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Ministry of Trade and Industry
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UNITED NATIONS
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West Africa Competitiveness Programme (WACOMP)

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

Cluster Diagnostic Study on Mango and Pineapple

June 2020

WACOMP
West Africa Competitiveness Programme

Ghana

Readers Guide:

This is a combination of two reports on a diagnostic study on the fruits (mango and pineapple) value chains in Ghana.

The mango study focused on the Greater Accra, Eastern and Volta mango cluster which is one of the most vibrant mango production areas in Ghana and contributes up to 50% of mango exports yearly and provides fresh fruits to processors.

Read details of the mango report via link : Mango Diagnostic Study

The study on pineapple production and fruit processing (Mango and Pineapple), focused on the Eastern and Greater Accra cluster because these regions house majority of fruit VC enterprises including producers and processors.

Read details of the pineapple report via link : Pineapple Diagnostice Study

Thank you.

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I wish to express my gratitude to my colleague Kofi Biney for sharing his experience and making it possible to carry out this study on Mango production. His contribution greatly added up to the content of this report.

Special appreciation goes out to all stakeholders especially farmers and cooperative executives, Input Dealers and Producers in the Greater Accra, Eastern and Volta Cluster; Support Institutions and partner organizations for their willingness and openness in sharing information about their businesses and institutions towards this study.

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LIST OF ABBREVIATIONS

BUSAC	Business Advisory and Advocacy Challenge Fund
COMANGA	Commercial Mango Growers Association
DAMFA	Dangme Mango Farmers Association
EU	European Union
EMQAP	Export Market Quality Awareness Programme
FAGE	Federation of Associations of Ghanaian Exporters
FDA	Food and Drugs Authority
FDI	Foreign Direct Investment
GAP	Good Agricultural Practices
GEPA	Ghana Export Promotion Authority
GIZ	German International Cooperation
GSA	Ghana Standards Authority
KNUST	Kwame Nkrumah University of Science and Technology
MKMFA	Manya Krobo Mango Farmers Association
MOFA	Ministry of Food and Agriculture
NBSSI	National Board for Small Scale Industries
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
USAID	United Sates Agency for International Development
WACOMP	West Africa Competitiveness Programme
YKBA	Yilo Krobo Mango Farmers Association
VVCCU	Volta Value Chain Committee Union (South)

Objective of the Assessment

The objective of this assessment is to strengthen the export competitiveness of the Ghanaian economy through enhanced value-addition, low carbon, sustainable production and processing and an increased access to regional and international markets.

Method of Data Collection and Analysis

The assessment adopted a mixed data collection approach. This included the review of existing literature complemented by interviews with value chain actors such as processors, producers, exporters and regulators. Semi-structured interview guides were used for collecting primary data on the various actors who were directly engaged. Focus group discussions were also held by the Consultant with mango producer associations. In addition, (key expert) interviews were conducted with processors, exporters, input suppliers, extension service providers, regulators, certification bodies, machinery and equipment fabricators, food safety regulators, among others.

Key Findings

The Cluster is made up of input suppliers (seedlings producers, agro-chemical dealers), producers, aggregators, post-harvest handlers, processors, exporters, consumers, extension service providers (private and public), researchers, logistics providers, as well as actors providing support services. Some of the support services provided along the mango value chain include research into improved varieties, disease control and pest management, cold chain services, financial services, training, inspection, business development and business promotion.

There are a few certified nursery operators who have the capacity to manage sustainable and pest-free nurseries. This situation largely affects the quality of seedlings available on the local market

for production. Relationships exist among all the actors and is strongest between producers and large-scale processors. The mango actors are mostly fragmented with producer associations and cooperatives concentrated at the production level. The associations and cooperatives coordinate and provide services such as group certification, marketing and extension delivery to their members. In December 2019, the **National Mango Growers Association** was formed. All associations in the mango growing areas in the country are members, to which the cluster members are no exception. This new association works in collaboration with the Federation of Associations of Ghanaian Exporters *(*FAGE*).* The federation acts more as a coordination unit and advocacy platform to champion the adherence to good agricultural practices and international standards. It also organizes interactive activities such as international business trips and fairs for members to market their produce. FAGE is the secretariat that hosts the Mango Round Table - a coordinating platform for mango actors. FAGE has a staff strength of seven (7) and operates on an annual budget of about GHS 300,000.00 (USD$55,000.00). FAGE receives support from the GIZ-MOAP to organise three (3) round table meetings for Mango, Pineapple & Vegetables as well as the annual Mango Week celebrations.

Major Challenges in the Cluster

The production of mango in the Cluster is threatened by the following challenges:

Coordination

Coordination structures present in the cluster include district level associations. Services mostly offered by these associations include extension services and market identification platforms. These Associations and national coordination structures were however found to be facing sustainability challenges due to limited funds for undertaking planned activities. This is largely as a result of the fact that FAGE operates with a limited annual budget of GHS 300,000.00. They also lacked the

expertise to train members to comply with national and international certifications and standards. The mango cluster currently faces a sustainability challenge with its national coordination platform – the Mango Round Table. Even though the forum provides stakeholders the platform to discuss challenges and identify practical solutions for the sector, it is solely financed by GIZ-MOAP. FAGE is also unable to have their operational budgets fully funded because members have defaulted in paying membership dues. There is therefore a challenge in respect of how to sustain the activities of FAGE for the mango value chain when the GIZ pulls out.

Conformity

The assessment found out that due to the absence of decentralized offices of regulatory bodies (such as PPRSD, EPA, GSA and FDA) at the district level, there are challenges with conformity among the actors. The inability of regulators to effectively supervise and regulate activities of the actors allow for the distribution of sub-standard products such as diseased seedlings, adulterated fertilizers and agro-chemicals on the market. In addition, the high cost of obtaining and maintaining international certifications means that producers and processors are either unable to be certified or maintain their certifications. This negatively affects the ability of producers to reach the high-end segment of the international market. Private Certification Bodies (CBs) are limited in scope in terms of their geographic locations. The lack of a national policy to guide the use of standardized measures in the sale and marketing of mangoes as is mostly done in Francophone countries deprive farmers from maximum benefits from the sale of their products.

In spite of the low levels of compliance, a large percentage (90%) of actors were fully aware of existing local and international standards and regulations in the industry. Whilst about 1% of nurseries were certified, 20-30% producers were GLOBALGAP Certified. The assessment found a low level of renewal of certification among current mango producers due to high cost of the

process. There was also little conformity to local standards among small and medium scale processors (10%). This was largely due to weak enforcement by regulatory authorities and the low demand for quality standards by domestic consumers.

Some recommended interventions include:

- Encouraging the main actors to at least produce according to GSA (GAPS)/Green label Certification standards as a differentiating mark for their products (domestic market).
- Identifying potential private sector actors or individuals in the "cluster" to be trained on international quality standards so that they can act as internal inspectors for quality production.
- Developing a communication strategy to be used in public education programmes on the importance and benefits of quality standards.

Generally, there is poor access to finance for the actors. In 2017, credits advanced to agricultural sector actors amounted to only 3.8% of all credits advanced by deposit-taking financial institutions. Many of the producers of mango rely on personal equity and interest-free loans from family and friends. In a few instances, some NGOs offer matching grants and low interest loans. The financial institutions spoken to also outlined challenges such as lack of permanent land titles for collateral, absence of agricultural insurance products to averse the high risk of agricultural holdings, lack of off-taker agreements, seasonal nature of crops in the case of mango and a lack of management capacity by farmers to handle disbursed loan facilities.

Producers, on the other hand, complained of high interest rates (24% - 26%) and the lack of management capacity of farmers to handle farm records and loan administration issues. Some

processors expressed their desire to bring on partners who had the financial wherewithal to support; they however lacked the capacity to get into such arrangements. The study recommends the need for the establishment of Partnerships with financial institutions and research institutes to design financial products that uniquely address the needs of producers and other value chain actors in the cluster.

Other general areas of intervention recommended are:

- The need to strengthen already existing platforms for engagement of public and private fruits value chain actors like the Mango Round Table and National Mango Week organized by FAGE;
- Facilitate the development or linkages with specific markets or procurement agencies. (e.g. school feeding programme or targeted social interventions);
- Establish value chain committees at "cluster" levels to serve as coordinating bodies for group marketing activities;
- Support producers to obtain/maintain international certifications and quality standards like GLOBALGAP, Fair Trade and Ecocert;
- Organize training programmes and sensitization workshops for the cluster actors on the need to compete collectively than individually;
- Promote marketing to regional processing industries instead of targeting high-end European market;

- Potential synergies among clusters targeting the same product in different geographical locations;

- Provide continuous support of cooperative action, phasing out external support.

1.0 Introduction

It is estimated that Ghana cultivated 109,480 ha of mango in 2015, however the figure declined to 80,920 ha in 2019[1]. The two main varieties of Mango cultivated by farmers in parts of Greater Accra, Eastern and Volta Cluster of Ghana are Keitt and Kent.

There are more than 330 farmers in the cluster who cultivate approximately 10,500 acres of mango in a season. Production is made up of 80% Keitt, 10% Kent and 10% of other varieties (such as Palmer, Tommy Atkins, Zill, etc.).

The cluster experiences two harvesting seasons i.e. major and minor season compared to producers in the middle and transition belt who experience only one harvesting season. Farmers have the opportunity to produce and export twice a year, usually from April to August for the major season and November to January for the minor season. Considering the national figures in 2017, the total land area under mango cultivation was about 80,920ha; average yield ranges from 15mt/ha to 17mt/ha (Facts & Figures 2017, MOFA)[2].

1.1 Scope of the study

The study focused on the Greater Accra, Eastern and Volta Cluster which is one of the most vibrant mango production areas in Ghana and contributes up to 50% of mango exports yearly and provides fresh fruits to processors. There are 4 - 9 strong producer associations concentrated in this cluster. The cluster is well known and recognized in Ghana due to the nature of the producer cooperatives strength. The main actors include Input Suppliers (agro-chemicals, certified mango seedlings, etc.), Producers (Farmers and Cooperative groups), Aggregators and agents, Market Women

[1] Ghana National Mango Study
[2] Ghana National Mango Study

(Wholesalers and Retailers), Support institutions (MoFA, financial institutions, UNIDO etc.), among others. The study employed both Quantitative and Qualitative research methods by reviewing existing literature and using semi-structured interview guides to solicit primary and secondary data.

1.2 Background and History of the Mango Cluster

The history of Ghanaian mangoes began in 1996 in the Yilo Krobo District of the Eastern Region which falls within this cluster. In the early stages, ADRA and USAID provided input credit in the forms of mango seedlings, corn seeds for intercropping, and fertilizers to farmers to start their mango farms. The goal of the project was to improve households' access to food, shelter, education and health. Approximately fifteen years after the introduction of mangoes in the district, the Yilo Krobo Mango Growers Association became one of the most successful associations in the cluster that produces quality mangoes. Their success story was the catalyst for investments into mango farms before anyone knew how or where mango farms would thrive. Later, other farming associations in the early 2000s such as Manya Krobo Mango Farmers Association (MKMFA), Dangme West Mango Farmers Association (DAMFA) and Volta Value Chain Committee Union-South (VVCCU) also joined the production of mangoes in the Cluster.

A summary of the historical events in the cluster are provided in Figure 1 below.

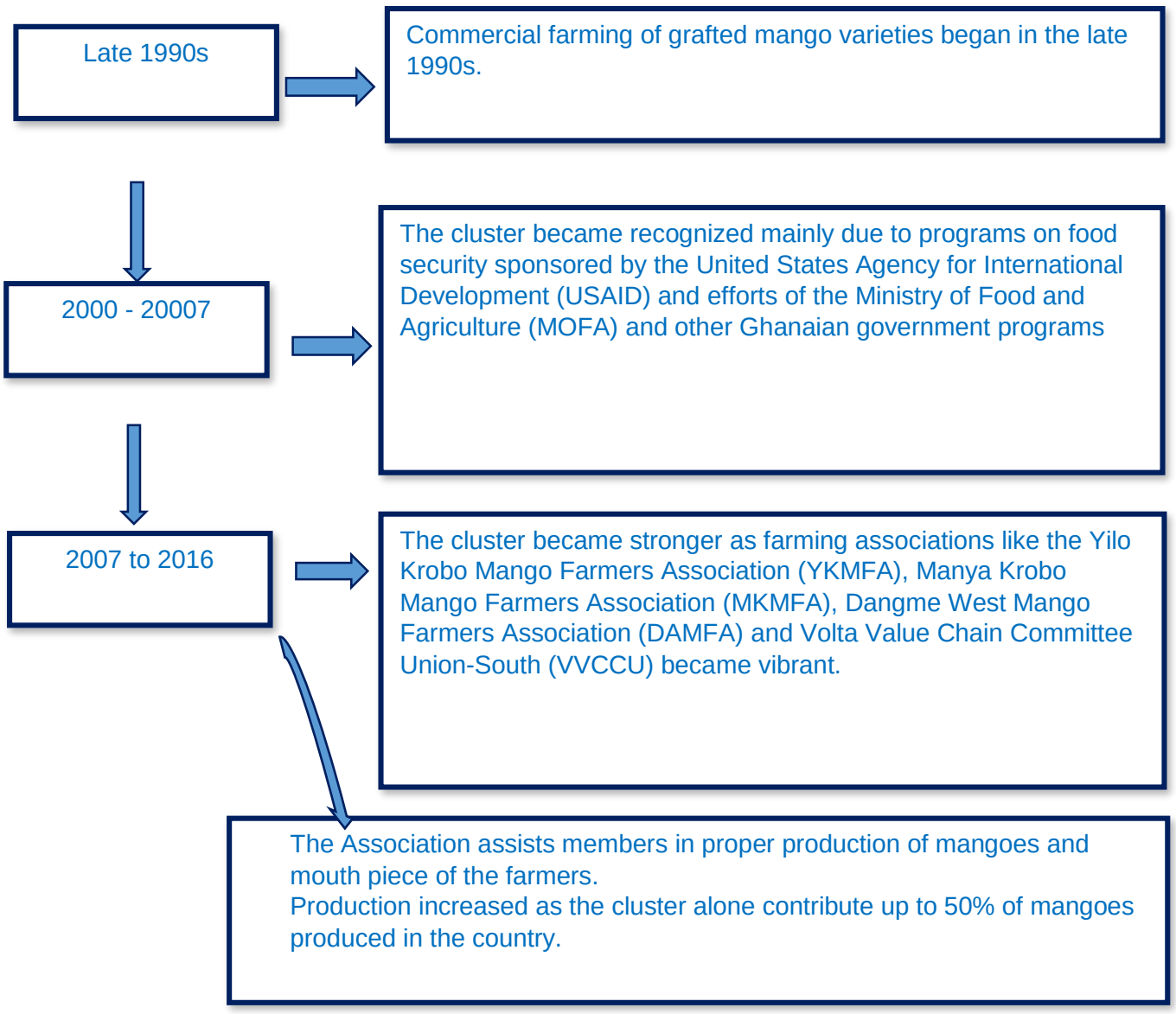


Figure 1: Historical events in the cluster

The cluster covers the Yilo, Manya, Dangme, Shai-Osudoku and Ada areas where the actors in the cluster include producers, exporters, support institutions, among others. The farming associations in this cluster include the Yilo Krobo Mango Farmers Association (YKMFA), Manya Krobo Mango Farmers Association (MKMFA), Dangme West Mango Farmers Association (DAMFA) and Volta Value Chain Committee Union-South (VVCCU).

Yilo Krobo Mango Farmers Association

The Yilo Krobo Mango Farmers Association was established in February 2005 to promote the interest of mango producers in the Yilo Krobo District in the Eastern Region of Ghana. The Association assists members in proper production of mangoes. It currently has a total membership of 124 farmers with orchard sizes averaging between 5 to 300 acres. Seventy of these orchards are GLOBALGAP certified with a combined acreage of approximately 1,428. About 1,050 acres of farms are not certified. The main varieties cultivated by members are the Keitt, Kent and Tommy Atkins. Yilo Krobo Mango Farmers Association fosters long-term contracts with reliable exporters and processors for the benefit of its members.

Manya Krobo Mango Farmers Association

This Association was registered in 2007 as a co-operative. Currently, it has a membership of 89 farmers with orchard sizes averaging between 5 to 100 acres. Twenty-six of these orchards are GLOBALGAP certified with a total acreage of 1,174. The association has a registered office at Kpong in the Lower Manya Krobo District of the Eastern Region. The main fruit varieties cultivated by the association are Keitt, Kent, Palmer and Haden. Currently, Manya Krobo is collaborating with various institutions to introduce additional varieties to meet increasing demand for other mango varieties.

Dangme West Mango Farmers Association

With a membership strength of 87 farmers growing mangoes in orchards that range from 3 to 90 acres in size, the DAMFA currently cultivates on a total land of 1,644.8 acres. The association was registered in 2006 and has an office at Agomeda in the Shai-Osudoku District where the famous National Game Reserve Shai Hills is also located. Agomeda is 40 km North of Tema. The association had 33 GLOBALGAP certified members for the 2019/2020 season and the total certified acreage is 762.

The Volta Value Chain Committee Union (South)

The VVCCU is a Volta Region based union of producers, processors, exporters, inputs dealers and services providers under one umbrella to facilitate production, marketing and processing of fruits and vegetables in the Volta Region of Ghana. The VVCCU was formed with the sole aim of promoting the interests of the fruits and vegetable industry in the Volta Region. Its pledge is to adopt and enforce internationally accepted standards to ensure the production of high-quality fruits and vegetables. VVCCU has a total membership of 17 groups (seven mango producer groups, two processors and two input dealers. A service provider cooperative and four vegetable producer groups are about to register).

Since 2005, these groups have been the backbone and history of this cluster regarding mango production. The cluster has several actors involved in the fresh mango value chain which includes producers, input suppliers, exporters, logistical service providers and other key stakeholders involved in the distribution of the product to final consumers. There are a total of 31 mango producers in VVCCU cultivating a total land acreage of 547. Eight (8) farms are currently certified with a total certified land area of 349 acres.

It must be emphasized that although there are other actors in the horticulture industry in general, their bearing on mango is not yet ascertained. They have however been identified in this study because it is anticipated that they could have a role in the general development of the mango sector, especially within the ECOWAS Trade and Enterprises Network.

Group	Number of membership/farmers	Size of farms (Estimate of farm per acreage)	Total Certified and Acreage
Yilo Krobo Mango Farmers Association (YKMFA)	124	2,200 acres in total	70 members with a total of 1,428 acres
Manya Krobo Mango Farmers Association (MKMFA)	89	1,295 acres in total	26 members with a total of 1,174 acres
Dangme West Mango Farmers Association (DWMFA)	87	1,644.8 acres in total	33 members with a total of 762 acres
The Volta Value Chain Committee Union (VVCCU)	31	547 acres in total	8 members with a total of 349 acres

Table 1: Cluster Data

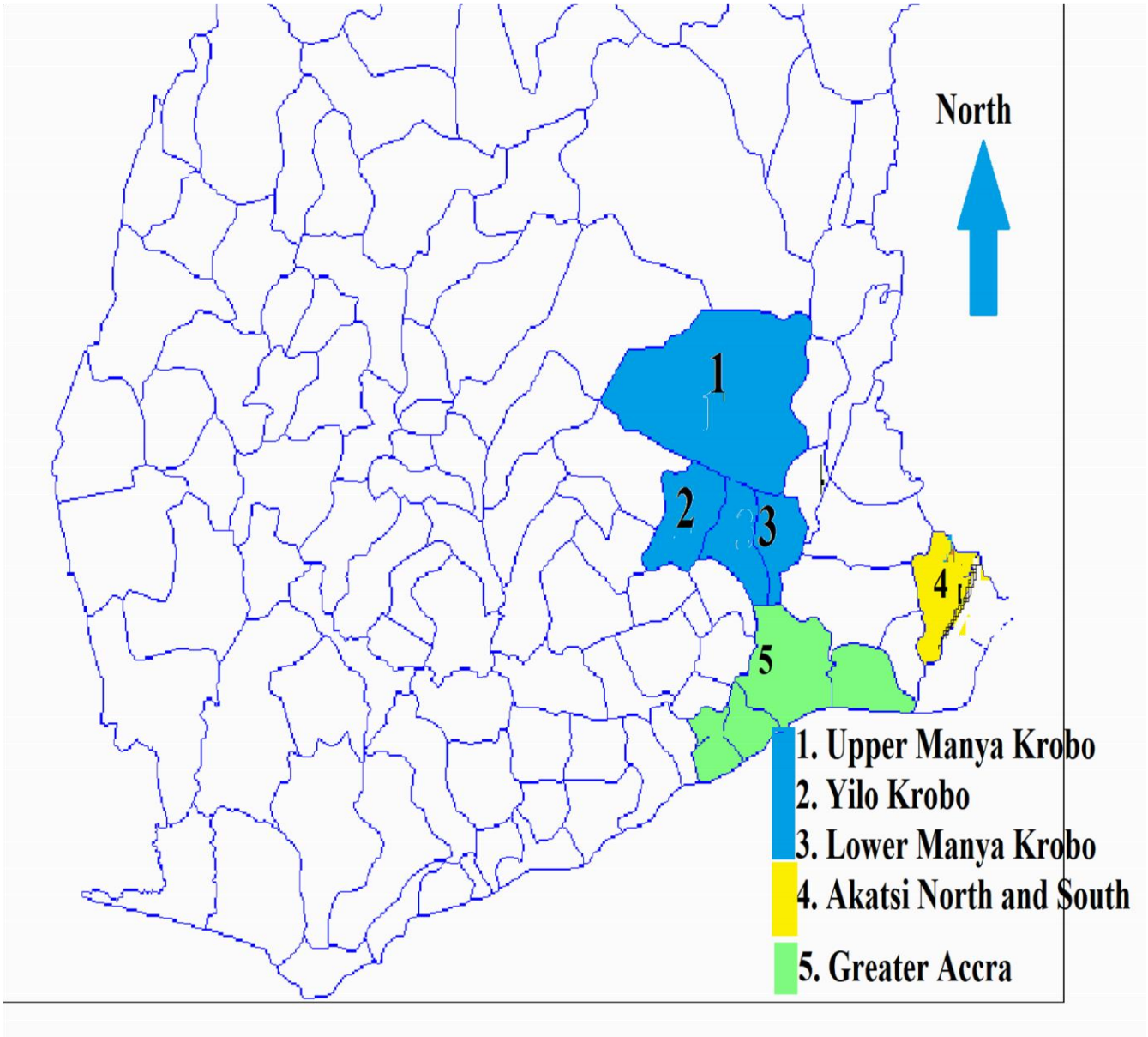


Figure 2: Mango Production areas in the Cluster

1.3 Production Process

The production of mangoes in the cluster goes through several stages to reach the final consumer.

Starting from the seedling stage, it moves to transplanting the seedlings into the field after which the farmers maintain the seedlings to be established in the mango orchards. Farmers undertake various agronomic practice such as disease and pest control and prune the plants when necessary. From this stage, the farmers await the flowering stage of the orchard. The fruits then mature for harvest. From the harvesting stage, the fruits pass through three points before it gets to the consumer: either to the local market, processing or direct export. (It takes between 2½ to 3 years from seedlings to fruiting stage).

The picture below shows the flow processes.

Stage1: Mango seedlings are transplanted into the fields for planting.

Stage2: Seedlings are maintained to be established.

Stage3: Pruning are done when necessary

Stage4: Flowering of the orchard takes place.

Preparing for Export

Waiting for Export

Local Market

Stage 5: The fruits are mature for harvest.
The harvested fresh mangoes from this stage pass through three points before it gets to the consumer. Either to the local market, processing or direct export

Actor	Actors Description of Roles
Input Suppliers	Provision of Seedlings, Fertilizers, Cutlasses, Weedicides Etc.
Farmers /Farming Associations	Production of Mango Fruits
Processors (Small, Medium and Large)	Mango Value Addition Through Fruit Processing
Local Market Women (Wholesalers, Retailers)	Direct Market to Farmers /Farming Associations
Exporters	Export Fresh Fruits and Finish Products of Processors
Support Institutions University of Ghana research, FAGE MOFA etc.	Assist farmers from production stage to harvesting stage.

Table 2: Actors and Description of Roles

1.3 International, National Scenarios and Features of Benchmarks

1.3.1 International Scenarios

Mango originated in southern Asia and India and there are two types primarily sold on the global market: the Philippine and Indian mangoes. Although they both come from the same species, their geographical separation gives them different characteristics. For example, in the United States, there are growing areas in Florida, California, Hawaii, and Puerto Rico. About 200,000 mango trees are currently being cultivated in Florida on 2,000 acres, which produce about $2 million worth of the product annually.[3]

[3] Mango Industry Statistics, Trends & Analysis, https://brandongaille.com/21-mango-industry-statistics-trendsanalysis/ [3] Statista, 2016

In 2016, the global mango market was able to produce 46.5 million metric tons of the fruit. Since 2000, growth within the industry has nearly doubled from the 24.7 million metric tons that were produced in that year[3].

It has been established that the United States imports more mangoes than any other country in the world with Mexico being its primary supplier[4]. Figure 3 below shows the global trend in mango production in the world over a 17-year period. In Ghana, the production of mango was estimated to be more than 98,477mt as at 2017[5]

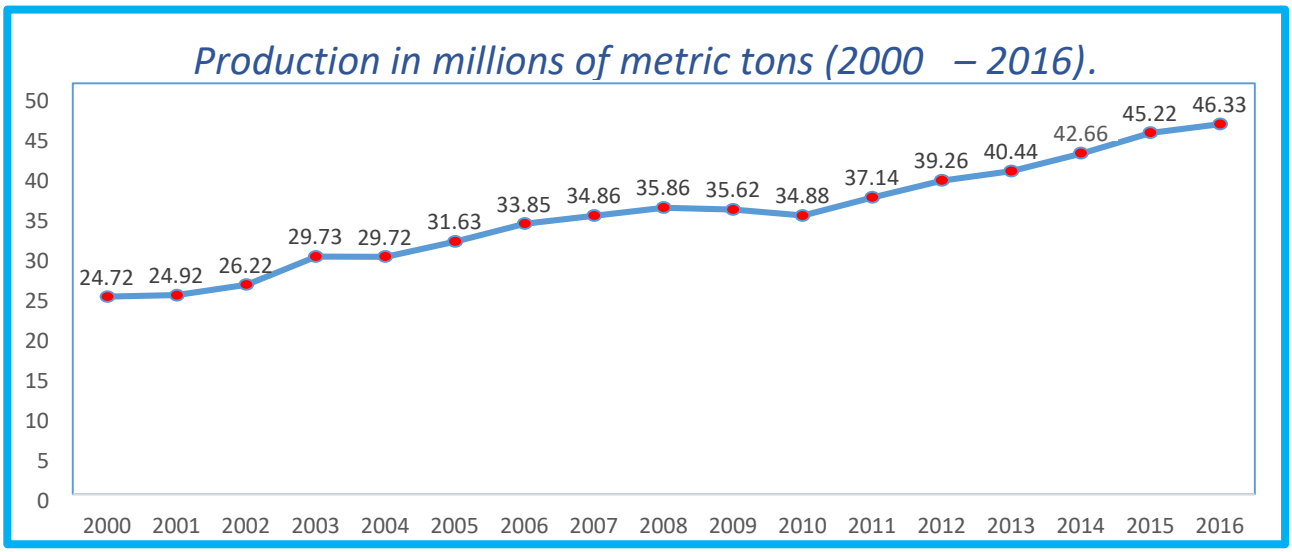


Figure 3[6]: Global trend in mango production

The global mango industry is built on an infrastructure where the threat of cold weather cannot impact harvest. Most major mango producers are located close to the equator and have good shipping

[4] AGMRC and https://brandongaille.com/21-mango-industry-statistics-trends-analysis/

[5] Value Chain Analysis of the Fruits (Pineapple and Mango) Sector in Ghana

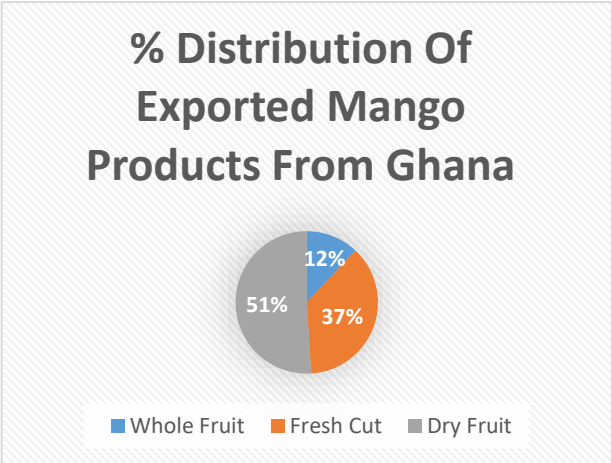
[6] Statista

networks that can take the fruit to its local or international destination immediately after harvest. Cuba is one of the Top 20 producers in the world because of its geographical location.

