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# West Africa Competitiveness Programme (WACOMP)

Building  
competitiveness for  
export of cassava,  
fruits and cosmetics  
value chains in  
Ghana

## A Value-Chain Analysis of the Fruits Sector in Ghana

December 2019





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## **List of abbreviations**

CBI	Centre for the Promotion of Imports from Developing Countries
DAMFA	Dangme Mango Farmers Association
EMQAP	Export Market Quality Awareness Programme
FAGE	Federation of Associations of Ghanaian Exporters
FDA	Food and Drugs Authority
GAP	Good Agricultural Practices
GEPA	Ghana Export Promotion Authority
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GSA	Ghana Standards Authority
KNUST	Kwame Nkrumah University of Science and Technology
MOAP	Market Oriented Agricultural Project
PAMPEAG	Papaya and Mango Producers and Exporters Association of Ghana
PPRSD	Plant Protection and Regulatory Services
SDF	Skills Development Fund
SPEG	Sea-Freight Exports Association of Ghana
UNIDO	United Nations Industrial Development Organization
WACOMP	West Africa Competitiveness Programme

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## **Executive summary**

This value-chain analysis of the fruits sector in Ghana focuses on quality, environment, social, sustainability, food safety and organic requirements; the fruits sector regulatory infrastructure; and how value-chain stakeholders comply with key industry standards.

### *About the fruits sector in Ghana*

The fruits market in Ghana is worth an estimated \$56.8 million and accounts for around seven per cent of agriculture industry revenue. The fruits sector is comprised predominantly of mango and pineapple, with citrus fruits and bananas the other key components.

Annual mango production is estimated at 98,477 metric tons, with an average yield of 15 metric tons per hectare, and annual pineapple production is estimated at 677,000 metric tons, with an average yield of 62.5 metric tons per hectare. The principal fruits products are whole fruits (conventional and organic), fresh cuts, concentrates, dried fruits and other fruit products, such as jam and ice cream.

Mango production is focused in three main areas: the Southern Belt (Greater Accra, Eastern and Volta Regions); the Middle Belt (Ashanti, Bono and Bono East Regions); and the Northern Belt (Northern, Upper East and Upper West). Pineapple production is focused in the Southern Belt, in particular in the Greater Accra, Central, Eastern and Volta Regions.

### *About the fruits sector value-chain*

The mango and pineapple value chains are made up of input suppliers, producers, aggregators, post-harvest handlers, processors, exporters, extension service providers (private and public), researchers and logistics providers, as well as companies that provide support services.

The mango and pineapple value chains are fragmented, with producer associations and cooperatives concentrated at the producer level. There are no regional or national associations for value chains. However, at the national level, the value chains are coordinated by the Federation of Associations of Ghanaian Exporters

(FAGE), while the Sea-Freight Pineapple Exporters of Ghana (SPEG) provides a range of support services to its members.

There are between 30 and 50 processors in the fruits sector value chain. These processors are located mainly in designated production zones. The small- and medium-sized processors are focused mainly on the local market, while the large processors export the vast majority of what they produce to Europe.

#### *About the value-chain analysis*

The value-chain analysis focused on the different stakeholders at each operational level in the fruits sector. Consultations were held with and field visits and interactions were carried out at various stakeholders.

The data from the consultations and interactions, and a literature review of the market, were used to carry out product-comparison and product-prioritization analyses.

The value-chain analysis identified a number of key challenges faced by the fruits sector in Ghana and produced a series of related recommendations aimed at developing the industry and fostering its growth. The challenges and recommendations relate to the following areas:

- Coordination structures relating to the fruits sector
- Standards and conformity in the fruits sector value chain
- Competition within the fruits sector value chain
- Collaboration and cooperation in the fruit sector value chain

## Chapter 1:

# An overview of the pineapple and mango value chains in Ghana

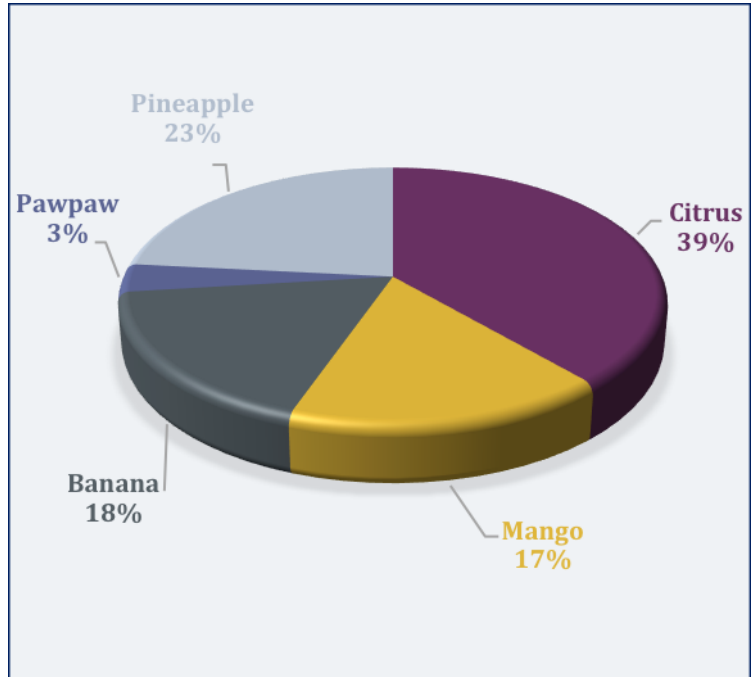
### 1.0. Introduction

The fruits sector in Ghana is comprised of the production, processing and export of mainly mango and pineapple, as well as banana, citrus fruits and pawpaw.

In 2017, the land dedicated to growing these crops totalled 476,000 hectares, with the production of citrus, pineapple and mango accounting for 39 per cent, 23 per cent and 17 per cent of the total, respectively.

Banana, mango and pineapple are among the top five Ghanaian fruit exports. In 2017, these fruits accounted for 15 per cent of total agriculture sector export revenue (\$67.7 million of \$441 million).

Figure 1: Fruits sector cultivation by fruit type, 2017 (%)



### 1.1. Production trends

#### 1.1.1. Mango

Mango cultivation in Ghana is focused on two main varieties of mango: Keitt (80 per cent of production) and Kent (10 per cent). The remaining 10 per cent is comprised of fourteen varieties (including Palmer, Tommy Atkins and Zill), which are all produced in low quantities.<sup>1</sup>

There are two mango growing seasons in Ghana: April to August is the major growing season and the minor season runs from November to January. However, mango producers in the Middle Belt have only one season, April to August.

<sup>1</sup> Abdallah Khalifa Zakari, *Ghana National Mango Study* (April 2012)

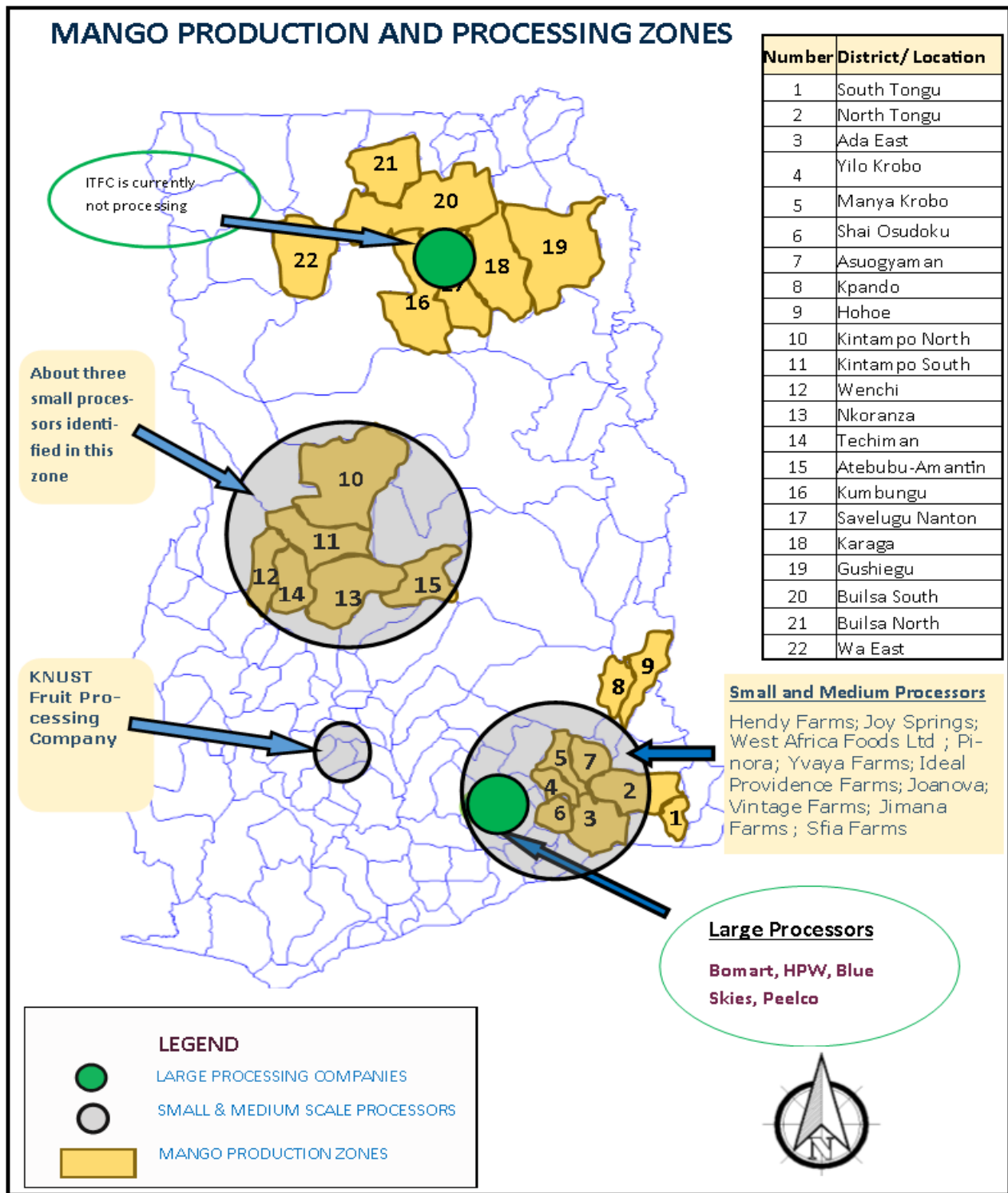
The land used for cultivation totals around 80,920 hectares and the average yield ranges from 15 to 17 metric tons per hectare. Mango production levels remained largely stable between 2013 and 2017, at an average of 98,478 metric tons per year.

Commercial mango production in Ghana is carried out mainly in the Bono, Bono East, Eastern, Northern, North-East and Volta Regions. Prominent mango production towns include:

- Sunyani in the Bono Region
- Wenchi, Techiman, Kintampo, Nkoranza, Jema and Atebubu in the Bono East Region
- Kpong, Somanya and Odumase in the Eastern Region
- Ada, Dodowa and Agomedza in the Greater Accra Region
- Dwapong, Sogakope, Dzodze and Kpando in the Volta Region

Mango production zones in Ghana are detailed in figure 2.

Figure 2: A map of mango production and processing zones in Ghana



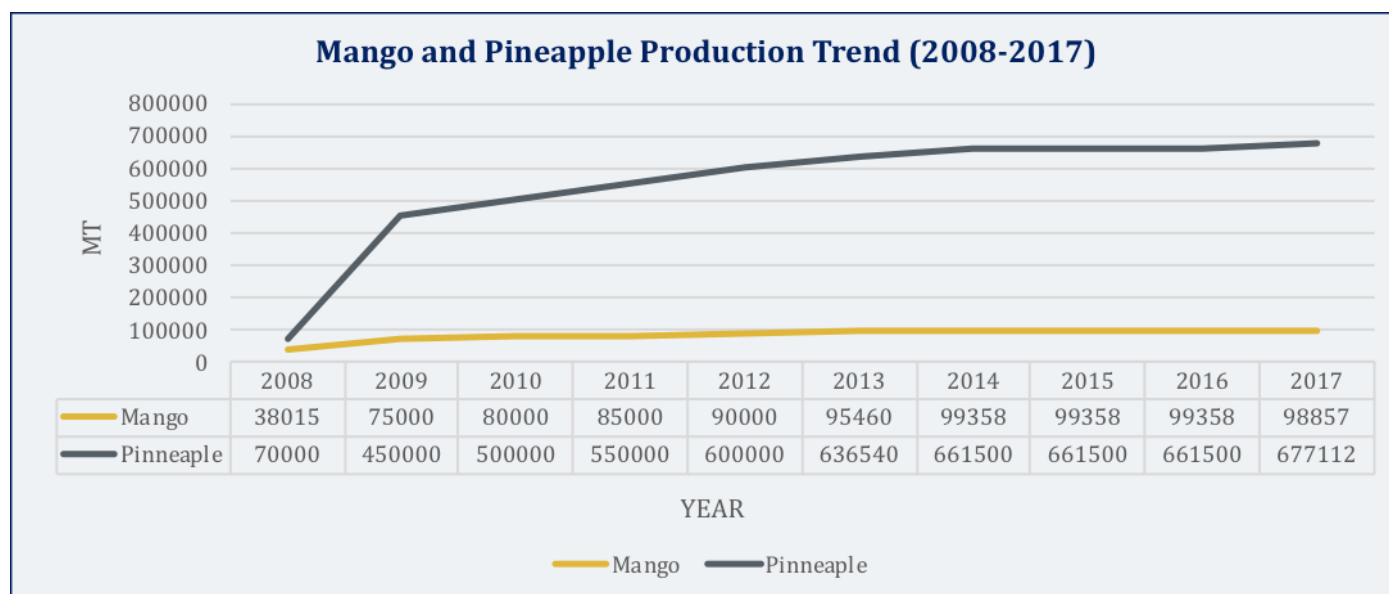
### 1.1.2. Pineapple

The main pineapple varieties cultivated in Ghana are MD2, Smooth Cayenne, Sugarloaf and Queen Victoria. MD2 is the most commonly grown variety. The land used for cultivation totals around 109,480 hectares.

There are two pineapple harvesting seasons in Ghana: October to December is the major season and the minor season runs from November to January. However, fruit quality is poor during the mid-year rainy season. As a result, pineapple production is usually lower at this time of the year, which leads to lower export volumes from June to September.

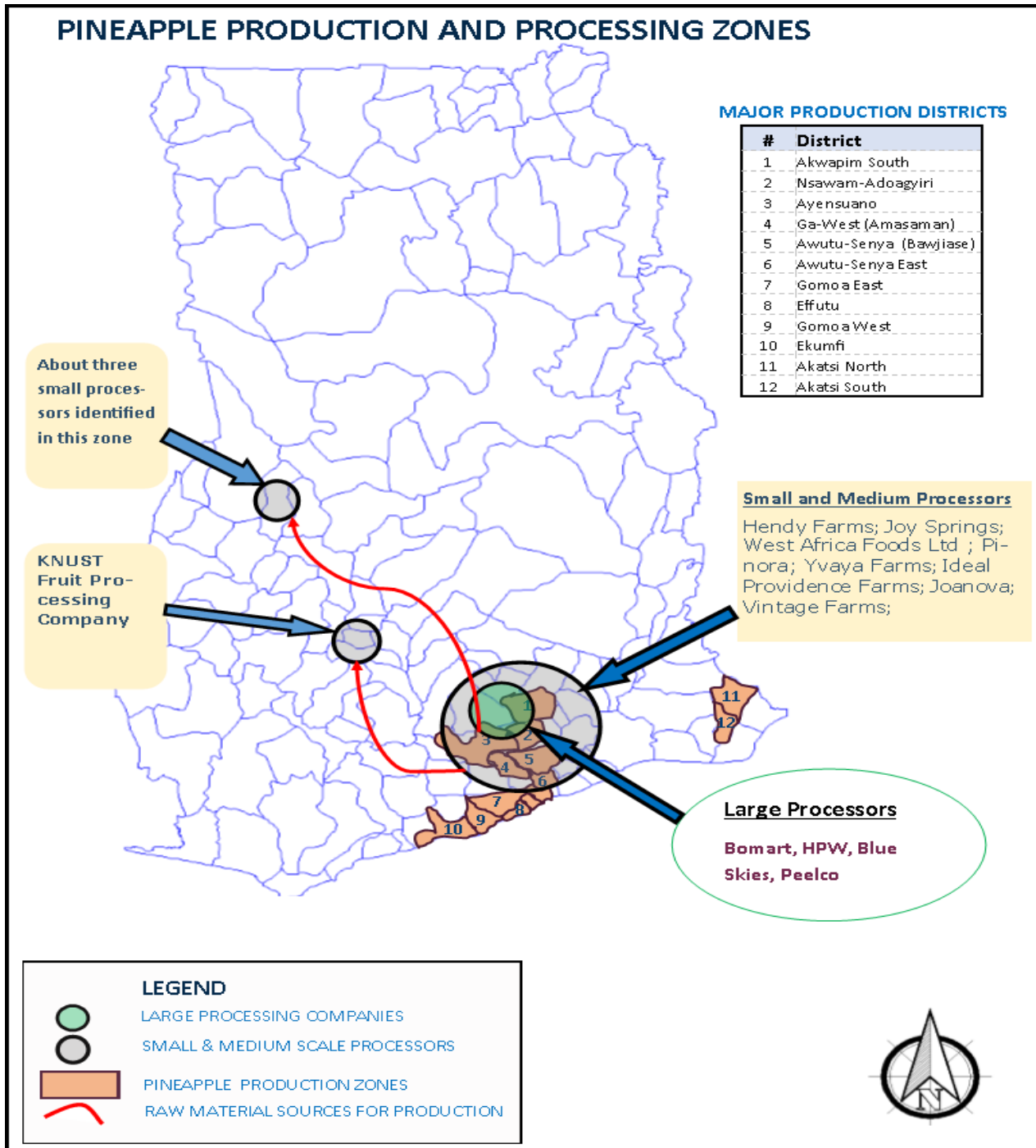
Between 2008 and 2017, there was an almost tenfold increase in pineapple production in Ghana, from 70,000 metric tonnes to 677,113 metric tonnes.

Figure 3: Mango and pineapple production trends (2008-2017)



Pineapples are mostly cultivated in the coastal savannah and forest zones in Ghana. Commercial cultivation of pineapples in Ghana mostly takes place in Nsawam, Aburi, and Suhum in the Eastern Region; Amasaman in the Greater Accra Region; and Kasoa-Bawjiase, Winneba, Ekumfi, Agona Swedru and Mankesim in the Central Region.

