

The Value Capture Opportunity in Fruit



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1. Executive Summary

“Fruit” is a heterogeneous category, including a broad set of varieties that can either be consumed in fresh form or in several different processed forms. Despite this, a set of general opportunities exist for African countries to add value to the fruit sector. Countries that can effectively produce fruit in accordance with international food safety regulations can access the international export market, especially in the EU and North America. The remaining fruit can be processed, to extend its useful life far beyond the natural harvest cycle, or to increase its inherent value, or typically, both. Therefore, opportunities to add value in the fruit sector are not just limited to processing. Opportunities for the complementary development of fresh fruit exports and processing remaining domestic fruit exist for most producers of significant quantities of fruit today.

OVERVIEW OF THE KEY FRUIT VALUE ADDITION MARKET OPPORTUNITIES AND AFRICA’S POSITIONING

Fresh Fruit for Export: The global fruit export market is worth \$50bn at export prices, and has grown at almost 20% per year in the period 2006 to 2008. Countries in Sub-Saharan Africa have several sources of comparative advantage in the tropical fruit market, such as the ability to offset growing seasons of northern hemisphere countries, and physical proximity to key markets in Europe (for West Africa) and the Middle East (for East Africa). Thus, African countries are well positioned to capture a significant share of the expected rapid growth of the global fruit trade, aided by preferential market access.

However, fresh fruit requires supply chain excellence both in terms of logistics and standards, which creates substantial challenges in realizing this opportunity. Prospective African players seeking to compete with efficient and established export industries in Latin America need to undertake significant investment and promotion of production models other than smallholder farming, which characterizes much of African production today.

Fresh Fruit for Domestic and Regional Consumption: The domestic and regional fruit consumption market is also expected to be an important opportunity – one that is less dependent on sea logistics and an adherence to international standards. Countries and individual exporters that can exploit either a growing Sub-Saharan Africa middle class with an appetite for fruit consumption, or material inter-country variations in the pattern of fruit consumption, can take advantage of diversified opportunities for growth in fruit horticulture. Policy-makers can support the growth of regional trade by instituting liberalizing reforms in the short term, and investing in inter-country logistics in the longer term.

Fruit Processing: A substantial proportion of tropical fruit that is produced is wasted. Estimates vary widely, with ranges from 10% to 80%¹. This wastage is caused by factors across the entire supply chain, from poor post-harvest handling, transportation, poor storage to retailing loss. Processing presents an opportunity to mitigate some of this wastage, add further value to the crop and create the driving force for increased economic sophistication in traditionally rural fruit-growing areas. While exports of fresh fruit can be constrained by the cost of shipping perishable produce over long distances and the high cost of compliance with food safety standards, processing offers an alternative route to market, especially for fruit considered below ‘export grade’. Investment in processing facilities can therefore be an important means to bring many labor-intensive fruit crops to the world market.

Fruit Processing itself can be divided into several sectors:

¹ “The Impact of Post-Harvest Handling Losses”, FAO, quoting R. Paull, 2001

- **Canned and Preserved Fruit:** this accounts for 11% of total processed fruit volumes; within this tropical fruit is a major segment, with pineapple the major canned fruit. This sector is highly consolidated amongst major players including Del Monte and Dole, given the high start-up and working capital requirements of the sector and challenging requirements for integration with major grocery retailers' supply chains, which represent the key target markets for the category. Asian countries dominate the canned fruit sector: Thailand is the world's major supplier with 42% share. African countries are nevertheless well placed to have a major role in the sector and in some cases have significant activity, such as Del Monte's canned pineapple production in Kenya, and Dole's substantial operations in South Africa. However, the sector is largely unattractive for potential new entrants given its low margins and high entry costs. The current approach used by countries such as Kenya and South Africa of working with large multinational fruit processors in order to leverage the canned fruit sector is likely to be one of the best routes to realize the value available; therefore the best approach for countries in this area is to focus on ensuring that incentive regimes maximize the direct and spillover benefits for countries that use them to attract international canning corporations.
- **Specialty Fruit:** specialty fruit is a diverse category that serves the needs of specific food processors for ingredients in dairy (e.g. fruit chunks and flavors for flavored yoghurts), baby food, prepared dishes and instant desserts. Clients typically have precise requirements on areas such as water content, color and flavor, making the sector highly challenging for potential new entrants if they cannot already leverage highly sophisticated food processing capabilities. Margins can, however, be quite high in some areas. Overall, specialty fruit constitutes a potentially attractive set of niche areas, but the accessibility to these niches will be broadly dependent on the nature of each country's specific comparative advantages and will typically require an established food-processing sector.
- **Juice processing:** this is the leading category of processed fruit, accounting for 50% of volumes in 2009. Asia is the leading producing region for all juices, with China a dominant player in concentrated apple juice. Orange is the main fruit juice, with pineapple the leading tropical fruit juice. From the African perspective, juice is a highly attractive category. It is a growth sector overall, with annual growth of 3.7% per year to 2009, and particularly fast growth for tropical fruit juices, based on a combination of increased interest in mature markets in new tropical flavors, and growth in emerging markets, which are familiar with tropical fruits. A large informal domestic sector exists in Sub-Saharan Africa, allowing domestically based processors to scale up on the basis of less challenging local market health and safety requirements, before addressing the international market. Finally, for policy-makers, juice processing creates a combination of highly sophisticated agro-processing roles, and a large number of low skilled jobs involved in sorting, cutting and preparing fruit, especially during harvest seasons.

However, even with the existence of a fruit processing sector a substantial proportion of fruit production can be uneconomic to harvest. Seasonal gluts of fruit, low prices offered by processors who have to contend with narrow production seasons to match the harvest cycle, high energy costs, and a lack of access to affordable finance result in low offered purchase prices to farmers. Prices are typically too low to make harvesting of the total crop worthwhile. Clear imperatives exist for market interventions that can improve price realization for farmers, increase crop availability for processors and provide processors with support to managing operational and financing costs.

IMPLICATIONS AND NEXT STEPS FOR POLICY-MAKERS

We view the fruit market as an opportunity for increase value capture for most countries, although the approach relevant for each country will depend on their current levels of production, processing and integration into

international export markets. At a high level, we classify countries in the African Transformation Report into the following groups:

1. **Fruit Producers:** Countries that are material producers of fruit but currently do not add value to a significant share of output through either processing or exporting, and which therefore appear to be opportunities for value addition. Typically, these countries have a limited degree of processing (for example, Jakana produces fruit juice in Uganda using local produce) but face substantial challenges to scaling, including access to finance and sourcing sufficient quantities of fruit of the right quality at low enough cost. In such countries, a focus on developing production and taking advantage of immediate opportunities in local, regional and potentially export markets for fresh fruit are key priorities.
2. **Fruit exporters:** Cameroon and Mozambique are both scale producers of fruit and export a significant share of output. In both cases, exports are focussed on bananas, and the countries have yet to exploit substantial opportunities in fruit processing. In such countries, business enabling support for expansion and development of the fruit processing sector –and in particular providing access to start-up and working capital financing – are critical.
3. **Integrated Fruit Processors:** Kenya is a key example of a country that is able to extract value from fruit by exporting ‘export-quality’ fruits both internationally and within the region, and by processing fruits locally, especially for juice manufacturing. In such sectors, more general support on improving the environment for doing business will benefit the growth of the sector, given that it has already started to gain traction.
4. **‘Non-Players’:** A final category of country – those considered ‘non-players’ – does not have a significant volume of fruit production today, and includes countries such as Zambia, Burkina Faso, Botswana, Mauritius and Rwanda. Opportunities in value addition for the fruit category may well exist in these countries, and processing may well exist to an extent already: For example, fruit processing facilities have been developed with government support in Rwanda. However, the current scale of the fruit processing opportunity may not justify a primary focus on this category to drive a transformational change in the agro-processing sector when compared to other commodities – such as cotton for Burkina Faso, or soybean for Zambia.

A more detailed country-level analysis is needed for policy-makers to understand the country-specific factors that will determine the attractiveness of pursuing fruit processing for any particular country.

Given the breadth of fruits as a category and the specificities of the opportunities for each country based on the portfolio of fruits that it can cultivate, this report takes a selective approach: Primarily, this report focuses on the requirements to unlock the opportunities in exports of fresh fruit and to develop a juice processing sector.

2. The Fruit Value Chain

Value chains for fruit differ substantially based on whether the fruit is to be consumed in fresh form, or whether it is to be processed prior to consumption.

FRESH FRUIT

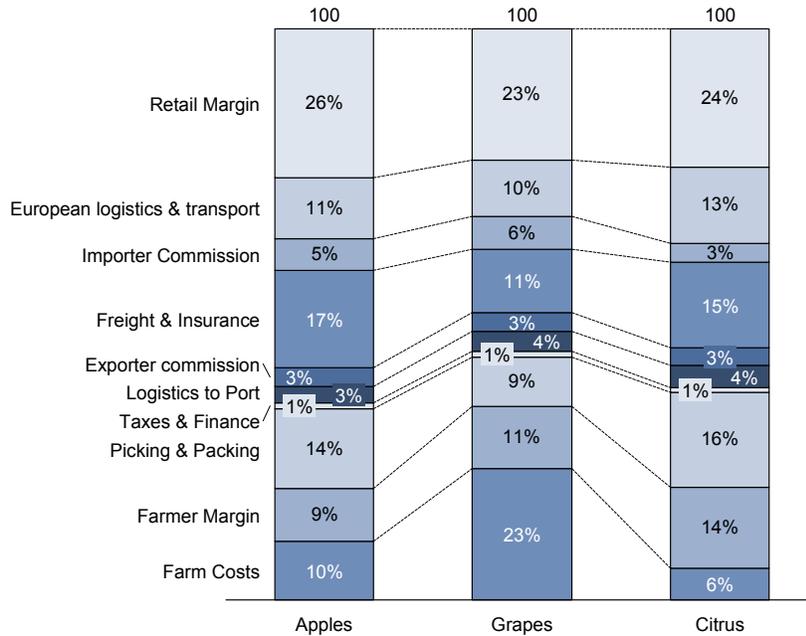
Fresh fruit value chains typically involve a broad number of actors for both domestic and for international exports, typically for different reasons:

- **Domestic supply chains:** In Sub-Saharan Africa, production is largely via smallholder farmers, the majority of whom are not commercially orientated in their horticulture. As a result, a substantial proportion of production is highly fragmented, requiring an infrastructure of local and regional agents to aggregate and bulk volumes across farms.

For example, in Kenya over 60% of the total mango crop is produced by farmers with less than 30 trees on a small farm. Over 90% of their production is purchased by consolidators who then trade mangos to global and regional exporters, suppliers to the foodservice and hospitality sectors, open markets, urban traders and retail outlets.

- **International supply chains** need to manage a global series of hand-offs to local ports, international logistics, and market transport to final customers. At the same time, they need to ensure compliance with quality standards and regulatory requirements across the entire chain of custody. Given the high burden of compliance and large minimum scale for transportation (e.g. minimum loads of 1 container) this sector often involves commercial farmers, although there may be a network of out growers that are connected to the main 'nucleus' commercial farm.

FIGURE 1: THE FRESH FRUIT VALUE CHAIN – EXAMPLE OF INTERNATIONAL EXPORTS FROM A SOUTH AFRICAN COMMERCIAL FARMER TO EUROPEAN RETAILER²



Source: M Dodd, Post Harvest Innovation Programme; Dalberg analysis

By taking the “Farm costs” and “Farmer Margin” as a proxy for the value of the fruit if it were not exported, this would account for approximately 20% to 34% of the value of the same fruit that is exported: as such, achieving compliance with international standards and the supply-chain excellence required to access this market provides the prospect to create substantial added value, and can help develop skills and capabilities that can leveraged across many potential export sectors. 40% to 50% of the total value remains captured by agents outside the country, however; therefore an export sector for fresh fruit is best considered a means to achieving a higher and more stable price, in addition to fostering activities related to in-country logistics which can have benefits for other sectors.

PROCESSED FRUIT

Processing fruit in order to add value to the fresh product can be undertaken in a variety of ways. However, in general, these can be separated into activities to extend the time over which the fruit can be stored and consumed (e.g. canning, drying) and processing activities to create a new product or ingredient (e.g. processing to create pulps to manufacture juice or to be used directly as a food ingredient in sectors such as dairy).

Processing fruit to manufacture juice is the main value-addition activity in this category (see “Processed Fruit”); thus, this section focuses on the juice manufacturing value chain.

Juice processing involves two different businesses with different types of activity, means of value addition and economics:

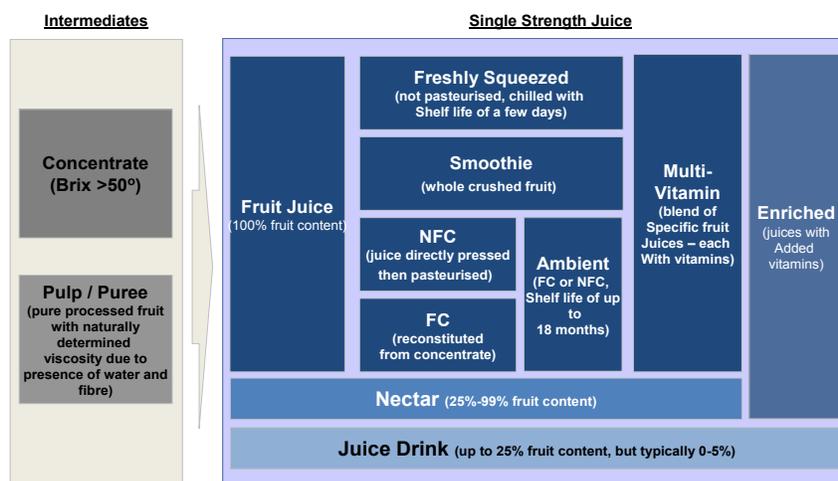
- **Fruit processing:** This involves the conversion of fresh fruit into “intermediate products”, which are pulps, purees and concentrates. Pulps and purees are the direct output from processes that break down the

² Based on the output from a single farmer for all 3 fruits

flesh of fruits, while concentrate is created by eliminating excess fibers in the pulp or puree and evaporating naturally occurring water³.

- **Juice Manufacturing:** This typically involves the mixing of concentrate, pulp or puree with water, sugar and stabilizers to create bulk beverages, followed by packaging for market consumption into forms such as cartons, plastic or glass bottles or plastic pouches. Various methods can be used to create a wide variety of different juices, with different definitions, as shown in Figure 2.

FIGURE 2: TYPES OF JUICE INTERMEDIATES AND JUICE PRODUCTS



1. Degrees Brix is the measurement of dissolved sugar-to-water mass ratio of a liquid, e.g. a 25° Brix liquid is 25% sugar and 75% water
Source: FAO, Dalberg experience and analysis

The two businesses do not necessarily have to be vertically integrated. The juice manufacturing industry in countries in East Africa (e.g. Kenya and Uganda) and in West Africa (e.g. Nigeria) include players that either process local fruit, import concentrate and mix and package them locally, or do either depending on the season.

Fruit processors need to manage seasonality of fruit production, and typically process a variety of fruits (and vegetables) in order to maintain utilisation across the year. Across both fruit processing and juice manufacture, ensuring adherence to a broad set of standards for food safety are critical for players that wish to export to key consumption markets in the EU and North America.

Manufacturing juice has the potential to materially add value to raw fruit. An example of mango nectar production in Mali⁴ indicates that fruit processing can increase the value of mango through its conversion to pulp by a factor of 2.8, while conversion to a ready-to-drink beverage at the factory gate raises its value by 17.8 times⁵. The largest area of value added is in the use of packaging, which tends to be costly to purchase. Often, juice processors in emerging markets will use sterile packaging that can be stored at ambient temperatures to avoid the

³ Under the ‘Codex Alimentarius’, which determine the international set of regulations and definitions of fruit juice, concentrate is defined as any juice with greater than 50° Brix. Brix is the measurement of dissolved sugar-to-water mass ratio of a liquid, e.g. a 25° Brix liquid is 25% sugar and 75% water

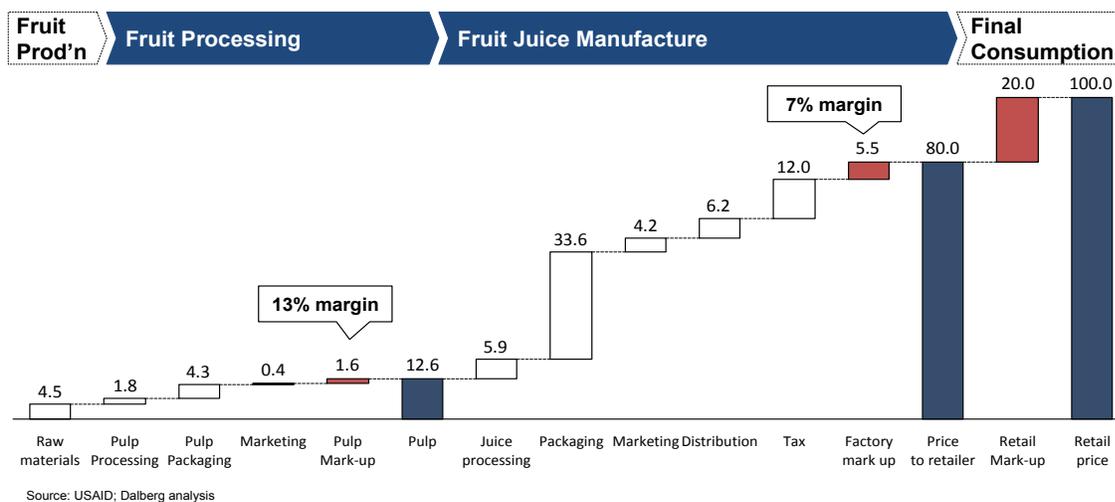
⁴ This is based on USAID’s project for developing mango processing and nectar production in Mali, as documented in “Mango and Pulp Processing in Mali”, August 2009

⁵ This is based on the fact that raw mango accounts for only 4.5% of the total retail value of the product, and that pulp and nectar in pouches account for 12.6% and 80% of the value respectively. For example the factor level increase in converting raw mango to pulp is calculated by dividing the share of retail value of pulp (12.6%) by the share of retail value of the raw mango input (4.5%)

requirement to invest in refrigeration. This reduces their initial capital outlay, and substitutes high ongoing energy costs with high packaging costs.

