FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

GHANA TRADE AND INVESTMENT ACTIVITY

ASSESSMENT OF LOSSES AND CAUSES OF BORDER REJECTIONS OF HIGH-VALUE EXPORTS FROM GHANA

SEPTEMBER 2022

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Author: Dode Seidu

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ACRONYMS

ACP	African Caribbean Pacific
EPPO	European and Mediterranean Plant Protection Organization
EPA	Environmental Protection Agency
EU	European Union
FVO	Food and Veterinary Office
G.A.P.	Good Agronomic Practices
GH-TRACE	PPRSD e-traceability system
ICM	Integrated Crop Management
GTI	Feed the Future Ghana Trade and Investment Activity
IPM	Integrated Pest Management
ISPMs	International Standards for Phytosanitary Measures
KG	Kilograms
KIA	Kotoka International Airport
MOFA	Ministry of Food and Agriculture
MRL	Maximum Residue Limits
NPPO	National Plant Protection Organization
PPRSD	Plant Protection and Regulatory Services Directorate
QR	Quick response
UK	United Kingdom
U.S.	United States
UNECE	United Nations Economic Commission for Europe
USD	United States Dollar
USFDA	U.S. Food and Drug Administration
WACOMP	West Africa Competitiveness Programme

EXECUTIVE SUMMARY

The Feed the Future Ghana Trade and Investment Activity (GTI) initiated this assessment to better understand the quantity, nature, and factors contributing to border rejections and interceptions and to provide recommendations to local public and private sector stakeholders to improve the overall market access for high-value exports from Ghana. This assessment is aimed at quantifying border rejections and identifying points of infraction along target value chains from Ghana to export destinations, with a particular focus on EU, United Kingdom, and United States market destinations.

The data for this assignment was collected through an extensive review of available literature and a comprehensive analysis of existing data on fruit and vegetable exports and data on local and international border rejections. In addition, field interviews were conducted with Plant Protection and Regulatory Services Directorate (PPRSD) staff and independent exporters who have experienced rejections.

Between 2012 and 2015, the EU intercepted 735 consignments of fruits and vegetables from Ghana on account of harmful organisms such as fruit flies, thrips, whiteflies, moths, and a host of other organisms.[1] The EU instituted a ban on vegetable exports from Ghana from 2015 to 2018. The ban, however, affected Ghanaian exporters significantly, with about $30 million lost by exporters during that time.[2]

Before the EU ban in 2015, about 90 percent of interceptions of Ghanaian fruit and vegetable consignments on the international market were due to the presence of harmful organisms, but after the ban, most interceptions have been due to other non-conformities. The majority of local interceptions are due to the presence of harmful organisms, particularly thrips, fruit flies, false codling moths, and stone weevils. The main commodities that accounted for the majority (99 percent) of local interceptions and rejections from 2018 to 2022 are turia, mango, and chili. Local interceptions and rejections have been persistent because of the general lack of knowledge of export processes by new exporters, non-adherence to good agronomic practices (G.A.P.) by producers, which, in part, was caused by PPRSD's inability to undertake rigorous field inspections due to the COVID-19 pandemic and the lax enforcement of punitive measures by PPRSD. In addition, there are still interceptions on the international market, due to the lack of PPRSD staff and inspection measures at the various Ghana Post Offices, where small quantities of fruits and vegetables are exported and where the PPRSD has inadequate staff capacity to conduct regular field inspections at the points of exit.

The key findings of the assessment also show that Ghana continues to struggle with interceptions and rejections on the local and international markets. Since the EU ban was lifted, more than 3.5 million kg of exportable fruits and vegetables have been rejected at the point of exit by Ghana's Plant Quarantine Officials. While international rejections have been declining, local interceptions have been increasing.

To minimize local and international interceptions and rejections, new exporters must be trained on international best practices and market requirements before they start exporting. PPRSD must continuously educate and sensitize producers and exporters on G.A.P., PPRSD export procedures, and international market requirements (e.g., United Nations Economic Commission for Europe [UNECE] standards). PPRSD should also send staff to large and medium scale exporters/packhouses to serve as a first level of screening and inspection before products are taken to the airport.

[1] Final Report of an audit carried out in Ghana from 21 April 2015 to 30 April 2015 in order to evaluate the system of official controls for the export of plants and plant products to the European Union, page 5

[2] Ghana loses over US$30 million to ban on vegetables to EU market, http://www.businessworldGhana.com/Ghana-loses-us30-million-ban-vegetables-eu-market/

1. INTRODUCTION

1.1 Background

Fruits and vegetables are among the top non-traditional agricultural exports from Ghana, generating $119.4 million in revenue in 2021.[3] The EU and the UK are the leading destinations, accounting for more than 80 percent of fruit and vegetable exports from Ghana.[4] The United States market for Ghana's non-traditional exports, estimated to be $5 billion, also presents significant opportunities for the fruit and vegetable sector in Ghana.[5] Although there have been significant and growing international market opportunities for Ghana's fruits and vegetables, value chain actors have failed to meet food safety standards in these markets.

Between 2012 and 2015, the EU intercepted 735 consignments of fruits and vegetables from Ghana on account of harmful organisms such as fruit flies, thrips, whiteflies, moths, and a host of other organisms.[6] This resulted in a ban on five vegetables[7] from Ghana into the EU from October 2015 until January 2018. This ban was lifted after the EU was assured that the Government of Ghana had taken sufficient measures to improve inspections and control systems pre-export.[8] The ban, however, affected Ghanaian exporters significantly, with about $30 million lost by exporters during that time.[9]

The measures the Government of Ghana put in place to lift the ban included the establishment of a Ministerial Taskforce for Export, the development of the roadmap for pest reduction, establishment of a traceability system by the National Plant Protection Organization (NPPO), establishment of inspection facilities at Kotoka International Airport, strict implementation of International Standards for Phytosanitary Measures (ISPMs) and EU Directives, and training of NPPO staff.[10]

Similarly, the U.S. Food and Drug Administration (USFDA) recorded 631 rejections of imports from Ghana between 2014 and April 2022, [11] with 85 percent of these rejections on food items.[12]

The issue of meeting standards in the EU and the United States has major implications on market access for Ghanaian products. Failure to meet these requirements "could undermine longer term opportunities" for Ghana.[13]

In June 2019, Ghana's Plant Protection and Regulatory Services Directorate (PPRSD), of the Ministry of Food and Agriculture (MOFA), issued a ban on all exports of leafy vegetables to the international

[3] Ghana Export Promotion Authority. 2021. Report on Analysis of Non-Traditional 2020 Export Statistics
[4] UN Comtrade
[5] Ghana National AGOA Strategy, 2016, page 1, https://agoa.info/images/documents/15271/ghanaagoastrategy.pdf
[6] Final Report of an audit carried out in Ghana from 21 April 2015 to 30 April 2015 in order to evaluate the system of official controls for the export of plants and plant products to the European Union, page 5
[7] These vegetables are Capsicum (peppers), Lagenaria (gourds), Luffa, Momordica (gourds) and Solanum (mainly eggplant) species
[8] EU removes ban on Ghanaian vegetables, https://www.hortidaily.com/article/6039029/eu-removes-ban-on-Ghanaian-vegetables/
[9] Ghana loses over US$30 million to ban on vegetables to EU market, http://www.businessworldGhana.com/Ghana-loses-us30-million-ban-vegetables-eu-market/
[10] Ghana Veg Sector Report, 2016, Vegetables Business Opportunities in Ghana
[11] Analysis from USFDA Import Refusal Report 2014-April 2022
[12] Ghana National AGOA Strategy, page 28, https://agoa.info/images/documents/15271/Ghanaagoastrategy.pdf
[13] Ghana National AGOA Strategy, 2016, page 3, https://agoa.info/images/documents/15271/Ghanaagoastrategy.pdf

market[14]on account of local rejections at the Kotoka International Airport, due to harmful organisms in[15] exports and notifications from the EU.

Although there have not been bans on mango and pineapple exports from Ghana, the increased prevalence of pests and diseases has affected production yields at the farm level and competitiveness in export markets. The presence of pests such as fruit flies and mealy bugs have been a major source of concern for EU and U.S. market regulators and consumers contributing to mango and pineapple rejections.

The Feed the Future Ghana Trade and Investment Activity (GTI) initiated this assessment to better understand the quantity, nature, and factors contributing to border rejections and interceptions, and provide recommendations to local public and private sector stakeholders to improve the overall market access for high value exports from Ghana.

1.2 Objective of the Assessment

The assessment's overall objective is to quantify border rejections and identify points of infraction along target value chains from Ghana to export destinations, with a particular focus on EU, UK, and U.S. market destinations. The assessment looked at both in-country rejections and interceptions at entry points to destination markets. The specific objectives are:

- To determine the scale and reasons for export border rejections for the selected value chains during the export ban (2014 – 2018), after the ban (Nov. 2018 – 2019) and COVID and post COVID period (2020 – to date);
- To identify critical points along the value chains of the focus crops that lead to infractions and export rejections (taking into consideration on field, post-harvest, transportation and at the point of export);
- To develop summary guidelines for training at the farm level and postharvest level for each of the value chains of the focus crops;
- To develop summary guidelines for quarantine inspectors at the point of export; and,
- To develop summary guidelines for interventions at the packhouse level for each of the value chains.

1.3 Methodology

The overall approach to the assignment will combine the collection of quantitative and qualitative data through literature view and field interviews with key informants, experts, and industry operators.

A comprehensive literature review was undertaken with the objective to identify and synthesize past and current data, research policies, and relevant documentation and interventions by governments, private sector, and donors on compliance, standards, and border rejections. The literature reviewed focused on:

a. Export data of fruits and vegetables from 2014 to 2021 or latest data of EU/U.S./UK interceptions/rejections fruits and vegetables from 2014 to latest data;
b. Data on rejections by border authorities in Ghana (in country rejections);
c. EU/U.S./UK measures on border rejections;

[14] Daily Graphic, Ghana bans all leafy vegetable exports, https://www.graphic.com.gh/news/general-news/Ghana-news-Ghana-bans-all-leafy-veggie-exports.html
[15] The specific vegetables include Capsicum, Solanum, luffa, and all leafy vegetables

d. Analysis of data on categorization of reasons for interceptions; and,
e. Analysis of national responses/measures on border rejections.

Stakeholders were interviewed to obtain first-hand experience and opinions, and to draw lessons learned related to border rejections. An open-ended interview guide was developed (Annex 1) to direct interviews with key informants. First, PPRSD staff at the Head Office, Kotoka International Airport, and Tema Port locations were interviewed to obtain border rejection data and information on PPRSD production and point of exit inspection processes. Exporters who have experienced rejections were identified for further face-to-face interviews to determine the potential causes of rejections at the firm level.

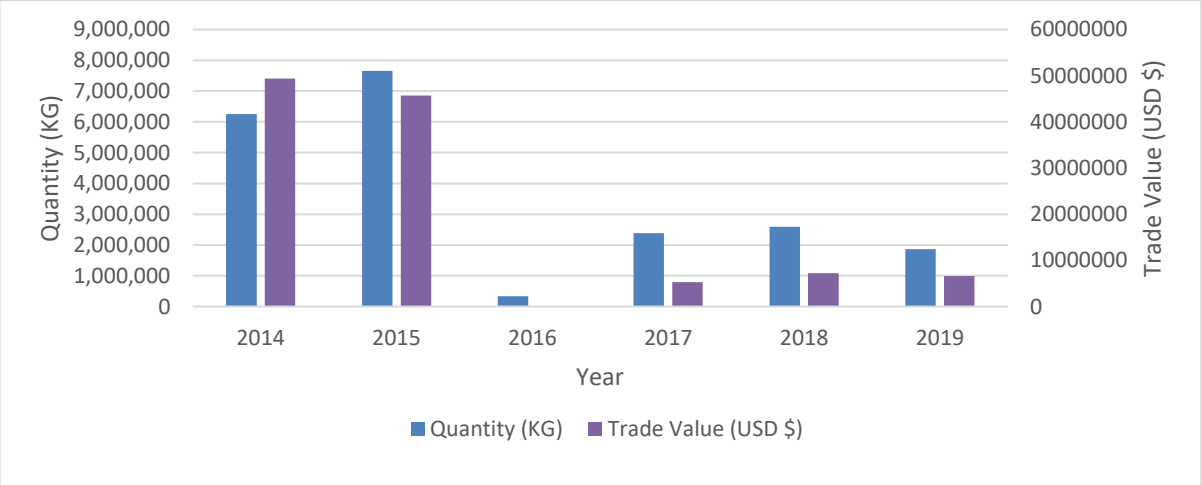
2. GHANA TRADE

2.1 Fruit Export

Ghana's fruit sector contributes significantly to revenue generation through export. The major fruits exported from the country as part of Ghana's non-traditional export commodities include pineapple, mango, banana, citrus, papaya, passion fruit, and coconut. Fruits are often exported in one of these forms: fresh/whole fruit, dried fruits, concentrates, and juice.[16]

As indicated in Figure 1, in 2014 the volume of fruit exported from Ghana stood at 6,248,361 kg ($49,397,029) but plummeted to 329,924 kg ($102,117) in 2016. The reduction in the volume of exported fruits is attributed to strong competition from Latin America, low productivity, production challenges, difficulty of producers and exporters in maintaining international quality standards certification, a shift in market demand for different varieties of major fruits, such as pineapple, and the slow response of Ghanaian exporters to market shifts.[17] The volume of fruit exported from the country rose in the subsequent years reaching 2,590,212 kg in 2018 ($7,220,394), however, in 2019, fruit exported from Ghana decreased again to 1,863,210 kg ($6,588,417).

Figure 1: Volume and Trade Value of Ghana's fruit export from 2014 to 2019

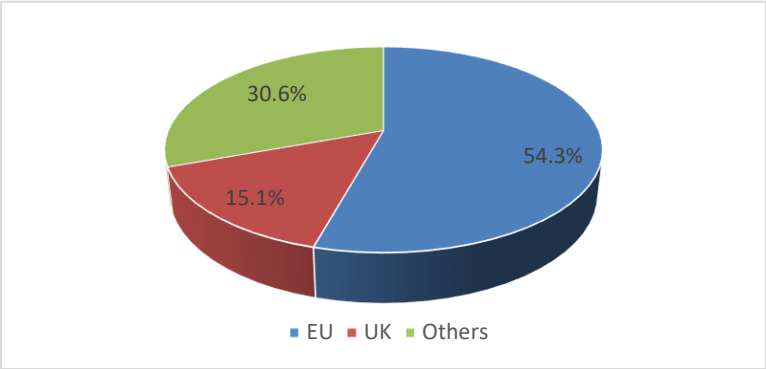


Source: UN Comtrade

[16] https://www.hortifresh.org/wp-content/uploads/FruitProcessingGhana_2021_online.pdf
[17] Hortifresh. 2019. Horticulture Business Opportunities in Ghana. Sector Report 1

The main destinations for fruits exported from Ghana are the EU and the UK. From 2014 to 2019, these two markets accounted for 69.5 percent of all fruits exported from Ghana on average. Approximately 54.3 percent of fruits exported from the country went to the EU (see Figure 2). The UK, accounted for an average of 15 percent of Ghana's total fruit exports. Other markets such as Canada, U.S., Switzerland, Japan, Lebanon, Kenya, Côte d'Ivoire, and Morocco, among others, together accounted for 30.6 percent of Ghana's total fruit exports from 2014 to 2019.