Although some countries have started producing their own mango crop, most notably Australia, the major producers rely on imported orders and continue to generate revenues for the global mango industry. As the demand for this fruit continues to grow in the US, producers should expect the need to expand the cultivation of more acreages of the fruit. Demand in the United States is year-round, thus creates a seasonally based import market for consumers.

1.3.2 National Scenarios and Features of Benchmarks

In Ghana, it is estimated that the volume of mango exports has also followed the trend of production, averaging 1,829 metric tonnes over the past five years. In 2013, the volume of mango exports was 1,789 metric tonnes which fell to 1,276 metric tonnes in 2014 and then rose to 2,219 metric tonnes in 2015 and declined to 1,741 metric tonnes in 2017. This was attributed to unfavourable climatic conditions. Dried fruits dominate the mango product export markets with about 51% of total exports followed by fresh cuts (37%) and whole fruits (12%). Figure 4 compares the percentage share of various mango products.



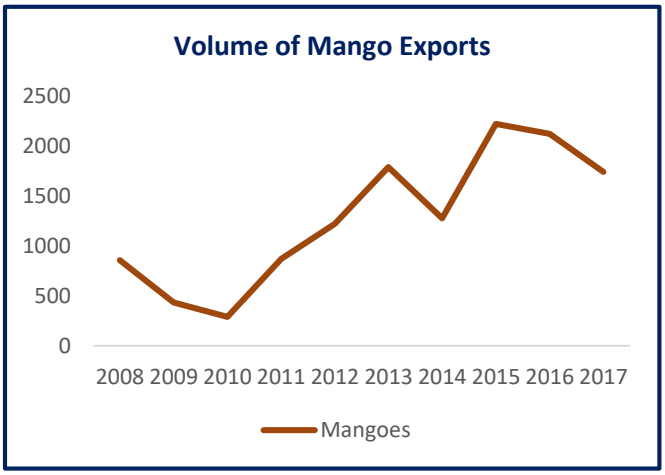


Figure 4[7]: % Distribution of exported mango products from Ghana and Trend

Fresh Mangoes and its derivatives are sold both on the domestic and international markets. In the domestic markets, approximately 70 percent of mango produced in the cluster are either consumed in Ghana or sold to local processors. In fact, a large share of mango is sold to processing firms. Interestingly, increasing income levels, rising urbanization and an increasing healthy eating consciousness are also driving the demand for fresh fruits including mango.

In terms of export**,** Ghana's main destination for exported mango products (fresh fruits, fresh cuts and dried fruits) has been the United Kingdom and the EU. Ghana exported a total value of $45.4million worth of mangoes in 2017. The country also exported $22.1 million worth of mangoes to the United Kingdom and to the EU, an estimated $11.65 million. To Switzerland (US$4.6 million), Germany (US$3.45 million), Italy (US$1.8 million) and France (US$1.8 million) all in 2017. Lebanon also remains an important market for some fresh mango exporters.

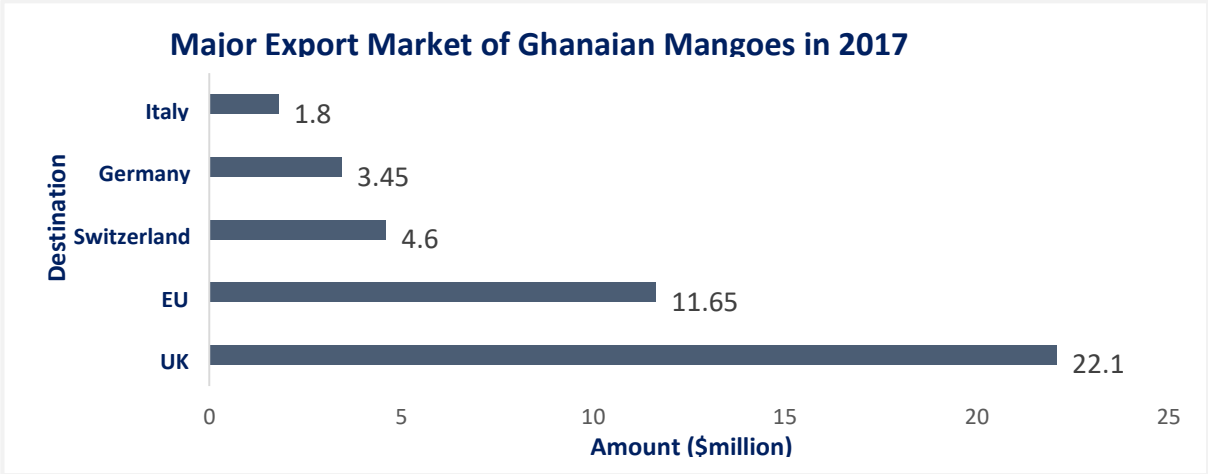


Figure 5: Major Export Market of Ghanaian Mangoes in 2017 Million ($)

[7] Statista, 2018

1.3.3 Competitiveness

Generally, the competitiveness of mango production within the cluster is still low. Small production quantities make it difficult to compete with large competitors outside the cluster. In addition, the cluster's producers are required to meet certain export quality standards, and sufficient quantities demanded by importers are often not met. This has mainly been due to the lack of financial resources to invest in production activities and the renewal of international quality certifications. Other challenges include high financial maintenance cost related to pest and diseases such as the Mango Black Bacteria Spot (BBS) and fruit fly.

Nonetheless, the cluster has some advantages over other mango exporting countries in the West Africa sub-region. A special feature of the mango industry in the Cluster is the occurrence of two harvesting seasons each year. Farmers have the opportunity to produce and export twice a year, usually from April to August for the major season and from November to January for the minor season. This is an advantage to Southern Ghana where the cluster is located and is unique to the cluster. This offers the farmers with an opportunity to supply the European market during periods of less competition such as in summer. However, mango has to compete with other European fruits in the summer.

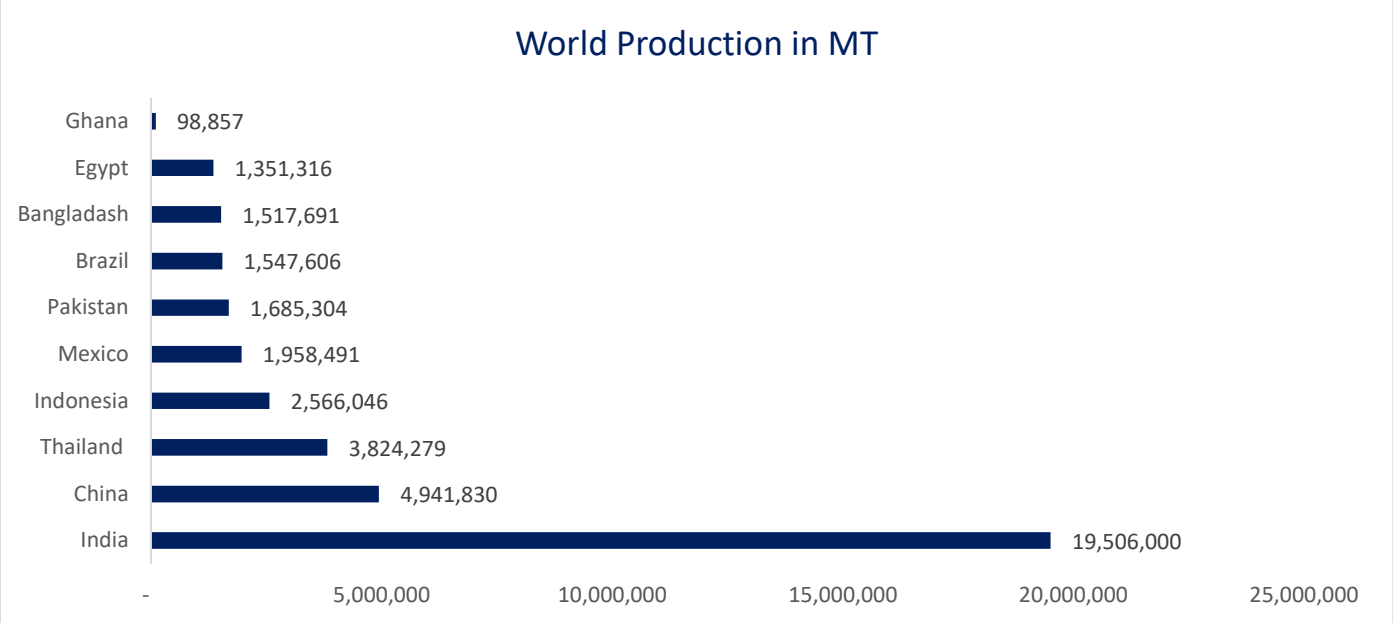


Figure 6: Competitiveness of Ghana to major mango producing countries

Comparing the cluster with the National Scenario

The focus is to show the performance of the cluster compared to national benchmarks. Table 3 below gives a summary on the national scenario.

Mango Cluster	National
330 smallholder producers, 2 commercial producers, 6 Cooperatives and Associations Other Associations	Over 500 smallholder producers, 3 commercial producers, 10 Cooperatives and Associations
8 Exporters, 3 Importers, domestic fresh market consumes 5,000 MT,	12 Importers of Mango in Ghana,
Export Fresh 1,000MT	Ghana's fresh mango export stood at 1,741 MT in 2017

Table 3: National Scenario (Comparing Cluster with National)

1.4 Cluster Facts and Figures

This is the summary of the field results obtained from the study which took into consideration the number of firms to size, estimated turnover and estimated employment, among others.

1.4.1 Background of the farmers in the Clusters

Most of the farmers in this cluster are sole proprietors who do not have extra interventions/interested persons in terms of ownership. Regarding the level of education, most of the farmers have at least primary school education. This is a unique characteristic of this cluster.

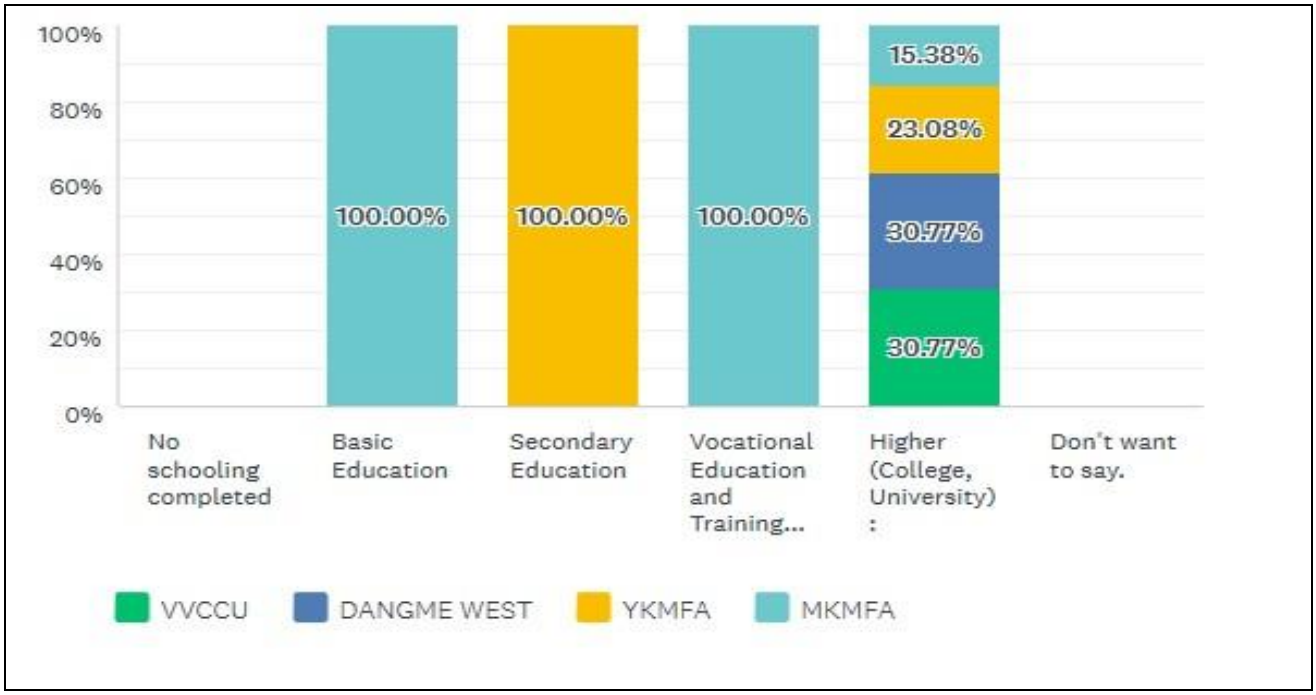


Figure 7: Highest level of Education by Farming Associations in the Cluster

1.4.2 Analysis of acreage under cultivation by the Cluster

This section looked at the cultivation capacity of the farmers and based on the responses obtained, it was discovered that the average acreage of mango cultivation stands at 23.25 acres per farmer with the margin of deviation being 17.79 acres.

Fruit	Average (Acre)	Min (Acre)	Max (Acre)	SD (Acre)
Mango	23.25	5.00	70.00	**17.79**

Table 4: Total acreage under the cultivation of Mango per farm

(Estimate by Consultant from field responses)

Additionally, the study looked at the capacity levels of the farmers in the cluster which revealed that in metric tons, the average capacity of mango production stands at 40,000 – 50,000MT for the past 3 consecutive years.

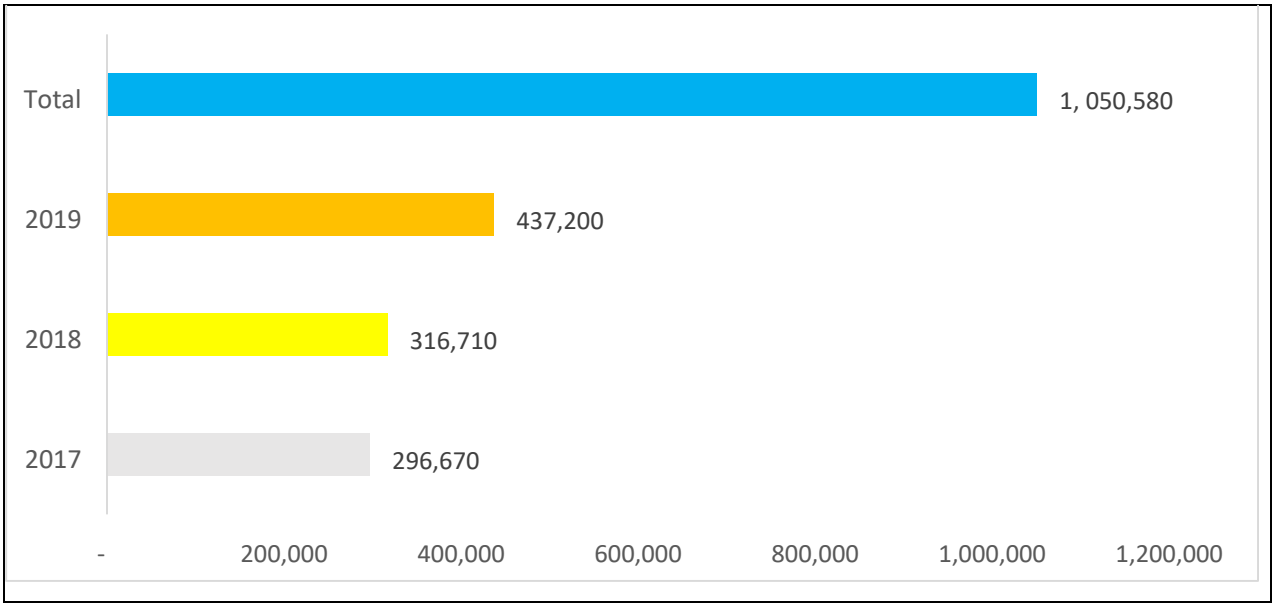


Figure 8: Estimates of turnover (GHC) from 2017 – 2019

(Estimate by Consultant)

The total estimate of turnover in GHC from 2017 to 2019 for the cluster is approximately 1,050,580. The cluster currently has approximately 1,452 permanent workers aside temporal workers for all the farmers in the cluster. Figure 17 shows an average distribution for a farm with the cluster.

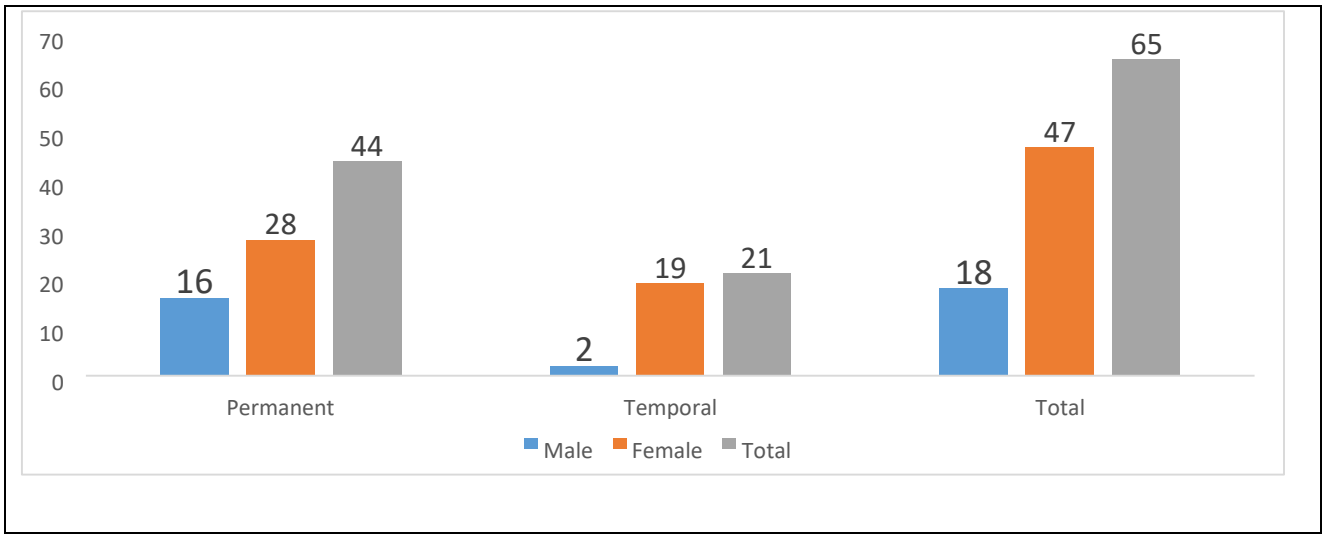


Figure 9: Estimate of the number of Employees per Farm

The study also considered the production cost base for fresh mango exports. The responses given are summarized in Table 5 with estimates of the cost involved and profit margin, assuming that a farmer in the cluster wanted to cultivate an acre of land for fresh mango export.

ACTIVITY	**UNIT COST - GH¢**	**TOTAL COST-GH¢**
Land Acquisition (leased for 3year period)	100	300.00
Input Materials (Seedlings) ***Note: for 1 acre plot 50 seedlings are required for planting.***	5	250.00
Land Preparation	300	300.00
Line Planting for 50 seedlings	10	500.00
Pruning	50*4 = 200	600.00

Note: Pruning is done quarterly for 3 years prior to harvesting with GH¢50 charged per pruning done.		
Weed Control ***Note: Weed control is done twice in a year for 3 years prior to harvesting with GH¢300 charged per weeding.***	300*2 = 600	1800.00
Cost of Chemical ***Note: Application of chemical is done twice a year at cost for 2 years at a cost of GH¢80 for the chemical.***	80*2 = 160	320.00
Labour for spraying	100*2 = 200	400.00
Harvesting ***Note: A team of 3 used for harvesting at a cost of GH¢50 per person.***	50*3	150.00
Total		GH¢4,620.00

Table 5: Cost Estimate analysis for an acre Land cultivation of Fresh Mango for Export

(Cost Estimated by stakeholders at a validation meeting)

From Table 5, the farmer is expected to spend approximately GH¢4,620.00 in order to get fresh mangoes for export using the 1-acre land estimate.

Sale of Fresh Mango

Using 1 Acre = Avg. 3000 Kilos in terms of production yield, it means that exporting 15% will give the farmer GH¢1,350 with a unit price of GH¢3.00 → Export = 15% = 450 X GH¢3= GH¢1,350

On the local market, at a unit price of GH¢2, the farmer will obtain GH¢3,900

→ Local = 85% = 2550 X GH¢2 = GH¢5,100

Hence, the total revenue for the farmer will be GH¢ 6,450 when the export revenue is added to the local revenue with the profit margin of GH¢ 2,530 (in reference to Table 5) i.e. Total Revenue less Total Cost of production.

Add 25% Post Harvest Loss = GH¢ 1,290* (*Assuming all products are Exported (4kg/Box of Fresh Mango)

$$\frac{3000}{4} = 750x \text{ €}5 = \text{€}3{,}750 = \mathbf{GH¢22,875.00}$$

The total revenue when all the fruits are exported will be GH¢22,875.00. However, the farmers are unable to meet this revenue target because majority of their produce go to the local market (i.e. local processors and market women) with only about 15% being exported and 20-25% being post-harvest loses.

Marketing

The cluster has different avenues for selling their products as summarized in Figure 18 below. The main source of market for the cluster is the local market as it constitutes 72.5% (95% women). However, only 2% of mangoes are exported with 19% sent to the small and medium scale processors for processing.

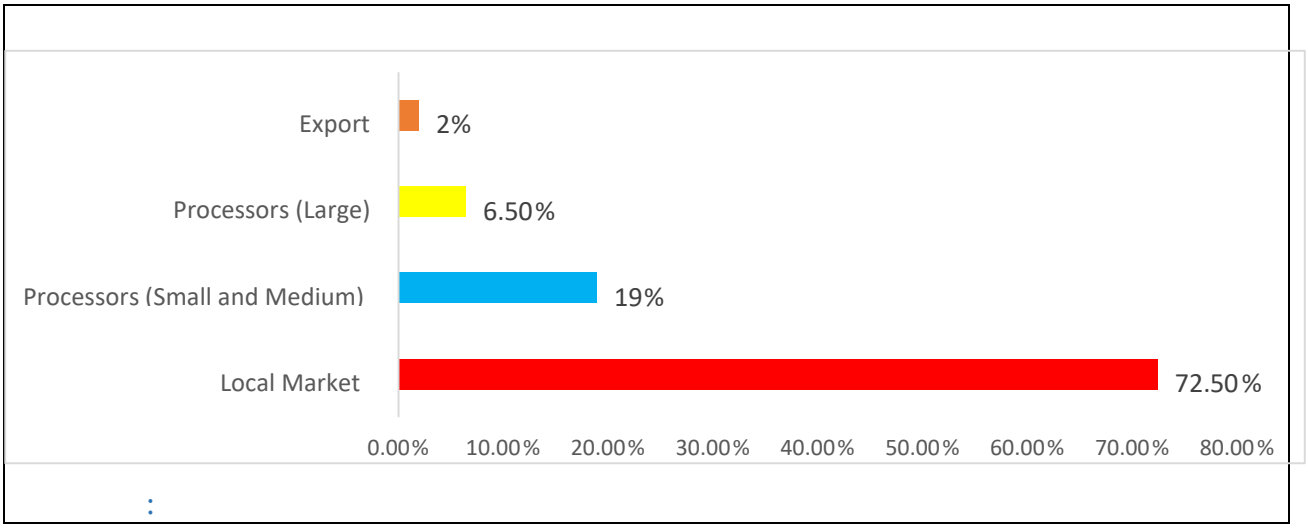


Figure 10: Buyers of Mango fruits

Certification of Producers in the cluster

It was realized from the study that some farmers were previously certified but have not renewed their certificates due to financial constraints. There are also some farmers with valid/renewed certifications from Fairtrade and GLOBALGAP in the cluster. Furthermore, there are some farmers who had never (previously and or currently) been certified by any recognized certification standard. The details are presented in Figure 11 below.

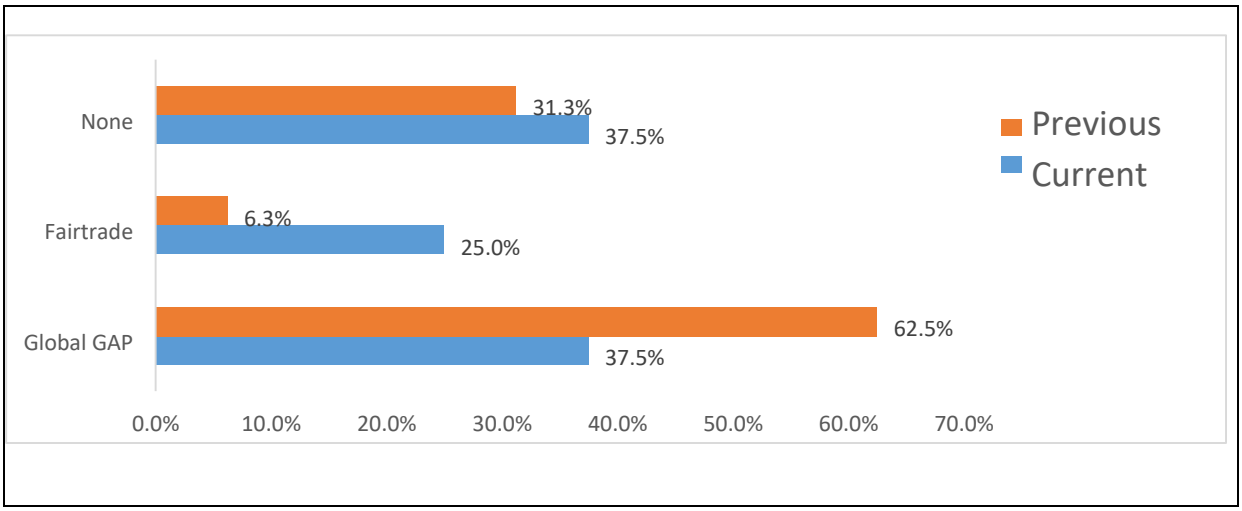


Figure 11: Certification of Producers in the cluster

1.5 Institutions/Firms Supporting the Cluster

NAP Farmers Enterprise - Input Dealers

NAP Farmers Enterprise is located at Somanya in the Yilo Krobo district. It mainly provides agricultural extension services to farmers especially, mango farmers in the cluster and it has been the backbone of farmers in the cluster. It supplies farmers with farming inputs, technical advice/training as well as assists farmers and other Small and Medium Enterprises (SMEs) in applying technology to their farming methods. NAP also provides consultancy services.

University of Ghana Soil and Irrigation Research Centre (SIREC)

This research centre of the University of Ghana is located at Kpong in the Lower Manya Krobo district. It is a public support institution that conducts soil research and disseminates information to stakeholders. Specifically, they help farmers to solve their plant protection problems through appropriate soil research. The institution currently provides support to Small and Medium Enterprises (SMEs) through technical training services for farmers. In addition, the institution provides consultancy services to farmers. The capacity of the institution in providing these services to SMEs is largely undermined by financial difficulties and technical challenges. The business consultancy aspect of the institution has been operational since 2007 with approximately 1,500 beneficiaries although funding remains a major issue. The institution has no past financial support or incentive schemes put in place to support enterprises as well as has no grants/loans schemes for disbursement. There is also no active promotion for saving and loan programming. Coupled with these challenges is low level of confidence between the farmers and researchers.