Figure 4: A map of pineapple production and processing zones in Ghana



## 1.2. Mango and pineapple processing

### 1.2.1. Categories of processors

There are three main categories of fruit processors in Ghana:

- **Large-scale processors** focus primarily on export markets and are often foreign investors with strong links to international markets. Currently, there are five large-scale processors in Ghana, with an estimated processing capacity of between 200 and 1,600 metric tons per day. Four of these processors (Blue Skies, HPW, Peelco and Pinora) are located in the Eastern Region, and the other (Integrated Tamale Fruit Processing Company) is located in the Northern Region. Most of the large-scale processors operate as free-zone companies.
- **Medium-scale processors** are involved in processing of fruits for both the domestic and export markets. Often with little or no foreign direct investment, these firms have established trading relationships with buyers that market products on their behalf on international markets. Production capacity ranges from 100 to 200 metric tons per month. There are around ten medium-scale processors in the Eastern and Greater Accra Regions. Processors in this category include Bomart and WAD African Foods Ltd.
- **Small-scale processors** are focused on the domestic market. Processing capacity varies, ranging from 10 to 100 metric tons per month. There are around 40 small-scale processors, located across the country. Examples of processors in this category include Hendy Farms, Ideal Providence and Kudor Foods Limited in the Greater Accra Region; Vintage Pineapple Processing Company in the Eastern Region; Methodist University College Fruit Processing Company in the Bono East Region; and KNUST Fruit Processing company in the Bono Region.

### 1.2.2. Major products

There are five main fruits products in Ghana.

- **Fresh fruits** are sold at farm gates to processors and market aggregators or graded and packaged for domestic and export markets. Available information indicates that 60 per cent of mangoes produced in Ghana are sold as fresh fruits.<sup>2</sup>
- **Cut fruits** are fruits that are processed into specified cuts and packaged for export. Cut fruits account for about 64 per cent of processed fruit exports.<sup>3</sup> According to the

<sup>2</sup> Ghana Export Promotion Authority, "Export Performance: Non-Traditional Exports (NTEs) Sector" (April 2019)

<sup>3</sup> HortiFresh, "Horticultural Business Opportunities in Ghana" (2019)



Ghana Export Promotion Authority (GEPA), cut fruits generated export revenue of \$56.86 million in 2017, compared to \$48.6 million in 2016.

- **Dried fruits** account for 9 per cent of exported fruit products.
- **Concentrates** account for 24 per cent of processed fruit exports.
- **Other fruit products** include ice cream, lollipops and jam for domestic consumption and export.

Table 1

**Scale and number of fruit processing companies in Ghana**

<i><b>Size of processing facility</b></i>	<i><b>Number of companies</b></i>	<i><b>Fruit products</b></i>	<i><b>Location</b></i>
Small scale	30 to 50	Fruit juice (60-70 per cent), dried fruits (15 per cent) and jam (5 per cent)	All regions
Medium scale	10 to 15	Dried fruit products (70-80 per cent) and fruit juice (20-30 per cent)	Mostly in the Eastern and Greater Accra Regions
Large scale	5	Dried fruit (20-30 per cent), fruit cuts (60-65 per cent) and frozen fruit (5 per cent)	Eastern Region and Northern Region

**1.3. Export of mango and pineapple products**

Mango and pineapple export activity is dominated by producer associations and export firms that are involved in the export of fresh fruits. In the pineapple subsector, exports receive organizational support from the Sea-Freight Exports Association of Ghana (SPEG), which provides collective fresh pineapple marketing services for its members. Pineapples are exported throughout the year, although the peak season is usually between November and April.

In the mango sector, fresh exports are often handled by individual producers and producer groups. As a result of the seasonality and perishability of fresh mangoes, export activity takes place predominantly in the major and minor growing seasons.

**1.3.1. Volume of exports**

Mango export volumes averaged 1,829 metric tons per year between 2013 and 2017. In 2017, the mango export volume was 1,741 metric tons, compared to 2,219 metric tons in 2015, 1,276 metric ton in 2014 and 1,789 metric tons in 2013. Dried fruits account for the largest portion of mango product exports, at around 51 per cent of the total, followed by fresh cuts (37 per cent) and whole fruits (12 per cent). Figure 5 compares the market share of various mango products.

Pineapple volume exports averaged 17,898 metric tons per year between 2013 and 2017. Pineapple is mostly exported in its whole form, with very little trade in processed products. In 2017, exports totalled 36,311 metric tons, compared to 27,148 metric tons in 2016, 43,461 metric tons in 2015, 33,632 metric tons in 2014 and 45,000 metric tons in 2011.

Figure 6 shows mango and pineapple export trends between 2008 and 2017.

Figure 5: Mango exports by product type (%)

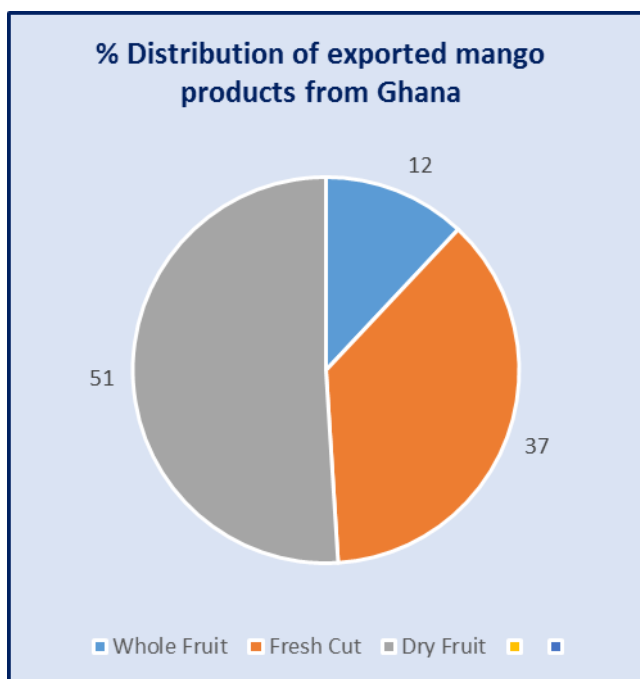
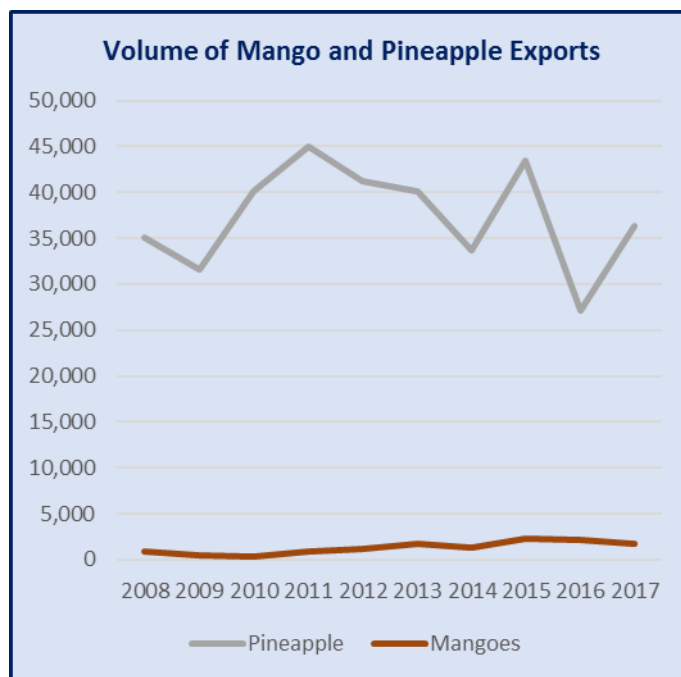


Figure 6: Mango and pineapple exports volumes, 2008-2017

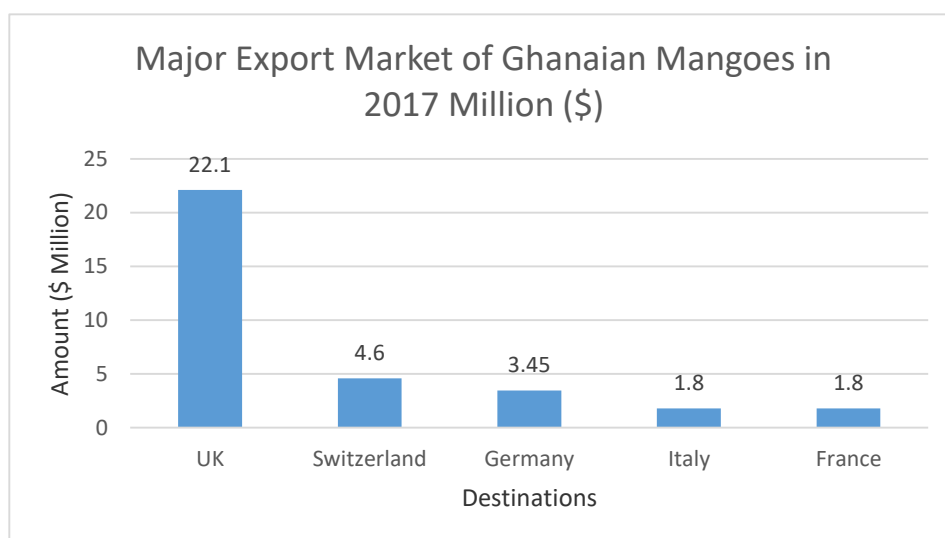


### 1.3.2. Mango market

Mangoes and mango products are sold to the domestic and international markets.

- **Domestic market:** an estimated 60 per cent of the mangoes cultivated in Ghana is consumed locally or sold to local processors (the latter accounts for the larger share). Increasing income levels, rising levels of urbanization and a growing trend for healthy eating are driving demand for fresh fruits, including mango.
- **Export markets:** the main destinations for exported mango (fresh, cut and dried) from Ghana are the United Kingdom and the European Union. Mango exports were worth \$36.4 million in 2017, with the United Kingdom accounting for \$22.1 million and the European Union for \$11.7 million. In the European Union, Germany, Italy and France are key markets, accounting for \$3.45 million, \$1.8 million and \$1.8 million in trade in 2017, respectively (see figure 7). Switzerland for \$4.6 million of exports in 2017.

Figure 7: Major export markets for Ghanaian mangoes, 2017 (\$ million)



Source: Ghana Export Promotion Authority

Lebanon is also an important export market for mangoes. According to GEPA, mango exports to Lebanon rose to \$641,000 in 2017 compared to \$40,000 in 2016.

- **Competitiveness:** the competitiveness of Ghanaian mangoes on the global market is weak. Low production volumes make it difficult to compete with large mango producers in Brazil and Peru. In addition, Ghanaian producers are constrained by their inability to meet export quality standards. The reasons for these weaknesses are a lack of financial resources to invest in production activities and the renewal of internationally acceptable standard certifications. Other challenges include high

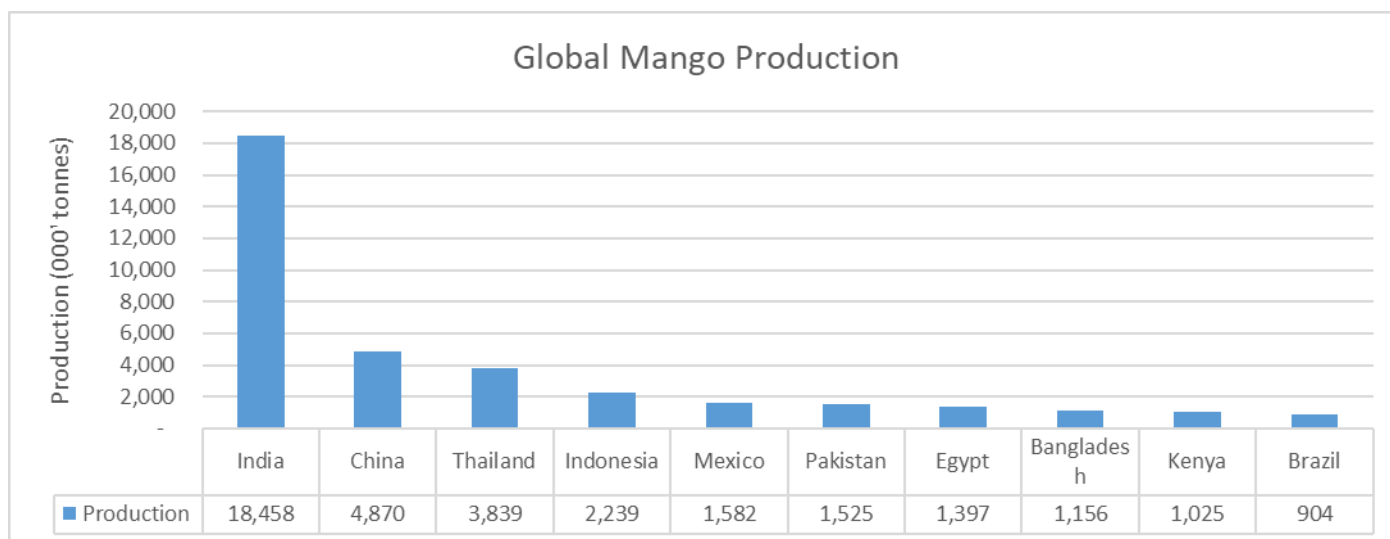
maintenance costs related to pest and disease control (including black bacterial spot disease and fruit fly infestation).

Nevertheless, Ghana has some advantages over other mango exporting countries in the West Africa region. One notable feature of the mango sector in Ghana is that there are two harvesting seasons each year in the Southern Belt. This gives Ghanaian exporters the opportunity to supply the European market during times when competition is weaker, for instance during summer. However, in the European summer time, mango has to compete with European fruits.

Mango processors in northern Ghana have a key competitive advantage over rivals in Burkina Faso: their harvesting starts two weeks earlier, which allows them to gain more market share. In addition, unlike Burkina Faso and Mali, Ghana is not a landlocked country and can draw on an existing and functioning infrastructure for mango exports, including transportation, logistics, networks, ports, box and pallet suppliers, and set freight rates.

Global Mango production is dominated by Asian and Latin American countries (see Figure 8). However, with regard to exports to Europe and the Middle East, Ghana has a geographical advantage over Latin American countries, as distances between Ghana and these markets are shorter. Capacities that can boost the national mango industry should be put in place in order for Ghana to leverage this geographical advantage.

Figure 8: Global mango production by leading markets (000 tons)

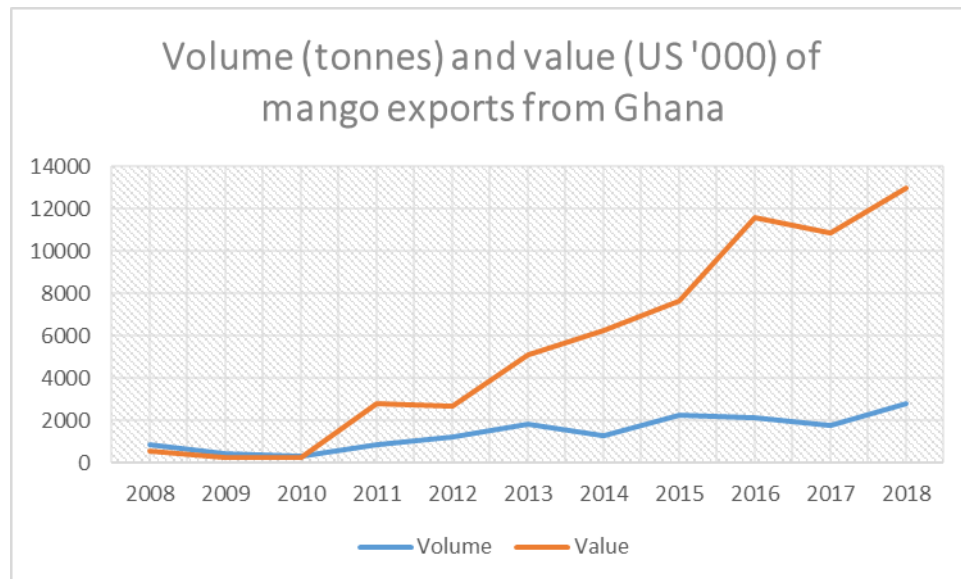


Source: FAO, Global Prospects for Major Tropical Fruits

### 1.3.3. Revenue from mango exports

Ghana's mango export revenue has grown markedly in recent years, from \$858,000 in 2008 to \$12,946,000 in 2018.

Figure 9: The volume and value of mango exports, 2008-2018 (\$ 000)



Source: SRID, MOFA 2018

### 1.3.4. Mango imports

Local mango cultivation is not meeting rising demand from the domestic market. As a result, Ghana imports mangoes from Benin, Brazil, Burkina Faso and Togo. This import activity is carried out predominantly by processing companies, including large-scale companies such as Blue Skies.<sup>4</sup> Between 2013 and 2016, processors imported 2,880 metric tons of mangoes from Benin and Brazil. This gap in supply is an opportunity for local cultivators and processors.

### 1.3.5. Pineapple market

Pineapples and pineapple products are sold to the domestic and international markets.

