

Nicholas School Masters Project

Kenya Market Analysis-An Evaluation for Emerging Food Technology Companies

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Executive Summary

Innovations in the agricultural technology market are designed to help alleviate a variety of different stressors that impact the quality of food on its way from the farm to the table. Research has found that the developing world, in particular, is prone to waste and decay in the earlier sections of the supply chain, including infrastructure and packaging. The use of active packaging technology (AP) has been found to reduce this waste and help more products successfully reach the market by increasing shelf life of fresh produce. Businesses are now turning to developing countries for expansion opportunities where AP technology would have a significant impact. One such country is Kenya. The following report outlines the general history of Kenya, economic indicators, and an overall market analysis that will help businesses evaluate the market for agriculture innovation in the country and whether they should invest. This research finds that AP products geared towards preserving fresh produce and berries should do reasonably well in Kenya given the agricultural goods that are grown there. However, those who attempt to enter this market should proceed with caution. Although Kenya has a variety of laws in place that should protect foreign investors and intellectual property rights, it is unclear whether governmental organizations have the will to truly enforce these regulations. Furthermore, concerns exist over the physical state of infrastructure and political stability that could negatively impact the success of a new business. That said, Kenya is deeply reliant on the strength of its agricultural market. A considerable portion of their population is involved in some way in agriculture, especially women. Technological changes that could improve efficiencies in this market could present a unique opportunity for the empowerment of women, particularly in rural communities. Additionally, the Kenyan economy has grown tremendously in recent years and shows few signs of stopping and has attracted a wide variety of investors. Businesses have already shown interest in the expansion of agricultural technology in the country and have made connections with existing growers' groups to help strengthen networks and increase communication. Therefore, Kenya presents a strong case for investment in AP technology. Issues at the federal level should not completely deter investors, but rather, should make them fully aware of the environment they are considering entering. Investment in this case could not only mean profit, but could also have positive social and environmental benefits that would help not only Kenyans, but the global community as well.

Introduction:

The Food Waste Problem

The goal of this work is to analyze the agricultural technology market in Kenya to assess future business opportunities for food preservation technology producers. Concerns regarding food scarcity, loss, and waste act as drivers of innovation, particularly in the developing world where poor packaging and faulty storage can lead to food losses of up to 50% (Sonneveld, 2000). Growth in the agricultural sector due to increasing population and increased demand for food places enormous stress on land and workers in a variety of ways. For example, the physical manipulation of soil and chemical alteration of agricultural lands through the use of fertilizers and pesticides causes effects that ripple into many different facets of the ecosystem (Tilman, 1999). It is expected that ensuring greater levels of sustainability while maintaining efficiency throughout every level of the food production process will help alleviate the pressure on the agricultural system, and ultimately, the environment (Tilman, 1999).

A study conducted in 2011 by the Food and Agriculture Organization of the United Nations (FAO) and the Swedish Institute for Food and Biotechnology (SIK) helped reveal certain disparities between the developed and the developing world in terms of food waste (Gustavsson, Cederberg, Sonesson, Van Otterdijk, & Meybeck, 2011). The study first defines food losses as, “the decrease in edible food mass throughout the part of the supply chain that specifically leads to edible food for human consumption” (Gustavsson, Cederberg, Sonesson, Van Otterdijk, & Meybeck, 2011). The authors went on to ask a variety of questions including: what was the volume of waste produced in total; what percent of waste was produced within the supply chain versus how much food was wasted after the food was purchased; what were the economic and energy costs of wasting food; and, how could food waste be prevented by consumers and producers in the future?

The team ultimately showed that depending on the product, different developing countries experienced food waste at different points in the production chain and in different volumes. For example, in the case of cereal production through wheat harvest, South East Asia experienced by far the most waste, amounting to 90 metric tons of food and 24 billion USD lost annually (Gustavsson, Cederberg, Sonesson, Van Otterdijk, & Meybeck, 2011). In the case of South East Asia’s cereal production, the point in the chain at which they lost the majority of their product was at the postharvest handling and storage stage; followed next by the agricultural production stage; then processing and packaging, distribution; and finally, consumption (Gustavsson, Cederberg, Sonesson, Van Otterdijk, & Meybeck, 2011). While other geographies experienced less waste than South East Asia, this pattern was relatively similar for the remaining regions of the developing world (Gustavsson, Cederberg, Sonesson, Van Otterdijk, & Meybeck, 2011).

The same FAO/SIK study also found that the commodity groups that experienced the highest levels of waste were general fruits, vegetables, roots and tubers (e.g. potatoes). These products in particular were most highly wasted by Industrialized China, North Africa, Central Asia, and Western Asia (Gustavsson, Cederberg, Sonesson, Van

Otterdijk, & Meybeck, 2011). The authors also found that waste was caused primarily by poor infrastructure (in both storage and market facilities), poor transportation, and poor packaging methods (Gustavsson, Cederberg, Sonesson, Van Otterdijk, & Meybeck, 2011). Furthermore, these same regions experienced issues earlier on in the supply chain when compared to high-income countries, where the opposite was true (Gustavsson, Cederberg, Sonesson, Van Otterdijk, & Meybeck, 2011). It seems that for high income countries, concerns related to waste were found late in the supply chain that had to do aesthetic controls on the produce sold, lack of accurate information provided to customers, and poor food planning by consumers (such as throwing away rancid food) (Gustavsson, Cederberg, Sonesson, Van Otterdijk, & Meybeck, 2011). Although education for both developing and developed countries was ultimately pointed out as a necessity to reduce food waste, the bulk of the recommendations for the two groups were generally different. Developed countries generally needed better planning and awareness on the part of the consumer while developing countries needed improved packaging and infrastructure to reduce waste along the production chain (Gustavsson, Cederberg, Sonesson, Van Otterdijk, & Meybeck, 2011)

Product Packaging Solutions to Reduce Food Waste

Shelf life, generally defined as the length of time from when produce is picked or produced to when it is sold and consumed, is often considered when developing solutions to food waste (whether it is a solution on the front or back end of the supply chain). Innovation in the food packaging industry has not only been driven by issues of scarcity, but also by increasing consumer demand for less processed food, changes in retail and distribution schemes in the face of globalization, new consumer product logistics, changes in distribution trends, automated handling systems at distribution centers, and new (and generally tighter) restrictions for consumer health and safety (Singh, Ali, & Saengerlaub, 2011) Two areas of exploration for the extension of shelf life are active packaging (AP) and modified atmosphere packaging (MAP). Active packaging is defined as a packaging whose materials interact with the food in order to extend shelf life (Singh, Ali, & Saengerlaub, 2011). This is particularly important in the area of fresh and extended shelf-life foods (Singh, Ali, & Saengerlaub, 2011). Active packaging generally works in one of two ways: releasing and scavenging (Singh, Ali, & Saengerlaub, 2011). Releasing works through the use of antimicrobial agents to extend the shelf life of produce. Preservatives may either be released from packaging materials onto the food surface or may be fixed to the packaging material and not migrate to the food (Singh et al., 2001). Scavenging generally works through the removal of oxygen that would have otherwise accelerated the metabolic activities that oxidize food and result in a loss of freshness and flavor (Singh, Ali, & Saengerlaub, 2011). Active packaging provides a significant advantage over the current MAP alternatives because the capital required to produce active packaging products tends to be lower (Singh, Ali, & Saengerlaub, 2011). Lower costs could be of particular interest to small or medium sized companies that are trying to manage costs as much as possible. Furthermore, the capital cost differential is not only attractive to investors and researchers in the developed world, but also to those in the developing world where buying power of consumers may be lower.

Hazel Technologies

Hazel Technologies is a company based out of Chicago, Illinois that is producing AP shelf-life extending technology. Their products include Fruitbite (more generally targeted for fresh produce) and the Berrybite (targeted more for fresh berries). The product they offer consists of a carton insert that prevents ethylene from oxidizing produce, thereby, preventing loss of color, taste, or shape of the food. The company has already conducted an analysis to determine their standing in the domestic market, but they also have interest in their position internationally. The following market analysis will explore the viability and strength of the Kenyan market for Hazel's product as well as set up the skeleton for future analysis of other countries in the developing and developed world. The market analysis will consider metrics such as cultural, economic, and political factors influencing investment opportunities in the country, as well as the market size, regulations, and competition that could influence Hazel's business decisions. A matrix will be presented at the conclusion of the paper that will serve to compare Kenya's market to other countries in the developing world that could be of interest to Hazel or similar companies to identify future opportunities in the food preservation market. Hazel has no affiliation with Duke University and has not paid for the completion of the following analysis.