Figure 2: Average market share of Ghana's fruit export from 2014 to 2019

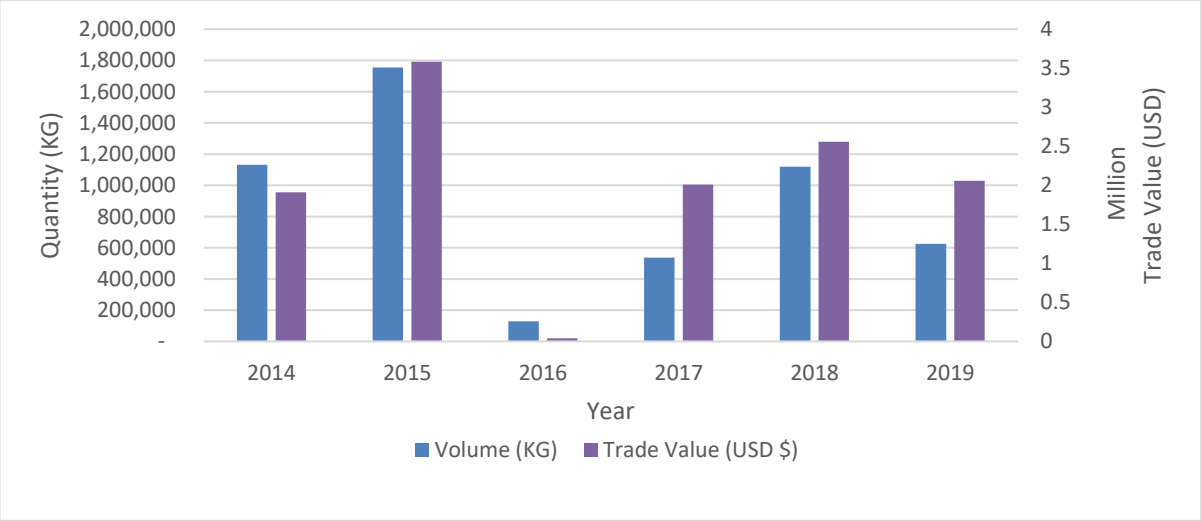


Source: UN Comtrade

2.2 Vegetable Trade

Ghana's vegetable exports increased from 1,132,085 kg ($1,911,312) in 2014 to 1,755,548 kg ($3,584,922) in 2015. As indicated in Figure 3, in 2016 vegetable exports from Ghana declined by more than 90 percent to 128,602 kg ($39,167), and only increased to 535,649 kg in 2017 ($2,008,156). This decline was due to a temporary ban that the EU imposed on Ghanaian vegetable exports in 2016 and 2017. The ban was imposed because of a large number of interceptions due to the presence of harmful organisms in Ghana's vegetable export consignment. Following the lifting of the ban in 2018, Ghana's vegetable export increased to 1,118,431 kg ($2,557,364). However, vegetable exports declined to 624,581 kg ($2,058,339) in 2019. This decline was due an internal ban by the MOFA on the export of some selected vegetables, because of an increase in the number of interceptions by the EU.

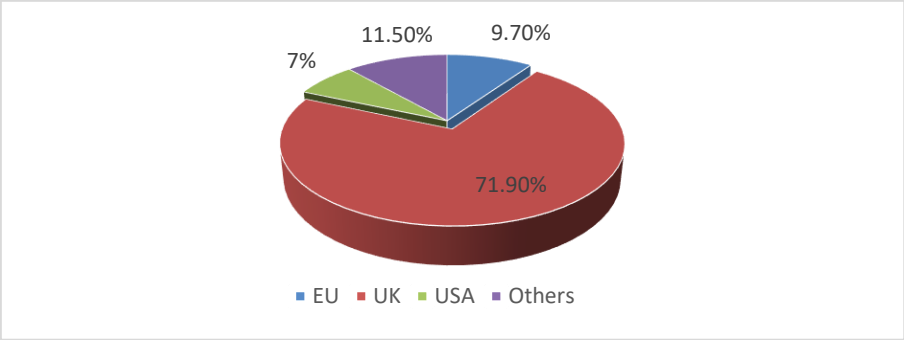
Figure 3: Volume and trade value of Ghana's vegetable export from 2014 to 2019



Source: UN Comtrade

The main vegetables exported from Ghana are Asian vegetables. Prominent among them are hot chilies, okra, ravaya, bitter gourd, turia and garden eggs.[18] The UK has remained the largest market for Ghanaian vegetables, accounting for an average of 71.9 percent of all Ghanaian vegetable exports from 2014 to 2019 (see Figure 4). Next to the UK, the EU accounts for an average of 9.7 percent of Ghana's vegetable exports from 2014 to 2019. The main export destinations for Ghanaian vegetables in the EU are Germany, Netherlands, France, Australia, and Belgium. The U.S. accounted for an average of 7 percent of Ghana's total vegetable exports over the period. Exports to countries including Canada, Switzerland, United Arab Emirates, Qatar, Lebanon, and a few other African countries accounted for an average of 11.5 percent of the country's total export.

Figure 4: Average market share of Ghana's vegetable export from 2014 to 2019

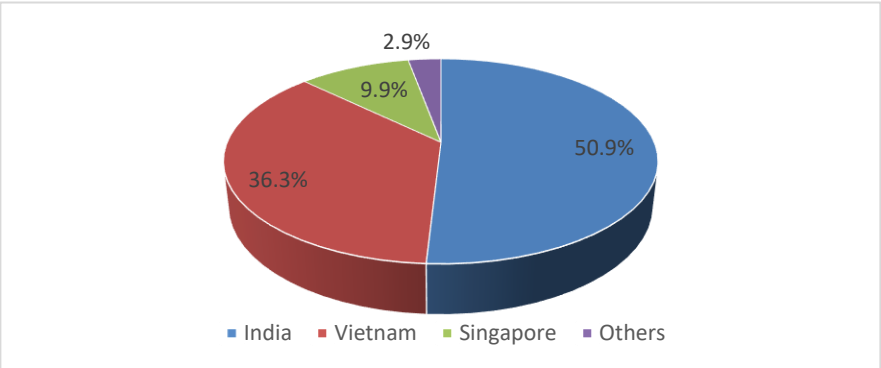


Source: UN Comtrade.

2.3 Cashew Trade

Cashew is the leading non-traditional agricultural export commodity in Ghana. Ghana's annual cashew export grew from 258.7 million kg in 2020 to 325.4 million kg in 2021, generating $251.4 million and $287.4 million in export revenue, respectively.[19] Growth in Ghana's cashew earnings is driven by growing demand for the commodity on the international market. [20] The main destination markets for cashew from Ghana are India and Vietnam. These markets accounted for more than 80 percent of total cashew exports from Ghana, as indicated in Figure 5.

Figure 5: Market share of Ghana's cashew export in 2019



Source: UN Comtrade

[18] Ghana Veg Sector Report 2014. Vegetables Business Opportunities in Ghana
[19] Ghana Export Promotion Authority. 2021. Analysis of 2021 Non-Traditional Export Statistics
[20] Ghana Export Promotion Authority. 2020. Report on Analysis of Non-Traditional 2020 Export Statistics

2.4 Shea Nut Trade

Shea nut is one of the top ten agricultural products exported under Ghana's non-traditional export sector. Ghana exported $20.2 million (36.1 million kg) worth of shea nuts in 2021. This represents a 46 percent increase from the $13.8 million (27.6 million kg) exported in 2020.[21] The leading importers of shea nuts from the country are Denmark and India.[22]

3. ANALYSIS OF BORDER REJECTIONS AND INTERCEPTIONS

3.1 International Markets

Fruits and Vegetables

There have been several interceptions of Ghana-originated vegetables into the EU, mainly due to the high incidence of harmful organisms in export consignments. The most intercepted harmful organisms are thrips, whiteflies, false codling moths, and fruit flies. These pests are detected on turia, aubergines, other eggplant-like species, chili peppers, bitter gourds, bottle gourds, leafy vegetables, and to a lesser extent, mangos.[23] The high incidence of rejections prompted the EU to place Ghana on the European Commission's Alert List of developing countries with poor interception records.[24]

In 2014, the EU intercepted 342 consignments from Ghana, see Table 1.[25] Out of this, 92 percent was due to the presence of harmful organisms, whereas 8 percent was due to documentary non-compliance (non-compliant or missing phytosanitary certificates). The large number of interceptions led MOFA to impose a temporary ban (from August to October 2014) on the export of vegetables to ensure compliance to EU food safety and phytosanitary standards.[26]

Table 1: EU interceptions of fruits and vegetable exports from Ghana from 2014 to 2022

Year	Total Interceptions	Interceptions due to harmful organisms	Interceptions due to other non-conformities
2014	342	313	29
2015	316	280	36
2016	42	35	7
2017	13	3	10
2018	65	38	27
2019	50	29	21
2020	31	8	23
2021	25	10	15
2022[27]	9	1	8

[21] Ghana Export Promotion Authority. 2021. Analysis of 2021 Non-Traditional Export Statistics
[22] Ghana Export Promotion Authority. 2020. Report on Analysis of Non-Traditional 2020 Export Statistics
[23] European Commission. 2016. Final report of an audit carried out in Ghana from 06 September 2016 to 15 September 2016 in order to evaluate the system of official controls for the export of plants and plant products to the European Union
[24] Ghana Veg Sector Report. 2016. Vegetables Business Opportunities in Ghana
[25] European Commission. 2016. Final report of an audit carried out in Ghana from 06 September 2016 to 15 September 2016 in order to evaluate the system of official controls for the export of plants and plant products to the European Union
[26] Ghana Veg Sector Report. 2016. Vegetables Business Opportunities in Ghana
[27] Data on 2022 is from January to March

Source : https://www.coleacp.org/e-data/[28]

The temporary ban imposed by MOFA had little effect, as interceptions continued to rise after the ban was lifted; the number of EU interceptions due to the presence of harmful organisms (false codling moth, thrips, whiteflies, and fruit flies) in fruit and vegetables from Ghana was 280 in 2015. In September 2015, the EU, informed by the increasing interceptions and recommendations from the European Commission's Food and Veterinary Office (FVO) conducted an audit in Ghana, temporarily suspending the imports of chilies, gourds, and eggplants.[29] The ban led to a reduction in the volume of fruit and vegetable exports, and Ghana lost an estimated $30 million in revenue.[30] The reduction in interceptions was not due to corrective measures taken by producers and exporters, but rather because of the low volume of exports as many exporters could no longer export their consignments.

Between 2016 and 2017 when the ban was in effect, total interceptions on fruit and vegetable exports from Ghana was 55, 38 of which were due to the presence of harmful organisms and 17 were due to other non-conformities.

In December 2017, the EU lifted the ban on vegetable imports from Ghana. This happened after the country had instituted corrective measures to reduce the incidence of harmful organisms in vegetables based on the recommendations set out by the EU audit assessment. Key among the measures put in place was the roadmap for pest reduction, which was developed to serve as protocols for managing the key pests of quarantine importance in vegetables exported from Ghana to the EU.[31] However, Ghana is still on the EU red list and is being closely monitored.[32]

After the ban was lifted, the number of harmful organisms in Ghanaian vegetable consignments continued to increase, but most of the rejections were done by PPRSD at the various points of exit in the country. PPRSD made a total of 162 rejections locally in 2018.[33] At the international level, the country received notifications of 65 interceptions; 38 of these interceptions were due to the presence of harmful organisms while 27 were due to other documentary non-compliance. In 2019, from January to May, the number of local rejections had reached 120 and international notifications were up to 20. By June 1, 2019, the high levels of rejections and international notifications coupled with a new EU directive to all countries to re-submit dossiers to the EU on the management of harmful organisms on some of the above vegetables compelled MOFA to impose an indefinite ban on the export of some selected vegetables to the international market: capsicum, solanum, luffa, and all leafy vegetables.[34] A month after this ban was imposed, two leafy vegetable exporters were granted permission to export after they satisfied all the conditions set by the PPRSD for exporters.[35]

At the end of 2019, the number of interceptions of Ghanaian fruit and vegetable exports on the international market was 50, of which 29 were due to presence of harmful organisms and 21 were related to documentary non-compliance. From January 2020 to March 2022, Ghana has received a total of 65 interceptions from the international market, with only 19 relating to the presence of harmful organisms and 46 relating to documentary non-compliance.

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[28] 2014 and 2015 data were obtained from European Commission. 2016. Final report of an audit carried out in Ghana from 06-15 September 2016

[29] Ghana Veg Sector Report. 2016. Vegetables Business Opportunities in Ghana

[30]https://www.graphic.com.gh/business/business-news/ghana-loses-30m-to-ban-on-veggies-to-eu-market.html#:~:text=%2C%E2%80%9D%20it%20added.-,The%20EU%20ban,the%20ecosystem%20of%20the%20EU.

[31] Hortifresh Sector Report. Horticulture Business Opportunities in Ghana

[32]https://www.pulse.com.gh/bi/strategy/the-government-of-ghana-indefinitely-bans-the-exportation-of-all-leafy-vegetables-to/74w21yc#:~:text=Ghana%20recently%20came%20out%20of,list%20and%20being%20monitored%20closely.

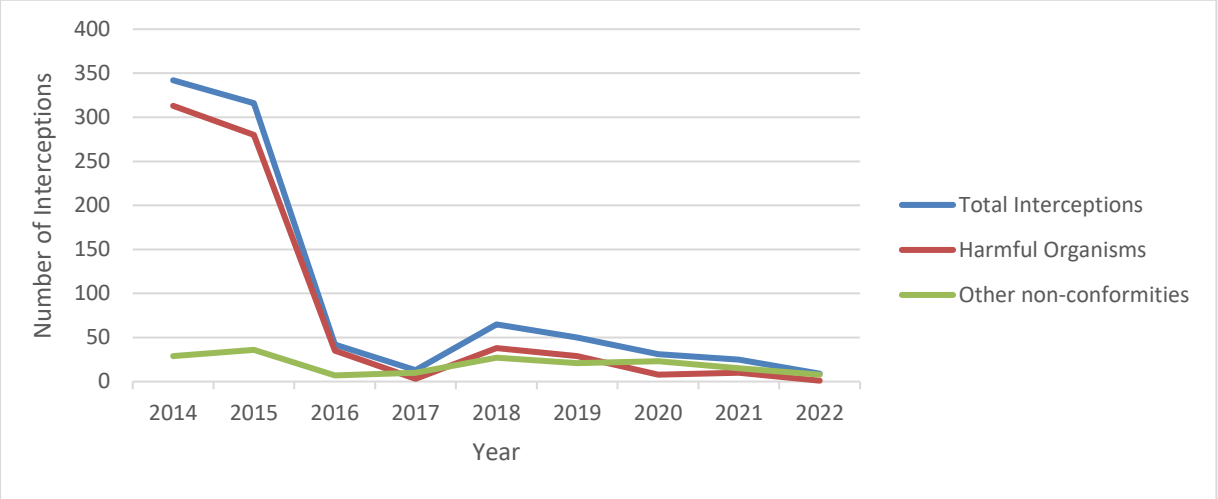
[33]https://www.pulse.com.gh/bi/strategy/government-of-ghana-lifts-ban-on-the-exportation-of-leafy-vegetables-to-the/0vvmj7t

[34] https://www.graphic.com.gh/news/general-news/ghana-news-ghana-bans-all-leafy-veggie-exports.html

[35] https://www.pulse.com.gh/bi/strategy/government-of-ghana-lifts-ban-on-the-exportation-of-leafy-vegetables-to-the/0vvmj7t

Figure 6 reveals a declining trend in the number of interceptions related to harmful organisms and an increase in interceptions due to documentary non-compliance. Before the EU ban, about 90 percent of interceptions of were due to the presence of harmful organisms. Documentary non-compliance, which emanate mainly from non-compliant or missing phytosanitary certificates, accounted for about 10 percent of all interceptions.

Figure 5: Trend in the cause of fruit and vegetable interceptions in the EU from 2014 to 2022



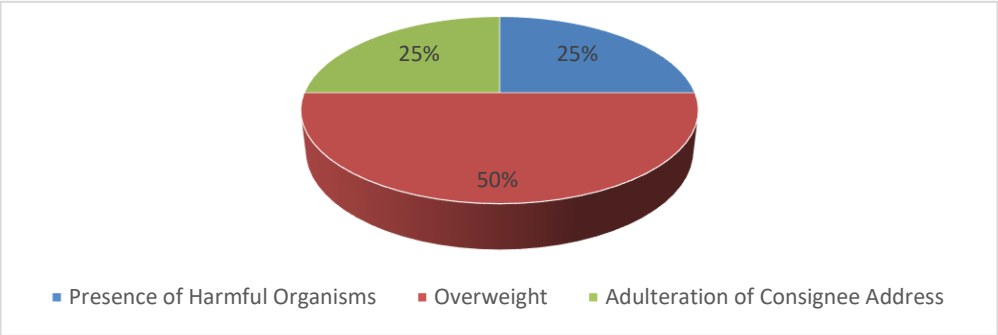
Source : https://www.coleacp.org/e-data/

In 2016, when the ban was in effect, harmful organisms accounted for 83 percent of all interceptions, whereas the remaining 17 percent was due to other non-conformities. In 2017, about 23 percent of interceptions were due to the presence of harmful organisms. This rose to 58 percent in 2018 and 2019, when the ban was lifted. However, from 2020, most interceptions on the EU market have been due to other non-conformities. About 74 percent of all interceptions in 2020 were due to documentary non-compliance, this only reduced to 60 percent in 2021, but stands at 89 percent as of March 2022.

Cashew and Shea

Based on data provided by the PPRSD (see Figure 7), the only interceptions on the international market in 2018 were for cashew.. Out of eight interceptions, two were due to the presence of harmful organisms, and the remaining six were due to other non-compliance such as overweight/weight (50 percent) and adulteration of consignee address (25 percent). There was, however, no data of interceptions for shea.