There are also other institutions and firms who have championed the marketing and production of mangoes produced from this cluster. These include:

Farm Management Services Limited (FMSL)

Established about a decade and half ago, it is based in Somanya in the Eastern Region. FMSL is a member of the Yilo Krobo Mango Farmers Association and Ghana Shippers Council. Since its inception, FMSL has been involved in a mango plantation sharing scheme - an initiative that enables investors to own well-managed mango farms without the hassle of day to day operations management.

Managing a farm requires significant time commitments and often involve processes which may seem quite complicated for an investor may not be able to visit the farm regularly. FMSL currently has six clients signed unto their scheme, who have fully established their farms and another four clients waiting to participate in the next planting season. Present members include Cotton Web Link Farms, Premier Exotic, UAM, SMI, Beulah and Kwesnah.

FMSL also cultivates almost 1,130 hectares of mangoes of which, about 500 hectares is owned by Cotton Web Link Farms. In 2011, the company produced 8,700 tons of mangoes, down from a peak of 14,000 tons in 2008. The CEO of FMSL intimated that, from the total mangoes produced by their group annually, 20 - 25% are lost to post-harvest losses, whilst export grade mangoes are estimated to be about 15% of the output. Processors, supermarkets and market women take up the rest of the produce for retail purposes. However, specific data on how much had been generated from commercial mango production was unavailable.

FMSL specifically uses three mango varieties namely: the Keitt, Kent and Palmer types and, their products normally exported to the Netherlands. It was revealed during the interactions that Britain prefers the Palmer and the Tommy Atkins varieties, whilst the rest of Europe prefer Keitt and Kent varieties which are even more commercially viable for producers and exporters in respect to the European market[8].

Other supporting Organisations or Institutions

GIZ-MOAP supports some cluster members in attaining and maintaining quality standards such as GLOBALGAP certification. The Ghana Standard Authority (GSA) previously helped in ensuring good standards in the mango industry by providing members with manuals for Good Mango

[8] National Mango Study

Production and also undertook Maximum Residue Limit (MRL) tests on fruits for exports for the members. Others like the Export Development and Agricultural Investment Fund (EDAIF) is another supporting institution to the Ghana mango industry. The European Union also contributes to the mango industry. UNIDO, FAGE, Exim Bank, Hotifresh, ADRA, CSRI and FRI are other supporting organizations to the mango industry.

Dizengoff Ghana Limited

For the past 40 years, the agricultural division of Dizengoff Ghana Limited has been selling various types of fertilizers and agrochemicals to farming communities in the cluster. In addition, they provides irrigation systems which Dizengoff installs, commissions and maintains for the cluster. They also provide seedlings/seeds and technical advice to the farmers on diverse cultivation methods and techniques. The company's contribution cuts across a multiplicity of crops including the horticultural industry hence they are considered as actors for their role in the supply of agriculture inputs to farmers including those of mango[9].

YARA Ghana Limited

YARA supplies fertilizers to various farmer groups and farmer associations based on specific crop and soil requirements. According to the managing director of YARA, Mr. Mendi Saint Andrea, Yara's fertilizer sales are done in various packaging forms, ranging from bulk cargo, sack sizes, smaller weight categories among other specifications. He indicated that fertilizers are provided to farmer groups in the mango producing areas based on their specific needs[10].

[9] National Mango Study

[10] *Current situation and perspectives of agro food packaging for export in Ghana (2006),* http://tinyurl.com/76qnh6l

Sidalco Ghana Limited

Sidalco Limited is a distributor of agricultural products in Ghana. Sidalco's product range includes Sidalco 10:10:10 compound fertilizers, and a range of Kwazar sprayers and applicators including the Kwazar Neptune 15 Knapsack Sprayer. Sidalco Limited is also a grower and exporter of Papaya and Pineapples. Sidalco is regarded as an actor because it is a known brand in the cluster by both farmers and groups. In this vein, mango farmer groups are able to liaise with the company to supply them with the requisite agricultural inputs. (Corroborated during interviews)

RMG Ghana Limited

Established in 1979, RMG imports and distributes agriculture inputs such as fertilizers and agrochemicals to farmers, and is also involved in cocoa, cotton and warehousing activities. Through its subsidiary, the Volta River Estates Ltd., the Ghanaian-Dutch joint venture has been involved in the banana sector that are certified by Fair Trade. In the mango sector, RMG's subsidiary company ITFC has developed an organic production farm in the Northern Region.

CHAPTER TWO

MANGO CLUSTER ANALYSIS

2.1 Introduction

The value chain for mango in Ghana is made up of all the actors in the key segments. This is made up of researchers, input suppliers, producers, extension service providers (private and public), certification bodies, regulators, logistics providers (transportation), post-harvest handlers (pack houses), aggregators, processors, marketers (exporters and retail) and consumers as well as actors providing support services.

The main actors for Mango maps are presented in Figure 12 below.

Actors along the VC in the Cluster

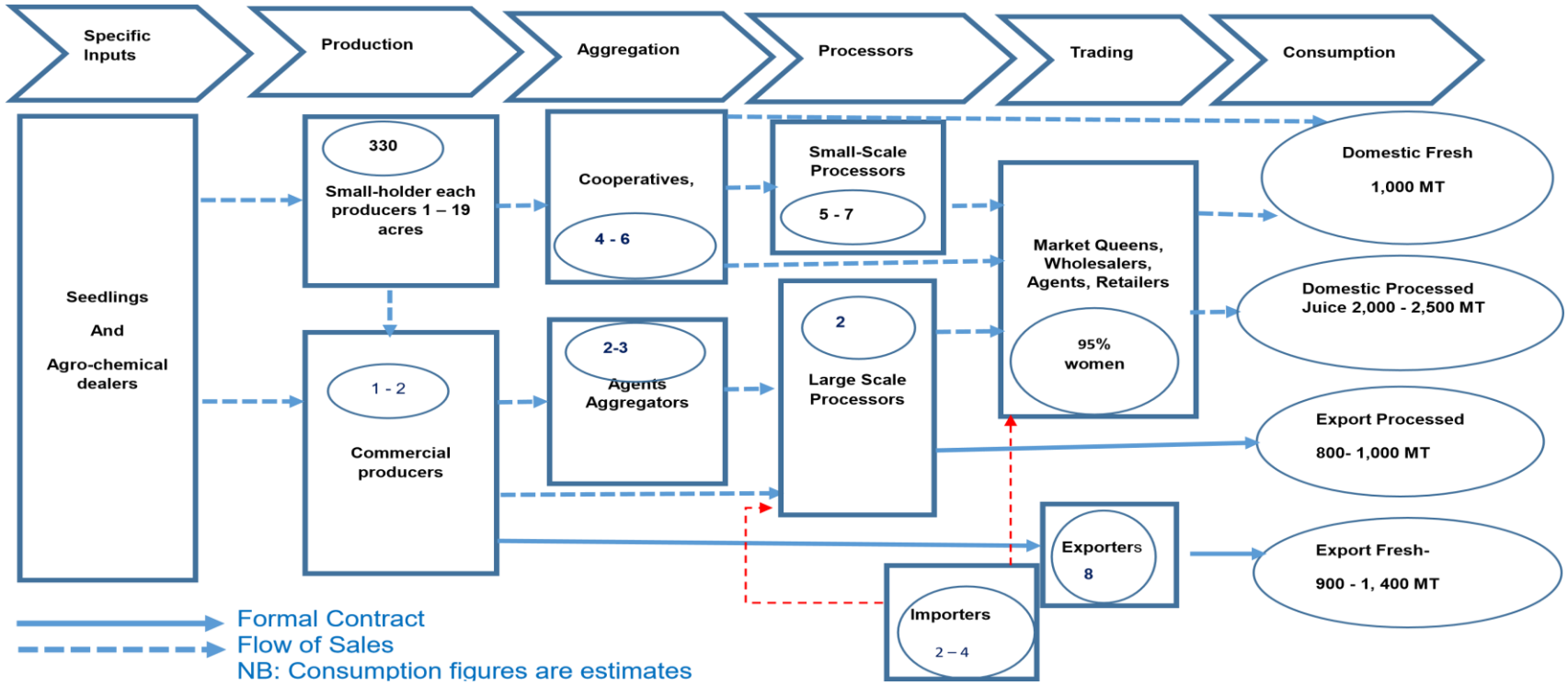


Figure 12: Actors along the Value Chain

2.1.1 Production

This aspect of the cluster comprises of producers - both smallholder farmers and medium to large-scale commercial farmers of mango. Farm sizes are classified based on the size and these lands under cultivation range from 1 to 10 acres (small scale producers), 11-100 acres (medium scale producers) and above 100 acres (large scale producers) for mango production. Large scale producers negotiate prices through pre-harvest price negotiation arrangements with the large processing companies. Processors also buy their produce from producer associations through pre-harvest contract agreement.

Mango producers are typically grouped under associations and the most notable ones include the Yilo Krobo Mango Farmers Association, Dangme West Mango Farmers Association, Manya Krobo Mango Farmers Association and the Volta Value Chain Cooperative Fruits and Vegetables Union Limited. These prominent groups are located within the coastal savannah ecological zone of Ghana, in the Greater Accra, Eastern and Volta regions.

2.1.2 Vertical and Horizontal Linkages

The relationships or association between the various actors in the chain serve as essential conduits for the flow of technical information. There is a relative degree of linkage among all actors 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 hence the relationships between exporters, intermediaries and producers are very tight knit. Not only does information flow down the chain, but access to inputs, the provision of technical extension services and market intermediation are also embedded in these relationships. Groups, FBOs and Associations are also linked up in the mango industry.

Fruit	Production/Mt	Value (USD) Million (local price)	Export/Mt	Value (USD$) Million
Mango	98,477	26.5	1,741	0.644

Table 6: Comparison of production and current exports (2017)
Source: Consultants estimates from field data.
*Note: Mango sold at USD$270.00/MT at the local market and USD$370.00 at export price.

2.1.3 Domestic and Export Market Requirement for Mango in the Cluster

Domestic Market Requirements

Mango fruits that are sold on local markets have no stringent quality requirements. Consumers and traders in the domestic market mainly look out for physical attributes such as variety, size, and quality (good looking) before making purchases. However, with shopping malls, supermarkets and processing companies, they additionally require certain quality conditions to be met and may only procure from farmers that are GLOBALGAP certified. However, the quality requirements for mangoes by local shopping malls and processing companies are usually less rigorous than the requirements for export, especially with respect to visual fruit appearance hence certification is not a prerequisite in certain instances.

Currently, only about 10% of processors are meeting the requirements for the international markets and these are mostly made up of large-scale processors and a few medium scale processors.

Export Market Requirements

Mango is a highly perishable fruit and is also vulnerable to pests and diseases such as fruit flies (a quarantined pest) and anthracnose. In order to deliver to the exporters of fresh mangoes or fresh cut mangoes (especially to the EU and the United States), farmers are expected to comply

with the stringent quality standards and are typically required to obtain certification for their mangoes.

The high cost of certifications has been the greatest obstacle to producers and processors in the mango value chain. In 2019 for instance, group certification (Option 2) of Global GAP audit/certification by AfriCert for 16 mango producers in DAMFA cost US$5,000.00; each farmer paid approximately US$315.00. However, because a lot more producers were involved in the group certification in the previous year, the cost per producer was $50.00. According to information gathered from the mango producers' association, about 70 farmers were unable to raise funds to prepare for the audit hence, they dropped out of the audit process in 2019. This negatively affected the production volumes of certified mango available for large processors while the remaining uncertified produce would be sold on the local markets and to small and medium scale processors.

Another challenge to certification is the high cost of maintaining mango orchards due to the mango Bacteria Black Spot disease. The prevalence of the disease has made it difficult to keep production cost low forcing most farmers to abandon their farms. Producers are therefore unable to meet certification requirements in terms of farm hygiene and Good Agricultural Practices (GAPs)

The EU market is characterized by different market segments that have specific requirements with regards to price, variety and quality of exported mango. Mango exported from Ghana is required to meet international sanitary and phytosanitary regulations. The EU market imports mango from suppliers who are Global GAP certified (other markets accept organic or Fair Trade certification). However, exporters from Ghana have not been able to diversify their

market within the EU because of the limited varieties they export and small volumes in demand for organic produce. Producers do not see going into the organic market with very little volumes demanded by the international markets as economically viable.

The various EU member states adhere to the mango marketing legislation by Brussels. Each European country is committed to the Codex Alimentarius, more specifically to the Mango Standards that define a set of provisions in terms of quality, sizing, tolerances, presentation, marking or labelling, contaminants and hygiene. Ghanaian mango suppliers are obliged to meet those minimum requirements for Class I products being destined for direct consumption and Class II mangoes that are used for processing purposes. GLOBALGAP (a private standard set by major European retail chains) is the minimum requirement for mango exporters when supplying to large retail chains in Europe.

Although the Certification of producers/exporters (Option 1) or grouping of small producers (Option 2) have made significant inroads in Ghana, the main challenge lies within the sustainability of such important demands by the final consumer. The fruits are expected to be devoid of chemical residue levels and must be firm with bright colours. Mango, being an edible fruit, undergoes strict sanitary inspection prior to shipment to maintain credibility in the European Market. PPRSD, Food and Drugs Authority, as well as the Ghana Standards Authority ensure that mango exports meet the required quality standards before they are exported. To avoid environmental degradation, the Soil Research Institute (SRI) and MoFA as well as EPA collaborate with farmers to adhere to best environmental practices. There are equally strict regulations regarding the type of chemical applications on the farm. The EPA,

with the mandate to protect both flora and fauna in the ecosystem, ensures that farmers adhere to best environmental practices.

CHAPTER THREE

NATURE OF COOPERATION IN THE CLUSTER

3.0 Introduction

In the Greater Accra, Eastern and Volta Cluster, a number of associations and corporations exist among the actors in the mango value chain. These includes producers and input dealers, processors and producers, processors and exporters, producers, aggregators and local market women.

3.1 Producers and Input Dealers Association

There is a strong relationship between the input suppliers in the cluster and producers. The input dealers sell various types of fertilizers and agrochemicals to farming communities within the cluster. In addition, they provide irrigation systems which they can also install, commission and maintain; offer seeds and technical advice to farmers on diverse cultivation methods and techniques. However, the number of irrigation schemes currently installed on mango farms is minimal with only about 10 farms boasting of this facility. The input dealers' contribution cuts across a multiplicity of crops including the horticultural industry.

3.2 Processors and Producers Association

Processors add value to fresh mango fruits produced in the cluster. They buy mangoes from reliable and reputable farmers or farmer groups within the cluster, especially those that are GLOBALGAP certified. The major problems encountered by processors include inadequate supply of mangoes and inconsistent quality and supply of fresh mangoes. The high cost of transporting the fruit to the processors and cost of fruits especially in the lean season also count as other problems.

3.3 Processors and Fresh Mango Fruit Exporters

Processors also have some association with fruit exporters. As they process more fresh fruits, exporters of fresh fruits tend to have lesser fruits to buy. The shortage of fruits is mainly due to the fact that processors buy bulk quantities of fresh mangoes to supply processing plants.

3.4 Producers, Aggregators and Local Market Women

Several associations exist among the Producers, Aggregators and Local Market Women. Depending on the producers' interest and focus, they either deal directly with the local market women and neglect processors and aggregators. This relationship may be complex and depends on factors like certifications of the producers, transportation (i.e. road networks), cost of energy, among others. Table 7 below depicts the comparison matrix in the cluster.

	Input Dealers	Producers (Farmers)	Exporters	Aggregators	Local Market Women	Financial Institutions	MOFA
Input Dealers	-	VS	S	S	W	VW	VW
Producers(Farmers)	VS	-	V	S	VS	W	S
Exporters	S	VS	-	S	S	VW	S
Aggregators	S	S	S	-	W	VW	VW
Local Market Women	S	VS	S	W	-	VW	VW
Financial Institutions	VW	W	VW	VW	VW	-	VW
MOFA	VW	S	S	VW	VW	VW	-

University of Ghana Research	W	S	W	W	W	W	S

Table 7: Cooperation Matrix for the Cluster

NB: P = Perfect, VS =Very Strong, W = Weak, S = Strong, VW = Very Weak

3.5 Analysis of Business Operation

The mango industry is largely organized along with Associations/Cooperatives, Processors and Exporters Associations.

Production Stage

Farmers have formed producer cooperatives/associations to secure input credit, negotiate for better prices, aggregate produce and advocate for better infrastructural development such as road construction and water supply. Cooperatives are very common in the cluster and while some cooperatives pay dues and hold meetings to address common challenges, others do not meet these basic cooperative governance requirements. The district department of agriculture is active in the cluster supporting with extension services. Almost all the associations in the cluster are members of the National Mango Growers Association formed to coordinate nationwide mango activities. The organization was recently formed hence there is the need for substantial support to be given to strengthen its governance structures and systems.

Analysis on Support Institutions

Exporters' Stage - The Federation of Associations of Ghanaian Exporters (FAGE).

FAGE is the umbrella organization of exporters and product associations in the agricultural and manufacturing industries. FAGE promotes the expansion and diversification of Ghanaian

exports to foreign markets by assisting members to develop and market their products and improving the facilitating environment for trade through government advocacy.

FAGE assists its members in maintaining common quality standards, attaining certification (GLOBALGAP) and providing shipping arrangements and logistics. The organization also undertakes market promotion activities and provides market information services, technical support in GAPs, postharvest handling and food safety services to its members.

Problems Identified	Potential Intervention Areas
• **Business development and marketing skills needed by cluster actors** • **Need for sustainable business model for traceability system** • **Support needed to develop**	• Improvement on storage facilities in the cluster as a measure to control post-harvest loss • Encourage Pest and disease control by establishing a laboratory for this purpose • Encourage multi-cropping system as a means to supplement income of fruit producers. • Support cluster actors to obtain quality standards like Global GAP, Fair Trade and Ecocert.

new product lines from mango.	• Share best practices, support (grants) for new product development and market testing for high potential products

Table 8: Issues discovered from Analysis of Business Operations

3.6 Constraints Analysis

The focus here was to outline issues concerning the actors in the cluster that impede their production activities.

Input Supply Level Constraints

According to the actors interviewed during the field survey and observation by the consultant. Producers' have challenges with the cost of mango seedlings and agro-inputs. They find it difficult to cover their input costs. Some producers raised concerns about the efficacy of some agro-chemicals. They were of the view that some of the agro-chemicals might be adulterated but they lack means to verify.. Hence, they requested for laboratories facilities and more field experts within the cluster for to encourage members to test and deter scrupulous people from engaging in such criminal acts.

Production Level Constraints

The major constraint at this stage is high postharvest loses. There is the need for improved ways of storage during bumper harvests which usually happen every other season, all things being equal. Inadequate extension support to farmers was also identified as a major factor

limiting farmers' access to improved production information. Producers indicated that aggregators offer preferential treatment to selected producers when their demands are met, leaving other farmers or producers unattended to.

At the processing stage, when there is high demand during the minor season, the farmers are unable to supply the processing companies with fresh mangoes compelling processors to import from neighbouring countries. Then again, during the peak season, processors are also unable to off-take all fresh fruits from producers due to their limited installed capacities.

Finally, high cost of conformity assessment such as GLOBALGAP and Fairtrade certification prevents most of the farmers from obtaining these certificates to meets the export market requirement. Additionally, high competitiveness from other producers from neighbouring countries have made it difficult for the mango farmers to export their produce. This is because in these neighbouring countries, their cost of production is low although they obtain higher yields per acre. They are therefore able to export to the international markets and make good profits. Furthermore, fluctuations in the market price of fresh produce (where the farmers have less control) and the fear of post-harvest losses are other constraints identified.

3.7 Porter's 5 Forces Analysis

The porters' five analysis was conducted on the cluster based on field responses (questionnaire and interviews), consultations and observations made .

Porter's 5 Forces	Analysis
Threat of New Competitors (High - medium)	• There is competitors coming from other clusters like the middle and northern belt clusters. • From the International perspectives, there is Togo, Burkina Faso and Côte d'Ivoire as main competitors
Threat of Substitute Products And Services (low)	• There are perfect substitutes for the processed mango in the cluster, importers import from other countries such as Côte d'Ivoire. • There is an increase in the Importation of fresh fruits from the other local producers of mango.
Intensity of Competitive Rivalry (Medium)	• Among the farming associations, there is some form of rivalry among associations in terms of preference to work with exporters directly. • In terms of access to funding / external support, the rivalry reactions in the cluster can be rated to be very high.
Bargaining power of buyers (High – medium)	• In the cluster, market women have the power to mostly determine how much they are willing to pay for mango fruits from the farm gate. • However, the actions of cooperatives and associations minimize this power of buyers. • Processors also have power to determine whom to buy from based on certification criteria and standards

Bargaining Power of Suppliers (Low – medium)	• To extent, there is some form of bargaining power from farmers, seedling producers and other suppliers as they control the prices of inputs they sell to farmers. • On the part of farmers, this kind of power is limited due to issues of perishability, poor road network, and poor storage facilities for the farmers to control the sales of the fruit.

Table 9: The Porter's Five Analysis on the Cluster

Porter's Diamond	Analysis
Factor Conditions	Ghana has sufficient human labour force, less qualification in farming, cost of labour is high as most of the youth labour force not ready to farm, less research into stock prices on the agricultural international market, more natural resources but insignificant value addition techniques employed. Inadequate infrastructure development. These have significant influence on the cluster.
Related and Supporting Industries	FDA, GSA and others have supported agriculture improvement. However, suppliers of Agriculture inputs, farmers and other actors in Ghana's Agriculture sector lack reinforce innovation and internalization strategies. Hence makes the cluster less competitive.
Home Demand Conditions	The local market has been successful, as it provides a ready market for fresh fruits from the farm gates. However, buyers buy fresh fruits at cheaper prices as farmers have less control over prices due to postharvest loss, poor roads network, among others. The size of the market is more than what is produced hence, importation to address demand. Hence, makes the cluster less competitive to others.

Government	Government through MOFA have been supportive as through a lot of programmes like planting food for jobs, among others. Despite this support, Ghana still import food into the country. This makes the cluster not to perform to expectations.

Chance	The chance of the market play significant role in the market competitiveness. This provides opportunities for innovative companies that are not afraid to start up new operations. Entrepreneurs usually start their companies in the country, without this having any economic advantages, whereas a similar start abroad would provide more opportunities. This has affected the cluster as most of the local processors cannot survive taxes, utilities charges etc.
Strategy, structure and Rivalry	Among the farming associations in Ghana, there is some form of rivalry among associations in terms of preference to work with exporters directly. In terms of access to funding / external support, the rivalry reactions in the cluster can be rated to be very high. There is no well strategy and structure in the cluster to ensure positive competitiveness.

Table 10: Porter's Diamond Analysis

CHAPTER FOUR

SWOT/ PESTEL ANALYSIS AND RECOMMENDATIONS

4.1 SWOT Analysis on Mangoes

Strengths	Weakness
❖ There are strong associations such as FAGE, SPEG and PAMPEAG that coordinate mango activities both at the national and cluster level. ❖ The Cluster shows strong producer associations. This helps to give out opportunities for price negotiation and sourcing for products at the group level. ❖ **Producers have a good appreciation of the relevance of GAPs and international certifications such as Global GAP and Fairtrade.**	❖ Poor access to finance for production due to the perceived risks and seasonality of agriculture and agriculture-related businesses. ❖ Low productivity of producers/mango fields ❖ Poor post-harvest practices in the area of fruit handling, transportation, among others lower the quality of fruits produced as well as contributing to post-harvest loses ❖ The difficulty of operators to maintain international certifications due to the associated costs ❖ High dependency on external support

❖ **Past and ongoing involvement of development partners such as the USAID/TIPCEE project, GIZ-MOAP, ADRA, GCAP, among other technical and financial partners have significantly improved the quality of mango production, harvesting and processing** ❖ The cluster benefit from 2 harvesting seasons (April - August and November – January) which makes it able to supply mangoes all year round.	❖ Small production quantities make it difficult to compete with large players such as Costa Rica, Brazil and Peru
Opportunities	**Threats**

❖ The cluster has well-established international beverage processing firms which provide opportunities for other actors along the chain; ❖ EU mango imports are still growing however supplies are dominated by South America. ❖ Mango and fruit processors in Ghana are always on the lookout for mangoes for processing purposes. This is good for producers. ❖ High demand for fresh and processed fruit products has increased in the domestic market, especially in Accra. ❖ Presence of Community packhouse	❖ The high prevalence of the bacterial black spot (BBS) disease reduces the number of fruits available for processing and exports; farmers lose about 15% to 30% of products due to the effects of the BBS disease. ❖ Post-Harvest loss due to inadequate storage facilities and cost of utility to store fruits after main harvest.

Table 11: SWOT/ PESTEL ANALYSIS on Mangoes

4.2 Vision Casted for the Mango Cluster (Producers)

Vision

To be a well-integrated cluster that produces high quality mangoes at competitive prices for the domestic and international markets in the next 10 years.

Strategic Objectives and Interventions

1. **Improved quality standards and compliance :** Improved access to certified planting materials; capacity building (training on GAPs with emphasis on land preparation, harvesting techniques and certification schemes such as **GLOBALGAP, FAIR TRADE, GREEN LABEL)**; Training on group dynamics to strengthen the governance structure of the association as the cluster management organization. Regarding interventions, subsidies should be provided to enable all farmers to acquire and maintain the requisite certifications.

2. **Increased access to support services :** The provision of input materials, BDS services, mechanization, irrigation and other services can be useful. Improved storage facilities for excess fruits from the farm gate will minimize postharvest losses.

3. **Better access to markets :** This can be done through research and participation in trade fairs and exhibitions. Provision of furnished research centres, laboratories and exhibition programs will improve market access.

4. **Reduced Post-Harvest Loses:** The use of improved technology for value addition, community/cluster common-shared fruit dryer. Area of intervention should be concentrated on value addition to fruits through processing.

4.2 Assessment, Potential Interventions and Opportunities for Cluster Development

Value Chain	Cluster Covering	Needs Assessment	Potential Intervention Areas	Potentials & Opportunities
Mango	Greater Accra, Eastern and Volta Regions. Covering Yilo, Manya, Dangme, Shai-Osudoku and Ada, VVCCU	• Business development and marketing skills needed by the cluster • Need for sustainable business model for traceability system • Support needed to develop new product lines from mango.	• Encourage multi-cropping system as a means to supplement income of fruit producers. • Support cluster members to obtain quality standards like , Global GAP, Fair Trade and Ecocert. • Share best practices, support (grants) for new product development and market testing for high potential products • Storage facilities to solve postharvest losses • Disease and Pest Control mechanisms	• Large fruit pack house at Akorley, near Somanya • Strong mango farmers associations • Experienced mango farmers • Existence of private quality certification auditing bodies • Closeness to market • Closeness to major fruit processing companies • Two seasons of harvest for mango

Table 12: Assessment, Potential Interventions and Opportunities for Cluster

4.3 Recommendations

Based on the diagnostic study analysis, the following are some recommendations:

- The need to strengthen existing platforms for engagement of public and private fruits value chain actors like the Mango Round Table and National Mango Week organized by FAGE.
- The need to facilitate the development or linkages with specific markets or procurement agencies (e.g. school feeding programme or targeted social interventions).
- The need to establish value chain committees at "*cluster*" levels to serve as coordinating bodies for group marketing activities.
- The need to support producers to obtain/maintain international certifications and quality standards like GLOBALGAP, Fair Trade and Ecocert.
- The need to organize training programmes and sensitization workshops for the cluster actors on the need to compete collectively than individually.
- The need to promote guidance and support for new product development in terms of processed mangoes for the regional processing industry in parallel to the high-end European market.
- The need for potential synergies among clusters of the same product in different geographical locations.
- The need to provide continuous support to cooperative action, phasing out external support.

