



The Business Case for Investing in the Export of Avocados in Rwanda

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Prepared by
MONITOR GROUP

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1. Executive Summary

The Market Opportunity for Avocado Exports

Global avocado demand is strong and growing, particularly in developed markets where the taste and nutritional value offered by avocado is driving consumer demand. Global avocado imports topped \$1.6 billion in value in 2010, having grown at 17% per annum over the last decade. Avocado is a relatively “new” fruit in many markets, having only been introduced into the U.S. 100 years ago and into the EU 50 years ago. Avocado production at 3.6 million metric tons still significantly lags that of citrus at 125 million metric tons and other “older” fruits. Current production and demand growth rates signal the market for this “new” fruit is far from saturated.

Rwanda has distinct natural competitive advantages for avocado cultivation and export. Rwanda’s soil and climate conditions are particularly well suited to avocado cultivation. Rwanda is located just two degrees south of the equator, at an average altitude of 1,400 meters. Rainfall is year-round and averages exceed 1,000 millimeters per annum. The average humidity is 75%, and the average temperature is 22 degrees Celsius, with very little variation. These good growing conditions have become comparatively even more advantageous in recent years as neighboring countries have experienced strong climatic changes that have dramatically reduced their periods of long rains.

Historically, avocado exports out of Rwanda have been low because Small Holder Farmers (SHFs) do not tend to grow the Hass or Fuerte variety avocados demanded by international markets. The 82,000 metric tons of avocado cultivated annually in Rwanda consist of locally grown varieties that are not export-grade. As a result, the Government has started distributing export-grade seedlings and educating SHFs on the value of different avocado varieties in recent years. These efforts are driving forecasts for exports of 20,000 metric tons over the next few years.

With the adoption of export-grade seedlings, Rwanda’s competitive advantage vis-à-vis neighboring countries such as Kenya will increase both in terms of yields and cost structure. In total, there are over half a million Rwandan households that grow avocado, with a combined 15,000 hectares under cultivation. The extensive penetration of avocado cultivation amongst SHFs and the complimentary growing conditions leads to avocado yields (21MT/ha) that are nearly double those of Kenya. Furthermore, the additional transportation costs to Nairobi incurred by sourcing avocados from Rwanda are more than offset by the lower labor and procurement costs in Rwanda. This favorable cost structure makes sourcing and exporting avocados from Rwanda up to potentially 15% cheaper than Kenya.

Investment Highlights

The identified investment opportunity is the establishment of a greenfield avocado exporting business with an output capacity of 4,000 metric tons per year. This capacity is driven by the current dynamics of Hass cultivation, and the capacities of typical avocado operations in neighboring Kenya (2,000 to 8,000 metric tons per annum). The business will oversee all the activities involved in order to sell avocado internationally, including cultivation, sorting, cleaning, waxing and packing of avocado.

Packaged avocados will be exported, via Mombasa or Dar es Salam, to the EU where the channel price for avocado is \$1.75 per kilogram, which provides an estimated 32% margin. The sales channel will primarily cover direct sales to 2-3 key EU wholesalers and distributors. Sales channels can be expanded to EU retailers and supermarkets, such as Tesco, Carrefour and Sainsbury’s.

Production costs will be driven by the costs of raw materials, labor, packaging, transport, and general processing. The cost of procuring avocados and the cost of packaging are adjudged to have the highest uncertainty and both have been adjusted upwards by 15% to increase to ensure projections are conservative.

Given the extent of current cultivation fragmentation across a large number of SHFs, a nucleus farm supported by a cooperative of out-growers will be the most effective model for sourcing avocados. The nucleus farm will need to provide 40% of the avocados in order to secure supply stability and scale. This model will require the nucleus farm to be around 100 hectares. Exports from the farm are not expected until year three and out-growers will not be needed for the first two years of operations. This allows time for educating and organizing the out-growers before they are assumed to be integral to the success of the business model. Yields on the nucleus farm are conservatively projected to be 17.5 metric tons per hectare per annum, leaving a supply gap of 2,400 metric tons per annum to be filled by SHFs once this capacity is available.

Financial Projections and Assumptions

The annual revenue forecast for 2017 will be \$8 million, requiring an initial investment of \$2.9 million. The capital investment centers on the acquisition of a 100 hectare nucleus farm (\$0.7 million), and the construction of a 4,000 metric tons avocado sorting and packaging plant (\$1.8 million) in Eastern Rwanda.

The investment is expected to deliver an IRR of 38% without leverage, and returns will improve with the addition of leverage (62% IRR at 50% debt). Operationally the avocado exporter will be cash positive by 2015 (year three). The projected 2017 EBITDA margin of 20% compares favorably with listed regional comparatives.

Enabling Requirements

The investor in collaboration with the Government and donors must address several key risks to ensure the success of the avocado exporting business. These risks include supply chain risks (e.g., cooperatives not being set up and variable commodity prices); political / regulatory risks (e.g., hidden costs and shortage of available land); market risks (e.g., limited smallholder farmer uptake and failure to secure EU certification); and collaboration risks (e.g., inability to distribute inputs and government / donor unwillingness to finance input provision). However, clear mitigation steps exist for each of these risk areas. For example, concerns about meeting the EU's fruit certification requirements are currently being addressed through partnership initiatives between the Rwanda Standards Bureau's and the British Standards Institute.

The Government of Rwanda and several public and donor stakeholders are also taking measures to improve the environment for doing business in Rwanda in general and investing in Rwanda's avocado exporting sector in particular. For example, the government is working to streamline the land acquisition process by simplifying acquisition procedures and shortening lead times for investors. It is also developing regulations for the strict enforcement of contracts between businesses, cooperatives, and other suppliers, along with a similarly robust legal framework around contract law. Additionally, it is implementing new measures designed to eliminate hidden costs for investors — particularly costs incurred at customs.

