on alternatives when specific products are unavailable, and instruct them on proper application techniques. In response to regulatory changes, agronomists also help dispose of banned pesticides.
If you go back to the moment of the listing, can you describe any consequences of the listing of the product in Annex I on your organization?	The cost of production has risen due to more expensive pesticides, while prices for French beans have remained stagnant at 55 Ksh/kg for the past five years, resulting in very small profit margins. Labour costs are 12 Ksh/kg. Some Regulations have improved food safety for domestic vegetables. Domestic prices have increased slightly, helping to sustain the business. Overall, the combination of high production costs and fixed prices is challenging.
Regarding the consequences, what were the factors for a farm to be able to adjust to the new situation?	Some farms are shifting from French beans to capsicum and chilli for export. Our farm has reduced its French bean cultivation from 10 to 5 acres, maintaining a total farm size of 20 acres but decreasing the area dedicated to French beans.
Could you give an estimation of the extra costs, if any, that are charged to you because of these Regulations?	Extra costs include increased pesticide prices, rising from Ksh 6,000 to Ksh 9,000–11,000 per litre. Fuel and labour costs have also risen, with wages for farm workers increasing from Ksh 8–12 per kg. While exporters cover testing costs, they do not compensate for produce in the event of interceptions and may suspend suppliers temporarily. Additionally, there are no shortcuts in chemical usage.

3.2.4 Summary – consequences

The analysis outlines the consequences and mitigation measures related to the listing of Kenyan green beans in Annex I from multiple perspectives.

Four exporters reported dropping smallholder outgrowers due to risks associated with the listing. Exporters have invested in production expansion, improved cold chain facilities, and increased testing frequency, while also prioritizing staff and farmer training. One exporter noted the government's emphasis on local certification under the KS 1758 standard to enhance food safety. Exporters are grappling with challenges such as uncertainties around high costs of testing and training, lengthy testing times, hiring difficulties for technical staff, and the need for changes in smallholder practices. The timeline for adaptation varies significantly among exporters, with some taking about 6 months and others around 3 years to realign with market demands, highlighting the need for clear timeframes to prevent trade barriers.

From the perspective of intermediate support structures, one competent authority noted that the stringent Regulations negatively impacted the market perception of Kenyan beans and the reputation of regulatory bodies. Another competent authority highlighted resource strains due to increased sampling and monitoring needs, and another pointed out the necessity for product reviews and training for spray service providers. Laboratory and certification bodies reported that exporters became more cautious, leading to heightened testing demands and quality controls. BMOs focused on enhancing member systems through risk-based training and communication.

On a macro level, many smallholder farmers have been pushed out of the Kenyan bean export market, some farmers shifting to other export crops. A total reduction in export volumes and profits was noted for exporting companies. A competent authority mentioned a 25% drop in export volumes. A laboratory and certification body indicated that large exporters imposed testing costs on outgrowers, further diminishing supply. Immediate panic among exporters prompted some to seek alternative markets, resulting in significant export declines.

The analysis also reveals that supportive structures in Kenya, such as the NHT, helped facilitate adaptation to the new regulations. Financial incentives and prior experience with certifications such as GLOBALG.A.P. contributed to readiness for change. Despite the increased controls, benefits include improved food safety awareness among local operators, and better-equipped food businesses to meet both local and export requirements. However, concerns remain about compliance costs and the sustainability of local systems, with opportunities identified for refining processes and reducing pesticide residue interceptions.

From the farmer's perspective, rising production costs due to expensive pesticides and stagnant prices have strained profit margins. Some farmers are shifting to other crops, facing additional challenges from increasing fuel and labour costs. While exporters cover testing fees, they do not compensate for produce during interceptions.

3.2.5 Challenges in anticipating the needed changes

The perceived challenges in the process of anticipating the needed changes are shown in Figure9.

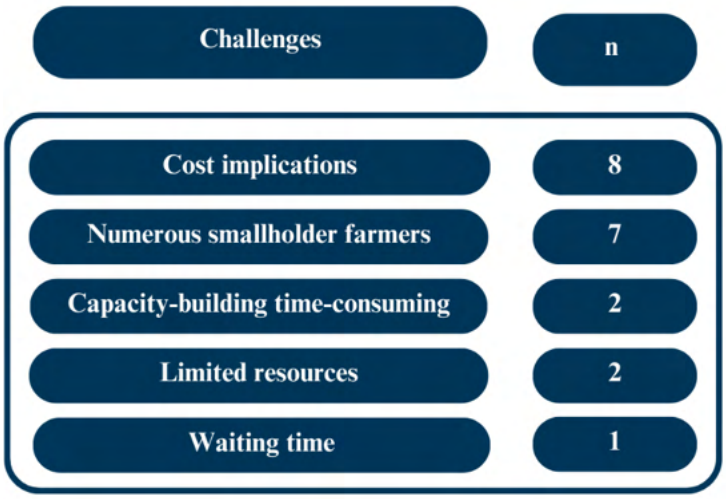


Figure9. Main challenges perceived in the process of anticipating the needed changes because of the listing in Annex I of Regulation 2019/1793. Numbers indicate how many of the 16 stakeholders interviewed mentioned the main challenge. Source: Interviews conducted by the authors.

The main challenge mentioned was the cost implications (*n*=8), including costs for training, hiring additional technical staff, and increased sampling and testing. These costs slowed down the process because not all resources were available immediately.

Since there are many smallholder farmers in the bean value chain, the changes needed are perceived to be more difficult to implement due to the multitude of actors involved (*n*=7). Some exporters took about 3 years to align their smallholder farmers, and also admitted that even after this timeframe it still is a continuous process. This prolonged effort is explained by the difficulty for exporters to allocate time and guidance across the numerous outgrower farmers. While exporters' technical staff often advise farmers on PPP, provide spraying

programmes, and sometimes also provide the PPPs themselves, exporters often have limited control during actual spraying operations, as indicated by both exporters and intermediate support structures.

Access to the required PPPs was also mentioned to be challenging (*n*=3), particularly for smallholder farmers who generally are more likely to face financial constraints. Two exporters had shifted to larger outgrowers, and four intermediate support structures confirmed this shift, adding that this caused some smallholder farmers to exit the beans export market. There is no general conclusion to be drawn on a difference in characteristics between smallholder farmers who are still producing beans for the export market and those who exited the beans export market. Generally, this depended on the decisions made by the exporter that contracted them, whether they decided to increase their own production or to keep buying extensively from smallholder farmers. This discrepancy in bargaining power and financial resources shows the challenges faced by smallholder farmers, underscoring their vulnerability in the export value chain.

Another main challenge mentioned was the time-consuming nature of training and capacity-building initiatives (*n*=2). It is recognized that shifting long-established practices can be difficult, especially when people are accustomed to working in a certain way.

Limited resources are also perceived as a challenge (*n*=2). Examples include limited staff available at intermediate support structures, and the capacity of testing at Kenyan laboratories. The waiting time for sampling and testing is also perceived to be a challenge (*n*=1). Before sending produce to the export market, exporters need the results from the tests of their samples. Waiting time varies between 1 and 4 days, depending on whether payment has been made for express testing promising results within 24 hours. Because of the waiting time, produce that reaches the market has decreased quality and a decreased remaining shelf-life, confirmed to be a consequence of the listing by two exporters.

3.2.6 Benefits from the increased official controls

Besides the challenges, several benefits were identified that resulted from the increased official controls (see Figure 40).

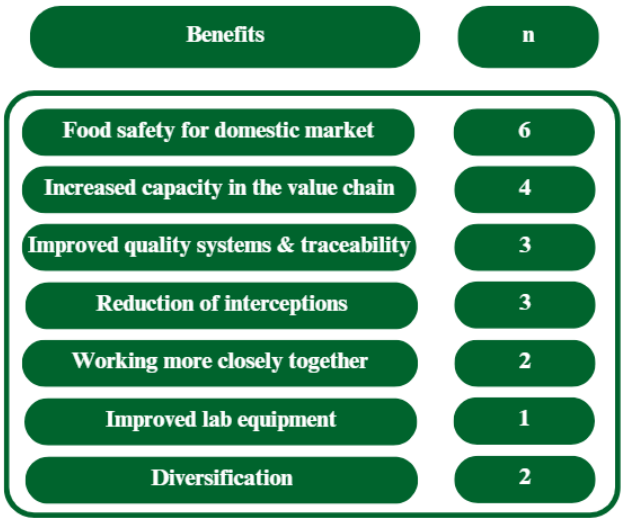


Figure 40. Benefits perceived to have resulted from the listing in Annex I of Regulation 2019/1793. Numbers indicate how many of the 16 stakeholders interviewed mentioned the main challenge. Source: Interviews conducted by the authors.

The most frequently mentioned benefit was the perception that stakeholders in the bean value chain are now more conscious of **food safety matters** (*n*=6). Stakeholders raised the question: If what we have been exporting caused issues, what about the food that we are eating, our **domestic consumption**? The increased focus on food safety in the export market was mentioned to cascade to the domestic market.

A related factor is that the increase in official controls is perceived to have resulted in **increased capacity** throughout the bean value chain regarding food safety and the use of PPPs (*n*=4), because of training provided on the safe use of PPPs and their effects on food safety.

With increased capacity and more awareness regarding food safety, it is perceived that private sector operators **improved** their **quality and traceability systems**, for both the export and domestic markets (*n*=4).

A few stakeholders (*n*=3) noted that being listed has led to a **reduction in interceptions** for exporters who have effectively implemented the necessary measures to lower residue levels. Exporters reported a decrease in interceptions after adopting these measures. It is important to highlight that exporters with better interception performance may also have been more inclined to participate in interviews.

It was also noted (*n*=2) that stakeholders in the bean value chain started **working more closely together** because the interceptions were a collective problem that called for collaborative approaches. Although not directly related to the listing, it is interesting to note that the horticulture sector in Kenya has a public–private NHT where multiple stakeholders come together to share updates and develop action plans, also highly relevant in the situation created by the listing.

The **laboratory equipment** at KEPHIS has been **improved** to enhance its capabilities, allowing for the identification of a wider range of chemical molecules (*n*=1). This improvement increases the scope of testing, enabling the detection of a broader spectrum of pesticide residues and contaminants in agricultural products. As a result, KEPHIS can now conduct more comprehensive assessments of food safety and compliance with international standards.

Finally, exporters and farmers (*n*=2) indicated that the increased costs stimulated them to look for alternative products and markets that could be served, thus searching for **diversification**. They mentioned that the listing opened their eyes in terms of diversification and not just relying on one crop.

3.3 Constructive analysis

This section discusses the possible steps that can be taken to exploit the benefits or mitigate the risks associated with the increased official controls – for private sector operators in the affected value chain (e.g. exporters, farmers), all stakeholders, public sector stakeholders, and the EU.

3.3.1 Exporters' perspective

Table 20 presents exporters' feedback on measures that could have enhanced their response to the listing in Annex I, highlighting key areas for improvement. Exporter B emphasized the need for better testing and quality control of products before shipment. Exporter C highlighted that timely access to information from the EU could have reduced negative impacts and costs. Exporter D called for stricter enforcement of chemical Regulations and better monitoring of banned substances. Exporter E stressed the importance of sharing testing results for comprehensive oversight, while exporter A raised concerns about the loose vetting process for smaller exporters, advocating for stricter regulatory practices. Additionally, Exporter B suggested stocking PPPs for smallholder farmers, and called for improved traceability systems to identify contamination sources.

Overall, exporters are advocating for enhanced regulatory frameworks, better communication, and collaborative efforts to ensure compliance and product quality in the export market.

Table 20. Steps that could have been taken to improve the response to the listing on Annex I of Regulation 2019/1793 from the perspective of exporters. Source: Interviews conducted by the authors.

Looking back at the situation, what steps within your organization or the country could have been taken to improve your response to the listing on Annex I?	
Better testing and quality control	Exporter B indicated the need for better testing of products before shipping: “We took a lot of time before doing so.”
Information and preparedness	Exporter C noted that timely access to information from the EU could have prevented negative outcomes and reduced costs related to increased testing requirements: “Information is power, had we gotten the information at the moment the EU already gave warnings, then maybe we would not have been listed. We could have prepared ourselves and could have continued to ship, the cost implications would be way less then.”
Stricter PPP monitoring	Exporter D highlighted the ongoing presence of banned chemicals in the market, calling for stricter enforcement by PCPB to improve safety and compliance. They stressed the need for better monitoring of chemical usage and labelling practices.
Collaboration and data sharing	Exporter E discussed the importance of sharing testing results with the NHT for comprehensive oversight, which has diminished recently. Despite private testing efforts, this lack of collaboration has not satisfied EU requirements.
Vetting and licensing issues	Exporter A raised concerns about the vetting process for exporters, suggesting that oversight is often loose, particularly for smaller companies. They called for stricter processes and greater involvement from industry associations to enhance regulatory practices and raise awareness among members about compliance challenges.
Stocking PPP products for smallholder farmers	Exporter B indicated that they could also stock PPPs for their farmers to better control usage.
Traceability system	Exporter B signalled that the authority should conduct traceability system checks to identify the origins of contamination. There is a disconnect in how exporters are treated – ”often like drug traffickers” – without properly investigating the source of the residues. Improved traceability is needed, especially concerning smallholder farmers.
Overall, the exporters advocated for improved regulatory frameworks, better communication, and collaborative efforts to ensure compliance and product quality in the export market.	

3.3.2 Intermediate support structures’ perspective

Intermediate support structures also identified several steps that could have improved responses to the Annex I listing. Support structure A, a competent authority, suggested that earlier collaborative action might have mitigated challenges, while structure C, another competent authority, called for a unified government voice and the implementation of food quality management systems to ensure compliance. Support structure B, a laboratory and certification body, emphasized the need for increased sensitization and timely communication across the value chain, whereas the other laboratory and certification body, structure F, advocated for stricter inspections and training on EU requirements. Support structures D and E, the BMOs, highlighted the importance of collaborative discussions and the role of KEPHIS

in fostering compliance to prevent the need for stricter Regulations. Overall, a proactive and coordinated approach is essential for effectively navigating regulatory changes (see Table 21).

Table 21. Steps that could have been taken to improve the response to the listing on Annex I of Regulation 2019/1793 from the perspective of intermediate support structures. Source: Interviews conducted by the authors.