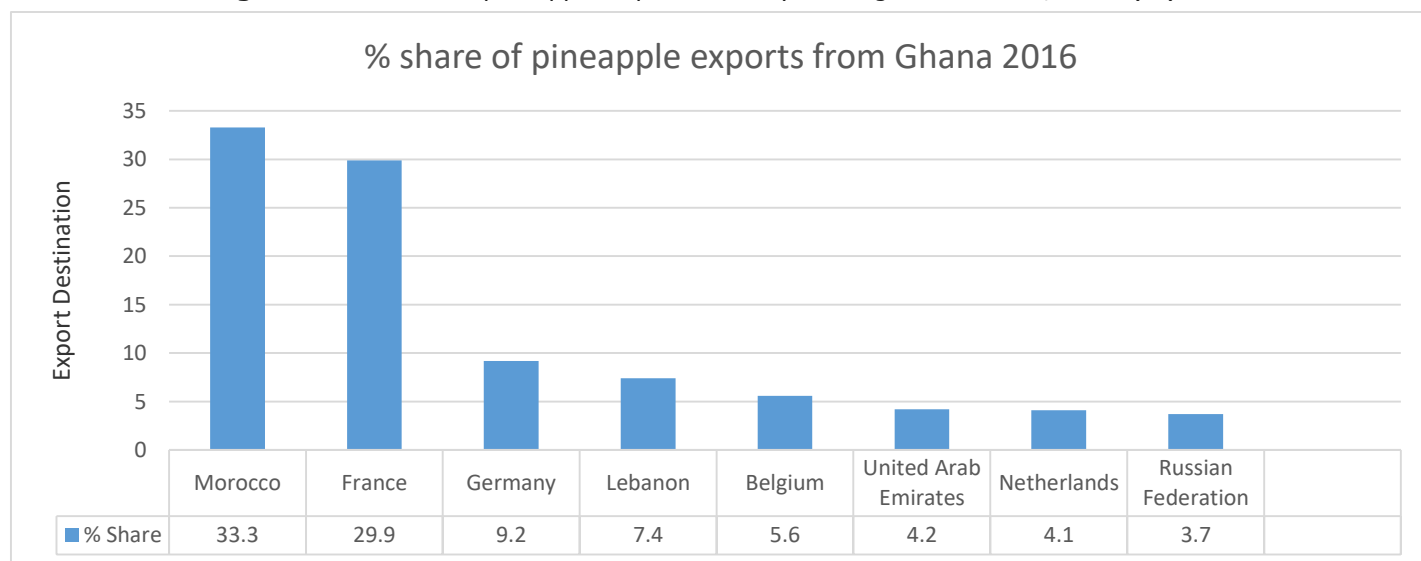
- **Domestic market:** there is growing local-market demand for fresh pineapples (including from fruit processing firms, hotels, supermarkets and traditional markets),

<sup>4</sup> Joep van den Broek, Nerissa Apenteng-Sackey, Michiel Arnoldus, Salif Keita and Roland Waardenburg, *West Africa Fruit - Scoping Study* (2016)

domestically produced pineapple juice and fruit salad. This growth is being driven by increasing income levels, rising levels of urbanization and a growing trend for healthy eating. According to SPEG, although demand for pineapples is not quantified, there is evidence that it cannot be met by current production levels.

**Export markets:** Ghana currently exports pineapples to a number of countries. Key markets include Belgium, France Germany, Lebanon, Morocco, the Netherlands, the Russian Federation and the United Arab Emirates. According to UN Comtrade (see figure 10), Morocco is the largest pineapple export destination for Ghanaian pineapples, with a market share of 33.3 per cent in 2016. Outside of Africa, France is the largest export destination, accounting for 29.9 per cent of trade in 2016. Notably, Ghana does not export to the world’s largest pineapple market, the United States of America.

**Figure 10:** Ghanaian pineapple export trade by leading destinations, 2016 (%)



Source: UN Comtrade

Ghana was the fourth largest supplier of pineapples to France in 2016, with a market share of 6.4 per cent. The larger pineapple exporters are Costa Rica, Ecuador and Côte d’Ivoire. Other competitors on the French market include the Benin, Cameroon, the Netherlands, Togo and the United Kingdom. Other key markets are Lebanon and Morocco.

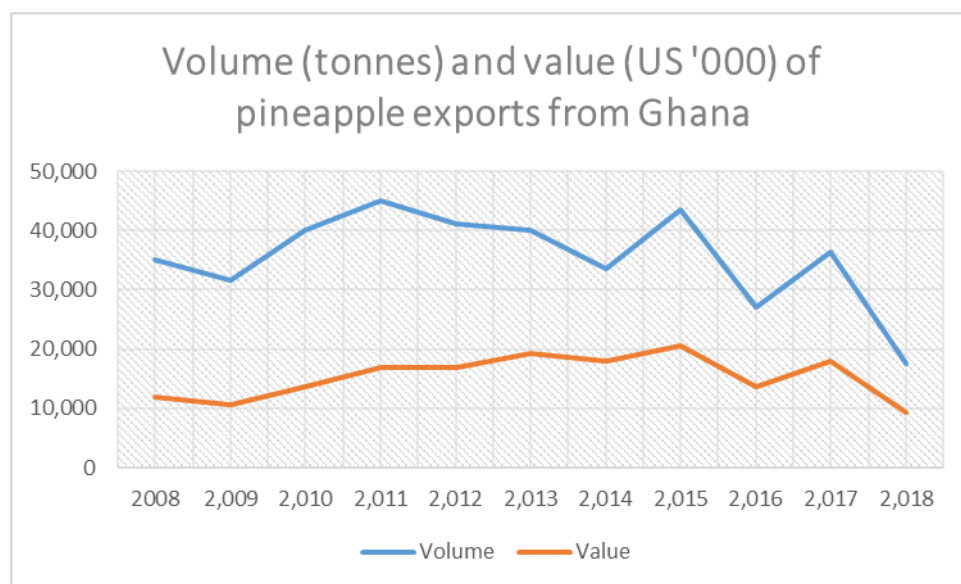
### 1.3.6. Revenue from pineapple exports

According to SPEG, pineapple export volumes decreased sharply between 2012 and 2016, at average of 30 per cent per year.<sup>5</sup> Pineapple exports fell to 27,148 metric tons in 2016 before increasing to 36,331 metric tons in 2017.

Pineapple exports were worth \$18,056,000 in 2017, a marked increase over the \$13,727,000 recorded in 2016, but a decline compared to the \$20,539,000 posted in 2015 (see figure 11). In 2018, Ghana's pineapple exports were worth just \$9,254,000, almost half of the 2018 value. The country's leading pineapple export market is the European Union.

There is some disparity between trends in the volume and value export figures. This is because exporters are selling to supermarkets using minimum-guarantee pricing agreements as a result of improved handling and post-harvest facilities.<sup>6</sup>

Figure 11: Volume and value of pineapple exports, 2008-2018 (\$ '000)



Source: SRID, MOFA 2018

### 1.3.7. Pineapple imports

As a result of a decline in pineapple cultivation in the country, processing companies are importing produce to meet demand. It was reported in 2015 that 30 per cent of smooth

<sup>5</sup> Ghana Export Promotion Authority, *Pineapple Promising Markets* (Ghana, 2016).

<sup>6</sup> J. Gatune, M. Chapman-Kodam, K. Korboe, F. Mulangu and M. Rakotoarisoa, *Analysis of Trade Impacts on The Fresh Pineapple Sector in Ghana*. FAO Commodity and Trade Policy Research Working Paper No. 41. Food and Agriculture Organization of the United Nations (Rome)

cayenne pineapples consumed in Ghana were imported by Blue Skies from Côte d'Ivoire and Togo, and that this level of import activity dates back to 2013.<sup>7</sup> In addition, UN Comtrade data show that Ghana imported 1,439 kilograms of fresh and dried pineapples worth \$1,176 in 2016, and 1,179 kilograms of fresh and dried pineapples worth \$4,439 in 2018.

<sup>7</sup> GhanaWeb, "Imports now hit mangoes, pineapples" (October 2015)



## **Chapter 2**

### **2.0. Product prioritization and selection**

#### **2.1. Products identified for prioritization**

The value-chain analysis identified five principal fruit products in the Ghanaian fruit sector value chain. The products are:

- Whole/fresh fruits (organic and conventional)
- Fresh cuts fruits
- Dried fruits
- Concentrates
- Other products (juice, jam, ice cream, fruit lollipops, etc.)

The vast majority of dried fruit processing activity is targeted at the export market, with very little carried out for local consumption. The jam industry is underdeveloped and needs the injection of capital and product development to meet market requirements in terms of volume and quality. The vast majority of fruit juice processing is focused on the local market.

Although there is the potential for small- and medium-scale processors to diversify their portfolios and target other fruit product sectors, the industry lacks the technology and technical capacity to do so.

Fresh cuts, dried fruits and organic products are the products with the greatest export potential. Fruit juice products could be further developed for the local market and export markets in West Africa. The jam industry is an emerging market and with further product improvement, it could become a source of significant revenue, both in terms of local sales and export activity.

#### **2.2. Product selection criteria and matrix**

In terms of WACOMP, it is important to focus on value-chain products that meet economic, sustainability and governance criteria, and reflect the multi-dimensional nature of industrial development. In keeping with these requirements, a set of selection criteria, grouped in six areas, was used to prioritize the selected products. The areas are economic, social, environmental, technological, institutional and cluster formation.

Table 2  
**Fruits sector product selection criteria**

Criteria	Dimensions
Economic	<ul style="list-style-type: none"> <li>▪ Potential importance for domestic consumption</li> <li>▪ Potential for exports</li> <li>▪ Scale of production</li> <li>▪ Scale of exports</li> <li>▪ Competitive advantage for Ghana</li> <li>▪ Potential for import substitution</li> <li>▪ Size of market (domestic and international)</li> <li>▪ Local market potential (sub-region markets)</li> <li>▪ Potential for cooperation among stakeholders (between producers and between producers and processors or exporters)</li> <li>▪ Capacity and readiness of processors to invest in products</li> </ul>
Social	<ul style="list-style-type: none"> <li>▪ Potential for job creation</li> <li>▪ Involvement of marginalized groups (women, youth, persons with disabilities, etc.)</li> </ul>
Technological	<ul style="list-style-type: none"> <li>▪ Presence of technology to manufacture products</li> <li>▪ Availability of the required skills sets</li> <li>▪ Potential for further research and development</li> </ul>
Environmental	<ul style="list-style-type: none"> <li>▪ Development impact (environmental sustainability)</li> <li>▪ Potential usage of by-products or waste</li> </ul>
Institutional	<ul style="list-style-type: none"> <li>▪ Presence of training institutions</li> <li>▪ Presence of national policies to support product development</li> <li>▪ Ease of certification and standardization</li> <li>▪ Presence of localized laboratories for food testing</li> <li>▪ Ease of certification and standardization</li> </ul>
Cluster formation	<ul style="list-style-type: none"> <li>▪ Size of clusters</li> <li>▪ Proximity to ports</li> <li>▪ Relative production volumes from clusters available for exports</li> <li>▪ Number of available workers</li> <li>▪ Number of brands</li> </ul>

The results of the analysis showed that the most significant products are (in order of priority): whole fruits, fresh cuts, dried fruits and other products (such as jam). The product selection and prioritization can be viewed in annex I.

In both the mango and pineapple sector value chains, domestic production has improved significantly. However, a lot more needs to be done in the area of processing. There is a lack of expertise and a skills shortage in this area. As such, there is a clear need for skills

development training in relation to product development, market identification and equipment operation. In addition, the sectors would benefit from greater research activity. In particular, the fruits industry would benefit from greater research into early yielding varieties of mangoes and new mango and pineapple product development.

Fruits sector standards include GSA Good Agricultural Practice certification for whole fruits; GLOBAL G.A.P., Good Manufacturing Practice, Hazard Analysis and Critical Control Points (HACCP), and FDA Food Safety certification for fresh cuts fruits and juice; and GSA organic certification for organic production and processing.

Table 3

**Quality standards for fruit products in Ghana**

Product	Standards
Whole fruit	<ul style="list-style-type: none"> <li>• GSA Good Agricultural Practice certification</li> <li>• GSA organic certification</li> <li>• GLOBALG.A.P certification</li> </ul>
Fresh Cuts Fruits	<ul style="list-style-type: none"> <li>• Good Manufacturing Practice certification</li> <li>• GSA certification</li> <li>• HACCP certification</li> <li>• GLOBALG.A.P certification</li> <li>• FDA certification</li> <li>• GSA organic certification</li> </ul>
Dried fruits	<ul style="list-style-type: none"> <li>• Good Manufacturing Practice certification</li> <li>• HACCP certification</li> <li>• GLOBALG.A.P certification</li> <li>• FDA certification</li> <li>• GSA organic certification</li> </ul>
Juice	<ul style="list-style-type: none"> <li>• Good Manufacturing Practice certification</li> <li>• HACCP certification</li> <li>• FDA certification</li> <li>• GSA certification</li> <li>• GSA organic certification</li> </ul>
Other products (jam, ice cream, lollipops, etc.)	<ul style="list-style-type: none"> <li>• Good Manufacturing Practice certification</li> <li>• HACCP certification</li> <li>• FDA certification</li> <li>• GSA organic certification</li> </ul>



## **Chapter 3**

### **3.0. Analysis of the value chain of selected products**

#### **3.1. Value-chain stakeholders**

The fruits sector value chain comprises researchers, input suppliers, producers, extension service providers (private and public), certification bodies, regulators, logistics providers (transportation), post-harvest handlers (pack houses), aggregators, processors and marketers (exporters and retailers), as well as companies that provide support services.

Figure 12 and figure 13 present overviews of the mango and pineapple industry value chains.

Figure 12: Detailed overview of the pineapple industry value chain

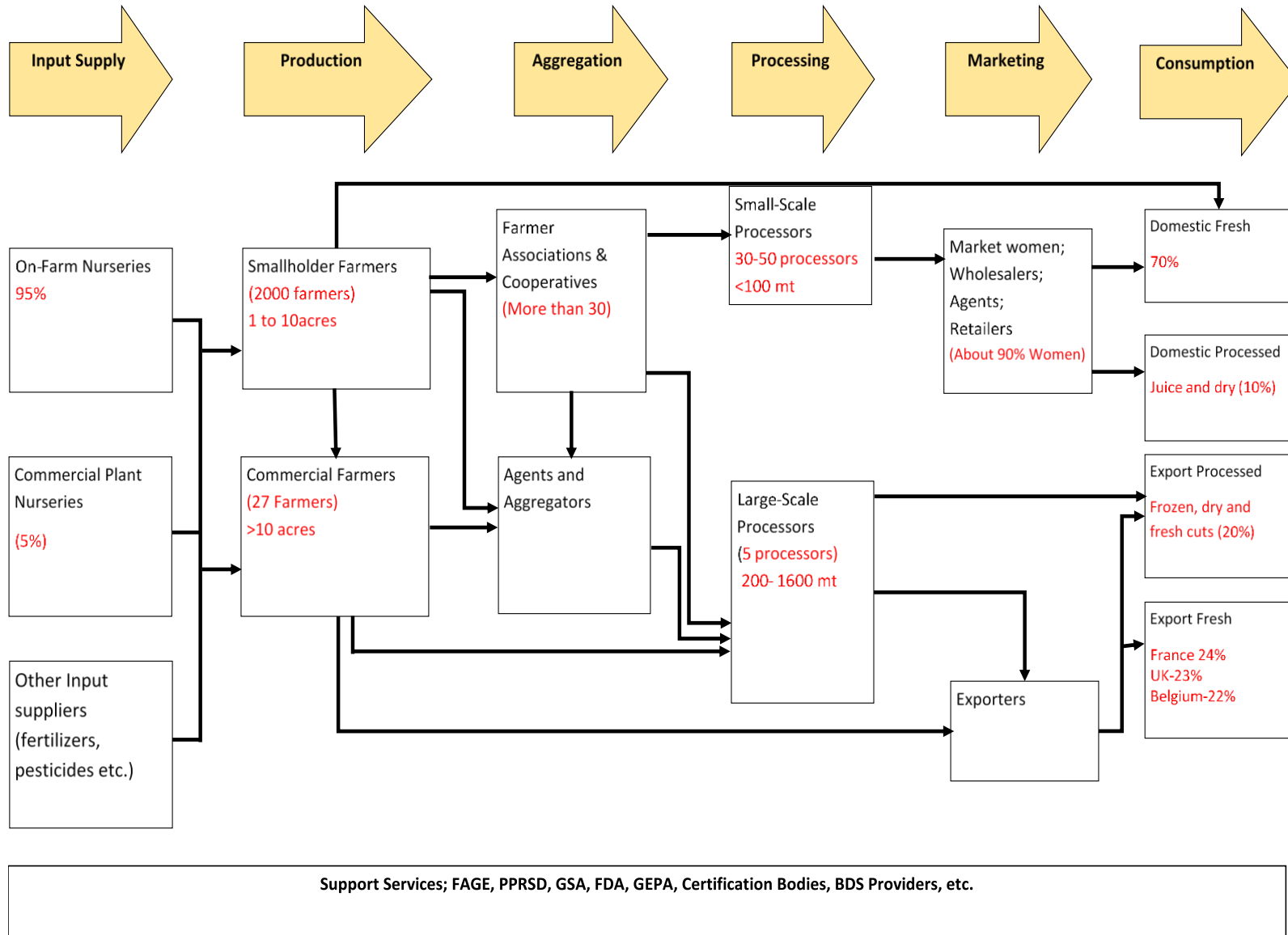
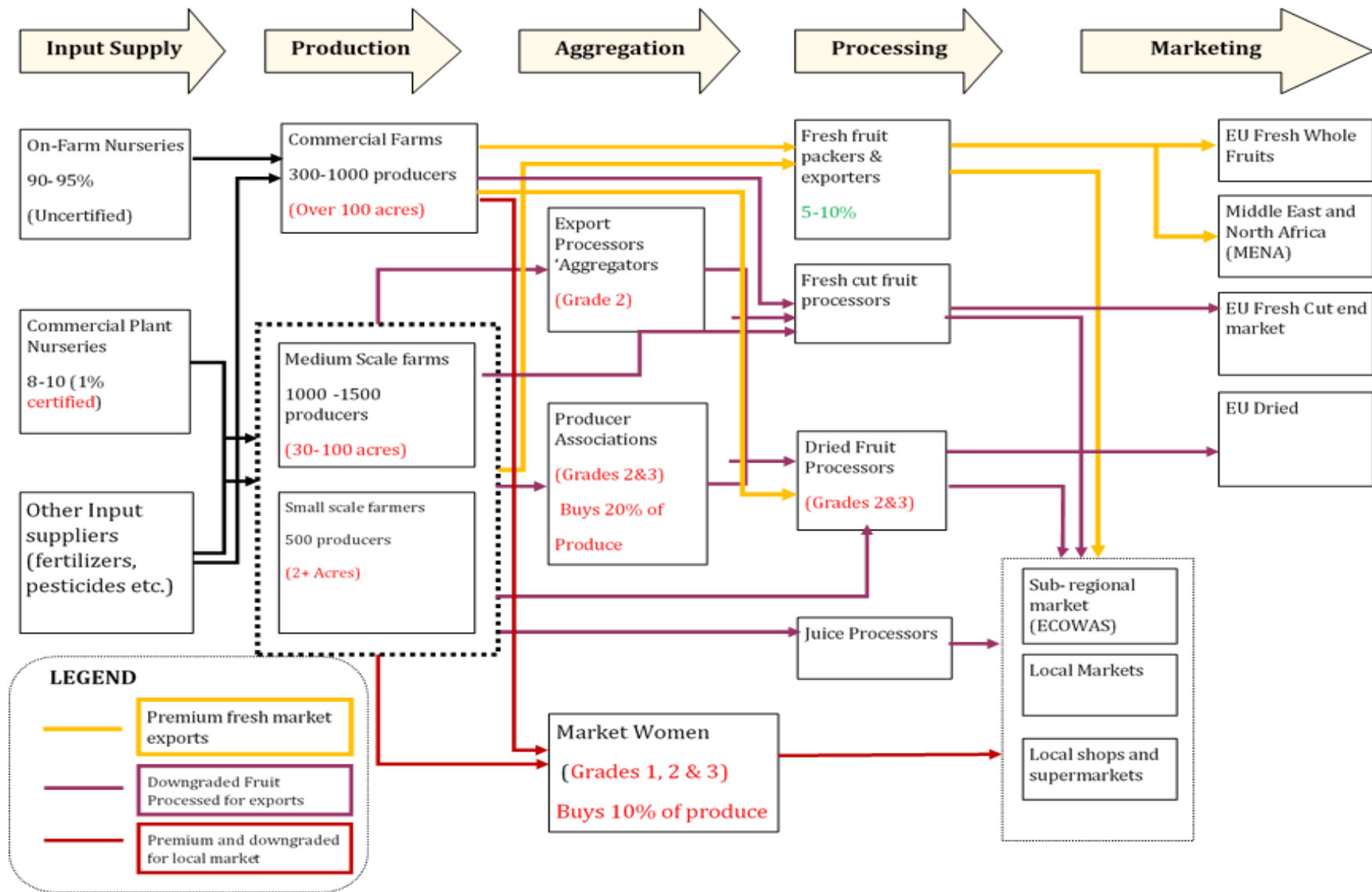


Figure 13: An overview of the mango industry value chain





### ***3.1.1. Input suppliers***

This section of the value chain is comprised of agro-chemical dealers, nursery operators and suppliers of farm equipment. The number of agro-chemical dealers is estimated at around 4,000. The activities of these dealers is regulated by the Plant Protection and Regulatory Services Directorate (PPRSD), according to the Plant and Fertilizer Act (2010).