Meanwhile, several initiatives by donors, NGOs, and the public sector are underway to build the capacity of smallholder farmers by improving their access to, and use of, the inputs they require to operate

optimally. The provision of export grade avocado seedlings to smallholder farmers will help ensure the quality and suitability of avocado for export. Several private and PPP initiatives designed to improve Rwandan farmers' access to credit — and to affordable insurance — are either planned or being implemented. Other donor initiatives are underway to help develop the knowledge and skills of smallholder farmers. Prospective investors can leverage these existing initiatives to build the capacity of farmers and cooperatives and/or monitor and evaluate improvements in farming practices, incomes, and livelihoods.

Development Benefits

The beneficial social impact the investment will have will drive much of the critical Government and public / donor support for an investor pursuing this opportunity. The Government of Rwanda has set aggressive economic development and export growth goals for Rwanda and favors investments which drive towards the realization of this mandate. With over 80% of Rwanda's population primarily engaged in the agriculture sector, this investment will be a critical building block in this effort. The investment will provide incomes to 6,500 Rwandans, consisting of 6,000 out-growers and 500 direct employees. Real incomes for out-growers are expected to improve by over 120%, given the little if any direct revenue currently received by SHFs for their avocado produce. Investors should consistently collaborate with the Government and donors on understanding and enhancing the social impact outcomes of this investment in order to maintain the level of support that will be required to successfully build an avocado exporting business in Rwanda.

The Way Forward

This investment is particularly well suited for investors interested in expanding their avocado sourcing networks to increase their volumes, build scale, and diversify their sourcing activities. Investors such as interregional horticultural exporters that already possess the requisite platforms and experience to make the opportunity operational and global enterprises not presently active in the East Africa region but active in the sourcing and selling of horticulture and cash crops are well positioned for this opportunity.

This opportunity will also be of interest to financial investors with operational experience and market linkages that want to serve as funding partners or even as backers for this venture. Furthermore, investors with social impact mandates can directly support the smallholder farmer engagement goals of these efforts with their investment.

To successfully execute this investment and realize the competitive advantages at hand, prospective investors will need to build relationships and with both public and donor stakeholders, including the Government of Rwanda, relevant financial institutions, and donor organizations. Establishing connections with RDB, MINAGRI, NAEB, and USAID, among others, will ease the land allocation and market entry process and also strengthen investors' efforts to secure institutional contracts. Assessing and building consumer market platforms in the EU and identifying procurement arrangements required will be important to initiate early on given the lead times required.

Prospective investors interested in exploring this opportunity can also seek further information from the Rwanda Development Board, the Ministry of Agriculture, or Monitor Group.

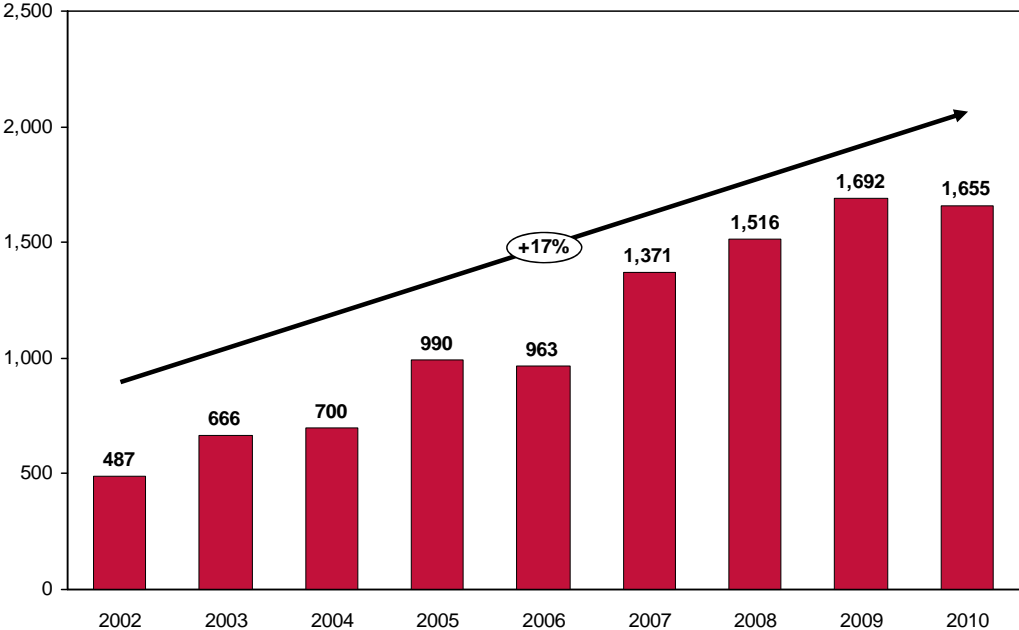
2. The Market Opportunity

The following business case outlines the investment opportunity for avocado exporting in Rwanda. Interest in the Rwandan avocado exporting industry has been traditionally high amongst Kenyan firms looking to expand their sourcing reach, but investment has been restricted because Rwanda mostly cultivates hybrid varieties of avocado and not the Hass variety in demand for international export. This business case seeks to address the opportunity to leverage and complement ongoing efforts to distribute Hass variety seedlings for cultivation and provide potential investors with more information on the market for avocados, the competitive environment, and the key financials and capital requirements associated with this opportunity.