Objective:

The objective of this report is to provide information to a client, Hazel Technologies, or similar companies, about the market in Kenya for food preservation technology. The report will include an overview of the country's history to in order to provide context for economic or social indicators that will be explored later on. This analysis will also outline relevant laws and organizations in the country that would either support or detract from an organizations interest to invest in Kenya. The information will be summarized through a brief opportunity analysis at the end of the report. Each section of final analysis will be color coded to provide a visual representation of risk. Green will signify low risk and a clear go-ahead to business owners. Yellow will signify moderate risk. There are both positives and negatives to consider with investment and should caution business owners moving forward. Finally, red will signify high risk and should act as a warning signal to investors. This report, and the subsequent color-based score it provides, should act as a skeleton for future market analyses of developing countries. The scoring method should also help clearly compare different countries of interest. For example, if one country is deemed to have several green or yellow scores and another has a wide range of red scores, the first country likely represents a safer investment opportunity for a business.

Methods:

The research for this paper was conducted entirely through the Internet. Information and data for this analysis were collected through websites under the direction of major international organizations, such as the World Bank or the World Intellectual Property Organization. Information was also gathered through websites under the control of the Kenyan government, particularly in terms of details regarding their own internal laws.

Historical Background:

The following section will briefly outline the history of Kenya. For more information, see appendix A. According to the Embassy of the Republic of Kenya in Washington, DC, the first settlers of what would become Kenya were from a variety of communities within the African continent (Kenyan Embassy, 2016). By the first century AD, the area located in the eastern-central portion of the continent (Figure 1) was frequented by traders, explorers, and tourists that eventually helped develop the Swahili language into the lingua franca of the region (Kenyan Embassy, 2016). Beginning in 1498, Kenya began its long history with European conquest, which opened up the area to the Portuguese, Omani, and finally British, and German rule (Ntarangwi, Ingham, & Hongo Ominde, The British East Africa Company, 2016). The 1884 Berlin Conference saw land in Africa divided by colonial interests and Kenya was considered a British colony until well after World War II (Ntarangwi M. K., World War II to Independence, 2016). A variety of uprisings and civil unrest led to independence in 1963, with the appointment of Jomo Kenyatta as the first president and Jaramogi Oginga Odinga as the first Vice President (Ntarangwi M. K., World War II to Independence, 2016). Rampant internal economic and political strife followed independence and a variety of political groups vied for power in this time. Most recently, Kenyans adopted a new constitution in 2010 in an attempt to overcome years of mistrust in the government (Ntarangwi M. K., Kenya and the 21st Century, 2016). However, recent elections continue to shine a light on the murky political backdrop of the country. Despite allegations of violence post-election by the International Crimes Court, recently elected President, Uhuru Kenyatta, remains in office under the Jubilee Party and remains in power in the capitol of Nairobi (Figure 2) (Ntarangwi M. K., Kenya and the 21st Century, 2016).



Figure 1: Modern Map of African Continent (Atlas, African Continent Map, 2016)



Figure 2: Map of Modern-day Kenya (Atlas, Kenya Map, 2016)

Country Overview:

Current Development Indicators: The following four sections will discuss financial and development indicators as determined by the World Bank. As of 2016, one Kenyan Shilling (KES or KShs) is equivalent to 0.0097 USD.

Gross Domestic Product (GDP):

The Gross Domestic Product (GDP) is defined as the sum of gross value added by resident producers in the economy, plus any taxes on products minus subsidies that are not included in the value of the products (Bank, GDP-Kenya, 2016). Gross Domestic Product and relevant GDP parameters are summarized in Table 1.

Indicator	1963 Value at Independence	2015 Value
GDP Growth (annual %)	8.778	5.649
GDP per capita (current US\$)	104.013	1,376.713
GDP per capita, PPP (international \$)	1,523.361	3,082.518
Inflation, GDP deflator (annual %)	-1.877	9.143
Total natural resource rents (% of GDP)	2.518 (as of 1970)	2.857 (as of 2014)

Table 1: GDP indicators in Kenya between 1963 and 2015 in USD (World Bank, GDP-Kenya, 2016).

Population:

Total population is the summation of all residents, independent of legal status or citizenship. Population values for Kenya are summarized in Table 2 and detailed demographics are shown in Figure 4. These values are derived from midyear estimates.

Indicator	1963 Value at Independence	2015 Value
Population, total	8,908,426	46,050,302
Age dependency ratio (% of working age population)	106.491	80.869
Population, ages 0-14 (% of total)	47.925	41.909
Population, ages 15-64 (% of total)	48.428	55.288
Population, ages 65 and above (% of total)	3.646	2.802

Table 2: Population indicators in Kenya between 1963 and 2015 (World Bank, Population-Kenya, 2016).

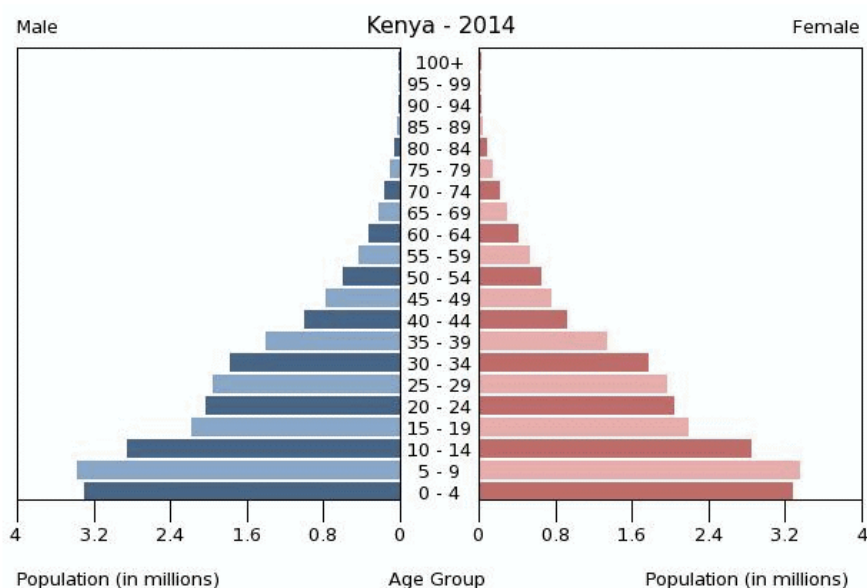


Figure 3: Kenya Population Pyramid-2016 (Central Intelligence Agency, 2016)

Education Enrollment:

Education Enrollment is defined as enrollment in primary education, regardless of age, displayed as a percentage of the population. Education enrollment can exceed 100% when over-aged children are included or grades are repeated (World Bank, Gross Enrollment Rate, 2016). Education Enrollment for Kenya is summarized in Table 3.

Indicator	Earliest Recorded Value	Most Recent Recorded Value
Gross enrollment ratio, primary, both sexes (%)	62.823 (1970)	111.396 (2014)
Children out of school, primary, female	958,962 (1999)	413,319 (2012)
Children out of school, primary, Male	993,883 (1999)	542,666 (2012)
Net enrollment rate, primary, both sexes (%)	62.3 (1999)	84.874 (2012)
Percentage of teachers in primary education who are trained, both sexes (%)	98.692 (2003)	96.807 (2009)
Pupil-teacher ratio in primary education	28.5 (1998)	43.334 (2012)

Table 3: Gross enrollment rate indicators in Kenya between 1963 and 2015 (World Bank, Gross Enrollment Rate, 2016).

Gross national income (GNI):

Gross national income is defined as the sum of a nation's Gross Domestic Product, adding in the net income it receives overseas. The values below have been converted to USD, and then are divided by the midyear population. The table also includes parameters related to GNI, including Power Purchasing Parity (PPP), which is an exchange-rate-adjusted comparison between different countries.