FIGURE 3: ECONOMICS OF FRUIT PROCESSING AND JUICE PRODUCTION, MANGO NECTAR EXAMPLE⁶

Mango Juice Example: Direct Sales from Manufacturer of Mango Nectar in Aseptic 200ml Pouches in Mali; % of Retail Price



Therefore, fruit processing not only offers a means to extract value from fruit that may not be typically ‘consumption grade’, but also offers the prospect of adding substantial value to raw fruit. [1]

A REVIEW OF SELECTED KEY PLAYERS

MAJOR FRESH FRUIT EXPORTER: DOLE

Dole, headquartered in California and founded in 1851 in Hawaii, is the world’s largest producer and marketer of fresh fruits and vegetables. In 2009 its revenues were \$6.8bn from the distribution of fresh fruits, packaged fruit products as well as frozen fruit products. Bananas and pineapples are Dole’s major fresh fruits, accounting for 42% and 8% of fresh fruit revenues in 2009.

The company has three business segments:

- **Fresh fruit:** This division markets and distributes fresh fruit to wholesale and retail customers. Dole’s fresh fruit business segment has four primary operating divisions: Bananas, European ripening and distribution, fresh pineapples and Dole Chile. The fresh fruit business segment represented approximately 69% of 2009 consolidated revenues. Dole has 35% market share in Bananas in the US and 9% share in it in Europe. In 2009, the European Ripening and Distribution accounted for approximately 40% of the fresh fruit business segment’s revenues.
- **Fresh vegetables:** This segment, as with the fresh fruit segment, markets and distributes fresh vegetables to clients.

⁶ Note that tax here is the taxation levied on the fruit juice manufacturer, all of which is passed onto the retailer; in the cases where this tax is offset by sales taxes levied on retailers, this taxation item would disappear, but be replaced by a slightly higher one at the retailer level after ‘retailer mark-up’. This is not the structure for the Mali case study used here.

- **Packaged foods:** The packaged foods division packages a range of prepared (e.g. canned) fruit, as well as juices, and frozen fruit.

Dole sources its fruits internationally from over 20 countries. These fruits are produced both directly on Dole-owned land and through associated producer and independent grower arrangements. It owns 122,000 acres of farms and other land holding assets. Dole has the largest dedicated refrigerated containerized fleet in the world, which includes 14,800 refrigerated containers. It also owns over 60 ripening and distribution centers in Europe and Asia. One of the strongest core competencies is Dole's ability to produce, transport and deliver quality perishable products around the world

In Africa, sourcing operations are through Cameroon, Ghana, Ivory Coast, Namibia and South Africa with a focus on banana and pineapple followed by papaya. Regional operations are headquartered in South Africa where Dole has a major position in the horticulture sector as the second largest exporter of fresh fruit. Sourcing is through a combination of local farmers and owned and operated agricultural assets. These include a large banana and pineapple plantation in Ghana, operated in conjunction with its partner Compagnie Fruitiere, which is also active in Ivory Coast and Cameroon.

Dole has also been active in increasing its regional distribution: in 2005, Dole South Africa began distribution into South African supermarket chains through the acquisition of Malembo Fresh Marketing, subsequently rebranded as Dole Africa.

MAJOR JUICE PROCESSOR: COCA COLA

While Coca-Cola is best known for its leading carbonated soft drinks brands, it is also a leading player in the global juice market, which it entered in 1960 through the acquisition of Minute Maid. This remains the flagship brand out of a broad portfolio of juice brands that also include *Five Alive* and *Sunfill* in Africa. Minute Maid was a leader in marketing Frozen Concentrate Orange Juice, and is the largest juice brand today with Tropicana, owned by PepsiCo, as the leading competitor.

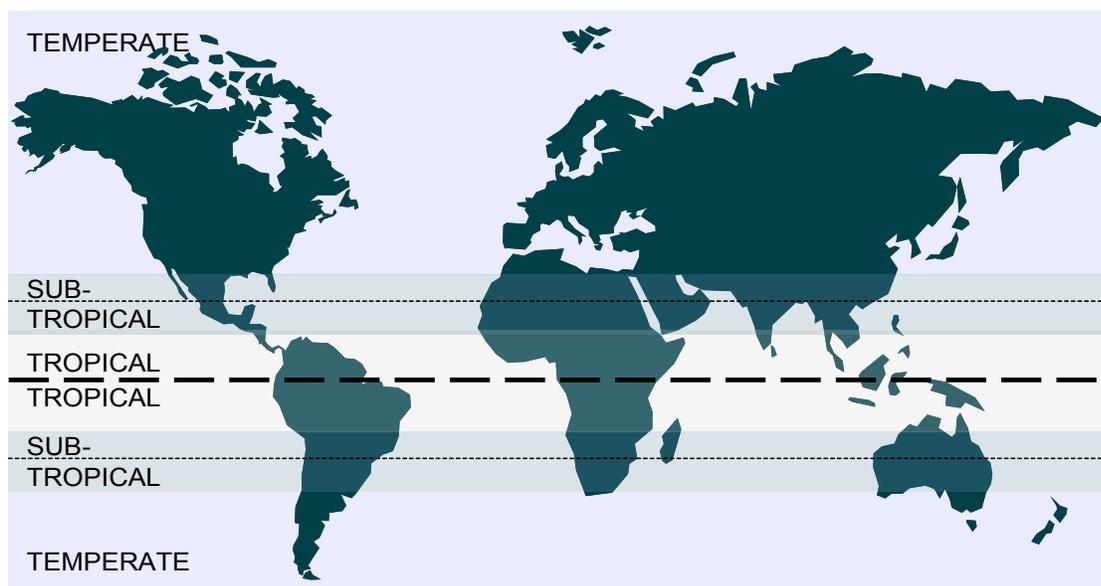
Overall operations in Africa across all product lines began in 1928 with a bottling and distribution plant in South Africa, which remains Coca Cola's largest African market. Juice production is limited to mixing concentrate in-country in markets such as Kenya, or through imports of ready-to-drink packaged products.

Africa is a strategically important region for Coca Cola, with a number of countries such as Kenya in which it has a strong 'first-mover' advantage as a multinational carbonated soft drinks player. However, it typically has a lower market share in the juice sector. In the example of Kenya, its substantial share of the colas segment (which is uncontested by PepsiCo, which plans to enter the market) compares with only 11% share of the fast-growing juice sector. As a result, Coca Cola is making material investments into juice processing, both at the level of juice manufacturing from concentrates and pulps (e.g. a \$62m investment in Beverage Services Kenya, its juice manufacturing plant, to increase capacity) and developing a supply of processed fruit, in conjunction with the Bill and Melinda Gates Foundation.

3. The International Market

The term 'fruit' has multiple definitions, but in this report we focus on the 'culinary' definition of fruit as a sweet, edible part of a plant. Different types of climates lend themselves to the cultivation of different types of fruits:

FIGURE 4: FRUIT GROWING ZONES



Source: FAO; expert interviews

- **Temperate fruits:** Fruits in temperate regions typically originate from woody shrubs or trees that cannot grow in tropics due to their need for a cold period before they can flower. Major fruits within this region include apples, pears and cherries. Given their position far from the equator, temperate regions tend to have the shortest growing seasons.
- **Sub-Tropical Fruits:** In sub-tropical regions, fruits originate from plants that cannot tolerate severe cold, but also typically have some requirement for cool weather in order to flower. Key fruits in this category include grapes, dates and citrus fruits. Sub-tropical regions have longer growing seasons than temperate zones, but cannot produce fruit in the off-season. There tends to be no definitive segmentation of fruits between tropical and sub-tropical in many cases, with fruits such as avocado and dates considered sub-tropical or tropical across different organizations and industry participants.
- **Tropical fruits:** This is the broadest category of fruits, with the only common characteristic being an intolerance of frost. Major fruits in this category include banana, mango, pineapple and passion-fruit. Tropical regions have the potential to grow fruit virtually continuously, with harvesting cycles largely driven by the growing cycle of the plant. As a result, key Sub-Saharan Africa and Latin American countries can engage in year-round production.

Fruit can be grown beyond its natural zones; for example, regions with relatively high elevation in parts of Kenya can grow sub-tropical and even temperate region fruits such as apples, while greenhouse cultivation can allow production of tropical fruits in markets in temperate regions.

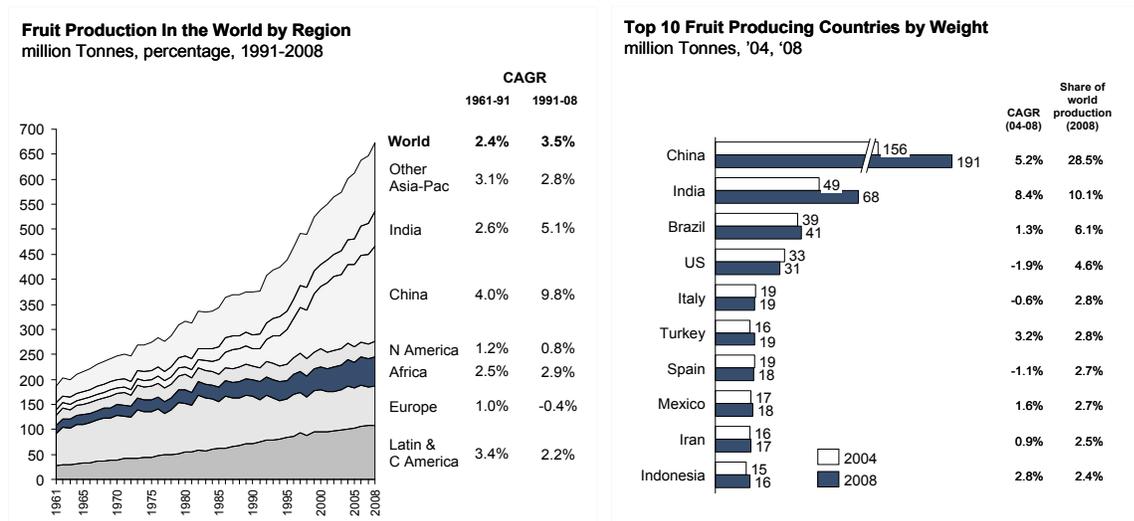
FRESH FRUIT

PRODUCTION

World fruit production has been growing historically at 3.5% per year since 1991, to reach a total production of 620 million tons in 2008. This is faster than the historical growth rate, with global growth averaging 2.4% per year from 1961 to 1991. The surge in growth in this more recent period has been driven by Asian countries: The region increased production at an average rate of 6% per year over this period, primarily driven by a substantial increase in yields led by China and to a lesser extent India. Together, these two countries accounted for 39% of world production by volume in 2008.

Beyond the rapid growth in the Asia-Pacific region, the rest of global production separates into mature markets such as the US and Europe, characterized by sluggish or negative growth since 1991, and faster growing emerging markets such as Latin America and Africa, which have grown by 2.2% and 2.9% per year since 1991 respectively.

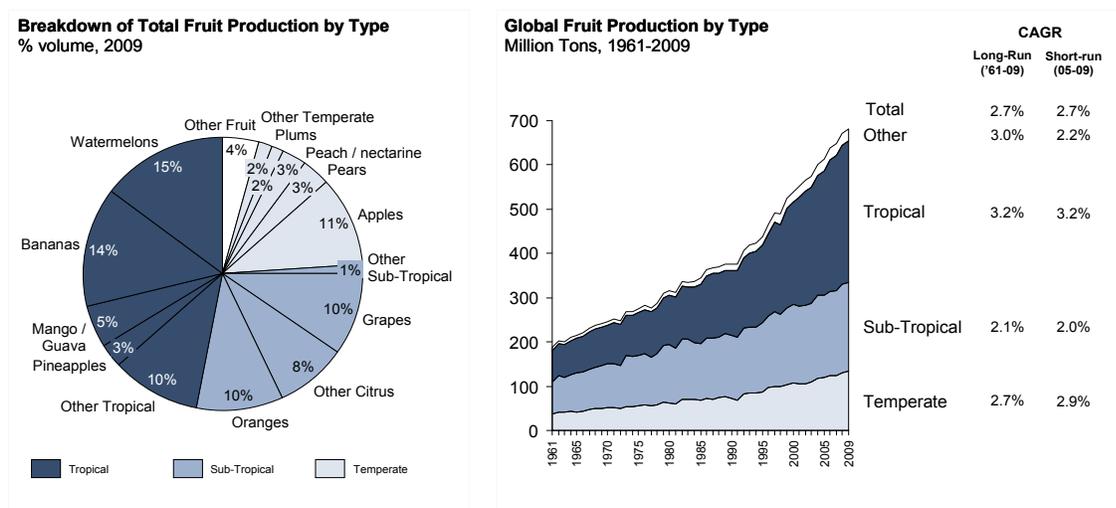
FIGURE 5: GLOBAL FRESH FRUIT PRODUCTION BY REGION



Source: FAOSTAT

At the country level, the volume of fruit produced in major emerging markets such as Brazil, Turkey and Mexico have increased over the more recent 2004 to 2008 period by 1.3%, 3.2% and 1.6% respectively. In mature markets such as the US, Italy and Spain fruit volumes have contracted.

FIGURE 6: GLOBAL PRODUCTION VOLUMES AND GROWTH RATES BY FRUIT



Source: FAOSTAT; Dalberg analysis

Growth in fruit production has been spread across the three major climatic categories, but tropical fruits have led the market: Asian growth has favored tropical fruits for domestic consumption, while key import markets in North America and the EU are characterized by an increasing appetite for tropical fruit consumption as a greater share of the overall mix of fruit consumption – either in fresh form or in processed products such as dairy and juices. A substantial share of temperate fruit production growth is driven by China alone, particularly in apple production, without which tropical fruit would be the clear leading growth category.

THE INTERNATIONAL FRESH FRUIT MARKET

The majority of fruit that is produced remains in-country, a feature which is also common to many staple crops. Much of this is consumed locally, but a significant proportion of production is also wasted. Estimates of wastage vary widely, with FAO quoting a range of 10% to 80% depending on region and type of fruit⁷. Some of this is unintentional wastage due to poor post-harvest handling and storage, and some is due to market inefficiencies, where the lack of a high enough market price, after accounting for all other supply chain costs (such as aggregation and transport), renders it uneconomic to harvest the entire crop. For African countries, it is estimated that combined harvesting and post-harvest losses could account for more than 50% of several key crops such as mango and passion fruit⁸.

⁷ "The Impact of Post-Harvest Handling Losses", FAO, quoting R. Paull, 2001

⁸ Expert interviews

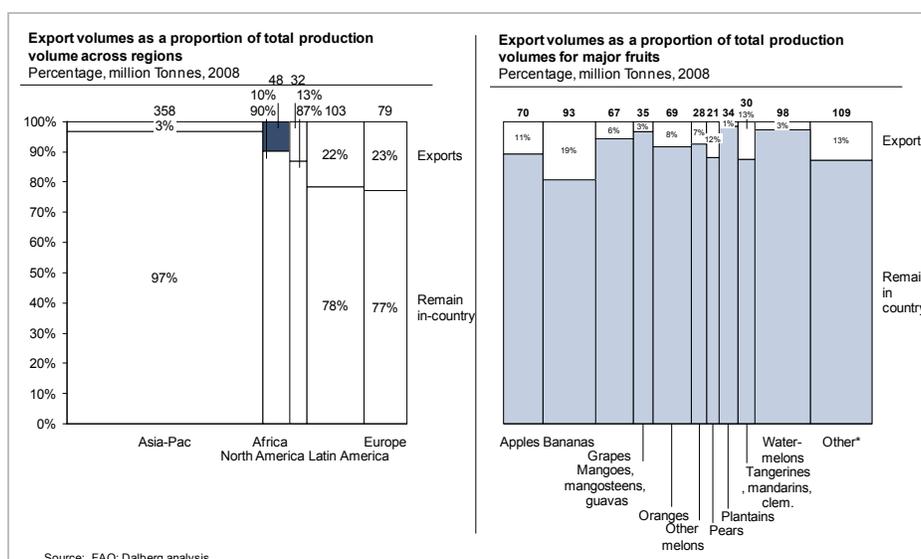
FIGURE 7: VOLUME AND VALUE OF THE GLOBAL FRESH FRUIT MARKET, 2008⁹

	Retained Domestically	%	Exported	%	Total
Volume (million tonnes)	559	90%	61	10%	620
Value (\$bn)	118	70%	50	30%	168

Source: FAO, Dalberg analysis

In 2008 only 61 million tons, constituting 10% of fresh fruit volumes, were exported globally. China and India, which constitute significant export destinations for other commodities, are both major producers of fresh fruit and cater to domestic demand primarily through indigenous production. Therefore the largest markets for exporters are the EU and North America.

FIGURE 8: EXPORT VOLUMES BY FRUIT-PRODUCING REGION AND BY MAJOR FRUIT



At the level of individual fruits, bananas, apples, pears and oranges are the most exported: 19% of bananas are exported, versus 11%, 12% and 8% of apples, pears and oranges respectively. These fruits tolerate transportation well and are established in consumer tastes across all major markets. Banana exports flow primarily from Latin America and Philippines to the US, Western Europe and Japan; apples from Western Europe, US and China to Germany, UK and Russia; and, oranges from Spain, US and South Africa to Western Europe and Russia.

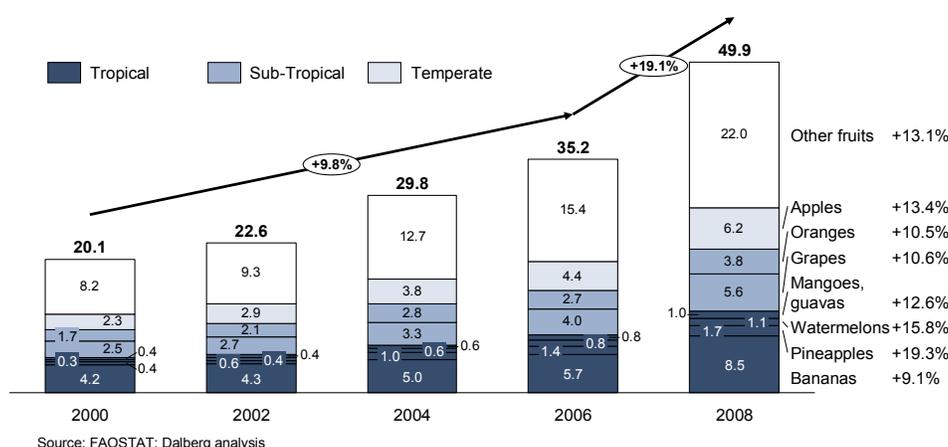
Although difficult to estimate precisely, total fresh fruit market could be worth \$170 billion¹⁰ in 2008, with the export market valued at approximately \$50 billion¹¹. On a value per ton basis, therefore, exporters are able to realize far higher prices for fruit than can be achieved through sales in the domestic market.