2.1 Global Avocado Demand

Avocado demand has grown rapidly in recent years, particularly in developed markets where the high nutritional content and taste of avocados is driving robust demand. The strong demand trend is well illustrated by import growth which has grown at 17% per annum over the last decade. In 2010 the total value of global avocado imports topped \$1.6 billion¹.

Figure 1: Global Imports of Avocado, 2002–2010 (USD Million)



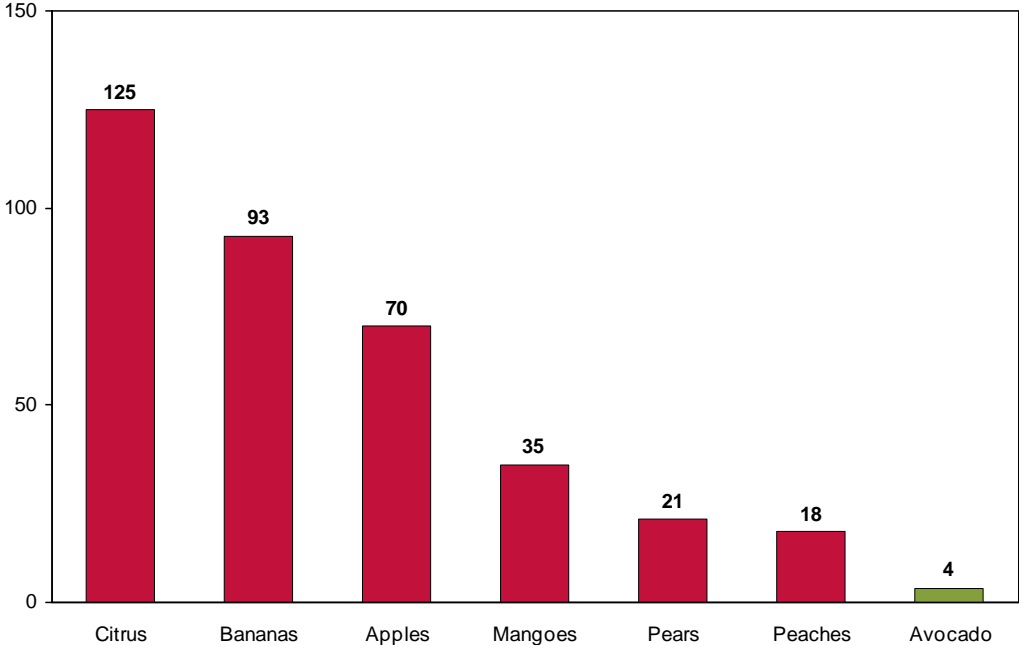
Yet despite the strong growth and high consumer appeal, avocado production significantly lags that of other popular fruits. This is due in part to avocado’s status as a “new” fruit item, having only been introduced into the U.S. a hundred years ago, and into the EU fifty years ago. With global production of 3.6 million metric tons, avocado is still far behind “old” fruits such as citrus, bananas and pears, which have global production of 125 million, 93 million, and 21 million respectively². Being a “new” fruit means avocado demand has not yet reached peak levels, and the consumer market remains far from saturated.

¹ ITC Trademap

² Agrexco, ‘Global Trends in Main Avocado Markets’, 2011

The room to grow for the avocado sector represents a substantial opportunity for new sources of supply.

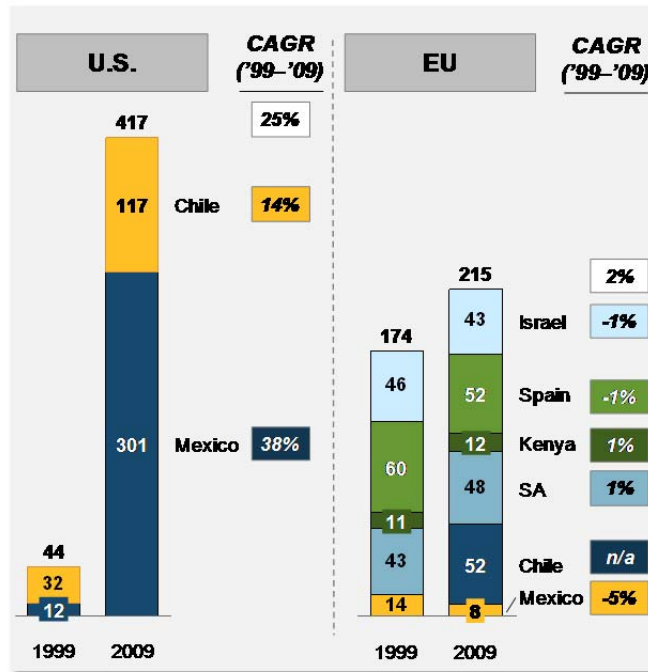
Figure 2: World Fruit Production (Million MT)



The EU presents a highly attractive market for avocado imports, driven by strong demand, current supply gaps, and high season prices. The market for avocado imports centers predominantly on the EU and the U.S., who between them account for nearly 85% of all avocado imports. However consumption growth across each of these markets has diverged substantially in recent years. About a decade ago both the EU and the U.S. had relatively similar total consumption levels of around 200,000 metric tons. Since then U.S. consumption has nearly tripled, while EU consumption has remained largely stable. Today, despite having more than double the population of the U.S., the EU consumes only half as much avocado.

The most significant reason for these markedly different growth rates rests with the supply dynamics of each market. The U.S. sources its avocados from local production, as well as Mexico and Chile. Mexico produces more than 50% of all global avocado imports. Over the last decade U.S. imports from Mexico and Chile have grown at 25% per annum, as production in these countries has ramped up rapidly. Over the same period EU imports from their six main suppliers (including South Africa, Kenya, Spain and Israel) have grown at just 2%. EU imports have thus been strongly constrained by the limited ability of current sources to increase their supply. For Mexico and Chile transport costs to the U.S. are significantly lower than to the EU, leading to a strong preference to direct supply to the U.S. over the EU.