Figure 6: Reasons for international notifications for cashew



Source: Author's calculation based on data from PPRSD

3.2 Local Points of Exit

Fruits and Vegetables

Table 2: Local rejections of fruits and vegetables at the Kotoka International Airport (KIA) from 2018 to 2022

Year	Weight (KG)	Total Rejections	Rejections due to harmful organisms	Rejections due to other non-conformities
2018	22,228	144	136	8
2019	20,023	149	149	0
2020	502,509	40	21	19
2021	2,883,051	30	9	21
2022	168,843	8	8	0

Source: Author's calculation based on data from PPRSD

As indicated in Table 2, in 2018, inspectors at the KIA rejected 22,228 kg of fruits and vegetables from export, after making a total of 144 interceptions linked to these consignments. In 2019, the number of interceptions increased to 149, and this led to the rejection of 20,023 kg of fruits and vegetables. Whereas the number of interceptions decreased considerably to 40 and 30 in 2020 and 2021 respectively, the volume of fruits and vegetables rejected these years grew substantially, to 502,509 kg and 2,883,051 kg respectively, indicating that much larger consignments had been rejected. As of July 2022, a total of eight interceptions have been made at the KIA, and 168,843 kg of fruits and vegetable consignments have been rejected.

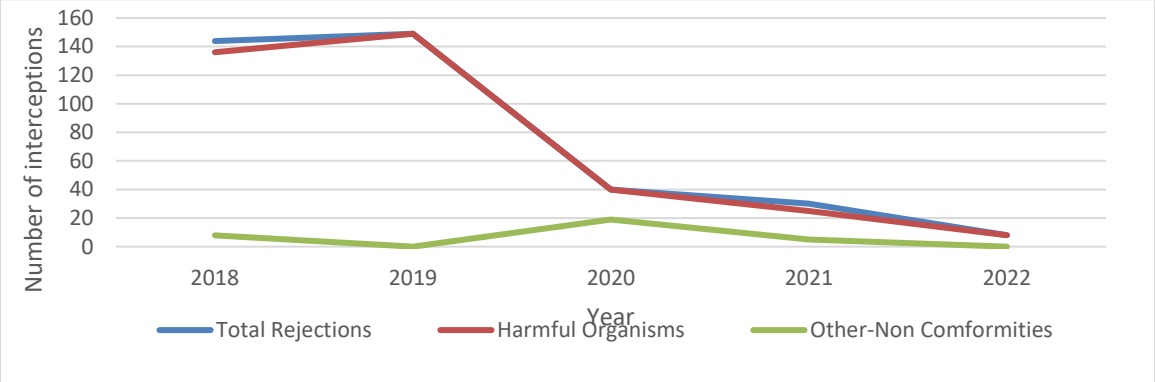
Table 3: Growth in the volume of rejected consignments from 2018-2021

Year	Weight (KG)	Growth Rate (%)
2018	22,228	-
2019	20,023	-9.9
2020	502,509	2409.7
2021	2,883,051	473.7
2022	168,843	-94.1

Source: Author's calculation based on data from PPRSD

As shown in Table 3, the volume of rejected consignments declined at rate of 9.9 percent, from 22,228 kg in 2018 to 20,023 kg in 2019, although the number of interceptions increased (see Figure 8). In 2020 and 2021, although the number of interceptions declined, the volume of rejected consignments increased drastically, first to 502,509 kg in 2020 at a growth rate of 2,409.7 percent from the previous year, and subsequently to 2,883,051 kg at a growth rate of 473.7 percent. In 2022, however, the volume of rejected consignments decreased by 94.1 percent to 168,843 kg.

Figure 7: Number of Interceptions of Fruit and Vegetables from 2018 to 2021



Source: Author's calculation based on data from PPRSD

Most local interceptions and rejections of fruit and vegetables at the KIA are attributed to the presence of harmful organisms in consignments. In 2018, 94 percent of local interceptions were due to the presence of harmful organisms (see Figure 8). In 2019, all local interceptions were due to the presence of harmful organisms; this decreased to 52.5 percent in 2020 but increased to 96.7 percent in 2021 and 100 percent by July 2022. The harmful organisms often detected by PPRSD officials at the KIA are fruit flies, stone weevils, thrips, white flies, spring tails, false codling moths, bemisia nymph, lepidoptera, l. orbonalis, mealy bugs, ballworms, and tephitidoe.

Local rejections due to other non-compliance are exceptionally low, often below 5.6 percent, except for 2020, when it made up 47 percent of total rejections at the KIA. The reasons cited by the PPRSD for rejections due to non-compliance were absence of laboratory report, poor quality of produce, harvest from farms not certified by PPRSD, smuggled or banned consignments, and presence of chemical residue. Smuggled consignments are those that exporters conceal or fail to disclose to the PPRSD for approval; banned consignments are commodities that have been suspended from exports either by local or international authorities.

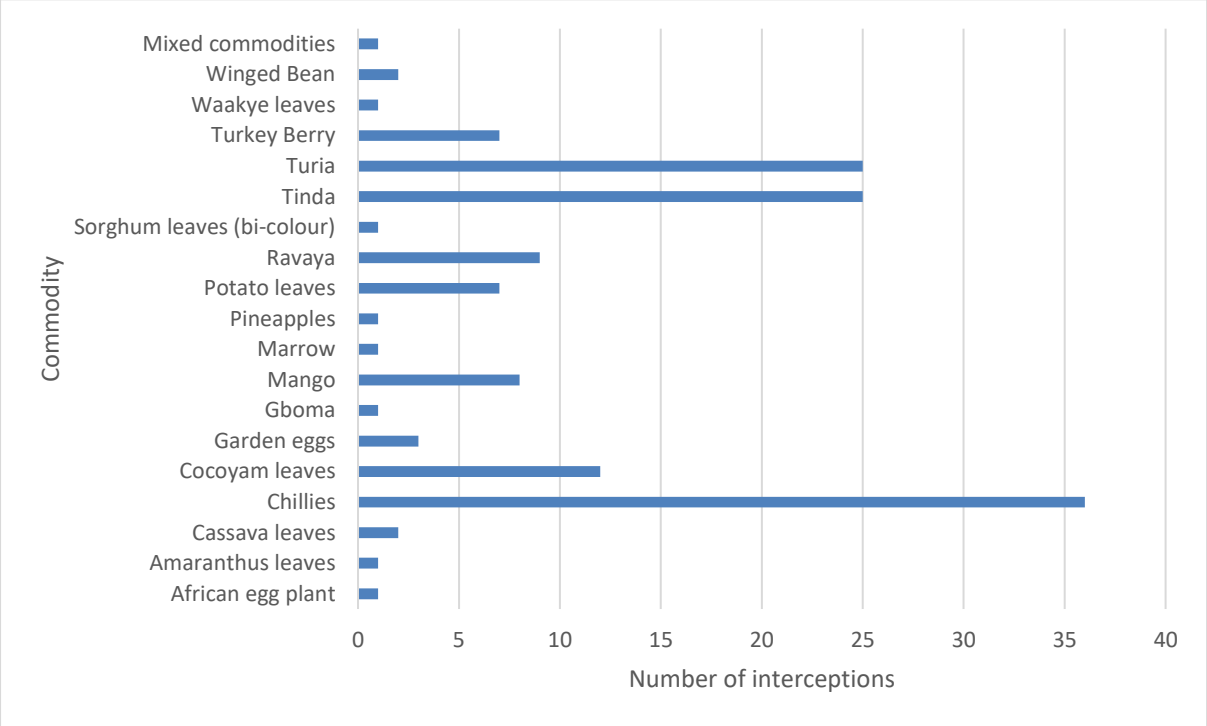
In 2018, out of eight interceptions due to other non-compliance, six were due to poor quality of produce, one was due to the absence of lab report, and one was due to poor presentation of produce. In 2019 and 2022, there were no interceptions resulting from other non-compliance. In 2020, 94.7 percent (18) of interceptions due to other non-compliance were caused by the presence of smuggled banned consignment, and one (5.3 percent) was due to the exporter harvesting produce from farms that have not been certified by the PPRSD. In 2021, four (13.3 percent) interceptions due to other non-compliance resulted from poor quality of produce (profusely rotten), one (3.3 percent) was due to the presence of chemical residues, and 83.3 percent (24) of interceptions were due to the presence of harmful organisms.

3.3 Analysis of Local Rejections Per Crop Per Year

Fruits and Vegetables

In 2018, 19 commodities[36] accounted for total interceptions and rejections at the KIA. Chilies accounted for 25 percent of total interceptions (see Figure 9), followed by tinda and turia, each accounting for 25 interceptions, which represents 25 percent of total interceptions; cocoyam leaves accounted for 8.3 percent of interceptions, mango accounted for 5.6 percent, 4.9 percent potato leaves, and 4.9 percent turkey berry. The rest of the commodities (including mixed commodities)[37] each accounted for three interceptions at most.

Figure 8: Total number of interceptions per commodity in 2018



Source: Author's calculation based on data from PPRSD

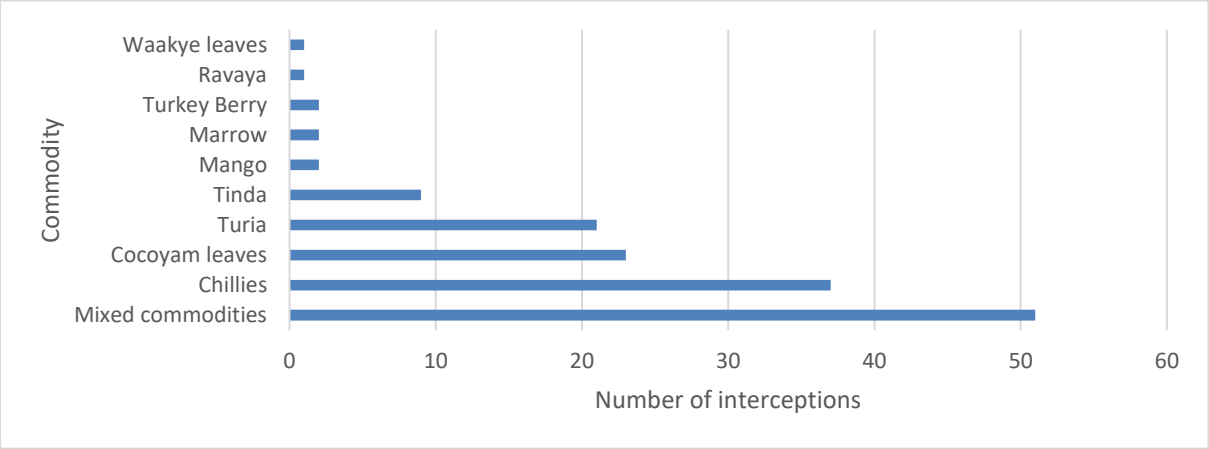
In 2019 (see Figure 10), the 149 consignments intercepted were made up of nine commodities:[38] 34.2 percent attributed to mixed commodities, 24.8 percent chili consignments, cocoyam leaves accounted for 15.4 percent, turia accounted for 14.1 percent, and tinda accounted for 6 percent. The remaining commodities accounted for 5.4 percent all together.

[36] These commodities were African eggplant, amaranthus leaves, cassava leaves, chilies, cocoyam leaves, garden eggs, gboma, mango, marrow, pineapples, potato leaves, ravaya, sorghum leaves (bi-color), tinda, turia, turkey berry, waakye leaves, and winged bean.

[37] Mixed commodities represent a combination of two or more fruits and vegetables being exported as one package by an exporter. In this case it is a combination of ayoyo, sweet potato leaves and bitter leaf.

[38] Namely: chilies, cocoyam leaves, mango, marrow, ravaya, tinda, turia, turkey berry, waakye leaves, and mixed commodities (cocoyam leaves, sawa leaves, waakye leaves, water leaves, potato leaves, African star fruit, ravaya, tinda, okra and turkey berry).

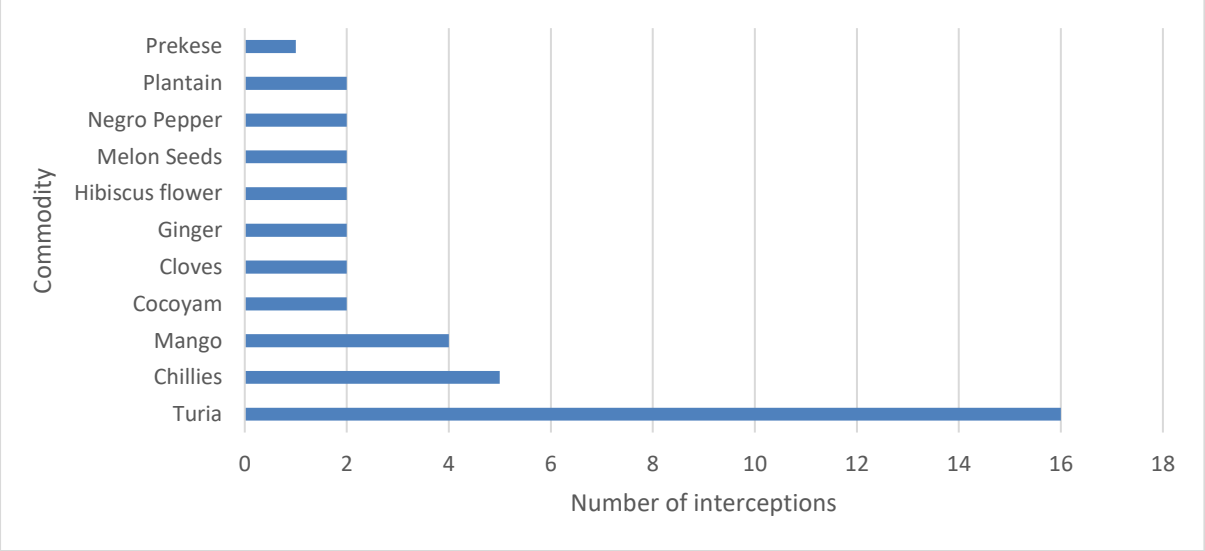
Figure 9: Total number of interceptions per commodity in 2019



Source: Author's calculation based on data from PPRSD

In 2020, 11 consignments were intercepted: chilies, cocoyam, cloves, ginger, hibiscus flower, mango, melon, seeds, Negro pepper (Grains of Selim), plantain, prekese, and turia. Turia accounted for 40 percent of interceptions, chilies accounted for 12.5 percent, and mango accounted for 10 percent. Prekese accounted for 2.5 percent of interceptions and the remaining commodities each accounted for 5 percent of interceptions (see Figure 11).

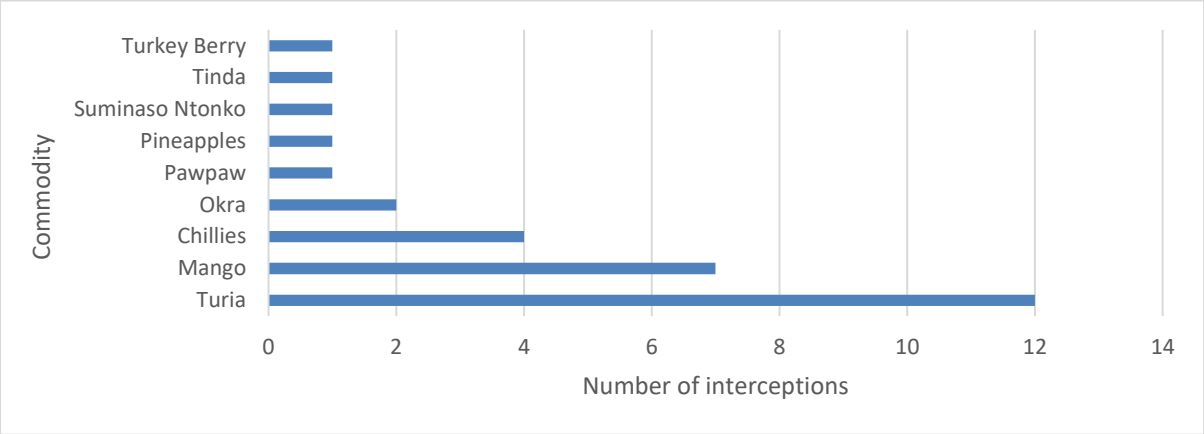
Figure 10: Total number of interceptions per commodity in 2020



Source: Author's calculation based on data from PPRSD

In 2021, as shown in Figure 12, interceptions were made on nine commodities. Turia accounted for 40 percent of interceptions, mango accounted for 23.3 percent, chilies accounted for 13.3 percent, okra accounted for 6.7 percent of interceptions and the rest of the commodities (pawpaw, pineapples, suminaso ntonko, tinda, and turkey berry) each accounted for 3.3 percent of interceptions.