⁹ NOTE: The value of the market in 2008 was calculated with the following assumptions: (1) Spoilage of fruit was assumed to be 30% of total production; (2) Thus, effective production (Total – Spoilage) was 434 mT; (3) Total exports were 61 mT according to FAOSTAT, thus, effective domestic consumption was (434-61) mT or 373 mT; (3) Domestic consumption was then further divided into farm level (50%), 217 mT and regional, 156mT. (4) The consolidated price of all fresh fruits was calculated by estimating the average price of five major African fruits (most produced: banana, orange, watermelon, grapes and mangoes) over time (2004-2008). The consolidated price was \$ 445; (5) FAOSTAT provided the value of the export market and the value of the domestic market was calculated by multiplying Farm level consumption by \$225 (approx. half the consolidated producer price) and the Regional consumption by 445.

Africa remains a marginal player in the export market with only with 7% share of the opportunity. Latin America and Europe produce the majority of exported fruit, trading 22% and 23% of their production volumes respectively. These countries are able to combine commercially oriented horticulture, with the requisite transport infrastructure to be able to deliver fresh fruit to target markets – in particular, efficient transport links, frequent and cost effective air transit for high-value low-weight fruits (such as berries), efficient port logistics, and the availability of efficient cool chains. Part of the European fruit trade is also driven by intra-regional flows. Sea freight hubs in Benelux (Belgium, Netherlands and Luxembourg) and Germany register high imports as received fruit, which is then further distributed to their intended continental markets.

The export market for fresh fruit has increased rapidly over recent years, rising from \$30 billion in 2004 to almost \$50 billion in 2008, and average annual growth rate of 13%. Bananas accounted for the largest share of global exports by value (18%), followed by apples and grapes (12% each), oranges (8%) and tangerines (6%) in 2008.

FIGURE 9: GROWTH IN GLOBAL EXPORTS OF FRESH FRUIT BY VALUE, 2004-08, \$BN



Price increases for raw fruits have been an important factor in the increase in value of the overall market: although prices for key fruits such as oranges and bananas remained broadly stable over the 1990s (with some, largely seasonally-driven, short term volatility), overall fruit prices have been rising since 2000. For example, banana prices increased 96% from \$483/ton in 2000 to \$949/ton in 2010, which is a 68% increase in real terms¹².

Increases in the price of fruits as an overall category is partly explained by increased demand from consumers in key markets in Europe and North America, which itself resulted due to the promotion of fruit as part of a healthy diet. Moreover, the rising importance of growth markets in Eastern Europe, Russia and the Middle East has pushed fruit prices upwards. New technologies, such as improved packaging, faster transport mechanisms and improved storage infrastructure, have also facilitated the trade in fresh fruits¹³: the invention and adoption of new transportation and controlled atmosphere technologies allow fresh fruit to travel greater distances and be available even during the off-season. Subsequently, consumers (especially in the EU and North America) are willing to pay higher prices for out-of-season fruits, leading to a rise in both volume and average prices^[2].

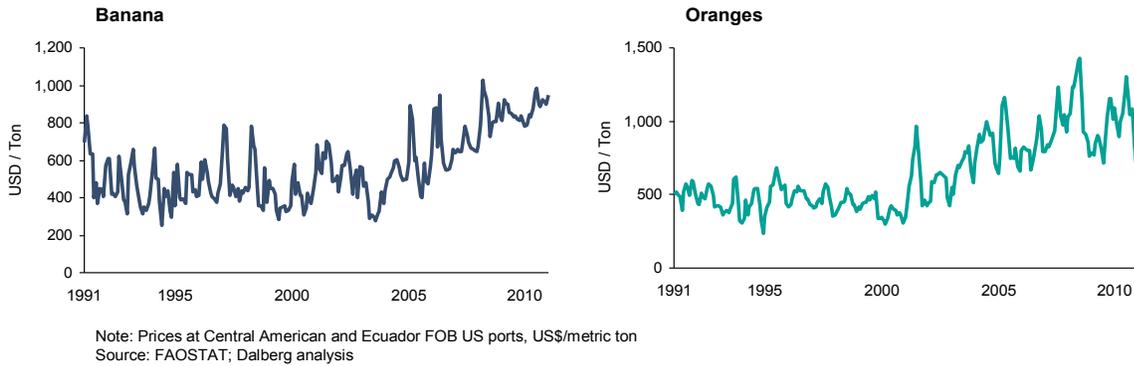
10 ibid. 2

¹¹ Valued at Free-On-Board prices, based on FAO estimates

¹² Based on using overall US GDP deflator against banana prices

¹³ The World Fresh Fruit Market, USDA, 2003-04

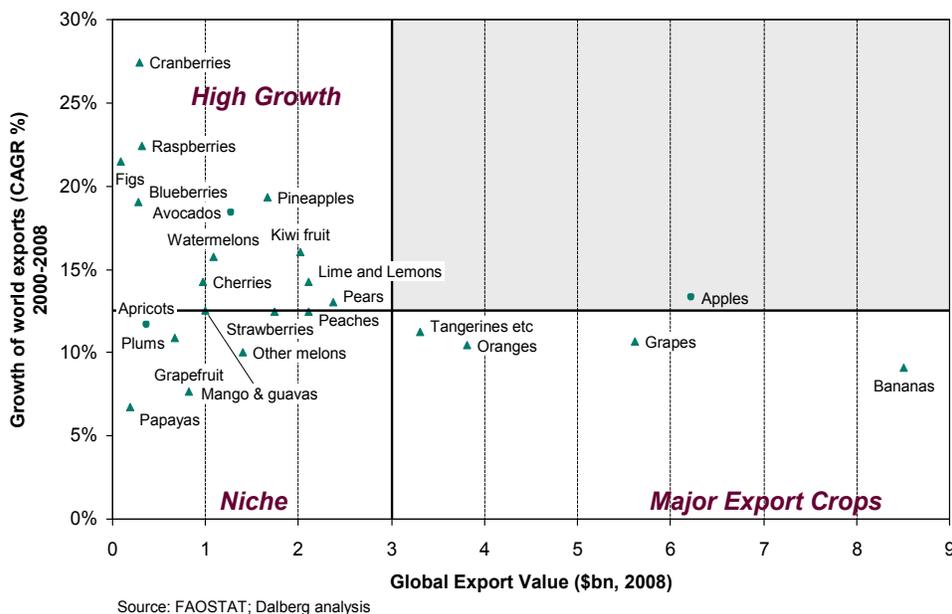
FIGURE 10: EVOLUTION OF SELECTED FRESH FRUIT EXPORT PRICES, 1991-2011



In the export market, fresh fruits can be segmented into three categories:

- **Major export crops:** Banana exports value grew at a pace of 9% CAGR during 2000-08, apples at 13% and oranges at 11%; these three fruits are also the most heavily traded in the world combining to account for more than half of global export volumes in 2008. Bananas, which are produced in large quantities in East and West Africa, represent a significant export market approaching \$9bn in 2008.
- **High growth:** These are best represented by the cluster of berries (see figure below) which are not heavily traded (as shown by low export values) but which have experienced extremely high growth rates of above 20% CAGR (2000-2008).
- **“Niche” Fruits:** These are fruits that remain small export market opportunities and exhibit relatively low rates of growth that are below the market average. This category is particularly weighted toward tropical fruits that pose substantial challenges in management of wastage, due to their susceptibility to bruising (which makes them either unacceptable or diminishes their value to target customers). They be characterized by rapid ripening and spoilage rates that are frequently not managed by effective cool chains in origin countries, and often also have substantial domestic demand competing for fruit volumes

FIGURE 11: CATEGORIES OF FRESH FRUIT CHARACTERIZED BY EXPORT MARKET SIZE AND RATES OF GROWTH



On the demand side, the EU and US are key markets for most of the world's traded fresh fruit. Collectively, the world's largest importer is the EU, responsible for 34% of total world imports of fresh fruits, with substantial growth occurring in rapidly growing Central and Eastern European countries. The US is the single largest importing country, with 14% of the global share of import volumes. The Russian Federation is the fastest growing importer in the recent period 2004-2008, with growth of almost 10% per year over that period.

As stated earlier, China and India are not key target markets for many exporters, and in fact, may emerge as key exporters¹⁴. Tropical fruit exporters do, however, believe that opportunities will emerge for exports to these countries, especially for tropical fruits in the off-season -- a limited off-season export market from East Africa to India already exists in fruits such as mangoes today.

PROCESSED FRUIT

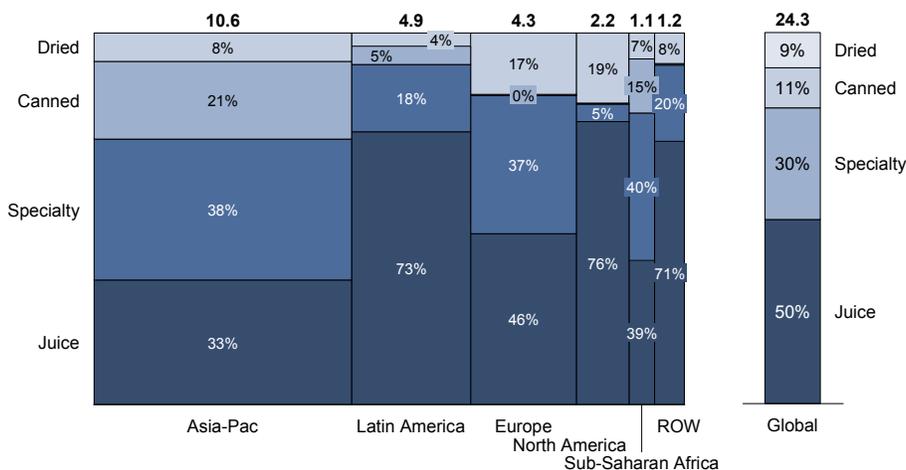
REVIEW OF FRUIT PROCESSING SECTORS

Fruit can be processed in a broad variety of ways, but can be classified into four high-level groups:

- **Dried and Dehydrated Fruit:** This includes solar and industrially dried fruit. Some fruits are frequently consumed in dried form (e.g. raisins, dates, prunes), while drying is a less common but growing component of other fruits such as pineapple and mango
- **Juice:** This category includes fruit that is processed to create intermediate products such as pulps and concentrates, as well as final 'single strength' juices. Globally, orange juice is the dominant juice, while apple is the main temperate fruit juice. Pineapple is the main tropical fruit juice.
- **Canned & preserved:** This category includes canned, pickled and brined fruits, typically with a very long shelf life after processing. Canned pineapple slices and pieces are a major component of the canned fruit sector.
- **Specialty:** This is a diverse category that includes prepared meals, soups and prepared desserts. Although a large category for vegetables, this tends to be a far smaller category for fruits, with products such as fruit salads, fresh cut and fresh peeled fruits, as well as flours of fruit, peels, sugars and homogenized cooked fruits.

¹⁴ A key example of this is China's emergence as a key producer of apples in the 1990's followed by a transition to a major apple juice concentrate exporter in the late 1990s

FIGURE 12: GLOBAL PROCESSED FRUIT PRODUCTION, BY TYPE OF PROCESSING, MILLION TONS, 2009



Source: FAO; Dalberg analysis

If both fruit and vegetables are taken together, the most important processed product segment is canned fruit and vegetables, valued at \$53bn globally in 2007¹⁵ out of a total processing industry valued at \$100bn. However, for fruit alone, juice is a more significant processing activity. Although FAO data is not comprehensive, indicatively it suggests that juice-processing accounts for 50% of the volume of processed fruit output, with specialty products such as prepared fruit mixtures and flours of fruits accounting for 30% and 11% respectively. Although dried fruits are sold in low volumes, they generally reap a high value per ton, and represent a larger market opportunity than their volume would indicate.

The Asia-Pacific region is the leading fruit processor by volume, with a major share of both the juice processing and canned/specialty sectors. China has emerged as the global leader in the production and distribution of canned apple juice, while Thailand, the Philippines and Indonesia are key players in canned fruit, particularly for pineapple. Sub-Saharan African production of processed fruit products are relatively low as a share of total output, accounting for 1.1 million tons of processed products or 5 percent of global volume, which is low compared to its share of the volume of total fresh fruit production in the world.

ATTRACTIVENESS OF FRUIT PROCESSING SECTORS

Given its size, growth, the availability of a local market and scope for positive spillovers in terms of development of industrial capabilities, juice processing appears to be the most important and attractive fruit processing sector for policy-makers in Africa. However, other processed fruit sectors confer different advantages. Below we briefly review the relative attractiveness of different fruit processing sectors. We then move to a more detailed treatment of juice processing as the key market to focus on for transformative growth.

Dried and Dehydrated Tropical Fruit

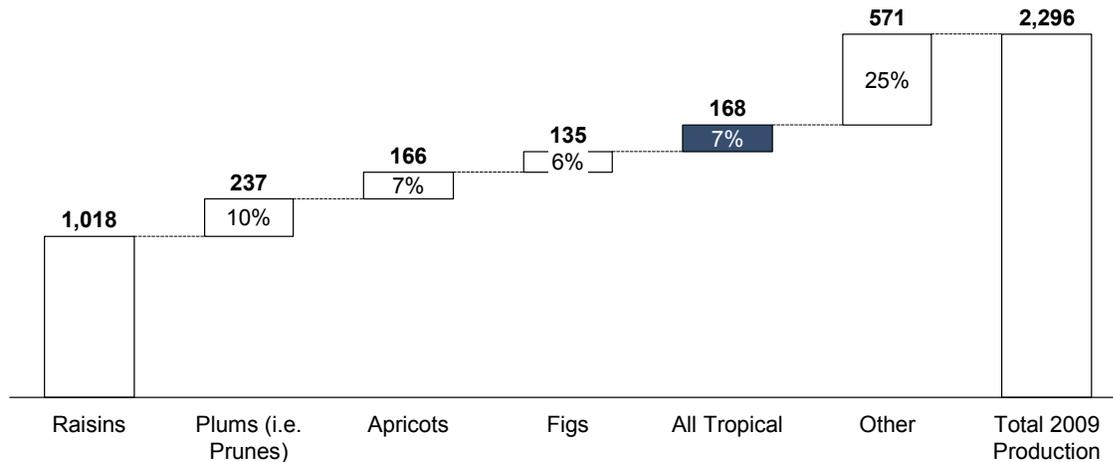
Approximately 2.3 million tons of dried fruit was produced in 2009, of which approximately 7% was tropical fruit, principally banana chips and dried bananas. Temperate and sub-tropical fruits, in particular raisins, plums and apricots, are the major dried fruit categories.

As shown in Figure 12, production is distributed across the world, with different industry structures in each region. The US and EU are both the major production regions and the major consumers of dried fruit. Production in the US

¹⁵ IBIS World, "Global Fruit and Vegetables Processing and Preserving", 2007

and EU is characterized by large-scale food processors that serve the direct consumption (or ‘dried fruit and nut’) sector, the breakfast cereal sector and confectionery sectors. Globally, the dried fruit market is small (accounting for 9% of processed fruit volumes) although prices can be high, especially for products meeting the requirements of food processors in the US and EU. In Sub-Saharan Africa, dried fruit production is typically more fragmented, smaller scale and less integrated into international supply chains.

FIGURE 13: GLOBAL DRIED FRUIT PRODUCTION, ‘000 TONS, 2009



Source: FAO; Dalberg analysis

A local or domestic opportunity in dried fruit may exist, especially given the potential for low cost local drying using solar driers. This can allow smallholder farmers to add value to excess fruit production during the harvesting season, given the ability to retain and store dried fruit over extended periods. However, the international market is a challenging opportunity given generally strict specifications in terms of cut or style, moisture content, sugar content, level of sulfur content and general SPS requirements.

Therefore, given the low scale of the domestic opportunity, the difficulty in accessing international markets, and the low level of sophistication of the sector (which does not place it as a core area for driving positive spillovers to the broader industrial production sector), dried fruit is likely to be most viable as an ancillary rather than core fruit processing activity.

Canned and Preserved Fruit

Canned fruit accounts for 11% of total processed fruit volumes, or 2.6m tons in 2009. Within this category, tropical fruit is a major segment, with pineapple being the major canned fruit, followed by fruit cocktails, litchi, mango and papaya.

Production volumes are highly consolidated amongst major players, including Del Monte and Dole, given the high start-up and working capital requirements for the sector and challenging requirements for integration with major grocery retailers that are the key consumption markets for the category.

Asian countries dominate canned fruit production today. Thailand is the world’s major supplier, accounting for 42% of total world exports, followed by the Philippines¹⁶.

¹⁶ World market shares are somewhat dated, and are estimated to be based on shares as at 2001 (see http://dsir.gov.in/reports/ittp_tedo/agro/AF_Farm_Fruits_Vegetables_Intro.pdf)

Nevertheless, African countries are potentially well placed to have a major role in the sector, and in some cases already are: Del Monte produces a large share of its total Sub-Saharan Africa canned pineapple production in Kenya. Dole's operations in South Africa also place the country in the top 5 producers of canned fruit in the world.

However, the attractiveness of the sector is challenged by the relatively low margins available: canned fruits are considered a commodity food product, and require substantial scale in order to be economically viable. The current approach of working with large multinational fruit processors in order to leverage the canned fruit sector is likely to be one of the best routes to realize the value available; therefore the best approach for countries in this area is to focus on ensuring that incentive regimes maximize the direct and spillover benefits for countries that use them to attract international canning corporations.

Specialty Fruit

Specialty fruit is, as described above, a diverse category that, when taken in aggregate, is the second largest processed fruit sector accounting for 30% of production in volume terms in 2009. However, relatively large categories such as peels, sugars and cooked fruits constitute less than 1% of total production each.

Overall, the category is a highly fragmented sector, typically serving the specific needs of food processors in the US and EU for ingredients in areas such as dairy (e.g. flavored yoghurts), baby food, rice packs, prepared dishes, instant desserts and fruit teas. These markets are predominantly based in the EU, US and in some parts of Asia (especially Japan), and usually carry customer specific requirements such as water content, color and flavor. Given these specific requirements, market access for new entrants without highly sophisticated food processing capabilities can be challenging, but prices in some niche areas can be substantially higher than fresh fruit.

Overall, specialty fruit constitutes a potentially attractive set of niche areas, but the accessibility to these niches will be broadly dependent on the nature of each country's specific comparative advantages and will typically require an established food-processing sector.