There are a small number of certified nurseries that provide certified seedlings to the mango and pineapple industries. Seedling associations are Improve Mango Nursery, Kodaps Mango Nursery, Tiase Mango Nursery and Vision Mango Nursery.

Pineapple sucker providers include Bio Exotica Ltd., Bomarts Tissue Culture Laboratory, Georgefields Farms, the Ghana Atomic Energy Commission, Koranco Farms and SOA farms. These providers are located in the Central, Eastern and Greater Accra Regions.

Major fertilizer importers include AFCOTT, Agrimat, Chemico, Dizengoff, Louis Dreyfus, OLAM Ghana, RMG, Sidalco and Yara.

### ***3.1.2. Production***

This segment of the value chain comprises a range of producers, from smallholder farmers to medium- and large-scale commercial farmers. Smallholder farmers cultivate one to ten acres of land, medium-sized producers cultivate between ten and 100 acres, and large-scale producers cultivate over 100 acres.

Producers have structured associations in place that provide a range of services, including education on good agricultural practices, group-level certifications and product marketing. The average annual yield of mangoes in Ghana is 15 metric tons per hectare and the average annual yield of pineapples is 62.5 metric tons per hectare. Large-scale producers negotiate prices through pre-harvest price negotiation arrangements with large processing companies. Processors buy their produce from producer associations through pre-harvest contract agreements.

Mango producers typically belong to associations. Associations in the Coastal Savannah ecological zone and the Greater Accra, Eastern and Volta Regions include the Dangme West Mango Farmers Association, the Manya Mango Farmers Association, Vegetables Union Limited, the Volta Value Chain Committee Union and the Yilo Krobo Mango Farmers Association. Associations in the Middle Belt include the Mid-Ghana Commercial Mango Growers Association, which comprises GlobalG.A.P.-certified mango growers in the Ahafo, Ashanti, Bono and Bono East Regions. These growers account for a major portion of mango production. In the Guinea Savannah ecological zone, mango producers are found mainly in the Northern, North East and Savannah Regions.

Pineapple value-chain production and processing activities take place predominantly in the Central and Eastern Regions, with a number of producers scattered across the Middle Belt. SPEG is a key entity with regard to the organization of coordination activities among pineapple value-chain stakeholders in relation to lucrative local and international markets. SPEG has a workforce of seven people and five active members. Pineapple producer groups include the Akuapim North Pineapple Association and the Fotobi Pineapple Farmers Association.

Many producers have moved into the export sector and other produce areas because of a lack of capital to invest in what is a capital-intensive business. Gaps in the value chain identified by the analysis include low levels of collaboration between stakeholders and food research institutions and regulatory bodies with regard to product development and quality assurance schemes.

Table 4  
**Comparison of mango and pineapple production and export activity (2017)**

<b>Fruit</b>	<b>Production (metric tons)</b>	<b>Value (\$ million) (local price)</b>	<b>Export (metric tons)</b>	<b>Value (\$ million)</b>
Pineapple	677,000	223.4	36,311	18
Mango	98,477	26.5	1741	0.644

*Source:* Consultants estimates from field data. *Note:* Pineapple at \$500 per metric ton export price and \$330 per metric ton local price. Mango sold at \$270 per metric ton local price and \$370 export price.

### **3.1.3. Vertical and horizontal linkages**

The relationships between the various stakeholders in the value chain serve as essential conduits for the flow of technical information. There is a degree of linkage between all stakeholders and at all levels in the value chain. Producers have stronger relationships with input dealers, aggregators, local traders, processors and exporters.

Traceability is a major principle in the mango trade and the relationships between exporters, intermediaries and producers are very close. Not only does information flow down the chain, but access to inputs, the provision of technical assistance and market intermediation are also embedded in these relationships. Groups, farmer-based organizations and associations in the mango and pineapple industries are also closely linked.

## **3.2. Processing**

### ***3.2.1. An overview of the fruits sector processing industry***

The fruits sector value chain generates annual revenue of around \$28 million, equal to 7 per cent of agriculture industry revenue. Mango and pineapple exports were worth GHS56.8 million in 2017.

The mango and pineapple value chains feature processors of varying sizes, from micro and small to medium and large scale. Small- and medium-scale processors focus mainly on the local market while large-scale processors export around 90% of their production volume, chiefly to European Union countries, such as France, Germany, Italy and the Netherlands, and Switzerland. Many of the small- and medium-sized processors focus on fruit juices. The juices are bottled into 350ml glass or plastic containers. Most of the bottling is done manually.

Processors are main located in the Southern Belt (Central, Eastern, Greater Accra and Volta Regions), the Middle Belt (Ahafo, Ashanti, Bono and Bono East Regions) and the Northern Belt (Northern, Savana and Upper West Regions).

Most processing facilities use manual labour and semi-automated machinery, such as fruit pressers, electric and gas ovens and electric pasteurisers. Small-scale processors have an annual processing capacity of around 100 metric tons, while medium-scale processors have an annual processing capacity of around 200 metric tons. However, most processing facilities operate below their capacity, at only between 10 and 15 per cent of their potential. This low capacity is attributed to high production costs and the inconsistent supply of fresh produce.

To solve this problem, some processors and factories, such as Ekumfi Pineapple Factory, Hendy Farms, Integrated Tamale Fruit Company (ITFC), Joanova Farms, Vintage Farms and WAD African Foods Ltd., have established their own farms to ensure a constant supply of raw materials. The size of these farms ranges from 50 acres, as in the case of WAD African Foods Ltd., to 2,000 acres, as in the case of ITFC. Some processors have outgrower contracts with local farmers to supply their processing facilities. For example, WAD African Foods Ltd. and Ekumfi Pineapple Factory has outgrower contracts with around 120 and 2,000 farmers, respectively.

Processors must manage a range of costs, the most significant of which relates to raw materials, which on average account for 38 per cent of total costs, followed by transportation (35 per cent) and labour (13 per cent). Utilities and the renewal of international quality certification are other major costs.

In terms of waste material use, some processors use their waste to produce biogas to feed their boilers. For example, Yvaya Farms, a small-scale dried-fruit processor in Accra,

supported by the Ghana Climate Innovation Centre, turns about two metric tons of waste produce into bio gas every week. This is done in collaboration with the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), SNV and TechnoServe, with sponsorship from the Danish International Development Agency and the World Bank. However, some processors dump their waste and have no plans for use, while others turn their waste into manure to fertilise their farms.

### ***3.2.2. Use of technology***

The technology used by processors and producers in the fruits sector value chain includes pasteurizers, hydraulic pressers, semi-automated and manual fruit pressing machines, and electric ovens (for the drying of fruits).

The research carried out for this report found that almost 50 per cent of the machines used by the processing facilities are locally manufactured. The GRATIS Foundation is the main supplier of this machinery. The research also identified McHammah Engineering, which is located in Accra, as a key provider of engineering and manufacturing services to processors. The company manufactures manually operated, semi-automated and fully automated machinery. It also provides consultancy and after-sales services to clients.

Challenges identified in relation to the equipment manufacturing industry include a limited number of skilled personnel and the high cost of materials, which are normally imported from China and India. Machinery is normally manufactured to order. The capacity of processing machinery ranges from one metric ton per hour to three metric tons per hour. Energy consumption is between 15 kilovolts and 30 kilovolts. Other challenges include machine specification and cost issues. In addition, the need for support in relation to standardisation is critical.

### ***3.2.3. Production capacity***

The fruit processing industry is largely comprised of small- and medium-scale processors (between 50 and 70), which have a relatively low production capacity, at between 100 and 200 metric tons per year.

The largest number of processors can be found in the Southern Belt because of the significant amount of raw materials cultivated in this region and the presence of key markets. The size of workforces at small- and medium-scale processors ranges from 10 to 50 employees, with women accounting for 55 per cent of the total. In total, processors employ about 3,000 people in Ghana.

The low levels of productivity among small- and medium-scale processors is attributed partly to the activity of large multinational fruit processing companies, such as Blue Skies, HPW and

PEELCO, which have contracts with a large number of farmers and as a result, account for a significant portion of fruits grown in the country.

A lack of investment is another main reason for low productivity among smaller processors. Some smaller-scale processors are not prepared to invest in equipment and structures because they do not consider them a main source of income generation. In addition, some fruit processing companies were established by universities as experimental facilities for food science students to conduct trials.

#### ***3.2.4. Packaging, labelling and product quality***

The quality of products manufactured by most processors is such that the potential exists to develop these products into international brands. However, a number of barriers are stopping processors from taking this step, including challenges relating to labelling, packaging and quality standards.

Some processors have semi-automated equipment for packaging and labelling, but most manually package and label their products. In terms of product quality, the absence of in-house laboratories and the high cost of private laboratory services have a significant impact on the quality of final products.

The relatively poor quality of packaging and labelling equipment in the local processing industry makes it very difficult for them to compete with imported products, which are of superior quality and come in superior packaging. Local product packaging materials are mostly made of wood and paper, with stickers containing information on the individual product. In general, labels lack FDA and GSA product approval stamps.

Daily bottling capacity ranges from 10 to 100 cartons (12 350ml bottles per carton) at small-scale processors. Medium-scale processors, such as Vintage Farms, have a capacity of around 500 cartons per day. The manual bottling carried out by some small- and medium-scale processors limits the quantity of products that can be processed per day.

Dried fruits are packed in paper and plastic wrapping, which weighs between 250 and 1,000 grams. The average price per kilo of dried fruit is GHS100 (\$18) and this product is mostly sold at high-end supermarkets and airport duty-free shops. Fruit jam products are packaged in branded bottles. There are two main sizes of bottle (250 grams and 400 grams) and they cost GHS20 and GHS40, respectively.

#### ***3.2.5. Certifications and quality standards***

In terms of quality certification, processors that also engage in production activities often hold GLOBALG.A.P. certification. A few also have Fair Trade certification.

Most small- and medium-scale processors (about 90%) do not have the quality certification required to supply to international markets and as a result, do not export their products. The main reason for this is the high cost of pre-audit preparations and international certificate renewal. Quality certification requirements for the international market can include GLOBALG.A.P. certification for fresh produce and Ecocert, Fair Trade, HACCP and SWISSCERT certification for organic products.

Local quality standards include FDA food safety certification, good agricultural practice certification and GSA certification, as well as GEPA certification for waste material utilization and disposal.

Local processors that hold the required certification to export products include WAD Africa Fruits Company. Some processors with the potential to access international markets are working to obtain GLOBALG.A.P. and HACCP certification. For example, KNUST Fruit Processing Company Ltd. is considering expanding and commercializing their operations, and is working towards obtaining HACCP certification. In addition, some processors are in the process of investing in upgrading equipment and facilities to qualify for HACCP certification and other local and international quality certifications.

Within the fruits sector value chain, only one per cent of nurseries comply with key standards. Between 30 and 35 per cent of producers have GLOBALG.A.P. certification and ten per cent have organic certification, while only 20 per cent of processors comply with the required standards.

The following table provides a summary of the standards that apply to the fruits sector value chain and the certification that is available to local processors, producers and other stakeholders. It also details the level of compliance of local stakeholders with the standards.

**Table 5**  
**Certification schemes and compliance levels**

<b>Value chain segment</b>	<b>Standards</b>	<b>Certification</b>	<b>% of companies complying</b>
Input supply	<ul style="list-style-type: none"> <li>• Nursery Standards (GSA)</li> <li>• GS 967 Planting Materials (Mango)</li> <li>• GS 969: 2009 Good Nursery Practices</li> <li>• GS 949 Code of Practice for Crop Production</li> </ul>	<ul style="list-style-type: none"> <li>• PPRSD, Seed and Fertilizer Act (2010)</li> <li>• Phytosanitary certificate (exports)</li> </ul>	<ul style="list-style-type: none"> <li>• 1 per cent (certified nurseries)</li> </ul>

Production	<ul style="list-style-type: none"> <li>• GLOBALG.A.P.</li> <li>• Fair Trade</li> <li>• Organic</li> <li>• Green Label (local)</li> </ul>	<ul style="list-style-type: none"> <li>• GLOBALG.A.P.</li> <li>• Fair Trade</li> <li>• Organic</li> <li>• Green Label</li> </ul>	<ul style="list-style-type: none"> <li>• 30-35 per cent</li> <li>• 10 per cent</li> <li>• 10 per cent</li> <li>• 5 per cent</li> </ul>
Packaging	<ul style="list-style-type: none"> <li>• GSA</li> <li>• FDA</li> </ul>	<ul style="list-style-type: none"> <li>• Pack house</li> <li>• FDA and GSA approved stamps (labels)</li> </ul>	<ul style="list-style-type: none"> <li>• 20 per cent (mainly large-scale exporters)</li> </ul>
Storage	<ul style="list-style-type: none"> <li>• GSA</li> <li>• FDA</li> </ul>	<ul style="list-style-type: none"> <li>• Warehouse</li> <li>• Cold room</li> </ul>	<ul style="list-style-type: none"> <li>• 20-30 per cent</li> </ul>
Processing	<ul style="list-style-type: none"> <li>• GSA</li> <li>• FDA</li> <li>• International Food Standard (IFS)</li> <li>• EPA</li> </ul>	<ul style="list-style-type: none"> <li>• HACCP</li> <li>• ISO 19000</li> <li>• ISO 22000</li> <li>• BRC</li> <li>• Food Safety System certification (FSSC22000)</li> </ul>	<ul style="list-style-type: none"> <li>• 20 per cent</li> <li>• International market suppliers (100 per cent)</li> <li>• Local supermarket suppliers (10 per cent)</li> </ul>
Export (marketing)	<ul style="list-style-type: none"> <li>• SPS</li> <li>• GLOBALG.A.P.</li> </ul>	<ul style="list-style-type: none"> <li>• GEPA Export Registration</li> <li>• Certificate of Free Sale (USA)</li> <li>• PPRSD registration for export</li> <li>• Phytosanitary</li> </ul>	<ul style="list-style-type: none"> <li>• 100 per cent</li> </ul>

### **3.2.6. Regulatory requirements for processing**

In Ghana, fruits and fruit products destined for export markets must meet phytosanitary and maximum chemical residue levels requirements. PPRSD registers and provides certificates for produce intended for export. Exporters must also register with GEPA and receive an export certificate before starting export activity. Other certificates include FDA and Environmental Protection Agency (EPA) food safety certificates for processors.

#### **3.2.6.1. Ghana Standards Authority fruits sector standards**

GSA standards that are relevant to the fruits industry include:

- GS 546: 2004 Fresh Fruits and Vegetables – Specification for Mango
- GS 969: 2009 Good Nursery practices – Code of Practice for Planting Material Production (parts 1 and 2)
- GS 949 Code of Practice for Crop Production – Good Agricultural Practices for Ghana (parts 1 and 2)

- GS 967 Planting Materials – Specification for Mango Planting Material
- GS IM 12 Inspection Manual – Instructions for Inspection of Mango Planting Material
- GS IM 3 Inspection Manual – Instructions for Inspection of Fresh Mango
- GS CAC RCP International Recommended Code of Practice – General Principles of Food Hygiene
- GS 717:2003 – Specification for Liquid Pulpy Mango Products Preserved Exclusively by Physical Means
- GS 1037 Fruits and Vegetables – Specification for Dried Mango
- GS Codex Stan 159:2003 – Specification for Canned Mango
- GS Codex Stan 160 – Specification for Mango Chutney

The following table details the various GSA standards that apply to the cultivation of mangoes and pineapples, and the processing and production of mangoes and pineapples products in Ghana.