Indicator	1963 Value at Independence	2015 Value
GNI per capita (current US\$)	100	1,340
GNI, (current US\$)	924,938, 645.116	61.824 Billion
GNI, PPP	34.469 Billion (1990)	140.954 Billion

Table 4: GNI indicators in Kenya between 1963 and 2015 (World Bank, GNI Per Capita, 2016).

Key Kenyan household characteristics:

According to the 2014 Kenya Demographic and Health Survey (Kenya National Bureau of Statistics, et al., 2015), a variety of the key development metrics that are tracked in the country are done in order to measure progress towards the “Millennium Development Goal 7,” which focuses largely on environmental and sustainability targets for safe drinking water, sanitation, and adequate housing (Kenya National Bureau of Statistics, et al., 2015). The population of Kenya has grown dramatically since gaining independence in 1963, and in 2015, it exceeded the 46 million resident mark (Table 2). Additionally, as of 2015, nearly the same percentage of the population fell between the ages of 0-14 (41%) as did the percentage of the population that is considered to be in their prime working-age years (15-64 years of age at 55%) (Table 2). This age distribution can also be seen visually in the population pyramid in Figure 3, where a large portion of the population is concentrated at the lower ages on the pyramid, and tapers off dramatically as higher ages are reached. Table 3 outlines the distribution of those children enrolled in school (which represents the large base of their population) and the differences between the completion of schooling between young men and women. In Kenya, 66.9% of residents have access to an improved source of drinking water (88.2% of those urban and 58.1% rural) (Kenya National Bureau of Statistics, et al., 2015). Nearly 23% of the population has access to improved drinking water through pipes that lead into their homes, yards or plots. However, when the water is transported from remote locations to the home or plot, the responsibility of gathering water typically falls on an adult female in the family (Kenya National Bureau of Statistics, et al., 2015). Finally, as of 2014, 64% of households in Kenya still do not have access to electricity (Kenya National Bureau of Statistics, et al., 2015).

As of 2014, 50% of households cook inside the home, while 42% cook in a separate building and 7% cook outdoors entirely (Kenya National Bureau of Statistics, et al., 2015). Solid fuel is often burned for the cooking process and can include coal, charcoal,

wood, straw, grass, and other agricultural crops which may increase chances for health concerns related to pollution (especially if cooking is being done in an enclosed location) (Kenya National Bureau of Statistics, et al., 2015). Bicycles remain by far the most popular method of transportation (21.2%), followed by motorcycles (7.3%), cars or trucks (4.6%), animal drawn carts (1.9%), and boats (0.2%) (Table 5) (Kenya National Bureau of Statistics, et al., 2015). Under the constraints of the study, the most popular electronic device owned by Kenyans is the mobile phone (86%), followed by the radio (67.5%), the television (34.5%), the DVD player (22.5%), the music player (11.6%), and the solar panel (9.8%) (Kenya National Bureau of Statistics, et al., 2015).

Method of Transportation	Percentage of residents using method as primary means of transportation
Bicycles	21.2%
Motorcycle	7.3%
Cars or Trucks	4.6%
Animal Drawn Carts	1.9%
Boats	0.2%

Table 5: Percentage of residents using different primary methods of transportation (Kenya National Bureau of Statistics, et al., 2015).

Agriculture continues to play a vital role in the Kenyan economy. Two out of three households own agricultural land (79.2% of rural households own agricultural land and 47.7% of urban own agricultural land) (Kenya National Bureau of Statistics, et al., 2015). Just about the same percentage of households own some sort of farm animal with 80.4% rural ownership and 42.3% urban ownership. (Kenya National Bureau of Statistics, et al., 2015)

The distribution of wealth is different in the varying regions of Kenya, which can be measured using the GINI index. According to the Organization for Economic Cooperation and Development (OECD), the GINI index measures the extent to which income or consumption expenditure among households or individuals within an economy deviates from a perfectly equal distribution (OECD, 2006). Therefore, the lower the coefficient, the smaller the differences in wealth among the residents of the region. A score of 0 would mean perfect equality while a score of 1 would indicate absolute inequality. According to the CIA, the index is a ratio that utilizes the Lorenz curve and measures the area between a country's Lorenz curve and the triangular area under a 45-degree helping line (CIA, 2016). As the curve gets closer to the helping line, the coefficient decreases and this represents lower levels of income inequality (CIA, 2016). As displayed in table 6, with a coefficient of 0.15, Nairobi presents the smallest inequalities in the distribution of wealth (Kenya National Bureau of Statistics, et al., 2015). The Western (0.20), Central (0.21), and Eastern (0.21) regions of Kenya are not far behind (Kenya National Bureau of Statistics, et al., 2015). In contrast, the North Eastern (0.36), Coastal (0.34), and Rift Valley (0.29) regions all recorded high GINI coefficients, which indicate high levels of unequal wealth distribution (Kenya National Bureau of Statistics, et al., 2015). Further, most of the wealth in the country is concentrated in urban areas while the majority of the poverty is concentrated in rural areas (Kenya National Bureau of Statistics, et al., 2015). The Central Intelligence Agency

(CIA) reports that as of 2008, Kenya's overall GINI coefficient was 0.425 (CIA, 2016). This value, notably higher than the coefficients that were derived for individual regions of Kenya, are representative of a country with high levels of income inequality overall. The same CIA report indicated that in 2013, South Africa's GINI coefficient was reported at 0.625 in 2013, neighboring Tanzania at 0.376 in 2007, and Ethiopia at 0.33 in 2011 (CIA, 2016). European countries such as Belgium or Germany came in at 0.259 in 2013 and 0.270 in 2006, respectively (CIA, 2016). Finally, the CIA reported that the United States' GINI coefficient was 0.45 as of 2007 (CIA, 2016).

Kenyan Region	GINI Coefficient
Nairobi	0.15
Western	0.20
Central	0.21
Eastern	0.21
Rift Valley	0.29
Coastal	0.34
North Eastern	0.36

Table 6: GINI Coefficients for selected regions of Kenya (Kenya National Bureau of Statistics, et al., 2015).

Although there is no official religion in Kenya, 91.4% of women and 88.9% of men identify as Roman Catholic, Protestant, or some other branch of Christianity (Kenya National Bureau of Statistics, et al., 2015). A much lower proportion of the population identifies as Muslim, with only 6.8% of women and 6.5% of men in the country (Kenya National Bureau of Statistics, et al., 2015). Finally, 1.5% of women and 4.1% of men were said to have no religion and 0.2% of women and 0.5% of men indicated other as their beliefs were not represented by the survey (Kenya National Bureau of Statistics, et al., 2015). As displayed in table 7, Kenya also boasts a large variety of ethnic groups. The largest segment of women (21.9%) identified as Kikuyu while similarly, 20.9% of men also identified as the same ethnicity (Kenya National Bureau of Statistics, et al., 2015). Fifteen percent of women indicated that they identified as Luhya and 12% of the remaining women surveyed indicated that they identified as Kalenjin (Kenya National Bureau of Statistics, et al., 2015). Again, following similar trends as women, 16% of men identified as Luhya, but slightly more men identified as Kamba (12.6%) (Kenya National Bureau of Statistics, et al., 2015). The remainder of the population identify with a large variety of other ethnic groups. 40.8% of women and 43.9% of men live in rural areas while 59.2% and 56.1% live in urban areas (Kenya National Bureau of Statistics, et al., 2015). 25.6% of women and 25.3% of men reside in the Rift Valley, which was identified as having notable levels of unequal wealth distribution (Kenya National Bureau of Statistics, et al., 2015).

Ethnic Group	Percentage of Identifying Women	Percentage of Identifying Men
Kikuyu	21.9%	20.9%
Luhya	15%	16%
Kalenjin	12%	12.2%
Kamba	11.4%	12.6%

Table 7: Distribution of ethnic groups in Kenya separated by gender (Kenya National Bureau of Statistics, et al., 2015).