Juice

Juice is the leading category of processed fruit, accounting for 50% of total volumes in 2009. Asia is the leading producing region for all juices, with China a particularly high producer of concentrated apple juice. Across fruits, orange is dominant, with pineapple the leading tropical fruit juice.

From the African perspective, juice is a highly attractive category. It is a growth sector overall, with annual growth of 3.7% per year to 2009. Indeed, tropical fruits such as mango are outperforming the overall sector at 4.8% year-on-year growth, based on a combination of increased interest in mature markets in new tropical flavors, and growth in emerging markets, which are familiar with tropical fruits. A large informal domestic sector exists in Sub-Saharan Africa, allowing domestically based processors to scale up on the basis of less challenging local market SPS requirements, before addressing the international market. Finally, for policy-makers, juice processing creates a combination of highly sophisticated agro-processing roles, and a large number of low skilled jobs involved in sorting, cutting and preparing fruit, especially during harvest seasons. Below, we review the juice processing opportunity for African players in more detail.

JUICE PROCESSING

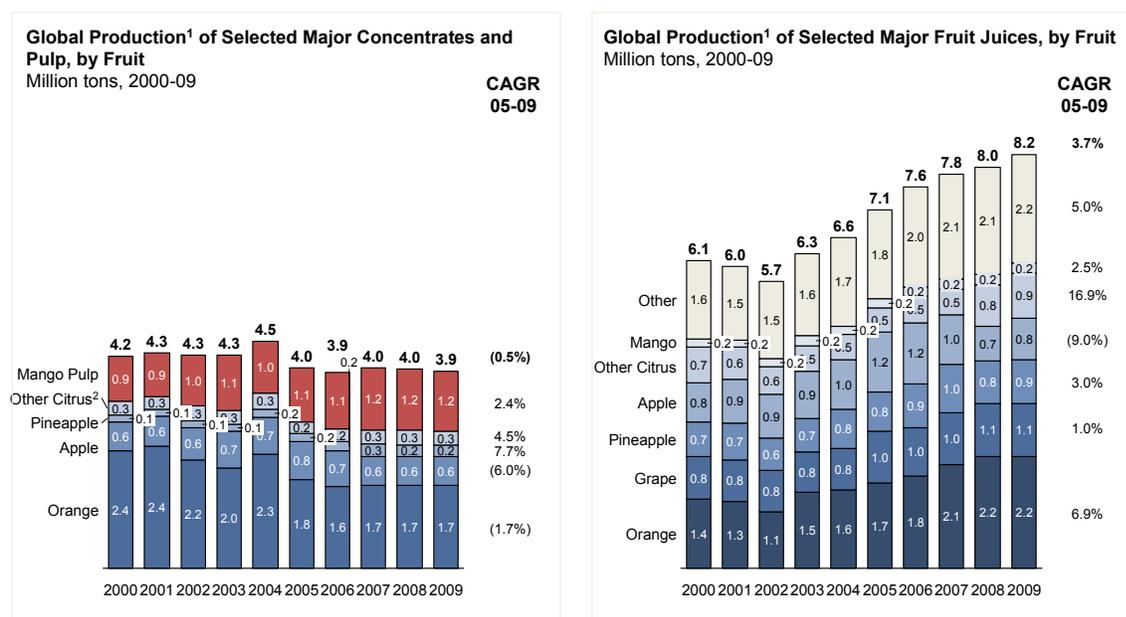
As outlined earlier, juice processing encompasses two main activities: *fruit processing* to produce either pulp or concentrate, which are termed in this report 'juice intermediates', and *juice manufacture* to mix the concentrate or pulp with water, sugar and other stabilizers as necessary and packaging to create a final consumer goods product.

Juice intermediates include globally traded agro-commodities such as Frozen Concentrated Orange Juice (FCOJ) and Frozen Concentrated Apple Juice (CAJ). These have established forward markets and suffer from the typical issues associated with heavily traded commodities, such as speculative trading and price volatility that create margin risk for export orientated fruit processors. Juice manufacturing is a fast-moving consumer goods industry with a range of major multinational players such as Coca Cola and PepsiCo, as well as regional and local players that compete for share of retail and foodservice sales. In emerging markets that are typical of Sub-Saharan Africa, the informal sector can be, at an aggregated level, a substantial part of the fruit juice sector, accounting for up to 70% of volumes in countries such as Kenya.

The global fruit juice market is growing at 3.7% per year in volume terms, while the market for intermediates appears to be flat. Fruit juice is an ‘affordable indulgence’ with an increase in per capita consumption that is tied to per capita incomes. For example, Germany and Norway had per capita consumption levels for 38.9 and 37.2 liters per year respectively, while Asia-Pacific and the Africa & Middle East region had per capita consumption levels of 2.1 and 2.7 liters in 2009. On this basis, overall fruit juice consumption tends to rise at least as fast as per capita GDP.

Within the total ‘fruit juice’ category, different types of juices have different dynamics. The most important trend at the global level is a shift away from made from concentrate juices towards ‘Not From Concentrate’ fruit juices, which are believed to be more natural and healthier. As a result, concentrate production has stagnated.

FIGURE 14: GROWTH IN GLOBAL JUICE AND CONCENTRATE PRODUCTION, 2000-2009¹⁷



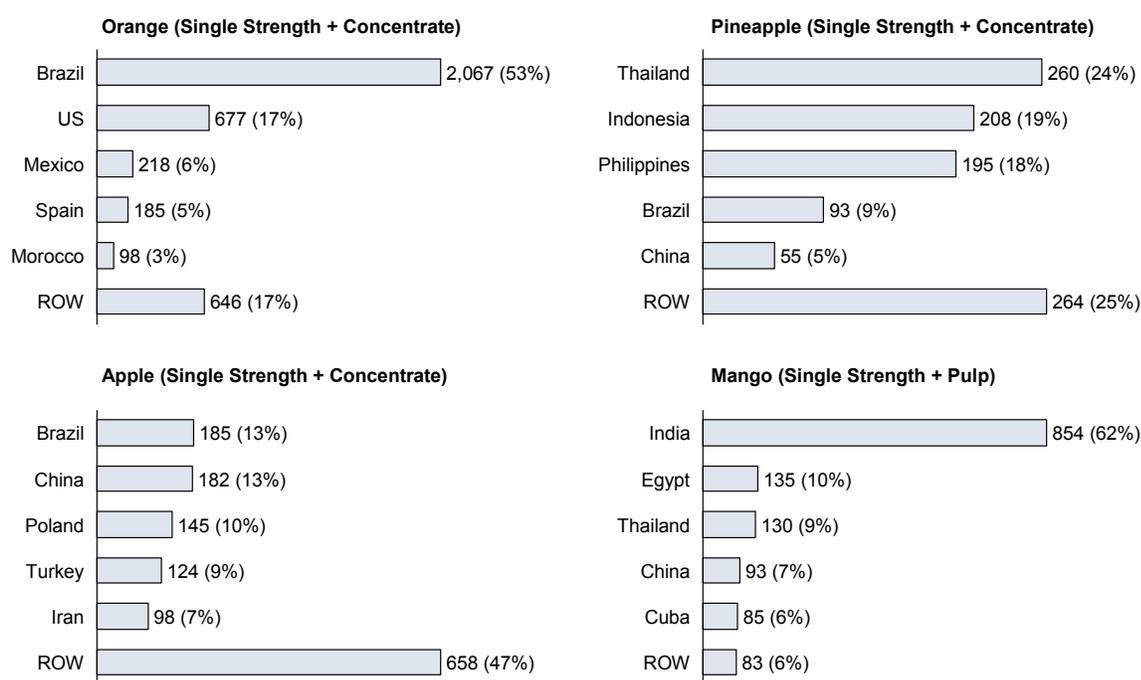
Orange juice (OJ) dominates the global market for both concentrates and single strength juice, and is a clear reflection of the shift in consumption towards not-from-concentrate and away for from-concentrate: Single strength production has risen robustly over the period 2005 to 2009, while production of concentrate has contracted. The US, Brazil and, to a lesser extent Southern Europe (especially Spain) are key producers of OJ.

¹⁷ Based on FAOstat data which is highly incomplete at the global level, even for the fruits that are tracked. Figures presented should be taken as indicative of a lower bound only

Apple and grape juice are key temperate fruit juice products, with Poland and China leading producers. Pineapple is the leading tropical fruit juice consumed globally.

The largest fruit juice consuming region, the EU, consumed 11.3 billion litres in 2009, approximately 28% of global consumption. Orange and apple juice accounted for 50% of total consumption (35% and 15% respectively), while the leading tropical juice, pineapple, accounted for 5% share of consumption. North America and the Asia-Pacific region are also important markets for juice intermediates and fruit juice manufacturers, accounting for 24% and 20% of global consumption respectively in 2009. Africa and the Middle East combined accounted for only 9% of global consumption; however, the consumption in emerging markets in Sub-Saharan Africa (and in Asia) are likely to be understated, given the importance of the informal processing sector.

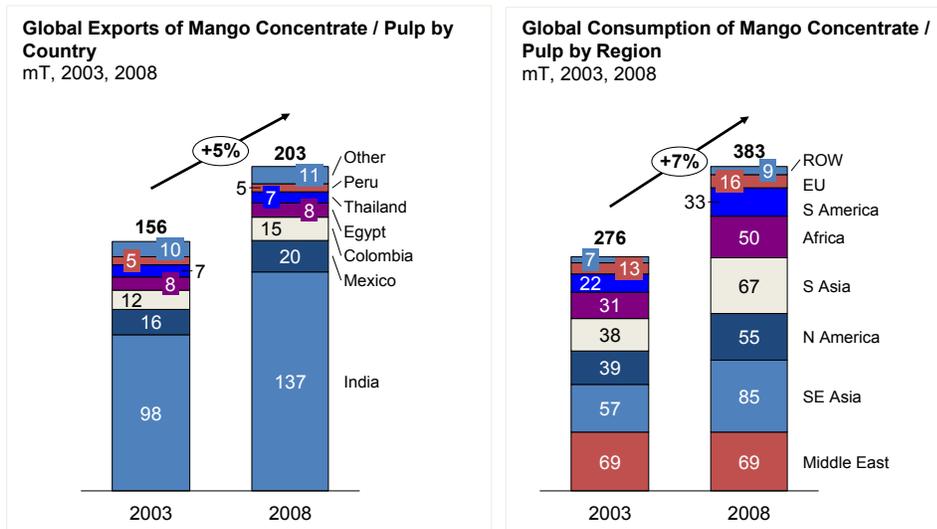
FIGURE 15: LEADING FRUIT JUICE AND CONCENTRATE PRODUCING COUNTRIES, SELECTED FRUITS, 2009, '000 TONS



Source: FAO; Dalberg analysis

As a result, there is a substantial flow of juice and intermediates from juice producing regions of Latin America and East Asia to key consumption markets in North America and the EU. Consumption patterns and therefore patterns of trade are different for tropical fruits. The Middle East and South East Asia are important consumption markets, with particularly fast growth in South East Asia consumption for the example of mango pulp, as shown in Figure 16. Given that East African fruit exporters indicate that these are addressable and growing markets for fresh mangoes, these may also be potentially addressable opportunities for prospective processors in the region.

FIGURE 16: KEY EXPORT AND IMPORT MARKETS FOR TROPICAL FRUIT JUICE – MANGO EXAMPLE



Source: USAID, PARNAV International, PAMCO, Dalberg analysis

4. The African Market¹⁸

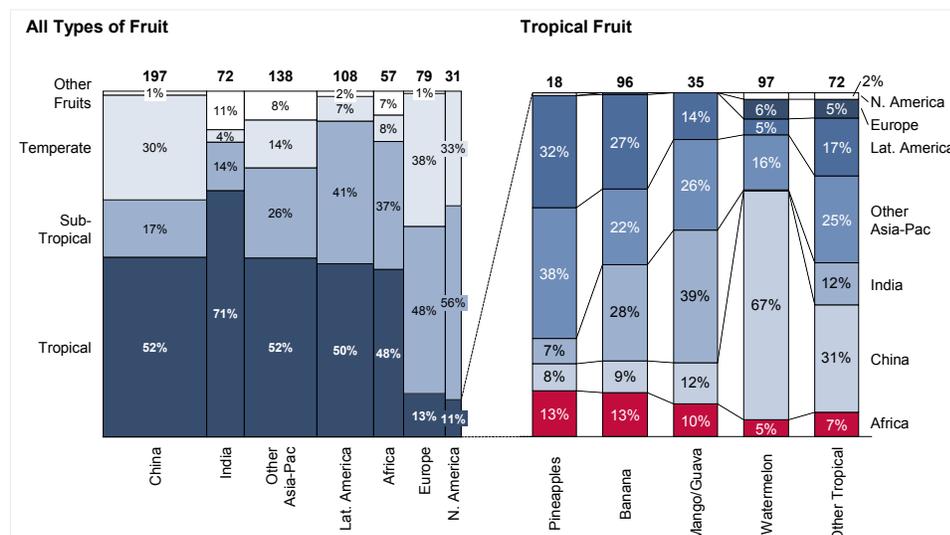
FRESH FRUIT

Production

Africa is not the leading region in any major tropical fruit production, but at the global level it is still an important region for the total production of pineapples, bananas and mangoes, accounting for more than 10% of volumes in 2009.

¹⁸ The accuracy of FAO data on year-to-year changes in fruit production is constrained by the need for FAO to estimate production volumes for many countries, with estimates typically being set as exactly equal to the level of production for the most recent year for which data is available. As a result, assessment of African production in this section can only be indicative.

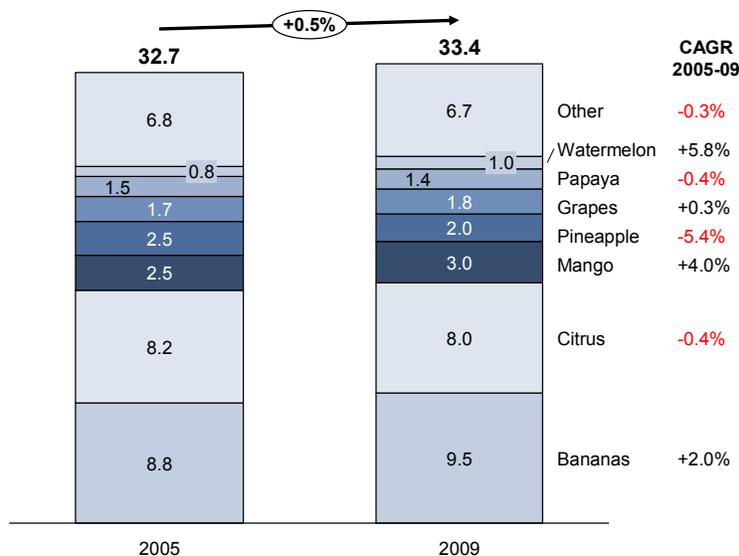
FIGURE 17: AFRICA'S SHARE OF TOTAL FRUIT PRODUCTION, 2009, MT



Source: FAO; Dalberg analysis

Fruit production in Sub-Saharan Africa has grown by almost 1% per year between 2005 and 2009, which is lower than the overall global growth of 2.7% (as shown in Figure 6). Within this, major fruit categories such as bananas, mangoes and oranges have grown robustly at 2 percent per year or more in volume terms, while pineapple output has fallen, especially in Kenya, Cote d'Ivoire and South Africa.

FIGURE 18: FRUIT PRODUCTION IN SUB-SAHARAN AFRICA, MILLION TONS, 2005-09



Source: FAOSTAT; Dalberg analysis

The banana – both sweet and starchy varieties¹⁹ that are either directly consumed fresh, used in cooking or in brewing – remains the most produced fruit in Africa, accounting for 25% of production by volume. Banana is a staple consumption crop in East Africa, and a major export crop for Cote D'Ivoire and Cameroon. Oranges are the second most produced crop, accounting for 13% of production by volume in 2008.

¹⁹ Fruit in this report excludes plantains, which is included substantially increases the total volume of fruit production. Some varieties of banana, for example those used for brewing or making juice, are classified as plantains by FAO

FIGURE 19: TOP 10 FRUIT PRODUCING COUNTRIES IN SUB-SAHARAN AFRICA, 2009

	Production (mT)			Share of SSA Production	Breakdown of Production by Fruit (mT, 2009)							
	2005	2009	% Growth		Bananas	Citrus	Mango	Pineapple	Grapes	Papaya	Watermelon	Other
Nigeria	8.1	7.3	-2.3%	22.0%	-	3.8	0.8	0.9	-	0.8	-	1.1
South Africa	5.8	6.0	0.7%	17.9%	0.4	2.2	0.0	0.1	1.7	0.0	0.1	1.5
Tanzania	2.7	3.9	9.2%	11.6%	3.2	0.0	0.3	0.0	0.0	-	0.0	0.2
Kenya	1.9	2.1	2.4%	6.3%	0.8	0.2	0.5	0.3	-	0.1	0.0	0.2
Sudan	1.3	1.4	2.3%	4.3%	0.1	0.2	0.2	0.0	-	-	0.1	0.9
Cameroon	1.1	1.3	3.7%	3.8%	1.0	0.0	0.0	0.1	-	0.0	0.0	0.2
DRC	1.3	1.1	-3.6%	3.2%	0.3	0.2	0.2	0.0	-	0.2	-	0.1
Madagascar	1.0	1.0	0.6%	3.0%	0.3	0.1	0.2	0.0	0.0	-	-	0.3
Côte d'Ivoire	0.7	0.8	3.7%	2.5%	0.4	0.1	0.0	0.2	-	0.0	-	0.1
Ghana	0.7	0.8	3.3%	2.4%	0.1	0.6	0.0	0.1	-	0.0	-	0.1
Other	8.1	7.7	-1.5%	22.9%	2.9	0.7	0.6	0.3	0.0	0.3	0.7	2.0
Total SSA	32.7	33.4	0.5%	100.0%	9.5	8.0	3.0	2.0	1.8	1.4	1.0	6.7

Source: FAO; Dalberg analysis

Nigeria is the largest producer of fresh fruits in Sub-Saharan Africa, accounting for 22% of the region's total production, followed by South Africa with 18% in 2009. Nigeria is a leading tropical fruit producer for fruits such as mango, while South Africa is a leading temperate and sub-tropical fruit producer; both countries are major producers of citrus fruits. Most remaining countries in Sub-Saharan Africa produce less than 2 million tons, with the exception of Tanzania and Kenya.