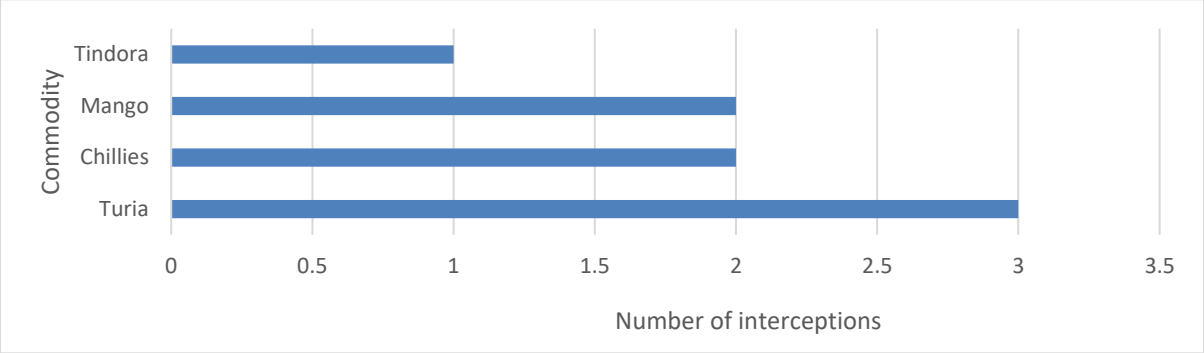
Figure 11: Total number of interceptions per commodity in 2021



Source: Author's calculation based on data from PPRSD

As of February 2022, only four commodities had been intercepted. Turia accounted for three interceptions, chilies and mango each accounted for two interceptions, and Tindora accounted for one interception, see Figure 13.

Figure 12: Total number of interceptions per commodity in 2022



Source: Author's calculation based on data from PPRSD

Table 4 shows that from 2018 to 2022, three commodities, turia, mango, and chili, have been consistently rejected each year. Cumulatively, these three commodities made up approximately 99 percent of total rejections. Turia accounted for 80.6 percent of rejections, with 2,898,099 kg of produce rejected. Mango was the second most rejected commodity, accounting for 12.8 percent of total rejections, with the quantity of rejected produce standing at 460,795 kg. Chili accounted for 6.1 percent of total rejections over the period, with 219,387 kg rejected. The rest of the commodities accounted for less than one percent of total rejections over the period. The prominent levels of local rejections associated with turia, chili, and mango are because of the inability of value chain actors (producers and exporters) to control pests effectively, however, these commodities are regularly exported on a large scale by large importers. The low volume of rejections of the rest of the commodities is largely due to the fact they are not exported regularly, and the export of these commodities are on a small scale, often by small and one-time exporters.

Table 4: Quantity of rejected commodities per year

	Quantity (KG)						
Commodity	**2018**	**2019**	**2020**	**2021**	**2022**	**Total**	**Percentage share of total**
African Egg Plant	10	-	-	-	-	10	0%
Amaranthus Leaves	40	-	-	-	-	40	0%
Ayoyo, Sweet Potato Leaves and Bitter Leaf	88	-	-	-	-	88	0%
Cassava Leaves	41	-	-	-	-	41	0%
Chili	13,098	8,720	194,114	960	2,496	219,387	6.10%
Cocoyam	-	-	1,440	-	-	1,440	0.04%
Cocoyam Leaves	270	2,251	-	-	-	2,521	0.07%
Cloves	-	-	160	-	-	160	0%
Garden Eggs	130	483	-	-	-	613	0.02%
Gomaa	8	-	-	-	-	8	0%
Ginger	-	-	100	-	-	100	0%
Hibiscus Flower	-	-	3,200			3,200	0.09%
Mango	1,285	999	14,353	443,961	197	460,795	12.81%
Marrow	70	376		-	-	446	0.01%
Melon Seeds	-	-	250	-	-	250	0.01%
Negro Pepper (Grains of Selim)	-	-	160	-	-	160	0%
Okra	-	-		1,948	-	1,948	0.05%
Pineapples	108	-	-	-	-	108	0%
Plantain	-	-	1,080	-	-	1,080	0.03%
Parkees	-	-	5	-	-	5	0%
Sweet Potato Leaves	152	-	-	-	-	152	0%
Luminoso Noto	-	-	-	0.05	-	-	0%
Ravee	810	80	-	-	-	890	0.02%
Sorghum Leaves (Bi-Color)	15	-	-	-	-	15	0%
Tindal	2,521	1,368	-	104	-	3,993	0.11%
Tindora	-	-	-	-	123	123	0%
Turia	3,401	4,944	287,647	2,436,079	166,028	2,898,099	80.58%
Turkey Berries	126	792	-	-	-	918	0.03%
Waakye Leaves	16	10	-	-	-	26	0%
Wing Bean	40	-	-	-	-	40	0%
Total Per Year	22,228	20,023	502,509	2,883,051	168,843	3,596,654	100

Source: Author's calculation based on data from PRSD

Analysis of Local Interceptions of Harmful Organism Per Year

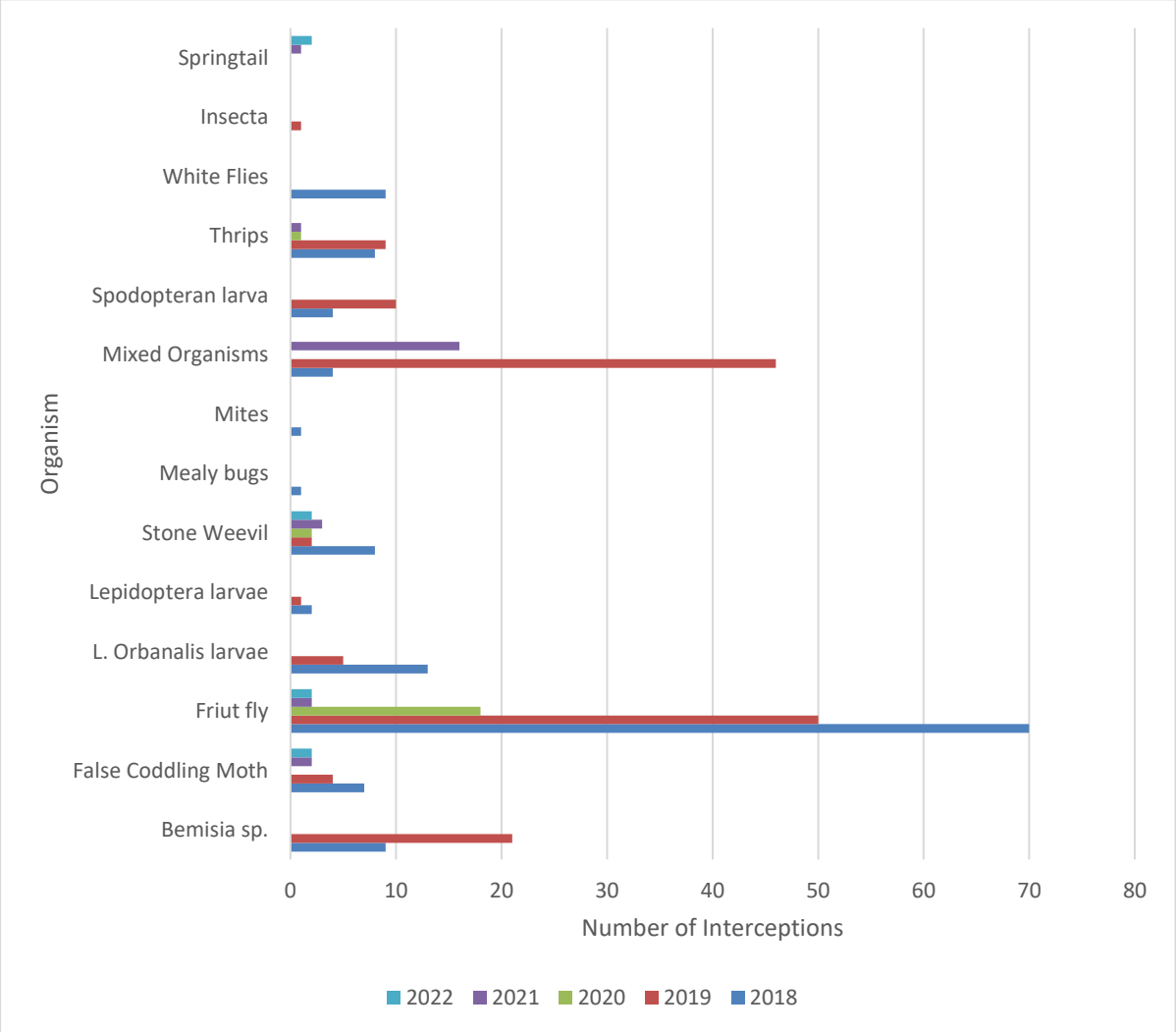
From 2018 to 2022, the PPRSD detected 12 harmful organisms at the KIA, leading to rejections of consignments. These organisms are bollworms, bemuses, false codling moths, fruit flies, leucinodes orbonalis, lepidoptera, mango weevils, mealy bugs, mites, spodoptera, thrips, and white flies.

In 2018, the presence of fruit flies accounted for 51.5 percent of interceptions, leucinodes orbonalis accounted for 9.6 percent of interceptions, while besimia and white flies accounted for 6.6 percent of interceptions each. There were four (2.9 percent) interceptions caused by more than one organism (fruit flies, lepidoptera, and false codling moths) in a single commodity. The rest of the organisms each accounted for less than six percent of interceptions (see Figure 14).

In 2019, the number of harmful organisms causing rejections decreased from 12 to nine and in 2020, three harmful organisms were intercepted locally: fruit flies, mango weevils, and thrips. Fruit flies accounted for most total interceptions over both years. In 2021, five organisms were intercepted locally: false codling moths and fruit flies each accounted for accounted for two (8 percent) interceptions, mango weevils accounted for three (12 percent) interceptions, and thrips and springtails each accounted for one interception. There were 16 (64 percent) interceptions caused by more than one organism in a single commodity.

As of July 2022, the organisms intercepted so far have been false codling moths, fruit flies, mango weevils, and springtails. Each of these organisms accounted for two interceptions, representing 25 percent.

Figure 13: Total number of interceptions per commodity per year



Source: Author's calculation based on data from PPRSD

4. INSPECTION MEASURES FOR EXPORTERS

4.1 Fruits and Vegetables

Fruit and vegetables are exported via the Kotoka International Airport (KIA) because export fruits and vegetables are primarily grown in the southern horticulture zone of the country, and seaport shipping is not conducive to perishable products, given the time to primary market destinations (e.g., EU and UK). To export fruits and vegetables, exporters must comply with two main requirements: documentary requirements and quality requirements. Each of these requirements are explained further below:

- **Documentary requirements:** Before export, exporters must register with the Registrar General's Department and submit proof of business registration to the PPSRD and must also register with the PPRSD. Exporters must notify the PPRSD of their intention to export 24 hours before export on the PPRSD Advanced Notice Platform. The notification information should indicate the intended exporter, the commodity, and destination of export. This information enables the PPRSD to conduct relevant checks on the destination country's market requirements. The consignments of exporters that fail to meet all the documentary requirements are rejected and do not proceed to the quality requirement stage. However, those that successfully comply with the documentary requirement proceed to the quality requirement stage.
- **Quality requirements:** The quality requirements stage involves the sampling of produce and physical inspections of export-ready consignments. Regarding the physical checks, the PPRSD ensures that consignments are properly labeled and that the details provided on the labels by exporters correspond to the documentary information. After this, samples of the consignments are taken to the inspection room, where they are thoroughly examined to ensure they meet the destination market requirements for quality, pests, and diseases. Exporters that do not fully satisfy all the quality requirements are not allowed to export.

4.2 Cashew and Shea Export Processes

Cashew and shea are exported through the Tema Port, along with other products such as soya beans, sesame, wood, yams, rubber, and palm oil. Exporting these commodities requires compliance with documentary and quality requirements. Like the process for exporting fruits and vegetables, exporters of cashew and shea must provide proof of business registration and register with the PPRSD.

The PPRSD educates new exporters on the appropriate cashew export requirements—warehouse, warehouse location, drying of produce, fumigation, and inspection. Exporters are required to inform PPRSD of their intention to export, after which PPRSD staff at the district level go to the exporters' warehouses to inspect the commodities. At the warehouses, PPRSD ensures that the produce is well dried, stored in dried bags, and that containers are properly fumigated. Fumigation is undertaken by registered fumigation companies that issue fumigation certificates to exporters. After receiving a fumigation certificate from exporters, the PPRSD contacts the fumigation company to verify whether the fumigation had been undertaken. Also, PPRSD ensures that exporters apply the right amount of aluminum phosphide to control insects and rodents. Exporters are required to provide information on the quantity of aluminum phosphide (100 tablets in a 40-foot container or 50 tablets in a 20-foot container) and the date of application. Apart from PPRSD, other agencies also conduct inspections at the port.

5 CAUSES OF LOCAL AND INTERNATIONAL INTERCEPTIONS

5.1 Causes of Local Interceptions

After the EU ban was lifted, MOFA and other stakeholders put measures in place to address the sanitary and phytosanitary issues related to Ghanaian fruit and vegetable exports. Despite these measures, there are still rejections of fruit and vegetable consignments by the PPRSD at the KIA. Rejections at the KIA can be attributed to two major sources of non-compliance, documentary non-compliance and presence of pests and foreign material:

1. ***Documentary non-compliance***: PPRSD inspectors at the point of exit inspect export documents against labels on packaging boxes, QR codes, packing lists, and information with PPRSD (registration and GH-TRACE [PPRSD's e-traceability system] for vegetables). Any material inconsistencies found will result in a rejection of export consignments. Causes of documentary non-compliance could be lack of knowledge of export processes, especially for first or new exporters, who are generally small and medium enterprises and may not have undergone appropriate registration processes with PPRSD or be aware of exporting procedures. The PPRSD also rejects consignments that have not been declared by the exporter (exporting without notice to the PPRSD)
2. ***Presence of pests and foreign materials***: PPRSD conducts physical inspections on consignments for exports. These inspections aim to identify the presence of pests or foreign material and contaminants. Presence of pests and foreign material related to production and typically emanate from the failure of farmers to adhere to good agronomic practices (G.A.P.) and improper pest control measures. The main reason this challenge has persisted is because of non-adherence to G.A.P. by producers. Also, there are no areas in the country demarcated exclusively for export-oriented production, therefore, producers that grow their commodities for export and adhere to all the necessary G.A.P. and phytosanitary requirements could still have their produce infested by neighboring producers that produce for the local market and do not adhere to any of the export requirements. In addition, in 2019, when the COVID-19 pandemic was at its peak, the volume of export was low, and PPRSD did not undertake rigorous field inspections due to the partial lockdown imposed in certain parts of the country. As a result, many exporters also failed to implement the necessary G.A.P. measures on their fields. This contributed to an increase in the number of internal rejections, especially after 2020, when the PPRSD started to undertake rigorous field inspections after a decline in the incidence of the COVID-19 pandemic.

5.2 Causes of International Interceptions

Fruits and Vegetables

Although the PPSRD has instituted inspection procedures for fruit and vegetables exporters at the KIA to help avoid delays in export and more importantly, to prevent interceptions at the destination markets, there are still international interceptions of fruits and vegetables exported from Ghana. However, the rate of interceptions at the various destination markets is currently at a minimum. As indicated earlier, interceptions on international markets are also due to documentary non-compliance and presence of pests and foreign material:

1. ***Documentary non-compliance:*** This results from fruit and vegetable consignments that are exported through the various Ghana Post Offices across the country. These consignments are

generally small in volume, do not undergo rigorous inspections, and are exported without phytosanitary certificates. The exports are made by individuals who are largely "one-time" exporters, have not registered with the PPRSD, and do not understand EU market requirements.

2. ***Presence of pests and foreign materials:*** One reason for the detection of pests and foreign materials on the international market is that Ghana Post Office staff have not been sensitized on EU sanitary and phytosanitary requirements and do not have measures in place to inspect fruits and vegetables that are exported. To address this issue, the PPRSD has placed several staff at the various Ghana Post Offices across the country to inspect fruits and vegetables. There are also exporters that smuggle vegetables into other non-fruit and vegetable consignments and therefore are not inspected by the PPRSD staff at the KIA for harmful organisms. These smuggled commodities are detected and intercepted upon arrival on the international market. Furthermore, there are harmful organisms that are not detected at the KIA due to inadequate inspection equipment. Inspection officers at the KIA do not have enough head visors to magnify pests for easy detection; the inspection boards in the inspection room have decolorized from white to brown, making it difficult to detect pests.