Political Structure:

The capital of Kenya is Nairobi and the country operates under a unitary multiparty system with a Senate and a National Assembly. The current President (2016) is Uhuru Kenyatta. Under the most recent constitution passed at the Federal level in 2010, Kenya is headed by a President who leads the executive branch as the head of state, as well as government (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Government and Society, 2016). The president, who is elected through direct popular vote, is supported by a deputy president and an appointed cabinet (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Government and Society, 2016). The expectation is that, in order to be elected president, the candidate must win more than 50% of the votes and at least 25% of votes cast in each of the counties in the country (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Government and Society, 2016). A president's term is 5 years long and there is a two-term limit (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Government and Society, 2016). In addition to the president, there is a 68-member Senate (most of whom reach office through direct election) and a 350-member National Assembly (also through direct election). (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Government and Society, 2016) In both bodies, some seats are set aside for individuals whose respective party already has Senate representation (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Government and Society, 2016). Other seats are protected for women, youth representatives, and individuals with disabilities (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Government and Society, 2016).

There is also local administration of affairs. Kenya has 47 counties, all of which are headed by an elected governor (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Government and Society, 2016). Local governments also include an assembly made up of a combination of both elected and non-elected representatives that serve five-year terms (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Government and Society, 2016). The 2010 constitution enacted the formation of counties as a way to decentralize the federal government and work to improve issues related to corruption and over-representation of certain ethnic groups or genders (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Government and Society, 2016). Prior to 2010, Kenya was organized into eight different provinces, but these were phased out in favor of the county structure by 2013 (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Government and Society, 2016).

The constitution also created a judicial structure and by 2011, a Supreme Court was established (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Government and Society,

2016). The Supreme Court oversees issues relating to elections, the presidency, and appeals from lower courts (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Government and Society, 2016). In contrast, the Kenyan High Court oversees the constitution and criminal matters (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Government and Society, 2016). Military service in Kenya is voluntary and comprises of a naval force, an air force, and an army (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Government and Society, 2016).

Geography and Physical Makeup:

Kenya sits on the equator with approximately 224,961 square miles of land (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Land, 2016). South Sudan and Ethiopia lie to the North, while Somalia and the Indian Ocean lie to the East and Tanzania and Uganda lie to the south (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Land, 2016). Kenya is divided into four main geographic regions: the Lake Victoria basin, the Rift Valley, the eastern plateau forelands, and the arid areas of the north, south, and coast (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Land, 2016). The central highlands and the rift valley experience up to 3,000 mm of rainfall per year and are responsible for a large portion of the agricultural activity in the country (Our Africa). Western Kenya is hot and wet, experiencing less, but still substantial rainfall per year (over 1,000 mm) (Our Africa). In contrast, Northern and Eastern Kenya are more arid and experience decidedly less annual rainfall, dipping below 510 mm per year (Our Africa). Finally, the coastal regions are moderated by the Indian Ocean and are suitable for crops such as fruits, nuts, and cotton for a limited time in the year (average rainfall barely exceeding 1,000 mm per year) (Our Africa). Nairobi, with its low GINI coefficient, falls into the central highlands and rift valley region of Kenya. Interestingly, North Eastern (0.36), Coastal (0.34), and Rift Valley (0.29) regions all recorded high GINI coefficients but are considered to be strong areas for agriculture. This calls into question the ability of the agricultural sector to provide enough income for residents in Kenya to close inequality gaps. Although Nairobi is in the South Central region of the country, it is like at an advantage economically because it is the capitol.

The landscape within all of these areas can vary from lush and mountainous to dry desert (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Land, 2016). Lava deposits in the Lake Victoria basin have produced extremely rich and fertile soils that are ideal for coffee and tea production (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Land, 2016) However, due to lack of forest cover, most of the soil in Kenya is sandy and eroded (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Land, 2016) The rainy season lasts from March to May, contrasted by a dry season that extends from June to August (Ntarangwi, Ingham, & Hongo Ominde, Kenya-Climate, 2016).

Market Overview:

Market Size, Share, and Growth Rate:

As indicated by tables 1 and 4, Kenya's economy has grown relatively steadily since gaining independence in 1963. Despite volatility in the 1970's, Kenya's GDP growth (measured as a percentage change) has steadied in the recent decades and has seen positive growth since 1993 (Table 1) (World Bank, GDP-Kenya, 2016). Furthermore, since 2002, GNI per capita has only seen increases in Kenya, measured initially at \$390 USD (2002) and then growing rapidly to \$1,340 as of 2015 (Table 4) (World Bank, GNI Per Capita, 2016). As of 2012, horticulture remains one of the country's most rapidly growing sectors and accounts for 12.2% of the Kenyan economy (United Nations, 2012). Exports alone account for US\$1,160 million per year by way of fruits, vegetables, and flowers (United Nations, 2012). Due to the fact that so many residents in Kenya are engaged in some sort of agricultural activity, extensive goals have been set by state officials as part of their *Vision2030* plan (United Nations, 2012). The plan includes increasing crop yield, using land that is currently not being cultivated, reforming land-use policies, and reworking irrigation methods (United Nations, 2012). Kenya has expressed interest in increasing the efficiency of their market, believing that by bolstering informal trade, they will increase the supply of formal traders, such as supermarkets or large chains, in the marketplace (United Nations, 2012). Kenya's economy experienced rapid growth in the early 2000's but was shaken by the global recession that began in 2008 (United Nations, 2012). However, since then, the economy has recovered (Figure 5), with growth up and inflation down, indicating that the country is capable of overcoming such setbacks (United Nations, 2012). Kenya has operated under an open trade regime since the 1990's, meaning the country has economic policies in place that do not discriminate against imports from or exports to foreign locations (United Nations, 2012).

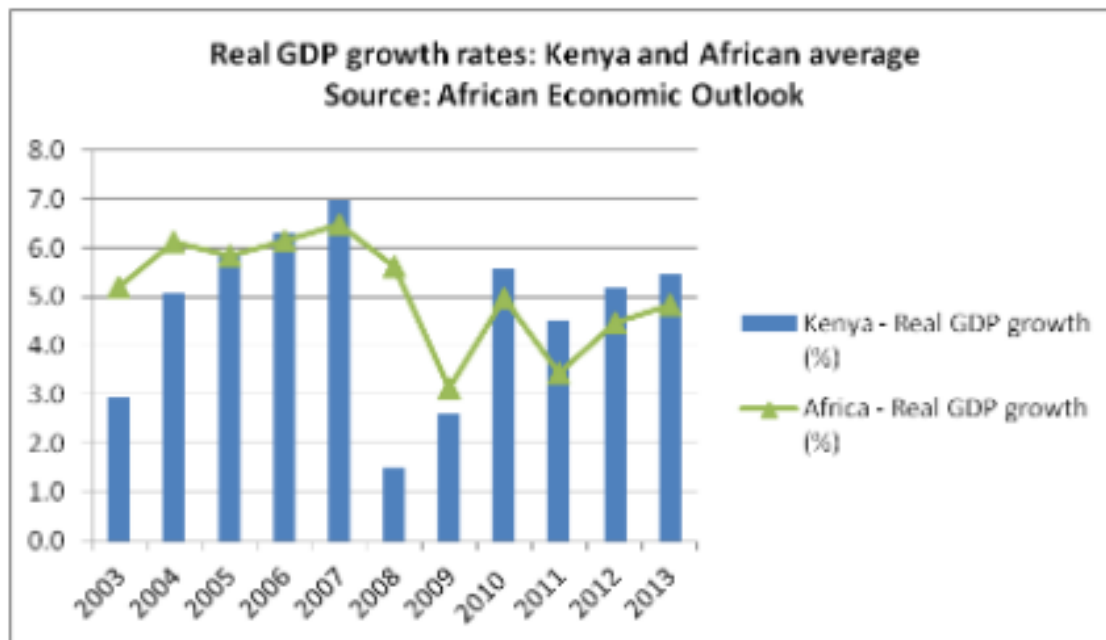


Figure 4: GDP Growth Rates Comparing Kenyan and African Averages (Turner, 2013)

Since 2012 (discounting the global recession in 2009), Kenya has seen largely steady and positive growth in their exports (United Nations, 2012). In 2010, export growth reached 16.1% with fruits and vegetables making up 10% of these exports (United Nations, 2012). Products from the horticultural market tend to be sent to the European Union (EU) (mainly the United Kingdom, accounting for 55.1% of vegetable exports and the Netherlands, accounting for 18% of vegetable exports) (United Nations, 2012). Fresh beans, brussels sprouts, broccoli, zucchini, and baby carrots make up the majority of the vegetables grown. Exports of fruits to Europe, including mangoes and avocados, generally end up most notably in France (19.5%), the Netherlands (12.9%) with the rest dispersed among the remaining European countries. (United Nations, 2012). That said, Kenya holds less than 1% of the EU market share in agriculture (.91%) for vegetables and less than one tenth of a percentage of fruits (.09%) (United Nations, 2012). In the United States, the percentages are also small: 0% for vegetables and 0.19% for fruits (United Nations, 2012). However, this sector has seen development for export to the United Arab Emirates, with 0.38% market share in vegetables and 0.80% in fruits (United Nations, 2012). Given this small market share, but increasing growth of the agricultural sector within the UAE, there seems to be room for investment and growth in the near future.