Appendix

No	Name of farming association in the Cluster	Total No of Farmers	Total Production (Tons)	Total Production Capacity (Tons)	Total Number of Companies in The Cluster	Total Exports (Tons) mainly through agents/ exporters	Value of Exports (USD $)	Name of Export Markets (%)	Estimated Number of Workers	Total Number of Brands Established	Quality Certification
1	Yilo Krobo Mango Farmers	124	8,800	13,200	-	400	148,000	Middle East (65%)	Male 393	No Brand	GLOBAL GAP - 70 Members
								Europe (25%)	Female		Fair Trade -10 Members
								Others (10%)	131		
2	Manya Krobo Mango Farmers	89	5,180	7,770	2	100	37,000	Middle East (65%)	Male 281	No Brand	GLOBAL GAP - 26 Members
								Europe (25%)	Female 94		
								Others (10%)			
3	Dangme West Mango Farmers	87	3,872	5,808	1	250	92,500	Middle East (65%)	Male 317	No Brand	GLOBAL GAP – 33 members
								Europe (25%)	Female 105		Fair Trade 20 members
4	Volta Value	31	2,188	3,282	-	80	29,000	Middle East (65%)	Male 98	No Brand	

	Chain Union							Europe (25%) Others (10%)	Female 33		GLOBAL GAP – 8 members
Total		344	20,040	35,868	3	780	306,500	-	Male = 1089 Female = 363 Total=1,452		

Table13: Baseline Data for the Mango Cluster (Greater Accra, Eastern & Volta Regions)

No.	Farming Association	Name of respondent	Location	Tel.	Email	Nature of Business
1	YKMFA	Asodji Daniel Teye	Yilo Krobo	245821497	jackstan1gh@yahoo.com	SOLE PROPRIETORSHIP
2	YKMFA	Tetteh Wilberforce Adu	Yilo Krobo	249506990		SOLE PROPRIETORSHIP
3	YKMFA	Takpo John Kofi	Abonse Okere E/R	244117549	jajkpo@yahoo.com	SOLE PROPRIETORSHIP
4	YKMFA	Gideon K Bokomi	Akorley	244801440	gbokomi@gmail.com	FAMILY ENTERPRISE
5	DANGME WEST	Noah Sabutey	Agomeda(Shai-Osudoku)	242375154	noahsab14432@gmail.com	SOLE PROPRIETORSHIP
6	DANGME WEST	Frederick Teye Nartey	Damfa	247142487	fredteye@yahoo.com	SOLE PROPRIETORSHIP

7	DANGME WEST	Eric Teye Lawer	Kongo(Shai Osudoku District)	241552050	lawerteye@yahoo.co.uk	SOLE PROPRIETORSHIP
8	DANGME WEST	Isaac Kabu	Agomeda(Shai-Osudoku)	243443947	isaackabu72@gmail.com	SOLE PROPRIETORSHIP
9	MKMFA	Mesh Atteh Gidisu	Abusakope Kpong	244099531		SOLE PROPRIETORSHIP
10	MKMFA	Samuel Lawer Angmor	Kpong Lower Manya E/R	543478239		SOLE PROPRIETORSHIP
11	MKMFA	Joseph Lowor Narh	Kpong Lower Manya E/R	249990116	narhjoseph@yahoo.com	SOLE PROPRIETORSHIP
12	MKMFA	Daniel Doku Teye	Okwenya	244290887	danbead85@gmail.com	SOLE PROPRIETORSHIP
13	VVCCU	Aborchie Wisdom	Kpoglu Ketu South	244876994	wisdomaborchie89@yahoo.com	PLC
14	VVCCU	Benaiah Wortordzor	Tadzewu Ketu North	543252597	benaiahwortordzor@gmail.com	SOLE PROPRIETORSHIP
15	VVCCU	William Kpesese	Xipe Ketu North	244661126	willkpesese@gmail.com	PLC
16	VVCCU	Godwin Anum	Ave-Afiadenyigba, Akatsi North	249377958	anumadotei@gmail.com	FAMILY ENTERPRISE

Supporting Institutions

Input Dealers-NAP Farmers Enterprise-Somanya, Yilo Krobo District

University of Ghana Research Studies-Kpong, Lower Manya Krobo District

Financial Institutions (GCB Bank Ghana Ltd, Barclays Bank, Rural Banks)

FAGE and MOFA

Table 13: List of Respondents (Producers and Supporting Institution)

Association/Institution	Region
1. Dangme West Mango Farmers Association	Greater Accra
2. Yilo Krobo Mango Farmers Association	Eastern
3. Manya Krobo Mango Farmers Association	Eastern
4. Volta Value Chain Committee Union	Volta
5. University of Ghana Research Studies-Kpong, Lower Manya Krobo District	Eastern
6. Input Dealers-NAP Farmers Enterprise-Somanya, Yilo Krobo District	Eastern
7. Financial Institutions, (Barclays Bank, GCB Bank Ltd, Yilo Krobo Rural Bank	Eastern

Table 14: List of Mango Associations/Support Institution in the Cluster

Funded by the European Union

Ministry of Trade and Industry
Republic of Ghana

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

West Africa Competitiveness Programme (WACOMP)

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

Pineapple Cluster Diagnostic Study

June 2020

WACOMP
West Africa Competitiveness Programme

Ghana

I wish to express my profound gratitude to my colleague and friend, Daniel Acquaye for sharing his experience and making available valuable data and information on the pineapple value chain. This enriched the content of this report.

Special appreciation also goes to all stakeholders especially farmers and cooperative executives of the QualiPine Union, Processors, Input Dealers and Sucker Producers in the Nsawam cluster, Support Institutions and partner organizations for their willingness and openness in sharing information about their businesses and institutions in this study.

In collecting and analyzing data for this study, I received substantial support from three colleagues; Victor Mensah, Emmanuel Braimah and Michael Nyemingor Tetteh to whom I say thank you for their invaluable support.

Finally, I would like to thank UNIDO for offering us the opportunity to conduct this Diagnostic Cluster Study with my appreciation going directly to the Chief Technical Advisor for Ghana, the Expert for Fruits and the Communication Expert all of UNIDO WACOMP who executed their facilitation and coordination role perfectly.

- AfDB African Development Bank
- AMSEC Agricultural Mechanization Services Enterprises Centre
- ATC Agricultural Training College
- ATVET Agriculture Technical Vocational Education and Trainings
- BAC Business Advisory Centre
- BDS Business Development Services
- BNARI Biotechnology and Nuclear Agriculture Research Institute
- CBT Competence Based Training
- CIAD Centre for Integrated Agricultural Development
- CSA Climate-Smart Agriculture
- CSD Crops Services Department
- CSIR Council for Scientific and Industrial Research
- DAES Directorate of Agricultural Extension Services
- DPs Development Partners
- EPA Environmental Protection Agency
- Eqv. Equivalent
- EU European Union
- FAGE Federation of Cooperatives of Ghanaian Exporters
- FAO Food and Agriculture Organization
- FAOSTAT Food and Agriculture Organization Statistics
- FASDEP Food and Agriculture Sector Development Policy
- FBOs Farmer Based Organization
- FDA Food and Drugs Authority
- FMAG Financial Market Association of Ghana
- FPMAG Fruit Processors and Marketers Association of Ghana
- GADS Gender and Agricultural Development Strategy
- GAIDA Ghana Agri-Input Dealers Association
- GAIP Ghana Agricultural Insurance Programme
- GAP Good Agronomic Practices
- GDP Gross Domestic Product
- GEPA Ghana Export Promotion Authority
- GIRSAL Ghana Incentive-based Risk Sharing System for Agricultural Lending

- GIPC Ghana Investment Promotion Centre
- GIS Geographic Information System
- GIZ Deutsche Gesellschaft für Internationale Zusammenarbeit
- GLGF Green Label Ghana Limited
- GLSS Ghana Living Standards Survey
- GoG Government of Ghana
- GSA Ghana Standards Authority
- GSGDA Ghana Shared Growth and Development Agenda
- Ha Hectares
- HACCP Hazard Analysis and Critical Control Points
- HR Human Resource
- HQ High Quality
- ICT Information and Communication Technology
- ISSER Institute of Statistical Social and Economic Research
- ITC International Trade Centre
- JICA Japan International Cooperation Agency
- m million
- METASIP Medium Term Agriculture Sector Investment Plan
- MMDA Metropolitan, Municipal and District Assembly
- MOAP Market Oriented Agriculture Program
- MOFA Ministry of Food and Agriculture
- MOTI Ministry of Trade and Industry
- MT Metric Tons
- MOBD Ministry of Business Development
- NAIP National Agricultural Investment Plan
- NBSSI National Board for Small -Scale Industries
- NEPAD New Partnership for Africa's Development
- NGOs Non-Governmental Organisations
- NTE Non-Traditional Export
- OVCF Out-grower Value Chain Fund
- PPP Public Private Partnership
- PPRSD Plant Protection and Regulatory Services Directorate
- PS Private Sector
- REP Rural Enterprise Programme

- SME Small and Medium-sized Enterprise
- SMS Short Messaging Service
- SCPI Sustainable Crop Production Intensification
- SDG Sustainable Development Goal
- SPEG Sea-Freight Pineapple Exporters
- SRID Statistics Research and Information Directorate
- USAID United States Agency for International Development
- VCC Value Chain Committees
- WIAD Women in Agricultural Development
- YEA Youth Employment Agency
- 1D1F 1 District 1 Factory Initiative

Introduction

The objective of this assessment was to conduct a diagnostic study of pineapple production and fruit processing (Mango and Pineapple) in the Eastern and Greater Accra regions of Ghana. The study will feed into a broader strategic approach to strengthening the export competitiveness of the fruit value chain in Ghana through enhanced value-added, low carbon, sustainable production and processing and an increased access to regional and international markets.

The study used a mixed approach for data collection which involved the review of existing literature and field interviews using semi-structured interview guides for collecting primary data on the various actors who were directly engaged. The consultants held focus group discussions with pineapple producer cooperatives and in addition, interviewed processors, exporters, input suppliers, extension service providers, regulators, certification bodies, machinery and equipment fabricators, food safety regulators, among others.

The study on pineapple production and fruit processing (Mango and Pineapple), focused on the Eastern and Greater Accra cluster because these regions house majority of fruit VC enterprises including producers and processors. Proximity of the cluster to the harbour

(seaport) and airport offer substantial access to export markets and logistics. Additionally, the cluster is one of the most prominent pineapple producing areas with over 10 pineapple growing cooperatives concentrated around Fotobi – Aburi- Adeiso areas with many medium to large mango and pineapple fruit processing factories also located nearby. The cluster has experienced a lot of upward and downward trends in terms of production and export; hence, it is a classical model for diagnostic studies.

Major constraints

Limited supply of certified MD2 and Smooth Cayenne suckers for smallholders, difficulty in accessing credit, inadequate land preparation equipment, as well as occasional shortage of labour and weak organizational and technical capacities of smallholders were cited as major constraints in the cluster. Large fruit processors do not get the required volumes and quality of raw material for processing. They are also confronted with high staff turn-over rates and high utility costs especially with electricity. Medium to Small processors are challenged with the lack of the right equipment for processing and local experts to operate imported machines. The inadequate logistics and high transport costs, poor market infrastructure and storage facilities as well as non-compliance to contractual agreements with suppliers were highlighted.

Uncoordinated efforts of development partners, donors, private sector and CSOs on value chain interventions, farmers' unwillingness to pay for services, limited scope and reach of value chain interventions, poor road networks leading to smallholder farms, limited availability of pack-houses as well as the lack of a National Strategic Plan (NSP) for production, processing and export of fruits were identified as major challenges hindering the competitiveness of the pineapple production and fruit processing value chain**.**

Recommendations

Investing in production and productivity systems/structures, improving service provision along the VC and strengthening the governance structures of organisations are key recommendations in the report. Trade promotion and adoption of strategies for exploiting market opportunities as well as improving the fruit value chain infrastructure have been elaborated to enhance competitiveness on domestic, regional and international markets. It is envisaged that the implementation of these recommendations would enable the realization of the cluster's vision if the objectives and targets set out in this diagnostic study are followed through.

The horticultural sector plays a significant role in Ghana's economy, creating jobs and generating over $392m in foreign exchange annually. The pineapple industry is the most developed horticultural sector in Ghana and it is very dominant in the Eastern, Greater Accra, Central, Western, Volta and Central Regions of the country[11]. Ghana's pineapple industry has seen massive changes over the past two and half decades and it currently has a strong footing on the export market, especially in the EU, with exports increasing outstandingly from the early 1990s to reach its peak in the mid-2000s to a tune of more than US$30 million. This represents a cumulative annual growth of 172% between 1994 and 2004[12].

The industry provides employment to many small-scale farmers and a lucrative business opportunity for the middle and upper class who make significant investments in the sector. The industry is tipped to be a significant tool for poverty reduction and employment creation in Ghana.

Between 2005 and 2010, the industry experienced a lot of volatility. Then from 2011 to 2020, another positive change happened: Fruit processing technologies became prominent in the cluster e.g. drying, juice. The expanding fruit processing (Mango/ Pineapple) offered an alternative market segment for smallholders. Pineapple production bounced back and is currently growing. A myriad of challenges in marketing, production and post-harvest management, among others, accounted for this.

[11] Kuwornu et al., 2013
[12] FAO, 2017

The re-emergence of Ghana's pineapple industry as a vibrant and competitive supplier of the national and international markets will largely depend on a clear understanding of the existing dynamics of its operational cluster areas, constraints that hinder its development and opportunities that should be seized on to propel the expansion and sustainable growth of the value chain system. It is against this backdrop that UNIDO, through its West Africa Competitiveness Programme (WACOMP) in Ghana conducted a cluster diagnostic study of pineapple production and fruit processing in the cluster as part of a model value chain commodity diagnostic study on the fruit subsector. This report therefore focuses on the diagnostic study of pineapple production and fruit processing enterprises in the Eastern and Greater Accra region cluster. The study was conducted between the period of November, 2019 and February 2020.

1.2.1 Why the Cluster was selected

The Greater Accra and Eastern regions of Ghana house majority of the fruit VC enterprises. The proximity of the cluster to the harbour (seaport) and airport offer substantial access to export markets and logistics. In addition, the cluster is one of the most prominent pineapple producing areas with over 10 pineapple growing cooperatives concentrated around Fotobi – Aburi- Adeiso areas in the Eastern region while there are also many medium to large mango and pineapple fruit processing factories located nearby. The cluster has experienced a lot of upward and downward trends in terms of production and export hence, it is a classical model for diagnostic studies. It has several actors including Input Suppliers (Agro-Chemicals Dealers, Sucker producers etc), Producers (Farmers and Cooperative groups), Aggregators and agents, Processors (Small, medium and large), Market Women (Wholesalers and Retailers), Exporters and Importers' Support institutions (MOFA, FAGE, SPEG, UNIDO, etc.).

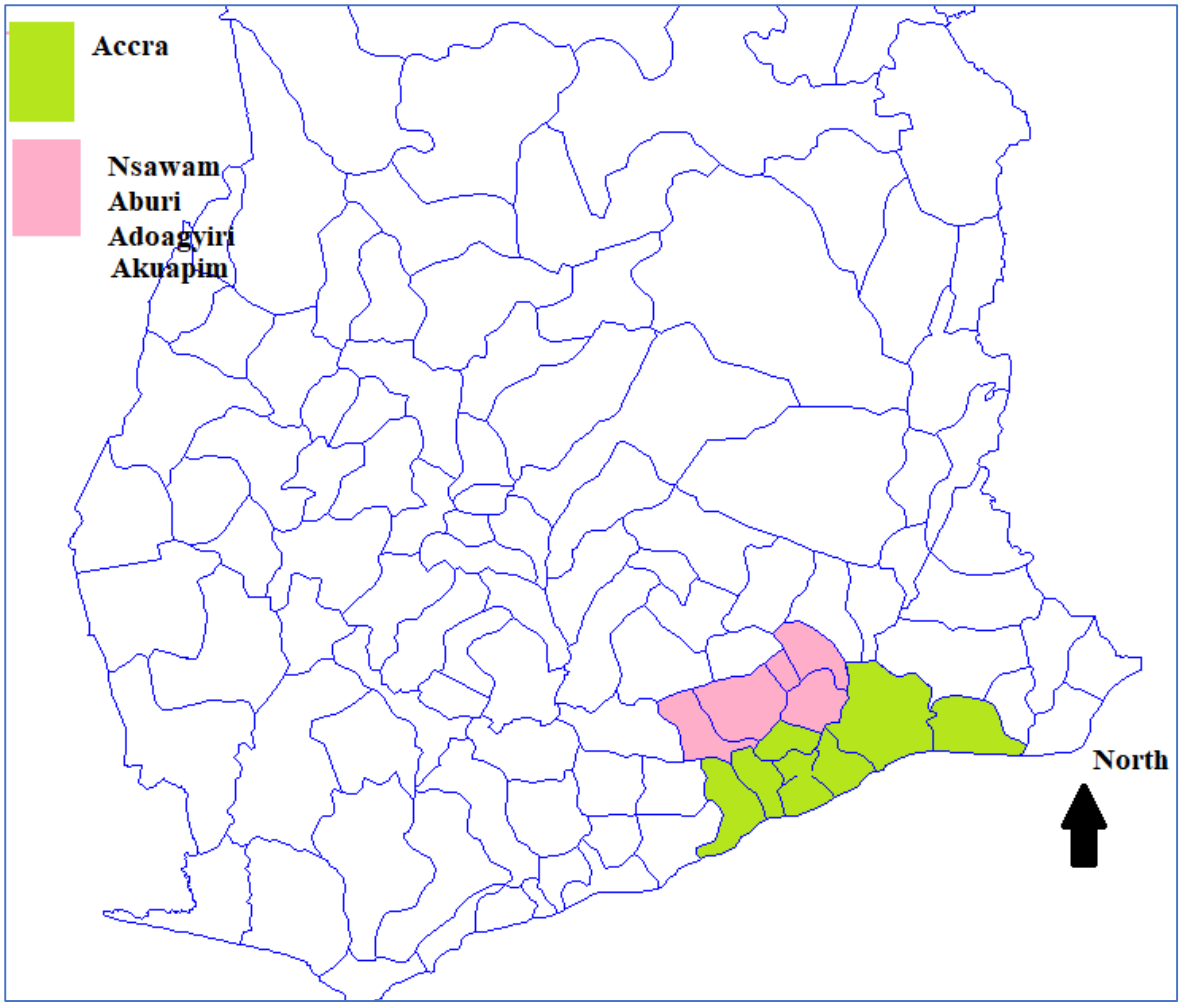


Figure 15: Map of the Eastern and Greater Accra regions Cluster

Pineapple production in the cluster started in the 1980s in a community near Nsawam called Fotobi, which consists largely of settlers who migrated from the Volta region of Ghana. In the mid-1990s, the government of Ghana initiated policies to promote non-traditional export. The horticultural sector was prominently targeted and pineapple became the most promising value chain to drive the sub-sector. Research, farmer organization, good agronomic practices, export logistics and some value addition interventions were intensively supported. The popularity of pineapple production in the area gradually expanded in the early 1990s and by the middle of

the 90s, 4 other communities in the area: Adonten, Pepawuni, Aboadaka and Boade joined Fotobi in the production of the smooth cayenne pineapple variety.

TechnoServe (a non-governmental organization), and the Ministry of Food and Agriculture (MOFA) facilitated the organization of these community-based farmer groups into cooperatives. Under the government of Ghana small enterprise development project scheme, TechnoServe and the Peace Corp from USA built the capacity of the cooperatives and supported the establishment of a pineapple business company called Farmapine in Nsawam to serve the marketing needs of the cooperatives. The cooperatives acquired shares in the company and had a representative on its board. A management team was constituted and the company presented a business proposal to Barclays Bank Ghana Limited which granted a loan of 1.4 million Cedis for the company to rent a pack- house and procure inputs to expand production. This area became a major pineapple producing hub supplying exporters of fresh pineapple to Europe.

In the early 2000s, the volume of Ghana's pineapple export grew tremendously reaching a peak of over 71,000 tonnes in 2004. This indeed was a major positive turning point for pineapple production in the cluster area. The number of cooperatives grew to more than 10 and commercial production for export expanded. At the time, it was estimated that the Nsawam cluster contributed over 50% of total pineapple exports thereby creating jobs and generating substantial incomes to meet household farms family needs such as school fees, health and housing. Unfortunately, this growth was short lived when the Del Monte Company in Costa Rica introduced and vigorously promoted the MD2 pineapple variety to the world market, driving international demand for the variety. Farmapine as well as exporters (especially SPEG members) who procured smooth cayenne pineapple fruits from farmers for export to Europe

could not sell their produce on arrival at the EU markets and subsequently, could not pay back farmers. The MD2 has been described as cylindrical fruits with an intense yellow colour, super-sweet, self-ripening and having a longer storage (shelf) life compared to the cayenne variety which has a less intense yellow colour and relatively shorter shelf life (Achuonjei et al., 2003). Due to loss in market share in the European markets Farmapine, exporters and famer cooperatives were unable to pay back their loans to Barclays Bank and this eventually resulted in the collapsed of Farmapine and most of the farmer cooperatives. Many smallholder farmers abandoned pineapple production and some pineapple fields were sold out to estate agents. Nevertheless, some smallholder farmers of the cooperatives in the cluster area who were able to raise some capital and continued to grow pineapple for sale to large processing companies such as HPW, Bomarts, Peelco, etc. These processing companies were supplying to super-markets in the EU and African markets. Increasing demand for processed fruit products on the domestic as well as export markets encouraged the processing companies to expand and diversify into different processed products which led to a market growth for more raw material supply especially of mango and pineapple.

The historical processes and major milestones of pineapple production and fruit processing in the cluster are summarized in Figure 2 below.

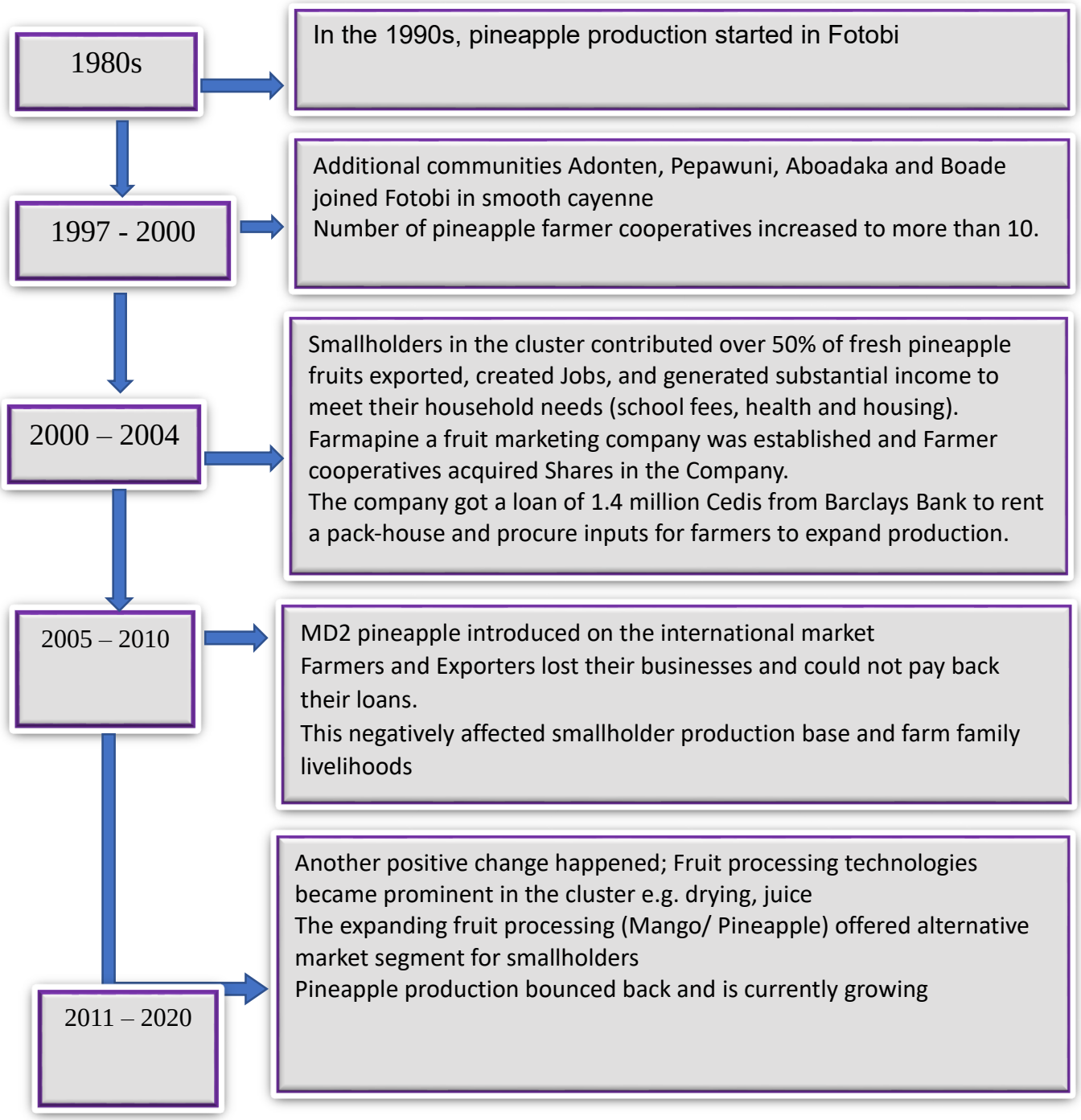


Figure 16: History of the pineapple production in Nsawam-Aburi cluster

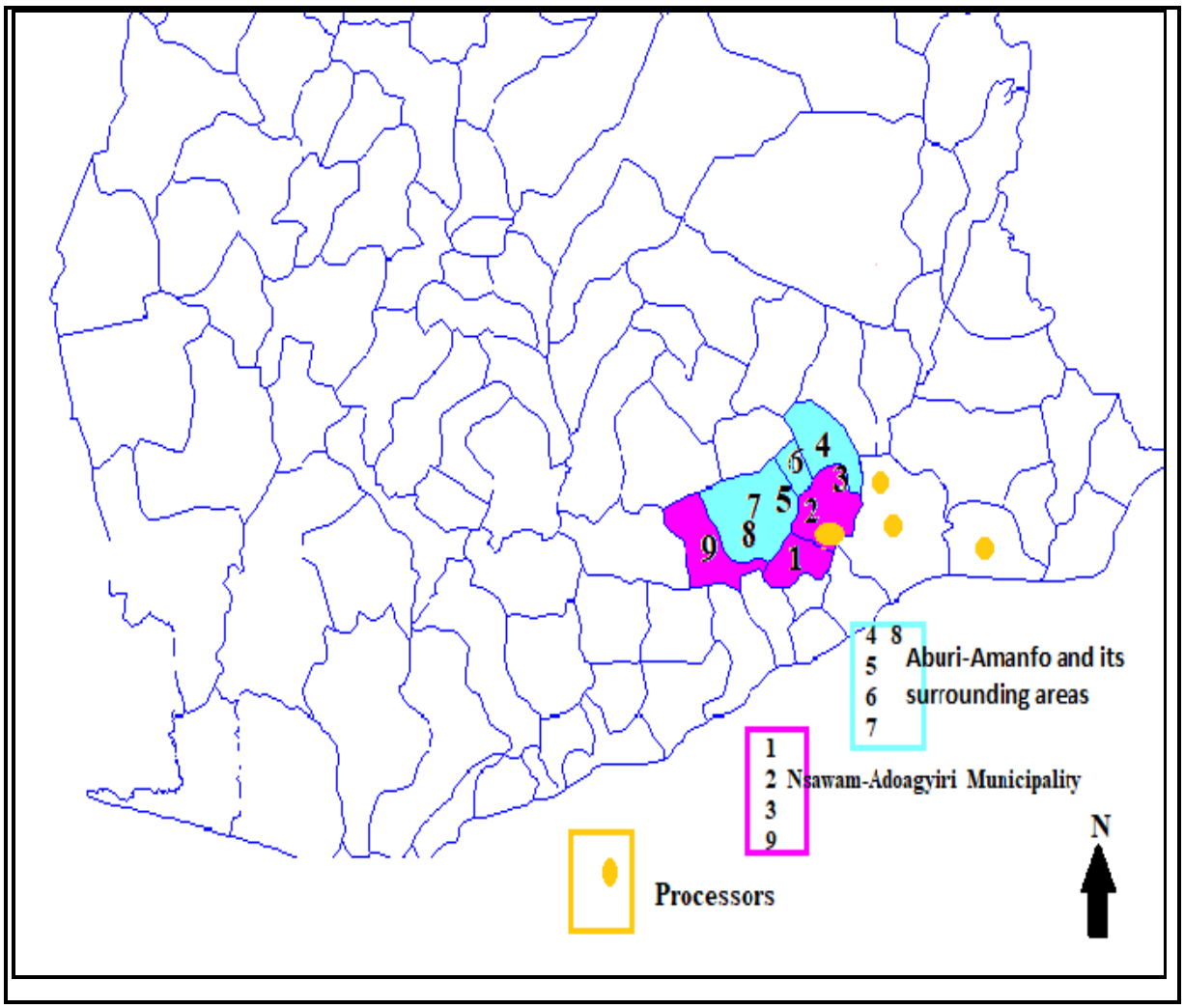


Figure 17: Pineapple production and fruit processing zone[13]

[13] UNIDO Value Chain Analysis Studies

Pineapple is one of the commercial fruit crops in the Nsawam cluster. It is a good source of vitamin A and B and fairly rich in vitamin C and minerals like calcium potassium and iron. Rainfall of 1500mm per year is optimum for pineapple production but it can also grow in areas with rainfall as low as 500 mm or as high as 5550 mm.