Looking back at the situation, what steps within your organization or the country could have been taken to improve your response to the listing on Annex I?	
Competent authorities	Support structure A noted that earlier collaborative action could have mitigated challenges before the listing reached 10%, suggesting that proactive measures were necessary. Support structure C emphasized the need for a unified government voice among various competent authorities to support the industry more effectively. They highlighted the importance of food business operators implementing food quality management systems to ensure compliance, along with the necessity of training and risk profiling to focus resources on higher-risk entities. There were calls for better communication strategies to raise public awareness about food safety impacts. Structure G echoed these sentiments, stressing the importance of timely information to prevent panic, particularly among small-scale farmers.
Laboratory and certification bodies	Support structure B emphasized the importance of increasing sensitization across the value chain, advocating for timely communication of changes, and ongoing analysis of trends to prepare stakeholders effectively. They stressed that changing attitudes among stakeholders is crucial for enhancing system efficiency. Similarly, Structure F called for more rigorous government inspections, noting that not too strict enforcement allowed some exporters to bypass compliance. They also highlighted the lack of awareness among exporters and producers regarding EU requirements, suggesting that targeted training could help prevent compliance issues.
BMOs	Support structure D emphasized the need for regular discussions that foster collaboration, rather than a top-down approach, acknowledging that pesticide use is inevitable and calling for strategies to ensure safety without exceeding thresholds. They recognized the necessity of addressing safety concerns. Structure E highlighted the role of KEPHIS as a key contact body, suggesting that a collaborative agreement could help implement measures to improve compliance before Regulations take effect, thereby preventing the need for stricter Regulations.

Table 22 analyses intermediate support structures' feedback on types of assistance or support that could help businesses navigate the changes of this Regulation effectively. The analysis emphasizes the critical need for capacity building and support for smallholder farmers to navigate regulatory changes effectively. Competent authorities stressed the importance of empowering farmers and technical personnel while advocating for collaboration between the government and the private sector, particularly in promoting environmentally friendly pest control methods. Laboratory and certification bodies highlighted the need for market access that ensures adequate returns for producers, and called for enhanced food safety standards through education and training. BMOs underlined the resources required for developing expertise and the necessity for better communication from the EU regarding regulatory decisions, while also cautioning against the negative impact of additional costs on business sustainability. Overall, a consultative approach is essential to ensure stakeholders' voices are heard before implementing new Regulations.

Table 22. Types of assistance or support that could help businesses in navigating the listing of Annex I of Regulation 2019/1793 effectively from the perspective of intermediate support structures. Source: Interviews conducted by the authors.

Can you think of types of assistance or support that could help businesses in navigating the changes of this regulation effectively?	
Competent authorities	Competent authorities emphasized the need for capacity building and support for small-scale farmers to enhance their skills and training. Support structure A focused on equipping businesses to train their growers effectively, while Structure C advocated for empowering farmers and technical personnel, continuous support for food business operators, and collaborative efforts between the government and the private sector to navigate the changes needed. They highlighted the challenges posed by climate change and the need for research into environmentally friendly pest control methods. They also stressed the importance of educating growers about compliance and marketing support as they recover. Support structure G mentioned the provision of technical and financial assistance to help businesses navigate regulatory changes. This includes reviewing the production systems in Kenya, conducting pest and disease analyses, and creating a database to identify problematic pests for specific products. Additionally, support would include technical assistance for conducting residue testing to ensure compliance with import tolerances. Overall, a consultative approach is needed to ensure that the voices of stakeholders are heard before implementing regulations.
Laboratory and certification bodies	Support structure B emphasized the importance of ensuring that market access leads to adequate returns for producers to provide the necessary resources to establish effective systems. They advocated for capacity building that enhances understanding of food safety impacts and fosters competition among government agencies, suggesting that educational courses should include certification to show that the person undertaking the course can share the information with others, and cascade it. They stressed the need to make food safety a standard practice, ensuring that all produce is safe for both domestic and export markets. Support structure F supported this by calling for increased awareness and training from both government and private sectors to help exporters and producers adapt to Regulations effectively. Together, these bodies highlighted the need for persistent efforts to enhance food safety systems and community welfare.
BMOs	Support structure D highlighted the significant resources needed to develop champions and subject matter experts, emphasizing the importance of supporting traceability and operations in the context of EU decision-making processes. They called for better communication from the EU regarding justifications for decisions, warnings, and clarity on the timeline for being removed from the list.Structure E raised concerns about the negative impact of additional costs on businesses, noting that these financial burdens deter investment in quality control and hiring technical staff, ultimately threatening the sustainability of operations. They advocated for minimizing costs to avoid discouraging business participation.

3.3.3 Summary – constructive analysis

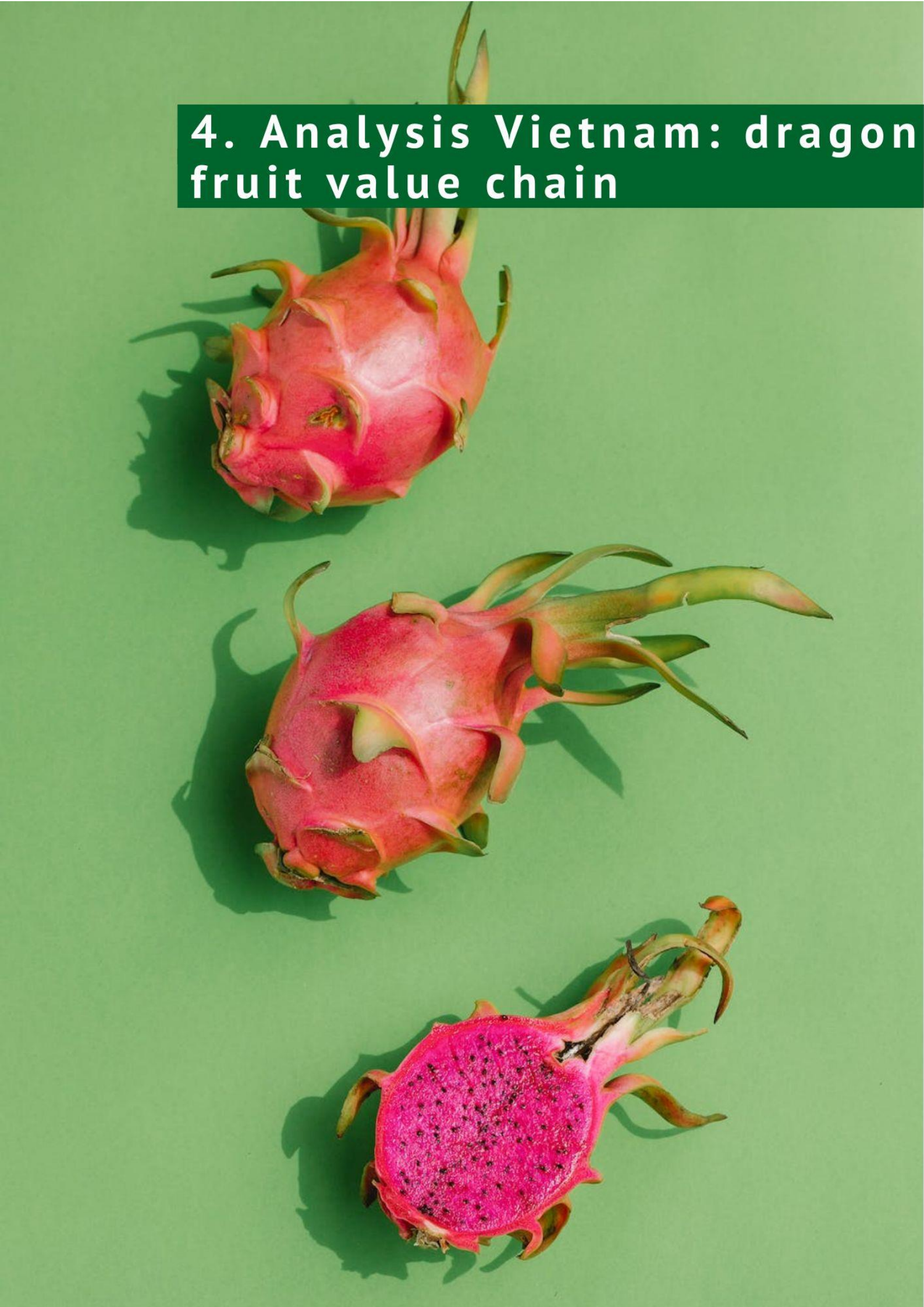
The analysis of exporters' feedback on the listing highlighted several key areas for improvement. Exporters emphasized the need for better testing and quality control before shipment, as well as timely access to information from the EU to mitigate negative impacts. They called for stricter enforcement of chemical Regulations and better monitoring of banned substances, along with the importance of sharing testing results for comprehensive oversight. Concerns were raised about the insufficiently strict vetting process for smaller

exporters, advocating for stricter regulatory practices. Additionally, suggestions were made to stock pest control products for smallholder farmers and improve traceability systems.

Intermediate support structures also identified steps to enhance responses to the listing. Competent authorities suggested that earlier collaborative action might have alleviated challenges, and they called for a unified government voice and the implementation of food quality management systems to ensure compliance. Laboratories and certification bodies emphasized the need for increased sensitization and timely communication across the value chain, as well as advocating for stricter inspections and training on EU requirements. BMOs highlighted the significance of collaborative discussions and the role of KEPHIS in fostering compliance to avoid stricter regulations.

The analysis underscored the critical need for capacity building and support for smallholder farmers to navigate regulatory changes effectively. Competent authorities stressed the importance of empowering farmers and technical personnel while promoting environmentally friendly pest control methods. Laboratory and certification bodies called for market access that ensures adequate returns for producers, alongside enhanced food safety standards through education and training. BMOs reiterated the necessity for better communication from the EU regarding regulatory decisions, cautioning against the negative impact of additional costs on business sustainability. Overall, a proactive, consultative, and coordinated approach is essential for effectively navigating regulatory changes and ensuring that all stakeholders' voices are heard before new Regulations are implemented.

4. Analysis Vietnam: dragon fruit value chain



4.1 Functional analysis

4.1.1 Role of agriculture production and export dynamics

In Vietnam, agriculture accounts for about 20% of the GDP, and these numbers are expected to decline because of decreasing employment in the primary agricultural sector. On the other hand, the agro-industry is expected to grow (Kingdom of the Netherlands, 2017b). Vietnam's main export countries for agricultural products are the USA, China, Japan, and South Korea (VIOIT, 2021). Produce is also exported to the EU, stimulated by the EU–Vietnam Free Trade Agreement (EVFTA). In the first month of the EVFTA taking effect (August 2020), Vietnamese agricultural products exported to the EU increased by 15–17% compared to the same period in 2019 (VIOIT, 2021).

Figure 51 illustrates the share of Vietnam's exports of tropical fruits (including pitahaya) to various countries in 2023. The data indicate that China is the dominant export destination, accounting for 70% of Vietnam's exports in this category. Other significant destinations include India (7.4%), France (3.4%), and the Republic of Korea (2.5%), with smaller shares distributed between the USA, Canada, Germany, and several other countries. This highlights China's overwhelming role in Vietnam's tropical fruit export market.

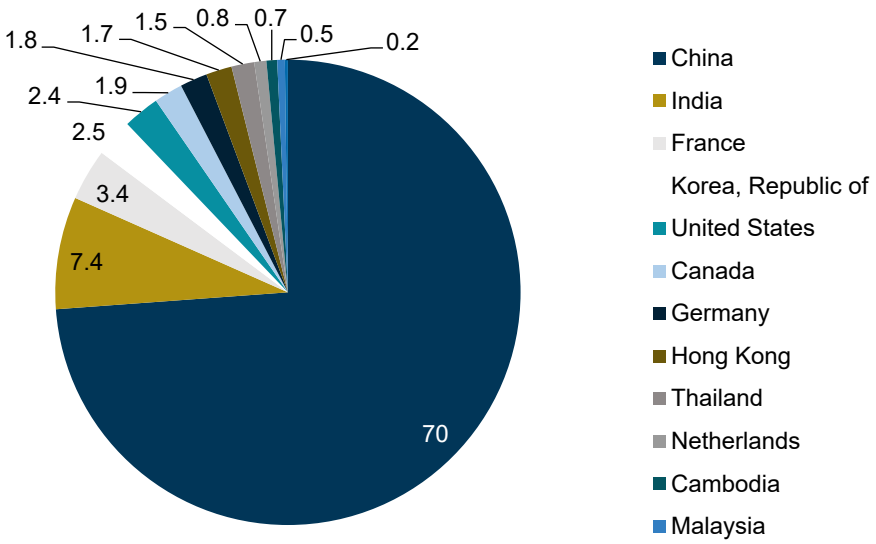


Figure 51. Share in Vietnam's export per country for HC 0810 9020 (tamarinds, cashew apples, lychees, jackfruit, sapodilla plums, passion fruit, carambola and pitahaya) in 2023. Source: ITC Trade Map.

Figure 2 presents a growth analysis of Vietnam's exports of fresh fruits (HC 0810) to various partner countries from 2019 to 2023. It compares the annual growth of Vietnam's exports to these countries with the annual growth of their overall imports of these products from the world. The analysis identifies Cambodia, China, India, and the Republic of Korea as dynamic markets where Vietnam's export growth outpaces the overall import growth of these countries, indicating significant expansion opportunities. Conversely, the UK is classified as a declining market, with Vietnam's export growth outpacing a shrinking overall market, suggesting Vietnam is gaining market share despite overall challenges.

The USA, Malaysia, and Switzerland fall under slower-growth markets, where overall import growth is positive, but Vietnam's exports are growing at a slower pace. Meanwhile, markets such as Hong Kong, the Netherlands, and France show negative growth in both Vietnam's exports and its overall imports, reflecting difficult conditions in these shrinking markets.