Profitability:

Mechanisms in Kenya exist to ensure that the profitability of business are protected while also attempting to improve the lives of rural farm workers. The 2004 Strategy for Revitalizing Agriculture (SRA) was designed to bolster the strength of public-private sector relationships while improving the usage of natural resources to increase the profits

of the private sector (Alila & Ateina, 2006). The goal of the strategy is ultimately to attract private businesses that are willing to invest in Kenya and help modernize the agricultural sector (Alila & Ateina, 2006). The hope is that overall technological modernization will help alleviate poverty in the country’s most rural areas while also decreasing levels of food-insecurity (Alila & Ateina, 2006). Furthermore, according to the FAO, agricultural products in Kenya are generally marketed with little processing and this results in lower revenues for farmer and less overall employment opportunities for residents (Alila & Ateina, 2006). Innovation in the packaging process will help increase the value of agricultural exports and enhance earning potential for farmers (Alila & Ateina, 2006). SRA explicitly mentions increasing research efforts for processing, storing, and packaging of agricultural products in addition to promoting relationships between rural farmers and large businesses, which may benefit Hazel’s capacity to build relationships in rural communities (Alila & Ateina, 2006).

Industry Cost Structure:

There are a variety of costs associated with agriculture, and more specifically, the packaging of products. Packaging costs may include, but may not be limited to, packaging development costs (concept and design), one-time costs for production, material costs, machinery and processing costs, storage and distribution, and insurance (KEBS, 1990). Table 8 presents costs of packaging for agricultural products in Kenya in KSHs. These prices may act as a proxy for packaging costs and help investors form an idea of what their own costs may look like if they decide to invest.

Food Type	Product Capacity	Cost of package (KShs)	Sale price (KShs)	% Package cost
Tomato Paste	400 mL	5.50	35	15.71%
Fruit Jam	500 mL	8.50	65	13.08
Marmalade	500 mL	8.50	80	10.63
Fruit Juice Concentrate	5 L	25	1500	1.67

Table 8: Typical Plastic Package Costs for Some Prepackaged Kenyan Foods (KEBS, 1990).

Other costs specific to the agricultural industry in Kenya include costs of labor and land. Labor statistics are displayed below in figure 5, as collected by the UN. Most of the women in Kenya (59%) are employed in either agriculture or domestic services while 24% of men are employed in the agricultural sector (United Nations, 2012). In Kenya, 43% of the women in agriculture go unpaid and 68% of women who work in agriculture are self-employed (United Nations, 2012). Products sold in the agriculture sector should pay special attention to this vital part of this sector of the economy.

Occupation	KES per month
Agricultural	
Unskilled agricultural employee	3,765
Farm foreman	6,792
Lorry driver or car driver	5,517

Figure 5: Minimum Wages for Agricultural Sector in Kenyan Shillings (KES), 2011 (United Nations, 2012)

Distributional Channels and Important Players:

Kenya is a member of the World Trade Organization (WTO), along with the Common Market for Eastern and Southern Africa (COMESA) and the East African Community (EAC). Kenya is an important player in the EAC market, which comprises of \$82.1 billion USD in GDP in 2010, along with 138 million people (United Nations, 2012). Goods in one EAC member country are sold and treated as if they were produced locally because there are no tariffs for members. There are, however, external tariffs, which all member countries impose on non-member countries, which target intermediate goods and finished goods, but not raw materials (United Nations, 2012). COMESA membership also gives Kenya access to a customs agreement, which includes an external tariff agreed upon by COMESA countries (United Nations, 2012).

The Fresh Produce Exporters Association of Kenya also (FPEAK) wields considerable influence over the fresh produce market in Kenya (United Nations, 2012). FPEAK, founded in 1975, represents growers of fresh produce, along with exporters and service providers and has become arguably the most important horticultural organization in Kenya (United Nations, 2012). FPEAK also provides technical and marketing information for members while actively lobbying the Kenyan government to improve the competition in the horticultural section sector (FPEAK, 2016). Major international members of FPEAK include Agrico East Africe LTD, Agrochemicals Association of Kenya, Bayer East Africe LTD, Fresh An Juici, Tracesoft, Umati Capital LTD, Thermopack LTD, and Shree Garnesh (United Nations, 2012). An enormous variety of growers local to Kenya are also members of FPEAK and can be found through the FPEAK database.

Finally, according to figure 6 below, producers, traders, brokers, transporters, and retailers are all important contributors in the market channels in Kenya (Report of a Study on Fresh Vegetables Market in Kenya, 2015). It is likely that in this particular case, producers have the most to gain by adopting food preservation technology. Previous reports indicate that in the developing world, the front end of the supply chain is where the highest degree of loss is found (Gustavsson, Cederberg, Sonesson, Van Otterdijk, & Meybeck, 2011). Therefore, farmers, who are faced with the challenge of harvesting produce and making it last long enough to get to the marketplace at all represent the first target where loss is found in the supply chain. Furthermore, women generally take the lead when it comes to growing vegetables for household consumption and typically sell the rest in the market (Report of a Study on Fresh Vegetables Market in Kenya, 2015).

Ensuring that more produce will stay fresh for longer may help women make more money in impoverished areas, which could be deeply economically and socially empowering for women in the developing world.