The South African horticulture sector has a markedly higher skew toward commercial farming than other countries: Much of South African production is subsequently traded both within the region and with key international export markets in the EU and US. Smaller producers like Kenya tend to have a limited range of export crops (in this case principally pineapples, mangoes and bananas), with a long tail of other fruits such as papayas, watermelons, plums and avocados that tend to be consumed on farms or in local markets.

In terms of consumption, East and West African countries are the largest consumers of fresh fruits in Sub-Saharan Africa, with the largest volumes concentrated in Nigeria, Ghana, Uganda, Kenya and Rwanda. East Africa is also the fastest growing region in Africa in terms of fruit consumption, driven by increasing income levels and stable population growth in recent years, especially in countries like Kenya and Rwanda, while West Africa is growing at a comparable rate to East Africa.

International trade

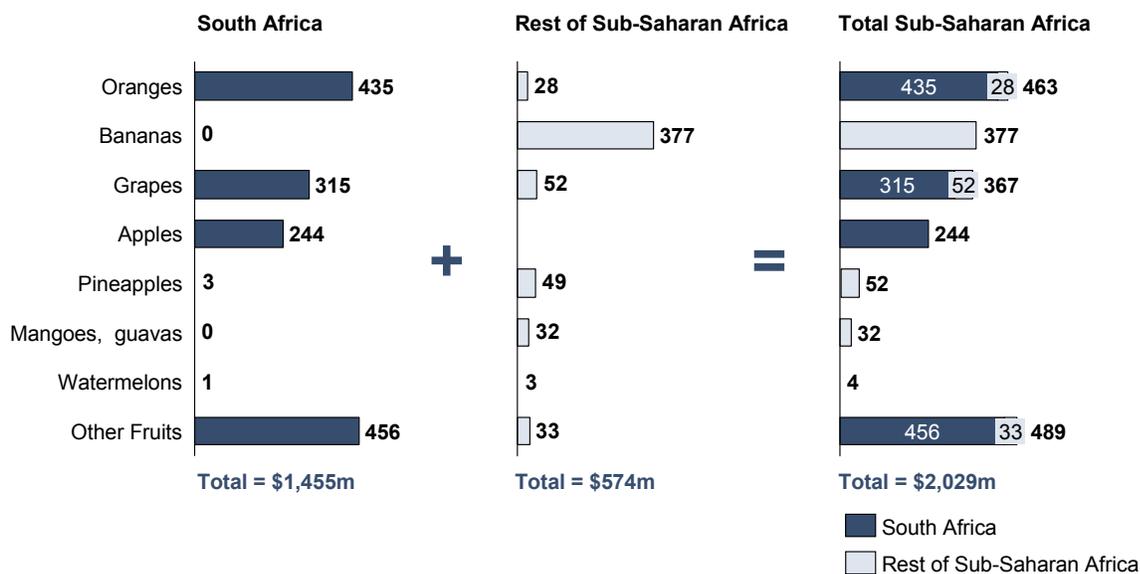
Fresh fruit exports has been increasing rapidly at 13% per annum between 2000 and 2008; this is far faster than the rate of growth of overall fruit production in Sub-Saharan Africa, and is indicative of the emergence of two segments of the African horticulture segment:

- **Domestically orientated farmers:** Typically, this refers to smallholders who have farms of less than 5 hectares, and who grow some vegetables and fruits on a small proportion of their total land both as a source of food and as a potential cash crop. These farmers either lack access to or are unable to afford inputs such as good quality seed, fertilizers and herbicides necessary for maximizing yield, and they

typically do not spend much of their labor on the horticulture crop; as a result, yield growth and overall production growth is low.

- **Commercial farms:** These larger farms are engaged in commercial horticulture, and are able to invest in inputs, apply best agronomic practices and ensure adherence to global quality standards such as GlobalGAP (“Good Agricultural Practices” guidelines that are globally accepted as standards for major commercial buyers, typically referred to as the GlobalGAP) in order to ensure export market access.

FIGURE 20: VALUE OF THE SUB-SAHARAN AFRICAN EXPORTS BY FRUIT, 2008

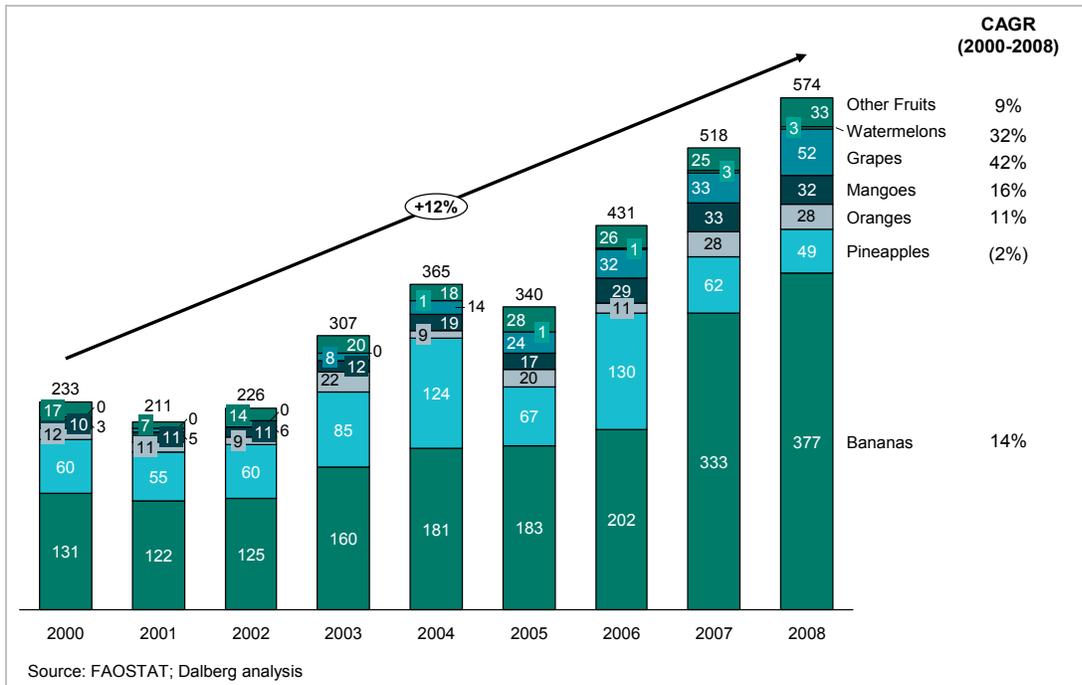


Source: FAOSTAT; Dalberg analysis

Within Sub-Saharan Africa, South Africa is the predominant exporter, realizing \$1.4bn out of a total of \$2.0bn in 2008; therefore, the country needs to be considered separately from the rest of Sub-Saharan Africa in order to get a clear perspective on the subcontinent’s market.

Excluding South Africa, Sub-Saharan African exports totaled \$574m in 2008, growing at an average rate of 12% per year since 2000.

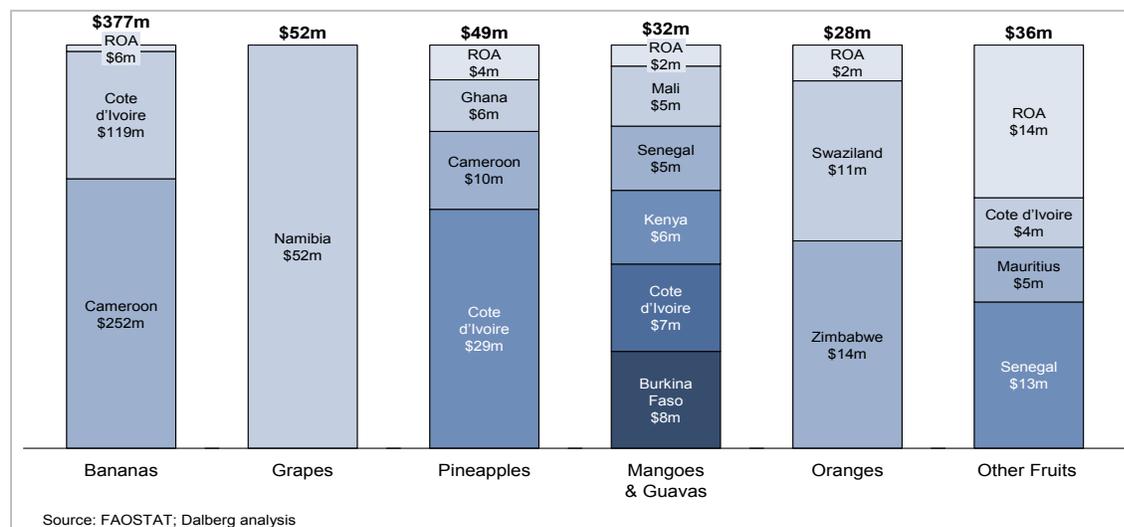
FIGURE 21: GROWTH IN FRESH FRUIT EXPORTS FROM SUB-SAHARAN AFRICA (EXCLUDING SOUTH AFRICA), 2000-08



Bananas are the dominant export fruit, accounting for \$377m of the total. Behind bananas are four major export fruit crops: grapes, pineapples, mangos and oranges. The set of key exporting countries differs for each fruit: Namibia is the primary exporter of grapes from Sub-Saharan Africa when South Africa is excluded; West African countries, in particular Cameroon and Cote d’Ivoire, lead the exportation of bananas and pineapples; and exports of mangoes are the most diversified in terms of origin within Africa, with countries from both East Africa and West Africa having a significant share.

Fresh fruit exports from East Africa tend to be sold to countries in the Middle East and South Asia, especially during the Northern Hemisphere off-season for tropical fruits, while West African countries export fruits largely to the EU. While North America is a significant import market, Latin America is more favorably positioned to serve that demand.

FIGURE 22: COUNTRY SHARE OF FRUIT EXPORTS FROM SUB-SAHARAN AFRICA (EXCLUDING SOUTH AFRICA), 2008



FRUIT PROCESSING

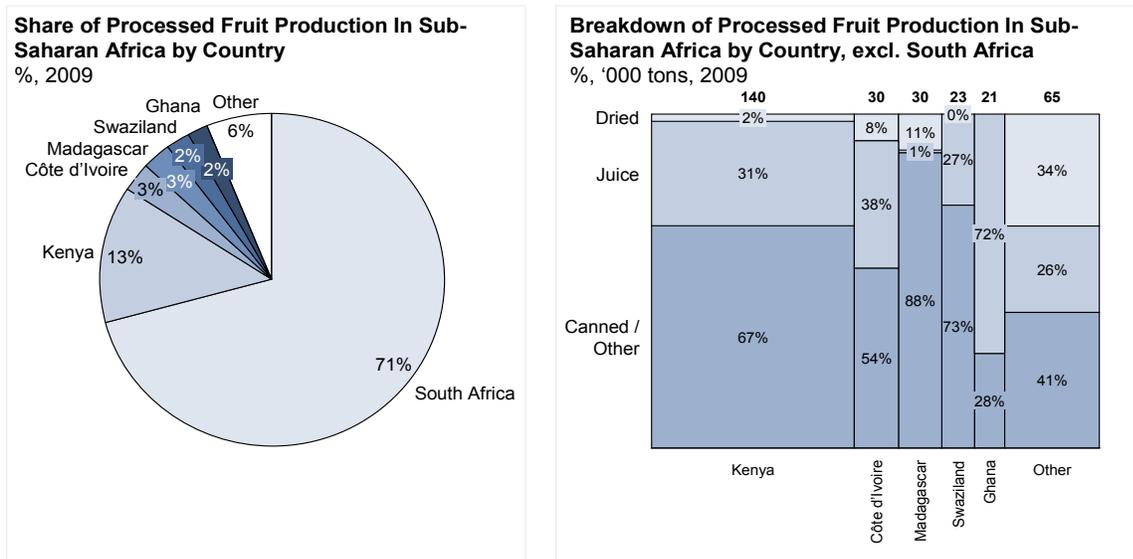
For the majority of Sub-Saharan African countries, the fruit industry does not advance significantly beyond fruit production and export. Given the early stage and heterogeneity of this sector, and the lack of reliable and comprehensive data on fruit processing for the region, only high-level insights can be gathered from sources such as FAO.

Processing in Sub-Saharan Africa is dominated by South Africa, which has a well-developed agro-processing sector and a high degree of focus on horticulture. South Africa accounted for more than 70 percent of processed fruit in the region by volume, with fruit juice and canned fruit, especially pineapple, the most significant products. Major fruit processors include Ceres, which produces a range of fruit juices that are exported regionally and internationally, and players like Dole, who focus on trading fresh fruit but who also have a portfolio of processed fruit (and vegetable) products.

Beyond South Africa, Kenya is also a major player in fruit processing, accounting for 13% of total processed volumes. Kenya similarly produces substantial quantities of canned pineapple via Del Monte's operations in Thika, and has several domestic fruit processors.

Countries such as Nigeria, with a ban on the import of fruit juice in individual consumer sized packaging, appear to be understated in the data. However, a domestic sector involved in the repackaging of fruit juice, as well as the mixing of concentrate to create juices, exists and is growing on the basis of rapidly rising domestic juice demand.

FIGURE 23: PROCESSED FRUIT PRODUCTION BY COUNTRY IN SUB-SAHARAN AFRICA, 2009



Source: FAO; Dalberg analysis

Overall fruit juice consumption in Sub-Saharan Africa is estimated to be growing at more than 7% per annum²⁰; while a robust quantification of juice production is not available, it is likely that processors' volumes are growing at least as fast as this level. The sector is largely characterised by informal processors today, but the share of volumes is shifting toward the formal sector, driven by the growth of organised retail, and the increased reach of branded juice manufacturers across both formal and informal sales outlets.

SEGMENTATION OF COUNTRIES IN THE AFRICA TRANSFORMATION REPORT

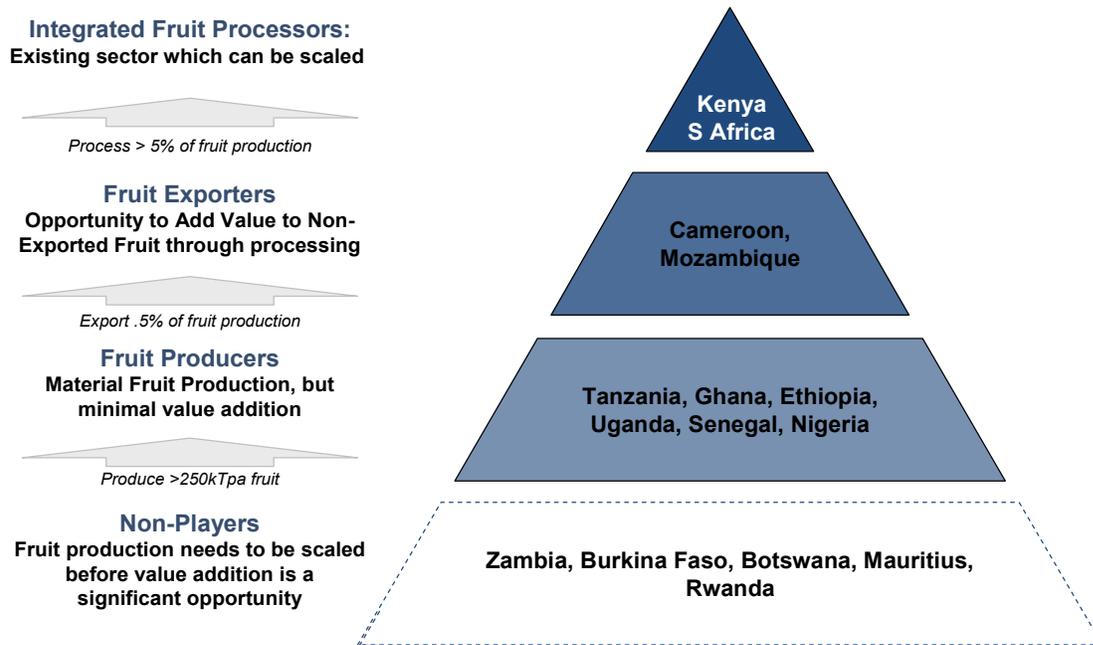
African countries can be categorized, in terms of their sophistication in adding value to fruit, into three main groups:

- Fruit Producers:** Countries such as Tanzania, Ghana and Senegal are material producers of fruit (all produce more than 250,000 tons of fruit per year), but currently do not add value to a significant share of output through either processing or exporting, which therefore appear to be opportunities for value addition. Typically, these countries have a limited degree of processing (for example, Jakana produces fruit juice in Uganda using local produce) but face substantial challenges to scaling, including access to finance and sourcing sufficient quantities of fruit of the right quality at low enough cost.
- Fruit exporters:** Cameroon and Mozambique are both scale producers of fruit and export a significant share of output. In both cases, exports are focussed on bananas, and the countries have yet to exploit substantial opportunities in fruit processing. Challenges in developing processing are similar to those faced by "Fruit Producers": an existing, niche industry faces challenges in scaling.
- Integrated Fruit Processors:** Kenya is a key example of a country that is able to extract value from fruit by exporting 'export-quality' fruits both internationally and within the region, and by processing fruits locally, especially for juice manufacturing.

²⁰ Based on Euromonitor estimates of African juice consumption growth from 2007-2012 of 7.1% CAGR

A final category of country – those considered ‘non-players’ – does not have a significant volume of fruit production today, and includes countries such as Zambia, Burkina Faso, Botswana, Mauritius and Rwanda. Opportunities in value addition for the fruit category may well exist in these countries, and processing may well exist to an extent already: For example, fruit processing facilities have been developed with government support in Rwanda. However, the current scale of the fruit processing opportunity may not justify a primary focus on this category to drive a transformational change in the agro-processing sector when compared to other commodities – such as cotton for Burkina Faso, or soybean for Zambia. However, a more detailed country-level analysis (in line with the approach outlined later in “Considerations and Steps Required to Develop Policy”) would be required to determine the country-specific factors that will determine the attractiveness of pursuing fruit processing for any particular country.

FIGURE 24: SEGMENTATION OF COUNTRIES IN THE AFRICA TRANSFORMATION REPORT BY TYPE OF FRUIT VALUE ADDITION OPPORTUNITY



Source: FAO; Dalberg analysis

Below we provide a deeper review of a selection of countries featured in the Africa Transformation Report, and the common situations they face.

INTEGRATED FRUIT PRODUCTION-TO-PROCESSOR: KENYA

Kenya’s horticulture sector has successfully integrated into the world export market and into a domestic agro-processing sector; however, both commercial activities still face substantial challenges that typify the difficulties for sector development in general.