Cashew and Shea

Notifications received by the PPRSD regarding cashew and shea are minimal and often have to do with verification of phytosanitary certificates and non-compliance. Notifications are sent via email to the PPRSD head office, which in turn notifies the port office.

1. ***Documentary non-compliance:*** The majority of Ghana's cashew is exported to India, Vietnam, and Bangladesh. Destination market authorities, especially India, contact the PPRSD to verify the authenticity of the phytosanitary certificates attached to consignments. Consignments that do not have phytosanitary certificates and phytosanitary certificates that are not authenticated by the PPRSD are rejected by these importing countries. Consignments that are authenticated by the PPRSD are accepted by the importing countries, even when there are documentary inconsistencies such as variance in weight or wrong spelling of consignee address. Such inconsistencies are of little relevance, as they does not affect the quality of the produce.
2. ***Defective Commodities***: Defects are caused by delays in export resulting from the inspection process and ineffective fumigation by third-party fumigation companies who are contracted by exporters. The moisture content of the produce could also be affected by rain, ventilation, and improper covering before export. However, consignments that are authenticated by the PPRSD are accepted by the importing country, even when defective. The reason for this is because any defect found on consignments approved by PPRSD are considered by the importer to have been caused during the time of shipment. The defective produce is treated by the importer and notifications are sent to the PPRSD explaining defect and treatment applied.

5.3 Post-Rejection Measures by PPRSD

According to the PPRSD, exporters are notified about rejections and interceptions of their consignments through direct phone calls. The PPRSD indicated that exporters who are rejected for the first time are cautioned and offered advice and periodic training by the PPRSD enabling them to meet the export requirements. The training offered by the PPRSD to importers is determined by the cause of the rejection or interception. The training usually includes G.A.P. and pest control (conducted

through field visits), as well as documentary compliance. However, for exporters that have been rejected for the second time, the PPRSD imposes a temporary ban on their fields, followed by field visits to ensure that these exporters undertake the necessary remedial measures to avoid further rejections. The duration of the temporary ban imposed by the PPSRD is not defined, because it depends on the time involved for the necessary corrective measures to be implemented. Corrective measures can take between one day or six months, depending on the measures to be implemented by the exporter. Measures can range from improvement in ventilation of the packhouse to the acquisition of refrigerated vans. Importers that refuse to adhere to the corrective measures proposed by the PPRSD are to be permanently banned from exporting from the country.

It was observed that PPRSD did not implement suspensions and bans on exporters whose consignments were rejected by PPRSD officials at the points of exit. PPRSD Officials indicated they were unable to track, record, and monitor border rejections (see section 5.4 for details on recording on border rejections). Moreover, PPRSD was equally not consistent in implementing remedial measures for exporters with rejections, often citing lack of staff to undertake regular field visits and training.

5.4 Systems for Recording Interceptions and Rejections

The PPRSD did not keep records of internal rejections until 2018, when the EU ban was reversed. At the various points of exit, inspection records are kept manually in inspection books. The inspection books contain information on all inspections conducted, remarks regarding the inspections, and reasons for rejections when exporters fail to satisfy the inspection process. Information from the inspection books is typed into a Microsoft Excel sheet and submitted to the PPRSD Head Office at the end of the month. The Excel document captures daily records of inspections at the airport without analysis. There seems to be no structured follow up or analysis of the monthly inspections submitted for PPRSD management action. The records contain exporter details, products to be exported, inspection results, findings, and reasons for rejections. PPRSD could use this information to institute ongoing improvements within exporters supply chain, introduce training, improve pest management systems, place temporary and permanent bans, and other institutional wide reforms.

6. CAPACITY GAPS OF STAKEHOLDERS

6.1 Capacity Gaps at the Production/Farm Level

The main capacity gaps identified at the farm/production level include:

1. Non-adherence to Good Agronomic Practices and Protocols: farmers do not comply with PPRSD guidelines/protocols to produce fruits and vegetables. This results in the production of poor-quality fruits that do not meet export requirements.
2. Low level of knowledge on pest management: Farmers are not able to control pests and minimize their impact on farms, because they do not have adequate knowledge about the life cycle of these pests. Farmers tend to engage in poor cultural practices (such as improper pruning, failure to collect and properly bury fruits that drop down, poor weed control, untimely and improper application of chemicals, use of unapproved and ineffective active ingredients) that cause the pests to flourish.
3. High cost of pest control technologies: Farmers are unable to procure technologies required to control pests and diseases at the farm level, such as traps and approved quality chemicals among other things, because they are expensive. They are forced to resort to ineffective

alternatives (such as applications of low-quality chemicals, and handmade mineral water bottle traps) of controlling pests.

4. Lack of knowledge on export market requirement: Some smallholder farmers that produce fruit and vegetables for exporters do not understand the plant health and food safety requirements of the international market.

6.2 Capacity Gaps at the Exporter/Packhouse Level

Capacity gaps affecting exporters/pack house operations include:

1. Packhouse Operations and Management: Packhouse operations involve removal of unsuitable produce, sorting, grading, and packaging. Each of these steps requires both equipment and skills. Poor staff capacity in terms of sorting, grading, packaging, and general hygiene in packhouse operations can introduce harmful and foreign materials in the fruit and vegetable value chains. Additional capacity is required in design and layout of packhouse for efficient operations, staff management as well as special operations such as color sorting, waxing, controlled ripening, and pest and disease control in the packhouse.
2. Lack of equipment to facilitate pest detection: Exporters/packhouses do not have the adequate equipment, such as visors[39], to detect the presence as well as the signs and symptoms of harmful organisms. As a result, some infested commodities are processed at the packhouses, but are intercepted either at the KIA or at the destination market.
3. Procurement of produce from unregistered exporters: Some exporters/packhouses purchase fruits and vegetables from smallholder farmers who are not registered with PPRSD and lack knowledge on export market requirements for fruits and vegetables. The result is the production of produce that does not qualify for export.
4. Inadequate knowledge of international market requirements: Some exporters (especially first time/new exporters) and packhouse operators do not fully understand the international market standards and regulations for fruits and vegetables. Specifically, food safety and hygiene regulations throughout vegetable and fruit supply chains to prevent contaminants and market standards relating to product quality, packaging, and labelling. The regulations include EU, UK, and U.S. Regulations on Food Safety as well as standards required by retailers such as Global G.A.P., BRCGS Global Food Safety Standard, Rainforest Alliance, and Fair Trade.

6.3 Capacity Gaps in PPRSD

There are several capacity gaps confronting the PPRSD at the various points of exit.

1. The PPRSD staff at the KIA and Tema Port lack vehicles and motorbikes to facilitate transport for farm and packhouse inspections. Currently, inspections at the packhouses and the farms of exporters are conducted by the PPRSD head office. However, at the KIA and the Tema Port, inspections are conducted by different PPRSD staff stationed at theses points of exit. This contributes to the delay in export procedures because most of the quality and documentary checks conducted at the packhouses are repeated at the ports.
2. In addition, the number of PPRSD staff at the various points of exit is low. This affects the inspections undertaken at both the port and the warehouses. There is no regular training for PPRSD staff in pest identification or on EU and UK market regulations.

[39] Visors are magnifiers with optical glass lenses mounted on the head.

3. The PPRSD lacks adequate inspection equipment, such as visors and inspection tables, to conduct effective inspections.
4. The PPRSD offices at the various points of exit do not have adequate computers and software to aid in collecting, compiling, synchronizing, and sharing data on exports, rejections, and interceptions.
5. The Advanced Notification Platform on which exporters declare their intention to export is a WhatsApp group created by the PPRSD for all exporters. This poses a competition challenge to exporters, because information shared by one exporter (commodity of export, volume, and destination market) is exposed to other exporters in the group. As a result, exporters can gather sensitive market information about their competitors, which would have otherwise been kept confidential. The advance notification system needs to be included in the GH-TRACE, Ghana's traceability system implemented by the PPRSD, which enables exporters to notify the airport or Tema Port in advance of shipment through an electronic message. Including the notification system in the GH-TRACE will make ample time for scheduling inspections by the PPRSD.

7. SUMMARY TRAINING GUIDELINES

To reduce border rejections and interceptions, the following guidelines are recommended for training and intervention for the various stakeholders, including farmers, packhouses, and inspectors at the points of exit:

7.1 Training Guidelines at the Farm Level

1. **Good Agricultural Practices:** Farmers need to improve their knowledge and capacity in the implementation of G.A.P. to improve the safety and quality of their produce, which would eventually lead to a reduction in the levels of local and international rejections. Areas of training should include:
    a. PPRSD Protocols for growing fruits and vegetables for exports (Annex 3); these protocols outline phytosanitary measures by PPRSD to address important amendments to EU Plant Health Regulations Implementing Directive 2019/523 on protective measures against the introduction into the community of organisms harmful to plants or plant products and against their spread within the EU PPRSD developed these protocols in 2019 for chili and mango.
    b. General fruit and vegetable production, harvesting, and post-harvest handling. This will focus on quality vegetable production at the farm level and includes guidelines for farm management and maintenance (staffing, hygiene, farm records, traceability), farming environment (soil and water management), farming practices (seeds, seedlings, fertilizer, and pesticide use), and harvest and post-harvest management.
2. **Pest Identification and Management**: Farmers need to be trained to understand the behavior and life cycle of pests, especially those of concern to the EU, to enable effective control and minimize their impact on farms. Specifically, training should include:
    a. Understanding maximum residue limits (MRL).
    b. Integrated Pest Management Practices, including:
        i. Pest identification: identification of different pests affecting vegetable and fruit production;
        ii. Preventive measures for pests, involving cultural control practices;

iii. Early detection/diagnosis of the signs, symptoms, and presence of pests (especially those of concern to the international market such as thrips, fruit flies, and false codling moths, among others) on the farm; and,
iv. Measures for controlling specific quarantine pests.

3. **EU/UK Market requirements:** Farmers need to be trained to understand United Nations Economic Commission for Europe (UNECE) standards for fresh fruits and vegetables. This will help farmers appreciate and comply with G.A.P. and integrated pest management (IPM) measures for production. It will also enable them to invest in the necessary equipment needed to ensure the production of quality produce.

7.2 Training Guidelines for Quarantine Inspectors

1. **EU/UK Market requirements**: inspectors need to be up to date with existing regulations, new regulations, and developments for fruits and vegetables in the EU and the UK markets. Regulations and requirements should cover:
    a. EU General Food Law Regulation (Regulation (EC) No 178/2002);
    b. Directive 2000/29/EC on Harmful Organisms;
    c. Directive 2017/1279/EC, on protective measures against the introduction into the community of organisms harmful to plants or plant products and against their spread within the community;
    d. Directive 2019/2072/EC, establishing uniform conditions for the implementation of Regulation (EU) 2016/2031 of the European Parliament and the Council, as regards protective measures against pests of plants, and repealing Commission Regulation (EC) No. 690/2008 and amending Commission Implementing Regulation (EU) 2018/2019;
    e. Regulation 2021/2285/EC, amending Implementing Regulation (EU) 2019/2072 as regards the listing of pests, prohibitions, and requirements for the introduction into, and movement within, the Union of plants, plant products and other objects, and repealing Decisions 98/109/EC and 2002/757/EC, and implementing regulations (EU) 2020/885 and (EU) 2020/1292.
2. **Identification of harmful organisms:** ensure that the technical competence of inspectors at the points of exit is enhanced to facilitate the identification of harmful organisms. The main harmful organisms of interest and concern include fruit flies, white flies, thrips, false codling moths, and mango stone weevils.
3. **Data Collection and Border Rejections Information Management:** inspectors at the point of exit need to have capacity in best practices in recording data, especially internal interceptions, and rejections, using recent information communications and technology tools. Capacity is also needed in developing regular analytical reports to improve risk management and inspection processes at the point of exit. This training will be useful when the PPRSD GH-TRACE (e-traceability system) is used to provide end-to-end data collection and information management from production through to export.
4. **Examination of documents:** Inspectors at the points of exit, including the various post offices, need be trained on documentary inspections. This is to prevent the export of consignments that do not meet all documentary requirements and minimize other documentary irregularities. It will also enhance the capacity of inspectors to ensure completeness, accuracy, and authenticity of the documents (such as phytosanitary certificates, field inspection certificates, inspection reports, laboratory reports, designation address, etc.) accompanying exported consignments.
5. **Verification of the contents of consignments:** Training is required to facilitate the detection of smuggled goods and harmful organisms especially in mixed consignments. This

inspection will ensure consignments are accurately described by its documents thus ensuring identity and integrity.

6. **Sampling Techniques for consignment inspections:** Training is required to improve the sampling procedure for fruits and vegetables to facilitate the detection of harmful organisms. Training should raise inspectors' familiarity with sampling regimes for the inspection of different kinds and volumes of commodities.
7. **Additional Declarations:** Inspectors need to be trained on the guidelines for writing additional declarations on phytosanitary certificates for exports, especially for the EU and UK markets.

7.3 Training Guidelines for Exporters

1. **EU/UK Market requirements**: inspectors need to be aware of existing regulations, new regulations, and developments for fruits and vegetables in the EU and the UK market. Regulations and requirements should cover:
    a. EU General Food Law Regulation (Regulation (EC) No 178/2002);
    b. Directive 2000/29/EC on Harmful Organisms;
    c. Directive 2017/1279/EC, on protective measures against the introduction into the community of organisms harmful to plants or plant products and against their spread within the community;
    d. Directive 2019/2072/EC, establishing uniform conditions for the implementation of Regulation (EU) 2016/2031 of the European Parliament and the Council, as regards protective measures against pests of plants, and repealing Commission Regulation (EC) No 690/2008 and amending Commission Implementing Regulation (EU) 2018/2019; and,
    e. Regulation 2021/2285/EC, amending Implementing Regulation (EU) 2019/2072 as regards the listing of pests, prohibitions, and requirements for the introduction into, and movement within, the Union of plants, plant products and other objects, and repealing decisions 98/109/EC and 2002/757/EC, and implementing regulations (EU) 2020/885 and (EU) 2020/1292.
2. **Phytosanitary measures:** Exporters must have knowledge of quarantine pests of interests to the UK and the EU and the migration tendencies of these pests. Moreover, they must be able to put measures in place to detect, control, or contain these pests. Exporters should also be sensitized on the phytosanitary requirements of the EU and UK and the importance of complying with these requirements.
3. **Documentary compliance**: Exporters must be educated on the phytosanitary documents required for the export of fruits and vegetables. Exporters must familiarize themselves with these documents and their importance to reduce documentary non-compliance and smuggling of commodities.
4. **Traceability Systems:** exporters who source commodities from out-growers and other farmers must be able to conduct the necessary checks on these suppliers to verify and validate their registration with the PPRSD.

7.4 Guidelines for Interventions at the Packhouse

1. **EU/UK Market Regulations**: inspectors need to be up to date on existing regulations, new regulations, and developments for fruits and vegetables in the EU and the UK market. Regulations and requirements should cover:

a. EU General Food Law Regulation (Regulation (EC) No 178/2002);
b. Directive 2000/29/EC on Harmful Organisms;
c. Directive 2017/1279/EC, on protective measures against the introduction into the community of organisms harmful to plants or plant products and against their spread within the community;
d. Directive 2019/2072/EC, establishing uniform conditions for the implementation of Regulation (EU) 2016/2031 of the European Parliament and the Council, as regards protective measures against pests of plants, and repealing Commission Regulation (EC) No 690/2008 and amending Commission Implementing Regulation (EU) 2018/2019; and,
e. Regulation 2021/2285/EC, amending Implementing Regulation (EU) 2019/2072 as regards the listing of pests, prohibitions, and requirements for the introduction into, and movement within, the Union of plants, plant products and other objects, and repealing decisions 98/109/EC and 2002/757/EC and implementing regulations (EU) 2020/885 and (EU) 2020/1292.

1. **Detection of target pest:** Packhouse operators should be trained to develop the capacity and technical competence to detect the presence of pests and other harmful organisms, and the signs or symptoms of these organisms on fruits and vegetable. This includes capacity in the physical examination of produce, including microscopic examinations. They must also be able to put in place effective control measures to manage infested commodities properly.
2. **Packhouse Operations and Management:** There is the need for training on general packhouse operations (receiving and recording, cleaning, sorting/grading, pre-treatments, packing, cooling, storage, and transport) to ensure product quality and minimize losses that occur after the produce have been exported.
3. **Documentary compliance:** Comprehensive training on documentary compliance is required for packhouse operators to be familiar with the phytosanitary documents related to the exported consignment. The relevant documents may include:
    a. Phytosanitary certificate
    b. Certificate of origin
    c. Inspection reports
    d. Laboratory reports
5. **Traceability Systems:** exporters who source commodities from out-growers and other farmers must be able to conduct the necessary checks on these suppliers to verify and validate their registration with the PPRSD.