Pineapple is suitable for cultivation in humid tropics hence, the fruit grows well near the coast. The crop grows in any type of soil provided it drains freely and is light in texture. Slightly acidic soil with a PH range of 5.5 to 6.0 is considered optimum for pineapple cultivation. The generally adopted steps for pineapple production in the cluster area are as follows:

Land preparation

The land is prepared by ploughing or digging followed by levelling. Depending on the nature of the land, ridges of about 90cm in length and 15-30 cm in width are prepared. Pineapple grows well both on plain lands and at elevations not exceeding 900 meters. It tolerates neither very high temperature nor frost.

Planting method of pineapple crop

There are four different planting methods which can be used depending on the land and rainfall patterns of the area. These methods are flat-bed, furrow, contour and trench. Pineapple is usually propagated by the sucker, slip and crown.

Harvesting of pineapple

The pineapple plant flowers 12-15 months after planting and the fruits become ready within 15-18 months depending on the variety, time of planting, type and size of the plant used in a prevailing temperature. The fruits usually ripen about 5 months after flowering.

Marketing of pineapple

There is always a ready market for pineapples produced in the cluster with the main buyers being the processors and local markets. Pineapples that meet international requirements are also exported. Figure 4 below gives a summary of the flow process of pineapple production.

The planting of pineapple suckers by Farmers in the cluster

After planting, the farmer walks through to fill in dead suckers and continues with other cultural practices (Fertilization, weed control, pesticide application etc.)

Next, flowering of pineapple (flower induction- Forcing)

Mature pineapple fruits

The matured fruits are harvested. From the harvesting stage, the fruits pass through three points before they get to the consumer. Either to the local market, processing or direct export

Preparing for Export

Processed Fruits

Local Market

Figure 18: Summary of pineapple production process flowchart

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Below is a value chain map for pineapple in the cluster

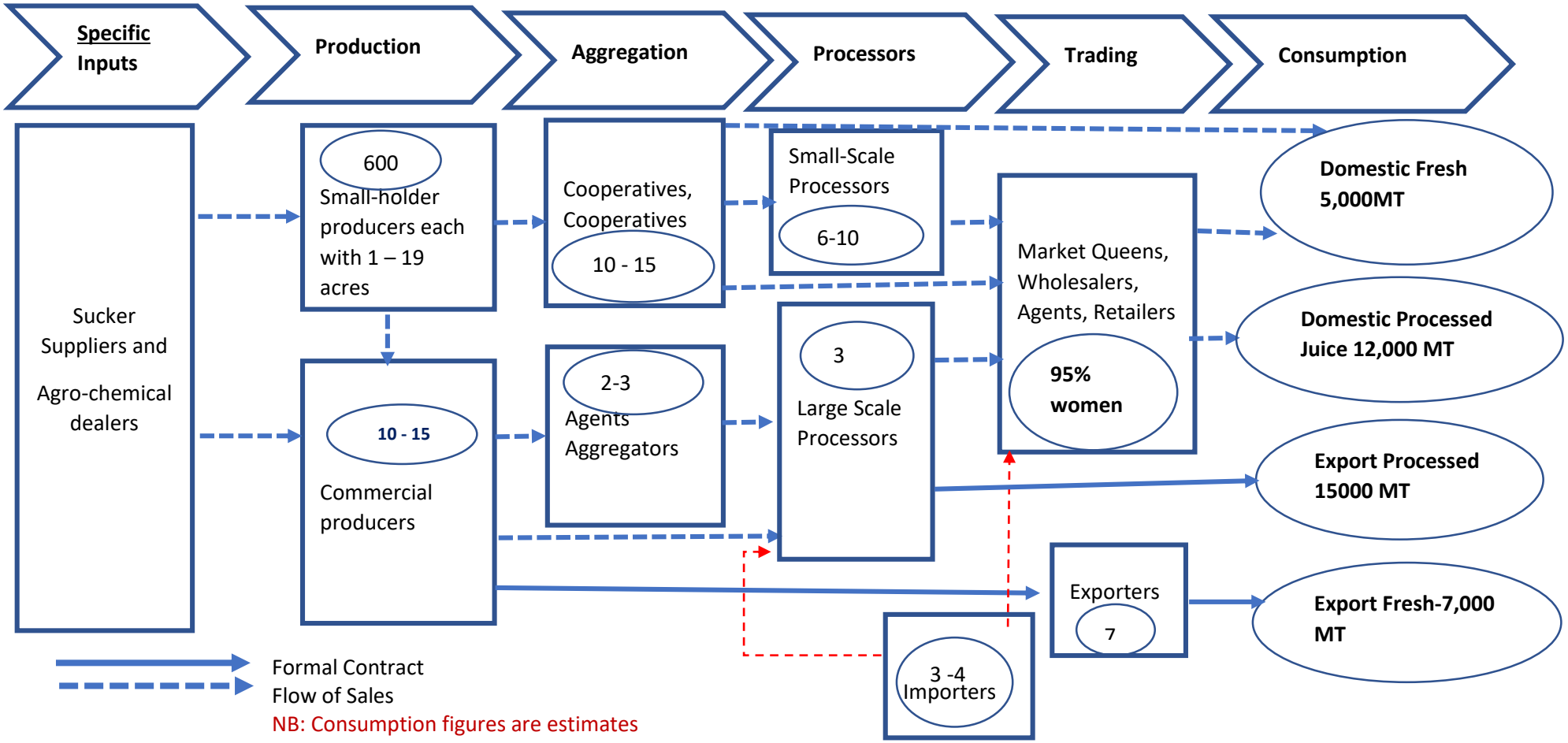

Figure 19: Cluster pineapple VC map

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1.5.1 Commercial-Scale vertically integrated producers

There are currently a few active commercial scale producers (10-15) within the cluster. These large scale producers are unable to produce enough fruits and sometimes have to source for extra fruits from smallholder producers to meet their export and processing orders. In the mid-2000s, these companies which numbered over 20 then, produced over 70% of their pineapple export needs on over 5,000 acres of land with up to 95% of area under cultivation being MD2 and 5% being smooth cayenne**.** Currently, only a few of these commercial farmers registered under the sea freight pineapple exporters of Ghana (SPEG) are in active operation. Their farm sizes vary widely from 20 to over 200 acres. They employ professional farm managers and supervisors, use machinery for land clearing and planting, and produce on irrigated land - a major requirement for MD2 cultivation.

1.5.2 Out-growers and organized smallholder farms

All the large-scale MD2 producers, processors and exporters including Prudent, Georgefield, Bomarts, HPW and Blue Skies have out-grower schemes connected to their farms. There are approximately 10 out-grower groups constituting about 20 farmers or more. Many of them are organized into producer cooperatives connected to at least one processor thus enabling them to obtain Option 2 GLOBALGAP and/or Fair Trade certification when this is possible and in demand. The out-growers receive MD2 suckers, technical advice and a market guarantee from the processors and exporters.

1.5.3 Non-organized Individual small and medium scale producers

A few small scale producers who are not part of organized out-grower or cooperative production schemes also exist in the cluster. They mainly produce Smooth Cayenne for supply to small - medium scale processors and fresh pineapple wholesale and retail markets.

The fruit processing firms in the cluster range from small-scale processors to state-of-the-art national and multinational companies identified by their sales, market size and distribution coverage. Some of the large-scale fruit processors in the cluster include Blue Skies, HPW, Bomarts, and WAD. These processing companies process the pineapple into fresh cuts, fruit juice and dried fruits. The large scale processors have stringent quality control protocols and they process to meet various certification requirements including ISO, GMP, HACCP as well as international CODEX ALIMENTARIUS.

Many small scale processors of pineapple on the other hand, do not have quality systems that are as stringent as the large-scale processors. Most of them have certifications from the Ghana Standards Authority and the Food and Drugs Authority respectively, and not the international certifications. They operate at the community level and do not have extensive distribution systems as compared to the large-scale processors. They usually target institutions and supply in bulk for ceremonies. Some small scale processors run table-top processing facilities in their homes and garages and they are mostly artisanal processors who supply in their vicinities, homes, restaurants and chop bars.

According to the Fruit Processors and Marketers Association of Ghana (FPMAG), pineapple fruit juice in Ghana has become popular and the demand is increasing on a daily basis. The domestic market for pineapple fruit juices has become so strong in recent times because Ghanaian consumers have increasingly appreciated the natural taste and health benefits of Ghana's own pineapple products. It is believed that fruit juices are the most consumed beverage next to water, however approximately 70% of these juice products are imported.

Pineapples are processed and exported as fresh whole, fresh cut, dried and juice. A number of small-scale pineapple juice processing firms have been established to take advantage of pineapples that are rejected for exports. However, some of the processing factories are currently not operating due to the lack of adequate pineapple fruits in the lean production season and they are sometimes compelled to source the fruits from Togo, Benin ad Côte D'Ivoire (Gatune et al., 2013). Processors currently have a high demand for downgraded produce from fresh exports of MD2, Smooth Cayenne and Sugar Loaf pineapples.

Blue Skies is the leading fresh cut processor in Ghana and the company supplies retailer-owned labelled products all over the world especially in the UK, France, the Netherlands and Ghana. HPW, Bomarts and WAD Africa are major processors of dried pineapple fruits. They source their fresh pineapples from their own farms and out-growers. As a result of the Government of Ghana's flagship industrialization programme "1 District 1 Factory", a number of new processing factories are springing up in the cluster area as well as outside the area. These up-coming industries will put more pressure on the raw material production capacities of pineapple growers in the cluster area and beyond. There are also several artisanal cut-fruit processors who operate in the local market. In the last 10 years, there has been a surge in fresh cut pineapple demand in most cities in Ghana. It is a common practice to see vendors selling fresh cut fruits at local markets, offices, on the street and at recreational centres. It is perhaps the fastest growing segment of processed fruit in the domestic market.

Fruit Processing (Mango and Pineapple) VC Map in the cluster area

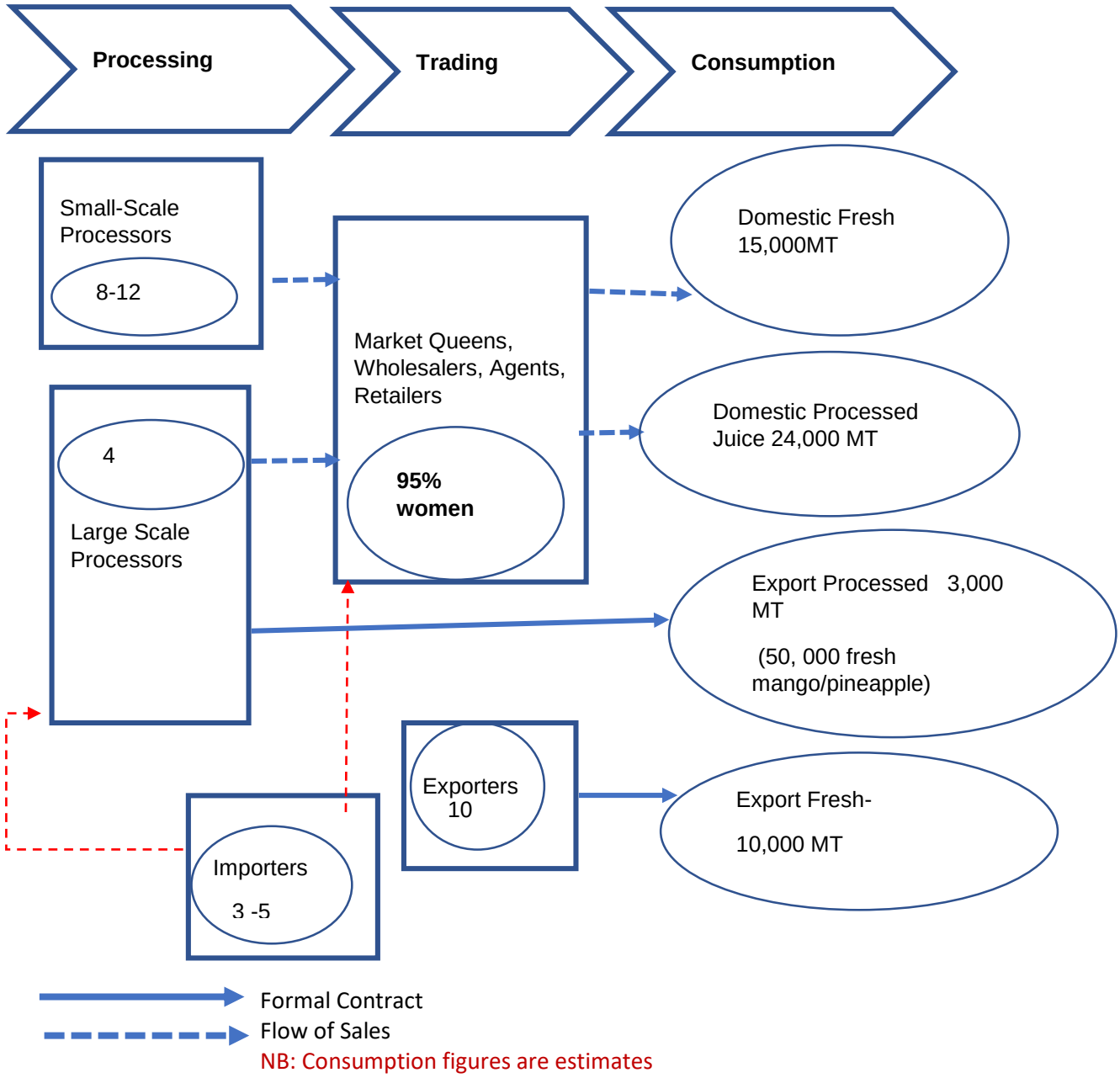

Figure 20: Fruit Processing (Mango and Pineapple) VC Map in the cluster

Dried Fruit Processing Flow (Mango/Pineapple)

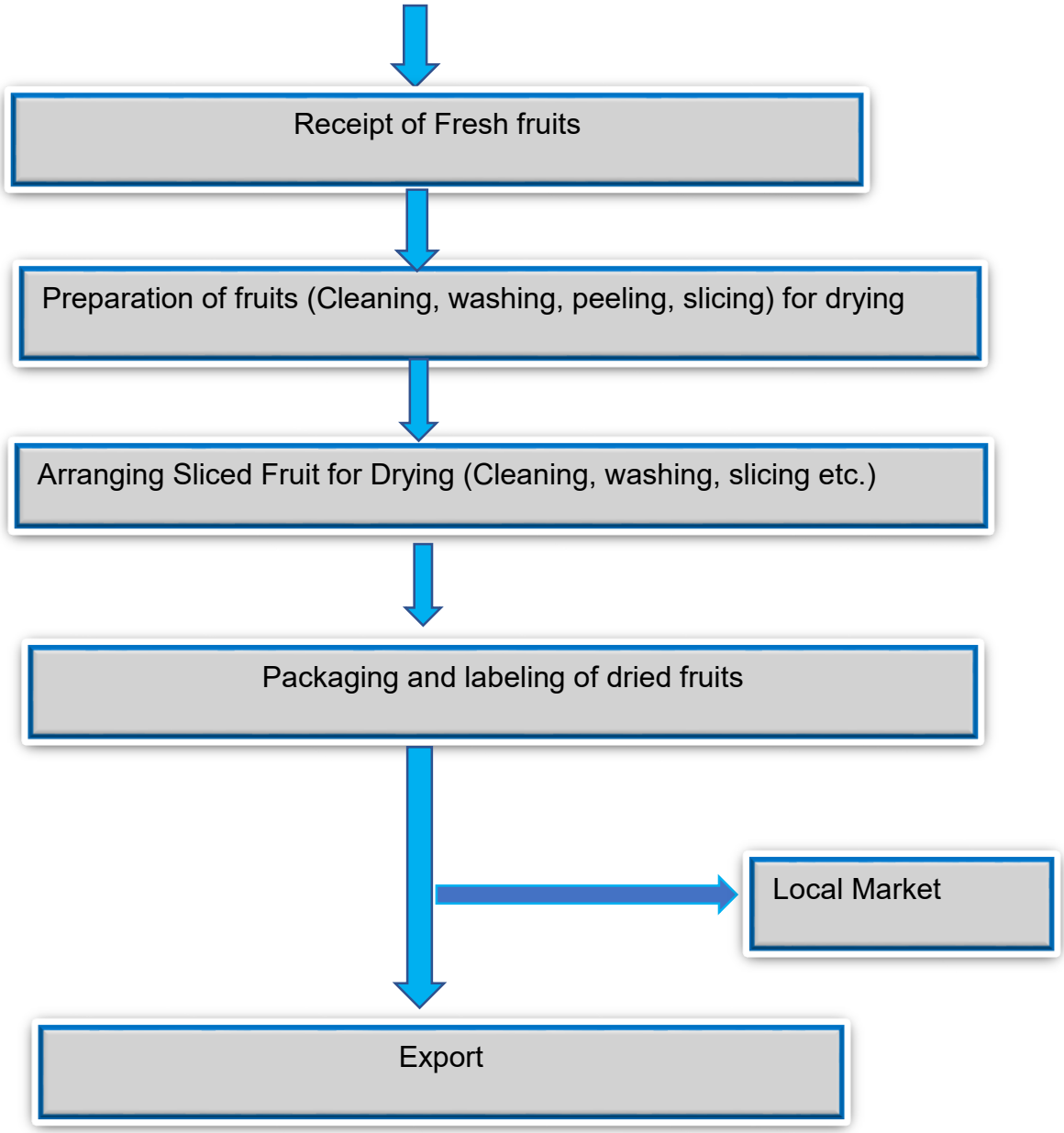

Figure 21: Mango/Pineapple Dried Fruit Processing Flow

Mango/Pineapple Juice Processing Flow

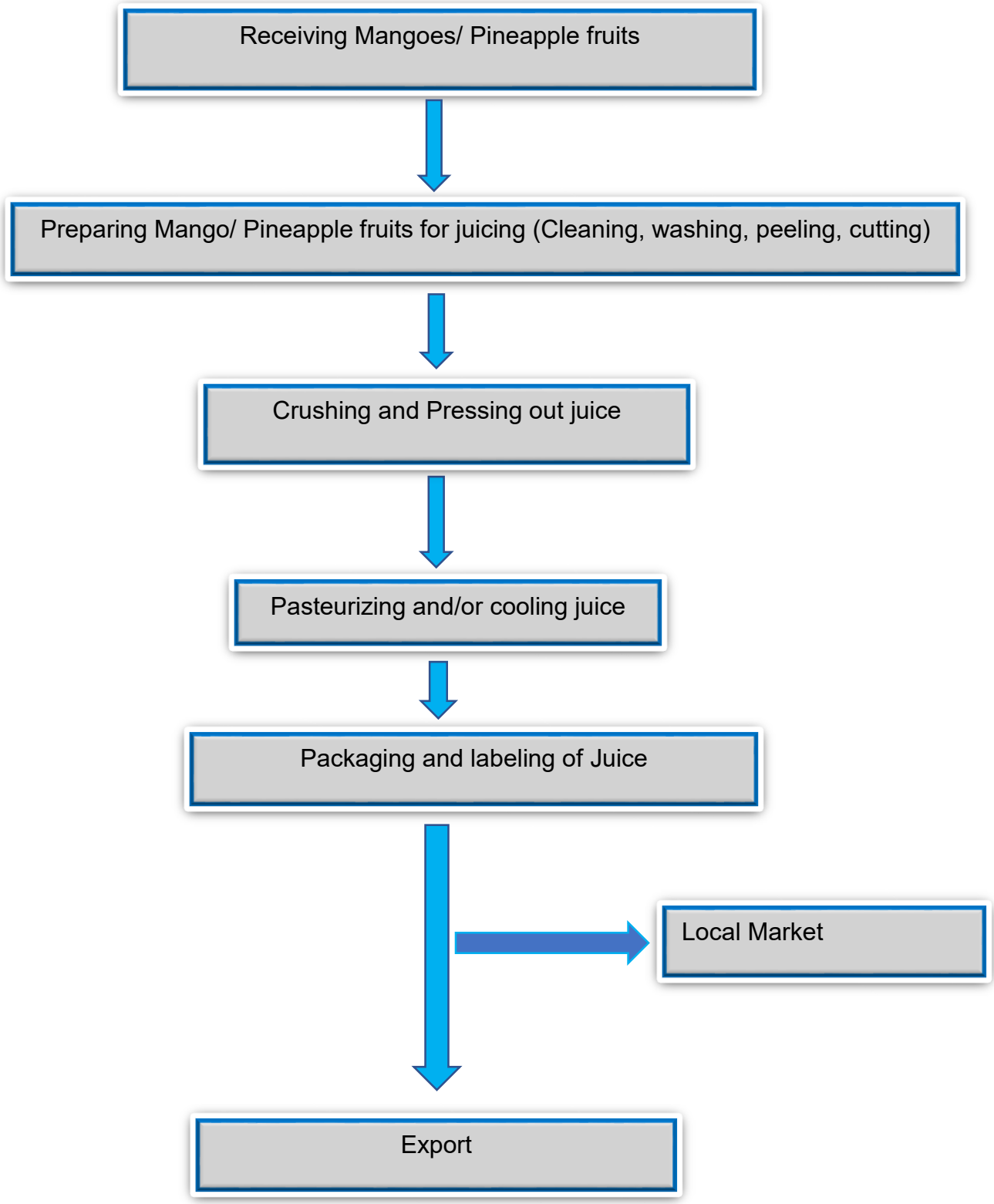

Figure 22: Mango/Pineapple Juice Processing Flow

Mango/Pineapple Fresh Cut Processing Flow

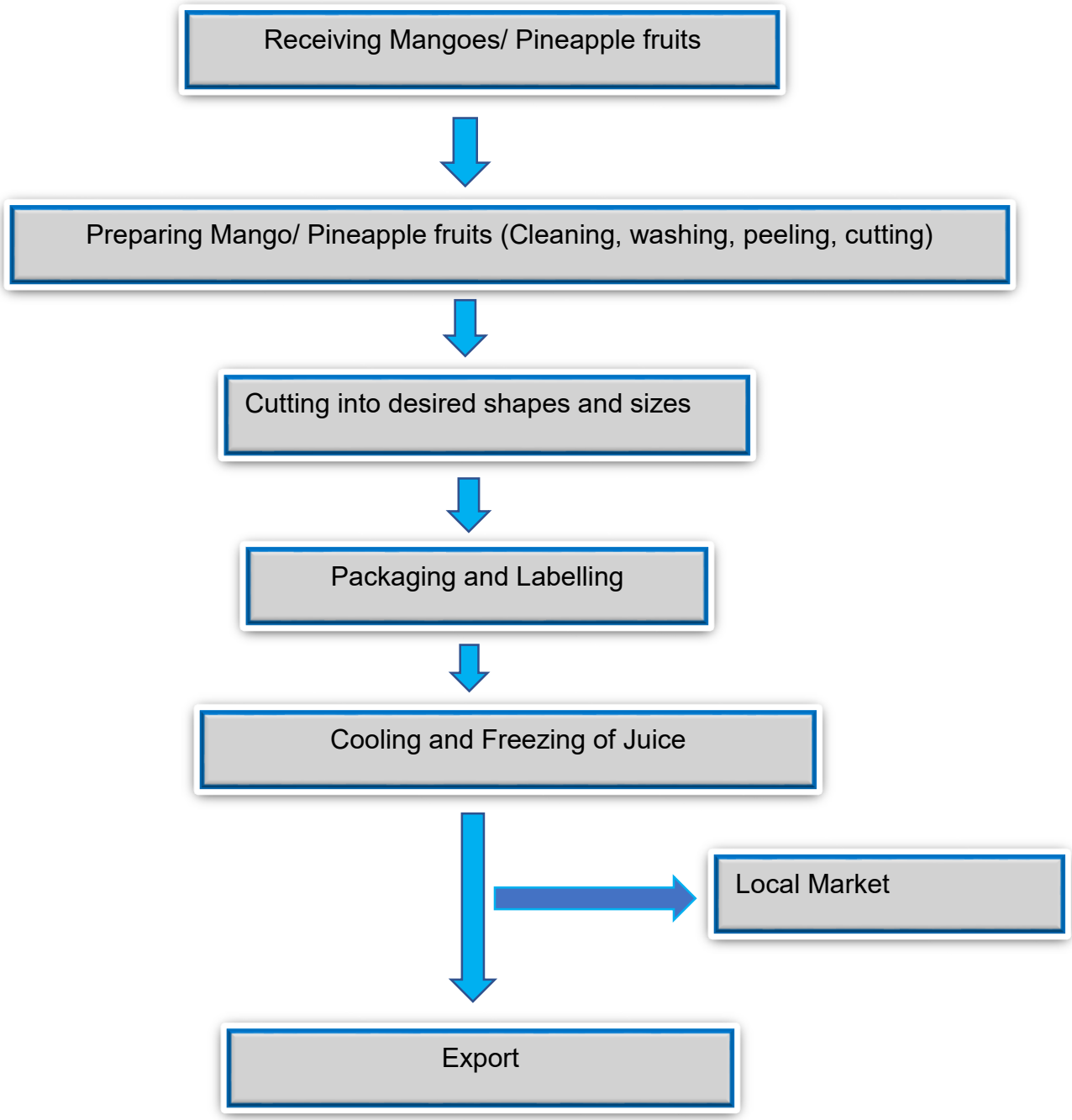

Figure 23: Mango/Pineapple Fresh Cut Processing Flow

Fruit Processing

Mango

Receiving mango Fruits for Processing

Preparing mango Fruits for Processing

Arranging sliced mango for drying

Packaged dried mango Fruits

Pineapple

Preparing for Processing

Fresh sliced Pineapple & Juice

Bottled Fruit Juice Products

Processed Dried Fruits

Processed Fresh cuts (Frozen cubes)

Figure 24: Fruit Processing (Mango and Pineapple)

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in 2018, the world pineapple market was estimated at US$2.1 billion. However, the value of global pineapple exports dipped by -7.8% from 2014 to 2015. There are 15 countries that exported the highest dollar value worth of pineapples during 2018 namely: Costa Rica - US$1 billion (49.6% of total pineapples exports), Netherlands with $207.2 million (9.9%), Philippines with $192 million (9.2%), Belgium with $108.4 million (5.2%), United States with $90.4 million (4.3%), Taiwan with $43 million (2.1%), Ecuador with $40.6 million (1.9%), Spain with $40.3 million (1.9%), Honduras with $32.2 million (1.5%), Mexico with $30.6 million (1.5%), Portugal: $25.6 million (1.2%), Germany with $22.8 million (1.1%), United Kingdom with $20.7 million (1%), Panama with $18.1 million (0.9%) and Italy in the 15th position with $16.8 million (0.8%). Ghana exported close to US$33million worth of pineapples at the end of 2018, with France emerging as the largest destination by far for Ghana (25.6% of all the pineapples exported by Ghana went to the French market). Ghana is the fourth (4th) largest supplier to France compared to dominant suppliers like Costa Rica, Cote d'Ivoire and Ecuador[14]. Figure 11 below depicts comparative pineapple exports globally.