Figure 3: Growth of Imports into the U.S. and EU, 1999–2009, by Source Country (Thousand MT)

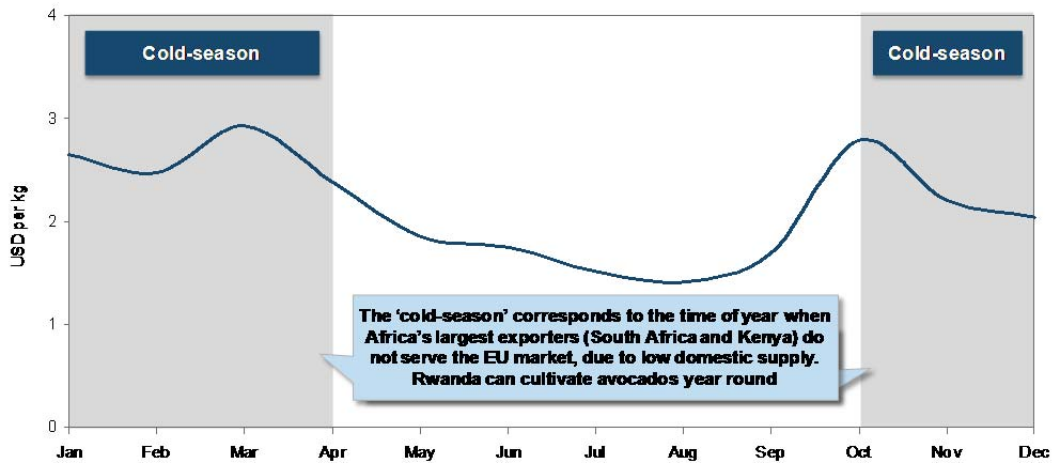


The lack of ready sources for increased supply to the EU creates a significant opportunity for avocado cultivation in Rwanda aimed at serving the EU market. The EU has increasingly sought to source fruit and vegetables imports from East Africa. Exports out of the East African Community (EAC) have grown at over 15% over the preceding decade, growing the region’s share of the global market by around 4% per annum³.

Supply shortages and subsequent price fluctuations in the EU also make it an attractive destination for avocado exports. The difficulties in sourcing larger volumes of avocado have led to seasonal price fluctuations in the EU market. During the period from October to April avocado prices can increase by 50%–100% over the prices paid at other times of the year. The ability to match supply with these higher prices further enhances the attractiveness of exports to the EU.

³ ITC Trademap

Figure 4: Avocado Price Fluctuations in the UK



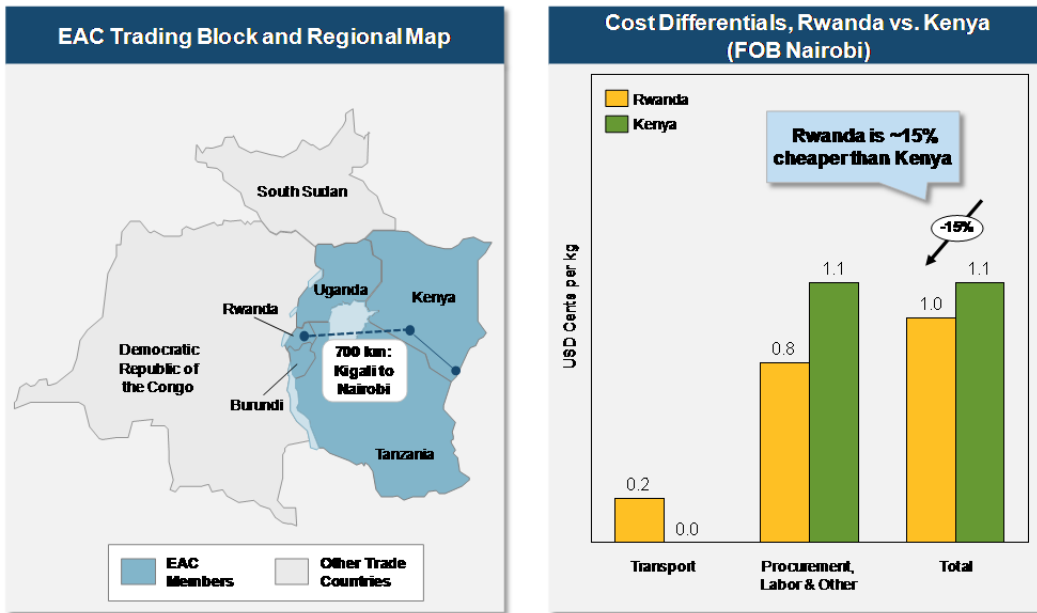
2.2 Competitive Advantages

Rwanda's linkages to regional avocado markets, cost structure and climatic conditions give Rwanda distinct competitive advantages in the export of avocados. Furthermore, the global market need for increased avocado supply goes beyond Rwanda's production capacity; thus the increase capacity or competitive advantage of another producing country does not negate this opportunity for Rwanda.

Rwanda has close proximity to the regional avocado supply chain via Nairobi, and is an attractive extension to the regional export network. Presently Kenya is the only significant exporter of avocado in the region; however across a number of dimensions Rwanda is a more attractive origin for avocado exports.