Table 6  
**GSA fruits industry codes and standards**

Code	Standard
GS 101:2016	Fresh fruits and vegetables specification for pineapple
GS 546:2017	Fresh fruits and vegetables specification for mango
GS 1066:2017	Code of hygienic practice for fresh fruits and vegetables
GS 1125: 2016	Specification for mango for processing
GS 1126: 2016	Specification for pineapple for processing
GS 1054: 2014	Good Agricultural Practices
GS ISO 874:2016	Fresh fruits and vegetables (sampling)
GS 1054: 2019	Ghana Green Label Scheme (requirement for fresh fruits and vegetables conforming to Green Label)
GS 136: 1990	Cartons for packaging pineapple
GS 966:2017	Planting material for pineapple
GS 1035:2013	Specification for dried pineapple
GS IM 1:2017	Inspection manual for inspecting fresh pineapple
GS IM 3: 2017	Inspection manual for fresh mango
GS IM 11:2009	Inspection manual for mango planting material
GS 1037:2013	Specification for dried mango
GS CAC STAN 160:2013	Specification for mango chutney



Code	Standard
GS 1034: 2012	Specification for fruit juice preserved with chemicals
GS 1091:2014	Specification of fruit juice preserved by physical means
GS 1213: 2015	Specification for freshly squeezed fruit juices
GS CAC STAN 1	Labelling of prepacked foods
GS CAC RCP 1:2016	Code of hygienic practices
GS 361:2018	Code of practice for organic farming

The research carried out for this report identified the following as priority standards for the fruits sector value chain:

- Standards for fresh mango and pineapple (GS 546:2017)
- Standards for dried mango (GS 1037:2013)
- Standards for fruit juice (GS 1034: 2012 and GS 1091:2014)

Key challenges identified in relation to the value chain include:

- Weak enforcement of regulations (e.g., regulations on seedlings)
- Weak enforcement of pesticide regulation and weak monitoring of pesticide sales
- Inadequate resources at regulatory bodies for the execution of their monitoring and enforcement functions
- Inadequate support services to help producers and processors access credit and other financial support
- Limited business advisory services in the following areas:
  - Credit sourcing
  - Technical advice
  - Business services support

### **3.2.6.2. The Food and Drugs Law, 1992 (PNDCL 305B)**

The Food and Drugs Law, 1992 (PNDCL 305B) requires processors to be registered by the FDA. This is achieved through the inspection of manufacturing facilities, which are assessed in accordance with the GMP standard. However, the legislation makes room for the FDA to produce codes of practice with regard to guidance relating to such inspection activities (article 48).

If the inspection is successful, producers and processors receive a certificate of registration and a unique FDA number that must appear on product packaging and labelling. Product samples are analysed at the FDA laboratory before registration is completed. Samples are assessed using the relevant domestic standard.

Guidelines on how to conform to FDA standards include:

- FDA Food Safety Guidelines
- FDA Labelling Guidelines
- Guideline for GMP
- GSA Certification Mark Rules
- Guidelines for GSA

### **3.3. Marketing**

The fruits sector marketing sector comprises aggregators of fresh produce for local processors and exporters of fresh produce. Aggregators are mostly concentrated in production areas, in particular the Southern Belt. They are also located in the Middle Belt and Northern Region.

Aggregators are predominantly (90 per cent) local market women who chiefly sell to other market women or local retailers. Aggregator activity is not well organized and is largely comprised of verbal arrangements with producers made on the phone. Aggregators normally buy grade 2 and grade 3 fruits from farm gates in sacks or by the kilogram. Other aggregator activity relates to that carried out by well-organized producers that supply international markets.

Relationship between exporters and producers are normally based on formal agreements that are made before the start of the harvesting season. Some aggregators supply inputs and contract private extension service providers to assist farmers with their activities. After harvesting, producers sell to aggregators at agreed prices, minus the cost of inputs supplied.

Some large-scale fruit processors also act as aggregators, entering into off-taker agreements with producers before the harvest season. Aggregators and exporters serve as the main link between producers (usually small and medium scale) and the local and international markets. The aggregator/exporter role is interchangeable. Usually aggregators/exporters pre-finance producers through contracts and provide extension support through the production season and buy at harvest.

Farm-gate prices in the export value chain are between \$0.25 and \$0.45 per kilogram. Value-added mango products for export can cost between \$3 and \$4 per kilogram. In comparison, farm-gate prices in the local market chain are between \$0.25 and \$0.90 per kilogram, with value-added fresh pineapple costing up to \$1.50. Little or no processing takes place for local markets.

#### ***3.3.1. Market share of local products and producers***

The Ghana fruits market is worth an estimated \$381 million, with mango and pineapple the principal crops. Locally made fruit products have a limited share of the market. For example,

locally made fruit juices account for only around 13 per cent of non-alcoholic drinks sales in shopping malls in Ghana.<sup>8</sup>

The main market for most small- and medium-scale fruit processors is the domestic market. Only a few processors target the West African region (e.g., Burkina Faso and Nigeria). Vintage Farms is a processor that supplies this market, exporting almost 10,000 cartons of processed mango and pineapple juice per month to Burkina Faso and Nigeria.

### ***3.3.2. Domestic and export market requirements for mangoes***

#### ***Domestic market requirements***

There are no stringent quality requirements for fruits sold at local markets. Traders and consumers base their selection on physical appearance (variety, size and quality).

Fruits sold at shopping malls and supermarkets and by processing companies must meet specific quality criteria. As a result, they often buy their produce from GLOBALG.A.P.-certified farmers. However, these criteria are often less rigorous than those that must be met by products for export, in particular with regard to physical appearance, and certification is not a prerequisite in some cases.

Currently, only about 10 per cent of processors are meeting international-market quality requirements. These are mostly large-scale processors in addition to a few medium-scale processors.

#### ***Export market requirements***

Mango is a highly perishable fruit and is vulnerable to pests and diseases, such as fruit fly infestation and anthracnose. In order to deliver fresh or freshly cut mangoes to exporters, in particular those that ship produce to the European Union and the United States of America, farmers need to comply with stringent quality standards and must hold associated certification.<sup>9</sup>

The high cost of complying with standards and holding certifications is one of the greatest challenges facing producers and processors in the mango value chain. For example, in 2019, the audit required for GLOBALG.A.P. group certification (option 2) for 16 mango producers belonging to the Dangme Mango Farmers Association, available from AfriCert, would have cost \$5,000 (equal to \$315 per farmer). The per-farmer cost represented a significant

<sup>8</sup> Konfidants, "Research reveals only 18% of goods sold in Ghana's leading supermarkets are Made in Ghana" (July 2019)

<sup>9</sup> Van Melle, C., and S. Buschmann (2013), Comparative analysis of Mango Value Chain models in Benin, Burkina Faso and Ghana, In: Rebuilding West Africa's Food Potential, A. Elbehri (ed.), FAO/IFAD.

increase over the price in 2018, when as a result of the involvement of more producers, the cost was \$50.

According to the local mango association, around 70 farmers were unable to raise funds to prepare for the audit and dropped out of the audit process. This means that the volume of certified mango available for large processors will decrease, while uncertified produce will have to be sold at local markets and to small- and medium-scale processors.

Another barrier to obtaining certification is the high cost of maintaining mango orchards, in particular the costs involved in combating bacterial black spot disease. The prevalence of the disease has made it difficult for farmers to keep production costs at a viable level and as a result, most have abandoned their farms. As a result, producers are unable to meet certification requirements in terms of farm hygiene and good agricultural practices.

The European Union is a leading destination for Ghanaian mango exports. The European Union market is characterized by different market segments that have specific requirements with regards to product price, variety and quality. Mango exported from Ghana is required to meet international sanitary and phytosanitary regulations. As a result, European Union markets import mango from suppliers that hold GLOBALG.A.P. certification (other markets accept organic or Fair Trade certification).

However, exporters from Ghana have not been able to diversify their market coverage within the European Union because of the limited varieties of mango they export and the limited demand for organic produce. Currently, most producers are reluctant to venture into organic production because of the low volumes demanded by international markets and the limited revenue available as a result.

Each European Union member State is committed to the Codex Alimentarius and more specifically to the Codex Standard for Mangoes that define a set of provisions in terms of quality, size, tolerance, presentation, marking and labelling, contaminants and hygiene. Ghanaian mango suppliers are obliged to meet these minimum requirements (class 1 products are destined for direct consumption and class 2 product are used for processing).

At the same time, GLOBALG.A.P. certification has become the minimum requirement for mango exporters when supplying large retail outlets in Europe. While the number of producers and exporters (option 1) and smallholder producer groups (option 2) with this certification is growing, the total remains relatively limited because of a number of factors.

Mangoes undergo strict sanitary inspection prior to shipment to maintain credibility on European markets. The FDA, GSA and PPRSD ensure that mangoes and mango products meet the required quality standards before they are exported. To avoid environmental

degradation, the Soil Research Institute, the EPA and the Ministry of Food and Agriculture collaborate with farmers to ensure adherence with best environmental practices.

There are strict regulations with regard to the use of chemicals by farmers. The EPA ensures that farmers adhere to best environmental practices. However, a lack of quality standard enforcement at entry and exit points affects the volume and quality of produce exported from Ghana.

### ***3.3.3. Domestic and export market requirements for pineapples***

#### **Domestic market requirements**

Awareness of food safety standards is low in Ghana and as with regard to mangoes, consumers do not often demand stringent quality checks on pineapples.

Consumers buying from local markets base their choice on price, variety, taste, size and physical appearance. The only exception is fruit juice, where most consumers check the manufacturing and expiry dates.

Pineapples sold at shopping malls and supermarkets and by processing companies must meet specific quality criteria. As a result, they often buy their produce from farmers that grow pineapples according to GSA good agricultural practices.

Processing companies supplying fruit products such as fruit juice, dried fruits, jam and cut fruits must ensure that their outgrowers and suppliers meet GSA good agricultural practice requirements and their processing facilities adhere to FDA and GSA food safety and product quality standard requirements. Fruit products must have a FDA approval stamp.

#### **Export market requirements**

Over 80% of MD2 pineapples cultivated in Ghana are sold to European markets. This region also accounts for a limited amount of other varieties of pineapple.

In terms of quality, pineapples sold on the European market are required to meet United Nations Economic Commission for Europe quality standards for pineapples, which is the standard for pineapples stated in the Codex Alimentarius and the European Union General Marketing Standards of Regulation no. 543/2011.

Other factors considered are size, packaging and labelling. The most common certification required from exporters is GLOBALG.A.P. certification, although some markets demand Fair Trade certification.<sup>10</sup> In addition, individual supermarkets can demand specific certifications without which an exporter cannot supply their shops.

<sup>10</sup> Centre for the Promotion of Imports, "Exporting fresh pineapple to Europe" (October 2018)

A major challenge with regard to export-related certification for local pineapple industry stakeholders is the high cost of obtaining and renewing certification. GLOBALG.A.P. certification (option 1) for a pineapple producer costs between \$1,800 and \$2,000, and Fair Trade certification costs between \$1,400 and \$1,500.

### 3.4. Cost- and profit-margin analysis of fruit products

#### 3.4.1. Production costs by area

The research carried out as part of this report identified eight principal costs associated with the cultivation and production of fruits and fruit products. They relate to raw materials, utilities, labour, labelling and packaging, marketing, equipment hire and maintenance, transportation and storage.

Raw materials account for the largest portion of production costs for all processors; as much as 45% of costs for small-scale processors. Transportation, labelling and packaging, and labour are other high-cost areas (see table 7).

Transportation accounts for a larger percentage of costs for large-scale processors because these companies source produce from across Ghana and from neighbouring markets, such as Burkina Faso and Côte d’Ivoire, as well as from Brazil.

Table 7

#### Production costs for fruit processors by area and size of processor (percentage)

Costs	Processor size		
	Small scale	Medium scale	Large scale
Raw materials	45	40	30
Utilities	5	7	5
Labour	10	10	15
Labelling and packaging	14	15	10
Marketing	1	3	5
Equipment hire and maintenance	5	6	15
Transportation	15	15	15
Storage	5	4	5
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

### 3.4.2. Conversion rates of processed fruits

With regard to the conversion of fresh fruits into various fruit products, the dried fruit product segment has the lowest fresh-fruit-to-final-product conversion rate.

The average fresh-mango-to-dried-fruit product conversion rate is ten per cent, while the average fresh-pineapple-to-dried-fruit-product conversion rate is four per cent. This means that 1,000 kilograms of fresh mango produce 100 kilograms of dried fruit, while 1,000 kilograms of fresh pineapple produce 40 kilograms of dried fruit. The higher conversion rate for mangoes is largely because pineapples have a higher water content.

However, dried fruits is the most expensive product per unit, at an average of GHS100, compared to GHS7 for fresh cuts, GHS40 for jam and GHS5 for fruit juice.

Table 8

#### **Average conversion rates of processed fruits by product (percentage)**

Fruit product	Conversion rate (percentage)	
	Mangoes	Pineapples
Fresh cuts	70	60
Juice	50	60
Dried fruit	10	4
Jam	60	50

### 3.4.3. Cost-margin analysis of dried mango production

The research carried out for this study also involved comparing the profitability of processing 1,000 kilograms of fresh fruit into dried fruits by geographic location.

The analysis revealed that that it is more profitable to produce dried mango in the Middle Belt than in the Southern Belt (see table 9). On average, 1,000 kilograms of processed mango yields a 60 per cent profit margin in the Middle Belt, compared to 49 per cent in the Southern Belt.

This disparity is largely due to a difference in processing costs, which are higher in the Southern Belt than in the Middle Belt. Data could not be obtained for the Northern Region.

Table 9

#### **Cost-margin analysis of dried mango production by geographic location**

	<b>Southern Belt</b>	<b>Middle Belt</b>	<b>Northern Region</b>
Raw materials costs (GHS per metric ton of fresh fruit at GHS1.50 per kilogram)	1,500	1,500	N/A
Processing costs (GHS per metric ton)	3,600	2,500	N/A
Total production costs (GHS)	5,100	4,000	N/A
Output (kilograms) (10% per cent conversion rate)	100	100	N/A
Average price per kilogram of dried fruit (GHS)	100	100	N/A
Total revenue (GHS) (Output x average price)	10,000	10,000	N/A
Profit/(loss) (GHS) (Total revenue minus total production cost)	4,900	6,000	N/A
<b>Profit/(loss) margin (%)</b>	<b>49%</b>	<b>60%</b>	<b>N/A</b>

#### 3.4.4. Cost-margin analysis of dried pineapple production

The research carried out as part of the study found that processors in the Southern Belt producing dried pineapple products are merely breaking even, while processors in the Middle Belt producing dried pineapple products are doing so at a loss (see table 10). This status is largely because of low pineapple conversion rates (4 per cent). Data could not be obtained for the Northern Region.

Table 10

#### **Cost-margin analysis of dried pineapple production by geographical location**

<b>Item</b>	<b>Southern Belt</b>	<b>Middle Belt</b>	<b>Northern Region</b>
Raw materials costs (GHS per metric ton of fresh fruit at GHS1.50 per kilogram)	1,000	1,000	N/A
Processing costs (GHS per metric ton)	3,300	2,500	N/A
Total production costs (GHS)	4,300	4,000	N/A
Output (kilograms) (4 per cent conversion rate)	40kg dried fruit	40kg dried fruit	N/A
Average price per kilogram of dried fruit (GHS)	100	100	N/A



Total revenue (GHS) (Output x average price)	4,000	4,000	N/A
Profit or (loss) (GHS) (Total revenue minus total production cost)	(300)	0	N/A
<b>Profit/(loss) margin (%)</b>	<b>(-7.5)</b>	<b>0.0</b>	<b>N/A</b>

### 3.4.5. Monthly cost-margin analysis of fruit juice production

The research carried out as part of the study found that processors of fruit juice across the country do so at a loss. This status is attributed to inefficient processing machines, the high cost of packaging materials and a lack of manual bottling labour.

Most small-scale processors use manual processes to bottle fresh juice and cannot produce the quantity of juice to make a profit. These processors have a monthly processing capacity of 1,000 kilograms and the conversion rates for mangos and pineapples are 50 per cent and 60 per cent, respectively. A 350ml of bottle fresh mango juice is sold for GHC5.00 and a 350ml bottle of pineapple juice for GHC3.00. As a result, the processors are operating at a loss (see table 11).

Data could not be obtained for the Northern Region.

Table 11

#### Cost-margin analysis of monthly fruit juice production by fruit and geographic location

Item	Southern Belt		Middle Belt		Northern Region	
	Mango	Pineapple	Mango	Pineapple	Mango	Pineapple
Raw materials costs (GHS per metric ton of fresh fruit at GHS1.50 per kilogram)	1,500	1,400	1,500	1,300	N/A	N/A
Processing and packaging costs (GHS per metric ton)	3,500	3,500	2,500	2,500	N/A	N/A
Total production costs (GHS)	5,000	4,900	4,000	4,800	N/A	N/A
Output (bottles) (CR=conversion rate)	424 CR:50%	466 CR:60%	424 CR:50%	466 CR:60%	N/A	N/A
Average price per 350ml of fruit juice	5.00	3.00	5.00	3.00	N/A	N/A

(GHS)						
Total revenue (GHS) (Output x average price)	2,120	550	2,120	550	N/A	N/A
Profit/(loss) (GHS) (Total revenue minus total production cost)	(2,880)	(4,350)	(1,880)	(4,250)	N/A	N/A
<b>Profit/(loss) margin (%)</b>	<b>(57.6)</b>	<b>(88.8)</b>	<b>(46.0)</b>	<b>(89.0)</b>	<b>N/A</b>	<b>N/A</b>

### 3.4.6. Cost-margin analysis of mango jam production

The jam industry appears very lucrative, with processors in the Southern Belt recording a profit margin of almost 80 per cent (see table 12).

Data could not be collected for the Middle Belt and the Northern Region because the processing of fruit into jam does not take place in these areas.

Table 12

#### Cost-margin analysis of mango jam production by geographical location

	<b>Southern Belt</b>	<b>Middle Belt</b>	<b>Northern Region</b>
Raw materials costs (GHS per metric ton of fresh fruit at GHS1.50 per kilogram)	1,500	N/A	N/A
Processing, labour and packaging costs (GHS per metric ton)	6,600	N/A	N/A
Total production costs (GHS)	8,100	N/A	N/A
Output (kilograms) (50% conversion rate)	500	N/A	N/A
Average price per kilogram (GHS)	80	N/A	N/A
Total revenue (GHS) (Output x average price)	40,000	N/A	N/A
Profit/(loss) (GHS) (Total revenue minus total production cost)	31,900	N/A	N/A
<b>Profit/(loss) margin (%)</b>	<b>79.8</b>	<b>N/A</b>	<b>N/A</b>

### 3.4.7. Cost-margin analysis of annual pineapple production

The result of a cost-margin analysis of annual pineapple production suggests that producers in the Southern Belt and the Middle Belt are making a profit (39 per cent and 38 per cent margin, respectively).

Production costs are higher in the Southern Belt than in the Middle Belt as a result of higher labour and maintenance costs. Data could not be obtained for the Northern Region.

Table 13

#### Cost-margin analysis of annual pineapple production by geographical location

	Southern Belt	Middle Belt	Northern Belt
Average production costs (GHS per acre)*	23,000	17,806	N/A
Average annual yield (metric tons)	25	19	N/A
Average price per unit product (GHS per metric ton)	1,500	1,500	N/A
Total revenue (GHS)	37,500	28,500	N/A
Profit/(loss) (GHS)	14,500	10,694	N/A
<b>Profit/ (loss) margin (%)</b>	<b>39</b>	<b>38</b>	<b>N/A</b>

\*14-month production cycle. Costs include land rental and preparation, planting materials, agrochemicals, labour for spraying, forcing, harvesting and transportation.