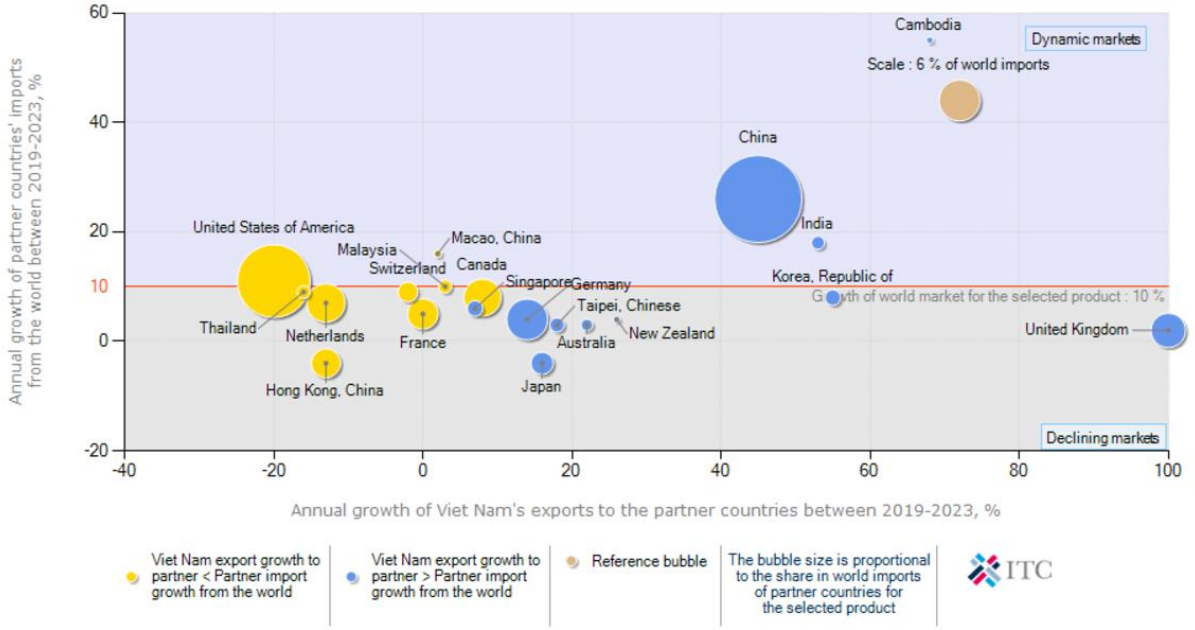


Figure 12. Growth in demand for product HC 0810 (fresh strawberries, raspberries, blackberries, black, white or red currants, gooseberries and other edible fruits (excl. nuts, bananas, dates, figs, pineapples, avocados, guavas, mangoes, mangosteens, papaws, citrus fruit, grapes, melons, apples, pears, quinces, apricots, cherries, peaches, plums and sloes)) exported by Vietnam in 2023. Source: ITC Trade Map.

Bubble sizes in the figure represent the share of each country in global imports, with larger bubbles (China and India) highlighting more substantial market potential. The horizontal reference line at 10% denotes global market growth for fresh fruits, with Vietnam's performance above this line indicating superior market capture. Overall, Vietnam demonstrates strong export performance in dynamic markets, but may need targeted strategies to sustain growth in slower and declining markets.

4.1.2 Export market for dragon fruit

Vietnam has traditionally been a leading global producer and exporter of dragon fruit, holding a significant market share in Asia, particularly in China, Europe, and the USA. However, the industry has faced substantial challenges in recent years. In the first 2 months of 2023, dragon fruit exports totalled $47 million, marking a 48.7% decrease compared to the same period the previous year (Zang, 2023).

China remains a critical market, accounting for 60–70% of Vietnam's dragon fruit exports. However, China's domestic production has grown significantly, with an annual output of 1.6 million tonnes, surpassing Vietnam's production. This increase has contributed to a decline in Vietnamese exports, which fell from $1.25 billion in 2019 to $632.6 million in 2022 (Zang, 2023). The Covid-19 pandemic exacerbated these challenges, leading to increased transportation costs and shipping times, further impacting export volumes (Netherlands Ministry of Agriculture, 2024).

4.1.3 Interceptions and legislative consequences

Table 23 outlines the regulatory changes imposed by the EU on dragon fruit imports from Vietnam, focusing on inspection requirements and food safety measures. Starting on 1 January 2017, dragon fruit was listed in Annex I of Regulation 669/2009, requiring a 10% inspection rate. On 8 November 2018, the fruit was subject to special conditions under Regulation 2018/1660, maintaining the same 10% inspection rate. By 29 October 2019, it was moved to Annex II under Regulation 2019/1793, continuing the 10% inspection frequency but with stricter special conditions. On 6 January 2022, the inspection frequency doubled to 20%, reflecting stricter enforcement of food safety standards under the same Regulation. From 2 July 2024, the inspection frequency was set to increase to 30%, further intensifying control. This progressive tightening of Regulations reflects persistent concerns about compliance.

Table 23. Listing of dragon fruit from Vietnam under various EU Regulations.

Date	Alteration	Relevant Regulation
01 Jan 2017	Listing in Annex I for controls at 10%	669/2009
08 Nov 2018	Listing in Annex I for special conditions and controls at 10%	2018/1660
29 Oct 2019	Listing in Annex II for special conditions and controls at 10%	2019/1793
06 Jan 2022	Increase of controls to 20%	2019/1793
02 Jul 2024	Increase of controls to 30%	2019/1793

Over the past 5 years, multiple border rejections of dragon fruit due to pesticide residue notifications have occurred. Specifically, there were six rejections reported in 2024, seven in 2023, and one in 2022, as depicted in Figure 63. It is important to note that the 2024 data include notifications recorded only up to October.

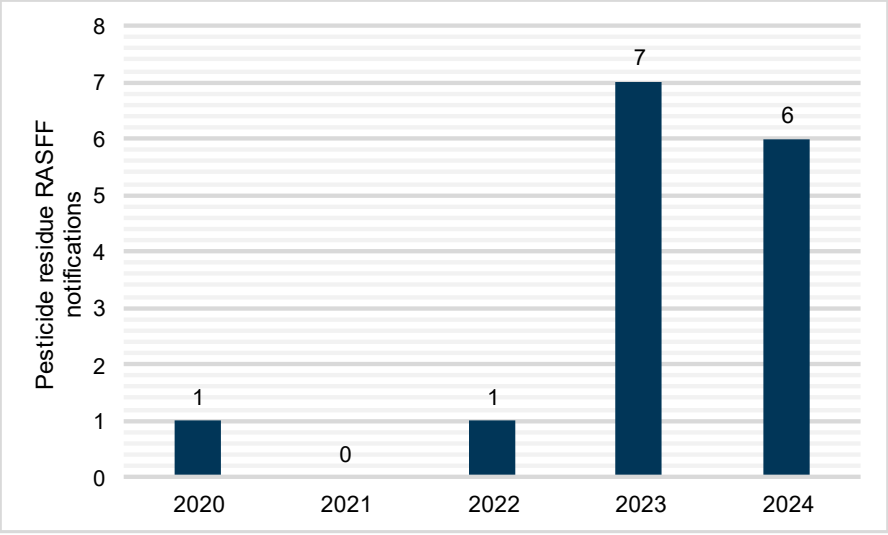


Figure 63. Pesticide residues: RASFF notifications on dragon fruit from Vietnam. Source: RASFF 2024 data.

These rejections predominantly involved the presence of unauthorized substances in the EU, as highlighted in Table 24. Unauthorized substances were detected 13 times, while approved substances exceeding permissible limits were identified in 11 instances.

Table 24. Hazardous substances detected on dragon fruit from Vietnam in the period 2020–2024 (substances unauthorized in the EU in bold type). Source: RASFF 2024 data.

RASFF list of hazardous substances 2020–2024	Number of notifications	EU notification Values in mg/kg bw/day (ADI, AOEL); mg/kg bw (ARfD)
Acetamiprid	2	Approved substance, 0.005 (ADI), 0.005 (ARfD), 0.025 (AOEL)
Alpha-cypermethrin	2	Unauthorized substance (after 7 Jun 2021), 0.00125 (ADI), 0. 00125 (ARfD), 0.0005 (AOEL)
Carbendazim	1	Unauthorized substance, 0.02 (ADI & ARfD & AOEL)
Chlorfenapyr	1	Unauthorized substance, 0.015 (ADI & ARfD)
Chlorothalonil	2	Unauthorized substance, 0.015 (ADI), 0.05 (ARfD), 0.003 (AOEL)
Dimethomorph	1	European Commission decided not to renew approval on 20 May 2024; dimethomorph MRLs to 0.05 (ADI), 0.6 (ARfD), 0.15 (AOEL) in 2025
Dithiocarbamates	3	Unauthorized substance, levels depend on the active substance which was not specified in the notifications
Forchlorfenuron	5	Approved substance, 0.05 (ADI), 0.5 (ARfD), 0.16 (AOEL)
Iprodione	1	Unauthorized substance, 0.02 (ADI), 0.06 (ARfD), 0.04 (AOEL)
Lambda-cyhalothrin	2	Approved substance, 0.0025 (ADI), 0.005 (ARfD), 0.00063 (AOEL)
Propamocarb	1	Approved substance, 0.29 (ADI), 1.0 (ARfD), 0.29 (AOEL)
Pyraclostrobin	1	Approved substance, 0.03 (ADI), 0.03 (ARfD), 0.015 (AOEL)
Thiamethoxam	2	Unauthorized substance, 0.026 (ADI), 0.5 (ARfD), 0.08 (AOEL)

ADI, acceptable daily intake; AOEL, acceptable operator exposure level; ARfD, acute reference dose.

4.1.4 Dragon fruit production

In Vietnam, dragon fruit cultivation involves biannual planting, with the initial harvest occurring 1 year after planting. Optimal commercial quality is typically achieved between the second and tenth years, and trees remain productive until about 12 years of age. The country cultivates three main varieties: red skin with white flesh, red skin with red flesh, and yellow skin with white flesh. The red-skin white-flesh variety is the most prevalent, while the red-skin red-flesh variety sees high demand during the Lunar New Year and is extensively exported to China. The yellow-skin white-flesh variety is relatively new and primarily available in major metropolitan areas (Nguyen *et al*., 2019). To enhance productivity and quality, and to adapt to various regional soils and climates, numerous dragon fruit varieties have been developed. The Southern Horticultural Research Institute (SOFRI) currently maintains a collection of 20 dragon fruit varieties sourced both domestically and internationally, along with 40 hybrid varieties. These collections support research, genetic conservation, and breeding programs (Hien, 2019).

Dragon fruit cultivation in Vietnam has expanded significantly, with the total planting area increasing from 5,900 ha in 2000 to 64,000 ha by 2023, yielding an estimated 1.3–1.5 million

tons (UNDP, 2023; Axmann *et al*., 2022; Tran *et al*., 2015). The primary dragon fruit production regions are Binh Thuan, Long An, and Tien Giang provinces. Binh Thuan province leads with 33,000 ha of dragon fruit production, followed by Long An with 12,000 ha, and Tien Giang with 9,600 ha (Axmann *et al*., 2022). Other provinces, including Vinh Long, Tra Vinh, Tay Ninh, Ba Ria-Vung Tau, and several in the northern region, also contribute to dragon fruit cultivation (Hien, 2019).

Dragon fruit blooms from May to August, with harvesting typically in September and October. However, prices often drop during this main season due to increased supply. To capitalize on higher prices in January and February, farmers use lighting systems to induce off-season flowering, allowing for a second harvest during the dry season from November to April. This practice results in two distinct harvesting periods: the rainy season (May to October) and the dry season (November to April). While dragon fruit trees are commercially viable for 10–12 years, their rapid growth allows for continued harvesting or replanting with different varieties based on market demand and pricing (Nguyen *et al*., 2019).

Economically, dragon fruit production in Vietnam presents both opportunities and challenges. On average, farmers produce 18.4 tons annually, generating approximately 200 million Vietnamese dong (VND) (about $8,800). However, production costs are substantial, accounting for about 46% of sales revenue, totalling around 91 million VND. The primary expenses include fertilizers (39 million VND, 43% of total costs), seedlings (20 million VND, 22%), and pesticides (15 million VND, 16%) (Sakata & Takanashi, 2018).

Labour costs remain relatively low, averaging 11 million VND, as most farmers are smallholders who employ seasonal workers primarily during harvest periods; only a few households hire year-round labour. While the majority of farmers focus solely on dragon fruit cultivation, many supplement their earnings through non-agricultural activities. To expand production, some households purchase additional land-use rights or enter the land rental market, a trend that has emerged since 2010 (Sakata & Takanashi, 2018). Wholesalers and farmers also occasionally sell dragon fruit to by-product producers, who make wine and packed dried fruit snacks (Nguyen *et al*., 2019).

4.1.5 The dragon fruit value chain

The main actors in the dragon fruit value chain of Vietnam are summarized in Figure 7.

Vietnam’s dragon fruit export value chain is characterized by fragmentation and informal transactions. Small-scale producers typically sell their harvest to local intermediaries, who then supply export enterprises responsible for shipping the fruit to export destinations. Occasionally, farmers engage with individual intermediaries who connect them with export companies. A major portion of the produce is exported to China, and a minor portion is exported to European and other Asian markets, such as Hong Kong and Singapore, often through special orders (Sakata & Takanashi, 2018).

After harvesting, dragon fruits are transported from farms to export enterprises in bamboo baskets. At these facilities, the fruits are sorted, packed into carton boxes, and stored in refrigerated warehouses to maintain freshness before export. Export enterprises are equipped with large sorting and packing areas, as well as refrigerated warehouses. Traders frequently visit these facilities to inspect and sort the dragon fruit, often providing the necessary packaging materials (Sakata & Takanashi, 2018).

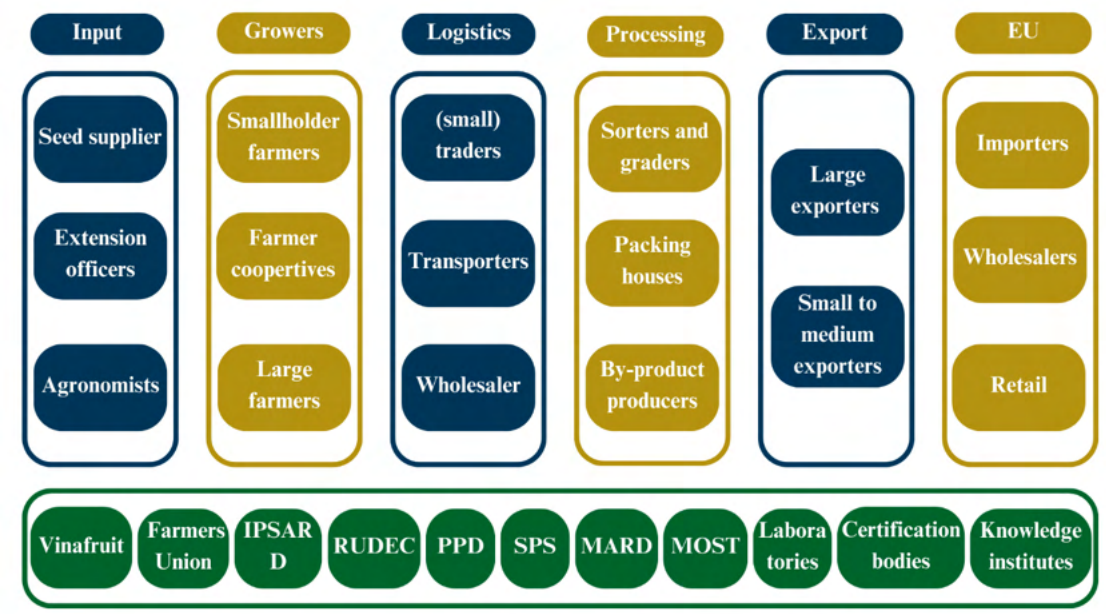


Figure 74. Main actors in the dragon fruit value chain in Vietnam focused on the export market. Source: Interviews conducted by the authors.