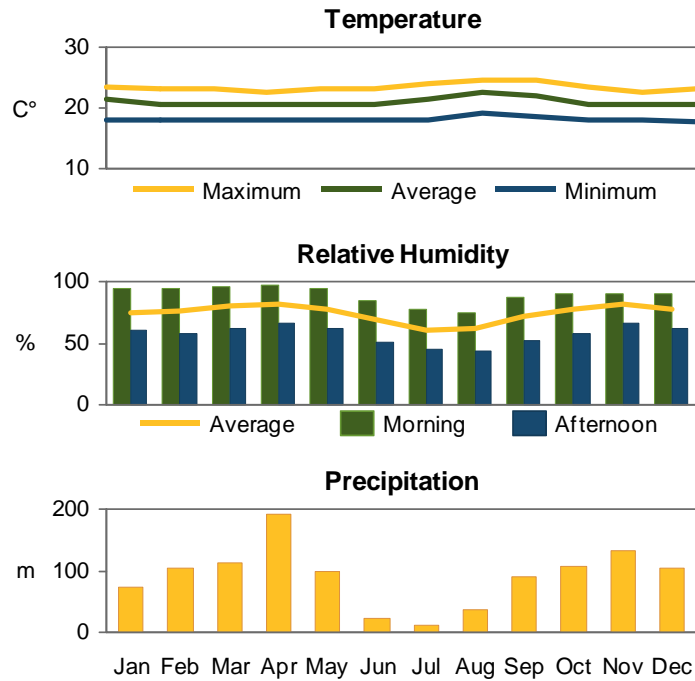
Though the outgoing transportation costs from Rwanda are high, the savings on procurement, in terms of sourcing avocado,) and labor more than offset these costs. The competitiveness of Rwandan agribusinesses have often been hurt by the high costs of exporting goods relative to neighboring countries, many of whom have better sea access. However, in this case, the cost differential between Kenya and Rwanda suggests that the costs to package and transport avocados from Rwanda (FOB Nairobi) will be up to 15% lower than from Kenya.

Figure 5: Location and Cost Advantage



Rwanda also has the ideal conditions for avocado cultivation, which reinforce the strong cost competitiveness. Hass avocado — the most widely consumed, representing 80% of all the total avocado market — is especially well suited to the prevalent agro-climatic conditions. According to the South African National Department of Agriculture, Hass grows best under the following climatic and geographic conditions; tropical locations, altitudes of between 900 meters and 2,400 meters, consistent rainfall with annual levels above 1,000 millimeters, temperature ranges of between 20 and 24 degrees Celsius, and humidity levels above 65%. Located just two degrees south of the equator with year-round rainfall Rwanda is the perfect match.

Figure 6: Climatic Conditions in Rwanda

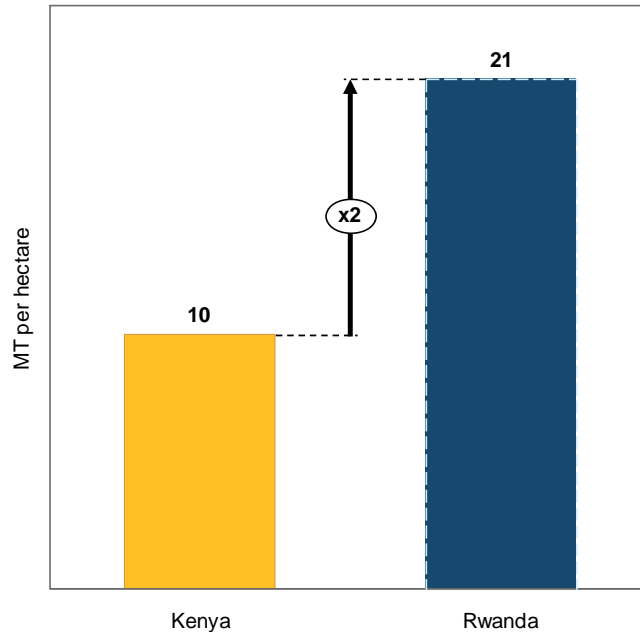


Rwanda’s climatic advantages have been accentuated in recent years as neighboring countries have experienced climatic changes that have drastically reduced their periods of long rains, leaving Rwanda with a clear advantage in terms of rainfall. Kenya, Ethiopia and Sudan have all experienced weather changes that have seen marked increases in the number of consecutive days without rain, while seeing annual rainfall levels fall to levels near 50% of what would have been considered normal in the past⁴.

Favorable conditions in Rwanda and changing weather patterns in neighboring countries have allowed yields in Rwanda to be double those of Kenya. With annual production of over 80,000 metric tons, avocado is the most widely produced fruit in Rwanda. Avocado is grown by more than half a million SHFs in Rwanda, with a combined total of over 15,000 hectares under cultivation. Growing conditions mean that avocados are produced all year-round. The strong position of avocado amongst SHFs and the complimentary growing conditions combine to deliver yields of 21 metric tons per hectare, compared with just 10 metric tons per hectare in Kenya.

⁴ USAID Rainwatch, May 2011

Figure 7: Potential Hass Avocado Yields (MT per hectare per annum)



These competitive advantages have not been capitalized on previously because historically Rwanda has cultivated local varieties and not the Hass avocado variety demanded by international markets. However, the distribution of export-grade seedlings in recent years increasing the link between supply and demand in Rwanda’s avocado market, and is driving forecasts for exports of 20,000 metric tons by 2017⁵. Actual export-grade avocado production in early 2012 was 150MT of Hass per annum and 300MT of Fuerte per annum.