### 3.4.8. Cost-margin analysis of annual mango production

The result of a cost-margin analysis of annual mango production suggests that mango producers in the Middle Belt and the Northern Region are making the most profit, at a margin of 61 per cent, compared to 48 per cent in the Southern Belt.

The major factors behind the higher profit margin in the Middle Belt and the Northern Region are lower labour costs and more frequent machinery maintenance.

Table 14

#### Cost-margin analysis of annual mango production by geographical location

	Southern Belt	Middle Belt	Northern Belt

Average production costs (GHS per acre) *	4,700	3,500	3,500
Average annual yield (metric tons)	6	6	6
Average price per unit product (GHS per metric ton at GHS 1.50 per kilogram)	1,500	1,500	1,500
Total revenue (GHS) (Yield x average price)	9,000	9,000	9,000
Profit/loss) (GHS) (Total revenue minus production costs)	4,300	5,500	5,500
<b>Profit/loss margin (%)</b>	<b>48.0</b>	<b>61.0</b>	<b>61.0</b>

\* Production costs in 2018 (annual cost of maintenance). This include pruning, spraying, labour, harvesting and transportation cost.

Table 15  
**Comparison of pineapple production in Ghana, Nigeria and Costa Rica**

	Ghana	Nigeria	Costa Rica
Global ranking	11th	6th	1st
Production volume (million metric tons)	0.66	1.59	2.93
Global production share (%)	2.6	6.2	11.4
Exports value in 2018 (\$ million)	29.5	68.0	1, 540
Global exports share (%)	1.1	N/A	55.2

Source: Tridge

Table 16  
**Comparison of mango production in Ghana, Kenya and Nigeria**

	Ghana	Kenya	Nigeria
Global ranking	34th	13th	10th
Production volume (metric tons)	93,360	734,700	917,600

Global production share (%)	0.2	1.6	2.0
Exports value in 2018 (\$ million)	29.52	N/A	N/A
Global exports share (%)	0.2	N/A	N/A

Source: Tridge

### 3.5. Support institutions and services

#### 3.5.1. Post-harvest support services

Post-harvest support services include logistics, transportation, storage and pack-house and cold-chain services.

Fresh mango is mainly exported by sea and there are a number of pack houses specifically used for the mango trade in the Middle Belt and the Northern Region. These pack houses are funded by the Millennium Development Authority (MiDA).

According to producer data, around 25-30 per cent of the fresh mangoes harvested are lost in the post-harvest phase. The main reasons for the loss of fruits are spoilage and rejection because of quality issues (e.g., not meeting size and maturity selection criteria). The prevalence of these factors is attributed to poor harvesting techniques, the lack of cold-storage facilities on farms or close to farms, poor disease and pest control practices, and theft.

Another issue for farmers in the Middle Belt is the failure of processors to honour their off-taker agreements. Often, this happens because European importers encounter quality management issues in the destination country and cannot purchase from local processors. As a result, off-taker agreements are cancelled. This led to a massive loss in revenue during the 2018 mango season.

With regard to processed mango products (especially fresh cut mango), export companies are positive about the facilities at airports and the on-factory inspections of PPRSD and CEPS, which ensure the fast movement of sealed trolleys directly from the factory to the airplane.<sup>11</sup>

Fresh pineapples are mostly exported by sea, with limited volumes shipped by air. This is because the cost of air-freight is higher and there have been significant improvements in the standards of sea-freight services.

<sup>11</sup> Joep van den Broek, Nerissa Apenteng-Sackey, Michiel Arnoldus, Salif Keita and Roland Waardenburg, *West Africa Fruit - Scoping Study* (2016)

Fruit Terminal Company Ltd., which is located at the Port of Tema, is a logistics provider for pineapples and other fruits transported by sea, especially those bound for France. Vessels operated by African Express Lines, which is a subsidiary of Compagnie Fruitiere, carries most of the fruits shipped by sea. Main European ports for shipments of pineapples from Ghana include Antwerp, Belgium; Vendres, France; Vado, Italy, and Dover, the United Kingdom.

With regards to air freight, the Air Ghana Perishable Cargo Centre (AGPC), located at Kotoka International Airport, and Aviance Ghana, are the two main air-freight logistic service providers in the country. AGPC has a cooling facility and provides handling services for fresh produce. It also carries out regulatory checks at this facility.

AGPC works with carriers such as Cargolux, Delta Air, Lufthansa and Turkish Airlines. Aviance Ghana is the largest cargo handler in the country and works with clients such as British Airways, South African Airways, Ethiopian Airlines, Alitalia and KLM.

### ***3.5.2. Traceability support services***

In terms of traceability, the activity of most farms and pack houses is captured through geographic information system technology. This platform tracks data relating to identification, transparency and crop volumes, and facilitates logistics planning between producers and buyers.

In addition, bar code technology allows pallets of fresh produce to be identified, tracked and traced to fields where the fruit was cultivated. This enhances and simplifies the handling of produce at ports and in storage facilities.

### ***3.5.3. Pack houses, packing lines and cold van services***

Community and public pack houses with packing lines at strategic locations across the country are provided by a number of initiatives. These initiatives include the Millennium Challenge Account, the Export Marketing and Quality Awareness Project, and the Export Development and Agricultural Investment Fund.

With regard to the pineapple industry, there are a number of large farms that have pack houses with cooling facilities and automated packing lines.

With regard to the mango industry, Akorley Pack House was established in 2010, with funding from MiDA. The pack house is owned and used by four mango farmer-based organizations: the Lower Manya Krobo Mango Farmers Association, the Upper Manya Krobo Mango Farmers Association, the Yilo Krobo Mango Farmers Association and the Dangme West Mango Farmers Association. The pack house is also used by farmers from the Volta Region.

Akorley Pack House is managed by Cotton Weblink Portfolio Limited, which ensures that the mangoes handled in the pack house satisfy Codex HACCP requirements.

Only fruits destined for export markets are brought to the pack house, which offers an automated processing service that includes washing, drying, waxing, sorting, packaging and boxing, and cold-room storage. The pack house processes five tons of mangoes per hour and 40 tons per day, based on an eight-hour working shift.

During the off-season, the pack house is idle. The management company is considering diversification, including vegetable processing for the export market, to ensure year-round use of the facility.

#### ***3.5.4. Cold-chain and demonstration centres***

The refrigerated trucks that can transport fresh fruits from pack houses to the fresh produce terminals at the ports, providing an unbroken cold-chain service, are either owned by large farms or processors, or have been acquired as part of EMQAP.

Most trucks are still operational. In order to show farmers and processors how this technology works and the benefits it brings, including compliance with good agricultural practices, fully fitted demonstration centres have been set up in the Southern Belt as part of EMQAP.

#### ***3.5.5. Certification services***

Quality certification requirements for the international market include GLOBALG.A.P. Certification for fresh produce, Ecocert, Fair Trade, HACCP and SWISSCERT certification for organic products. Local quality standards include FDA food safety certification, good agricultural practice certification and GSA certification, as well as EPA certification for waste material utilization and disposal.

In both the mango and pineapple sector value chains, key stakeholders are aware of the quality standards that must be met, including phytosanitary and inspection requirements, and a number of local processors are working towards compliance and completing the quality certification processes.

Many producers are supported by large-scale processors, such as Blue Skies, Bomart and HPW, which also act as aggregators. Other groups are trying to levy members to raise funds, including through the use of commissions on sales made at harvest. However, some group members are not in favour of this commission system.

Non-government organizations and initiatives such as the Adventist Development and Relief Agency, the GIZ-Market Oriented Agriculture Programme and HortiFresh provide training on good agricultural practices, emphasizing its status as a minimum quality standard requirement for the local industry.

Examples of food safety management systems include:

- British Retail Consortium (BRC)
- International Food Standard (IFS)
- Food Safety System Certification (FSSC22000)
- Safe Quality Food Programme (SQF)
- Fair Trade

### ***3.5.6. Laboratory support services***

Laboratory support services are provided by GSA (food, microbiology, and chemical and pesticide residue laboratories) and the microbiology laboratory of the Food Research Institute, which operates under the auspices of the Council for Scientific and Industrial Research. In the private sector, SGS offers accredited laboratory support services. The cost of private sector services is higher.

There is the need to decentralize metrology laboratory services in order to provide localized services for value chain stakeholders that are located in the various production zones across the country. In addition, there is the need for a centrally located measurement laboratory to serve the fruits industry. This facility should be linked to the national metrology laboratory.

### ***3.5.7. Calibration and testing support services***

The only provider of calibration and testing support services in Ghana is the GSA. Its metrology laboratory provides accredited services that meet international standards.

Recommendations in the area of calibration and testing support services include:

- The decentralization of testing support services
- The creation of smaller laboratories in areas where production activity is concentrated
- The identification of specific test scopes required by the industry
- The training of Field Extension Officers so they can help farmers with applications



### ***3.5.8. Private certification bodies***

A number of private certification bodies provide GLOBALG.A.P. pre-audit and audit-certification services. They include:

- AfriCert
- Control Union
- Ecocert
- SGS
- NSF
- Smartcert

Additional information is provided in annex I.

### ***3.5.9. Training and human capital development***

Large-scale processors and buyers, such as Blue Skies, Bomart and HPW, provide training in the area of good agricultural practice and local and international quality certification requirements.

The Ministry of Food and Agriculture also provides training on good agricultural practices and group operating systems to producer associations, in collaboration with non-government organizations and large-scale processors.

For example, the Adventist Relief Agency was sub-contracted by Exim Bank to provide private services to mango and pineapple farmers. Subjects covered under this service agreement included complete agronomy, land preparation, seedling selection and establishment, disease control, good agricultural practices and good harvesting practices. Around 6,250 farmers from 30 associations took part in this training.

The processing sector employs between 2,000 and 3,000 workers. However, human capital capacity is low; 70-80 per cent of workers do not have any form of food processing skills or experience. In-service training on food safety and basic hygiene is normally organized for the workers.

### ***3.5.10. Agricultural financing services***

Access to finance continues to be a critical challenge for stakeholders in the mango and pineapple industry value chains. Relationships between stakeholders and financial institutions are weak or non-existent.

Reasons for this status cited by stakeholders include high interest rates, the absence of off-taker agreement services, poor management capacity, a lack of risk-related services (such as agricultural sector insurance products) and issues with land titles.

In turn, reasons cited by financial institutions include the inability of stakeholders to repay loans, a lack of collateral, the high risk involved in fruits production and the long gestation period of tree crops and other fruit crops.

The Outgrower Value Chain Fund, which is funded by the KfW Development Bank, offers loans with an 18 per cent interest rate to farmers. The project has a total fund of €18 million and is aimed at reducing rural poverty through agricultural development. Its objectives are:

- To improve access for small-scale farmers and technical operators (e.g., processors, exporters, aggregators and bulk buyers) to medium-to-long-term financing solutions
- To contribute to the development of outgrower schemes
- To integrate smallholder farmers into the commercial agricultural development process

The Fidelity Bank Ghana Ltd. also offers a range of financial services, including warehouse receipt finance, input finance loans, export finance loans and commercial asset finance. The interest-rate level attached to these services ranges from 22 per cent to 26 per cent.

The bank has a fund of GHS105 million (\$19 million) but does not offer its services to producers in the mango sector because of the long gestation period of the mango plant. However, the bank does provide some support to help processing facilities maintain cashflow and repay loans.

Mango and pineapple industry stakeholders also receive financial support from non-government organizations and other initiatives, such as the Skills Development Fund, the Business Advisory and Advocacy Challenge Fund, the Ghana Climate Innovation Center and the HortiFresh project.

This support comes in the form of grants and capacity-building activities. For example, Yvaya Farms received a grant from the Ghana Climate Innovation Center to help it use its waste products for biogas production to power their dryers.

### **Observations from farmers, processors and exporters**

- High interest rates (24-30 per cent)
- High collateral requirements (120 per cent)
- Short loan tenures (up to three years) that do not fit with production dynamics (mango production does not see cash flows until the fifth year and pineapple production has a gestation period of 14 months and high initial investment costs)
- Early repayment periods that are not aligned with crop production calendars
- A lack of financial products suited to the fruits sector (financing for capex, working capital, production loans, etc.)
- Cumbersome processes

## Observations from banks

- Banks are interested in financing processing more than production
- Financial institutions have experienced high non-repayment rates by farmers
- The poor record keeping of firms leads to long processing times for loans
- The mango and pineapple sectors are high-risk areas because of the perishability of products
- The mango and pineapple sectors are high-risk areas because of the stringent requirements needed to supply international markets
- The mango and pineapple sectors are high-risk areas because of the reliance on good rainfall

## 3.6. Value-chain support schemes and institutions

### *3.6.1. Plant Protection and Regulatory Services Directorate*

PPRSD was established in 1965 and has the mandate and capacity to organize, regulate, implement and coordinate the plant protection services needed to support the sustainable growth and development of agriculture in Ghana. The national plant protection policy is Integrated Pest Management.

PPRSD provides certification for inputs such as seeds, fertilizers, agro-chemicals and planting materials, such as seedling and nursery establishments. In 2005, the development of a mango planting material certification was supported by the Export Market Quality Awareness Project (EMQAP), which was an African Development Bank-funded project under the auspices of the Ministry of Food and Agriculture. The certifying standard is GS 969, the Code of Practice for Planting Material Production.

PPRSD provides phytosanitary services for field production, plant protection, harvesting and packing of agricultural produce. The Directorate also provides inspection services at ports of exit for agricultural exports.

A fee is normally charged for all produce inspected according to the volumes of goods presented.

### **Services provided by PPRSD:**

- **Pesticide and fertilizer dealers:** registration, inspection, training on pesticides and fertilizer management and the removal of obsolete and unwanted chemicals
- **Pesticide and fertilizer applicators:** registration, inspection and training on pesticide and fertilizer management

- **Extension service delivery:** training on and technical assistance with pesticides and fertilizer management
- **Exporters:** training of trainers in pesticide and fertilizer management for export certification
- **Importers:** sampling, inspection, analysis and testing of fertilizers and preparation of associated manuals and reports
- **International non-government organizations:** provision of pesticides and fertilizer consumption statistics

Exporters are required to provide a traceability code for each box of fruit or fruit products. This allows PPRSD to trace the origin of the produce.

The research carried out as a part of this study found that PPRSD staff, in particular inspectors at the Accra and Tema ports, need more training on how to handle audit and certification processes for agricultural products.

### ***3.6.2. Food and Drugs Authority***

FDA is the national regulatory body responsible for the regulation of food, drugs, food supplements, herbal and homeopathic medicines, veterinary medicines, cosmetics, medical devices, household chemical substances, tobacco and tobacco products, and the conduct of clinical trials protocols. FDA was established in 1992 as the Food and Drugs Board on the basis of the 1992 Food and Drug Law.

The registration of food products involves a review of manufacturing processes, an assessment of food safety and quality, and confirmation of compliance with FDA labelling regulations. The registration of any food product can take between one or two months from the date that samples are submitted for laboratory testing. Registration of pre-packaged food is valid for three years and must be renewed by the end of the third year.

In an effort to avoid food adulteration, FDA carries out food processing facility inspection, destination inspection of imported products, the verification of exports and post-market surveillance.

### ***3.6.3. Ghana Standards Authority***

GSA is a Government agency responsible for developing, publishing and promoting standards in the country. These activities ensure that products, goods and services produced in Ghana, whether for local consumption or for export, are safe, reliable and of good quality.

GSA carries out chemical, physical and organoleptic analysis of various food and agricultural products to determine quality and compliance with applicable standards.

The GSA Product Certification Department is responsible for the certification of products. Product certification facilitates trade, market access, fair competition and consumer acceptance of products on a national, regional and international level. It involves the issuance of a certificate or mark (or both) to demonstrate that a specific product meets a defined set of requirements for that product.

GSA has developed a Good Agricultural Practices for Ghana standard (GS 949). However, the code is not being applied by most local farmers. The lack of a regulatory body to enforce the code is a principal reason. Widespread adoption of good agricultural practices would help increase crop yields and improve crop quality.

### ***3.6.4. Environmental Protection Agency***

EPA is an agency of the Ministry of Environment, Science Technology and Innovation, and has a mandate to improve, conserve and promote the country's environment. It works to achieve environmentally sustainable development.

With regard to the fruits sector, EPA is responsible for controlling pesticide use and managing the registration of these chemicals. All pesticides must be tested at the point of import. EPA publishes an annual list of approved and banned chemicals, which is distributed to farmers by PPRSD.

EPA inspects fruit processors and other operators in the fruits sector on a regular basis to monitor the environmental impact of their operations. If chemical residues are discovered that are detrimental to the soil, corrective measures must be taken. Farm input sellers need EPA certification to operate.

### ***3.6.5. Other support and regulatory institutions***

Other support and regulatory institutions relating to the fruits sector include:

- Ministry of Food and Agriculture
- National Board for Small-Scale Industries
- Ministry of Trade and Industry

- Ghana Investment Promotion Council
- Ghana Export Promotion Authority
- Free Zones Board
- Ghana National Accreditation Service
- Farm associations (especially those located in the pineapple and mango growing areas)
- Metropolitan, Municipal and District Assemblies
- Financial institutions, commercial banks and financial service providers
- International partners, such as the Centre for the Promotion of Imports (CBI)
- Europe-Africa-Caribbean-Pacific Liaison Committee
- International Trade Centre

### **3.7. International and regional legal and non-legal requirements**

#### **Control of fruit exports to European Union markets**

To ensure food safety and avoid environmental damage, products are subjected to official controls. These controls are carried out to ensure that all foods marketed on European markets are safe and in compliance with all applicable regulatory requirements.

There are three types of checks:

- Documentary checks
- Identity checks
- Conformity checks (with marketing standards)

In case of repeated non-compliance of specific products originating from particular countries, the European Union can decide to carry out controls at an increased level or lay down emergency measures. Controls can be carried out at all stages of the import and marketing process in Europe. However, most checks are done at the points of entry.

For importers of fresh fruit and vegetables, the traceability of products is compulsory. To fulfil this obligation, European importers require exporters to provide proof of origin for all fruits and vegetables. In addition to a bill of lading, phytosanitary certification, packing list and custom documentation, a unique traceability code, such as a lot number or GLOBALG.A.P. number, are generally required.

#### **New regulation on compliance**

Recent detection and rejection alerts relating to agriculture exports to the European Union has led to the review of regulations governing phytosanitary compliance.