8. CONCULSIONS AND RECOMMENDATIONS

8.1 Conclusions

Ghana has instituted measures to address the sanitary and phytosanitary issues affecting the export of fruit and vegetables on the international market. The country continues to struggle with interceptions on the international market, although improvements have been made over the past several years. The declining levels of international rejections are not due to improvement in the value chains of fruit and vegetables in terms of compliance with international market regulations (pest control and documentary compliance) but rather due to high levels of internal interceptions and rejections at the KIA. Although this demonstrates improvement of enforcement capacity by regulatory authorities, it also highlights the need for improved knowledge and practices of value chain actors to reduce losses and improve their competitiveness.

Most local interceptions and rejections are related to turia and to a lesser extent, chili and mango. The rejections show a deficiency in the capacity of local producers and exporters to effectively comply with EU/UK sanitary and phytosanitary market requirements despite the measures established by the PPRSD.

Internal rejections over the period were due to the non-adherence to G.A.P. by producers, the inability of the PPRSD to undertake rigorous field inspections due to the partial lockdown imposed in certain parts of the country induced by the COVID-19 pandemic, and a general lack of knowledge of export processes by new exporters.

On the international market, interceptions were due to capacity gaps in the PPRSD notably, inadequate equipment to facilitate inspections, the lack of inspection measures at the various Ghana Post Offices, and the export (smuggling) of fruits and vegetables by exporters either via other fruit and vegetable consignments or via non-fruit and vegetable consignments that do not require inspection by the PPRSD office at the point of exit.

Capacity gaps within the PPRSD include the inadequate inspection equipment to facilitate pest detection, inadequate staff capacity to conduct regular field inspections at the points of exit, farms, and packhouses, lack of enforcement of punitive measures, and weak data collection and information management systems. Capacity gaps along the value chain include non-adherence to G.A.P. and established protocols for production, inadequate knowledge of pest management and international market requirements, and the high cost of crop protection products in the local market.

8.2 Recommendations

1. The PPRSD must deliver training for new exporters on international best practices and market requirements before they start exporting. Existing exporters whose consignments are intercepted locally or on the international market should also be compelled to attend and complete this training before being allowed to export again.

2. In addition to initial training for new exporters and compulsory training for poor performers, the PPRSD must continuously educate and sensitize producers and exporters on G.A.P., PPRSD export procedures, and international market requirements to minimize rejections and interceptions. This could be rolled out on a regular basis and when new EU regulations are issued. Training Certification information can be uploaded in the PPRSD traceability system and be made a requirement for exporters.

3. PPRSD must upgrade its existing traceability system to deploy of an end-to-end public traceability system that will integrate and record all farm, packhouse, and exporter activities, including notifications to exporters and PPRSD on intention to export. As indicated earlier, currently exporters notify PPRSD via WhatsApp of their intention to export 48 hours in advance of bringing their consignment to the airport. The advance notification is to allow PPRSD schedule inspections and obtain information (documentary) about export requirements before the actual inspection at the airport. An end-to-end traceability system for exporters and PPRSD will support the tracking of rejections, notifications, and implementation of sanctions. It was observed that several exporters experienced rejections at KIA but continue to export, even though the PPRSD procedure requires suspension or ban in the case of internal rejection.

4. PPRSD should send staff to large- and medium-scale exporters/packhouses to serve as a first level of screening and inspection before products are taken to the airport. This would reduce cost and time of transporting fruits and vegetables to the point of exit. PPRSD staff at the KIA and the Tema Port require the necessary resources (including means of transport) to conduct inspections at the packhouses and warehouses. This will lead to several benefits for both the exporters and the PPRSD. First, it would ensure that unqualified commodities are rejected at the packhouses before being transported to the point of exit, therefore, only exportable commodities would be transported to the Tema Port and KIA for export. Second, it would reduce the time and transport cost incurred by exporters, who must initially transport their commodities from the packhouses to ports and back to the packhouses when they are rejected. Third, it will reduce inspections conducted at the ports thereby reducing the time for exporting commodities, especially fruits and vegetables. Finally, it will ensure that specific PPSRD staff at the KIA and the Tema Port can be held accountable for interceptions on international market.

Annex 1 – METHODOLOGY FOR BORDER REJECTIONS ASSESSMENT

I. Introduction

This document provides detailed methodology for undertaking the border rejections assessment consultancy. The objective is of the assessment to quantify border rejections and identify points of infraction along target value chains from Ghana to export destinations, with a particular focus on EU, UK, and US market destinations) (in-country rejections and rejections at destination markets). The target value chains are fruits, vegetables, cashew, and shea.

II. Proposed Methodology

The overall approach to the assignment will combine the collection of quantitative and qualitative data through literature view and field interviews with key informants, experts, and industry operators.

A. Literature Review focusing on:

A comprehensive literature review will be conducted, the objective will be to identify and synthesize past and current data, research, policies and relevant documentation and interventions by government private sector and donors on compliance, standards, and border rejections. The literature review will conduct:

f. Analysis of export data of fruits, vegetables, shea, and cashew 2014 to 2021 or latest
g. Analysis of data of EU/US/UK Interceptions/Rejections fruits, vegetables, shea ,and cashew 2014 to latest data Rapid Alert System for Food and Feed (RASFF)/OASIS
h. Analysis of data on rejections by border authorities in Ghana (in country rejections)
i. Review of EU/US/UK Measures on Border Rejections
j. Analysis of data on categorization of reasons for interceptions
k. Analysis of National Responses/Measures on Border Rejections

B. Field Interviews with the following stakeholders

Stakeholders (regulators, exporters, technical assistance providers) will be interviewed to obtain first-hand experience, opinions and draw lessons learned on border rejections. An open-ended interview guide will be developed (see below) to guide interviews with key informants. Proposed Stakeholders to be interviewed for Border Rejection Assessment are:

Regulators/Public Sector	Private Sector/Industry Associations	DPs/Other Interventions
• PPRSD Office • PPRSD Airport • PPRSD Tema • FDA-Head Office • FDA KIA • FDA Team • GEPA	• VEPA • SPEG • FAGE • Africa Cashew Alliance • Global Shea Alliance • Exporters • Packhouses • Processors • Farmers	• CABI • COLEACP • West Africa Competitiveness Programme (WACOMP)

C. Report Drafting, Review and Validation

Based on the interviews, and literature review a synthesis of key findings, trends, insights, lessons learned, and recommendations. The report will quantify and identify critical gaps in the value chains for improvement to reduce border rejections. It will provide guidelines/interventions for improving compliance for farmers, quarantine officers, packhouses and exporters.

D. Report Submission and Dissemination

The report will be submitted for review and comments by the GTI/IESC Team. Feedback will be adapted into the report for final submission, and validation with stakeholders and dissemination.

Draft Interview Guide for Border Rejections Assessment

A. Questions for PPRSD/FDA/GEPA

1. What has been the trajectory of border rejections from the periods (Exports versus Rejections)
    a. 2014-2018
    b. November 2018-2019
    c. 2020
    d. Post COVID period to date
2. Provide a step-by-step explanation of inspections conducted at the point of exit?
3. What type/category of exporters often have their goods rejected at the border?
4. Distinguish between border rejections at Ghana point of exit and border rejections in the international market.
5. What are the main countries of border rejection of food exports from Ghana?
6. What are the frequently cited reasons for border rejections?
7. What part of the value chain are rejections often attributed to?
8. How are border rejections notified to the regulatory authorities?
9. What has been the impact on border rejections on Ghana, PPRSD, FDAS Private Sector, others?
10. What compliance measures have you put in place to reduce border rejections?
11. Despite these measures, why are there still border rejections? What are the gaps in the system?
12. What support (technical assistance) do you provide to private sector to reduce rejections at the border?

13. What systems do you have in place for recording and addressing in-country border rejections?
14. What are the measures/requirements for firms that have their goods rejected at the border? Are there sanctions, support/technical assistance?
15. What is the follow-up system for addressing border rejections?
16. What capacity challenges do regulators have (if any) in addressing capacity issues of private sector that face border rejections?

Questions for Exporters/Packhouses/Processers/Farmers

1. Has your company or any other company had goods rejected at the border in the export market?
2. Has your company or any other company you know had their goods rejected at the point of exit of Ghana? Which point of exit?
3. What volume of goods were rejected? In Ghana or EU/US market?
4. What were the reasons for the border rejection?
5. Which aspect of your operations/value chains can the rejections be attributed to?
6. What was the impact of the rejection on your business/operations?
7. What support if any did you receive for any regulatory institutions to meet market requirements?
8. What measures did your business put in place to forestall future rejections?
9. What will you recommend as support to exporters to reduced border rejections?

Questions for Other Interventions

1. What has been the main reasons for border rejections for main exports from Ghana?
2. What support programmes have you been providing to exporters in meeting requirements in export markets?
3. What support programmes have you been providing to regulatory bodies in Ghana to address border rejections?
4. What has been the main challenges in supporting exporters with your intervention?
5. What has been the main challenges in supporting regulators with your intervention
6. What will you recommend to improve regulatory capacity in reducing border rejections?
7. What will you recommend to improve exporters' capacity in reducing border rejections?

Annex 2 – STAKEHOLDERS INTERVIEWED

S/N	Name	Position	Institution	Contact
1.	Prudence Attipoe	Deputy Head, Quarantine	Plant Protection and Regulatory Services Directorate	[redacted]
2.	Nicholina Ama Badu Kotei	Officer in Charge, Tema Harbor	Plant Protection and Regulatory Services Directorate	[redacted]
3.	Cletus Sam	Officer in Charge, Kotoka International Airport	Plant Protection and Regulatory Services Directorate	[redacted]
4	Ampofo Yebeoah	Operations	Dhillion Farms	[redacted]
5.	Anthony Morrision	Chair	Ghana Agribusiness Chamber	[redacted]
6.	Victor Avah	Agribusiness Consultant	GAPS Consulting	[redacted]
7.	Richmond	Manager, Akorley Packhouse	Cotton Weblink Limited	[redacted]
8	Frank Kwesi	National Cluster Expert-Fruits	West Africa Competitiveness Programme	[redacted]

Annex 3 – PHYTOSANITARY MEASURES BY GHANA'S NPPO

23-08-19

PHYTOSANITARY MEASURES

BY GHANA'S NPPO

TO

ADDRESS IMPORTANT AMENDMENT TO
EU PLANT HEALTH REGULATIONS

IMPLEMENTING DIRECTIVE 2019/523

AFFECTING EXPORT OF CHILIES AND PEPPERS (*CAPSICUM*) – TO ENSURE PRODUCE IS FREE FROM THE FALSE CODLING MOTH *Thaumatotibia leucotreta* (Meyrick) (Lepidoptera: Tortricidae).

August 2019

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PREFACE

Ghana has implemented a successful integrated pest management program for the False Codling Moth (FCM), *Thaumatotibia leucotreta* (Meyrick) (Lepidoptera: Tortricidae) which was commonly intercepted by the European Union (EU) Members States and Switzerland in consignments exported from Ghana. The FCM is a regulated quarantine pest in the EU since 1st October 2015, following a risk assessment by the European and Mediterranean Plant Protection Organization (EPPO) in 2013, which indicated that it can establish in EU member states with economic consequences, thus requiring intervention. The FCM, *T. leucotreta* has been categorized as an A2 pest (a quarantine pest present in the EPPO region, but not widely distributed there and being officially controlled), thus qualifying for inclusion as a harmful organism. Ghana's NPPO presented a roadmap in December 2017 to the EU to address the European Commission's published Implementing Directive 2017/1279, which sets out important new plant health rules affecting African Caribbean Pacific (ACP) exports, regarding rules and additional measures for the control of some new quarantine pests, including False Codling Moth (*T. leucotreta*) on *Capsicum* (including hot pepper). The purpose of this current dossier or roadmap is to describe in detail the treatment method, including revisions made, for FCM based on the Annex IV, Part A, section I Point 16.6 option (d), selected by Ghana and to provide more evidence about its effectiveness so as to address the requirement of the new EU Implementing Directive published in March 2019 (2019/523), which take effect from 1st September 2019. The current phytosanitary measure employs a holistic approach to crop health, known as Integrated Crop Management (ICM) of which, Integrated Pest Management (IPM) is an integral part. This approach was tested through participatory on-farm trials conducted by the NPPO with exporters and their out-grower farms, with technical assistance from expert Entomologists, from knowledge institutions, during 2016 and 2017 cropping seasons. The outcome of these trials and continuous surveillance for FCM at the farm level, analysis of chilies for export at the NPPO's laboratory and interceptions at the exit point (Kotoka International Airport) for 2018 and part of 2019 have also been used as the baseline for this phytosanitary measure to ensure, chilies from Ghana to the EU, is free from all pests, including the FCM, as per the guidelines and options provided by the EU Implementing Directive 2017/1279, which took effect from 1st January 2018 and the current Directive 2019/523 which commences from 1st September 2019.

BACKGROUND:

i. *Ghana's NPPO initiative to strengthen the internal controls on the production and export of formerly banned vegetables to make them pest free*

As part of the efforts to strengthen the certification and controls for the export of vegetables from Ghana to the European Union (EU), the National Plant Protection Organization (NPPO) of Ghana, referred to hereafter as the Plant Protection and Regulatory Services Directorate (PPRSD), of the Ministry of Food and Agriculture (MOFA), together with its key stakeholders, have developed a scientific protocol and phytosanitary measures for all out-grower farms of exporters of vegetables, especially the formerly banned ones (gourds, eggplant, aubergine and chilies) whose export resumed from 1st January 2018 (Fening *et al*., 2016; GhanaVeg Sector Reports 2017).

As indicated in the review of control options and risk mitigation measures for the FCM, Moore and Hattingh (2016) demonstrated that there is a wide range of effective pre- and post-harvest treatments available for *T. leucotreta* that may be used singly or in varying combinations, thereby providing a range of options for achieving internationally accepted levels of phytosanitary risk mitigation.

The current protocols developed by Ghana offered guidelines on important agronomic, pest, disease, and nutrient management practices for specific commodities; *Luffa*, *Momordica* and *Lagenaria* (luffa, bitter and bottle gourds, respectively), *Capsicum* sp. (chilies) and *Solanum* spp. (eggplant and aubergine), based on best practices utilised in Integrated Crop Management (ICM), of which Integrated Pest Management (IPM) is an integral part. Specifically, the management interventions (phytosanitary measures), has been developed for the key quarantine pests, including the FCM. These pest-specific interventions have been summarized into pictorial, one-page fact sheet or poster, with limited text, for the management of each of these quarantine pests in the field. The management options follow three stepwise approach, involving prevention, monitoring and acting, as a holistic and sustainable approach to pest management.

In addition, exporters and their out-grower farms records on agronomic practices (e.g. weeding, fertilizer application, irrigation) and pest management (such as pest scouting and pesticide application) is also monitored and documented. These records are still being updated to offer

evidence of producers complying with management interventions and other production protocols developed. Data sheets for recording such information have been developed by PPRSD, and given to exporters and their out-growers for their farm records. This process is currently being monitored at all production sites. The PPRSD is ensuring that all exporters and their out-grower farms fully comply with this provision before they will be allowed to export any of the target vegetables, especially chilies, to the EU market. These field monitoring efforts by the NPPO has been further strengthened with the recruitment of about 300 new staff who have been trained and deployed to all the districts, where the production of these vegetables occur, to offer support to the farmers and the out-growers of the exporters in the execution of the roadmap for pests' reduction, including the management of FCM.

(*ii) Ghana's performance on FCM interceptions on chilies at the EU among other ACP countries has been very encouraging*.

The interception of FCM for Ghana has drastically reduced from 70 in 2014 and 66 in 2015 to 12 in 2018 (EUROPHYT 2014, 2015 and 2018). Comparing Ghana's performance with other ACP countries, Kenya and Uganda each had 53 interception notifications due to FCM in 2018 (EUROPHYT 2018). However, Ghana still needs to improve its performance until it records zero interception for FCM as indicated in Ghana's roadmap to the EU to control the FCM (Fening and Billah 2017a, b).

***The NPPO is improving its performance for zero interception for FCM through the following:

1. Inspecting the capsicum farms for mapping and coding prior to production to be included in the traceability system.
2. Inspection and coding of pack house to be included in the traceability system
3. Inspecting the capsicum farms to ensure that all the phytosanitary measures are being applied.
4. Samples are picked after fruiting for laboratory analysis during which inspection and incubation of the chili fruits is done to check for the presence of the FCM.
5. If the chili fruit sample passes the laboratory test, the chili farm is approved for export pending inspection and certification at the exit point.
6. The laboratory report is sent to the Officer-in-charge at the exit point for the necessary action.