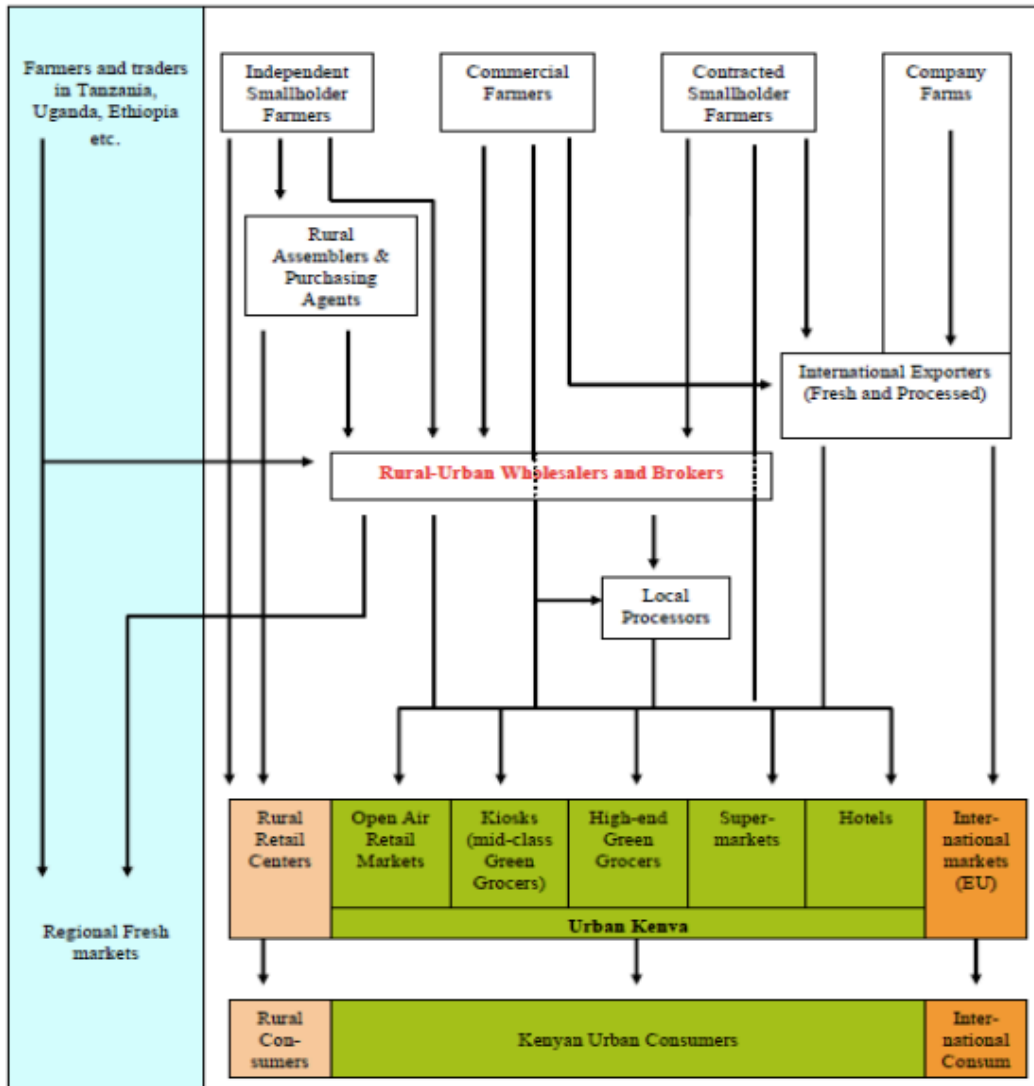


Figure 6: Distribution Channels in Kenya for Domestic, Regional, and International Horticultural Markets (Report of a Study on Fresh Vegetables Market in Kenya, 2015)

Regulations for Investors and IP Management:

The 2004 Investment Promotion Act, enacted by the Kenya Investment Authority (Keninvest), was passed to ensure to promote reliable and profitable investment in Kenya is all sectors of the economy. The act gives Keninvest the authority to issue investment certificates, obtain licenses and exemptions, provides information about potential

opportunities and sources of capital, and advises the government on improving the investment environment (United Nations, 2012). In Kenya, foreign investors are required, under the act, to obtain special certification to engage in business. Obtaining a certificate requires an investment in Kenya of at least 100,000 USD and must show that the investment will have a positive impact on the Kenyan people and the economy (United Nations, 2012). This positive impact can be demonstrated through improvements to employment, upgrading of skill sets for workers, technology transfer, and increases in tax revenue (United Nations, 2012). A separate section of the Act outlines 71 different licenses that the holder of the certificate is entitled to; all of them are required to conduct business in Kenya and until the licenses are officially issued, for a period of one year, they are deemed to be issued by virtue of the original certificate (United Nations, 2012). The investment certificate also allows the holder of the document to hold work permits for three members of their technical staff and three shareholders or partners for up to two years (United Nations, 2012). Businesses in Kenya can be run as incorporated limited liability companies, partnerships, sole proprietorships, cooperatives, companies limited by non-profit guarantees, and representative offices (United Nations, 2012). Typically, foreign entities have favored limited liabilities when investing in Kenya (United Nations, 2012).

Kenya has adopted a relatively liberal stance when it comes to their trade policies, generally allowing the market to be free to set its own prices (United Nations, 2012). The 1988 Restrictive Trade Practices, Monopolies, and Price Control Act (RTPMC) was enacted for two main purposes: to allow the Kenyan government to regulate the market but also to transition into the gradual removal of price controls (United Nations, 2012). Currently, no restrictions exist on the amount of equity a foreign national can hold in a company that has been locally incorporated (United Nations, 2012).

Being a member of the World Intellectual Property Organization (WIPO), as well as WTO Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), both foreign and local investors in Kenya are entitled to the enforcement of intellectual property protection (United Nations, 2012). The most recent iteration of Kenya's Trademark Act (2002), allows trademark infringement to be an offense punishable by a fee up to KES 5,000 (United Nations, 2012). The 2001 Industrial Property Act provides the language for compensation when patent infringement was not intentional and can include injunctions, damages, and compensation (United Nations, 2012). The act also includes language detailing the procedures for criminal offenses, which can include a financial fine and up to five years in jail (United Nations, 2012). In addition, foreign entities are entitled to the right of priority, which is handled through the Kenya Industrial Property Institute (United Nations, 2012). The right of priority allows for a commercial entity to claim priority to a patent in member countries to the Paris Convention for the Protection of Industrial Property. Many companies work on similar issues at the same time and the right of priority protects companies for a period of one year during which their patent has priority over similar ideas or projects (WIPO).

According to the Global Agricultural Information Network (GAIN), as of 2014, Kenya has no special or extraordinary standards regarding how food is packaged (Hammond &

Onsongo, 2009). Generally, fruits and vegetables should be packaged in a permeable material so that gases may flow freely in and out of the packaging to reduce the chances of food spoilage (KEBS, 1990). Cellulose acetate, lacquered cellulose, PVC, and lacquered oriented cellulose are all considered allowable options (KEBS, 1990). Furthermore, neither the Government of Kenya nor local governments currently require consumer-product package recycling and Kenyan importers are allowed to market US consumer-ready products in their original containers regardless of the size of the package (FPEAK, 2016).

Market Analysis

Positive considerations for advanced food packaging in the Kenyan Market

Perhaps the most obvious strength that Kenya has to offer is that their economy relies so heavily on the success of agriculture. Given the enormous amount of people engaged in this sector and its role in the economy overall, there are many channels that could be used to integrate new packaging technology. The Kenyan government has also shown particular interest in the ways its investment laws are written that should encourage foreign entities to invest in Kenya. Not only do these laws encourage investment, technological modernization, and the strengthening of relationships between rural farmers and large companies, but also attempt to ensure that investment is done in such a way that ultimately helps the development of Kenya as a country and brings people out of poverty. For a foreign investor, there are positive opportunities to show off that their business in Kenya is not only for their personal profit, but also the wellbeing of Kenyans.

In addition, there are existing social and governmental bodies in Kenya that may help spread information about the product (such as FPEAK) that would aid in getting this technology to more rural or potentially inaccessible locations. Having these systems in place will speed up the process by which the technology is spread and integrated into the culture. Having organizations already in place to help do this may also assist in overcoming any sort of cultural barriers that may come up along the way. Given extensive research already conducted on the demographic makeup of the country, it is known that large portions of the people in Kenya dedicated or involved in agriculture are women. Successfully integrating this high-end food technology into agriculture should heavily consider the role of women. Research shows that many of these women are not paid, or are paid very little. If this product helps them get more produce to market, they may have a higher chance of making a profit, which in turn, will help increase and bolster the empowerment of women in rural communities. Furthermore, there are not strict laws thus far related to how packaging should be conducted for fresh produce and will likely not pose any major barriers in the development of AP packaging expansion. Rather, most of the laws in Kenya seem to concentrate on nutritional labeling which is not the concern of the technology being considered.

Barriers to Entry:

Thus far, regional markets have not been fully tapped in the agricultural sector (Alila & Ateina, 2006). Although bodies exist that enhance the communication between neighboring countries, the government of Kenya has yet to truly exploit these relationships at a highly profitable level (Alila & Ateina, 2006). Kenya must do more to support trade in agricultural products across close borders, improve quality control of those products, and rethink their sanitation standards. Kenya also currently lacks stable and effective systems that would help facilitate the transfer of knowledge and opportunities between and among farmers and those engaged in the agricultural sector. This market fragmentation increases the time that it takes to create large-scale, profitable projects and increases long-term costs for those projects. Although market fragmentation could potentially be overcome by targeting consumers at the grassroots level, barriers still exist that would make this process challenging. This challenge will be explored in more depth shortly. The government also has many laws in place that should help protect IP and foreign investment, but questions remain as to whether or not there is successful implementation of those laws.

Kenyan infrastructure, including roads and transportation systems, are in a questionable state. This may make certain rural areas that would benefit most from agricultural technology and modernization more difficult to reach, which would in turn increase costs for investors and likely the farmers as well (Alila & Ateina, 2006). Infrastructure issues may negatively impact aforementioned grassroots efforts to reach people at the local level, which would have served as a significant channel into the marketplace. Inadequate sources of funding for research at the small-scale in agriculture, as opposed to funding for major food crops in larger projects, have made it more difficult for small farms to be productive since the country gained independence in 1963 (United Nations, 2012). Therefore, there may be social bias in scientific and technological sectors in terms of creating relationships with small-scale operations. The government structures put in place to protect foreign investments may also not be implemented to the highest degree. Concerns regarding the implementation of the SRA exist in Kenya, which may dissuade foreign investment even if the goals of the policy are intended to protect investors and Kenyans alike (Alila & Ateina, 2006).