Despite the export-oriented nature of dragon fruit production, there is an absence of exclusive sales contracts or contract farming arrangements. While some farmers receive technical guidance from intermediaries or traders when they begin cultivating dragon fruit, these interactions do not lead to long-term purchasing commitments. Sales transactions are predominantly conducted as spot deals without binding contracts. Farmers procure inputs such as fertilizers and pesticides from local markets at prevailing prices, with no provisions supplied by buyers (Sakata & Takanashi, 2018).

This fragmented value chain and the reliance on spot market transactions pose challenges to capability improvement and the establishment of consistent quality standards in Vietnam's dragon fruit export sector.

Government support

Since 2007, local governments, such as in Cho Gao District, have introduced policies to boost dragon fruit cultivation. These initiatives include annual and 5-year development plans, financial assistance for farmers (e.g., subsidies covering 30% of the cost of concrete pillars), provision of seedlings for new varieties, and the establishment of experimental farms for research and promotion of new cultivars (UNDP, 2023). Efforts have been made to promote the "Cho Gao Dragon Fruit" brand through participation in agricultural fairs and exhibitions.

The Ministry of Agriculture and Rural Development (MARD) has taken steps to eliminate highly hazardous pesticides from agricultural use. Between 2017 and 2019, MARD issued decisions to prohibit 13 types of pesticides, encompassing 414 active ingredients and 782 trade names, to mitigate health and environmental risks (Phong *et al.*, 2021).

In collaboration with the Department of Plant Protection (DPP), IDH (Sustainable Trade Initiative) launched a national mobile application in May 2019 to assist Vietnamese farmers in optimizing pesticide use. The app, named "Thuoc BVTV," provides farmers with information to identify appropriate pest control methods, aiming to enhance product value in international markets while minimizing potential harm to human health and the environment (IDH, 2019).

To address the decline in export volumes since 2019, Mr Tran Thanh Nam, Vice Minister of MARD, has highlighted the importance of leveraging ecological advantages in key provinces

such as Binh Thuan, Long An, and Tien Giang. He also stressed the need to enhance product quality, add value, boost competitiveness, protect the environment, and adapt to climate change: “Among the key strategies are reorganizing the dragon fruit value chain towards cooperative and linked production, overcoming disconnection among value chain entities, facilitating access to export markets, and mitigating market and production risks. A comprehensive and efficient logistics system and mobilizing resources from the private sector, state, and international support are crucial in driving efficiency, adding value, integrating multiple values, reducing carbon footprint, and ensuring sustainability in the dragon fruit value chain” (UNDP, 2023).

The Vietnam Farmers Union (VFU), a government-affiliated organization operating at both national and provincial levels, provides farmers with essential support including training and resources. It collaborates with international partners to enhance the quality of tropical fruits such as dragon fruit. For instance, the VFU, in partnership with the Medical Committee Netherlands-Vietnam (MCNV), implemented the “Improving Quality of Tropical Fruit Vietnam” project, focusing on key production areas and offering extensive guidance to farmers (Netherlands Ministry of Agriculture, 2024).

The Institute of Policy and Strategy for Agriculture and Rural Development (IPSARD) conducts research and develops policies aimed at sustainable agricultural development. Through its Rural Development Centre, IPSARD has organized workshops to promote the responsible use of agrochemicals. These initiatives include studies on farmers’ perceptions of agrochemicals and the application of behavioural designs to improve good practices, thereby influencing pesticide use in dragon fruit cultivation (CropLife Asia, 2022).

The Ministry of Science and Technology (MOST) oversees scientific research and technological advancements in agriculture. By supporting the development of innovative farming techniques and technologies, MOST contributes to improving the quality and safety of dragon fruit production.

SPS Vietnam Office

The Vietnam Sanitary and Phytosanitary Notification Authority and Enquiry Point (SPS Vietnam Office) plays a role in keeping government agencies, local authorities, and industry associations informed about updates and changes in EU Regulations. By providing timely and detailed notifications, the office ensures that Vietnamese businesses are informed of the necessity to maintain compliance with the stringent requirements of the EU market (Nhung, 2024).

According to the Deputy Director of the SPS Vietnam Office, the office processes and disseminates an average of 100 notifications and draft Regulations related to SPS measures each month. These updates include critical information on proposed amendments to MRLs for pesticides. The proactive distribution of this information is essential for helping businesses navigate regulatory landscapes, minimize risks, and sustain their competitiveness in the global marketplace, especially within the highly regulated EU market (Nhung, 2024).

EU–Vietnam Free Trade Agreement

The EVFTA, effective from 1 August 2020, has significantly enhanced Vietnam’s export potential for fruits and vegetables to the EU. Prior to the EVFTA, these exports were subject to preferential tax rates under the Generalized System of Preferences (GSP), ranging from 10 to 20%. Post-EVFTA implementation, approximately 94% of the 547 tax lines on fresh and processed fruits and vegetables have been substantially reduced, offering Vietnam a competitive edge over other Asian countries including Thailand and China, which lack similar agreements with the EU (Netherlands Ministry of Agriculture, 2022).

Development organizations

Since 2008, the Pesticide Action Network Asia and the Pacific (PAN AP) has collaborated with three Vietnamese organizations:

- Centre for Gender, Family & Environment in Development (CGFED)
- Centre for Sustainable Rural Development (SRD)
- Research Center for Rural Development (RCRD).

PAN AP's initiatives in Vietnam focus on reducing or banning highly hazardous pesticides such as paraquat, glyphosate, chlorpyrifos, and 2,4-D. PAN AP has facilitated the Community-based Pesticide Action Monitoring (CPAM) project and assisted local research centres in developing eco-friendly farming models. These models aim to reduce agrochemical usage by promoting practices such as integrated pest management (IPM).

The Food and Agriculture Organization (FAO) has supported the IPM programmes for Vietnam since 1992, including financial aid and technical assistance, training of trainers, and farmer field school programmes. The FAO has been cooperating with central government and local authorities to carry out IPM programmes all over the country.

The Enhancing the Export Competitiveness of Vietnamese Small and Medium Enterprises in Spice, Fruit and Vegetable Sub-Sectors project, funded by the EU and implemented by Oxfam in Vietnam alongside the Vietnam Chamber of Commerce and Industry (VCCI), ran from 2022 to 2023. This initiative aimed to bolster the export capabilities of Vietnamese SMEs in the spice, fruit, and vegetable sectors, including dragon fruit, by providing technical assistance and facilitating market access to the EU.

4.1.6 Historical context

Vietnamese fruit exports to Europe have historically faced challenges related to pesticide residues and shelf-life. In March 2017, the European Commission's Directorate-General for Health and Food Safety conducted an audit in Vietnam to assess the country's controls on pesticide residues in produce intended for export to the EU. The audit revealed that, despite existing legislation and procedures, significant gaps in implementation prevented the establishment of an effective pesticide control system. As a result, Vietnamese authorities were unable to ensure that their produce met international MRLs, including those set by the EU. While some exporters had private controls contributing to compliance, overall progress in addressing recommendations from a previous 2014 audit was minimal. The report concluded with recommendations for Vietnamese authorities to address these shortcomings (DG SANTE, 2017).

The overuse of chemical fertilizers and pesticides has been documented in dragon fruit cultivation. A 2018 report by the Food and Fertilizer Technology Centre for the Asian and Pacific Region highlighted that Vietnamese dragon fruit farmers often apply excessive amounts of fertilizers and pesticides, leading to increased production costs and environmental pollution (Thanh *et al*., 2018). Additionally, a 2019 study by the International Atomic Energy Agency noted that traditional pest control methods in Vietnam's dragon fruit orchards relied heavily on chemical pesticides, resulting in limited effectiveness and potential environmental harm (IAEA, 2019).

There has been a push for farmers to obtain certifications such as VietGAP and GLOBALG.A.P. to meet international standards, thereby enhancing market access and consumer trust. Cooperatives and cooperative groups play a key role in this effort. However, Sakata & Takanashi (2018) found that farmers in Tien Giang province noticed that the acquisition of a VietGAP certificate has little benefit for sales. The price of VietGAP dragon fruit does not differ from non-VietGAP fruit, and the price of dragon fruit exported to the EU market, which prefers certified fruit, is often lower than in the Chinese market. Farmers

expressed difficulties in maintaining the subtle production processes stipulated in the certificate, and the financial return was negligible.

4.1.7 Summary – functional analysis

Vietnam's agriculture sector contributes approximately 20% to the GDP. Key export markets include the USA, China, Japan, South Korea, and the EU, with the EU-Vietnam Free Trade Agreement boosting exports by 15% in 2019. China dominates Vietnam's tropical fruit exports, accounting for 70% in 2023, with notable shares in India, France, and South Korea. Export growth is strong in dynamic markets such as Cambodia, China, India, and South Korea, but slower or declining in the USA, Malaysia, UK, and Hong Kong.

Dragon fruit remains a critical export product for Vietnam, but challenges have emerged. Export volumes dropped significantly from $1.25 billion in 2019 to $632.6 million in 2022, exacerbated by Covid-19-related logistical challenges and increasing competition from China's domestic production.

Dragon fruit cultivation has expanded significantly over the past two decades, with planting areas increasing from 5,900 ha in 2000 to 64,000 ha in 2023, producing 1.3–1.5 million tons annually. Binh Thuan, Long An, and Tien Giang provinces lead production, with a focus on three main varieties.

Challenges persist with pesticide residues in Vietnamese fruit exports to Europe. While certifications such as VietGAP and GLOBALG.A.P. aim to enhance market access, farmers report minimal financial benefits, as prices for certified fruit remain comparable to non-certified produce. The Chinese market often provides higher returns than the EU.

The dragon fruit value chain is highly fragmented, characterized by spot transactions and limited long-term contractual arrangements, which complicates quality consistency and compliance efforts.

Despite these obstacles, initiatives by the government and international organizations have supported research, quality improvement, and compliance efforts in the sector.

4.2 Critical and evaluative analysis

4.2.1 Communication process

The communication process is described for the moment when increased controls combined with special conditions were first required for dragon fruit from Vietnam, which was in November 2018, at that time following Regulation 2018/1660.

Intermediate support structure A, the governmental body, indicated that the EU shared an alert with the MARD that there were frequent interceptions of dragon fruit consignments. This support structure added that the MARD informed the competent authority, the Vietnam Plant Protection Department (PPD) about this, ensuring that both governmental bodies were aware of the interceptions and the potential of being listed. Support structure A indicated that the same line of communication (EU, MARD, PPD) was followed when the actual listing happened, although none of the stakeholders interviewed could provide any details about the timeline.

Exporter B and Support structure B indicated that a document by MARD was published on the website of the PPD about how to deal with the implications of the listing. However, all three exporters interviewed indicated that private sector stakeholders were considered to be more active in terms of information sharing. Support structure C, the project lead, mentioned that farmers mainly rely on exporters for information regarding EU market requirements. This structure added that most exporters rely on such information from their clients in the EU, which was confirmed by exporter C, who explained that their EU client keeps them up-to-date. Exporter C added that they do not receive much information from "the Vietnam side".

Most information is channelled from the EU client (importer), to the exporter in Vietnam, then to the farmer.

Support structure B, the laboratory, reported that it became aware of the actual listing shortly after it occurred, through receiving a customer request. This customer was involved in projects aimed at improving farmer practices by reducing the use of PPPs. They experimented with some products and sent them to the laboratory for testing.

In terms of sharing information regarding the implications of the listing, the SPS Vietnam Office held some workshops with growers on what to do in order to continue exporting to the EU, as indicated by Exporter B.

These findings suggest that information sharing by the government with affected value chain stakeholders is not actively pursued. Support structure C noted that information sharing within the value chain is generally perceived as limited, and highlighted the absence of a platform specifically designed to facilitate information sharing.

4.2.2 Consequences

Exporters' perspective

The perspective of dragon fruit exporters highlights the complex and uneven impacts of the EU's increased official controls. The situation of the three exporters participating in the study appears to be not fully representative of the broader dragon fruit value chain. Exporters A, B, and C have standardized their operations, strictly adhering to EU market requirements.

The characteristics of the three exporters interviewed are shown in Table 25. Exporter A sources produce from their own production sites, smallholder outgrowers and larger outgrowers. Exporter B started the business in 2016 and relies fully on outgrowers, both smallholders and larger outgrowers. Exporter C is fully focused on the export of dragon fruit to the EU, which it sources from two own production sites and one larger outgrower.

Table 25. Case studies of the three exporters interviewed in the dragon fruit value chain in Vietnam

Exporter	Year	Export crops	Main markets	Number of own farms	Number of smallholder outgrowers[1]	Number of larger outgrowers[2]
A	2012	Dragon fruit, pomelos, limes, coconuts	Europe, Asia-Pacific, Middle East, USA, Vietnam	186	171	15
B	2016	Dragon fruit, coconut, rambutan	EU, UK, China, USA, Australia	–	5	2
C	2012	Dragon fruit	EU	2	–	1

[1] < 5 ha
[2] > 5 ha

Table 26 outlines the key consequences for exporters resulting from the listing of dragon fruit from Vietnam in Annex II. It should be noted that all three exporters interviewed indicated that the impact of the increased sampling was limited for them. However, increased amount of work, increased costs, and increased market sharewere mentioned as consequences.

Table 26. Consequences for dragon fruit exporters in Vietnam of the listing in Annex II of Regulation 2019/1793. Source: Interviews conducted by the authors.