The primary focus of the reform process has been to better prevent the introduction and spread of pests and diseases in the European Union. The new regulation (EU 2016/2031) came into effect in December 2019 and introduced a more proactive approach to monitoring,

eradication and finance, and strengthened import regulations through the stricter application of existing standards.

### **Minimalization of pesticide residues**

Pesticide residues are a critical issue for suppliers of fruits and vegetables. With the aim of preventing adverse health effects and environmental damage, the European Union has set maximum residue levels for pesticides in and on food products. Products containing more than the permitted level of pesticides are withdrawn from the European market.

Notably, buyers in several countries, such as Austria, Germany, the Netherlands and the United Kingdom, have stricter maximum residue levels for pesticides.

### **New Sanitation Performance Standards regulation**

As of September 2019, all mangoes exported to the European Union are expected to meet one of the following options under regulation 2019/523/EC:

- Originate from a country recognized to be free from fruit fly infestations
- Originate from a recognized free zone
- Originate from a pest-free place of production
- Be subject to an effective treatment that ensures the fruit is pest free (a dossier must be submitted detailing the treatment applied)

Information about pesticide spraying programmes and related records are normally demanded upfront by European buyers. Therefore, exporters and producers are solely responsible for managing the quantities of pesticides used during production. The ability to trace products to the source of production is an additional requirement for the export of fresh fruit to the European Union.

### **Phytosanitary standards compliance (plant health regulations)**

Fruit and vegetables exported to the European Union must comply with European legislation on plant health. The European Union has phytosanitary requirements in place to prevent the introduction and spread of organisms harmful to plants and plant products in Europe.

Compliance with these requirements is managed by the competent food safety authorities in the importing and exporting countries. This means that PPRSD needs to have phytosanitary agreements with the European Union in place to ensure export trade with Europe. In Ghana, mango and pineapple exports are subject to inspections and require phytosanitary certificates prior to shipping.

### **Fair and sustainable means of production**

Demand for fair and sustainable means of production in the fruit industry has led to the adoption of optional requirements that are often required of producers by supermarkets in the European Union and other international markets.

According to CBI, most European buyers have a social code of conduct that they expect exporters of fruit and fruit products to adhere to. With regard to fresh mangoes and pineapples, producer social compliance is important. A few specialised buyers provide extra opportunities for trade in socially certified products. Social compliance initiatives in the European Union include:

- The Ethical Trading Initiative in the United Kingdom
- The Business Social Compliance Initiative in north-western Europe
- The Global Social Compliance Programme (for reference and self-assessment tools)

Examples of social or social accountability labelling for fresh fruit include:

- Fair for Life
- Fair Trade

Table 17 details the main standards relevant to the fruit industry in Ghana.

Table 17

**Important standards relevant to the Ghanaian fruits industry**

Level	Public		Private	
	Mandatory	Voluntary	Individual	Collective
National	<ul style="list-style-type: none"> <li>• National legislation</li> <li>• United States Department of Agriculture (USDA)</li> <li>• GSA</li> <li>• FDA</li> <li>• PPRSD</li> <li>• EPA</li> </ul>	<ul style="list-style-type: none"> <li>• HACCP certification</li> <li>• USDA national organic programme</li> </ul>	<ul style="list-style-type: none"> <li>• Tesco Nature's Choice</li> <li>• M&amp;S Field to Folk</li> <li>• Terre &amp; Saveurs Casino</li> <li>• Conad Percorso Qualita</li> <li>• Albert Heijn BV:AH Excellent</li> </ul>	<ul style="list-style-type: none"> <li>• British Retail Consortium</li> <li>• Assured Foods Standards</li> </ul>
Regional	<ul style="list-style-type: none"> <li>• European Union regulation</li> </ul>		<ul style="list-style-type: none"> <li>• Filière Qualité Carrefour</li> </ul>	<ul style="list-style-type: none"> <li>• GLOBALG.A.P.</li> <li>• HACCP</li> <li>• Qualität Sicherheit (QS)</li> <li>• International Food Standard</li> </ul>



Level	Public		Private	
	Mandatory	Voluntary	Individual	Collective
International	<ul style="list-style-type: none"> <li>World Trade Organization SPS Agreement</li> </ul>	<ul style="list-style-type: none"> <li>ISO 9000</li> <li>ISO 22000</li> </ul>	<ul style="list-style-type: none"> <li>SQF 1000/2000/3000</li> </ul>	<ul style="list-style-type: none"> <li>GLOBALG.A.P.</li> <li>Global Food Safety Initiative</li> <li>SA8000 Standard</li> <li>IFOAM Standard</li> </ul>

*Source:* The Impacts of Private Food Safety Standards on the Food Chain and on Public Standard-Setting Processes (May 2009).

### 3.8. Agriculture industry programmes and projects

There are a number of fruits sector-related development programmes and projects funded and implemented by donor agencies and multilateral development banks.

Table 18

#### Agriculture industry programmes and projects

Name of project	Implementing agency	Funding body	Geographical Coverage	Scope of intervention	Project duration
HortiFresh	SNV	The Government of the Netherlands	Bono, Central, Greater Accra, and Volta Regions	<p>HortiFresh supports the sector through activities and funding that is aimed at increasing the value of exports, both to the European Union and to regional markets; improving quality standards and product development in the domestic market; and reducing imports.</p> <p>HortiFresh is aiming to achieve these goals through business partnerships and cluster development activities focused on innovation and scaling. Importantly, it is aiming to encourage the banking sector to develop tailored financial products for the agriculture sector.</p> <p>Major activities include new financial products for the agriculture sector; individual company support; commercial agriculture support services; agriculture cluster development funding; funding of innovation; technical support in business management; trade promotion.</p>	Ongoing

GIZ-Market Oriented Agriculture Programme (MOAP)	GIZ	The Government of Germany and the European Union	Multiple regions	<p>GIZ-MOAP focused on the promotion of value chains in a range of fruit and vegetable sectors, including mango, pineapple and citrus fruits. Funding was provided in the Ahafo, Bono, Bono East, Central, Eastern, Northern, Upper West and Volta Regions.</p> <p>Major activities included the provision of inputs and services, including those relating to good agricultural practices, processing, marketing and certification.</p>	2004 - 2019
Ghana Agricultural Sector Investment Programme (GASIP)	Ministry of Food and Agriculture	International Fund for Agricultural Development	Nationwide	<p>GASIP is aiming to provide an institutional basis, a framework and supplementary financing for long-term private-sector engagement and the scaling up of investment in development of the pro-poor agricultural value chain.</p> <p>Major activities include:</p> <ul style="list-style-type: none"> <li>• Linking smallholder farmers to agribusinesses to enhance pro-poor growth</li> <li>• Nationwide scaling up of a successful value-chain investment strategy</li> <li>• Promoting and mainstreaming climate change resilience approaches in Ghana, in particular in the north of the country (financed through the Adaptation for Smallholder Agriculture Programme)</li> <li>• Knowledge management</li> <li>• Harmonization of intervention approaches</li> <li>• Policy optimization</li> </ul>	

Modernizing Agriculture in Ghana Programme (MAG)	Ministry of Food and Agriculture	Global Affairs Canada	Nationwide	MAG is the major government initiative behind the Planting for Food and Jobs Programme. The programme is aiming to improve access to improved seedlings, fertilizers, extension services, marketing for produce and e-Agriculture.	
Ghana Commercial Agriculture Project (GCAP)	Ministry of Food and Agriculture	World Bank	Nationwide	<p>The objective of GCAP is to improve agricultural productivity, in particular production levels of smallholder and nucleus farms in selected project intervention areas, by improving access to reliable water, land, finance, agricultural inputs and output markets.</p> <p>Principal activities include:</p> <ul style="list-style-type: none"> <li>• Strengthening investment promotion infrastructure and facilitating secure access to land</li> <li>• Securing public-private partnerships (PPPs) and smallholder links in the Accra Plains</li> <li>• Securing PPPs and smallholder links in the ADA Zone</li> <li>• Investing in the physical rehabilitation and modernization of existing irrigation and drainage infrastructure</li> <li>• Supporting the restructuring of irrigation and drainage institutions of the Government of Ghana</li> <li>• Supporting the development of new institutions, including water users associations</li> </ul>	

Skills Development Fund (SDF)	SDF Secretariat	DANIDA	Nationwide	<p>SDF is providing a demand-driven response to three critical challenges faced by production sectors in Ghana:</p> <ul style="list-style-type: none"> <li>• An inadequately qualified labour force</li> <li>• The urgent need for new entrants to the labour market with gainful, employable skills</li> <li>• Inadequate access to new technologies and innovation</li> </ul>	
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## Chapter 4

### 4.0. Analysis and recommendations

#### 4.1. SWOT analysis of the fruits sector value chain

Strengths	Opportunities
<ul style="list-style-type: none"> <li>• The existence of strong associations, such as FAGE, the Papaya and Mango Producers and Exporters Association of Ghana, and SPEG</li> <li>• Strong producer associations at the cluster level, which can apply leverage in terms of produce sourcing and price negotiation</li> <li>• Producers and processors have good appreciation of the relevance of good agricultural practices and international certifications, such as GLOBALG.A.P. and Fair Trade. A considerable number are GLOBALG.A.P. certified and some are Fairtrade certified</li> <li>• Strong private-sector participation in training, inspection and certification</li> <li>• Ghana has relatively well-developed institutional and governance structures that are supportive of industrial development</li> <li>• Some farms have good post-harvest facilities and there is a state-of-the-art export facility at the Port of Tema (for pineapples)</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Increasing demand for products that are certified, especially HACCP-certified processed foods</li> <li>• The volume of mango and pineapple imports into the European Union is continuing to grow.</li> <li>• Mango and other fruit processors in Ghana are always searching for fresh mangoes for processing purposes. This is demand cultivators could meet</li> <li>• Increasing domestic-market demand for fresh and processed fruit products, especially in Accra and other major cities</li> <li>• The shipping route from Ghana to Europe is shorter than the ones between South America and East Africa and Europe, which means lower transportation costs</li> <li>• The involvement of development partners, such as the United States Agency for International Development, GIZ-MOAP, ADRA and GCAP, has significantly improved the quality of mango and pineapple production, harvesting and processing</li> </ul>
Weaknesses	Threats
<ul style="list-style-type: none"> <li>• High production costs for processors, which are attributable to the high utilities, raw materials, labour and transportation costs</li> <li>• Poor access to finance for production and processing because of the perceived risks related to and seasonality of agriculture-related businesses</li> <li>• Seasonality of raw materials supply (mango and pineapples) that affects the production capacity of processing companies</li> <li>• Low yields from mango and pineapple fields and low productivity of fruit industry producers</li> <li>• Low level of automation at processing facilities. Activity at small- and medium-scale processing plants tend to be largely manual</li> <li>• Poor post-harvest practices in the areas of fruit</li> </ul>	<ul style="list-style-type: none"> <li>• The high prevalence of the bacterial black spot disease is a threat to the industry, both in terms of the impact on domestic and export market revenue</li> <li>• Major fruit companies in markets such as Brazil, Costa Rica and Peru, are strong, and are a significant barrier to the development of the Ghanaian fruit sector. Supply remains dominated by South American processors and producers</li> </ul>

<p>handling and transportation, among others, impact produce and product quality, and contribute to post-harvest losses</p> <ul style="list-style-type: none"> <li>• The challenges faced by stakeholders in maintaining international standard compliance because of the associated costs</li> </ul>	
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## 4.2. Recommendations

The following are recommendations based on a detailed analysis of the fruits sector value chain.

### 4.2.1. Recommendations for improving coordination

- Establish national value-chain committees to support fruits sector value-chain coordination activities
- Strengthen existing mango producer associations so they exert a more independent influence on certification and marketing operations relating to the value chain
- Strengthen existing platforms, such as the Mango Round Table and National Mango Week, to better engage public and private fruits sector value-chain stakeholders
- Provide training on sustainability strategies, such as resource mobilization for existing platforms
- WACOMP value-chain committees should work with the various value-chain bodies and structures to make them more sustainable, which will help to prevent the duplication of activities
- Strengthen existing value-chain coordination structures at the cluster level in the Ashanti, Brong Ahafo, Central, Eastern, Greater Accra, Northern and Volta Regions
- Strengthen networks between processors and producers in the Northern Region and the Middle Belt to expand business portfolios
- Organize trade forums between local and international buyers and producers in each cluster to improve production levels and product quality
- Encourage off-taker agreements between buyers (processors) and producers
- Provide accurate data on farmer numbers and farm size in the mango and pineapple sector value chains
- Identify potential investors willing to invest in the Integrated Tamale Fruit Company and the fruits sector value chain in the Northern Region and the Middle Belt
- Establish value-chain committees at the cluster level to serve as coordinating bodies for group marketing activities
- Encourage cooperation between large-scale processors and other processors aimed at facilitating learning about export markets and improving product quality
- Commission a study to look for solutions to tackle black bacterial spot disease and fruit fly infestations, consolidating the findings of previous studies

- Encourage producers to adopt climate-smart production technologies as part of their production infrastructure
- Encourage producers to focus on a wider range of produce to help increase revenue and achieve greater stability and security

The following persons and companies have been identified as potential value-chain coordinators in the various production and processing zones in Ghana.

Table 19  
**Recommended value-chain coordinators by sector**

Zone	Potential coordinators	
	Mango	Pineapple
Northern Region	Mango City (Mr. Davis Korboe)	N/A
Middle Belt	Sky-3 Farms	N/A
Southern Belt	Yilo Krobo Mango Farmers Association	Qualipine Union (Fotobi)

#### **4.2.2. Recommendations for improving conformity**

- Provide support to producers and processors to help them meet quality standards and maintain quality certifications, such HACCP, GLOBALG.A.P., Fair Trade and Ecocert
- Provide support to small- and medium-scale processors to help them improve the quality of product, labelling and packaging systems
- Provide training to build the capacity of production managers and technicians in the areas of product development and efficient production techniques
- Support early stage producers with scalable business models to obtain quality certifications (e.g. Green Label and GLOBALG.A.P.) to increase the quality and prices of produce available for high-end markets
- Encourage emerging exporters to meet GSA (good agricultural practices) and Green Label certification standards as a stepping stone for the export market. Identify individuals in the private sector at the cluster level that can be trained with regard to international quality standards and can act as inspectors of production quality
- Develop a communication strategy that focuses on the importance and benefits of quality standards that can be used in public education programmes
- Work with FDA, GSA and PPRSD to better enforce regulatory standards in the mango and pineapple value chains



- Encourage the adoption of good agricultural practices as a minimum requirement for production in the mango and pineapple value chains
- Identify opportunities for the creation of value-chain networks in the Central, Eastern, Greater Accra and Volta Regions

#### ***4.2.3. Recommendations for improving competitiveness***

- Help processors to fully automate aspects of production line operations to increase production capacity and volume
- Provide support to processors in the area of waste materials use (e.g., using rotten fruits and manure to generate biogas that can power equipment)
- Organize training programmes and sensitization workshops for value-chain stakeholders on the benefits of competing collectively
- Provide support to processors with the aim of improving product quality, packaging and labelling to enhance their ability to compete against imported products
- Provide support to local producers and processors that do not offer dried fruit products and do not target export markets to form partnerships with experienced companies in Ghana and Europe. This could be achieved at the cluster level
- Involve fruit processing equipment manufacturers (e.g., GRATIS Foundation, McHammah Engineering and Pee-Tech Fabrications) in value-chain discussions to ensure that their input is incorporated in decision-making processes
- Help small- and medium-sized processors to adopt appropriate and cost-effective technologies to reduce waste and improve processing efficiency
- Support dried fruits and jam product initiatives by small- and medium-scale processors that are aimed at supplying large-scale exporters
- Help small- and medium-scale processors to acquire appropriately sized dried-fruit processing equipment

#### ***4.2.4. Recommendations for improving market connections***

- Provide support services to improve the ability of producer associations to effectively negotiate prices and to manage contracts with the aim of improving relationships with buyers and enhancing competitiveness
- Enhance the capacity of processors that are supplying regional markets with the aim of increasing sales to neighbouring markets
- Help value-chain stakeholders to diversify their product portfolios by means of market identification exercises
- Establish public-private sector collaboration platforms with the aim of setting up policy dialogue programmes that focus on the need to create localized markets for the fruit processing sector

- Provide support to producer associations with the aim of training selected members on requirements relating to pre-audit GLOBALG.A.P. and Fair Trade certifications
- Help processors to obtain ISO 22000 and IFS certification so that they can widen the scope of the markets that they can target
- Organize trade forums between local and international buyers and producers at the cluster level to drive the production of quality produce
- Facilitate linkages between producers and government-sponsored social intervention programs, such as the school feeding programme. Promote links between large-scale fruit processing companies and small- and medium-scale companies that meet export quality requirements through outsourcing agreements

#### ***4.2.5. Recommendations for improving access to credit***

- Encourage collaboration between value-chain stakeholders and financial institutions with the aim of creating and supplying financial products that better meet the requirements of stakeholders in the value chain
- Establish a partnership with a least one financial institution at the cluster level to demonstrate the benefits of collaboration with fruits sector value-chain stakeholders
- Train value-chain stakeholders on how to better structure businesses to attract investors and appeal to financial institutions
- Engage business development service providers to provide support to value-chain stakeholders with the aim of establishing effective and efficient management structures