Finally to enable us trace back for corrective measures on the farms, we are upgrading our manual traceability system by putting in place an electronic traceability system for all chili growers and exporters to ensure that only chilies from approved farms are allowed for export. *** Four hundred and sixty-three (463) new PPRSD staff have been recruited and trained to support in the field monitoring of exporter farms to ensure compliance. The number of inspectors undertaking inspections at the exit point have been doubled to ensure increased probability of pest detection.

Exporters and their out-growers have been trained and advised to follow strictly the management interventions for the FCM on chilies. Among the interventions developed include farm sanitation (destruction of dropped fruits), use of biopesticides (CrleGV-SA, neem, maltodextrin, *Bacillus thuringiensis* (*Bt*)) and novel pesticides (e.g. Emamectin benzoate), and mass trapping using FCM lure in a Delta® or Pherocon® trap with a sticky surface. The earlier recommendation of 5 traps per hectare is increased to 12 traps per hectare to enhance its usefulness as a population suppression tool. The mass trapping is an integral part of an integrated control measure, especially in areas with high pest (FCM) pressure such as Begoro in the forest agro-ecological zone of Ghana (fig 3 and 4).

iii. The New EU amendments affecting the export of chilies and pepper- Directives 2017/1279 and 2019/523

Until the new European Plant Health Regulation comes into force in December 2019, the application of existing EU rules is being reinforced. This has implications for third party countries exporting to the EU, including the African, Caribbean and Pacific (ACP) states. On 14 July 2017, the European Commission (EC) published Implementing Directive 2017/1279, which sets out important new plant health rules affecting ACP exports. These rules require additional measures for the control of some new quarantine pests, including False Codling Moth (*Thaumatotibia leucotreta*) on *Capsicum* (including hot pepper). The Directive specifies *Capsicum* exported to the EU from the African continent, Cape Verde, Saint Helena, Madagascar, La Reunion, Mauritius and Israel must meet either of the two requirements below. As these countries are known to have established populations of False Codling Moth (FCM) (EPPO 2013), and there have been historically high numbers of interceptions on hot pepper (EUROPHYT 2012-2015). Consequently, from 1st January 2018, producers in these countries will only be able to export *Capsicum* to the EU; either by chosen between Annex IV, Part A,

section I Point 16.6 option (a)-(d). The option (d) states '*If the produce is given an effective cold treatment (or other effective treatment), that ensures it is FCM free. The method used must be indicated on the plant health certificate, and be communicated in advance to the EC.* Based on the above EU directive, Ghana as an affected country adopted the option (d), i.e. alternative (**OTHER EFFECTIVE METHOD**) and accordingly

1. Compiled a dossier on the methods used, and data on its effectiveness, and submitted to the EU authorities in December 2017.
2. Collected data on FCM to show evidence of the effectiveness of control methods being used by growers.

3. Informed *Capsicum* growers and exporters about the regulatory changes and for them to be aware of the new Directive so that they can take appropriate actions and decisions.

Having chosen the option (d), the new EU implementing Directive issued in March (2019/523) brings in an important change to Annex IV, Part A, section I Point 16.6 option (d). It states that *Capsicum* imported into the EU must "have been subjected to an effective cold treatment to ensure freedom from *Thaumatotibia leucotreta* (Meyrick) or another effective treatment to ensure freedom from *Thaumatotibia leucotreta* (Meyrick) and the treatment data should be indicated on the certificates referred to in Article 13(1)(ii), provided that the treatment method together with documentary evidence of its effectiveness has been communicated in advance in writing by the national plant protection organization of the third country concerned to the Commission." Ghana, and other ACP Countries that have opted for Annex IV, Part A, section I Point 16.6 option (d) therefore need to send a new dossier describing the control method, and this time providing evidence of its effectiveness. This directive take effect from September 1st 2019.

SUMMARY OF GUIDELINES OR PROTOCOLS FOR THE PRODUCTION OF CHILIES FOR EXPORT

Production protocols for chilies

A. Nursery management and transplanting of seedlings

1. Purchase certified hybrid seeds of the recommended variety from a registered seed dealer for sowing. Seeds that develop into pepper fruits that are thick fleshed (e.g. M.I.G 3 and KA 2) are preferred as they exhibit some level of resistance against FCM attack.

2. Construct a raised bed (during major or wet season) or a sunken bed (during the dry season). Turn the soil and remove all debris, and expose it to the sun for some days (soil solarization using sunlight). This can be further aided by mulching the soil and covering it with a transparent polyethylene cover to trap solar energy. This will facilitate the control of pests such as soil-borne plant pathogens, including fungi, bacteria, nematodes, insect and mite pests along with weed seed and seedlings in the soil.

3. Sandy loam soil is preferred for the sowing of seeds. You can incorporate well decomposed poultry manure (at a rate of 10-20t/ha) into the soil at least two weeks before the sowing of seeds.
4. Make furrows (in lines) for the seeds, following the packet instructions for depth of furrows and spacing between them (normally half to one inch deep, 2-6 inches apart). If possible, lay out the rows in a north-south direction, so that both sides will receive an equal amount of sunlight during the day.
5. Sow seeds evenly, spacing them as the packet directs. You can tear off a small corner of the packet and tap the seeds out as you move along or pour a small quantity of seed into your palm and scatter pinches of seed as evenly as possible.
6. Water the furrows with a fine spray; then keep the soil surface moist but not dripping wet until the seeds sprout.
7. Young sprouts are often tempting to ants, snails and birds. Cover your seedbeds after sowing with palm fronds or grass. After germination, remove the palm fronds or grass and construct a mosquito-proof net around the seedbed to protect the seedlings against attack by insect pests, snails, millipedes and birds.
8. Drench with a recommended fungicide against damping off.
9. Subsequently, water seedlings when the need arise rather than on a regular schedule.
10. Thin overcrowded seedlings while they're still small (at 2 sets of true leaves stage). Transplant the thinned seedlings to fill empty spaces in the bed. If you wait too long to thin, the plants will develop poorly, and you'll have a harder time removing an individual plant without disturbing those around it.
11. Another option is to sow your seeds in a seed box or container in an indoor or greenhouse environment and thin out to seedling trays for recover transplanting shock.
12. Transplant seedlings to the main field at 5-true leaf stage in the cool of the day or late afternoon. The soil should be moist and of a fine texture using the recommended spacing. The recommended spacing for chilies is 60 cm x 60 cm.

13. You can harden the seedlings, especially those sown indoors, prior to transplanting.

Land preparation in the main field

Remove stumps and clear land of weeds. Plough and harrow to obtain a uniform field. Construct ridges to transplant chilies in low lying areas or soil with high water retention or transplant seedlings on flat land in uplands or soils with good drainage or without flooding.

B. Crop management practices

Nutrient management

Farmers should examine the history of fertilizer application and decide when the fertilizers should be applied. Before fertilizer application, the soil should be tested and analyzed to determine the initial fertility levels and adjust rates to meet the crop nutrient requirements. There is the need to document where farmers have been applying inorganic fertilizers and organic manure, did any soil testing and records keeping. Also record the previous crops, or fallow periods, crop rotation regimes, etc.

Fertilizer application

- At transplanting, water seedlings with a starter solution (of 5g/L NPK 15-15-15 or 3g/L di-Ammonium Phosphate or any commercial fertilizer rich in Phosphorus and Nitrogen). This is also informed by results of initial soil testing.

- 2-3 weeks after transplanting (WAT), apply a mixture of 6g (2 crown caps) NPK 15-15-15 and 3g (1 crown cap) Ammonium Sulphate per plant

- At flowering, side dress 3g Potassium Nitrate, repeat at 2 weeks interval. Apply high Calcium foliar fertilizers containing Boron every 2 weeks following manufacturer's instructions.

- Reduce the Potassium Nitrate (KNO3) from the onset of flowering, and add after each harvest by applying a combination of 3g KNO3/ Ammonium Sulphate per plant.

Mulching

Mulch to conserve soil moisture, reduce weed competition, erosion and soil compaction. Use rice straw (5t/ha) or other organic material, polyethylene sheet, or a combination of materials. Where plastic mulch is used, lay before transplanting.

Supplementary Irrigation

Provide supplementary irrigation to maintain a good moisture level throughout the growth period especially during flowering and fruit development. Select production sites in areas that have uncontaminated water. If possible send sample of the water for irrigation for testing of its quality. This must be done annually.

Weed control

Keep the field free of weeds by applying approved pre and post emergent herbicides, or preferably hoeing or hand picking. Avoid damaging plant roots.

Pest and Disease management

Monitor and control pests such as nematodes and fungal diseases using the appropriate nematicides and fungicides, respectively at the recommended rates. Use only registered and approved pesticides for use by the Environmental Protection Agency (EPA) and PPRSD of MOFA.

PROTOCOLS FOR MANAGING FCM ON CHILIES FOR EXPORT

The protocols or methods for FCM control in chilies will follow three pronged IPM approach to prevent, monitor and act (control) timely to ensure harvested chilies are free from FCM. The measures to be used by all grower farms are as follows:

Step 1: Prevent

1. Select areas with low pest (FCM) prevalence for the production of chilies.
2. Weed and remove all crop residues as they provide shelter and food for the pest (adopt field sanitation).
3. Deep plough to burry or harrow, and rake to expose FCM larvae or pupae to natural enemies and harsh weather conditions
4. Remove and destroy infested fruits by putting them in thick black plastic bags, fastened tightly and expose to the sun for up 10-14 days, turning bag regularly, or bury them to a depth of 90 cm.
5. Do not grow chilies on plots which were earlier used for alternative host plants of FCM or in the vicinity of alternative host plants (e.g. maize, eggplant, citrus, beans, cotton, avocado, coffee, cocoa and guava).

6. Where sprinkler irrigation is used for supplementary irrigation. It must be done during dusk or late evening to disrupt mating and oviposition by adult FCM moths.

Step 2: Monitor

1. Set up pheromone traps at the beginning of the season (within crop and on the borders) to establish the presence and build-up of adults (males) in traps. For monitoring purposes, having one(1) Delta or Pherocon® wing trap, with a sticky surface with lure in one (1) hectare of crop field is sufficient. Data from the trap catches or information is important for making a decision to initiate other control measures. As soon as chilies are at the fruiting stage, it must be expected that female moths will start visiting the crops for oviposition on the fruits and therefore traps will start catching male moths. Adult moths have variegated brown and grey forewings with a white spot in the center, while hind wings are light brown to grey (Fig. 2).
2. Scout or look for eggs (small whitish, about 0.9mm long and are normally laid singly) and larvae (young larvae are whitish, with a dark brown head, but mature larvae are pinkish-red with a brown head) on the crop every week.
3. Cut and open fruits to inspect for the presence or absence of larvae.
4. Look for small with yellowish-brown edges on fruits. This is the characteristic exit hole left in chili fruits by mature FCM larvae (5th instar). Harvest such fruits and bury them at the recommended depth of up to 90 cm or tie them in thick black polythene bags and expose to the sun.
5. Inspect top soil and crop residues for pupa enclosed in a cream colored cocoon. Fully grown larvae emerge from fruits and pupate in the soil.
6. Note that FCM does not undergo diapause or a quiescent period. In most areas of its distribution, the pest is present all year-round, with overlapping generations feeding on the available fruits of its wild or cultivated host plants.

Step 3: Act

1. Handpick and destroy FCM egg masses and infested fruits (those with excrement or frass of larvae).
2. Mass trap and kill moths with FCM lures baited with insecticides or sticky traps. It is recommended that more Delta® or Pherocon® wing traps with a sticky surface (Figs. 3 and 4) are placed at the borders (8 traps) and inside (4 traps) the field, making a total

of 12 traps per hectare to ensure effective control (Figs. 5 in Annex A). Traps must be set above canopy level of the crop and high enough to avoid soil splashing on the sticky surface. Since in this case, the traps are also used to mass trap and kill the males (to disrupt mating and reproduction with their female counterparts).

3. Apply a botanical [crude neem seed extract (50g of seed /L of water) or neem oil (60ml/15L of water)] to control larvae and to prevent the adult female moths from ovipositing on fruits, as fruits sprayed with neem acquire a smooth surface coat. The active ingredient, azadiractin in neem, also exhibit anti-feedant properties and acts as oviposition deterrent and suppress the growth and development of pest by preventing moulting among instars.
4. Alternatively, apply a biopesticide (*Bacillus thuringiensis*) (*Bt*) product at the recommended rate. *Bt* acts as a stomach poison when ingested. Can also apply the microbial biopesticide Cryptogran® (*Cryptophlebia leucotreta* granulovirus) (CrleGV-SA) at the recommended rate of 1.5ml per 15L of water. Application of Cryptogran® should be applied at dusk for effective control and must be stored in a fridge at 4^0C when not in use. Preliminary data shows that CrleGV-SA offered over 95% protection against FCM in two exporter chili fields, i.e. Shrighan and Trosky farms located at Weija and Pampaso, respectively in Ghana.
5. Apply physically-acting Maltodextrin (282g/L) at 150ml per 15Lof water. Like neem, pepper fruits sprayed with maltodextrin prevent the adult female moths from ovipositing on fruits, as fruits sprayed with maltodextrin acquire a smooth surface coat. Also it blocks the spiracles of the insect leading to suffocation and death.

   Spray synthetic insecticides; binary action insecticide – [Acetamiprid 16g/L + Indoxacarb 30g/L, (40ml/15L); Lambda cyhalothrin 15g/L + Acetamiprid 20g/L (40ml/15L of water); Dimethoate (400g/L) + Cypermethrin (36g/L) (35ml/15L of water)]. Can also spray semi-synthetic insecticide Emamectin benzoate at the recommended rate.
6. Spray the synthetic insecticides bi-weekly by rotating the active ingredients up to the flowering stage, and discontinue use. Then continue with weekly application of environmentally-friendly products – microbial biopesticides Cryptogran® (CrleGV-SA) and *Bt*, botanical neem seed extract or neem oil, and physically acting insecticide, Maltodextrin.

7. Respect the pre-harvest intervals (PHI) for the different products, especially the synthetic insecticides, which have PHI of up to 14 days. The PHI for *Bt* is between 4-7 days. CrleGV-SA, neem and Maltodextrin have no pre-harvest interval, but it is generally recommended that fruits are harvested 3 days after their application.

PEST (FCM) DATA TO SHOW EVIDENCE OF EFFECTIVENESS OF CONTROL METHODS USED BY GROWERS

Monitoring using specific pest (FCM) survey has be undertaken to generate this data. The baseline information was obtained from chili trials undertaken in 2016 and 2017 from selected out-grower farms from the Ghana Association of Vegetable Exporters (GAVEX) (Fening *et al*., 2016; GhanaVeg Sector Reports 2017). Four FCM lure Delta sticky traps were placed at the borders of each chili farm to monitor adult male moth population, as well as trap and kill to disrupt mating with their female counterparts.

Thirty (30) chili fruits were sampled from each treatment plot (5 m x 5 m) weekly to inspect, for damage signs, and the presence of FCM larvae in fruit after dissecting them. Additional 30 fruits were sampled, reared and incubated in the laboratory to monitor for the emergence of FCM. Below is a table summarising the initial data obtained after the trial at Begoro which stands out currently as the hotspot for FCM (Table 1). Catches from other locations are likely to be much lower. A visual observation of the trap catches from the chili field at Begoro (a tropical rain forest) shows a gradual increase at the onset of the traps to peak periods around the fourth week after trap set (which happens to coincide with the period of fruit bearing by the plants). Thereafter, the numbers begin to decline to levels below the initial numbers (Table 1). This shows the traps played a significant role in the mass control of FCM.

Table 1: Relative density based on weekly trap catches of FCM from a field trial at Begoro for chilies, 2016-2017.

Date	No. Adults	No. Traps	Days
26.12.16	9	4	7
04.01.17	13	4	14
11.01.17	11	4	21
18.01.17	19	4	28
25.01.17	15	4	35
01.02.17	8	4	42

08.02.17	6	4	49	
15.02.17	2	4	56	
F/T/D	83	4	56	**0.371**

The relative population of FCM was calculated as 0.371 moths per trap per day on chilies (Table 1). This means it will take approximately one-and-a-half days for a single trap to collect FCM adult moth from the vicinity of the chili field. No wonder the total number of adult moths collected during the 8-week period were 83 for the chili farm). These indices are usually used to categorize crop production areas into areas of low, medium or high pest prevalence, and are important in the import/export trade of fruits and vegetables.