Can you describe any consequences of the listing of the product in Annex II on your organization?	
Impact of the increased sampling was limited (*n*=3)	Exporters A, B, and C all mentioned that the impact of the increased sampling was limited, as they already had the right systems in place, minimizing the amount of MRL interceptions at the EU border. Exporter B: "We already adhered to the MRL requirements before the listing." Exporter C: "We already had the systems in place, so it did not affect us so much. It mostly resulted in extra costs."
Increased market share (*n*=2)	Export B highlighted that growers and exporters who were already successful in exporting to the EU gained an increased market share. Exporter C mentioned that the EU market for dragon fruit from Vietnam is relatively small, meaning only those exporters who focused on the EU as one of their main markets did not need to implement mitigation measures and were able to continue exporting to the EU without major adjustments.
Increased amount of work (*n*=1)	Exporter C added that there was an increased amount of work to continue exporting dragon fruit to the EU, due to the need to arrange testing and issuing of the health certificate in Vietnam. However, they emphasized that the increase was small since they already had the required traceability and administration systems in place.
Increased costs (*n*=3)	Exporters A, B, and C described extra costs as detailed below.

Exporters A, B, and C all highlighted the increased costs associated with exporting dragon fruit to the EU. These costs include obtaining health certificates (a requirement for dragon fruit from Vietnam from November 2018), and conducting produce testing in Vietnam (see Table 27).

Table 27. Cost implications for exporters in the dragon fruit export value chain to adhere to Regulation 2019/1793. Source: Interviews conducted by the authors.

Cost item	Costs (Euro)	Additional information
Testing in Vietnam	300	Per average consignment Price varies depending on the time given to receive the sampling results
Issuing health certificate	30	Per average consignment

Another cost factor highlighted by all three exporters was the increased expense of testing upon arrival in the EU. Exporter B explained, "There are also increased costs for testing on arrival, but if compliant, the EU client always pays for it."

According to Exporter B, the cost of testing at the EU border averaged €600 per consignment, varying by the country where the testing occurs. These costs are typically covered by the EU client, provided the shipment meets compliance standards. However, in cases of non-compliance, the Vietnamese exporter is responsible for the costs. Exporter C, on the other hand, noted a lack of awareness regarding the exact amount of these costs, as they are paid by the EU client.

Exporter C also observed that the EU client slightly increased their prices for customers while marginally reducing the price paid to the Vietnamese exporter. Despite this adjustment, exporter C emphasized that this change did not impact the price paid to farmers. Additionally, they raised a broader concern about the rising overall costs of exporting dragon fruit to the EU, but affirmed that the business with their EU client remained profitable enough to continue operations.

Table 28 shows the time exporters needed to implement the necessary measures following the listing of dragon fruit in Annex II. All included three exporters interviewed mentioned that they already had the right systems in place, so they did not need time for adjustment. Exporter B and Support structure A, however, stressed that this might not be the case for all exporters, as some are perceived to still not comply.

Table 28. Time needed to put in place necessary changes by exporters. Source: Interviews conducted by the authors.

How much time did your organization need to put in place these changes?
All three exporters mentioned that they already had the right systems in place, so did not require time for adjustment. Exporter C: “We already had the systems in place, so it did not affect us so much.”
Exporter B noted that for other exporters, it could be different: “I could not tell you, some exporters are still not at a moment of compliance.”
Support Structure B: “To learn new farming processes it requires trials and time to get the results. This may take 6 months to a year to get it right. To standardize the process.”
Structure A indicated that the required changes are not already in place for all exporters: “Some things are still work in progress.”

Broader exporter perspective

As noted above, the perspective of the three exporters interviewed might not represent that of other exporters and farmers in the value chain.

According to Mr Dang Phuc Nguyen, General Secretary of the Vietnam Fruit and Vegetable Association, only a small number of exporters operate at this high level of compliance. For these well prepared businesses, the increased official controls (at that moment with sampling in the EU of 20%) have had less severe consequences (Thang, 2022).

However, he indicated that the increased official controls have placed logistical and financial burdens on Vietnamese exporters and producers. The increased sampling of 20% added approximately 4 days to the export process, which directly affected product quality and competitiveness in the EU market. Because of long shipping times and the perishable nature of dragon fruit, with a maximum shelf-life of 6 weeks, many exporters are forced to rely on air freight. Air freight costs, at $10 per kg, are four to five times higher than for sea freight, severely reducing profit margins. Exporters and buyers also face additional financial risks, including the costs of rejected shipments, EU-imposed residue testing, and penalties for exceeding MRLs. Furthermore, logistical delays make it challenging to maintain consistent product quality. Farmers and cooperatives often lack the necessary infrastructure and knowledge to meet strict EU standards, leading to vulnerabilities across the value chain. Thousands of hectares of dragon fruit were wasted in Binh Thuan in early 2022 when its price was low (Thang, 2022). These factors collectively pose a significant threat to the viability of Vietnamese dragon fruit exports to the EU market.

Intermediate support structures' perspective

The perspectives of intermediate support structures on the consequences of the listing in Annex II are outlined in Table 29 (micro level). The three intermediate support structures interviewed were a governmental body, a laboratory, and a project lead. Support structure B, a laboratory, reported an increased workload after the product's listing in Annex II. They attributed this to their efforts in translating and sharing key regulatory updates with their network on a quarterly basis. The laboratory also observed a rise in demand for testing services, particularly from Vietnamese exporters of dragon fruit to the EU, who now require frequent sampling and health certificates. The listing also prompted the laboratory to enhance its pesticide screening capabilities, enabling it to detect substances such as ethylene oxide, and bringing its testing standards closer to those of EU laboratories.

Table 29. Consequences of the listing in Annex II of Regulation 2019/1793 on an organizational (micro) level from the perspective of intermediate support structures. Source: Interviews conducted by the authors.

If you go back to the moment of the listing, can you describe any consequences of the listing of the product in Annex II on your organization? (micro level, organization)	
Increased amount of work (*n*=1)	Support structure B, a laboratory, indicated an increased amount of work after the listing. The laboratory took the initiative to translate key information regarding regulatory changes and requirements, sharing it with their network quarterly.
Increased demand for testing laboratories (*n*=1)	Support structure B also noticed an increase in demand for testing laboratories. They mentioned that although the EU market is relatively small for dragon fruit from Vietnam, those exporters that continued to export to the EU now request frequent sampling and issuing of health certificates from Vietnamese laboratories.
Better pesticide screening techniques (*n*=1)	Support structure B also indicated that the required changes enabled them to upgrade their testing facility, now having better pesticide screen techniques. As an example, the laboratory is now able to test for ethylene oxide, which previously could not be detected: "Our laboratory now has comparable results to laboratories in the EU."

For the consequences within the broader context (macro level), the perspectives of both support structures and exporters are taken into account. All six stakeholders interviewed indicated a broader consequence: the discontinuation of exports to the EU for certain farmers and exporters. Exporters A, B, and C, along with support structures B and C, observed that those farmers and exporters that already focused on the EU market could continue exporting due to existing compliance systems. However, exporters and farmers for whom the EU was just an additional market for their produce were perceived to have seen the increase in official controls as a reason to stop exporting to the EU.

Table 30. Consequences of the listing in Annex II of Regulation 2019/1793 within the broader context (macro level) from the perspective of intermediate support structures and exporters. Source: Interviews conducted by the authors.

If you go back to the moment of the listing, can you describe any consequences of the listing of the product in Annex II within the broader context? (macro level, value chain)	
Reduced quality of produce (*n*=1)	Support structure A, the governmental body, mentioned that the increase in official controls had also impacted the quality of produce. They mentioned that dragon fruit has a relatively short shelf-life, approximately 14 days, and waiting times for sampling in both Vietnam and the EU reduce the remaining shelf-life by the time the fruit reaches the EU market. This, in turn, affects the quality of the produce at the point of sale. Structure A emphasized the need for heightened attention to the quality of the produce, and for ensuring that storage conditions are optimized throughout the supply chain to mitigate these challenges.
Discontinuation of export to the EU (*n*=6)	All support structures and exporters mentioned the consequence of discontinuation of the export of dragon fruit to the EU for many exporters and farmers. This also explains the perceived increased market share mentioned by exporter B. All three exporters mentioned that exporters and farmers fully focusing on exporting to the EU already met the EU market requirements and had the right systems in place. Their subcontracted farmers already executed spraying programmes that result in compliance with the EU market requirements and could therefore easily continue exporting to the EU. Exporters and farmers for whom the EU was just an additional market for their produce were perceived to have seen the increase in official controls as a reason to stop exporting to the EU (stated by all exporters, and support structures B and C). Exporter A: “Only a small percentage of the dragon fruit is exported to the EU. You thus would have to change your entire system, for just a small percentage of your harvest.” Exporter C emphasized the limited relevance of the EU market for Vietnamese dragon fruit, stating that only 1% of all dragon fruit grown in Vietnam is exported to the EU. Exporter A: “The EU market is not considered important enough to alter the complete chain. When this increased official controls would be implemented by China, it would have a totally different influence.” Exporter A even indicated that it can be seen as a commercial risk to adapt to the EU market requirements that focus on pesticide residues and MRLs. The larger markets for Vietnamese dragon fruit, such as China and Australia, tend to focus more on quality than phytosanitary standards. Spraying fewer PPPs is perceived to lead to more phytosanitary and quality problems, risking access to the biggest dragon fruit markets in Vietnam, such as China. That means, as Export A explained, that investments made to attain access to the EU market are likely to potentially reduce access to the bigger markets. Exporter B stated that the EU market has limited demand for dragon fruit from Vietnam, partly because this export comes with high shipping costs because of the long distance between Vietnam and the EU. All exporters and support structures mentioned that there is a general perception in the dragon fruit value chain that the EU market requirements are difficult to adhere to, and that these requirements are more stringent than the Chinese market requirements, which is the biggest market for Vietnamese dragon fruit. Exporter C: “Because the EU Regulations are strict, and we are the ones that can do it, we focus on the EU market. Other markets might be easier, but less certain. Suddenly their demand changes, or the price fluctuates.” Support structures B and C, and Exporter C, acknowledged that farmers are perceived to be reluctant to adhere to the EU regulations, so it is hard to convince them to adjust their practices to comply with the EU MRL requirements. Exporter C also went through a process of putting in place the required systems at the farms supplying them: “For us at the beginning, it was also difficult to ensure the farms follow good agricultural practices that are in line with EU requirements.”

For the consequences within the broader context (macro level), the perspective of both intermediate support structures and exporters is taken into account. All six stakeholders indicated that a consequence within the broader context was the discontinuation of exports to the EU for certain farmers and exporters. Exporters A, B, and C, along with support structures B and C, observed that those farmers and exporters that already focused on the EU market could continue exporting due to existing compliance systems. However, these stakeholders indicated that exporters and farmers for whom the EU was just one additional market for their producesaw the increase in official controls as a reason to stop exporting to the EU.

Value chain perspective

Exporters and intermediate support structures had varying perspectives on the readiness of authorities for identity and physical checks on dragon fruit (Table 31). Exporter A noted challenges such as limited testing capacity in Vietnam compared to the EU, variability in sampling procedures, and concerns about tampering with certificates, while exporter B found the process manageable and emphasized the need for capacity building. Exporter C mentioned that the small EU market made the process less burdensome. On the other hand, support structure A believed authorities were prepared, while structure B highlighted resource constraints, specifically a lack of personnel, and the need for certified labs. Support structure C emphasized Vietnam's eagerness to adapt and improve.

Table 31. Readiness of competent authorities to offer the identity and physical checks required because of listing in Annex II of Regulation 2019/1793. Source: Interviews conducted by the authors.

To what extent do you think the competent authorities were prepared and able to offer the identity and physical checks when dragon fruit was listed in Annex II?	
Exporters	Exporters had mixed views on the readiness of competent authorities to perform the identity and physical checks. Exporter A highlighted procedural sampling issues to obtain the health certificate, such as variability in testing (per lot vs. per shipment), the possibility to select and send your own samples, and a more limited testing capacity in Vietnam, compared to the Netherlands: "In the Netherlands, the LC-MS [liquid chromatography–mass spectrometry] machine can test for 600 active substances, whereas the laboratory in Vietnam can only test for 300." Exporter A also added concerns about tampering with health certificates, although it did not speak from own experience. Exporter B acknowledged that the sampling was effective and the equipment was adequate, but also emphasized a need for capacity building to perform proper surveillance and sampling. Exporter C found the process manageable due to the limited number of exporters serving the EU market: "It did not take too long to make the health certificates."
Intermediate support structures	Intermediate support structures emphasized challenges and adaptability. Structure A, a governmental body, believed the authorities were ready: "They were ready to do the testing as they already did a lot of testing." In contrast, structure B, the laboratory, pointed to resource constraints: "The government authorities do not have enough personnel to implement it," and highlighted the role of certified labs with ISO 17025 and 17020. sSructure C, a project lead, emphasized Vietnam's willingness to adapt: "Vietnam is a country where people are eager to learn, very willing to change, develop, and grow."

In Vietnam, exporters and intermediate support structures had mixed views on the support available for adapting to the increased official controls (Table 32). Exporter B, felt there was no initial infrastructure in place, and that growers had to push laboratories for authorization and face issues with testing procedures. Exporter A acknowledged Vietnam's determination to address challenges but highlighted past issues with phytosanitary certificates. Exporter C noted that only those already exporting to the EU were able to adapt. In contrast, Intermediate support structure A emphasized the active role of the PPD and the awareness of farmer associations, while structure B highlighted SPS Vietnam's regular updates and access to support from Eurofins[1].

Table 32. Structures already in place that helped adapt to the listing on Annex II of Regulation2019/1793. Source: Interviews conducted by the authors.

To what extent do you feel like there was anything already in place in Vietnam or the value chain that helped you adapt to the regulation?	
Exporters	Exporter B expressed that there was no existing support to help adapt to the regulation: "The growers had to do it themselves, pushing the laboratories to get the authorization." They also noted the initial monopoly on authorized testing, despite adequate capacity, and pointed out that the testing process was not conducted as it should have been. They suggested that a clear list of inspection requirements should have been available. Exporter A referenced Vietnam's determination to overcome challenges: "If Vietnam wants something, they'll pound their fist on the table and get it done." They also mentioned past issues, such as the EU's letter on chilli peppers, which resulted in a blanket ban on issuing phytosanitary certificates for all products. Exporter C observed that the small EU market meant only those already exporting to the EU were able to adapt.
Intermediate support structures	Structure A, a governmental body, highlighted the active role of the PPD in districts, which helped maintain close contact with producers. They also pointed out that farmer associations already had significant awareness and good networks. Structure B, a laboratory, noted that SPS Vietnam shares regular updates based on its information exchanges with WTO countries, and that Vietnamese stakeholders can request support and receive information from Eurofins.