2.3 Enabling Environment

The attractiveness of the competitive landscape is augmented by the attractiveness of Rwanda’s business environment. Rwanda offers the most business friendly environment when compared to its East African counterparts, ranking 1st within East Africa, and 3rd in Sub-Saharan Africa on the “Doing Business” report for 2012⁶. Rwanda performs well on these rankings as it offers less bureaucratic red-tape, easier access to credit and lower tax rates than its neighbors. The Government of Rwanda (GoR) is actively seeking private sector investment into the country, particularly in the agriculture sector. With government support combined with the interest and support from large NGOs and development partners, such as USAID, the enabling environment provides compelling support for investment in Rwanda’s agribusiness sector.

Economically, Rwanda has shown robust growth in GDP over the past few years, with an 8.2% CAGR between 2006 and 2010⁷. Confidence from foreign investors can be seen in the rapid increase of foreign direct investment (FDI) of 20% between 2007 and 2009⁸. The country’s political and macroeconomic

⁵ NAEB Interview

⁶ IFC and World Bank, “Doing Business”, 2012

⁷ BNR

⁸ World Investment Report 2011

stability compared to other countries in the region should provide investors with a degree of confidence regarding country risk, particularly if they are first time investors on the continent.

Furthermore, the Government is committed to investments in infrastructure that will facilitate trade originating from Rwanda⁹. These investments including increased air connectivity, improved road networks, a rail link with coastal ports, and expansion of the electricity supply. This commitment strengthens the potential for Rwanda to serve as a spring board into regional markets over the medium to long-term.

Such competitive advantages are well recognized within Rwanda, and have been very specifically targeted by the Government of Rwanda, who aim to boost the value of horticultural exports to \$335 million by 2017 (a CAGR of 76%)¹⁰. In order to realize these horticultural targets steps are being taken to enhance investor attractiveness.

2.4 Long-term Potential Market Developments

There is long-term potential to grow profit margins and increase product differentiation within the avocado sector. These developments will take place over time, catalyzed by the early stage sector investment that is occurring today. The first phase in sector development will be the establishment of export market links and trade flows. To realize increased margins this phase will be followed by investments in branding Rwandan avocados as premium produce. The third phase will involve potential product diversification across the sector, as new, high value avocado products begin to be produced locally.

The sustained growth of avocado exports and sales across the EU is the target outcome of the initial development of the avocado exporting in Rwanda. To achieve this there is a requirement to match the quality requirements and certification standards expected across EU countries. The existing agricultural certification board in Rwanda has not matched up to global expectations in the recent past. However Government efforts to team up with foreign standards organizations, including the British Standards Institution, seek to enhance the capability and credibility of Rwanda's standards. It is expected that as certification standards and the quality of produce are improved, the selling prices and profit margins on Rwandan avocado exports will improve as well.

Creating a strong, premium Rwanda "country brand" will be the next source of value addition and margin improvement for avocado exporting. South Africa and Chile have been successful in branding their avocado exports accordingly. For example South African avocados are perceived to be much higher quality than Kenyan avocados, and can fetch higher prices in the EU. Much of this is due to marketing and advertising which has established South Africa as a premier origin for fresh food, and avocado in particular. Rwanda will benefit from similar initiatives, which should be carried out at a sector level, and with public funding and / or collaboration.

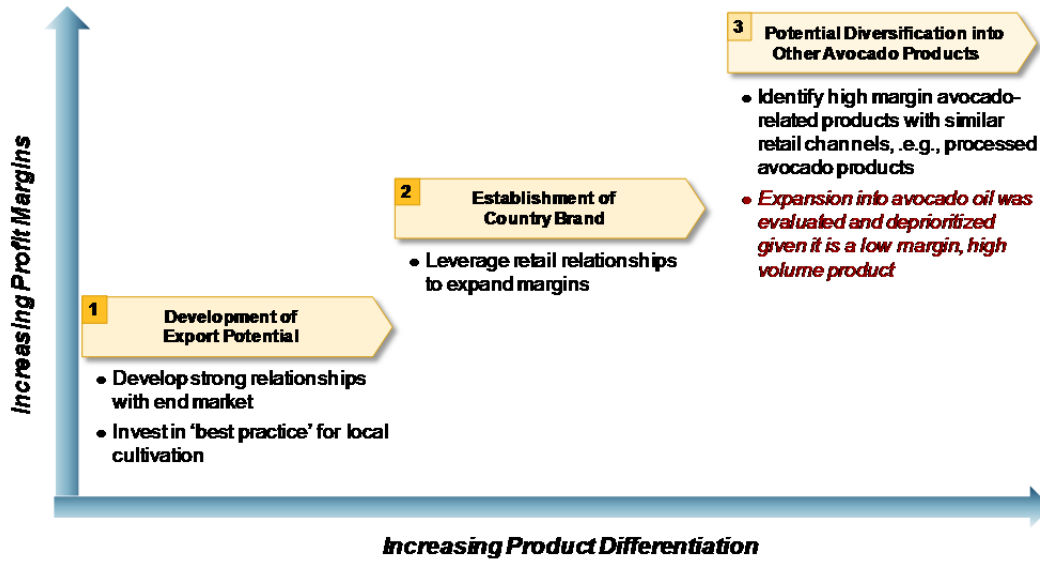
Further margin improvements may be found through the diversification of avocado products produced in Rwanda. Avocado oils, both cosmetic and edible, are unlikely to be attractive additions to the avocado sector in Rwanda, as they are high volume, low margin products. Other consumer products which use avocado, in any form, can be considered for suitability within the Rwanda context, especially where these products command hefty premiums. Furthermore, as global avocado consumption grows and

⁹ Grow Africa Forum, "Brief on Rwanda: Agricultural Investment opportunities in Rwanda's Food Baskets", 2011

¹⁰ Revised National Export Strategy

consumer markets potentially open up beyond the EU, Rwanda will be able to look to serve new markets with growing demand for this 'new fruit'.