Kenya typically produces 2.4 to 2.6 million tons of fruit each year, with the largest share comprising bananas, mangoes and pineapples, at 1.2, 0.5 and 0.3 million tons respectively in 2009. Smallholders produce the majority of output, accounting for 61% of mango production and 72% of passionfruit production. Larger farmers and producer groups with a commercial orientation typically account for less than 20% of fruit production.

A significant exception is the production of pineapple: Pineapple production is largely conducted in plantations in Thika for fruit processing by Del Monte, which produces canned pineapple for the domestic and international export market. The vast majority of pineapple cultivated in Kenya is therefore taken up through the processing sector.

Kenya also has a thriving fruit juice sector that includes local processors that compete with international brands. The largest players in terms of capacity are Keveian (*Pick n' Peel*), Milly Fruit Processors (*Picana*), and Sunny; Britania (*Splash*) in Uganda and Ceres from South Africa. also have a significant share of fruit juice sales in the formal sector. These major players process locally sourced fruit, and (with the exception of Sunny) then produce fruit juice for the consumer market, while some smaller players such as Yatta and Miritini or international majors such as Coca Cola, mix concentrate.

The domestic fruit processing sector is growing to serve a rapidly rising local demand, especially in the formal retail sector. However, domestic producers face high energy costs (especially given the requirement to carry redundant supplies and high levels of fuel), high packaging costs and challenges in locating affordable finance, especially for working capital. The highly fragmented nature of fruit production requires processors typically to rely on consolidators, which may charge a 20% mark-up on farmgate prices for fruit that is suboptimal (in size, variety or ripeness) for processing.) This leads to relatively low yields or additional processing costs to make the product fit for processing. As a result, processors are not willing to pay high enough prices to justify farmers' harvest of the entire fruit crop, and for some fruits such as mango, which has a very compressed harvesting seasons, up to 30% of the crop may go unpicked.

Given the high costs and management challenges of adhering with international health and safety regulations, the Kenyan juice processing industry is largely domestically orientated, with some regional sales. To date, this does not appear to be a significant brake on growth, as domestic demand is flourishing but it will be a longer-term challenge for the sector.

Compared with flower and vegetable exports, the fruit export sector has performed poorly, with mostly stagnant volumes exported per year. While the vegetable sector has successfully adopted GlobalGAP, and ensured that smallholders are aware of and comply with minimum residue levels (MRL), guidelines that prohibit the use of herbicides and pesticides shown to threaten humans if consumed, the fruit sector has not been able to achieve the same successes, and also suffers from a high incidence of pests like the mango weevil, which is hard to detect visually and manage. However, some fruit exporters do report successes in some specific areas, such as penetrating the Middle East market with sales of mango and avocado, and cite the Indian off-season market as an attractive and growing opportunity.

The Kenyan horticulture sector until recently has been highly regulated by the Horticultural Crop Development Agency (HCDA). Until the early 1990's, the HCDA had a highly interventionist role, with power to fix farmgate prices, regulate trade, operate processing facilities and market horticultural goods. However, this was unsuccessful in stimulating growth in horticultural output or the development of an efficient, sustainable horticultural sector; The HCDA now has a smaller role focussed on information dissemination to farmers, and the provision of supporting services such as logistics and cold storage for prospective exporters. Other programs also exist to develop the processing sector, such as the Bill and Melinda Gates funded program, involving Technoserve, to develop producer groups, better agronomic practices and to introduce new varieties of fruits with better processing characteristics, like yellow passionfruit.

FRESH FRUIT EXPORTER: CAMEROON IN THE GLOBAL BANANA TRADE

Cameroon's fruit sector is dominated by the banana trade; of the 1.4m tons of fruit produced in 2009, 1.1m tons were bananas. However, less than 30 percent of production is exported, due to the importance of bananas as a staple food. Beyond bananas, a relatively small volume of pineapples (10,000 tons), and only marginal volumes of other horticultural products are produced. In the global context, Cameroon is a relatively small player, with only 1 percent of global banana production and 1.5 percent of trade. However, for Cameroon, the banana is an important part of the economy, accounting for 5% of GDP, direct employment of 12,000 people, and responsible for a further 35,000 indirect jobs.

Cameroon's focus on the banana sector is due to a combination of proximity and preferential access to the EU market, and natural agricultural and climatic conditions that favour banana cultivation. The preferential access was part of a banana import regime in the EU that allowed Africa-Caribbean-Pacific (ACP) countries to export up to 775,000 tons into the EU without any customs penalties, while South American bananas from major exporters – in particular Ecuador and Colombia – carried very high tariffs of 176 Euros per ton. Following a WTO agreement in 2009, the EU is in the process of gradually reducing the tariffs on South American bananas, eliminating a key advantage for Cameroon.

Banana production is dominated by the state-owned Cameroon Development Corporation (CDC), which accounts for approximately 30 percent of production volumes. Private sector producers and exporters, such as the Mbanga Plantations Company and farmer co-operatives account for the remaining volumes.

The EU has provided €190m to ACP countries to support their adjustment to greater competition from South American producers, which are able to produce at a lower cost per ton and therefore threaten to erode ACP's share of the EU market. The CDC is leading the Cameroonian sector to increase the scale of production, drive down costs of production and develop a brand, the "Makossa Banana," to aggressively push to retain share of the EU market.

Cameroon also has a small processing sector, producing dried and fried bananas and banana-based alcohol from companies such as Taless Dry Foods, Cameroon Friture and GIC GIDESI; but these tend to be small businesses operated by NGOs that have not achieved scale.

FRUIT PRODUCER WITH EXPORT GROWTH POTENTIAL: SENEGAL

Senegal is a producer of fruits that has leveraged its good quality infrastructure and proximity to the EU to move from fruit production to fruit exports.

Agriculture accounts for 17% of the GDP of Senegal, and employs approximately 70% of the workforce. The horticulture sector involves approximately twenty active companies grouped in two federations (ONAPES and SEPAS). In terms of horticulture production and export, the Senegalese sector is divided into three tiers: three companies are involved in activities that cover the value-chain from production, post-harvest processing and export that account for 50% of traded volumes; a second tier of approximately ten companies export 200 to 500 tons of produce per year; beyond this, a range of smaller players are active in production and processing, and typically serve as suppliers to major exporters.

The major fruits produced in Senegal are watermelons, mangoes, oranges and bananas with the production volumes in 2009 of 190, 105 and 41 thousand tons respectively. Mangoes are the third largest horticultural export overall, behind green beans and cherry tomatoes, and make up the majority of Senegalese fruit exports, which primarily go to the EU. Senegal's prime location allows it to be a gateway to West African markets. Senegal has strong ties with other West African countries and is a member of the West African Economic and Monetary Union

(WAEMU), as well as the Economic Community of West African States (ECOWAS). Senegal also has a relatively well developed transport infrastructure, allowing rapid and cost-effective transportation, which is of particular importance in the horticulture sector.

Senegal's exportation of mangoes was facilitated by the support of the PPEA (Project for Promotion of Agricultural Exports) program, run by the government and the World Bank from 1998-2003. However, scope exists for a substantial increase in export volumes: Only 8% of mangoes and 0.4% of watermelons were exported in 2006.

Liberalization of the agricultural sector, allowing unfettered import and export of agricultural products, started in 1995, with an expectation that the sector would be able to increase its export volumes. While this has been achieved, liberalization has led to a widening of trade deficits as import growth outpaced exports. As a result, Senegal is a net importer of fruit: Exports from Senegal accounted for revenue of \$7.5m in 2008 while imports accounted for \$23.4m.

Recently, Senegal's natural comparative advantages and advantaged access to EU markets has led to interest and investment from international horticulture players, which the government of Senegal is leveraging to catalyze growth in the horticulture sector. As an example, Agricola Famosa, the largest producer of melons from Brazil, has signed a partnership agreement with the government of Senegal for the development of commercial melon cultivation for export to the EU market, requiring an investment of \$10m and access to 600 hectares of land.

5. The Value Capture Opportunity in Fruit

OPPORTUNITIES FOR VALUE CAPTURE

Opportunities to add value to fruit are not limited to processing: exploiting opportunities for exporting fruit internationally and regionally, as well as improving the quality of the local supply chain provide additional ways to increase the price and therefore capture more value from the category. At a high level, opportunities can be segmented along two dimensions:

- **Fresh versus processed:** Fresh simply involves the sale of fresh fruit, and requires capabilities for management of quality and efficiency across the supply chain, and ensuring rigorous compliance to food safety and agricultural regulations relevant to the target market. Processed fruit can involve canning, drying or juice processing, all of which require excellence in upstream supply chain management to secure efficient levels of processing facility utilization, and a similar attention to food safety compliance.
- **Domestic versus export:** Export sales require adherence to complex and often challenging sets of Sanitary and Phytosanitary regulations, other food safety and agricultural practice regulations, and management of complex logistics. Domestic sales are can potentially be less complex in execution, but require identifying local markets.

FIGURE 25: THE SIZE OF THE VALUE CAPTURE OPPORTUNITY IN FRESH AND PROCESSED FRUITS

	Market Size: c\$50bn	Market Size: c\$15bn
Exports	<p>Description</p> <ul style="list-style-type: none"> • Smaller than domestic fresh market, with some key current fruits (banana) and several emerging major fruits (pineapple, mango) • Several fast growing niches (avocado, kiwi, berries) <p>Nature of opportunity</p> <ul style="list-style-type: none"> • Cultivation of key export 'cash crop' fruits to international quality standards • Improve infrastructure and produce at scale 	<p>Description</p> <ul style="list-style-type: none"> • Smaller than fresh, but faster growing • Orange and apple juice dominate, sales are largely to EU and North America, although Middle East and Asia emerging as key markets for tropical processed products <p>Nature of opportunity</p> <ul style="list-style-type: none"> • Develop secure supply of local fruit / sources of concentrate or pulp when out of season • Production of concentrate and/or juice for international market
Domestic	<p style="text-align: center;">Market Size: c.\$10bn</p> <p>Description</p> <ul style="list-style-type: none"> • The majority of fruit volumes today • Opportunities for countries are in exploiting growth in intra-regional trade and growing domestic consumer markets through growing 'modern trade' channel (e.g. Massmart in SA) <p>Nature of opportunity</p> <ul style="list-style-type: none"> • Drive volume through improved supply chain & higher production 	<p style="text-align: center;">Market Size: <\$1bn (growing fast)</p> <p>Description</p> <ul style="list-style-type: none"> • Characterized by two major products: juices and dried fruits, with juices dominating. • Nascent 'formal' market, although informal sector can be material. V fast growth expected as overall sector grows and formalises <p>Nature of opportunity</p> <ul style="list-style-type: none"> • Develop fruit juice for local / regional market • Develop secure supply of local fruit / sources of concentrate or pulp when out of season • Increase production of easily processed products such as dried fruits, esp at farmer / co-op level
	Fresh	Processed

DOMESTIC FRESH MARKET

The most immediate opportunity for capturing greater value in the fruit sector is to develop local production in order to service domestic demand, as an immediate and relatively low-complexity strategy to increase farmer incomes and improve general nutrition for consumers.

Across Sub-Saharan Africa, the domestic fruit market could be worth approximately \$10bn in value²¹ at farmgate prices. Consumption growth was estimated to grow by almost 3 percent per year²², as rising per capita GDP and associated shift to healthier eating habits amongst a growing middle class, as well as spend of income on a more diversified diet, are expected to support consumption growth.

The market constitutes both an opportunity for domestic farmers and for regional trade: currently only 6 percent of African fruit consumption (by value) is accounted for by regional or international imports. As a result, over 94 percent of fruit consumption in Africa is dictated by local agricultural output.

As an example of the scale of this opportunity, if all Sub-Saharan Africa countries were to shift to the emerging market average consumption level of bananas of 10kgs per capita²³, this could create a regional banana trade sector worth an additional \$1bn²⁴ at farmgate prices. This market is material, and can be easier to access than developed world markets with both regulatory barriers and high logistics challenges.

EXPORT FRESH MARKET

The global export market constitutes a \$50bn opportunity growing at almost 10% per year between 2000 and 2006 and at 19 percent per year from 2006-08. Tropical fruit is already an important share of global trade, with the most traded tropical fruits of banana, pineapple, mango and watermelons accounting for approximately 25 percent of value, although to date Latin American countries have a substantial share of these markets, especially for trade with North America.

How to access the fresh fruit export opportunity will vary from country to country, based on climatic conditions, seasonality, the degree to which production is based on smallholder farming versus commercial farming, proximity to key markets, especially the EU, and historical factors. Key exporters of fresh fruit in Sub-Saharan Africa, such as Kenya, Zimbabwe, Cote d'Ivoire and South Africa vary on all these counts, and therefore have different export sectors: Kenya's horticulture sector remains based on smallholder farming, thereby requiring an emphasis on efficient aggregation of volumes and reducing the burden (and therefore cost) of compliance with international SPS and GAP regulations, by introducing measures such as KenyaGAP; commercial farming has a larger role in Zimbabwe and South Africa production, both of which, given their distance from key North American and European import markets, have a heavy reliance on air freight; Cote d'Ivoire is focused solely on the export of two tropical fruits (bananas and pineapples) to the EU and leverages its established sea-freight links for logistics.

Four issues need to be addressed for any country to have scope for entry or growth in the export sector:

²¹ The value of the domestic fresh fruit market is very difficult to evaluate, given the challenges in determining the proportion of fruit that is not commercially harvested, the proportion of post harvest losses across various formal and informal channels to market, and the actual realized prices for product in both informal and formal markets. We have assumed that c.30% of fruit production is not harvested due to a lack of market or infrastructure to make harvesting worthwhile for farmers, and that an additional 30% of the remaining crop is lost through post-harvest losses. We have then applied a blended average of farmgate prices for the 5 major produced fruits by volume (bananas, oranges, watermelons, grapes and mangoes) from FAO data and applied this to the remaining volumes. All data was sourced from FAO stat and refers to 2008.

²² Based on Euromonitor's estimate of annual fresh fruit consumption in Africa of 2.7% per year from 2007 to 2012.

²³ Per capita consumption levels are based on comparing FAO stat data for apparent consumption (which we calculate as production, plus imports, less exports) versus UN data on population. Note that this includes per post-harvest losses: not all apparent consumption is actually consumed, as some is lost in the supply-chain and on farm.

²⁴ Based on the total volume uplift in banana consumption assumed, if each country below 10kgs per capita were to raise its consumption to this level, which is equivalent to a volume increase of 3 million tons, multiplied by the average 2008 farmgate price of \$339 per ton from FAO stat, which is equivalent to approximately \$1bn in trade at farmgate prices.

- **Appropriate varieties and / or development of demand for indigenous varieties:** within any major fruit category, some varieties tend to be favored by consumers, especially in the major import markets in the EU and US. For example, the Alphonso mango, typically supplied from India, is considered by consumers to be the typical ‘mango taste’. Countries that aim to enter established markets need to consider whether they can produce the appropriate varieties, or whether they have indigenous varieties that can either be promoted or are similar to established ones. In this case Kenya’s Ngowe variety of mango has a similar taste profile to Alphonso, and could therefore be well placed to compete in EU markets, as well as in India’s off-season. Focusing on alternative markets such as the Middle East that may have greater tolerance for new or alternative varieties offers a potential alternative to this approach.
- **Cost efficient production and transport:** Production costs in Latin American countries for key export crops such as bananas tend to be lower than African countries. Although African countries may have preferential access to the EU market through the EU’s system of tariff-rate quotas, that make a provision for a large volume of low or tariff-free exports of bananas to the region, Latin American producers are able to leverage larger economies of scale from larger average farm / plantation sizes and generally lower cost logistics to close much of this differential. Beyond the EU, Latin American producers can often be a lower cost competitor to African countries
- **Quality and volume:** large grocery chains and food processors tend to be major buyers of fresh fruit in major import markets in the EU. Both sectors require sufficient, reliable volumes from suppliers; given that, beyond a most important 1-2 fruits, there tends to be a very broad range of fruits produced at low quantities per fruit in most countries in sub-Saharan Africa, and that fruit production is largely by smallholder farmers, potential exporters need to develop robust and reliable aggregation practices in their supply chain in order to be able to service clients’ demands for predictability and scale of supply. Both sectors also require adherence to quality standards (e.g. size, blemishes, color, ripeness, existence of sap or other debris on surfaces), which therefore requires exporters to ensure good quality selection processes are enforced, to avoid entire batches being downgraded to the price-level of the lowest quality fruit enclosed.
- **Adherence to regulatory standards:** access to key clients requires adherence to Food Safety standards (such as specifications on minimum residue levels – MRLs – for fertilizers, herbicides and pesticides). Compliance with the GlobalGAP standards on agricultural practices, which also include post-harvest handling and packing, are a basic requirement to ensure market access. For the smallest farmers, investing in certification and regular audits may not be cost effective, and therefore methods such as certification at the level of a co-operative need to be used.

DOMESTIC PROCESSED FRUIT MARKET

The domestic processed fruit market in Sub-Saharan Africa includes demand for juice, dried and canned fruit. Demand for the sector is difficult to quantify, but is likely to be fast growing, with juice as an example estimated to be growing more than twice as fast as fresh fruit consumption²⁵.

The size of the addressable opportunity may be larger than the market size estimate of less than \$1bn across the region, due to two main factors:

²⁵ Based on estimates of fruit juice consumption demand in Sub-Saharan Africa of 7.1% per year from 2007 to 2012, versus 2.7% per year for fresh fruit.

- **Low cost processing technologies**, such as solar drying, can be easily and cost-effectively adopted by smallholder farmers and co-operatives to add value or efficiently store harvested fruit. This allows farmers to extend the commercial cycle far beyond the natural harvest cycle, and therefore address demand that is completely un-serviced out of season
- **A large informal sector**, particularly in juice processing, exists in most Sub-Saharan Africa countries; USAID estimates that informal juice processing could account for 70% of total volumes. The formal sector is growing, as retail multiples increase share and as established brands extend their coverage of formal and informal outlets.

EXPORT PROCESSED FRUIT MARKET

The international market for processed fruit products is worth up to \$15bn, and is largely accounted for by fruit juice, versus canned/specialty and dried fruit.

Accessing the international market is likely to be the most challenging of the opportunities to increase the value of the fruit sector, due to the excellence in logistics, operational efficiency, and quality and food safety standards required.