[14] https://www.gepaghana.org/market-report/pineapple-in-france-competitor-report-2019/

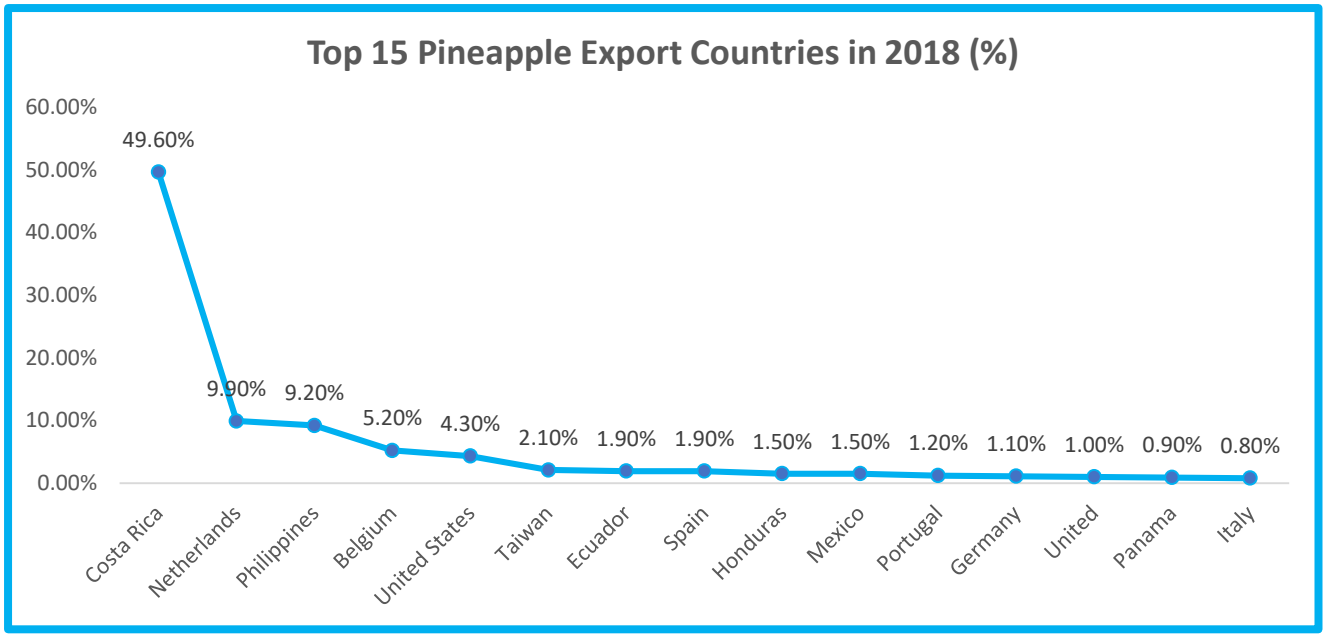

Figure 25: Comparative Pineapple Export (2018)[15]

1.7.1 Pineapple Production in Ghana

Pineapple is considered as one of the most important non-traditional agricultural export commodities in terms of volume and value in Ghana (GEPC, 2015). Between 2005 and 2014, pineapple production in Ghana covered approximately 10,000 ha. Production remained fairly constant between 2005 and 2010 - hovering around 50,000 to 70,000 tons. However, in 2011, Ghana experienced a massive 10-fold production rise from 50,000 to 550,000 tons due to production intensification, skills improvement, availability of suckers, adoption of good agricultural practices and market incentives underscoring the surge in production. Again in 2010, EOSAT BV of Netherlands sponsored by ICCO, initiated and supported a soil fertility improvement programme using high grade compost as basic ingredient for better growth and improved disease resistance. This boosted crop performance and increased productivity. There was a concomitant percentage increase in yield of 25.18% over the same period.

[15] Source: Vedat Kunt, 2020

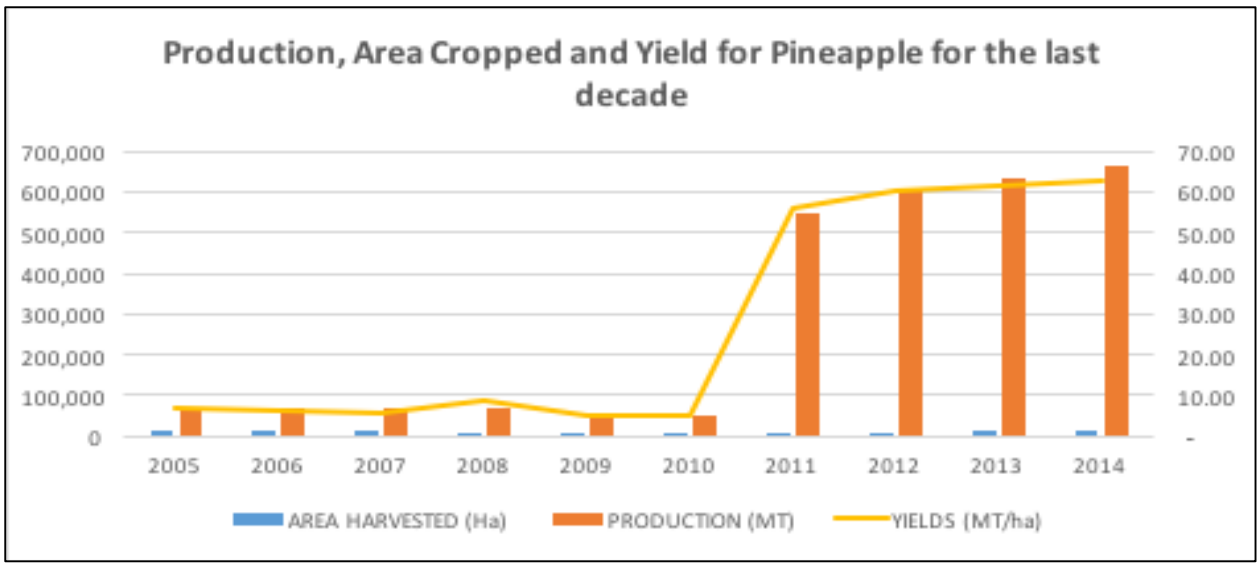

Figure 26: Trends of production, yield and acreage[16]

1.7.2 Pineapple Export in Ghana

Pineapples served as Ghana's entry point into the international horticultural market (Danielou & Ravry, 2005) and it has been one of the best performing horticultural crops in terms of foreign exchange earnings for the Ghanaian economy. Available data from the Ghana Export Promotion Authority (GEPA) shows that between 1990 and 2013, pineapples cumulatively contributed over USD 283,000,000 in foreign exchange to the Ghanaian economy (GEPA, 2015). Ghana's exports of pineapples to the world stood at US$33m at the end of 2018. The Country exported US$30.3m and US$36.9 in 2016 and 2017, respectively. Almost 79% of the total exports of pineapples from Ghana went to the EU market. France absorbed close to 26% of the total exports in 2018.

Ghana's[17].

[16] Production, Area cropped and Yield for Pineapples in Ghana (2005-2014) FAOSTATS 2017

[17] https://www.gepaghana.org/cms/wp-content/uploads/2020/03/Competitor-report-for-Pineapples-in-France-2.pdf

Cluster	National
600 smallholder pineapples producers, 3 commercial pineapples producers, 9 Cooperatives (Making QualiPine) and Other pineapples Cooperatives	2,000 smallholder producers, 23 commercial producers, 21 Cooperatives
5 Aggregators, 7 Small-scale Processors (Mango and Pineapple), 4 medium- Large Scale Processors (Mango and Pineapple)	40 Aggregators, 25 Small-scale Processors, 5 Large Scale Processors, 23 Exporters ,
10 Exporters, 6 Importers, domestic fresh market consumes 15,000 MT (mango and pineapple)	13 Importers of pineapple in Ghana, domestic fresh market consumes 42,000 MT,
Processed Juice consumed locally 24,000 MT Export Processed 3,000 MT (50, 000MT fresh mango and pineapple)	fresh processed 126,000 MT Export processed 12,000 MT
Export Fresh - 10,000 MT (mango and pineapple)	Ghana's fresh pineapple export stood at 21,000 MT n 2016

Table 14: Summary National Scenario (Comparing Cluster with National)
Source: [18]

[18] Production, Area cropped and Yield for Pineapples in Ghana (2005-2014) FAOSTATS 2017

Ghana	World
Ghana ranked 3rd in yields (63mt/ha) for pineapple production in the world after Indonesia (114.7mt/ha) and Costa Rica (63.4mt/ha)	World pineapple market was estimated at US$1.7 billion in 2015
Ranked 8th in 2015 among countries that exported the highest dollar value worth of pineapples (CBI, 2016).	Global pineapples exports dipped by -7.8% from 2014 to 2015 European market share was 23.5% followed by Asia 9.5%,
In 2014, Ghana's yield is 6-7% higher than its competing neighbouring such as Cote d'Ivoire and Benin	North America 8.2% as Africa accounted for 4.4% of international pineapples sales.
Between 1990 and 2013, pineapples cumulatively contributed over USD 283,000,000 in terms of foreign exchange to the Ghanaian economy	Latin America (excluding Mexico) and Caribbean countries accounted for the highest dollar worth of pineapples
Ghana's Pineapple exports declined in value from $19,208,877 in 2013 to $17,960,113 in 2014 but soared to US$75,853,670, indicating a 322% rise, in 2015	Exports during 2015 with shipments valued at $934.3 million or 54.5% of global pineapple exports.

Table 15: International Scenario (Comparing Ghana with Global)
Source: [19]

[19] Production, Area cropped and Yield for Pineapples in Ghana (2005-2014) FAOSTATS 2017

1.8.1 Analysis of Pineapple Production in the cluster

Below is results of the analysis of focus group discussions, interviews and consultations with nine (9) cooperatives in the Nsawam-Aburi-Adeiso pineapple production cluster. Eight (8) of the cooperatives have organized themselves into an umbrella union called QualiPine (Quality Pineapple).

Gender of Workers

The respondents indicated that they only employed temporary workers in all the cooperatives with more males being employed than the females. On the average, male workers made up 72.26 percent of the workforce with the remaining 27.74% being female.

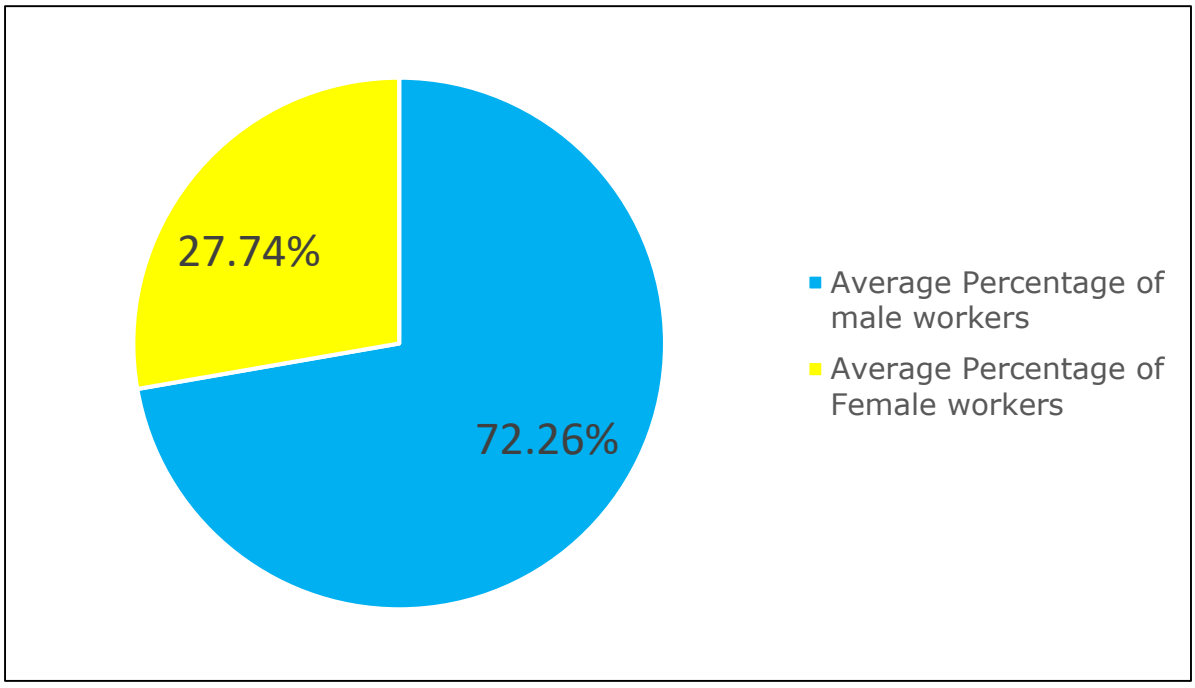

Figure 27: Percentage of Male verses Female temporary workers[20]

[20] Estimates by Consultant from field data

Average annual Turn-over over the last 3 Years

The average turnover for all cooperatives increased significantly from 2017 to 2018 but stayed relatively constant between 2018 and 2019. The average turn-over remained stable from 2018 to 2019 as can be seen in the graph below.

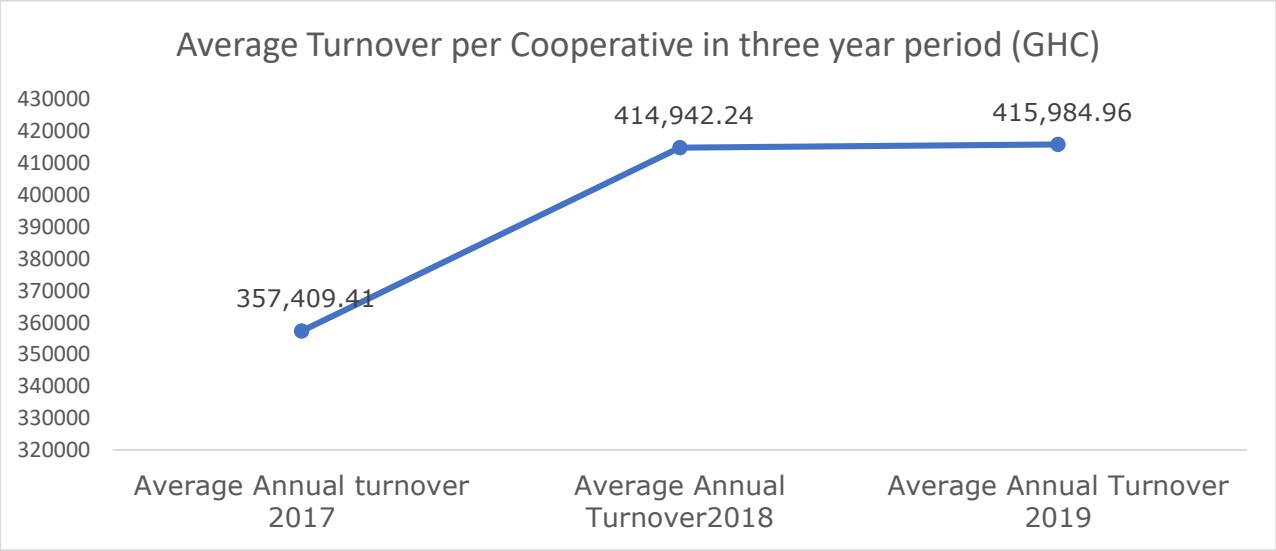

Figure 28: Average Turnover per Cooperative (GHC) for the past 3 years[21]

Certification

Only one out of the 9 cooperatives currently has a certification – a Fair Trade certification. However, they all indicated that they were previously certified with Seven (7) of them representing 70% having been certified by GLOBALGAP whilst two representing 20% were certified by Fairtrade and one representing 10% was by Green Label. This is shown in the pie chart below.

[21] Estimates by Consultant from field data

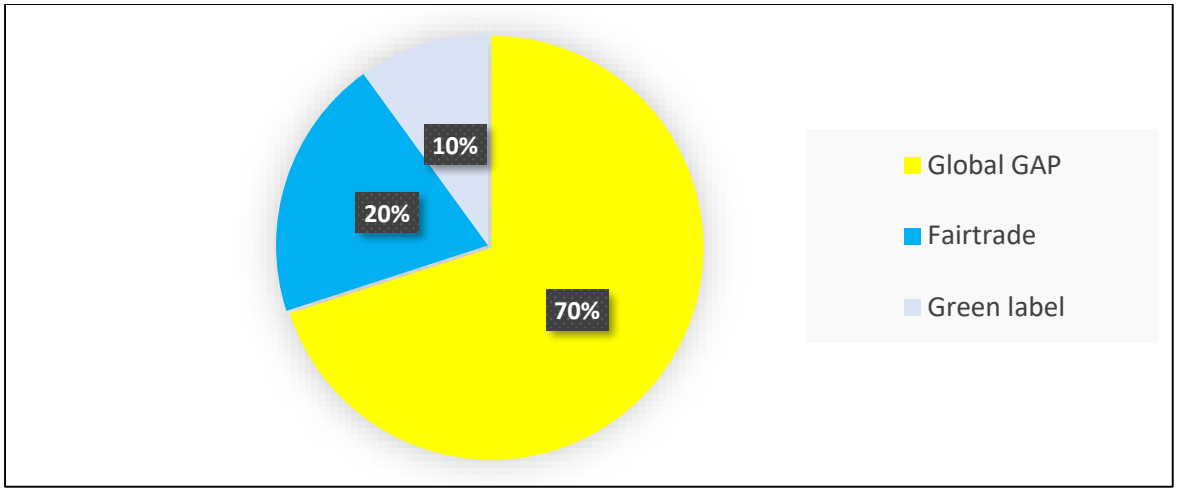

Figure 29: Number previously certified[22]

Two main reasons were given for their inability to continue with certification:

- lack of funds to continue paying for the yearly audit; and
- their inability to pass the audit.

One respondent indicated that the audit had taken them by surprise while 66% cited financial constraints. The remaining 33% cited their inability to pass the audit.

Services provided by cooperatives

All the respondents belong to cooperatives and the services received from these cooperatives include:

- Technical support and field visits
- Trainings in Good agricultural practices, Marketing, Block farming, Farm hygiene, Herbicide application, Records keeping
- Access to inputs and output markets and
- Bulk purchase/hiring of inputs and farm implements

[22] Estimates by Consultant from field data

- Networking and Welfare for members
- Access to market information
- Access to Loans, grants

These services were largely rated as good by the respondents.

Buyers of Farmers produce

The cooperatives have three main buyers for their produce namely:

- Large processors – who purchase 82% of produce and are the largest buyers.
- Small and medium scale processors purchase 6% and are the smallest buyers.
- Local market women are the second largest buyers purchasing 12% of the produce.

None of the respondents indicated that they had recently sold directly to exporters. The different buyers and the percentages of those who buy from the cooperatives are shown below in the pie charts.

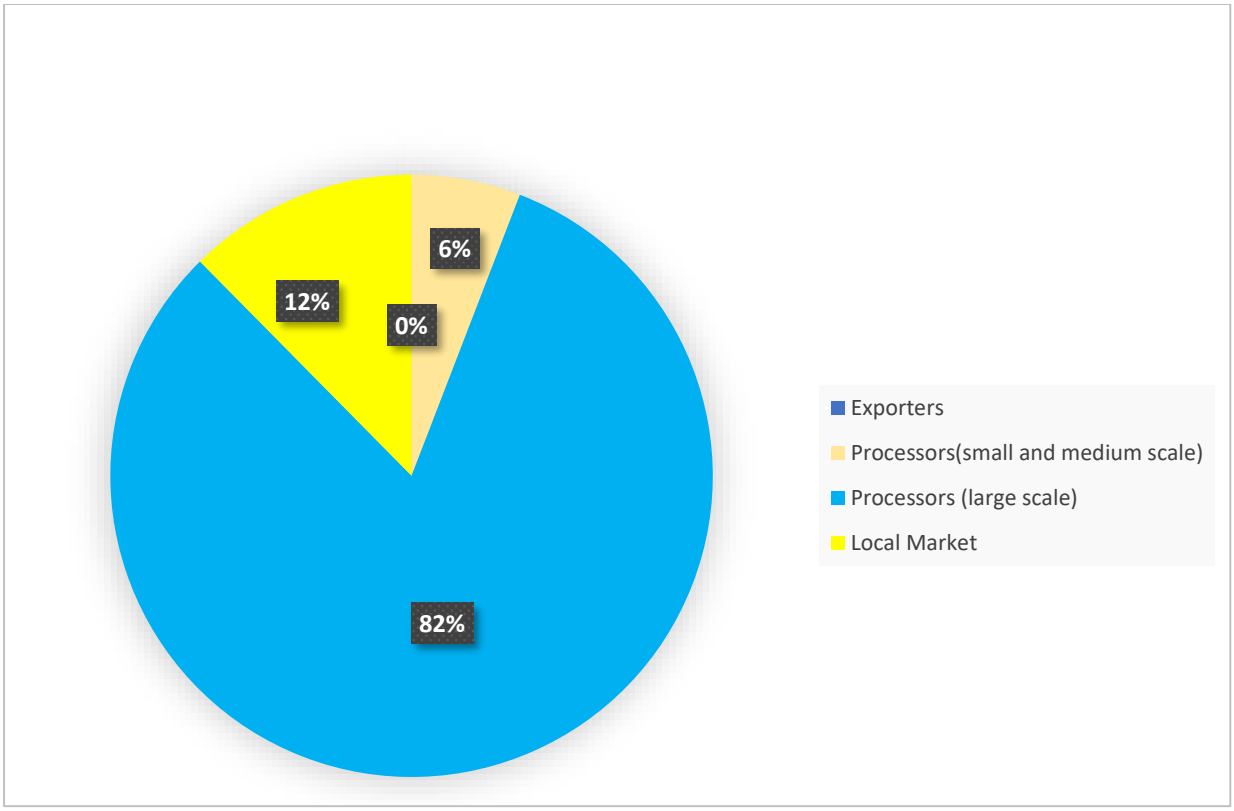

Figure 30: Percentage Sales to different types of buyers[23]

Marketing

All respondents cited referrals as their sole mode of marketing. None used business cards, trade fair exhibitions, banners and sign boards, television or any other form of marketing for promoting sales of their produce. Only a third (33.3%) did not consider marketing as a problem with 66% saying that marketing was a problem.

Sources of market information

The sources of market information as cited by respondents include:

- Media publications
- Exhibitions

[23] Estimates by Consultant from field data

- Processing companies
- Networking with other agencies
- MOFA, cooperative groups and farmer networks
- Local market women

Competitors

Respondents outlined those they considered as competitors on a global, regional and local level. Cost Rica and South Africa are considered as their global competitors. On the regional level, Cote D'Ivoire, Togo and Benin were as considered. Local competitors included Blue Skies, Bomarts, HPW, Billy Farms and Koranco Farms. These processors and exporters are considered competitors because they also produce pineapple on their own farms. This result cut across for all the respondents.

Loans

All the respondents said they needed loans to enhance their businesses and they cited two reasons for it:

- To expand their farms and increase production (eight respondents)
- To mechanize their farming business (one respondent)

Problems with accessing Loans

Respondents cited two main problems associated with accessing loans namely:

- The lack of collateral as demanded by financial institutions.
- High interest rates on the Loans.

Financial management plan

All the respondents indicated that they had financial management plans because they had undergone training in QMS as part of the preparation for certification. Only a third of respondents i.e. 33.3% were aware of support/incentives schemes offered by public institutions. They were aware of the following credit incentive schemes/ institutions:

- Exim bank
- Government fertilizer subsidy
- Municipal assembly common fund

Problems related to existing Policies

In response to the question 'what do you perceive as the major problems related to existing policies and regulations?', the respondents mentioned the high cost and taxes on farm inputs.

1.8.2 Analysis of Processors in the cluster

This analysis is based on data collected in an interview with a sample of the fruit (mango and pineapple) processors in the Eastern and Greater Accra region cluster.

Employee categories by gender

Three small/medium sized processing firms were interviewed and they had a combined staff of 51 employees made up of 12 technical staff, 7 administrative staff, and 32 assistants. Twenty-five workers representing 49% were male and the remaining 26 representing 51%, were female. The breakdown of staff is visualised in the bar chart and table below:

Staff category	*Male*	*Female*	*Total*

Technical Staff	*8*	*4*	*12*
Administrative Staff	*1*	*6*	*7*
Assistant/Practice	*16*	*16*	*32*
Gender	*25*	*26*	*51*

Table 16: Employee categories by gender
Source: [24]

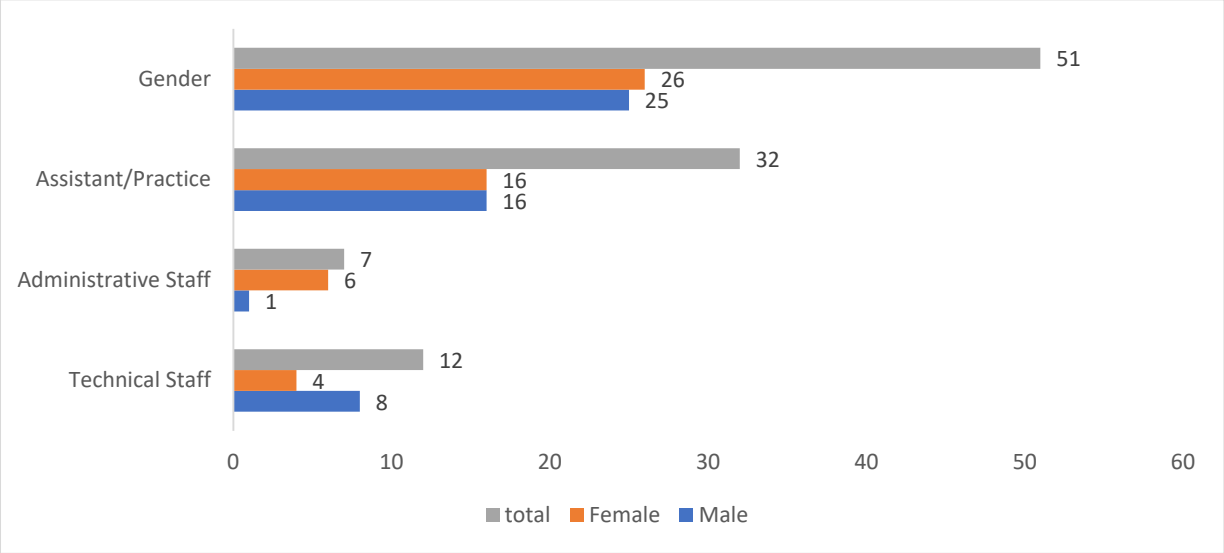

Figure 31: Employee categories [25]

Calibre of staff

With the exception of one processor who provided response and indicated that they were satisfied with the calibre of labour on the market, none of the respondents provided any information on this. The processor attributed the satisfaction to the high number of University graduates searching for employment. Additionally, only one of the three processors was found to have received technical training on their products.

Technical training received include:

[24] Estimates by Consultant from field data
[25] Estimates by Consultant from field data

- The AfCFTA and business without borders - the game changer
- Strengthening Ghanaian industries for Global competitiveness
- Building production capabilities of SMEs under the Ghana Business Linkage Program
- Industrial Projects funding and cost saving strategies

Training Needed

The respondents also indicated some topics they will need training on as well as the organizations they believed would be most suitable to provide such training:

- Hazards Prevention and First Aid to be provided by the Red Cross
- HACCP to be provided by the Ghana Standard Authority
- FSSC 22000 to be provided by Ghana Standard Authority
- Food Safety to be provided by Ghana Standard Authority
- FDA Registration by FDA
- Advanced Farm knowledge
- Good manufacturing practices
- Tractor Training

Sources of Supply

All processors had farms that supplied them with raw materials. As much as 65% of the supplies were sourced from the processors' farms. The sources and corresponding average percentages are outlined below.

Own farm	60%
Individuals	8%
Aggregators	2%

Cooperatives 30%

Issues with supply of raw materials

The main issue with the supply of raw materials was the seasonality of mangoes. Processers complained that the supply was not all year round and there were also long periods within the year when there were no mangoes to process. The second issue was quality-related attributed to the fact that not all farmers used Good Agricultural practices. The cost of raw materials was also a major issue.

The main equipment used by processing factories included: Dryer; Chiller; Pulping Machines; Tractors and Spraying Machines. These equipment were mainly purchased in the USA and Europe. The processers rated their equipment as "mainly not good" or "barely average" because they lacked the capacity to produce on an industrial scale due to the small capacities of their equipment.