Figure 8: Potential Development Stages of the Avocado Exporting Industry



3. Investment Highlights

3.1 Opportunity Definition

The identified investment opportunity is the establishment of a greenfield avocado exporter with an output capacity of 4,000 metric tons per annum. This capacity is driven by the current dynamics of Hass cultivation, and the capacities of typical avocado operations in neighboring Kenya (2,000 to 8,000 metric tons per annum).

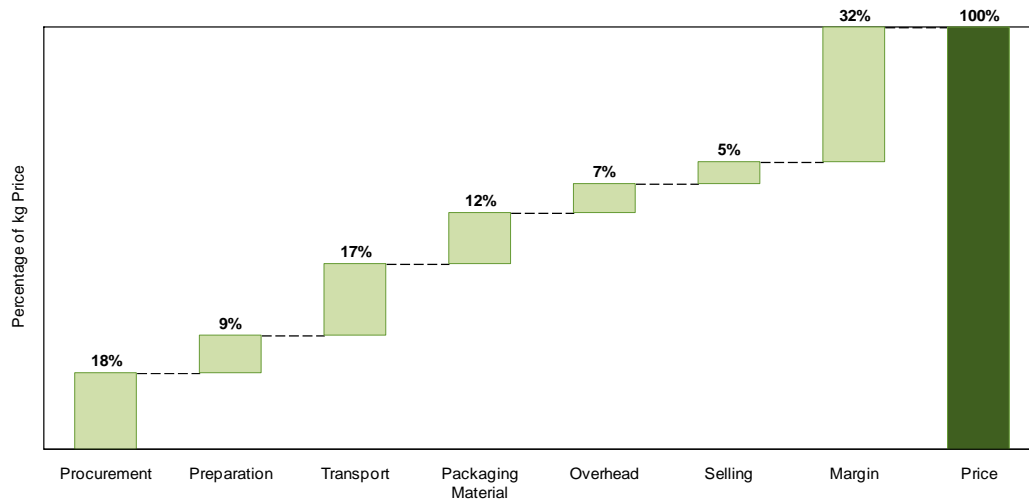
Due to favorable agro-climatic conditions avocado cultivation is distributed across Rwanda. The North, East, South and West provinces are all centers of avocado cultivation. Given the locations targeted thus far for Hass introduction and land availability, the plant will ideally be located in East Rwanda. However, the key determinant of its final location will be where the most suitable plot can be sourced.

The analysis indicates that a 4,000 metric tons greenfields operation in Rwanda would be able to sell all avocado output when operating at full capacity — provided quality meets export grade and prices are at competitive levels. This output would represent 0.4% of global exports, and 1.1% of all exports to the EU.

The value addition which would take place within Rwanda would cover the full range of preparation for commercial retail, including cultivation, aggregation, preparation and packaging. Packaging in this instance refers to the sorting, cleaning, waxing and packaging of avocado. The end product will be in the standard form in which the avocado will ultimately be retailed to the end consumer. In this instance, given the prohibition on most forms of plastic in Rwanda, the packaging will be limited to cardboard boxes and containers, which are the dominant form of export packaging across the region. This packaging will also carry the branding.

Packaged avocados will be exported, via Mombasa or Dar es Salam, to the EU where the channel price for avocado is \$1.75 per kilogram, including a 32% margin. The sales channel will primarily cover direct sales to 2–3 key EU wholesalers and distributors. This will be further supported by sales to EU retailers and supermarkets, such as Tesco, Carrefour and Sainsbury's.

Figure 9: Channel Cost Structure for 1kg of Avocado



Due to the requirement to increase the penetration of Hass cultivation it has been conservatively assumed that no exports will occur during the first two years, as trees reach maturity and begin to bear fruit. The extent to which investors can support and encourage the ramp up Hass cultivation prior to investment will create strong upside potential.

3.2 Opportunity Specific Attraction

Investment in this avocado exporting opportunity has a projected IRR of 38%, which can be improved with leverage. Operations are projected to have an average EBITDA margin of 20% by year five, with positive operational cash flows from 2015 (the third year of production).

The opportunity to export avocados is considerable due to the competitive advantages presented by the favorable conditions locally as well as the strong global demand. The opportunity is supported by an established base of local SHFs who are comfortable and willing to produce avocado for processing.

3.3 Operating Model and the Role of Smallholder Farmers

Given the local context, the nucleus-centered out-grower scheme will be the most effective business model for sourcing avocado (see **Figure 25** in the appendices for more on the pros and cons of this scheme). This model involves sourcing from a nucleus farm linked to smallholder farmers through a hub-and-spoke setup. In order to produce the minimum amount of raw materials for the processor to be profitable, a nucleus farm will need to provide 40% of inputs, which will require the farm to be about 100 hectares — a sizable piece of land in the Rwandan context.

The nucleus-centered out-grower scheme is a form of contract farming whereby the exporter does not rely solely on the output of individual farmers.¹¹ Typically, agreements or contracts will be signed between the exporter and the contract farmers (out-growers) or the cooperatives to which they belong. If an agreement is established with a cooperative, then it is expected that the cooperative will put specific agreements in place with its members who are involved in producing raw materials for the exporter. Such contracts usually specify the quantity and quality of product to be delivered. Prices are

¹¹ “Making the Most of Agricultural Investment: A Survey of Business Models That Provide Opportunities for Smallholders,” IFAD, 2010.

typically fixed, although adjustments may be made according to current market prices at the time of sale. The exporter can provide upfront inputs, the cost of which may be deducted from the final selling price realized by the out-grower.