Between November 21st and 23rd of 2017, Nairobi will host the Food Processing and Packaging Exposyum. The conference will offer significant networking opportunities for any company interested in food packaging technology. Communication with conference attendees will provide a variety of opportunities to better understand the market that Hazel is trying to enter. This is absolutely a positive thing, and shows that the Kenyan government is aware of food waste issues in agriculture and is seeking out opportunities to draw in interest from the private sector on an international scale. It is also a sign that the laws protecting foreign investors and food technology businesses have a reason to be in Kenya. However, such interest could play into higher levels of competition, particularly with well-established companies that operate all over the world. It may make it extremely difficult for a start up to find an original and unique niche in Kenya. Nearly

50 different exhibitors were present at the 2015 conference including Amcor Flexibles, Robert Bosch GmbH, Coveris Flexibles Egypt LTD, Food Business Africa, and MULTIVAC North Africa (Interpak).

Opportunity Analysis:

The table below uses the conducted research to rate different aspects of investment in the Kenyan agricultural market. The technology, market size, and consumers themselves are all considered, both in their positive and negative aspects. The final column assigns each aspect of the investment decision on a green/yellow/red scale. Green indicates very few negative considerations and should mark a strong go-ahead for investors. Yellow indicates that both strong negatives and strong positives should be considered in the decision-making process for that aspect of investment. Finally, red indicates that the negatives to consider overwhelm the positives and should be a strong warning signal to investors. Overall, in this particular analysis, Kenya garnered one green score and two yellow scores. No overwhelming negatives were noted during the research process and therefore, were not assigned in the final evaluation.

	Positive	Negative	Assessment (Green – good; yellow – low risk; red – high risk)
Technology	The technology has been successful in other markets and the team understands how it works. It is easy to use and effective.	There may be cultural barriers that have to be considered, such as language, when entering a foreign country that may make it more difficult to integrate a new piece of technology into a long-existing practice (like agriculture)	Recommend the expansion of the Fruitbite over the Berrybite given what is typically grown in Kenya. Cultural barriers can be overcome by tapping into existing agriculture networks like FPEAK.
Market Size	Kenya has been attracting a lot of investment in recent years, particularly in agriculture. Given the past success of other companies, it is a good time and place to invest. People are deeply invested in agriculture in Kenya and would welcome anything to help develop rural regions.	Questions about whether or not Kenya has the infrastructure or the market access to surrounding countries exist. Development of a company may also suffer from difficult political situation.	Navigating opportunities in Kenya will be tricky. The country has attracted a variety of different businesses in food tech in the past, indicating that a new start up could potentially do well. Government structures and organizations exist that should help support foreign companies. However, the state of their infrastructure and questionable political stability may detract Kenya’s positive attributes.
Revenue/Customer Base	Agriculture is extremely important to the Kenyan economy. A considerable amount of people are involved in this sector. Investing in Kenya could help empower rural communities, particularly the women residing in them. There are also laws in place that should help protect investment	Accessing the people that may need this product the most might be difficult due to infrastructural issues like roads and railways in poor condition. The enforcement of protection laws may also be called into question	People involved in agriculture would likely welcome a product that would help them get more produce to market. If other companies have been successful despite infrastructure issues, then there is no reason to believe a new start-up would not also be.

Table 9: Overall market summary and evaluation including analysis regarding agricultural technology, market size, and the customer base.

Discussion and Conclusion:

Kenya has an incredibly complex history deeply marked by the influence of the outside world. Even before the invasion of the Portuguese, traders from all over Africa, Western Europe, and India brought their own cultures to the region. Through time, the country’s history was further molded by the influence of both the Ottoman Empire and the British Empire. When Kenya finally reached independence in the early 1960’s, varying political

groups vied for control of the country and even in the new millennium, the effects of political turmoil can be seen.

That said Kenya has recovered remarkably well and has attracted the interests of businesses all over the world. This likely has created a positive cycle, in which more laws are written to encourage and protect interest, which in turn attracts business, which in turn incentivizes the creation of more business-friendly laws. Kenya is member to a variety of international agreements whose interests span from IP protection to tariff reduction with neighboring countries. These factors have also helped create a positive climate for investment. Although Kenya still struggles with political instability, which calls into question the enforceability of these very laws, as well as issues with inequality of wealth and poor infrastructure, Kenya is a place that food technology would flourish in. Although a start up would likely face competition, the market does not yet seem completely saturated with companies that focus on packaging technology. There is still space available and the Food Processing and Packaging Exposyuum in 2017 would be a key place to build contacts to start growing opportunities in Kenya.

Three levels of risk were assigned to the assessment of the opportunity (table 9). The technology is well-positioned for the Kenyan market – especially the Fruitbite offering – and therefore was assigned a low risk level (green). On the other hand, the market size and the ability to generate revenue/customer sections were assigned more risk (yellow) because in both cases risk increased because of the fragmentation of the market and the fact that there may not be an ability to pay for improved technology. However, these assessments were not made to discourage investment, but only to make investors aware of certain risks that may impact investment decisions. The risk-level/color-coding system also serves as a comparison method for future analysis of other market opportunities. A country that has more green or yellow ratings might be a better option for investment than a country with multiple red ratings.

Overall, the integration of food preservation technology in Kenya would be invaluable for a Kenyan farmer and therefore would serve as an attractive investment opportunity under the right conditions. A cheap, easy to use product that would help increase the shelf life of produce would help the Kenyan economy tremendously. Many Kenyans rely on agriculture and introducing a product that would help more produce reach the market would help in Kenya's development efforts. Women play a special role in agriculture, and giving them the tools to be more productive would be deeply empowering. Given the information that the GINI coefficient reveals about the areas with the highest levels of inequality in the country, investors should pay particular interest to the coastal regions of the country. There seems to be an opportune blend of high levels of income inequality and the ability to farm fruits (fresh produce).

Appendix A

History of Kenya

Kenya has been deeply shaped by the outside world since the first century AD. Although many returned to their home countries, a large portion of visitors from the Arab and Persian worlds stayed and, in combination with the Bantu, Nilotic, Cushitic, Oromo's, and Somali peoples, helped shape many aspects of the Kenyan culture we even see today (Kenyan Embassy, 2016). Overseas traders generally brought clothes, beads, alcohol, weapons, and crafts to trade for ivory, timber, gold, copper, and animal products (Kenyan Embassy, 2016). 1498 saw the arrival of the Portuguese explorer, Vasco da Gama in the city of Mombasa (Campbell & Fernandez-Armesto, 2016). His ships passed through on his expedition's way to India as part of a mission gave the Portuguese the upper hand in trading where Muslim traders had historically held a monopoly. Although his visit was brief, it arguably prompted the invasion of the Portuguese into a variety of cities on the East African coast seven years later in 1505. Control of Mombasa was handed over to Francisco de Almeida, who was made Viceroy of the newly conquered territories, or colonies, of India (Britannica, 2016). For nearly 200 years, the Portuguese fought for control of Mombasa and other major cities along the East Coast of Africa until finally falling to Arab rule in 1698.

The rule of Seyyid Said of Oman brought in a time of somewhat stable political unity among the coastal African cities, which helped further spread Islam in the region (Korir, 2014). However, in 1822, the Sultan sent his armies to East Africa to claim Swahili coastal kingdoms. Internal clashes led the Swahili people to call on the British for assistance and eventually, the British held the Mombasa region as a protectorate for 3 years (Grenville & Grenville, 2009). This, in combination with an increasing amount of Christian missionaries and interference from the British East Africa Association fed into the race that many European countries had already been engaging in: to split up Africa for colonial rule and resource extraction. The 1884 Berlin Conference was held for this very purpose, and saw Germany, Britain, and France carving up much of East Africa (Ntarangwi, Ingham, & Hongo Ominde, The British East Africa Company, 2016). Although the Sultan was granted power over a strip of land on the coastline, it was eventually conceded to the British East Africa Association (later changed to Company) (Ntarangwi, Ingham, & Hongo Ominde, The British East Africa Company, 2016).