4.2.3 Summary – consequences

The increased official controls imposed by the EU have had complex and uneven impacts on Vietnamese dragon fruit exporters. All three exporters studied demonstrated preparedness, with standardized operations that comply with EU market requirements. The impacts for these exporters were primarily limited to increased workload, higher costs associated with health certificates and testing, and logistical adjustments. While these exporters reported profitability and market retention, they also highlighted financial burdens such as testing fees, both in Vietnam and upon arrival in the EU.

Beyond these three exporters, the broader value chain reveals significant challenges. According to the Vietnam Fruit and Vegetable Association, only a minority of exporters have achieved a comparable level of compliance. For many, increased sampling requirements, extended shipping times, and rising air freight costs – exacerbated by the perishability of dragon fruit – have created financial and logistical pressures. These conditions have resulted

[1] https://www.eurofins.com

in disruptions, including by smaller-scale producers and exporters who lack the resources to adapt ceasing to export to the EU.

Intermediate support structures, such as laboratories and government bodies, experienced an increased workload due to the need for enhanced regulatory compliance. Laboratories reported greater demand for testing services, and the need to improve their pesticide screening capabilities to meet EU standards. However, resource constraints, including personnel shortages and limited certified laboratories, were identified as barriers.

Perspectives on the readiness of Vietnamese authorities for identity and physical checks were mixed. Some stakeholders noted gaps in capacity and inconsistencies in procedures, while others emphasized ongoing efforts to adapt and improve. Exporters and support structures highlighted varying levels of support for navigating the regulatory landscape, with more established entities benefiting from existing compliance systems, while others struggled with the lack of infrastructure and guidance.

Overall, while well-prepared exporters managed to maintain their operations in the EU market, the broader value chain faces significant challenges, including financial burdens, logistical delays, and compliance gaps, affecting the viability of Vietnamese dragon fruit exports to the EU.

4.2.4 Challenges in anticipating the needed changes

The value chain encountered several challenges due to the increased official controls under Regulation 2019/1793 (Table 33). One challenge was the need for more efficient knowledge sharing and cooperation within the value chain, particularly regarding regulatory changes. Traditional farming practices, such as monoculture and limited pesticide options, also posed difficulties in meeting EU requirements. The high number of smallholder farmers made compliance more complex, and initially there were delays in certification and unclear testing protocols, which impacted the readiness of competent authorities. Additionally, a more reactive approach to addressing challenges and the top-down nature of decision-making sometimes delay the implementation of proactive, market-oriented solutions.

Table 33. Challenges perceived in the process of anticipating changes required by listing in Annex II of Regulation 2019/1793. Source: Interviews conducted by the authors.

What were the challenges, if any, the value chain faced due to the temporary increases in official controls under Regulation 2019/1793?	
Lack of knowledge sharing and cooperation (*n*=4)	The value chain struggled with a lack of information sharing, particularly regarding changes in EU regulations. Exporter B highlighted that vital information was not disseminated by the government to the right stakeholders in a timely manner, leaving stakeholders to independently figure out compliance requirements. Exporter A added that there was no communication from the Vietnamese Government about changes in EU regulations, creating further confusion. Intermediate support structure C, the project lead, felt that information sharing is not common in the value chain, with stakeholders often searching for information individually instead of collaborating. Exporter A and Structure B added that a platform is lacking for information sharing, such as an association specifically for stakeholders in the dragon fruit value chain.
Traditional way of farming (*n*=4)	The traditional monoculture farming practices for dragon fruit are perceived to have created challenges. Exporter A and Structure C pointed out that these practices led to increased pest pressure, making it harder for farmers to meet pesticide residue requirements set by the EU. Structure B: “Farming practices have been practised for many years, so changing is not possible in a short time. The dragon fruit has had a high price for a long time, which caused the farmer to profit from it and be less strict on some quality criteria. They could just traditionally grow the dragon fruit and sell it to the Chinese market.” Exporter A emphasized that a lack of lobbying for specific research on residue levels for dragon fruit causes a lot of residues to be set at the default lowest limit of determination (LOD) in EU law (0.01 mg/kg), which might not be realistic and feasible for farmers, leaving farmers with limited options.
Readiness of competent authorities (*n*=2)	Exporter B mentioned that initially there was confusion regarding which laboratory was authorized to issue health certificates, with the private sector pushing for proper certification processes: “When I started the company, I had to guide the laboratory to provide the health checks.” Exporter A highlighted procedural sampling issues around obtaining the health certificate, such as variability in testing, the possibility to select and send your own samples, and a more limited testing capacity in Vietnam.
Amount of smallholder farmers (*n*=1)	Exporter C noted that many farms are less than 1 hectare, which makes it difficult for these small operations to meet the EU’s stringent standards, especially given their limited resources and capacity. This added financial strain and risk of non-compliance for smallholders, making EU export less feasible for them.
Reactive approach (*n*=1)	Structure C, the project lead, pointed out that a reactive approach is often taken, not having a strategy and planning ahead, but reacting once issues may arise.
Top-down (*n*=1)	Structure C noted that the government plays a central role in decision-making, so it is perceived to work in a more top-down manner. This support structure added that plans and visions for the market are influenced by the government, leaving less room for the value chain to be market-oriented.

4.2.5 Benefits resulting from the increased official controls

Several benefits resulted from the increased official controls (Table 34). Intermediate support structure A noted improvements in the quality and food safety of dragon fruit, while exporter B observed that successful growers gained a larger market share in the EU market. Exporter A added that this is beneficial, given the stability of the EU market. Support structure B highlighted better pesticide screening.

Table 34. Benefits or opportunities that resulted from the increased official controls from the perspective of intermediate support structures. Source: Interviews conducted by the authors.

To what extent do you see any benefits or opportunities that resulted from the increased official controls?	
Quality and food safety improvements (*n*=1)	Support structure A, a governmental body, emphasized that the increased official controls led to investments in improving the quality of dragon fruit, as well as overall quality and food safety improvements.
Market share expansion (*n*=2)	Exporter B noted that growers who were already performing well were able to secure a larger market share as a result of the increased official controls. Exporter C pointed out that this position is beneficial, as the EU market offers stability in both demand and prices, which allows for better financial outcomes and the ability to pay farmers more.
Improved testing and pesticide screening (*n*=1)	Structure B, the laboratory, highlighted the benefits of enhanced testing facilities, such as improved pesticide screening (e.g., ethylene oxide). This laboratory even stated that they now produce comparable results to EU labs. This enables better management of quality issues.

4.3 Constructive analysis

The constructive analysis discusses the possible steps that could have been taken to exploit the benefits or mitigate the risks associated with the increased official controls, as well as types of assistance or support that could help businesses navigate the changes due to this Regulation effectively.

Mr. Dang Phuc Nguyen, General Secretary of the Vietnam Fruit and Vegetable Association, has emphasized the importance of proactive quality control across all stages of production, storage, and export to address the challenges posed by EU inspection requirements (Thang, 2022). He advocates for the standardization of practices, such as achieving GLOBALG.A.P. certification, to ensure that exporters meet stringent EU standards. According to Mr. Nguyen, collaboration throughout the value chain is crucial. This includes regular inspections during the growing season, and the implementation of stricter commercial contracts with farmers to ensure compliance. He highlights the necessity for businesses to prioritize sourcing from reliable suppliers and to conduct thorough pre-export testing to minimize the risk of non-compliance with EU regulations (Thang, 2022). Mr. Nguyen also points out that, despite the tariff exemptions provided under the EVFTA, the increased costs and heightened inspection frequency have significantly reduced the competitiveness of Vietnamese dragon fruit in the EU market. He stresses that improving compliance and maintaining market access are essential steps to prevent the waste of valuable exports of dragon fruit. To achieve these goals, Mr Nguyen calls for greater investment in capacity-building initiatives for farmers and cooperatives, enabling them to meet EU standards. He urges the Government to enhance support for pre-export testing and certification processes to ensure compliance. Additionally, he underscores the need to invest in logistics and cold chain infrastructure to mitigate transportation delays and preserve product quality. According to Mr. Nguyen, these measures

are critical to maintaining Vietnam's reputation and competitiveness in the global market, particularly in demanding regions such as the EU (Thang, 2022).

4.3.1 Steps that could have been taken

Table 35 demonstrates exporters' and intermediate support structures' feedback on measures that could have enhanced their response to the listing in Annex II, highlighting key areas for improvement. Support structure A called for stricter controls by authorities, while exporter B stressed clear communication and guidance from national authorities rather than relying on the EU. Structure B highlighted challenges with fragmented and unclear information dissemination, also suggesting earlier assignment of official laboratories to issue health certificates. Structure B also shared a need for proactive engagement through associations or boards to facilitate better information flow and coordinated responses.

Table 35. Steps that could have been taken to improve the response to listing on Annex II of Regulation 2019/1793. Source: Interviews conducted by the authors.

Looking back at the situation, what steps within the value chain or the country could have been taken to improve your response to the listing in Annex II?	
Enhanced training and guidance (*n*=2)	Intermediate support structure A, the governmental body, emphasized the need for comprehensive training programmes for farmers and other stakeholders to improve their understanding of the requirements. Proper training of competent authorities and laboratories was also highlighted by exporter B, ensuring they are adequately prepared and guided locally, rather than relying solely on information from the EU clients.
Improved communication and information dissemination (*n*=2)	Exporter B and structure B, the laboratory, noted the importance of clear and timely communication of regulations. Currently, information dissemination is fragmented, with some relying on industry sources or Government websites that are challenging to navigate. Structure B suggested proactive involvement of stakeholders in drafting documents to ensure clarity before dissemination.
Strengthened coordination and control (*n*=2)	Structure A called for stricter controls by competent authorities, particularly around testing processes. Assigning and empowering laboratories early to issue the health certificates and the correct testing and sampling was suggested by structure B to prevent delays and ensure consistent standards.
Proactive stakeholder involvement (*n*=1)	The absence of a dedicated association for the dragon fruit sector was highlighted as a gap by structure B. Encouraging proactive engagement through associations or boards could facilitate better information flow and coordinated responses.
Leveraging existing knowledge and expertise (*n*=1)	Structure C pointed out that exporters already familiar with the EU market relied on individual knowledge and entrepreneurship, showing the importance of leveraging existing expertise within the value chain.

4.3.2 Types of assistance or support

Table 36 analyses feedback on types of assistance or support that could help businesses navigate the changes due to this Regulation effectively. Stakeholders emphasized the need for capacity building and technical assistance. Intermediate support structure A highlighted the importance of training for competent authorities and laboratories, farmer cooperatives, and funded projects to support the dragon fruit value chain. Exporter B stressed the need for

joint seminars and workshops organized by the government with EU support to improve information dissemination and targeted training. Exporter A called for a re-evaluation of MRLs to provide farmers with more flexibility in crop protection, while exporter C emphasized the need for cost-effective sampling, improved cool storage facilities, and lower testing costs. Intermediate support structure B advocated for early producer involvement in regulatory processes.

Table 36. Types of assistance or support that could help businesses in navigating listing in Annex II of Regulation 2019/1793 effectively. Source: Interviews conducted by the authors.

Can you think of types of assistance or support that could help businesses in navigating the changes of this regulation effectively?	
Capacity building and technical assistance (*n*=2)	Intermediate support structure A, the governmental body, emphasized the need for capacity building for competent authorities and laboratories, as well as technical assistance to support farm production and explore alternative substances for farming. They highlighted the role of farmer cooperatives and guiding companies, as well as funded projects aimed at strengthening the dragon fruit value chain. This would ensure "very good quality produce", benefiting consumers' health. Exporter B called for targeted training programmes for exporters/farmers who are currently failing to meet compliance with EU MRL requirements.
Measure segmentation (*n*=2)	Exporter B: "Split the growers that can do the job properly and those that won't adapt." Exporter C: "We do not have any problems for many years, already since 2017, and we are still affected too." Even though they did not have any interceptions at the EU border related to MRL exceedances, they are still affected by the increased official control.
Enhanced information dissemination (*n*=1)	Exporter B suggested that the EU should push Vietnam to organize joint seminars and workshops, ensuring effective dissemination of regulatory information to all provinces.
Proactive regulation assessment (*n*=1)	Structure B, the laboratory, advocated for involving farmers early in the regulatory process to allow quick adjustments to production standards.
Evaluation of MRLs (*n*=1)	Exporter A called for a re-evaluation of MRLs to ensure they are both realistic and necessary, providing farmers with more options for crop protection substances.
Harmonizing food safety standards (*n*=1)	Exporter A stressed that global food safety standards should be harmonized, reducing political influence.
Cost-effective sampling (*n*=1)	Exporter C identified high sampling costs as a significant challenge, advocating for more reasonable pricing for importers and exporters. They suggested the EU could negotiate lower laboratory testing costs in Vietnam.
Cold chain infrastructure improvement (*n*=1)	Exporter C highlighted the lack of cool storage facilities in Vietnam, which are essential for extending product shelf-life. They suggested support mechanisms to improve the cold chain infrastructure.

4.3.3 Summary – constructive analysis

To effectively navigate the changes under Regulation 2019/1793, stakeholders emphasized the need for better communication, capacity building, and strategic support. Key recommendations included offering technical assistance, such as farm production guidance and introducing alternative substances, as well as strengthening farmer cooperatives and empowering companies to lead farmers. One exporter suggested that the EU secretariat should encourage the Vietnamese Government to organize joint seminars and workshops to ensure provincial dissemination of information. Additionally, stakeholders advocated for evaluating and standardizing procedures to support quicker adaptation and providing training for competent authorities and laboratories to enhance compliance. Support for dragon fruit value chain projects, and affordable resources such as sampling prices and storage facilities, were also highlighted. Two of the three exporters interviewed proposed segmenting growers into those who can meet requirements and those who are less adaptable, since some exporters did not have any MRL exceedances but were still impacted by increased official controls.

5. Conclusion and recommendations

This study, commissioned by COLEAD under the EU-funded AGRINFO programme, examines the implications of increased official controls under Regulation 2019/1793 on Kenyan beans and Vietnamese dragon fruit exports. The findings highlight the challenges faced by both countries, the strategies they have adopted to mitigate the impacts of the Regulation, and the contextual differences in their export dynamics that shape the outcomes of these controls.