Sources of Information and market promotion methods

The sources of information as stated by the respondents included the Internet, Media, friends and family members. The processors also mentioned the use of personal contacts, Trade Fairs, Social media and Banners as methods for effectively promoting/marketing and sale of their products. The graph below shows the various ways products are promoted. It is interesting to note that the processors do not use traditional media (Television or Radios or Newspapers) at all. Personal contacts and Trade Fairs were the most used forms of promoting products.

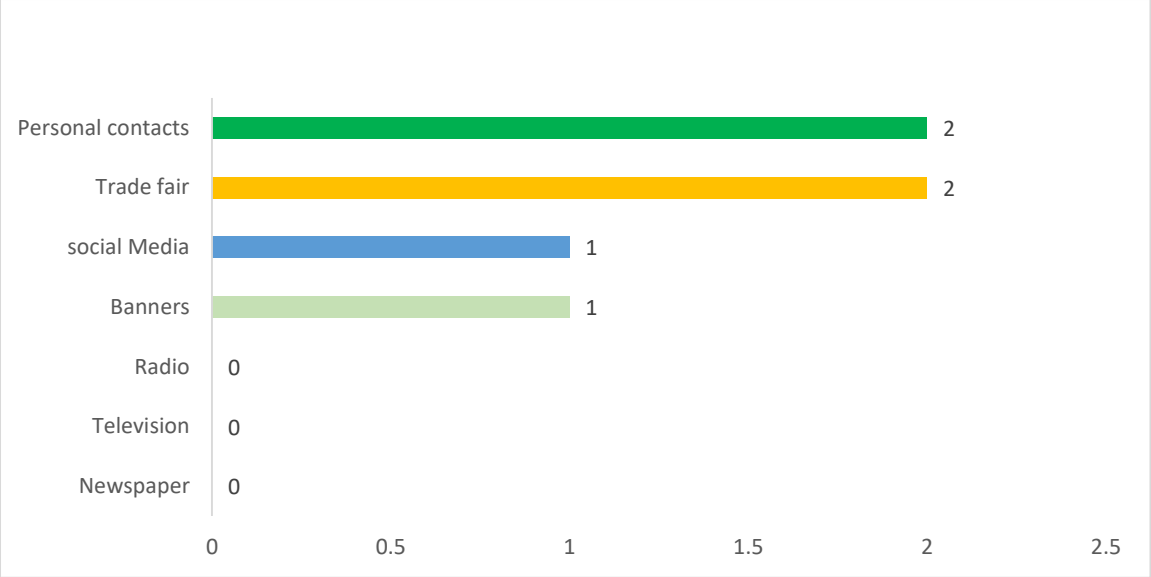

Figure 32 : Methods of promoting the marketing of processors products

Issues for competitiveness

- **Price** – Larger processors that the smaller processors supply to offer very low prices for the products because of the glut in the system during peak season.
- **Quality** – The quality of products taken in by larger processors are often reduced due to delays in the intake.
- **Sales** – There are no sales networks therefore larger processors have a strong hold on the market.
- **Location** – The road networks to factories and farms are usually not in very good condition to transport the products.

Managing waste

The two main forms of handling waste mentioned by participants were:

1. Converting waste into compost for use on the farms.
2. Disposal into bins that are collected by waste management companies.

Improving Productivity

All participants cited the expansion of current equipment as the number one way for improving productivity. Other ways mentioned include a packaging and labelling print equipment, Capital to increase the number of staff, developing solar energy equipment built facility on farm and Training of high technical skilled staff. All respondents rated their level of awareness and understanding of Occupational Safety and Health (OSH) management systems as the medium. Only one participant stated that they were aware of programmes for creating awareness and providing training and information for private enterprises and other OSH activities.

Sources of Capital

The number one source of capital was owners' equity (50%), followed by Family and Relations (33%) and Bank Loans (17%). This is displayed below in the pie chart.

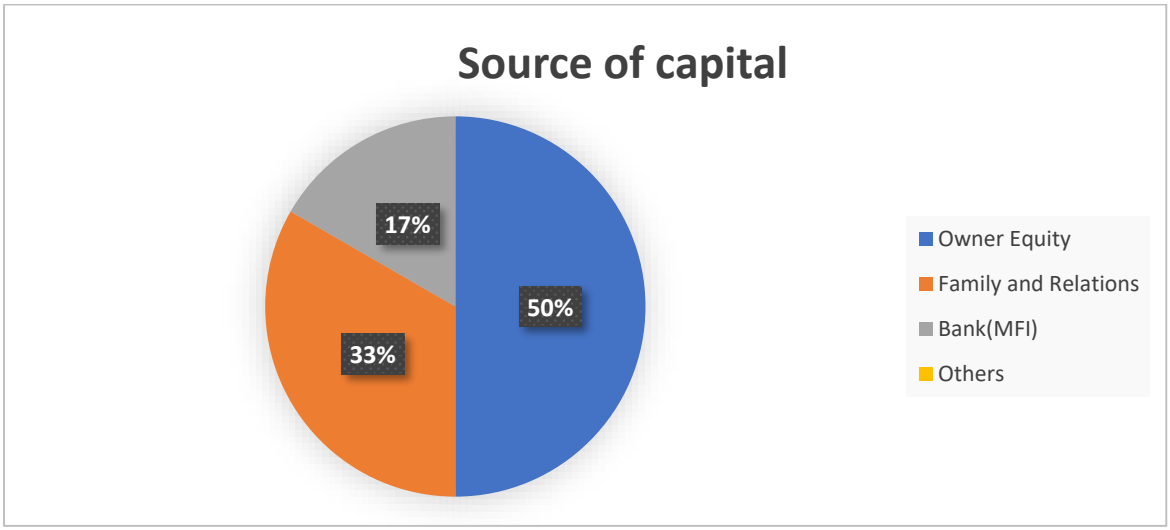

Figure 33: Sources of Capital[26]

Loans

All respondents indicated that they would be interested in accessing loan facilities to either expand drying facilities and marketing; Increasing sales network; Establishing all-purpose built structures that will help to increase processing efficiency; as well as investing in the

[26] Estimates by Consultant from field data

employment of skilled staff. However, the challenges with accessing Loans as mentioned by the respondents include High-interest rate, Lack of collateral, and the long and cumbersome loan processing procedures. All respondents were aware of support/incentives schemes offered by public institutions that they might qualify for.

Future expansion plans

All respondents indicated that they wanted to expand in the following areas: Capacity expansion; Machinery & Equipment; Sales Promotion; and New product Lines.

Membership of Cooperatives

Only one processor indicated that they belonged to an association with some of the benefits derived being Market Linkages, Sales promotion, Group Advertisement, Business Information, Training, Government Policies, Technical and financial management training.

Recommendations on how to improve association to be effective

1. Contribute percentage sales to finance the association.
2. Promotion of democracy in the election of officers.
3. Encourage all out-grower farmers to join the Association as associate members.

Large Scale Processors

There are several pineapple processors in Ghana especially within the cluster under study although only a few of them are nationally and internationally recognized. These processors include HPW, Bomarts, Blue Skies and Golden Fruits.

Pineapple is a year-round crop and cultivation throughout the year is based on demand. May – June is the major season for the cultivation of the crop and prices are relatively low during this period. December - January is the minor season for the crop where prices of the produce are fairly high. Nonetheless, because of the practise of 'forcing', the fruit can be made ready for the market at any time of the year. In the major season and depending on size of the fruit, prices range from 50p to 80p at the farm gate, whilst during the minor season, prices range between GH¢1.00 and GH¢ 1.50 at the farm gate.

The gross margin below was been calculated using data generated from interaction from operators in the fields in and outside the cluster area. On an acre basis, an investment of GH¢ 10,730 is required to produce 26,000 to 30,000 pieces of pineapple. The cost of the suckers account for 28% of the total production cost. A total amount of GH¢ 3,880 is required for agro-inputs (representing 38% of the production cost). At the farm gate price of GHC0.8/kg and an effective output of 19,000-23,730, the gross margin for an acre of pineapple farm is estimated at between GHC 4,470 - 8,270 representing 41% and 77%. The table below shows the summary of the economic analysis in the cluster.

Main Season (GHC)	Price Range: 0.50 -0.8
Minor Season (GHC)	Price Range: 1.00 -1.50
Investment Required (GHC)	10,730
Expected Yield	26,000 - 30,000 pieces of pineapple fruits (Av, weight of 1.2-1.5KG)
Cost of Suckers	28% total cost

Agric-Inputs Cost (GHC)	GHC3,880 (38% production cost)
Gross Margin (1 acre)	
Unit price per kg	GHC 0.8/kg
Effective Output (Pieces)	19,000 - 23,730
Margin	GHC4,470 - GHC80,270 (41% to 77%)

Table 17: Economic Analysis Summary

Source: Field study estimates

The pineapple value chain operators in Ghana as well as in the cluster, consider Costa Rica as their most important global competitor. An analysis of the competitive advantages between Ghana and Costa Rica is presented as follows:

2.2.1 Competitiveness of Ghana and the cluster area

Heavy rainfall in Costa Rica caused devastation to their plantations in 2015 resulting in a decline of their export volume to the global export market and a consequent shift in demand from Ghana. This occurrence presented a bright opportunity for Ghanaian pineapple producers to increase their production and output to feed the demand-supply gap. The situation stimulated the establishment of huge processing facilities in Ghana with high intake capacities to accommodate the growing opportunities.

Ghana has a competitive advantage in supplying pineapples to the Netherlands, which is one of the biggest export destinations for pineapples, since it takes 16 days from Ghana to the Netherlands by sea, as compared to 21 days from Costa Rica. According to a news report [27], a

[27] www.citibusinessnews.com

new airline (Air France) that started operations in Ghana in March 2017, disclosed their commitment to facilitate the swift export of fresh agricultural produce from Ghana to Europe in the short to medium term. This dedicated route for pineapple exports presented a competitive edge for Ghana over its competitors on the pineapple export market since the EU market is the largest importer of pineapples from Ghana. A summary of Ghana's competitiveness against its major competitor (Costa Rica) is presented in table 6.

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Components	Indicator	Costa Rica	Ghana
Production			
	Strength	Large multinational firms with commercial farms; state of the art production technologies and highly skilled personnel. Full complements of production logistics, service provision and relatively cheap financing. Production is mainly under irrigation. Fully funded research support and a strong relationship between research and industry. Has a national strategy to strengthen responsible production and trade	Efficient and vibrant producer Cooperatives. Different climatic conditions favour the production of different pineapple varieties. Growing domestic demand and processing opportunities
	Weakness	One type of climatic condition limiting the production of different varieties	Small farm sizes, fragmented farms, Labour intensive, high production costs and weak linkages with research; high cost of borrowing
Product	Strength	High-quality product, consistent supply; excellent product presentation	All varieties have a sweet taste which is gaining preference in the international market; pineapples known as the golden fresh pineapples.
	Weakness	MD-2 still most popular but decreasing because of taste	Lack of consistency with different quality fruit, poor packaging
Export Marketing	Strength	Mainly via the Netherlands, and more direct to UK, Spain, Italy; well-developed shipping logistics; economies of scale, aggressive promotion in Europe strong export Cooperatives; dedicated vessels for pineapples; skilled personnel	Proximity to the EU and the history of trade relations with Europe. Increasing export of value-added (e.g. dried) pineapple Ship more directly to the UK, France and Italy

		Collaboration with importers & able to sell to supermarket	Ability to sell via smaller importers and wholesalers
	Weakness	Germany has a big market but Costa Rica does not export directly to that country	High freight cost; shipping delays; Exports via Belgium and Netherlands. Limited diversification
Buyer Requirements	Strength	Has the ability to comply with most buyer requirements including Organic, Fair Trade, BRC Most exporters are able to meet delivery schedules. Delivery in large volumes only Sea freight 16 – 20 days. Close and regular communication with customers	Able to meet some of the buyers' requirements. Smaller volumes possible. Sea freight 10 – 15 days, Air -freight direct flights.
	Weakness	Some issues on bad labour conditions on a few farms	Exporters struggle with strict EU requirements. Sometimes poor packaging materials and lack of adherence to total quality assurance protocols. Delays in delivery and cold chain problems. Lack of the staff for customer service
Price Level	Strength	Reasonable fixed prices (economies of scale)	Competitive prices for air freight pineapples
	Weakness	Bad weather conditions can drive up cost and prices	High prices due to intensive labour and poor handling

Table 18: Comparative analysis between Ghana and Costa Rica
Source: [28]

[28] Estimates by Consultant from field data

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2.2.2 Competitiveness of Costa Rica

Costa Rica supplies about 84% of the EU fresh pineapple market with the MD2 variety. It is the lead exporter of pineapples in the world with the productivity of about 63.4tons/ha and a dollar value worth of US$821.9 million in 2015.

Del Monte Company in Costa Rica introduced and promoted the MD2 variety unto the world market, driving international demand for the variety to date. Costa Rica, therefore, benefits from economies of scale producing MD2 for a market dominated by that variety. Large investments have been made into technology, packing, logistics, market research and campaigns that enable them to meet the increasing buying power of EU supermarkets, with whom they have fixed contracts. Costa Rica enjoys more economies of scale by also supplying North American markets (US and Canada) as a result of their proximity. In addition, the multinational pineapple plantations in Costa Rica have their own trucking companies, distribution and ripening centres. This integrated supply chain allows them to have total control over the supply of fresh pineapples to overseas markets.

It was reported that approximately 70% of workers in the Costa Rican pineapple industry are Nicaraguan migrants. These migrant workers are the secret to Costa Rica's pineapple success - providing cheaper and more flexible workforce. This cheap labour has great effect on reducing production cost hence it gives the country a competitive advantage in production. Reports suggest that there are dedicated sea-freight and air-freight that conveys Costa Rican pineapples daily, with Maersk Line alone shipping 130 containers of pineapples weekly. These factors among others, arguably, give the country a competitive advantage in the production and trade of pineapples across the globe.

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Flow Chart: Value Addition in the Cluster -

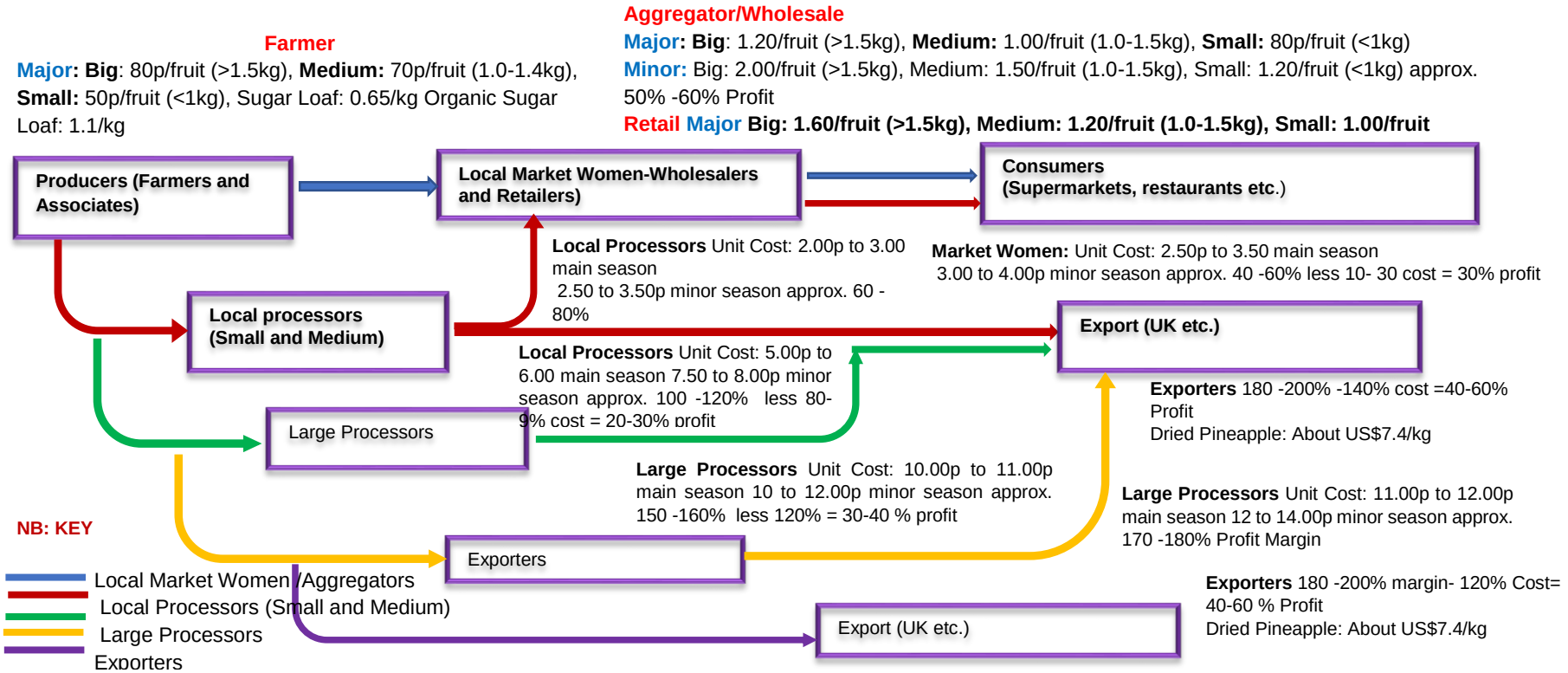

Figure 34: Value Addition in the Cluster-Flow Chart[29]

[29] Estimates by Consultant using field data, 2019

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Market Queens/Agents/Aggregators, Processors, Wholesalers, Retailers and Exporters are the primary actors involved in trading fresh, juiced, fresh-cut and dried pineapples. The relationships among these actors are described below.

Trading of pineapples in Ghana happens at the local, regional and international levels.

Input dealers sometimes serve as extension officers, providing information on the safe and right chemicals and application methods. Depending upon the relationship with farmer or grower associations, input dealers may provide agrochemicals on credit to farmers to be repaid after the harvesting season.

There are formal relationships between producers and large-scale processors, which mostly entail contractual arrangements with out-growers or nucleus farmers. Factors considered in such contractual arrangements include quality standards, volumes, supply schedules and sometimes prices of produce to be traded. Within the trading arrangement, processors provide trucks and sometimes cold vans to transport pineapples from producers to their processing facilities. Some processors may pre-finance the harvesting as well as certain key operations required by the producer. The companies also invest in the capacity building of producers and work with other value chain facilitators (e.g. MOAP, MOFA) to provide technical training. The relationship between the producers and the medium to small scale processors is largely informal with no contractual agreements. These processors can do a walk-in to purchase any

quantity for processing with the exception of a few who maintain their relationship and sometimes provide pre-financing to support harvesting operations.

Most commercial producers double up as exporters of fresh pineapples. These commercial producers have out-grower networks with whom they have formal contractual arrangements and provide them with technical capacity building, pre-financing arrangements and assistance. In certain instances, they source produce from other smallholder producers (not under contract) to augment export volumes.

Trade between farmers and aggregators, agents and market women are mostly informal and unorganized. Trade at this level which normally end in the domestic market is ad-hoc and unsegmented in nature. With the exception of relationships with well-established supermarkets and government institutions, there are no binding contracts and products are sometimes purchased on credit. Aggregators/Market Queens may provide credit to smallholder unorganized producers to fund pressing needs. In return, the smallholder producers may dedicate part of their farms to the Aggregators/Market Queens to harvest produce based on agreed amount to be paid for credit extended.

The domestic fresh market gets its supply mainly from market queens and agents/aggregators, whiles the domestic processed market is supplied by wholesalers, agents and retailers of processed fruit. The domestic market is segmented into Local-markets centres, Supermarkets, Hospitality (Hotels and Restaurants), Roadside and Head Porters. The description of the various market.

outlets are presented in the figure below:

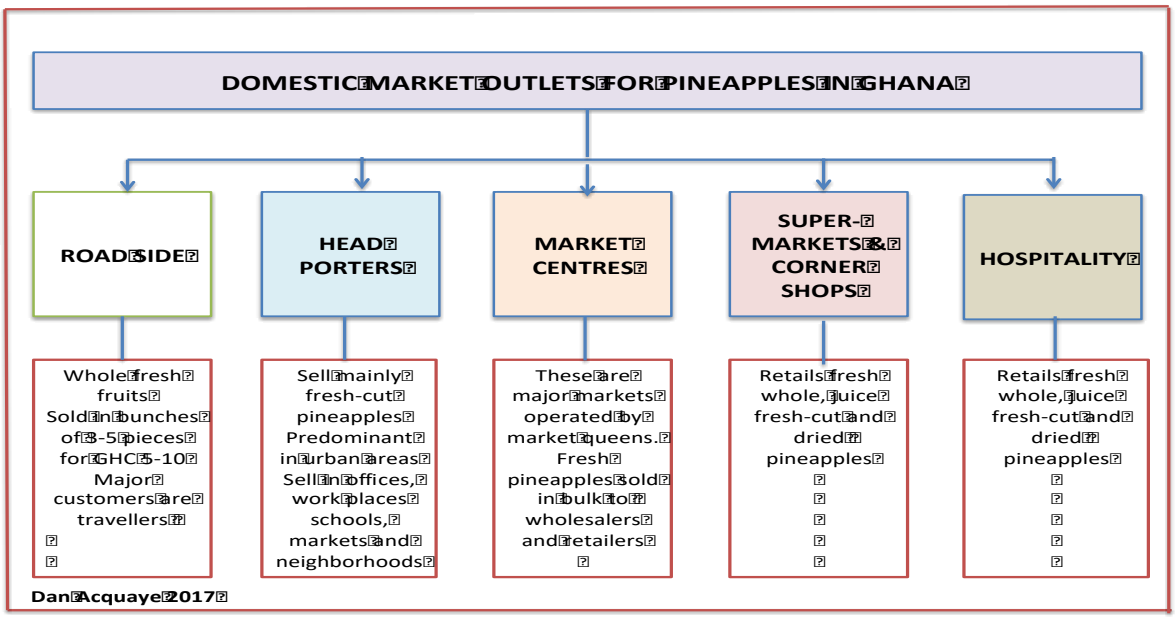

Figure 35: Domestic market outlets[30]

The large processing firms import pineapples from Cote D'Ivoire and Benin in the off season through very formal agreements. Malls and Supermarkets such as ShopRite import processed pineapple juice for sale in their shops. The formal relationship between these importing companies and the supermarkets are largely based on mutual respect. Besides, there are several small and medium scale importing companies of fruits juices including pineapple that supply container shops, marts and wholesalers at business centres in cities and municipalities.

Several players provide services in the pineapple value chain actors.

[30] Dan Acquaye, 2017

I. **GIZ – MOAP** Seeks to promote pro-poor, income-raising business models for competitive agricultural value chains and through this, they have worked closely with both the public sector (principally MoFA) and the private sector to strengthen service delivery in agriculture. Key activities undertaken under the Pineapple value chain promotion include supporting the operations and functions of the Value chain facilitation platforms, the development of the CBT curriculum on Pineapple and supporting the ATCs to operationalize its use, training farmer groups on best agronomic practices and postharvest practices.

II. **The Ghana Export Promotion Authority (GEPA)** is the National Export Trade Support Institution of MOTI responsible for the facilitation, development and promotion of Ghanaian exports. GEPA has recently introduced Export Trade Services – the newest to the non-traditional export portfolio. The GEPA market information hub supported by UNIDO has been highly appreciated by horticultural industry players.

III. **IDH** accelerates and scales-up sustainable trade by building impact-oriented coalitions of multinationals, civil society organizations, governments and other stakeholders. By convening public and private interests, strengths and knowledge, IDH programs help create shared value for all partners. This is intended to make sustainability the new norm and make an impact on the Millennium Development Goals.

IV. **The Ministry of Food and Agriculture (MoFA)** has been at the forefront of the provision of agricultural extension services in the country. It has been involved in the training of pineapple farmers on group dynamics and GAP for pineapple production although this has not been too effective due to the high extension officer to farmer ratio.

V. **Value Chain Coordinating Committees**: MoFA, in collaboration with MOAP under GIZ, has facilitated the creation of regional Value Chain Committees (VCC) where input dealers, producers, processors, traders, researchers and other support service

providers – who all operate along a certain value chain – meet regularly to discuss strategies for upgrading the value chain and overcome challenges.

VI. **Bank and Non-Bank Financial Institutions:** A number of financial institutions including banks, microfinance and savings and loans provide credit facilities at the national, regional and district levels to qualifying Pineapple value chain actors to support their operations. However, issues regarding high cost of capital, prolonged/late approvals, release of funds, as well as the difficulty of particularly small-scale operators successfully accessing loans are persistent.

VII. **Transport Services:** These exist to transport fresh produce from production areas to the processors. They also offer transport and handling services for the distribution of fresh and processed products to domestic markets and to importing countries.

VIII. **Cooperatives/Farmer Association** provide collective marketing, training for farmers, facilitate trade, and improve bargaining power with input dealers and processors. Poor functioning and ill-resourced Cooperatives are pervasive and the low membership base of most Cooperatives impede their effectiveness.

Regulatory Requirements for Processing through supporting institutions

In the Cluster, fruits meant for the export market must meet phytosanitary requirements and maximum chemical residue levels. The Plant Protection and Regulatory Services Directorate (PPRSD) registers and provides certificates for produce meant for exports. Exporters however must register with the Ghana Exports Promotion Authority (GEPA) for an export certificate before exporting. Other certificates include food safety certificates for processors from the Food and Drugs Authority (FDA) and the Environmental Protection Agency (EPA).

Ghana Standards Authority (GSA)

Some national standards relevant to the fruits industry in 2018 from the Ghana Standards Authority (GSA) are:

- 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 & 2)
- GS 949 Code of Practice for crop production – Good Agricultural Practices for Ghana (parts 1 & 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

Food and Drugs Law – PNDCL 305B

The law requires processors to be registered by the Food and Drugs Authority – this is done through inspection of manufacturing premises. The inspection is done using general GMPs (however the law makes room for the FDA to produce codes of practice as guidance in such inspection activities (PNDCL 305B; Article 48)). The processor is given a certificate of

registration and a unique FDA Number which should appear on the package/label of the product. Samples of the product are analysed in the laboratory before registration is completed. Samples are assessed using relevant Ghana Standard.

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	Input Dealers	Producers (Farmers)	Processors	Exporters	Aggregators	Local Market Women	Financial Institutions	SPEG	FAGE	University of Ghana Research	MOFA
Input Dealers	-	VS	W	S	W	W	VW	W	VW	W	W
Producers(Farmers)	VS	-	VS	S	S	VS	W	S	W	S	S
Processors	W	VS	-	S	S	W	VW	S	S	S	S
Exporters	S	S	S	-	S	W	VW	VS	VS	W	W
Aggregators	W	S	S	S	-	W	VW	VW	VW	W	W
Local Market Women	W	VS	W	W	W	-	VW	VW	VW	W	W
Financial Institutions	VW	W	VW	VW	VW	VW	-	VW	VW	W	W
SPEG	W	S	S	VS	VW	VW	VW	-	S	S	S
FAGE	VW	W	S	VS	VW	VW	VW	S	-	S	S
University of Ghana Research	W	S	S	W	W	W	W	S	S	-	W
MOFA	W	S	S	W	W	W	W	S	S	W	-

Table 19: Cooperation Matrix for the Cluster

Note: - = Perfect, VS =Very Strong, S = Strong, W = Weak, VW = Very Weak[31]

[31] From consultants

3.7 Analysis of Business Operations

3.7.1 Organization Analysis

The pineapple industry is largely organized along with Producer Cooperatives, Processors and Exporters.

At the producers' level, farmers have formed producer Cooperatives to secure input credit, negotiate for better prices, aggregate produce and advocate for better infrastructural development such as road construction and water supply. Cooperatives are very common in the cluster. Some cooperatives pay dues, hold meetings to address common challenges, etc. while others do not meet these basic cooperative governance requirements. In the cluster area, 9 producer cooperatives with the support of the Ministry of Food and Agriculture (MOFA) have come together to form an umbrella union called QualiPine – derived from the union of quality pineapple producers Organizations. Established in 2017, it aims to promote the interests of pineapple producers in the Akwapim South, Nsawam Adoagyiri and Upper West Akim districts of the Eastern Region of Ghana. Its main aim is to assist members and individuals in the production of high quality pineapples. The union also encourages the enforcement of appropriate standards and signing of long term contracts with reliable processors for the benefit of all members. The union is spearheaded by a seven-member elected officers and their sources of funds include membership registration fees, dues, levies and from NGOs and government agencies. The Union receives technical advice and training from MOFA and other development partners.