## Annex I: A profile of the major value-chain stakeholders

Name	Contact, location and address	Product	Farm size (hectares)	Capacity/ annual production (metric tons)	Sales volume (metric tons)	Number of members/ employees	Markets (export/ local)	Standards complied with	Group affiliation
<b>Producer and exporter associations</b>									
Sea-Freight Pineapple Exporters of Ghana	<ul style="list-style-type: none"> <li>• <i>Stephen Mintah</i></li> <li>• Ampomah House, Olusegun Obasanjo Highway, Accra</li> <li>• +233 (0) 244 237 805</li> <li>• <a href="mailto:speg@spegpine.com">speg@spegpine.com</a></li> </ul>	Fresh pineapples	N/A	N/A	N/A	27 members	Europe, Ghana	GAP	FAGE
Papaya and Mango Producers and Exporters Association of Ghana	<ul style="list-style-type: none"> <li>• Bassam Aoun</li> <li>• Eve-Lyn Farms, Oyarifa, Ga East</li> <li>• +233 (0) 244 375 131</li> <li>• <a href="mailto:bef_farmevelyn1991@yahoo.com">bef_farmevelyn1991@yahoo.com</a></li> </ul>	Fresh mangoes	200	1,320	N/A	100 members	Europe, Ghana, Lebanon	GAP	FAGE
Yilo-Krobo Mango Farmers Association	<ul style="list-style-type: none"> <li>• Rev. Lawrence Lomo Kwami</li> <li>• PO Box SA 358</li> <li>• Somanya</li> <li>• +233 (0) 249 461 188</li> <li>• <a href="mailto:Yilomangos2005@yahoo.com">Yilomangos2005@yahoo.com</a></li> </ul>	Fresh mangoes	1,295	8,500	N/A	124 members	Europe, Ghana, Lebanon	GAP	FAGE
Kintampo Mango Farmers Association	<ul style="list-style-type: none"> <li>• Samuel Nimo Effah</li> <li>• Kintampo</li> <li>• +233 (0) 243 683 975</li> </ul>	Fresh mangoes	1,214	8,000	N/A	100 members	Europe, Ghana, Lebanon	GAP	N/A
Manya Krobo Mango Farmers Association	<ul style="list-style-type: none"> <li>• Elijah Mush Kumah</li> <li>• Kpong, off Kpong-Odumase Road, PMB Odumase-Krobo</li> <li>• +233 (0) 204 153 648</li> </ul>	Fresh mangoes	490	18,000	NA	89 members (19 GLOBALG. A.P.-certified)	Europe, Ghana, Lebanon	GAP	FAGE

Name	Contact, location and address	Product	Farm size (hectares)	Capacity/ annual production (metric tons)	Sales volume (metric tons)	Number of members/ employees	Markets (export/ local)	Standards complied with	Group affiliation
	<ul style="list-style-type: none"> <li>mush.uew@gmail.com</li> </ul>								
Dangme-West Mango Farmers Association	<ul style="list-style-type: none"> <li>James Owusu Koranteng</li> <li>P.O. Box 23, Dodowa</li> <li>+233 0553110535</li> <li>Jim.nadom60@gmail.com</li> </ul>	Fresh mangoes	308	2,000	N/A	103 members (19 GLOBALG. A.P.-certified)	Europe, Ghana, Lebanon	GAP	FAGE
Mid-Ghana Commercial Mango Growers' Association	<ul style="list-style-type: none"> <li>Dixon Oppong</li> <li>P.O. Box 473, Sunyani</li> <li>+233 (0) 208 718 401</li> <li>comangagh@yahoo.com</li> </ul>	Fresh mangoes	607	4,000	N/A	30 GLOBALG. A.P.-certified members	Europe, Ghana, Lebanon	GAP	FAGE
Sunyani Greenfield Cooperative and Mango Producers and Marketing Society Ltd.	<ul style="list-style-type: none"> <li>Vida Korang</li> <li>P. O. Box 2571, Sunyani</li> <li>+233 0208158867</li> <li>vdkorang@gmail.com</li> <li>greenfirlddmf@yahoo.com</li> </ul>	Fresh mangoes	260	3,900	N/A	65 members	Europe, Ghana, Lebanon	GAP	FAGE
Techiman Mango Farmers Association	<ul style="list-style-type: none"> <li>Nana Kwaw Adams</li> <li>nakdams@yahoo.com</li> <li>+233 (0) 200 967 575</li> </ul>	Fresh mangoes	250	3,750	N/A	100 members (50 active)	Europe, Ghana, Lebanon	GAP	FAGE
Volta Value Chain Cooperative Fruits and Vegetables Union Limited	<ul style="list-style-type: none"> <li>Dr. William Kpesese</li> <li>P.O. Box 165, Ho</li> <li>+233 (0) 244 661 126</li> <li>voltavvccunion@gmail.com</li> </ul>	Fresh mangoes	1,012	N/A	N/A	17 mango producer groups (150 members)	Europe, Ghana, Lebanon	GAP	FAGE

Name	Contact, location and address	Product	Farm size (hectares)	Capacity/ annual production (metric tons)	Sales volume (metric tons)	Number of members/ employees	Markets (export/ local)	Standards complied with	Group affiliation
	<ul style="list-style-type: none"> <li>willkpesese@gmail.com</li> </ul>								
Wenchi Mango and Citrus Farmers Association	<ul style="list-style-type: none"> <li>Stephen Ankomah</li> <li>+233 (0) 249 013 882</li> <li>wenchimangofarmers@yahoo.com</li> </ul>	Fresh mangoes	800	5,600	N/A	130 members	Europe, Ghana, Lebanon	GAP	FAGE
Aburi Amanfo Cooperative Pineapple Growers & Marketing Society Ltd.	<ul style="list-style-type: none"> <li>Daniel Akotuah</li> <li>+233 (0) 246 838 907</li> <li>+233 (0) 547 990 876</li> </ul>	Fresh pineapples	11	660	N/A	40 members (13 GLOBALG. A.P.-certified)	Ghana	GAP	N/A
Adeiso Cooperative Pineapple Growers & Marketing Society Ltd.	<ul style="list-style-type: none"> <li>Christopher Obeng Boadu</li> <li>Adeiso, Upper West Akyim</li> <li>+233 (0) 242 509 340</li> </ul>	Fresh pineapples	24	1,440	N/A	20 members (GLOBALG. A.P. certification pending)	Ghana	GAP	N/A
Adonten Cooperative Pineapple Growers & Marketing Society Ltd.	<ul style="list-style-type: none"> <li>Pokrom-Nsaba</li> </ul>	Fresh pineapples	40	2,400	N/A	52 members (11 GLOBALG. A.P.-certified)	Ghana	GAP	N/A
Fotobi Cooperative Pineapple Growers & Marketing Society Ltd.	<ul style="list-style-type: none"> <li>Douglas Gameti</li> <li>Fotobi, Akwapim South</li> <li>+233 (0) 243 911 267</li> </ul>	Fresh pineapples	40	2,400	N/A	45 members (12 GLOBALG. A.P.-certified)	Ghana	GAP	N/A

Name	Contact, location and address	Product	Farm size (hectares)	Capacity/ annual production (metric tons)	Sales volume (metric tons)	Number of members/ employees	Markets (export/ local)	Standards complied with	Group affiliation
Okunase-Sunkwa Cooperative Pineapple Growers & Marketing Society Ltd.	<ul style="list-style-type: none"> <li>Hayford Djan</li> <li>Aburi, Akwapim South</li> <li>+233 (0) 246 150 339</li> </ul>	Fresh pineapples	20	1,200	N/A	20 members (10 GLOBALG. A.P.-certified)	Ghana	GAP	N/A
<b>Processors</b>									
KNUST Fruit Processing Company	<ul style="list-style-type: none"> <li>Bismark Osei Kuffour</li> <li>+233 (0) 248 88 3931</li> <li>KNUST Campus</li> <li>Wa and Sunyani</li> <li>Kumasi and Sunyani</li> </ul>	Mango, pineapple and ginger	Market women from Kumasi, Accra	1,200	10 per month	16 permanent employees and 150 casual staff	Local	None	N/A
Methodist University College Fruit Processing Company	<ul style="list-style-type: none"> <li>Agro-Processing Unit, Methodist University College, Wenchi</li> <li>+233 (0) 507 091 064</li> <li>danokyeremateng@gmail.com</li> </ul>	Mango, pineapple and ginger drinks and dried fruits	N/A	2,400	200 per month	10	Local	None	N/A
Hendy Farms	<ul style="list-style-type: none"> <li>Ayanya #2 Dodowa</li> <li>+233 (0) 5 0 554 129;</li> <li>+233 (0) 500 554 130</li> <li><a href="mailto:hendyfarmsgh@gmail.com">hendyfarmsgh@gmail.com</a></li> </ul>	Mango habanero hot sauce (jam), mango and moringa hot sauce	50 acres	5,000	10 per week	3 full-time employees and 6 casual staff	Local (intends to export)	N/A	DAMFA
Joy Springs Fruit Juice Company Ltd.	<ul style="list-style-type: none"> <li>Freda Abu</li> <li>+233 244 604 575</li> </ul>	Pineapple and mango juices	N/A	3,000	5 per week	6 full-time employees	Local (intends to export)	FDA	N/A

Name	Contact, location and address	Product	Farm size (hectares)	Capacity/ annual production (metric tons)	Sales volume (metric tons)	Number of members/ employees	Markets (export/ local)	Standards complied with	Group affiliation
West Africa Foods Ltd. (Free Zones Enterprise)	<ul style="list-style-type: none"> <li>Dinah Ampadu</li> <li>+233 (0) 244 128 721</li> <li>wad@wadco.ch</li> <li>Dinah@wadco.ch</li> </ul>	Fresh and dried fruits (pineapple, mango, banana, papaya)	200 acres	48,000	4 per month	34 employees	Export	<ul style="list-style-type: none"> <li>FDA</li> <li>GSA</li> <li>GLOB ALG.A .P.</li> <li>Fair Trade</li> </ul>	N/A
Yvaya Farms	<ul style="list-style-type: none"> <li>Yvette Tetteh</li> <li>Faanofa Rd, Accra</li> <li>+233 (0) 20 011 9525</li> <li>+233 (0) 55 823 3308</li> <li>info@pureandjustfood.com</li> </ul>	Dried mango, dried pineapple, dried pawpaw (papaya), dried banana	N/A	60	1 per week	6 employees	Local	FDA	N/A
Ideal Providence Farms	<ul style="list-style-type: none"> <li>Georgina Koomson</li> <li>+233 (0) 24 466 4572</li> <li>+233 (0) 26 616 0484</li> <li><a href="mailto:ipfghana@yahoo.com">ipfghana@yahoo.com</a></li> </ul>	Mango, pineapple fruit juice, dried fruits	50 acres	500	10 per month	12	Local	<ul style="list-style-type: none"> <li>FDA</li> <li>GSA</li> </ul>	N/A
Joanova Fruit Processing Company	<ul style="list-style-type: none"> <li>Joseph Andoh,</li> <li>+233 (0) 206 221 187</li> <li>Sunyani</li> </ul>	Mango and pineapple juice	100 acres	2,000	40-60 kg of fruits per day	10	Local	FDA	N/A
Vintage Farms	<ul style="list-style-type: none"> <li>Nsawam</li> </ul>	Sliced fresh fruits, dried fruits	200 acres	20,000	500 cartons per day	25	Local and export	<ul style="list-style-type: none"> <li>FDA</li> <li>GSA</li> </ul>	SPEG
Jimana Farms (yet to commence operations)	<ul style="list-style-type: none"> <li>Capt. James Koranteng</li> <li>+233 (0) 553 110 535</li> </ul>	Dried mango	100 acres	N/A	N/A	N/A	Local and export	N/A	<ul style="list-style-type: none"> <li>DAMFA</li> <li>FAGE</li> </ul>

Name	Contact, location and address	Product	Farm size (hectares)	Capacity/ annual production (metric tons)	Sales volume (metric tons)	Number of members/ employees	Markets (export/ local)	Standards complied with	Group affiliation
Sfia Farms and Agro-Processing Ltd, Somanya	<ul style="list-style-type: none"> <li>• Mathias Segbefia</li> <li>• +233 (0) 244 320 071</li> <li>• matsegbey@yahoo.co.uk</li> <li>• <a href="mailto:sfiafarm@yahoo.co.uk">sfiafarm@yahoo.co.uk</a></li> </ul>	Fruit juice, dried fruits	N/A	2,000	40 per week	N/A	Local	FDA	Volta Value Chain Committee
Integrated Tamale Fruit Company	<ul style="list-style-type: none"> <li>• +233 (0) 244 331 092</li> <li>• +233 (0) 243 867 375</li> </ul>	Fresh mangoes, puree and dried mangoes	120 acres	N/A	N/A	1,300 outgrowers	Export	N/A	N/A
HPW Fresh and Dry Ltd.	<ul style="list-style-type: none"> <li>• Maik Blaser</li> <li>• +233 (0) 501 690 095</li> <li>• office-ghana@hpwag.ch</li> </ul>	Fresh pineapples, dried fruits (pineapple, mango, coconuts, papaya, banana)	N/A	<ul style="list-style-type: none"> <li>• Mango (4,500)</li> <li>• Pineapple (5,000)</li> </ul>	15 per day	N/A	Export	<ul style="list-style-type: none"> <li>• FDA</li> <li>• GSA</li> <li>• GLOB ALG.A .P.</li> <li>• Fair Trade</li> </ul>	SPEG



## Annex II: Needs assessment, potential interventions and opportunities for cluster development

Value chain	Cluster	Needs assessment	Potential intervention	Opportunities
Mango	<b>Cluster 1:</b> Eastern, Greater Accra and Volta Regions (covering Ada, Dagme, Manya, Shai-Osudoku and Yilo)	<ul style="list-style-type: none"> <li>• Business development and marketing skills</li> <li>• A sustainable business model for traceability systems</li> <li>• Support to develop new mango and pineapple product lines</li> </ul>	<ul style="list-style-type: none"> <li>• Encourage a multi-cropping system as a means to supplement the income of fruit producers</li> <li>• Provide support to value-chain stakeholders to help them obtain quality certifications, such as HACCP, GLOBALG.A.P., Fair Trade and Ecocert</li> <li>• Share best practices and provide support (grants) to encourage new product development and market testing for high-potential products</li> </ul>	<ul style="list-style-type: none"> <li>• Large fruit pack house at Akorley, near Somanya</li> <li>• Strong mango farmers associations</li> <li>• Experienced mango farmers</li> <li>• Existence of private quality certification auditing bodies</li> <li>• Close proximity to market</li> <li>• Close proximity to major fruit processing companies</li> <li>• Two mango harvest seasons</li> </ul>
	<b>Cluster 2:</b> Ahafo, Ashanti, Bono and Bono East Regions (covering Atebubu, Kintampo, Nkoranza, Sunyani and Techiman)	<ul style="list-style-type: none"> <li>• Education of value-chain stakeholders on the importance of local and international quality standards</li> <li>• Low processing capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Provide support to fruits sector value-chain stakeholders to help them form stronger associations and coordination structures (e.g., value-chain committees)</li> <li>• Encourage commercial fruit farmers in the Southern Belt to invest in pineapple farming in the Middle Belt</li> <li>• Encourage investment in fruit processing factories to drive fruits sector value chain development</li> <li>• Provide support to value-chain stakeholders to help them obtain quality certifications, such as HACCP, GLOBALG.A.P., Fair Trade and Ecocert</li> <li>• Work with Sky-3 Farms to invest in processing facilities that will help drive value-chain development</li> </ul>	<ul style="list-style-type: none"> <li>• Presence of mango industry value-chain associations</li> <li>• Stakeholders in the Middle Belt can specialize in dried fruit products</li> </ul>
	<b>Cluster 3:</b> Northern, North-East and Upper East Regions	<ul style="list-style-type: none"> <li>• More investors to establish fruit processing companies to drive fruits market growth in the zone</li> <li>• Creation of fruit producer associations to drive sustainable production, adoption of best practices</li> </ul>	<ul style="list-style-type: none"> <li>• Collaborate with ITFC to secure investors to drive fruits sector value-chain development in the Northern Region and Middle Belt zones</li> <li>• Provide support to fruits sector value-chain stakeholders to help them form stronger associations and coordination structures (e.g., value-chain committees)</li> <li>• Encourage commercial mango framers, such as</li> </ul>	<ul style="list-style-type: none"> <li>• Availability of large amounts of cheap land for commercial fruit farms</li> <li>• New commercial airlines connecting Tamale and Wa to Accra creates opportunities for the fruits sector in the north to sell produce in Accra and to export markets</li> <li>• Cross-border links between producers</li> </ul>

Value chain	Cluster	Needs assessment	Potential intervention	Opportunities
		and adherence to quality standards	<p>Mango City in Navrongo, to expand operations into the fruit processing arena in order to drive value-chain development</p> <ul style="list-style-type: none"> <li>• Provide support to value-chain stakeholders to help them obtain quality certifications, such as HACCP, GLOBALG.A.P., Fair Trade and Ecocert</li> </ul>	and processors in the northern cluster creates opportunities for fruit processors that are located in the north
Pineapple	<p><b>Cluster 1:</b></p> <p>Eastern and Greater Accra Regions (covering Accra Metro, Akwapim South, Ayensuano and Nsawam-Adoagyiri)</p>	<ul style="list-style-type: none"> <li>• A Pineapple Round Table to drive policy development and bring stakeholders together to improve production, domestic processing and export opportunities</li> <li>• Business development and marketing skills</li> <li>• A sustainable business model for traceability systems</li> <li>• Support to develop new mango and pineapple product lines</li> </ul>	<ul style="list-style-type: none"> <li>• Establish a Pineapple Round Table or expand the Mango Round Table to cover the pineapple industry</li> <li>• Provide support to value-chain stakeholders to help them obtain quality certifications, such as HACCP, GLOBALG.A.P., Fair Trade and Ecocert</li> <li>• Share best practices and provide support (grants) to encourage new product development and market testing for high-potential products</li> <li>• Encourage investment in fruit processing factories to drive the development of the fruits sector value chain</li> </ul>	<ul style="list-style-type: none"> <li>• Large fruit pack house at Mariakrom</li> <li>• Experienced pineapple farmers</li> <li>• Existence of private quality certification auditing bodies</li> <li>• Close proximity to the market</li> <li>• Close proximity to major fruit processing companies</li> <li>• Climatic conditions well suited to pineapple cultivation</li> </ul>
	<p><b>Cluster 2:</b></p> <p>Central Region (covering Awutu Senya East and West, Effutu Municipal, Ekumfi, Gomoa Central, Gomoa East and Gomoa West)</p>	<ul style="list-style-type: none"> <li>• A Pineapple Round Table to drive policy development and bring stakeholders together to improve production, domestic processing and export opportunities</li> <li>• Educate value-chain stakeholders about the importance of local and international quality standards</li> <li>• Educate producer associations about the role and benefits of group dynamics</li> <li>• Low processing capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Provide support to fruits sector value-chain stakeholders to help them form stronger associations and coordination structures (e.g., value-chain committees)</li> <li>• Encourage investment in fruit processing factories to drive fruits sector value-chain development</li> <li>• Provide support to value-chain stakeholders to help them obtain quality certifications, such as HACCP, GLOBALG.A.P., Fair Trade and Ecocert</li> </ul>	<ul style="list-style-type: none"> <li>• Existence of private quality certification auditing bodies</li> <li>• Newly developed fruit processing factories as a result of National Industry Policy (1D1F)</li> <li>• Close proximity to the market</li> <li>• Close proximity to major fruit processing companies</li> <li>• Climatic conditions well suited to pineapple cultivation</li> </ul>

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