The EU is Kenya's primary market for beans, significantly contributing to the country's horticultural export revenue. However, stringent EU regulations have placed substantial pressure on Kenya's bean value chain, resulting in higher costs, reduced export volumes and quality, and a growing dependence on larger outgrowers, which has partially excluded smallholder farmers. To address these challenges, mitigation measures have been implemented, including enhanced testing protocols, training programmes, capacity building, and hiring additional technical staff. Existing public–private partnerships, such as the National Horticulture Taskforce, familiarity with a risk-based assessment approach, and adherence to standards such as KS 1758 and GLOBALG.A.P. have strengthened the sector's ability to meet regulatory demands. Nonetheless, Kenya's heavy reliance on the EU market means that any compliance disruption carries significant economic consequences.

In Vietnam, export dynamics differ, with China dominating the dragon fruit market while the EU accounts for only a small share. This contrast influences how the sector navigates and responds to EU regulations. Leading exporters with established compliance systems and certifications have successfully met EU requirements. In contrast, the broader value chain, characterized by fragmentation and spot transactions, faces significant challenges. Limited access to compliance resources, high logistical costs, and poor coordination within the value chain have hindered adaptation. The perishability of dragon fruit exacerbates these difficulties, leading many smaller exporters and farmers to exit the EU market due to the high costs and complexities of compliance.

The impacts of increased regulatory controls differ significantly between Kenya and Vietnam, driven by variations in market orientation and value chain structure. Kenya's strong dependence on the EU as its primary export market requires comprehensive, sector-wide strategies to ensure compliance and sustain its horticultural economy. In contrast, Vietnam, where most dragon fruit exports are directed to China, can adopt a dual approach: supporting larger exporters capable of meeting EU requirements, while helping smaller players strengthen their position in alternative markets. Vietnam's fragmented value chain poses additional challenges, as the lack of long-term relationships and reliance on spot transactions hinder efforts to ensure quality consistency and compliance. Developing more organized and coordinated value chains, including fostering long-term partnerships, will be crucial for improving traceability and meeting regulatory standards.

To support low- and middle-income countries in navigating these regulatory requirements, the following actions are recommended for the EU.

- Simplify complex regulations into user-friendly formats such as infographics, fact sheets, and videos tailored to the needs of different stakeholders. This approach can help exporters, smallholders, and regulatory bodies understand the implications of being listed under the Regulation, and the steps necessary for compliance.
- Develop mechanisms for disseminating regulatory updates and facilitating timely adaptation across value chains. For example, a dedicated helpdesk could serve as a centralized resource, offering clear guidance, answering queries, and assisting exporting countries.
- Employ diverse communication channels – including workshops, online platforms, and partnerships with local organizations – to ensure broad outreach and understanding.

- Provide sufficient advance notice of regulatory changes to allow adequate time for preparation and adjustment.
- Facilitate dialogue between EU authorities, exporters, and governments to align regulatory expectations and refine implementation strategies. Clearly communicate the rationale behind listing decisions, including the evidence base and risk assessment methodology, to increase understanding and trust.
- Adopt a flexible and context-specific approach to consider the specific challenges faced by low- and middle-income countries, such as resource limitations and capacity constraints.

The following strategies can help horticulture value chains in low- and middle-income countries to avoid being listed, or to deal effectively and efficiently with the consequences of listing.

- Strengthen cold chain logistics and traceability systems to reduce compliance risks and enhance food safety standards.
- Invest in national food systems, including robust monitoring and control systems, accredited laboratories, qualified personnel, and effective enforcement mechanisms.
- Prioritize training programmes focused on food safety, traceability, IPM, and responsible pesticide use, particularly for smallholder farmers who face the greatest challenges in meeting compliance requirements.
- Strengthen cooperatives and encourage contractual arrangements to build a more organized and resilient value chain. This will help improve quality consistency, traceability, and compliance, especially in contexts such as Vietnam, where the value chain is fragmented and heavily reliant on spot transactions.
- Establish early warning systems monitoring EU regulations, MRL notifications, and potential risks, allowing for timely adjustments and preventive actions.
- Diversify: exploring alternative markets can help to reduce reliance on the EU market, mitigating potential risks associated with increased controls.

To conclude, tailored strategies aligned with each country's unique circumstances are critical to achieving effective and sustainable regulatory compliance. By providing accessible information, strengthening communication systems, fostering stakeholder collaboration, and investing in infrastructure, low- and middle-income countries can better navigate the challenges posed by Regulation 2019/1793. These measures will not only enhance compliance capacity, but also support more resilient and inclusive value chains for horticultural exports.

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7 Appendix

I. Interview guide Kenya – intermediate support structures

Topic 1. Introduction

1.1 Thank you for your time

1.2 Recording allowed?

- Mention confidentiality

1.3 Short introduction interviewees

1.4 Short introduction interviewers

1.5 Short introduction Q-Point

1.6 Introduction COLEAD project

- Impact study on the temporary increases of official controls (Regulation (EU) 2019/1793) on low- and middle-income countries with a specific focus on the bean value chain in Kenya

1.7 Purpose of study

- Document the experiences to identify strategies adopted to continue access to the EU market
- Feedback on how the Regulation (EU) 2019/1793 can be implemented in a way that supports exporting country efforts to meet these requirements.
- Learn from it and guide other countries or value chains when they are faced with a temporary increase in official controls due to the regulation

1.8 Selection of value chain

- The bean value chain is chosen since beans exported from Kenya are placed on Annex I of the regulation, meaning they temporarily require increased control at the EU border (physical and identity checks). These controls started in 2013, after which the beans were delisted in 2015 and faced increased controls again in 2019, with an increase to 10% in 2020.

1.9 Scope of interview

- Preferably answers specifically about the bean value chain, but in case that is not possible, answers on the impact of the regulation more in general or concerning another value chain are also helpful.

1.10 The interview will take about an hour

1.11 Any questions before we start?

Topic 2. General

2.1 Do you have any remarks or additions on the following general description of the bean value chain in Kenya?

- **Brief description of the value chain of beans in Kenya**

Topic 3. Listing of products in Annex I

3.1 To what extent were you aware of the potential of beans being listed before the product was actually listed?

- *Pre-warning, signs indicating the listing*

3.2 By whom were you first informed about the addition of beans from Kenya on Annex I of Regulation (EU) 2019/1793?

- According to you, to what extent was this the most efficient way?
- Was it following the communication flow that you are used to?

3.3 Through what communication means did you learn about this listing?

- *Newsletter, through your network, e-mail, phone, meeting*

3.4 How long before or after the listing were you informed?

- *Right before/after publishment, a few weeks before/after, a few months before/after*
- A general estimation is ok in case not specifically known

3.5 Do you have any feedback on being informed about the listing concerning the organization/person who informed you, communication means, or timing?

3.6 Which stakeholder was taking the lead in terms of sharing information on the implications of the regulation?

- What activities did this stakeholder undertake?
- *Information sessions, awareness sessions, policy briefs, implication brief*
- According to you, to what extent was this the most efficient way?

Topic 4. Adaptations after listing

4.1 If you go back to the moment of the listing, can you describe any consequences of the listing of the product in Annex I on your organization? (micro level, organization).

- *Costs, testing, increased waiting time, trade disruption, day-to-day operations, procedures within your organization, monitoring programme, human capacity, infrastructure, certification, access to information and knowledge*
- Collaboration, projects, who steered initiative?
- Particular obstacles or hindrances in a given situation?
- Positive or negative forces at play?

4.2 If you go back to the moment, can you describe any consequences of the listing of the product in Annex I within the broader context of the bean supply chain? (macro level, value chain or sector).

- *Costs, testing, increased waiting time, trade disruption, day-to-day operations, procedures within your organization, monitoring programme, human capacity, infrastructure, certification, access to information and knowledge, continuation export to the EU*
- Collaboration, projects, who steered initiative?
- Particular obstacles or hindrances in a given situation?

- Positive or negative forces at play?

4.3 To what extent could the value chain anticipate any needed changes and did the value chain have the time to make such changes if needed?

4.4 How was knowledge shared, if any, on how to anticipate possible needed changes?

- Was there any cross-sectional learning?

4.5 *Only in case changes were made:* What time did the value chain need to put in place these changes?

- *Days, weeks, months, still working on it*
- On what factors did this depend?
- *Collaboration/initiative, access to information/knowledge, size of value chain*

4.6 What were the challenges, if any, the value chain faced due to the temporary increases in official controls under Regulation (EU) 2019/1793?

- *Costs, prices, communication, cooperation, information, skills, resources available, trade disruption*
- To what extent are these challenges currently solved?

4.7 Looking back at the situation, what steps within the value chain or the country could have been taken to improve your response to the listing on Annex I?

- *Resources, skills, information, knowledge, communication, public sector, private sector, monitoring program, costs (division), timing, collaboration, initiative, training on safe use*

4.8 Could you give an estimation of the extra costs, if any, that are charged throughout the value chain because of these regulations?

- *Lower prices for suppliers, transportation, increased waiting time, extra testing, shorter shelf-life at customer*
- How are these costs distributed in the value chain?

4.9 To what extent do you feel like there was anything already in place in Kenya or the value chain that helped you adapt to the regulation?

- If any advantages, what were they?
- *Value chain, actors, collaboration, EU relations, government, skills, knowledge*

4.10 To what extent do you see any benefits or opportunities that resulted from the increased official controls?

- If any benefits or opportunities, what are they?
- *Systemic changes, spillover effect for the rest of the food system, monitoring programme, certification, training, policy, regulations, costs, prices, communication, cooperation, information, skills, and resources available*

4.11 Can you think of types of assistance or support that could help businesses in navigating the changes of this regulation effectively?

- *In terms of communication, costs, information, resources, information, skills, knowledge*

Topic 5. Closing

5.1 Is there any additional insight you would like to share regarding the impact of Regulation (EU) 2019/1793 on the value chain?

5.2 Thank you for your time and valuable contributions to this study

5.3 Recap of confidentiality and use of the information gathered

5.4 Confirmation of any follow-up actions or contact information for further queries

- Inform participant of the possibility of receiving information on the study results
- Direct the participant to the COLEAD AGRINFO platform: *https://agrinfo.eu/*

II. Interview guide Kenya – private sector operators

Topic 1. Introduction

1.1 Thank you for your time

1.2 Recording allowed?

- Mention confidentiality

1.3 Short introduction interviewees

1.4 Short introduction interviewers

1.5 Short introduction Q-Point

1.6 Introduction COLEAD project

- Impact study on the temporary increases of official controls (Regulation (EU) 2019/1793) on low- and middle-income countries with a specific focus on the bean value chain in Kenya

1.7 Purpose of study

- Document the experiences to identify strategies adopted to continue access to the EU market
- Feedback on how the Regulation (EU) 2019/1793 can be implemented in a way that supports exporting country efforts to meet these requirements.
- Learn from it and guide other countries or value chains when they are faced with a temporary increase in official controls due to the regulation

1.8 Selection of value chain

- The bean value chain is chosen since beans exported from Kenya are placed on Annex I of the regulation, meaning they temporarily require increased control at the EU border (physical and identity checks). These controls started in 2013, after which the beans were delisted in 2015 and faced increased controls again in 2019, with an increase to 10% in 2020.

1.9 Scope of interview

- Preferably answers specifically about the bean value chain, but in case that is not possible, answers on the impact of the regulation more in general or concerning another value chain are also helpful.

1.10 The interview will take about an hour

1.11 Any questions before we start?

Topic 2. General

2.1 Do you have any remarks or additions on the following general description of the bean value chain in Kenya?

- **Brief description of the value chain of beans in Kenya**

Topic 3. Listing of products in Annex I

3.1 To what extent were you aware of the potential of beans being listed before the product was actually listed?

- *Pre-warning, signs indicating the listing*

3.2 By whom were you first informed about the addition of beans from Kenya on Annex I of Regulation (EU) 2019/1793?

- According to you, to what extent was this the most efficient way?
- Was it following the communication flow that you are used to?

3.3 Through what communication means did you learn about this listing?

- *Newsletter, through your network, e-mail, phone, meeting, BMO*

3.4 How long before or after the listing were you informed?

- *Right before/after publishment, a few weeks before/after, a few months before/after*
- A general estimation is ok in case not specifically known

3.5 Do you have any feedback on being informed about the listing concerning the organization/person who informed you, communication means, or timing?

3.6 Which stakeholder was taking the lead in terms of sharing information on the implications of the regulation?

- What activities did this stakeholder undertake?
- *Information sessions, awareness sessions, policy briefs, implication brief*
- According to you, to what extent was this the most efficient way?

Topic 4. Adaptations after listing

4.1 If you go back to the moment of the listing, can you describe any consequences of the listing of the product in Annex I on your organization? (micro level, organization).

- *Costs, testing, increased waiting time, trade disruption, day-to-day operations, procedures within your organization, monitoring programme, human capacity, infrastructure, certification, access to information and knowledge*
- Collaboration, projects, who steered initiative?
- Particular obstacles or hindrances in a given situation?
- Positive or negative forces at play?

4.2 If you go back to the moment, can you describe any consequences of the listing of the product in Annex I within the broader context of the bean supply chain? (macro level, value chain or sector).

- *Costs, testing, increased waiting time, trade disruption, day-to-day operations, procedures within your organization, monitoring programme, human capacity, infrastructure, certification, access to information and knowledge, continuation export to the EU*
- Collaboration, projects, who steered initiative?
- Particular obstacles or hindrances in a given situation?
- Positive or negative forces at play?

4.3 To what extent could your organization anticipate any needed changes and did you have the time to make such changes if needed?

4.4 How did you learn or receive information on how to anticipate possible needed changes?

- Was there any cross-sectional learning?
- Where did you get that information from?

4.5 *Only in case changes were made:* How much time did your organization need to put in place these changes?

- *Days, weeks, months, still working on it*
- On what factors did this depend?
- *Collaboration/initiative, access to information/knowledge, size of organization*

4.6 What were the challenges, if any, the value chain faced due to the temporary increases in official controls under Regulation (EU) 2019/1793?

- *Costs, prices, communication, cooperation, information, skills, resources available, trade disruption*
- To what extent are these challenges currently solved?

4.7 Looking back at the situation, what steps within your organization or the country could have been taken to improve your response to the listing on Annex I?