African countries that aim to develop this sector to a level that is internationally competitive could consider this sector as the logical final phase in the development of the fruit agribusiness sector, which builds on the capabilities developed in earlier stages. A generic roadmap (for either private sector players, or for potential policy-makers) to develop an internationally competitive fruit processing sector could focus on initial, easier sectors initially:

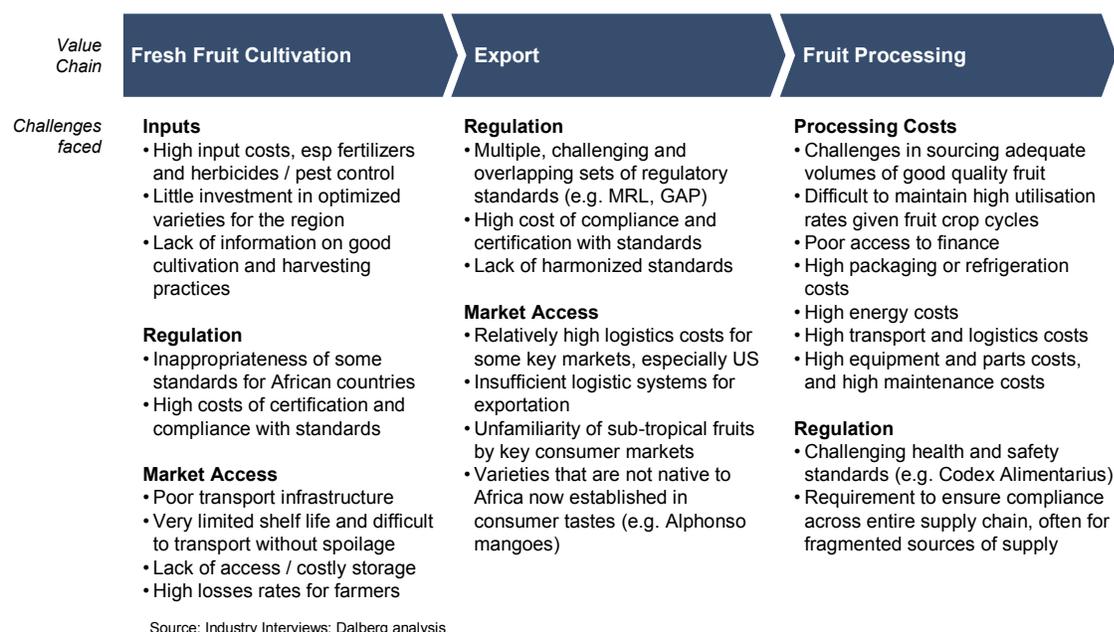
1. **Developing the domestic and regional market for fresh fruit:** this requires developing efficient and high-volume domestic production, efficient domestic logistics and providing basic levels of adherence to quality standards. Development of this sector might focus on identifying local or regional markets for the most naturally abundant fruits, while looking for additional niches for high value fruits such as berries that can be grown in the local [climate](#)^[3].
2. **Segmenting production by quality, and developing ways to monetize each level:** once basic production and infrastructure is in place, the agro-processing sector may transition to a more sophisticated approach of segmenting production into 2-3 sub-markets:
 - **Export-grade fruit:** this involves developing capabilities in compliance and monitoring of adherence to international standards such as MRLs and GlobalGAP, quality control to sort and separate out fruit that adheres to international clients' quality specifications, and developing cost-effective international logistics
 - **Local and regional consumption-grade fruit:** fruit that is not international export-grade can be diverted to the regional exports or local markets in order to realize value.
 - **Processing-grade fruit to use for domestic consumer products:** remaining fruits may be monetized by processing them to either preserve or convert them for human consumption, or produce animal feeds and associated bi-products. Initial market orientation may be for the domestic sector, such as local or regional grocers and hospitality / foodservice. At this point, the processing technology may not need to be at global best practice levels in terms of quality or efficiency, but processors will need to focus on developing stable, low-cost supplies of raw inputs in order to be economically viable, and therefore develop a robust supply-chain of aggregators and direct farmer relationships.

3. **Develop an internationally competitive processing sector:** shifting to internationally competitive processed products required challenging adherence to standards (e.g. Hazard Analysis of Critical Control Points, for juice processors, will involve monitoring and control points across the entire supply-chain from farm to packaged output to be monitored, controlled and enforced), and will need to build on the capabilities in sorting, quality control, domestic and international logistics excellence developed in prior steps.
4. **Ensuring availability of the right varieties of fruit, or using the right taste profile:** in a similar way to the export market for fresh fruit, the export for processed fruit requires processors to use varieties that match the requirements of clients' recipes. Countries need to ensure that they are able to match clients' requirements either by ensuring availability of supply of the right varieties, or using local varieties that have a similar taste profile. There may also be opportunities to promote unique and specialist varieties of common fruits; as an example, Tropicana has developed a broad range of specialist orange juices that use niche orange varieties as alternative products to its 'standard' orange juice.
5. **Consider investments in supporting infrastructure, in particular packaging:** given the importance and relative cost of packaging as part of a viable fresh export sector, public sector intervention may be warranted to develop for example a single packaging company that can has offerings that are internationally compliant and potentially at a discount, in order to facilitate market access for new entrants into the export sector. This is only one example, and the full case may be dependent on the benefits that such an entity could have to multiple sectors above and beyond the fresh fruit export sector.

CHALLENGES AND BARRIERS

Although value capture opportunities exist for many African countries in terms of fresh and processed fruit production, these can be challenging markets to enter. An overview of the broad range of challenges facing potential entrants is outlined below.

FIGURE 26: OVERVIEW OF CHALLENGES FACED BY SUB-SAHARAN AFRICAN COUNTRIES ACROSS THE FRESH AND PROCESSED FRUIT VALUE CHAIN IN AFRICA^[4]



FRESH FRUIT

For fresh fruit, ensuring efficient production of fruit to the point of sale is critical, and requires addressing challenges in three areas:

- **Cost effective fruit cultivation:** fruit cultivation in Sub-Saharan Africa is typically conducted on smallholder farms (with the exception of countries such as South Africa and Zimbabwe) with a focus on fruit production for domestic consumption, with little commercial orientation. Fruit production is considered an expensive and high-risk crop, with high investments required in fertilizers and herbicides / pest control, and typically little investment in optimized varieties for the region. As a result, yields are low, and fragmented across a large number of farmers, creating challenges, and associated costs in aggregation.
- **Low cost aggregation and distribution to sale:** poor transport infrastructure and the high cost of finance for working capital increase the cost of trading and aggregation, by increasing losses from poor transportation and handling, and thereby reducing the prices that aggregators can pay to farmers at the farm-gate for their production
- **Good practice in handling and storage:** fresh fruit typically has a short shelf life, making appropriate storage and handling critical to ensure that this is maximized, to reduce wastage at point of sale. Lack of information on good practices, and lack of access to costly storage such as cool rooms and refrigeration lead to high losses rates, which reduce the prices that can be paid to aggregators for their output

The cumulative effect of these challenges is to yield a low market price for fruit at the farm-gate that can make it uneconomic for farmers to either substitute their own time or hire labor to harvest the entire fruit crop. As a result, a substantial proportion of fruit crops – often up to 30%²⁶ - are not economic to harvest at all.

²⁶ Based on Technoserve’s estimate of the share of the Kenyan mango crop that is not harvested, due to a market price that makes it uneconomic to harvest. Jakana estimates that the level of wastage due to the lack of a market price that makes full harvesting worthwhile in the Ugandan mango sector is at least as high as Kenya.

In the context of the export market for fresh fruit, key markets such as North America and the EU remain the key opportunities. Several challenges must be overcome in order to be able to serve these mature markets:

- **Adhering to Sanitary and Phytosanitary requirements (“SPS”):** these regulations articulate standards for the acceptable levels of contaminants for foods. These can be demanding, and may also require certification of the processes used for production (codified in a set of “Good Agricultural Practices” or GAP), and can include requirements in terms of packaging and transportation conditions. In addition to the demands to meet these requirements, there can be variations in the standards used by region, with, for example, differences in the SPS and GAP requirements for China versus the EU. The lack of harmonized standards is compounded by the different, and typically higher, standards required for key private sector buyers such as supermarkets.
- **Domestic and International Logistics excellence:** many fruits spoil rapidly and can be damaged through improper handling and rough transportation. Speed of transportation can therefore be a vital determinant for fruits to be commercially viable as an export crop, especially for fruits with a high value-to-mass ratio; for example, berries produced in areas such as Israel are typically transported by air to key consumption markets in Europe, where the high price of berries, combined with the frequency of flights (and therefore volume of available air freight capacity) make this mode of transportation viable. Excellence also includes the ability of suppliers to be able to adhere to their clients’ delivery windows: key channels to consumers such as major grocers require that suppliers are able to provide a steady supply of fresh fruit, and do not want to bear the inventory risk of storing large volumes of rapidly perishable produce, and therefore require that their suppliers can manage logistics to ensure that their inventory is minimized.
- **Efficient production costs:** Key exporters to the EU and US--Latin American countries such as Brazil--are able to produce at low cost, and manage logistics costs to be able to compete in markets against suppliers in regions such as Sub-Saharan Africa. While not the sole determining factor, the ability of commercial farmers to produce at prices competitive with other players will require managing input and logistics costs and maximizing production efficiency: typically smallholder farmer models are not optimally suited to scale commercial production at costs that can compete at the global level.
- **Selection and Quality Control:** Fruits produced can vary substantially in type and quality based on the types of varieties grown, quality of husbandry and inputs and the manner of post-harvest handling. While there are a very broad range of mango varieties grown, a small set of key varieties, such as Alphonso, Totapuri, Kent and Tommy Atkins dominate global trade due to their appearance, color and consumer’s taste preferences, while many local varieties of ‘stringy’ mangoes with high fibrous content are only consumed locally. Within the same varieties, fruits need to be graded and selected in a rigorous manner in order to ensure that ‘export quality’ produce is effectively separated from produce that does not meet client requirements, in order to prevent entire batches from being marked down to the price of the lowest grade that is identified.
- **Educating consumers:** many consumers in key consumption markets are unfamiliar with a broad range of and sub-tropical fruits, as well as the many varieties for familiar fruits. Many key tropical fruits require marketing investment in order to create consumer demand for new products; however, no individual country or exporter can fully capture the benefits of such marketing drives, resulting in a low level or complete absence of marketing for many tropical fruits.
- **Tariffs, quotas and minimum entry prices:** key import markets such as the EU, US and Japan operate a complex system of seasonal duties, tariffs and quotas to protect domestic production, especially during domestic growing seasons. Minimum entry prices tend to negate the competitive advantage of lowest cost producers versus those that are able to import at close to the entry-price level. However, from the perspective of tropical fruit producers, these regimes tend to be less important than for temperate fruit

producers, given their focus on protection of temperate horticultural production. Differential treatment of African, Caribbean and Pacific (ACP) countries by the EU in particular has skewed trade in favor of these regions largely at the expense of Latin American producers: for example, the EU exercises a tariff rate quota of 750,000 tonnes of bananas from ACP countries that attract a zero tariff, versus a 2.6m ton quota from non-ACP countries with a €75/ton tariff. Tariff escalation is also significant, with tariffs of 12.2% on orange juice and 18% on apple juice imports into the EU in 2011 versus substantial proportions of apples and oranges entering the EU tariff-free

JUICE PROCESSING

For juice processors, there are three key sets of challenges that are specific to the sector need to be addressed:

- **Managing seasonality versus processing facility utilization:** The majority of fresh fruits for production are seasonal; in some cases production may be harvested in a few months, while continuously harvested fruits might not be harvested in scale quantities in any given month. A short time from harvest-to-pulp is critical, due to the challenges and expense of storing substantial inventories of fruit for extended periods, therefore throughput needs to match the crop cycles for fruit inputs. Fruit processors manage this in three ways
 - **Processing a portfolio of fruits,** with some fruits (or vegetables) that can be harvested across the year. For example, Jakana Foods processes bananas to make banana juice, which can be harvested across the year, versus mangos with a short and high volume season. Other East African processors include vegetables, especially tomatoes, in their portfolio of processed outputs
 - **Storage:** processed fruit that has been appropriately pasteurized, concentrates with high sugar content, and fruit juice that is packaged appropriately can typically be stored for extended periods. For example, pasteurized mango juice that is packaged in 200ml tetrapak cartons or sterile aseptic pouches can be stored at ambient temperature for over a year. Processors can then manage their production capacity closer to the crop cycles of the products they produce. This does, however, require access to affordable finance to fund the required build up in working capital.
 - **Right-sizing capacity:** while a straightforward concept, building the right-sized plant needs to take into account the minimum efficient scale of plant design, input costs and costs to upscale versus downscale capacity (including the impact of adding additional shifts, and the knock-on impact of increasing throughput on all aspects of the processing chain from intake to loading for distribution). Setting the right level of capacity can be difficult before a processor has operating history.
- **Building an Effective Supply chain:** Accessing sufficient volumes of fruit, of the right varieties, of the right quality, at the right time is critical to success. Fruit production may be spread across a large base of smallholder farmers, many of which lack commercial orientation and understanding / ability to meet requirements. Processors can focus on aggregators as their key source of supply, but this carries a cost and can make enforcing standards for quality more challenging.
- **Meeting (international) standards:** in the current global processed fruit market, substantial quantities of processed fruit intermediates and juice are exported to N America and EU markets, which enforce rigorous standards for quality of process and product specification. Plants need certification in areas such

as HACCP or ISO 22000, and adhere to General Principles of Food Hygiene recommended by Codex Alimentarius

Beyond these challenges, juice processors share the challenges of high energy costs, high transport and logistics costs and the difficulties in accessing finance that characterise agro-processing in the Sub-Saharan Africa region in general.

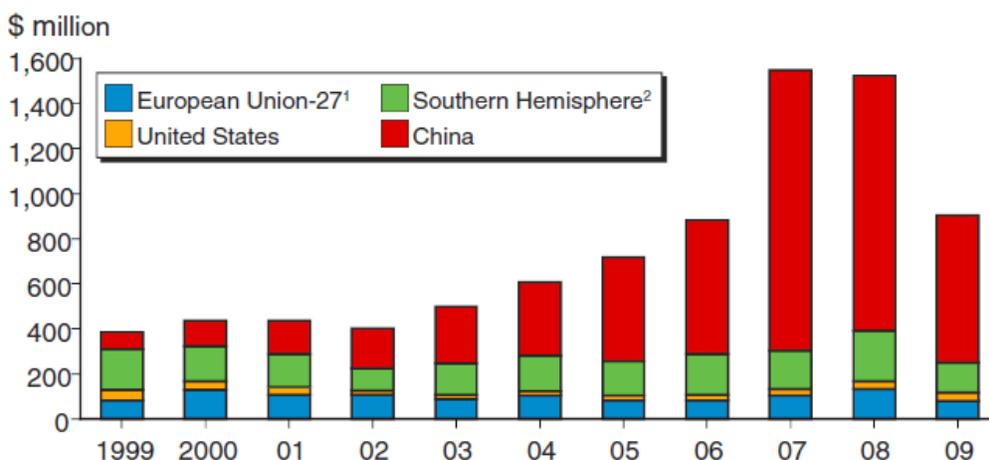
6. China: a Case Study of the Key Success Factors for Value Capture in the Fruit Industry

BACKGROUND: MOVING FROM FRESH APPLES TO APPLE JUICE²⁷

China is the world's leading supplier of concentrated apple juice (CAJ), with its position the result of direct government intervention in the fruit production and agro-processing sectors as part of a deliberate strategy to develop a commercial basis for exporting labor intensive agricultural commodities. China's horticulture sector faces challenges in the export market for fresh fruit, given the cost of long distance logistics for perishable products and SPS concerns. CAJ is an alternative to exporting fresh apples that circumvents these challenges, and in 2009 of the 30 percent of total apple production that was exported from China, 4 percent was in fresh form while 26 percent was as CAJ.

Today, China is the world's leading producer of apples, accounting for almost 45 percent of global production (32 million tons in 2009, versus 71 million tons globally), and has rapidly grown to be the dominant player in the global CAJ export market, accounting for \$770m of sales out of approximately \$900m, from under \$50m in 1999, and peaked at \$1.4bn in 2008. The US and EU are China's largest export markets, accounting for 44% and 21% of total sales. The rapid growth of Chinese volumes of CAJ has supported an increase in global fruit juice consumption, but has also displaced volumes from Chile, Argentina, Mexico and the EU.

FIGURE 27: GLOBAL CONCENTRATED APPLE JUICE EXPORTS, BY COUNTRY/REGION



¹External trade only; does not include trade between countries within the EU-27.

²Southern Hemisphere includes Argentina, Australia, Brazil, Chile, New Zealand, and South Africa. Data include Harmonized System codes 200970, 200971, and 200979.

Source: USDA, Economic Research Service analysis of customs data from Global Trade Information Services, Inc.

The Chinese government played an important role in directing the development of the industry:

- **Federal Level Support:** In 2000, the government launched a “Develop the West” program to encourage investment in the poorer, less developed Western provinces of China. The program included direct

²⁷ This section is adapted from the USDA's report “Investment in Processing Industry Turns Chinese Apples into Juice Exports”, Gale, F., Huang, S., Gu, Y., October 2010

government investment, financial transfers to Western provincial governments, and financial incentives to the private sector such as subsidized loans, tax breaks and access to infrastructure projects. The program focused on developing industries based on local sources of comparative advantage: the Ministry of Agriculture identified apples as one of China's internationally most competitive crops and suggested concentration in China's most efficient production regions, especially in China's northwest.

In 2006, the Ministry of Commerce developed a plan to promote agricultural exports, including additional incentives for the private sector to develop inland 'export bases'.

Press and industry cite that the development of the CAJ and apple export industry was a response to the Develop the West program. Players such as Tongda Group- a diversified conglomerate that is also China's third-largest apple processor – set up facilities as a direct response to the program's incentives

- **Provincial Level Support:** Provincial government also played an active role in facilitating the sector's development by recruiting apple growers, disseminating new technologies and apple varieties, assisting farmers and companies in the adoption of safety standards, providing low cost sources of finance and supporting tax breaks, and setting up networks for market information dissemination.
- **Local and parastatal assistance:** local branches of China's inspection and quarantine bureaus support processors and farmers in obtaining the required certifications to be able to trade in export markets.

Government also plays a direct role in creating linkages between players in the supply chain and picking winners. The Ministry of Agriculture advocates integrating smallholder farmers directly with juice manufacturers, picking strategic or 'dragon head' enterprises that can provide technical assistance to farmers and provide a guarantee of a market, in return for a package of financial incentives that include tax breaks, subsidies for cold-storage and cold-chain facilities, preferential loans and government help in meeting international standards such as ISO 22000 for exports.