It is interesting to note that the Neem kernel extract, Protocol® and Viper® provided total protection (100%) against FCM in chili field (Table 2). Here, levels of protection ranged from 71.2-100% for all the six products. Hitherto, the farmers had used some of these same products before with little success. The plausible reason for the success now could be due to the consistent and systematic procedure engaged in the use of the products, including when and how they are applied with the appropriate applicator, coupled with the good planting distances used for the different crops as well as the good agronomic practices used during the trials. It has always been the thinking of farmers to plant as many seeds or seedlings per a fixed plot of land in order to harvest as many fruits as possible.

These results indicate that with the proper scientific basis, good agronomic practices, appropriate application of treatments, high quality fruits and vegetables can be produced for both the local and export markets. However, due to challenges with pre-harvest interval during fruiting stages of the crop and food safety issues, only neem seed extract and Maltodextrin are recommended for use after fruiting, in addition to mass trapping, using FCM lures in the Delta sticky traps, coupled with farm sanitation and good agricultural practices.

Table 2: Emergence of false codling moths from incubation of fruits from chili at Begoro.

Begoro – Chili					
Treatment (T)	No. fruits	No. Puparia	Pupa/Fruit	Diff. (C-T)	% Protection (Rel. to Control)
Crude neem seed extract	30	0	0.00	-	**100**

Cydim Super (Dimethoate (400g/L) + Cypermethrin (36g/L)	30	2	0.067	0.166	**71.2**
Bacillus thuringiensis (Bt.)	30	1	0.033	0.200	**85.8**
Eradicoat (maltodextrin 282g/L)	30	1	0.033	0.200	**85.8**
Viper (Acetamiprid 16g/L + Indoxacarb 30g/L)	30	0	0.00	-	**100**
Protocol (Lambda cyhalothrin 15g/L + Acetamiprid 20g/L)	30	0	0.00	-	**100**
Control (Unsprayed plot)	30	7	0.233	-	**-**

Monitoring of FCM male population in chilies and garden eggs fields of exporters have been on-going from 2017 to now. For instance, Fig. 1 below shows the trap catches of FCM in some out-grower farms of exporters in 2019. Generally more FCM were caught on traps placed in chilies than garden eggs

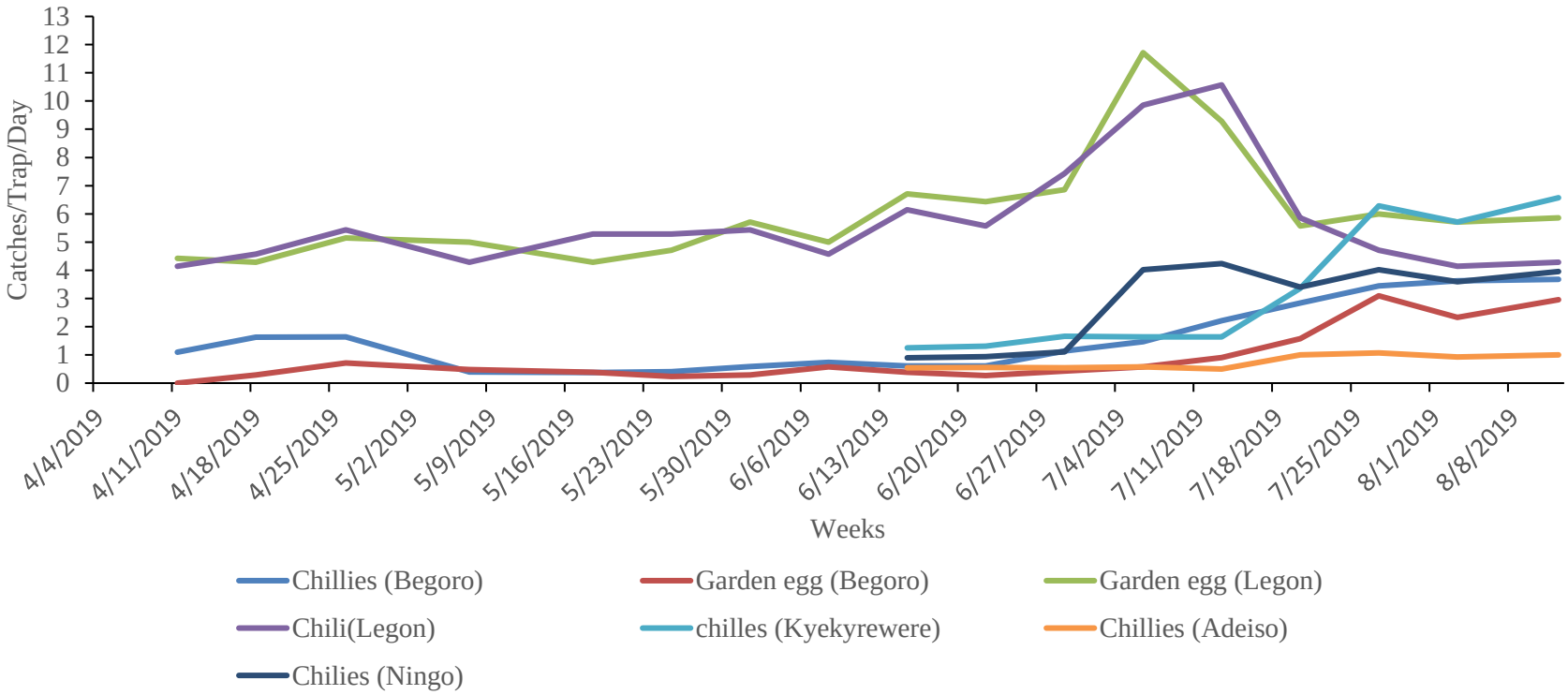

Figure 1 . Weekly trap catches of FCM in different localities from April to August, 2019 in some exporter farms in the forest and coastal agroecological zones of Ghana.

Monitoring data from selected exporter farms in the forest and savanna agroecological zones of Ghana in 2019 indicated that, all the chilies inspected and incubated had no emergence of FCM larvae or pupae (Table 3). This is likely to be the result of the mass trapping of FCM males (Figs 1, 3, 4 & 5) as a population suppression tool and also the enforcement of other management interventions, including farm sanitation, use of biological pesticides (*Bt*, CrleGV-SA, Neem) during fruiting and other less persistent synthetic (Acetamiprid + Indoxacarb; Lambda cyhalothrin + Acetamiprid ; Dimethoate + Cypermethrin, etc.) and semi-synthetic (Emamectin benzoate) insecticides prior to fruiting.

Table 3. : Infestation of chilies by FCM in different farms after fruits were sampled, inspected and incubated in the Entomology laboratory at the University of Ghana in August 2019.

Location	**Farm Nº**	**Number of samplings**	**sample size[1]**	**FCM**		
				BInc	Inc	Total
Begoro	1	3	540	0	0	0
	3	3	540	0	0	0
	6	3	540	0	0	0
Adeiso	1	1	180	0	0	0
	2	1	180	0	0	0
Kyekyewere	1	1	180	0	0	0
University Farm (Legon)	1	1	180	0	0	0

[1]Total Number of chili fruits collected.

BInc: Number of FCM larvae or pupae collected before incubation

Inc: Number of FCM larvae or pupae collected from chilies after incubation

NPPO's protocol for sampling fruits for pest detection and identification

The sampling protocol below is being followed for pest detection and identification in harvested fruits by the NPPO before the farm is approved to send chilies to the exit point for final inspection and certification if produce is found free from FCM and any other quarantine pest.

Prior to approval to export, one (1) box (5kg) of chilies will be randomly harvested from the field by PPRSD staff and at the production site and sent to the entomology laboratory of PPRSD for further examination and incubation for seven (7) to ten (10) days.

Based on the laboratory report, the farm will be approved for export or otherwise to the EU.

Interpretation of data and decision to allow an exporter to export chilies

If the data from the sampled chilies from the production site shows produce is free from the target pest (FCM) and other quarantine pests, the chilies from the production site will be approved for export pending risk based inspection and certification at the exit point for that production season.

The table below summarises some of the chilies incubated at the NPPO's entomology laboratory as part of the requirement for approval for export. From 23rd August 2018 to 17th April 2019, only 5 larvae of FCM have emerged from the samples of chilies incubated from the exporter farms (Table 4) out of the numerous chili samples that were incubated at the PPRSD Entomology laboratory. This suggests that generally, the interventions put in place at the field level to control FCM have been very effective.

Table 4.Intercepted chilies at the NPPO's laboratory after inspection and incubation of chili fruits from exporter's out-grower farms, 2018-2019.

Name of Outgrower	**Name of Exporter**	**Date**	**Commodity**	**Location**	**Pest**
William Alormenew	VEPEAG	23/08/18	Chili	Tadzewu, Ketu North	False Codling moth larva

Emmanuel Addo Bekoe	Joekopan Enterprise	11/09/18	Chili	Panpaso, Nsawam	False Codling moth larva
Osafo Kwame	Original seed farm	11/09/18	Chili	Akuffo krom, Nsawam	False Codling moth larva
Emmanuel Odoom Mensah	Srighan Farms	14/02/19	Chili	Buduata Gomoa East	False codling moth larva
Kwesi Nyantakyi	Joekopan Ent	17/04/19	Chili	Apaa, Fanteakwa	False codling moth larva

Beyond the field, the packhouse and the PPRSD laboratory, the final sampling of chili commodities and their inspection is done at the exit point (airport), before a phytosanitary certificate or plant passport is issued when produce is found to be free from FCM. Based on the records at KIA, a total of 6 and 5 FCM larvae were intercepted by Phytosanitary Inspectors from chili consignments inspected at the exit point (KIA) from January to December 2018, and January to June 2019, respectively (Tables 5 and 6). This attests to the NPPO's preparedness to ensure chilies exported from Ghana to the EU are free from FCM and any other quarantine pest. This low level of interceptions at the exit points further confirms the fact that the management interventions instituted at the field level supported by our earlier data is very effective in the treatment of the FCM.

Table 5. Intercepted chilies at the exit point (Kotoka International Airport) after inspection of chilies from exporters, Jan to Dec 2018

DATE	CONSIGNOR	COMMODITY	*BOTANICAL NAME*	NO. OF PACKAGE	TOTAL WT (KG)	IMPORTING COUNTRY	REASON(S) FOR INTERCEPTION	ACTION TAKEN
06/07/2018	Trosky Farms	Chilies	*Capsicum* sp.	30	120	United Kingdom	Suspected FCM larvae	Rejected
22/09/2018	Dhillon Farms	Chilies	*Capsicum annuum*	22	66	United Kingdom	Presence of FCM	Rejected
28/09/2018	Param Farm	Chilies	*Capsicum* sp.	40	120	United Kingdom	Presence of FCM larvae	Rejected
10/12/2018	Srighan Farms Ltd.	Chilies	*Capsicum* sp.	74	370	United Kingdom	Presence of harmful organisms (FCM larvae)	Rejected
23/10/2018	Trosky Farms	Chilies	*Capsicum* sp.	36	180	United Kingdom	Presence of harmful organisms (FCM larvae)	Rejected
24/11/2018	A-Mahli Ventures	Chilies	*Capsicum* sp.	30	120	United Kingdom	Presence of FCM larva	Rejected

Table 6. Intercepted chilies at the exit point (Kotoka International Airport) after inspection of chilies from exporters, Jan to June 2019.

COMPANY	COMMODITY	FARM CODE	OUTGROWER NAME	LOCATION OF FARM	REASON FOR REJECTION	DATE OF REJECTION
A-MAHLI VENTURES	Chili	GH030816190522003	A. Mahli ventures	Tomefa	Presence of false codling moth larva	18/01/2019
SRIGHAN FARMS LTD.	Chili	GH041204180009087	Zormelo	Fanteakwa	Presence of false codling moth	26/02/2019
FFINT CONSULT	Chili	GH041203030029037	Latifa Abudu	Aboabo	Presence of false codling moth	10/05/2019
JOEKOPAN FARM	Chili	GH040103140006054	Joekopan Ent	Kyekyewere	Presence of false codling moth	10/05/2019
TROSTKY FARMS	Chilie	GH042401040120094	Kwame Owusu	Amoakrom - Adeiso	Presence of FCM larva	21/06/2019

The Way forward

Only exporters and out-grower farms that strictly follow these protocols and pass the test of producing pest free (FCM) chilies were allowed to export chilies to the EU during the period January 2018 till now. Other potential exporters and their out-growers will be given training on the phytosanitary measures and the control of FCM and also have to strictly follow the phytosanitary measures put in place by the NPPO under the supervision of PPRSD field personnel, before they will be certified to export chilies to the EU, after samples are tested to confirm the produce is free from the target pests.

AWARENESS CREATION AMONG *CAPSICUM* GROWERS AND EXPORTERS ABOUT THE REGULATORY CHANGES- THE NEW DIRECTIVES

The NPPO (PPRSD), with support of other development partners such as CABI, GhanaVeg now Hortifresh, COLEACP and GIZ-MOAP have conducted several stakeholder consultations, trainings and Business platform meetings among the exporters, their out-growers and the Directorate of Agricultural Extension of MOFA to disseminate the requirements of the new EU directives (2017/1279 and 2019/523) on the export of chilies. Farmers/exporters are already implementing these interventions in their newly established chili farms, under the supervision of PPRSD. Over 1000 copies of fact sheets or posters for the management of the target pests (FCM**,** thrips, fruit flies, whiteflies, eggplant fruit and shoot borer.) have been distributed to the exporters and their out-growers as a guide to produce pest free vegetables for export.

The NPPO admits that these pest management interventions are dynamic and not static. As and when new knowledge comes in or challenges are met in the implementation of this phytosanitary measure, the knowledge institutions (Universities and Research Institutes) will be consulted to provide technical backstopping, based on International Plant Protection Convention's (IPPC) approved guidelines, to ensure we continually achieve sustainable management of pests in our exported vegetables.

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Annex A

A **B**

Figure 2. Matured larva (A) and male moth (B) of FCM.

Figure 3: Delta® trap with Crytrack FCM lure in a canister and catches of male moths on a sticky paper surface in a chili field.

Figure 4. Pherocon® wing trap with caches of FCM male moths in a chili field of an exporter.

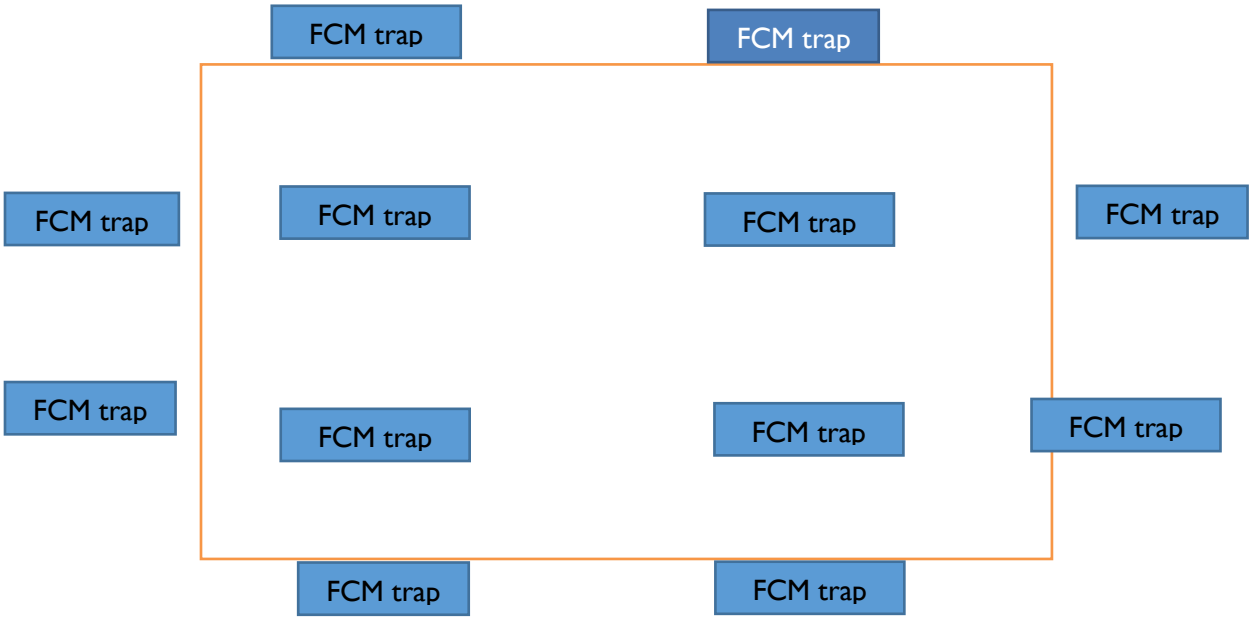

Figure 5: Placement of FCM Delta® or Pherocon® trap in a one hectare (10000 m^2) chili plot.