- *Resources, skills, information, knowledge, communication, public sector, private sector, monitoring program, costs (division), timing, collaboration, initiative, training on safe use*

4.8 Could you give an estimation of the extra costs, if any, that are charged to you because of these regulations?

- *Pay lower prices to suppliers, transportation, increased waiting time*
- How are these costs distributed in the value chain?
- What are the costs that you charge others to mitigate some of the costs?
- *Costs for testing, lower prices, shorter shelf-life at customer*

4.9 To what extent do you feel like there was anything already in place in Kenya or the value chain that helped you adapt to the regulation?

- If any advantages, what were they?
- *Value chain, actors, collaboration, EU relations, government, skills, knowledge*

4.10 To what extent do you see any benefits or opportunities that resulted from the increased official controls?

- If any benefits or opportunities, what are they?
- *Systemic changes, spillover effect for the rest of the food system, monitoring programme, certification, training, policy, regulations, costs, prices, communication, cooperation, information, skills, and resources available*

4.11 Can you think of types of assistance or support that could help businesses in navigating the changes of this regulation effectively?

- *In terms of communication, costs, information, resources, information, skills, knowledge*

Topic 5. Closing

5.1 Is there any additional insight you would like to share regarding the impact of Regulation (EU) 2019/1793 on the value chain?

5.2 Thank you for your time and valuable contributions to this study

5.3 Recap of confidentiality and use of the information gathered

5.4 Confirmation of any follow-up actions or contact information for further queries

- Inform participant of the possibility of receiving information on the study results
- Direct the participant to the COLEAD AGRINFO platform: *https://agrinfo.eu/*

III. Interview guide Vietnam – intermediate support structures

Topic 1. Introduction

1.1 Thank you for your time

1.2 Recording allowed?

- Mention confidentiality

1.3 Short introduction interviewees

1.4 Short introduction interviewers

1.5 Short introduction Q-Point

1.6 Introduction COLEAD project

- Impact study on the temporary increases of official controls (Regulation (EU) 2019/1793) on low- and middle-income countries with a specific focus on the dragon fruit value chain in Vietnam

1.7 Purpose of study

- Document the experiences to identify strategies adopted to continue access to the EU market
- Feedback on how the Regulation (EU) 2019/1793 can be implemented in a way that supports exporting country efforts to meet these requirements.
- Learn from it and guide other countries or value chains when they are faced with a temporary increase in official controls due to the regulation

1.8 Selection of value chain

- The dragon fruit value chain is chosen since dragon fruit exported from Vietnam are placed on Annex II of the regulation, meaning not only increased border controls but also specific conditions apply for entry into the EU. Competent authorities in Vietnam are expected to carry out identity and physical checks on all export consignments, including sampling and laboratory analyses.
- Increased controls combined with special conditions started in 2018, after which the percentage of increased controls went up to 20% in 2022 and to 30% in 2024.

1.9 Scope of interview

- Preferably answers specifically about the dragon fruit value chain, but in case that is not possible, answers on the impact of the regulation more in general or concerning another value chain are also helpful.

1.10 The interview will take about an hour

1.11 Any questions before we start?

Topic 2. General

2.1 Do you have any remarks or additions on the following general description of the dragon fruit value chain in Vietnam?

- **Brief description of the value chain of dragon fruit in Vietnam**

Topic 3. Listing of products in Annex II

3.1 To what extent were you aware of the potential of dragon fruit being listed before the product was actually listed?

- *Pre-warning, signs indicating the listing*

3.2 By whom were you first informed about the addition of dragon fruit from Vietnam on Annex II of Regulation (EU) 2019/1793?

- According to you, to what extent was this the most efficient way?
- Was it following the communication flow that you are used to?

3.3 Through what communication means did you learn about this listing?

- *Newsletter, through your network, e-mail, phone, meeting*

3.4 How long before or after the listing were you informed?

- *Right before/after publishment, a few weeks before/after, a few months before/after*
- A general estimation is ok in case not specifically known

3.5 Do you have any feedback on being informed about the listing concerning the organization/person who informed you, communication means, or timing?

3.6 Which stakeholder was taking the lead in terms of sharing information on the implications of the regulation?

- What activities did this stakeholder undertake?
- *Information sessions, awareness sessions, policy briefs, implication brief*
- According to you, to what extent was this the most efficient way?

Topic 4. Adaptations after listing

4.1 If you go back to the moment of the listing, can you describe any consequences of the listing of the product in Annex II on your organization? (micro level, organization).

- *Costs, testing, increased waiting time, trade disruption, day-to-day operations, procedures within your organization, monitoring programme, human capacity, infrastructure, lab analysis capacity (17025 Lab accreditation), certification, access to information and knowledge*
- Collaboration, projects, who steered initiative?
- Particular obstacles or hindrances in a given situation?
- Positive or negative forces at play?

4.2 If you go back to the moment, can you describe any consequences of the listing of the product in Annex II within the broader context of the dragon fruit supply chain? (macro level, value chain or sector).

- *Costs, testing, increased waiting time, trade disruption, day-to-day operations, procedures within your organization, monitoring programme, human capacity, infrastructure, lab analysis capacity (17025 Lab accreditation), certification, access to information and knowledge, continuation export to the EU*
- Collaboration, projects, who steered initiative?
- Particular obstacles or hindrances in a given situation?

- Positive or negative forces at play?

4.3 To what extent could the value chain anticipate any needed changes and did the value chain have the time to make such changes if needed?

4.4 How was knowledge shared, if any, on how to anticipate possible needed changes?

- Was there any cross-sectional learning?

4.5 *Only in case changes were made:* What time did the value chain need to put in place these changes?

- *Days, weeks, months, still working on it*
- On what factors did this depend?
- *Lab capacity, collaboration/initiative, access to information/knowledge, size of value chain*

4.6 What were the challenges, if any, the value chain faced due to the temporary increases in official controls under Regulation (EU) 2019/1793?

- *Costs, prices, communication, cooperation, information, skills, resources available, trade disruption*
- To what extent are these challenges currently solved?

4.7 Looking back at the situation, what steps within the value chain or the country could have been taken to improve your response to the listing in Annex II?

- *Resources, skills, information, knowledge, communication, public sector, private sector, lab capacity, monitoring program, costs (division), timing, collaboration, initiative, training on safe use*

4.8 To what extent do you think the competent authorities were prepared and able to offer the identity and physical checks when dragon fruit was listed in Annex II?

- What changes were made to be able to fully provide these services?
- *Certification, costs, ISO, resources, skills, knowledge*

4.9 Could you give an estimation of the extra costs, if any, that are charged throughout the value chain because of these regulations?

- *Lower prices for suppliers, transportation, increased waiting time, extra testing, shorter shelf-life at customer*
- How are these costs distributed in the value chain?

4.10 To what extent do you feel like there was anything already in place in Vietnam or the value chain that helped you adapt to the regulation?

- If any advantages, what were they?
- *Value chain, actors, collaboration, lab capacity, EU relations, government, skills, knowledge*

4.11 To what extent do you see any benefits or opportunities that resulted from the increased official controls?

- If any benefits or opportunities, what are they?
- *Systemic changes, spillover effect for the rest of the food system, monitoring programme, lab capacity, certification, training, policy, regulations, costs,*

prices, communication, cooperation, information, skills, and resources available

4.12 Can you think of types of assistance or support that could help businesses in navigating the changes of this regulation effectively?

- *In terms of communication, costs, information, resources, information, skills, knowledge*

Topic 5. Closing

5.1 Is there any additional insight you would like to share regarding the impact of Regulation (EU) 2019/1793 on the value chain?

5.2 Do you have any contact in the dragon fruit supply chain in Vietnam that we could request to be interviewed too?

5.3 Thank you for your time and valuable contributions to this study

5.4 Recap of confidentiality and use of the information gathered

5.5 Confirmation of any follow-up actions or contact information for further queries

- Inform participant of the possibility of receiving information on the study results
- Direct the participant to the COLEAD AGRINFO platform: *https://agrinfo.eu/*

IV. Interview guide Vietnam – private sector operators

Topic 1. Introduction

1.1 Thank you for your time

1.2 Recording allowed?

- Mention confidentiality

1.3 Short introduction interviewees

1.4 Short introduction interviewers

1.5 Short introduction Q-Point

1.6 Introduction COLEAD project

- Impact study on the temporary increases of official controls (Regulation (EU) 2019/1793) on low- and middle-income countries with a specific focus on the dragon fruit value chain in Vietnam

1.7 Purpose of study

- Document the experiences to identify strategies adopted to continue access to the EU market
- Feedback on how the Regulation (EU) 2019/1793 can be implemented in a way that supports exporting country efforts to meet these requirements.
- Learn from it and guide other countries or value chains when they are faced with a temporary increase in official controls due to the regulation

1.8 Selection of value chain

- The dragon fruit value chain is chosen since dragon fruit exported from Vietnam are placed on Annex II of the regulation, meaning not only increased border controls but also specific conditions apply for entry into the EU. Competent authorities in Vietnam are expected to carry out identity and physical checks on all export consignments, including sampling and laboratory analyses. This has been the case since October 2019.
- Increased controls combined with special conditions started in 2018, after which the percentage of increased controls went up to 20% in 2022 and to 30% in 2024.

1.9 Scope of interview

- Preferably answers specifically about the dragon fruit value chain, but in case that is not possible, answers on the impact of the regulation more in general or concerning another value chain are also helpful.

1.10 The interview will take about an hour

1.11 Any questions before we start?

Topic 2. General

2.1 Do you have any remarks or additions on the following general description of the dragon fruit value chain in Vietnam?

- **Brief description of the value chain of dragon fruit in Vietnam**

Topic 3. Listing of products in Annex II

3.1 To what extent were you aware of the potential of dragon fruit being listed before the product was actually listed?

- *Pre-warning, signs indicating the listing*

3.2 By whom were you first informed about the addition of dragon fruit from Vietnam on Annex II of Regulation (EU) 2019/1793?

- According to you, to what extent was this the most efficient way?
- Was it following the communication flow that you are used to?

3.3 Through what communication means did you learn about this listing?

- *Newsletter, through your network, e-mail, phone, meeting, BMO*

3.4 How long before or after the listing were you informed?

- *Right before/after publishment, a few weeks before/after, a few months before/after*
- A general estimation is ok in case not specifically known

3.5 Do you have any feedback on being informed about the listing concerning the organization/person who informed you, communication means, or timing?

3.6 Which stakeholder was taking the lead in terms of sharing information on the implications of the regulation?

- What activities did this stakeholder undertake?
- *Information sessions, awareness sessions, policy briefs, implication brief*
- According to you, to what extent was this the most efficient way?

Topic 4. Adaptations after listing

4.1 If you go back to the moment of the listing, can you describe any consequences of the listing of the product in Annex II on your organization? (micro level, organization).

- *Costs, testing, increased waiting time, trade disruption, day-to-day operations, procedures within your organization, monitoring programme, human capacity, infrastructure, lab analysis capacity (17025 Lab accreditation), certification, access to information and knowledge*
- Collaboration, projects, who steered initiative?
- Particular obstacles or hindrances in a given situation?
- Positive or negative forces at play?

4.2 If you go back to the moment, can you describe any consequences of the listing of the product in Annex II within the broader context of the dragon fruit supply chain? (macro level, value chain or sector).

- *Costs, testing, increased waiting time, trade disruption, day-to-day operations, procedures within your organization, monitoring programme, human capacity, infrastructure, lab analysis capacity (17025 Lab accreditation), certification, access to information and knowledge, continuation export to the EU*
- Collaboration, projects, who steered initiative?
- Particular obstacles or hindrances in a given situation?
- Positive or negative forces at play?

4.3 To what extent could your organization anticipate any needed changes and did you have the time to make such changes if needed?

4.4 How did you learn or receive information on how to anticipate possible needed changes?

- Was there any cross-sectional learning?
- Where did you get that information from?

4.5 *Only in case changes were made:* How much time did your organization need to put in place these changes?

- *Days, weeks, months, still working on it*
- On what factors did this depend?
- *Lab capacity, collaboration/initiative, access to information/knowledge, size of organization*

4.6 What were the challenges, if any, the value chain faced due to the temporary increases in official controls under Regulation (EU) 2019/1793?

- *Costs, prices, communication, cooperation, information, skills, resources available, trade disruption*
- To what extent are these challenges currently solved?

4.7 Looking back at the situation, what steps within your organization or the country could have been taken to improve your response to the listing on Annex II?

- *Resources, skills, information, knowledge, communication, public sector, private sector, lab capacity, monitoring program, costs (division), timing, collaboration, initiative, training on safe use*

4.8 To what extent do you think the competent authorities were prepared and able to offer the identity and physical checks when dragon fruit was listed in Annex II?

- What changes were made to be able to fully provide these services?
- *Certification, costs, ISO, resources, skills, knowledge*

4.9 Could you give an estimation of the extra costs, if any, that are charged to you because of these regulations?

- *Pay lower prices to suppliers, transportation, increased waiting time, extra testing, shorter shelf-life at customer*
- How are these costs distributed in the value chain?
- What are the costs that you charge others to mitigate some of the costs?
- *Costs for testing, lower prices, shorter shelf-life at customer*

4.10 To what extent do you feel like there was anything already in place in Vietnam or the value chain that helped you adapt to the regulation?

- If any advantages, what were they?
- *Value chain, actors, collaboration, lab capacity, EU relations, government, skills, knowledge*

4.11 To what extent do you see any benefits or opportunities that resulted from the increased official controls?

- If any benefits or opportunities, what are they?
- *Systemic changes, spillover effect for the rest of the food system, monitoring programme, lab capacity, certification, training, policy, regulations, costs, prices, communication, cooperation, information, skills, and resources available*

4.12 Can you think of types of assistance or support that could help businesses in navigating the changes of this regulation effectively?

- *In terms of communication, costs, information, resources, information, skills, knowledge*

Topic 5. Closing

5.1 Is there any additional insight you would like to share regarding the impact of Regulation (EU) 2019/1793 on the value chain?

5.2 Do you have any contact in the dragon fruit supply chain in Vietnam that we could request to be interviewed too?

5.3 Thank you for your time and valuable contributions to this study

5.4 Recap of confidentiality and use of the information gathered

5.5 Confirmation of any follow-up actions or contact information for further queries

- Inform participant of the possibility of receiving information on the study results
- Direct the participant to the COLEAD AGRINFO platform: *https://agrinfo.eu/*