This has led to the emergence of a consolidated juice processing sector, with 5 major players accounting for 72 percent of total output. The five major players (North Andre, Haisheng, SDIC Zhonglu, Hengxing and Tongda) are all diversified conglomerates that have been able to secure government support for the development of juice processing divisions. SDIC was China's first modern juice processing company, formed from a joint venture between Mitsubishi and the Chinese government in 1992. This was **followed by a second wave of entrants between 1996 to 2002, backed by significant private sector financing following the successful 'demonstration' of the public-private JV.** By 2002, all of today's major players had entered the market; since this time, players have competed to maximize their share of the growing sector through a combination of capacity expansions, new facility builds and acquisitions of smaller players.

The government sector also promotes the export sector through trade shows and facilitates introductions to potential clients.

The future development of the Chinese CAJ sector faces substantial bottlenecks in the supply of apple varieties best suited for processing. Chinese processors tend to be constrained to the use of local varieties of apples, which are predominantly 'sweet' varieties best used for direct human consumption, and lead to a relatively low acidity CAJ that has to be mixed with other juices in order to match recipe requirements for US and EU drinks manufacturers. Low acidity CAJ trades at a 40 percent discount and can frequently be rejected by consumers.

High acid apple plantlings growth has been low as processors typically pay lower prices than the fresh fruit market; farmers also see juice processors as a valuable market for realizing value from fallen or defective fallen fruit.

As a result, growth in CAJ production is requiring an increased proportion of defective sweet varieties, leading to growing concerns over the safety of Chinese output. To date there have been no food safety incidents with Chinese CAJ, and current output is monitored closely, given that over 90 percent of output is exported.

China is likely to remain the leading CAJ exporter globally, given that it has a leading position in the production of apples, and continued to actively pursue expansion in output. While this provides a world-class position in cost of production, **CAJ remains a commodity product, subject to downstream demand from juice manufacturers, and exposed to risk of competition from other major producers such as Poland if China loses its cost advantage**, especially if China's currency appreciates. Shifting towards higher value added activities such as development of branded juices will protect China's apple industry from some of these risks, but will require the development of consumer insight and marketing capabilities as well as brand investments.

IMPLICATIONS: KEY SUCCESS FACTORS FOR VALUE CAPTURE

The Chinese experience demonstrates many of the most important success factors required for countries to capture value in fruit processing. While substantial financial incentives and government intervention have had an important role in promoting the development of the industry, China's ability to integrate fruit producers with processors to provide high volumes of low cost raw material, access to finance, high quality logistics and skilled management have also been important contributing factors to the successful growth of the Chinese fruit processing industry.

In general, the most critical factors required to successfully capture more value in the fruit processing value chain include:

- **Incentives for investment, and access to finance:** although juice processing requires investment in plant and machinery, the critical bottleneck for most juice processors is working capital. The highly seasonal nature of most fruit production requires that processors build anticipatory stocks of packaging, fund purchases of fruit often in advance of processing from farmers that are engaged in out grower or contract farming schemes, and are able to process and store high volumes of packaged juice post-harvest in order to be able to meet client requirements across the year.
- **Market linkages between producers and processors:** processors must be able to obtain the right varieties of fruit, at the right stage of ripeness and with the appropriate levels of quality. In countries characterized by smallholder cultivation of fruit, it is challenging to meet any of the above requirements. Markets with highly fragmented production typically require consolidators to aggregate volumes and supply processors, but this creates a challenge for processors to ensure that farmers both understand and are incentivized to produce fruit of appropriate varieties and of sufficient quality. Chinese government support to the processing sector in forming direct linkages with farmers created the dual benefit of eliminating consolidator margins from processors' costs, while also ensuring that processors could capture a more reliable supply of fruit, and incentivize farmers for producing fruit of the appropriate standard.
- **Scale, low cost production:** the cost of fruit is a major determinant of the economics of juice processing. Processors will typically compete with other sectors – especially domestic and export markets for fresh fruit, but also other processing sectors – for local production, and are typically unable to offer the highest prices for fruit, and are therefore one of the 'last in line' buyers of fruit. Without sufficient overall supply, it is therefore challenging for processors to be able to obtain viable volumes.
- **Great logistics:** fruit prior to processing is vulnerable to spoilage, and in comparison with the weight of final juice or concentrate is a heavy product. As a result, potential losses in transport and the high cost of

transporting the whole fruit to the processing site result in a high level of sensitivity of processing economics to the efficiency and cost of logistics.

- **Capability and credibility in meeting safety standards and quality requirements:** although the domestic informal juice production sector can form a viable basis to initially develop a juice processing sector, long term transformational growth will require processors to export to key markets that will likely include the EU, and the US. In order to be able to address these markets, the local sector must develop the capability to evaluate, implement and enforce international standards of food safety, while also ensuring that they have the capability to meet clients' requirements in areas such as color, taste, sugar content and packaging. With respect to food safety, the potential negative externalities of a single high-profile failure for the entire food processing sector create a potential role for the public sector in defining and enforcing strict quality control, as well as providing support for the sector to meet requirements. The Chinese experience in CAJ is an example of effective government support in meeting key requirements such as ISO 22000.
- **A scale domestic market to support early-stage sector growth:** with respect to this success factor, China is an exception rather than an example. In the case of China, 'market' has from the outset been an export sector, with an aim to develop a channel for capturing value from fresh fruit that was difficult to export in fresh form. For players aiming at export markets, the ability to meet the requirements of international clients at globally competitive rates requires world class execution or substantial export promotion and support, which is a difficult starting position for the industry. An alternative development path that is already open for African countries is serving the scale domestic market for juice that is currently served by the informal juice processing sector.

It should be noted that, while the Chinese government had a high level of direct intervention in the development of the juice sector, key success factors such as the availability of finance, integration of production with processors and the availability of abundant and low cost fruit do not necessarily require government support. Nevertheless, the Chinese model does demonstrate that targeted support to these areas can be highly effective in making a transformational change in value addition in the fruit sector.

7. Positioning of African Countries for Successful Value Capture

African countries with scale fruit production have a range of opportunities to capture more value in the fruit value chain, either through deriving increased value from fresh fruit sales, from increased processing, or a combination of the two.

However, the feasibility of capturing greater value, especially through deriving increases in local processing, is not entirely straightforward. Below we review Kenya’s potential for successful value capture in the juice processing sector, based on the success factors in entering juice processing identified in the previous chapter.

FIGURE 28: OVERVIEW OF KENYA’S POSITIONING AGAINST KEY SUCCESS FACTORS FOR GREATER VALUE CAPTURE IN THE FRUIT VALUE CHAIN

Success Factors	Positioning of Kenya	Comments and Observations
Incentives for investment, and access to finance	Moderate	Players in the juice processing sector state that access to finance continues to be one of the dominant constraints to growth of the sector. Given the seasonality and price volatility of raw fruit, the sector is perceived as high risk and therefore unable to attract affordable finance from the commercial banking sector.
Scale, low cost production	Moderate / Strong	Kenya has substantial volumes of several fruits that can be used in juice or puree production, including bananas, pineapple and mangoes However, there are constraints in a number of areas: pineapple volumes are largely accounted for by Del Monte’s production in Thika and are not on the open market, while most banana varieties available locally are not optimal for juice manufacture. Kenya’s supply of Ngowe mangoes does, however, position it well as a potential substitute for Alphonso mangoes, given its similarity in taste, which provides Kenya with a potential entry route into the largest mango juice market globally
Market linkages between producers and processors	Challenging	Fruit cultivation is largely undertaken by smallholder farmers, with the majority of fruits such as mangoes then purchased by traders and consolidators, who are the dominant channel for fruit purchases by the processing sector. As a result, fruit processors are unable to develop longer term, reliable supplies of fruit or work with farmers to produce higher quality fruit that is better adapted to processing. Several programs exist to develop market linkages, although these remain relatively small scale.
Great logistics	Challenging	Kenya is ranked 99 out of 155 countries in the quality of its logistics in the World Bank Connecting to Compete 2010 report. Kenya is particularly challenged in its domestic infrastructure, with poor quality roads leading to weaknesses in terms of

		<p>timeliness and reliability.</p> <p>Kenya’s sea and airport logistics, are relatively stronger, allowing players that can manage the challenge of domestic logistics to potentially reach international markets effectively</p>
<p>Capability and credibility in meeting safety standards and quality requirements</p>	<p>Moderate / Strong</p>	<p>Kenya’s early proactive stance on developing Good Agricultural Practices (GAP) through KENYAGAP has benefitted the overall fresh export and fruit processing sector with both credibility and the time to develop good monitoring and safety management capability.</p> <p>Industry players in fruit processing believe that the sector will require further investment to apply the appropriate plant equipment and acquire appropriate skills to match the quality requirements of major international buyers of juice and concentrate.</p>
<p>A scale domestic sector to support early-stage sector growth</p>	<p>Strong</p>	<p>Approximately 70% of Kenya’s current juice volumes is currently served by the informal sector, which constitutes a largely addressable market for local processors, while juice consumption overall appears to be growing rapidly. Replacement of the informal juice production sector on a 1-for-1 basis in terms of volumes should not be the objective: instead, this should constitute an addressable market for individual private sector actors which can then scale to a sufficient level to achieve lower per unit costs of production than the informal sector, which can then constitute a platform for greater domestic scaling and entry into the international exports market.</p> <p>Local player such as Kevian and Milly Fruit Processors have been able to successfully develop scale based on capturing some of the overall growth in the market – especially as modern grocery retailing takes a greater share of beverage sales in Kenya – and displacing some informal volumes.</p>

Although the Kenyan juice processing sector is one of the most vibrant amongst the countries in the Africa Transformation Report, players in the sector face substantial supply-side challenges, especially in terms of accessing cost effective supplies of fruit, poor logistics and a lack of access to finance. As a result, Kenya’s sector could be considered a candidate primed for transformative growth if these barriers can be eliminated.

8. Considerations and Steps Required to Develop Policy

The preceding chapters provide an overview of the key trends in the fruit and fruit processing sector, where the primary opportunities are for African countries and the key success factors required to capture a greater share of the value available in the fruit value chain.

There are several common themes that will frame country-level policy-making in Sub-Saharan Africa. Policy-makers can potentially take an instrumental role in guiding the development of a fruit export and processing industry, given the existence of key failures in most markets of the ability for the private sector to efficiently and cost-effectively co-ordinate production across fruit producers and promote linkages with the processing sector. While there can be synergies between a fruit export and processing sector, policy-makers should ensure that competition between the sectors for sourcing fruit can be managed.

To develop a fruit sector strategy that is relevant at the country-level, policy-makers need to consider a range of areas in order to develop a country-specific plan to catalyse and drive transformative growth. Below we outline some of the key areas and considerations to be included in country-specific policy development.

A – IDENTIFY AND PRIORITIZE OPPORTUNITIES FOR VALUE CAPTURE

Although at a generic level four main opportunities have been identified for Sub-Saharan African countries in the fruit sector to increase value capture (focusing on the fresh domestic, fresh export, processed domestic and processed export markets), the prioritization of these opportunities will need to take into account several country-specific factors, including:

- **Base lining the current economics of the sector:** Policy-makers need to develop a robust understanding of the vertically integrated economics of the fruit sector. This should include the current level of efficiency of fruit production and the scope and feasibility of increasing production, either through increased land allocation, increased yields, or both. An equivalent analysis for the fruit processing sector also needs to be undertaken, with a review of the current levels of operating capacity and efficiency of the sector, followed by an assessment of the sensitivity of costs to drive increases in production.
- **Forecasting the key variables that have the most impact on the economic viability of the sector:** In this case, this should at least include expectations of export prices for competitor products and logistics costs, and the likely reactions of traders and farmers to prices moving forward.
- **Sizing the opportunity:** based on the above economic models and forecasts, scenarios for the potential scale of the overall economic opportunity for scaling up production and processing need to be evaluated.
- **Assessing opportunity costs for market participants in the sector:** The opportunity cost of cultivating different fruits, and the relative opportunity cost of supporting fruit production, export and processing versus other crops or other sectors, given limited financial and human resources.
- **Identifying areas of comparative advantage / disadvantage:** Analysis of the relative costs of fruit production and harvesting, and processing versus in competing markets, the relative positioning of local varieties in export markets for fresh and processed products, and an identification of the key sources of current lack of competitiveness and areas for potential comparative advantage.
- **Outlining what policies would be required to take advantage of opportunities, and paring this back to what is possible:** For example, in the case of driving increased fresh fruit exports, policy-makers need to

take a view on the willingness and ability of government to intervene to support the appropriate application of international SPS and GAP standards

- **Prioritise opportunities:** From the above, a ranking of opportunities for value capture based on an overall assessment of the net gains, feasibility and risks.

B - IDENTIFY CURRENT POLICY BOTTLENECKS

Having identified priority areas for value capture, relevant policy bottlenecks need to be identified. Given the perishable nature of fresh fruit and the cost pressures for processors to acquire raw inputs at the lowest cost, current barriers to the free and timely transport of fruit tend to be the key bottlenecks that should be addressed. This may include:

- **Barriers to intra-regional trade:** although West and East African countries are in the process of developing greater coordination of trade policies across their borders and eliminating trade barriers, processors and traders state that the transport of highly perishable fresh fruit is particularly sensitive to any additional lead times involved in transporting produce across borders.
- **Challenges in transport of goods within country:** some countries preserve a regime of fees that involve charges for transporting goods across provinces or states. For example, prospective Kenyan processors that wish to source fruits from Western Kenya to locations in the east such as Coast need to include the cost of fees for crossing each state en route to the processing facility. This can distort processors supply chains and production location decisions.

C – DEVELOP KEY ENABLING INTERVENTIONS

Based on the opportunities for value capture and associated policy bottlenecks that have been identified, a policy agenda to support a coffee growth strategy can be developed. This policy-agenda must necessarily be specifically adapted to the needs and resources of each country, although some general themes may be shared.

Policy-makers face a portfolio of options to intervene in the fruit processing sector, ranging from business enabling initiatives (such as providing access to finance and supporting market access through reducing the cost of certification and compliance with international standards) to taking a highly interventionist role similar to China's strategy of focussing on the development of a production-to-processing sector focussed on only 1 to 2 fruits where comparative advantage exists in low cost production.

Below we outline some key interventions that gradually increase in the level of direct intervention in the structure and development of the processing sector.

- **Reducing finance costs for processors:** while for small-scale processing – such as solar drying undertaken directly by farmers or at the level of a co-operative – there is only a limited need for financing for start-up capital, truly industrial processors can require substantial financing for commercial scale processing equipment, buildings and civil work, and can require substantial working capital, especially for packaging. Provision of low-cost finance is cited by industry players as a key method for stimulating the growth of the sector, especially given the need to stockpile packaging before a peak harvest cycle, and store high volumes of ready-to-drink product after a peak. Current financing costs of over 20 percent per annum²⁸ are typically too expensive to processors to take advantage of financing from the private sector.

²⁸ Based on an example of financing costs in Uganda for working capital of 22%

- **Reduce costs of compliance with international food safety and agricultural practices standards:** support for compliance in countries such as Kenya, which developed KenyaGAP, is cited by industry players as effective in reducing the costs of compliance with standards by developing not only a regulatory framework that is compatible with international norms, but is also resourced with a locally based team that is capable of undertaking rapid certification and audits.
- **Coordinate producers / organise farmers into cooperatives:** There is a role for the public sector to play at co-ordinating role in the fruit production-to-processing supply chain. Processors state that a key challenge for the set-up of viable operations is developing a fruit supply chain that can aggregate volumes of fruit of the appropriate standards, at an efficient cost. Given the fragmented nature of production, processors often rely on consolidators, but have to bear the additional costs and cannot interact directly with farmers to ensure quality across their supply chain and cannot work with farmers to improve the processing characteristics of their crops. Processors state that support in developing direct relationships with farmers can allow them to provide higher prices at the farm-gate. There is therefore an opportunity for the public sector to support the coordination of the market, organising fruit producers into groups or co-operatives and supporting linkages between these groups and current or prospective processors.
- **Identify and focus on scaling up production of fruits in areas of comparative advantage:** the experience of China suggests that an initial focus on fruits for which countries have or could have a comparative advantage in production is a critical foundation to the development of the fruit industry. Elements of China's policies to 'develop the west' can be applied, in particular the focus on only 1 to 2 key fruits, and provision of a package of incentives for producers to scale up production to a commercial scale to drive down input costs that can support the economics of a processing industry.

D – ADDRESS POTENTIAL POLICY TRADE-OFFS

Policy-makers typically need to take into account the reality that any sector-specific strategy must compete with many other overlapping, and potentially conflicting, priorities. However, there are several additional policy trade-offs specific to the fruit sector that need to be addressed when determining an overall approach to defining a fruit sector strategy for any country. Policy-makers need to address key questions on the right structure of the fruit production sector required to achieve low-cost and high-quality fruit production that is a prerequisite for entry into the fruit export and processing sectors. Focussing on developing production through a large number of smallholder farmers will not eliminate several critical challenges to developing an export and processing oriented processing sector, including:

- **Raising the costs, and feasibility of compliance with international standards:** Production per farmer may be too low to justify investments in certification. The education and implementation of good agricultural practices need to be repeated many times
- **Encouraging efficient commercial farming versus supporting sustainable, labour intense smallholder farming:** in order to be competitive internationally, production costs and quality need to be rigorously managed; smallholder farming is generally unsuitable for such models, but a switch to encouraging commercial farming may risk reduction in smallholder farmer incomes and perhaps employment. Hybrid models such as out-grower schemes may be feasible options that can leverage an existing agricultural base while providing the price stability, training and agricultural inputs required to deliver sufficient volumes at acceptable levels of cost and quality.

- **High costs of aggregation of farmers:** fragmented supply chains require processors and exporters need to invest in developing buying stations and sorting practices for a large number of farmers, or rely on aggregators, both of which may be too expensive.
- **Relatively high input costs:** although some of the economies of scale for large commercial farmers can be replicated for smallholders (e.g. providing shared herbicide spraying services for smallholders that, on a per farm basis, would not be able to afford the initial investment in spraying equipment), some differential in production cost per ton is likely to exist

However, shifting to support of commercial farmers needs to be weighed against the potential for developing a sustainable income for smallholder farmers, the typically higher levels of rural employment that a fragmented production base creates, and the ability to improve the nutrition for a broad sector of the rural population by increasing the fruit content of their diets.