As a relatively new organization, they require substantial support to strengthen their governance structures and systems.

At exporters' level, there is the Federation Association of Ghanaian Exporters (FAGE) and Sea- Freight Pineapple Exporters of Ghana (SPEG). The Federation of Association of Ghanaian Exporters (FAGE) is an umbrella organization of exporters and product Cooperatives in the agricultural and manufacturing industries. They promote the expansion and diversification of Ghanaian exports to foreign markets by assisting member firms to develop and market their products, improving the enabling environment for trade through government advocacy.

SPEG, the aegis body for pineapple producers and exporters, assist their members in maintaining common quality standards, attaining certification (GLOBALGAP) and provide shipping arrangements and logistics. The organization also undertakes market promotion activities and provides market information services, technical support in GAPs, post-harvest handling and food safety services to their members. One of the outstanding roles of SPEG is that they aggregate produce from their members to obtain critical mass that is attractive enough for shipping companies including reefer vessels to dock in Ghana and take pineapple consignments to Europe.

3.7.2 Major Challenges/Constraints Analysis

Suckers Production

Currently, most pineapple producers use their own suckers for production. Commercial pineapple producers, however, produce their suckers professionally and distribute them to out-grower networks with whom they have formal arrangements. Majority of smallholder farmers' use suckers from their previous harvests. Most suckers are often not well treated on smallholder farms and this impacts negatively on the quality of planting material. Some

suckers used were identified as third (3rd) generation planting material with poor quality which affected yields. Since BNARI's 2011 production and distribution of MD2 suckers to smallholder farmers ended, no investment has been made into quality suckers' production. There are a few farmers who produce suckers for sale but there are no certified commercial sucker producers.

Agro inputs

Key agrochemicals and fertilizers required for pineapple production are generally available and, if sourced directly from the key agro-input dealers or facilitated through the grower Cooperatives, tend to be of good quality. Large scale processors and exporters facilitate the distribution of good quality agrochemicals for their out-grower networks. There are however fake products on the market and many small and medium holder operators who do not avail themselves for training and information usually fall prey to purchasing such sub-standard products which are largely influenced mainly by cost considerations. Additionally, due to the high cost of agrochemicals, some producers do not apply the right dosage or adhere to the recommended frequency of application. Such actions severely limit their ability to effectively control pest and diseases.

Production and Export

Most pineapple producers in the cluster target processors or the export market and producing for these outlets require certain standards and certifications. A good number of farmers have been supported through projects and by some processors/exporters to obtain certifications. SPEG has been supporting its members to enforce and maintain the quality standards of their

produce and assist producers and exporters to obtain GLOBALGAP certification. In order to attain this certification, SPEG uses its GLOBALGAP trained agronomist to assist members with certification requirements. The Association also has trained auditors who assist farms with pre-assessment audits. Experts from SPEG have been working closely with the Ghana Standards Authority to contribute to the development of the National Quality Standards for Pineapple.

Processing

Nearly all the large scale processing firms have a full complement of equipment including stainless steel production lines to receive, treat, process and store products under temperature controlled conditions. They also have cool vans and are able to maintain a cool chain from the farm to the market. Their major challenge had to do with the quality of fruits mobilized where, insects and diseases as well as early harvesting result in high factory rejections with 10% being reported by HPW.

For small-scale processors, in addition to fruit quality challenges, most of them do not have good transportation facilities resulting in further losses from poor handling and bruising. These companies are also not investing in good quality food grade processing equipment due to limited investment capability and generally, the food safety and hygiene standards observed are low. Another challenge is the lack of technical know-how and information on the right sources of good quality processing equipment, set-up and maintenance.

Trade

Quality issues along the supply chain of pineapples is very critical. Aggregators usually arrange their produce on the bare floor without crates or pallets while market queens display their wares

in open spaces. Transporters arrange the produce in their trucks without any safety and quality control measures. Most market centres do not have storage facilities and it is common to see heaps of pineapples being sold in the open market, often, close to gutters and unsanitary areas.

Stage	Major constraints
Input provision	▪ There is limited supply of certified MD2 and Smooth Cayenne sucker and shortage of plastic mulch ▪ Unavailability of pre-formulated fertilizers specifically for pineapple production. ▪ Access to land and land tenure system hamper expansion of farms
Primary production	▪ Rainfall irregularity cause delay in some phenological stages of the pineapple plant growth leading to reduction in fruit yield. ▪ Smallholder farmers find it difficult to access loans from banks. ▪ There are no dedicated tractor and transport services at the smallholder level, raising cost. ▪ Some farmers/ Cooperatives lack requisite technical and organizational/governance capacities e.g. Certification, Group dynamics, GAP ▪ There is occasional shortage of labour during peak seasons ▪ Uncoordinated efforts of DPs, donors, private sector and CSO on VC interventions, ▪ Farmers' unwillingness to pay for services
Processing	▪ Large processors do not get the required volumes of quality raw material forcing some of them to import from neighbouring countries such as Togo, Benin and Cote d'Ivoire. ▪ Processors incur high production cost in aggregating pineapples from fragmented locations that are also far from production sites. ▪ Medium to Small processors are challenged with sourcing right equipment for production and employing people with expertise in operating these equipment leading to under-utilization or abuse of processing equipment. ▪ High staff turnover rate for processors ▪ High cost of utilities especially electricity
Trade	▪ Lack of logistics and high transport cost, Poor market infrastructure and storage facilities , Non-compliance to contractual agreement ▪ Processors and aggregators sometimes by-pass producer Cooperatives and buy from non-members who may not have complied with good agricultural practices

Service provision at meso level	▪ Uncoordinated efforts of development partners, donors, private sector on value chain interventions sometimes leading to duplication of efforts of training fatigue. ▪ Farmers' unwillingness to pay for services make most service provision unsustainable ▪ Value chain interventions by programs and projects are limited in scope and reach. Only few producers' benefit from intervention making overall industry impact insignificant and unsustainable.
Quality	▪ Handling and carting of fresh produce from farm to either processing or trading is done without quality assurance measures like packing on pallets or in crates. ▪ Inappropriate forcing of pineapples with unapproved agrochemicals affect product quality ▪ Most of the value chain actors are not aware or do not understand the protocols of good agricultural practices
Infrastructure and regulations at macro level	▪ Road networks leading to smallholder farms are mostly inaccessible ▪ There are limited pack houses at major production areas. Public pack houses constructed by MiDA and EMQAP are under-utilized; major issues being lack of fruits, ownership and management structure ▪ Limited government policy direction for the industry though it is an important Non-Traditional Export (NTE) foreign exchange earner for the country. No National Strategic Plan for Pineapple production and export.

Table 20: Constraints Analysis

4.1. Porters 5 Factors and PESTLE Analysis

The table below provides an analysis of Porter's 5 factors and PESTLE analysis on competitiveness of pineapple production and fruit processing in the cluster.

Porter's 5 Factors	Analysis
Threat of New Competitors (Medium to High)	• Competitors coming from other clusters like the Central Region. • Internationally, Costa Rica, Ecuador and Côte d'Ivoire.
Threat of Substitute Products and Services (High and Low)	• There is perfect substitutes for the processed mango and pineapples juices in the cluster imported from other countries such as South Africa. • Import of fresh fruits from the other local producers of pineapple.
Intensity of Competitive Rivalry (Medium)	• Among the farming cooperatives, there is some form of rivalry among Cooperatives in terms of preference to work with exporters directly. • In terms of access to funding / external support, the rivalry reactions in the cluster is very high.
Bargaining power of buyers (High – Medium)	• In the cluster, market women have the power to mostly determine how much they are willing to pay for the pineapple fruits at the farm gate. • However, the interventions of cooperatives and Cooperatives minimize this power of buyers. • Processors also have power to determine whom to buy from based on their criteria and standards
Bargaining Power of Suppliers (Low – Medium)	• There is some form of bargaining power from farmers, sucker producers and other suppliers as they control the prices of inputs they sell to farmers. • On the part of farmers, this kind of power is limited due to issues of perishability, poor road network, and poor storage facilities for the farmers to control the sales of the fruit.

Table 21: Cluster Analysis – PESTLE and Porter's 5 Analysis

4.2 Gross Margin Analysis

Gross Margin Analysis for pineapple production

A gross margin analysis was computed during the stakeholder validation workshop with the support of the QualiPine farmer cooperative. It was based on estimated cost of production per acre, potential yield per acre and income based on prices offered by buyers. The analysis does not include the costs of interest on capital and labour input by the farmer and family.

COST OF PRODUCTION	
Acquisition of Land	GH¢300/acre/year
Land Preparation	
Ploughing (2x) + harrowing	GH¢ 750/acre/year
Ridging	GH¢ 200
Mulching	GH¢ 1600
Laying of plastic mulch	GH¢ 200
Suckers	
2400 suckers x GH¢ 0.15	GH¢ 3600
Labour for planting	GH¢ 200
Fertilizer	
7 applications	GH¢ 1030
Labour (1 day)	GH¢ 490
Weeding (3x)	GH¢ 210
Pesticides	
Cost	GH¢ 330
Labour application	GH¢ 720
Water	GH¢ 540
Flower induction ("forcing")	
6kg carbide x 4drums	GH¢ 320
Water	GH¢ 120

Labour	GH¢ 160
Harvesting	
Labour	GH¢ 600
Transport	GH¢ 600
PPEs	
Hand Gloves (3)	GH¢ 30
Wallington boots	GH¢ 50
Nose Mask (3)	GH¢ 30
Renting Knapsack	GH¢ 50
	GH¢12, 130
Yield	
24000 x80%= 19200 x1.3 kg/fruit	
GH¢24960*1.15	GH¢28,704
Margin Income	GH¢28, 704
Less Cost	GH¢12, 130
	GH¢ 16, 574
Other Cost	
Labour of Owner	Not Included
Cost of Capital	Not Included

Table 22: Gross Margin Analysis for 1 Acre Pineapple Production
Source: [32]

[32] Estimates from farmer at stakeholder validation workshop

Gross Margin for Processors - Value Addition per 300ml Fresh Pineapple Juice

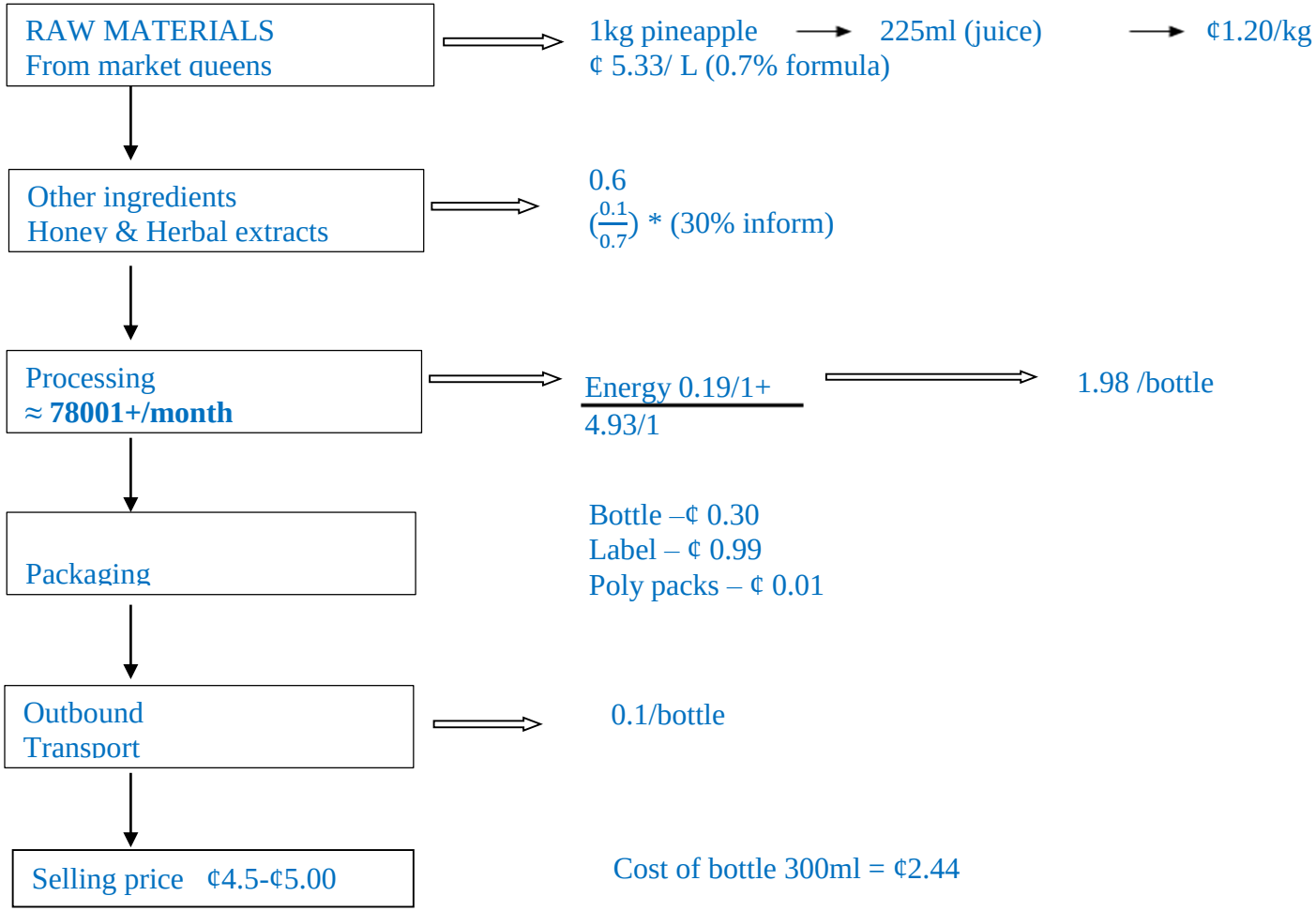

Figure 36: Value Addition per 300ml Fresh Pineapple Juice
Source:[33]

[33] Estimates from Processors at stakeholder validation workshop

4.3. Vision and Objectives for Pineapple producers

The vision statement for pineapple production was defined by cluster members during a stakeholder validation workshop of this mission.

Vision of pineapple production

To be a leading cluster in the improvement of the pineapple production quality that meet market demand and exporting 70% of both fresh and processed fruits by 2030.

On the basis of the vision, the following strategic objectives and activity intervention areas were elaborated by stakeholders at the validation workshop:

Strategic objectives, Activities/Intervention areas

1. **Enhanced Quality and productivity of planting materials and process of planting to be done through:**

- Support and promote sucker production for better and easy access.
- Awareness Raising/Training for farmers on GAPs.
- Facilitate access to equipment for Land Preparation.
- Training on standards and support certification.
- Increased access to support services (Input materials, BDS services, mechanization, irrigation and other services).

2. **Better market Access**

- Market needs analysis.
- Product promotion by way of exhibitions, fairs, B2B, etc.

3. Improved Dialogue and Exchange between Actors i.e. Producers/Farmers and Processors within the Cluster

- Organization of thematic fora of interest for both farmers and Processors (Pineapple Roundtable).
- Exchanges with actors with similarly experience.

4.4 Vision and objectives for fruit processors

The vision for fruit processing (Mango & Pineapple) was discussed and defined by representatives of processing companies present at the stakeholder workshop. Products produced by these processors include Dried Fruits, Juice, Fresh cuts, Jam and Chutneys.

Vision of Fruit Processing

To be leaders in producing high quality processed products for the global market with strong networks among industry stakeholders by 2025.

Strategic Objectives and activity areas

1. Improved quality standards and compliance.
2. Train and support the implementation of basic HACCP, GMPs, FDA, GSA standards.
3. Enhance access to technology and support appropriate technologies for production and packing.
4. Support shared/joint use storage facility.
5. Support shared/joint use waste re-cycling plant.
6. Improved access to market: Provide training in marketing, branding and market linkages

7. Enhanced access to finance: Establish linkages with financial institutions and donor partners (DPs) with grant support.
8. Introduce the use of clean energy: Facilitate the use of renewable energy (e.g. establish linkages with clean energy technology providers, etc)
9. Networking, Cluster branding and joint promotions.
10. Strengthen linkages with BDS, Governments and among cluster actors.

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- Support and promote aggressive production of suckers as business units within the value chain.
- Engage government and district assemblies to improve access to land for pineapple production especially in peri-urban areas and create further incentives for commercial production in new areas.
- Promote cluster or agro-based pineapple production model.[34]
- Strengthen the technical capacity of value chain actors including producers, aggregators and small scale processors.

- Promote the formation of functional Producer Cooperatives, Unions and VC Councils and strengthen policies that will empower cooperatives to streamline production and marketing systems.
- Facilitate the establishment of Business Service Centres to provide advisory services and attract the youth into pineapple production.
- Promote the use of ICT in service delivery to impact on wider actors especially on the adoption of GAPs and adherence to quality assurance protocols.
- Promote the formation of stakeholder platforms that engage research, public, private sector; fostering PPP to drive the pineapple sector.

- Collaborate with MOFA and MOTI (GEPA) to develop a roadmap to improve Ghana's performance and competitiveness on the international market.
- Identify key investment areas and advocate for the provision of the necessary incentives to attract private sector investment.

- Promote investments in cut and dried pineapples where Ghana appears to have a niche.
- Collaborate with MOTI to promote the production of Sugar loaf and Baby pineapples.
- Explore and intensify market opportunities in Scandinavian and Middle East countries.
- Strengthen business partnerships with buyers and encourage investment partnerships between Ghanaian and overseas investors.

- Prepare investment briefs within the pineapple VC.
- Promote PPPs to attract investments in infrastructure along the value chain.

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Table 23: Baseline data for the Cluster

Farming Cooperative in the Cluster	Total No of Farmers	Total Production (Tons)	Total Production Capacity (Tons)	Total Number of Companies in the Cluster	Total Exports (Tons)	Value of Exports (USD $)	Name of Export Markets (%)	Estimated Number of Workers	Total Number of Brands Established	Quality Certification
Aburi Amanfo Cooperative Pineapple Growers And Marketing Society Ltd	25	1,687.50	3,375	1	None	None	None	**Male: 55 Female: 20 Total: 75**	**None**	-
Adeiso Cooperative Pineapple Growers And Marketing Society Ltd	30	2,025.00	4,050	1	None	None	None	**Male: 66 Female: 24 Total: 90**	**None**	-
Apesika Cooperative Pineapple Growers and Marketing Society Ltd	25	1,687.50	3,375	1	None	None	None	**Male: 55 Female: 20 Total: 75**	**None**	-
Adonten Pineapple Farmers Association	15	1,012.50	2,025	1	None	None	None	**Male: 33 Female: 12 Total: 45**	**None**	-
Fotobi Cooperative Pineapple Growers and Marketing Society Ltd	21	1,417.50	2,835	1	None	None	None	**Male: 48 Female: 18 Total: 66**	**None**	-
Oboadaka Pineapple Farmers	25	1,687.50	3,375	1	None	None	None	**Male: 55 Female: 20**	**None**	-

								Total: 75		
Okunase-Sunkwa Cooperative Pineapple Growers and Marketing Society Ltd	17	1,147.50	2,295	1	None	None	None	**Male: 37 Female: 14 Total: 51**	**None**	-
Pepawani-Kwamikrom Cooperative Pineapple Growers and Marketing Society Ltd	40	2,700.00	5,400	1	None	None	None	**Male: 88 Female: 32 Total: 120**	**None**	-
Afabeng Multi-Purpose Pineapple Growers Association	20	1,350.00	2,700	1	None	None	None	**Male: 44 Female: 16 Total: 60**	**None**	-
Sub-Total QualiPine Cooperative Members	**218**	**14,715.00**	**29,430**	9	**None**	**None**	**None**	**Male: 477 Female: 177 Total: 654**	**None**	
Non-QualiPine Members and Large exporter producers (including active SPEG Members)	382	50,785.00	51,570	12	None	None	None	**1146**	**None**	
Total for the Cluster	**600**	**65,500.00**	**131,000**	21	No Fresh produce was exported b/n 2017 & 2019. They were sold to processors who added	Pineapple cooperative producers have not done direct exports b/n 2017 and 2019. They sold to processors	None	1800	However, SPEG had Sankofa Brand. It will be useful to check if the brand	Global GAP-20%, Fairtrade-20%, Green Label-10%

					value largely for export	who then exported.			is still working	

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Table 24: Baseline Data for the Processors

No	Description	Data
1	Total Number of Companies in the Cluster	12
2	Products processed	Fresh - 5,000 MT Fresh Cut - 2,000 MT Dried Fruits - 3,000MT Juice - 24,000MT
3	Total Production (Estimate MT)	Fresh - 5,000 MT Fresh Cut – 2,000 MT Dried Fruits –3 ,000MT Juice – 24,000MT
4	Total Processing Capacity (MT)	Fresh - 10,000 MT Fresh Cut – 4,000 MT Dried Fruits – 6,000MT Juice – 48,000MT
5	Total Exports (MT)	Fresh Cut/ Juice/ Dried/Fruits – 7,000MT
6	Value of Exports (USD $)	Not immediately available. Processors were not willing to share their export earnings
7	Name of Export Markets (%)	UK - 40%, Germany - 15%, France - 26%, Other - 21%
8	Estimated Number of Workers (Casual and permanent workers)	Male – 360 Female – 240 Total – 600
9	Total Number Of Brands Established	None
10	Quality Certification	FDA registration, GSA certification, HACCP, BRC, ISO certification etc. (most of small processors have only GSA and or FDA with the big processors having all)

COOPERATIVE	REGION
1. Aburi Amanfo Cooperative Pineapple Growers and Marketing Society Ltd	Eastern
2. Adeiso Cooperative Pineapple Growers and Marketing Society Ltd	Eastern
3. Apesika Cooperative Pineapple Growers and Marketing Society Ltd	Eastern
4. Akuapem South Pineapple Farmers Association	Eastern
5. Adonten Pineapple Farmers Association	Eastern
6. Fotobi Cooperative Pineapple Growers and Marketing Society Ltd	Eastern
7. Oboadaka Pineapple Farmers	Eastern
8. Okunase-Sunkwa Cooperative Pineapple Growers and Marketing Society Ltd	Eastern
9. Pepawani-Kwamikrom Cooperative Pineapple Growers and Marketing Society Ltd	Eastern
10. Afabeng Multi-Purpose Pineapple Growers Association	Eastern

Table 26: List of Processors in the Cluster

Name	Location	Product
Joy Springs Ent.	East Legon - Accra	Juice
Hendy Farms	East Legon - Accra	Chutneys
Judacy Plus	Spintex – Accra	Dried Mangoes
Ideal Providence Farms	Kpong – Tema	Dried Mangoes
Ekumfi Fruit Juice Ltd.	Central Region	Juice
Yvaya Farms	Accra	Dried Fruit
Peelco	Eastern	Fresh Cut and Dried Fruit
Bomarts	Eastern	Dried Fruit
HPW	Eastern	Dried Fruit
Blue Skies	Nsawam, Eastern	Fresh cuts and Juice

Name/ position of respondent	Location	Tel.	Email	Year of Establishment	Nature of Business
Benjamin Horlali Kofi Atidjah (CEO)	Afienya Ningo - Prampram	0244649810	benatidjah@yahoo.com	2010	Private/ Support Institution
Dr. Francis Collison Brentu, Senior Research Fellow	Okumaning, Denkyembour	0244726303	brentu64@yahoo.com	1957	Public/ Support institution
Prof. Irene S. Egyir, Graduate Committee Chairperson	Legon, Ayawaso West Wuogon, Greater Accra Region	0240932768	ireneegyir@yahoo.com	1968	Public/ Support institution
Anthony Botchway	DOBRO / NSAWAM		admin@bomarts.com	2000	PLC/ Processor
Elias Amoako (Consultant)	Accra	0208133403	eliasamoaku@gmail.com	2001	Private
Sanni Mohammed	Nsawam – Akuffokrom	0241861342		2016	Sole Proprietorship
Marjorie Quist Abdin, 1st Vice President	La, Dade Kotopon, Greater Accra Region	0344379173	fageghana@gmail.com	1992	NGO/ Support Institution
Samuel Frimpong Boateng, CEO	Accra, Kumasi	0247023068	sfboateng@afrideg.co.uk	2008	Private/ Support Institution
Victor Mensah/ AL	Nsawam Adoagyiri	0244185816	vmensah27@yahoo.com		Public / MOFA
Head of Services, Manufacturers & Petrochemicals	Ridge Accra		gepa@gepaghana.org	1969	Public

Table 27: List of Support Organisations Consulted

Table 28: List of value Chain Actors consulted as part of the study

Name/ position of respondent	Location	Tel.	Email	Year of Establishment	Nature of Business
Apesika Cooperative	Fotobi Nsawam	0541718244	matspine@gmail.com	**2001**	**Cooperative**
Fotobi Co-operative pineapple Growers and Marketing Society	Fotobi, Eastern Region	0243911267	doyglasgameti20@yahoo.com	**1998**	**Cooperative**
Okunase Sunkwa Cooperative Society	Aburi, Akwapim	0246150339	okonsankwa@yahoo.com	2004	Cooperative
Adonten Coop. Pineapple Growers and Marketing Society limited	Pokrom-Nsaba, Akwapim South	0243555215		1993	Cooperative
Adeiso Cooperative Pineapple Growers and Marketing Society Ltd	Adeiso, Upper West Akim East	0543045117		1996	Cooperative
Aburi-Amanfo Cooperative pineapple	Apantem Akwapim-South	0246838907	d.oakot@gmail.com	2000	Cooperative

Growers and marketing Society					
Boade Pineapple Grower, Fruit and Vegetable Marketing Association	Amanfro, Akwapim South	0557676 797		2000	Cooperative
Pepawani-Kwamekrom Cooperative Society	Pepawani Akwapim South	0242342 101		1997	Cooperative
Afabeng Multipurpose Pineapple Growers	Afabeng Upper West Akim East	0249295 501		2010	Cooperative
Solomon Idrisu Ankrah	Nsawam Eastern Region	0244694 631	solomonankrah 3@gmail.com	2006	Family enterprise Input Dealer
Theresa Okran	Kudjo, Nsawam Adoagyiri	0201869 698			Sole Proprietorship Input Dealer
Herman Benjamin Atuobi	Nsawam Adoagyiri	0576551 044	eastlands.agric @gmail.com	2015	Partnership Input Dealers
Francis Gamati	Nsakyere-Akwapim South	0244862 438	francis2015@y ahoo.com		Sole Proprietorship Sucker Producer
Eric Danquah	Amanfro, Akwapim South	0244694 685	fishbyte2002@ yahoo.com		Sole Proprietorship Sucker Producer
Billy Gamati	Amanfro, Akwapim South	0244658 155	bgamah@yaho o.com		Sole Proprietorship Sucker Producer
Bomarts	Nsawam	0574286 594	vida@bomarts. com		Production and Processing
HPW	Nsawam	0242859 376	Fd.marketing @hpwag.ch		Processing
Sfia farms and Agro-processing Ltd	Abonse, Okere District, Eastern Region	0244320 071/ 0559235 025	sfiafarm@yah oo.co.uk		Processing

Sandra Snowden / Rita Brobey	Dodowa	0500554 129	hendyfarmsgh @gmail.com	1997	Family enterprise – Processing
Joy Springs Ent.	East Legon – Accra	0244604 575 /0557580 630	Kofabu@gmai l.com		Processing
Joseph Oduro Boateng	SPINTEX / SEGE	0243 937996	Odurowa2000 @yahoo.com	2018	Family enterprise- Processing

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www.wacomp.ecowas.int

3rd Norla Sreet.
North Labone, Accra
Ghana.

UNIDO Trade, Investment and Innovation (TII) department
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Website: https://wacompghana.org
E-mail: wacomp.ghana@unido.org

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