In 1895, the area that is now known as Kenya was declared the East Africa Protectorate and Sir Arthur Hardinge was named its commissioner. 1898 marked the beginning of major infrastructure projects, including a railway that would connect Mombasa to Lake Victoria, the same project prompting the birth of the city of Nairobi (Ntarangwi, Ingham, & Hongo Ominde, The British East Africa Company, 2016). The construction of the railway attracted an increasing number of British settlers, which prompted the forced movement of many Africans into camps to work for the Europeans. Certain groups were shown favor over others, which caused ethnic clashes and uprising for years afterwards (Ntarangwi, Ingham, & Hongo Ominde, The British East Africa Company, 2016).

World War I deeply impacted the East Africa Protectorate; thousands were forced to serve in the name of the British and many of them died either in battle or from diseases. The structure of the economy had also been rattled, due to the fact that food production had been geared to providing only for troops. Overuse of the land also eventually led to widespread drought and famine (Ntarangwi, Inghman, & Hongo Ominde, *The East Africa Protectorate*, 2016). However, despite delays to stability, the economy of the Protectorate was restored by the 1920's.



Figure 7: Eastern Africa as partitioned by imperial powers, c. 1914 (Ntarangwi, M., Ingham, K., & Hongo Ominde, S., 2016)

The East Africa Protectorate finally became a colony under the name Kenya in 1920, named after the tallest mountain in the region (Ntarangwi, Ingham, & Hongo Ominde, *Kenya Colony*, 2016). Although the governor expressed interests in improving the education of the Kenyans, those who were educated still could not find positions in the Kenyan legislature to represent themselves, and instead, were represented by appointed European officials (Ntarangwi, Inghman, & Hongo Ominde, *The East Africa Protectorate*, 2016). Throughout the 1920's, movement of Kenyans to urban areas, such as Nairobi, was accompanied by a greater interest in political representation and spurred the formation of such groups as the Young Kikuyu Association, which fought for higher wages and spoke out against the opposition of Christian Missionaries against traditional

African practice (Ntarangwi, Ingham, & Hongo Ominde, Kenya Colony, 2016). Although the group's leader, Harry Thuku, was exiled and the group was disbanded, its formation would inspire further political movement post-World War II and demands to see Africans in the legislature.

After the Second World War, increasing numbers of African's were eventually placed in legislative positions, but they were often selected from a pre-approved list by a British official (Ntarangwi M. K., World War II to Independence, 2016). The Kenyan African Union (KAU, 1944), led by Jomo Kenyatta, who advocated for a peaceful transition to African majority rule, attempted to gain mass African following but many Africans felt that Kenyatta's attempts were not producing the results that were necessary. Such groups, such as the Mau Mau, took a more violent approach to reach their goals African majority control, which forced the colonial government to declare a state of emergency (Ntarangwi M. K., World War II to Independence, 2016). Between 1952 and 1960, the colonial powers forced massive relocations of Africans, particularly the Kikuyu, and Kenyatta and others were sentenced to jail (Ntarangwi M. K., World War II to Independence, 2016). The Mau Mau uprising spurred a variety of social and economic changes in Kenya: a land-consolidation program centralized many Kikuyu into large villages and many Africans living in Nairobi were resettled into rural detention camps. In contrast, a plan to give more opportunities to Africans in agriculture (the Swynnerton Plan) had been enacted to invigorate the economies of cash crops like coffee (Ntarangwi M. K., World War II to Independence, 2016). The 1950's in Kenya ultimately saw enormous foreign investment in agricultural but little in industrial development (Ntarangwi M. K., World War II to Independence, 2016).

Groups like the KAU were banned until 1960, but in that same year, the Kenya African National Union (KANU) formed with Jomo Kenyatta (still in detention), at its core. KANU and the Kenya African Democratic Union (KADU) fought for control of Kenyan hearts and minds but eventually joined as a coalition government in 1962 (Ntarangwi M. K., World War II to Independence, 2016). Both groups called for the release of Kenyatta and in 1963, the Kenya became a fully independent republic with Kenyatta as its first President and Oginga Odinga as its Vice President (Ntarangwi M. K., World War II to Independence, 2016).

Kenya's first years as an independent country were met with great challenges. In 1964, Kenyatta sought the assistance of British troops to put down a rebellion in the army. Kenyatta attempted to appoint members of all different ethnic groups to ensure that the people felt like their needs were being addressed, but Odinga saw many of the President's actions as "Western" and ignoring the needs of the country's poor (Ntarangwi M. K., World War II to Independence, 2016). The rift between the two finally came to a head and Odinga split from Kanu to create his opposition party: Kenya People's Union (KPU). The 1969 assassination of a former KANU furthered Odigna's claims that the government was not providing to the country's poor but was instead catering to the wealthier Kikuyu people. Due to the divisions Odinga was creating, Kenyatta banned the KPU. Further issues arose when, in 1974, Odinga and others were prevented from running for office due to new regulations that forbade the candidacy of anyone who had

not been a member of KANU for the previous three years (Ntarangwi M. K., *World War II to Independence*, 2016). Increasing inflation and political assassinations led to widespread unrest and claims of corruption. Finally, in light of Kenyatta's death in 1978, Daniel arap Moi ascended to the presidency and Mwai Kibaki became the Vice President (Ntarangwi M. K., *World War II to Independence*, 2016).

Under Moi's command, Odinga continued to voice concerns over government corruption. Moi, wielding widespread Kikuyu support, amended the constitution, declaring that Kenya would officially be a one-party state. This decision was met with enormous opposition, so much so, that Moi temporarily closed universities to prevent students from meeting. Despite Moi's efforts, Western powers began requiring that financial aid be tied to certain political or economic reforms and eventually in 1991, Moi reinstated multi-party elections (Ntarangwi M. K., *World War II to Independence*, 2016). His former Vice President became the leader of the opposition party in 1997 but Moi regained control of the Presidency in the following election. In an effort to show the Kenyan people he was truly committed to addressing government corruption and mismanagement, Moi finally appointed non-KANU officials to his cabinet (Richard Leaky and Charles Njonjo) (Ntarangwi M. K., *World War II to Independence*, 2016).

The 21st century saw further political change and development for Kenya. In 2002, Moi announced he would not run again for the Presidency and that Uhuru Kenyatta would be the official candidate for KANU (Ntarangwi M. K., *Kenya and the 21st Century*, 2016). However, Moi's former Vice President, Mwai Kibaki, defeated Kenyatta under the National Rainbow Coalition (NARC), effectively ending KANU's rule of Kenya (Ntarangwi M. K., *Kenya and the 21st Century*, 2016). Although Kibaki promised to combat corruption, his administration fought major scandals in 2005, which spurred the development of a coalition of political parties (including KANU) named the Orange Democratic Movement-Kenya (ODM-K). In 2007, Kibaki founded his own political coalition (Party of National Unity, PNU), and through a highly contested election, re-won the presidency (Ntarangwi M. K., *Kenya and the 21st Century*, 2016). The international community expressed concerns over the results of the elections and the country experienced a period of upheaval and violence including multiple ethnic groups (Ntarangwi M. K., *Kenya and the 21st Century*, 2016). In 2008, both Kibaki and Odinga, who had been a candidate in the 2007 election, agreed to a power-sharing plan developed by the President of Tanzania (Ntarangwi M. K., *Kenya and the 21st Century*, 2016).

In 2010, Kenyan voters passed a referendum to adopt a new constitution in hopes that it would combat years of political unrest and government corruption (Ntarangwi M. K., *Kenya and the 21st Century*, 2016). The document limited the power of the presidency and gave local governments more control. However, this progress was met with the ghosts of the 2007 election when the International Criminal Court (ICC) named Kenyatta and five others as responsible for instigating the post-election violence. They were eventually charged for crimes against humanity for having targeted ethnic groups typically associated with opposing political parties (Ntarangwi M. K., *Kenya and the 21st Century*, 2016). However, despite the allegations, Kenyatta ran again for the presidency in 2013 and won with just 50.07% of the votes against Odinga (Ntarangwi M. K., *Kenya*

and the 21st Century, 2016). The ICC eventually dropped the claims against Kenyatta in 2014, while his Vice President who had also been named in case, continued on trial until 2016 when his case was dropped as well (Ntarangwi M. K., Kenya and the 21st Century, 2016).

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