As exports are conservatively assumed to begin in year three, out-growers will not be required for the first two years of operations. This will provide time for capacity building and organizing among smallholder farmers and cooperatives, which will help ensure that they are properly equipped and able to perform optimally when engaged as out-growers.

Avocado yields on the nucleus farm are conservatively projected yield to be 17.5 metric tons per hectare per annum. At capacity this will leave a raw material supply gap of 2,400 metric tons per annum for SHFs to fill. SHF avocado yields are conservatively projected to be 100 kilogram per tree per annum, with initial interviews indicating that on average SHFs have five trees each¹². At these yields each SHF will produce, on average, 0.4 metric tons of avocado per annum (see **Figure 26** in the appendices for production calculation). At capacity 6,000 SHFs will be involved as out-growers.

3.4 Key Financials and Capital Requirements

3.4.1 Capital Investment

To provide a comparative basis for investor decision making a base case has been modeled to reflect a 100% equity capital investment. The effect of leverage has also been modeled to assess the returns with 50% capital and 50% equity investment. The full capital investment required at 100% equity equates to approximately \$2.9 million. The majority of this capital investment encompasses the upfront costs to purchase land (\$0.7 million) and the costs to acquire and construct plant and machinery (\$1.75 million). The balance will cover working capital requirements and early stage operational losses. Costs for plant and machinery are only expected to be incurred in 2014 (year two), as avocado trees will only reach maturity and begin to bear fruit in the third year; therefore operational facilities will only be required from that point. Costs for land will be incurred upfront, as the nucleus farm will need to be established, and seedlings planted, in the first year.

3.4.2 Forecast Financials

Cash flow and income has been forecast on a comprehensive basis, as well as on an operational basis. Under a 100% equity-funded investment there are no financing cash flows.

¹² Farmer Interviews; Monitor Analysis

Figure 10: Forecast Income Statement Assuming a 100% Equity-Funded Investment (Million USD)

	2013	2014	2015	2016	2017
Total Revenues	0	0	2.58	5.69	7.79
Total COGS	0.20	0.16	1.23	3.44	5.20
Gross Profit	-0.20	-0.16	1.35	2.25	2.59
SG&A Total	0.05	0.05	0.68	0.88	1.03
EBITDA	-0.24	-0.20	0.67	1.37	1.56
<i>EBITDA %</i>	-	-	26.0%	24.1%	20.0%
Depreciation	0.07	0.07	0.07	0.07	0.07
Interest	0	0	0	0	0
Earnings Before Taxes	-0.31	-0.27	0.60	1.30	1.49
Taxes	0	0	0	-0.40	-0.45
Net Income / NOPAT	-0.31	-0.27	0.60	0.91	1.04

Figure 11: Forecast Cash Flow Statement (Million USD)

	2013	2014	2015	2016	2017
Cash Flow from Operations					
Earnings from P&L	-0.31	-0.27	0.57	0.91	1.04
Depreciation	0.07	0.07	0.07	0.07	0.07
Net Interest (after tax)	0	0	0	0	0
(Change in net working capital)	0	0	-0.65	-0.78	-0.53
Total Cash Flow from Operations	-0.24	-0.20	0.02	0.20	0.59
Investment (Capex)	-0.72	-1.75	0	0	0
Free Cash Flows	-0.99	-1.95	0.02	0.20	0.59
Cumulative Cash Flows	-0.99	-2.91	-2.89	-2.69	-2.10

The forecast EBITDA margin ranges from 20% to 26% as sales volumes gain traction, and SHF sourcing increases. The 2017 (year five) EBITDA margin of 20% compares favorably with listed regional comparables. Key companies in the fruit and vegetable sector across Africa realize average EBITDA margins of 19.3%, with a range from 6% to 36%, in 2010¹³.

3.5 Projected Returns

Four key metrics have been used to project returns, notably the net present value (NPV), the project's internal rate of return (IRR), the return on invested capital (ROIC) in 2017 (year five), and the NOPAT (or Net Income) margin in 2017 (year five).

¹³ S&P Capital IQ

Figure 12: Projected Returns with 0% Debt

NPV (\$M)	\$1.01
Project IRR	38%
ROIC (yr 5)	26%
NOPAT Margin (yr 5)	13%

The projections indicate that the project will generate a positive return and create value for equity investors. The ROIC ranges from -13% to 26% over the first five years of operation and compares very strongly to listed regional comparables. Key companies in the food processing sector across Africa generate average ROIC's of 13%, with a range from 7% to 20%.¹⁴

With approximately 50% leverage the projected IRR would improve to 62%. Under this scenario fixed assets would be funded with 50% debt, requiring a debt investment of \$1.2M, with an equity investment of \$1.9M. This demonstrates that an investor's ability to secure debt funding will be positively impactful on the return outcome of the project.

Figure 13: Projected Returns with 50% Debt on Fixed Assets

NPV (\$M)	\$1.74
Project IRR	62%
ROIC (yr 5)	26%
NOPAT Margin (yr 5)	13%

3.6 Key Risks and Mitigation Mechanism

3.6.1 Opportunity Risks and Mitigation Steps

Several risks associated with this opportunity have been identified. These risk and suggestions for mitigating them are summarized below.

1. Supply Chain Risks

If **cooperatives are not setup** and do not function well, then the sourcing of avocados and provision of seedlings, inputs and training will become complicated and risky. This could lead to low input volumes as well as higher procurement costs. Mitigation requirements would include:

- Directly empower key SHFs to form cooperatives, and provide monitoring and training to the cooperatives and leaders
- Form a subsidiary sourcing company which focuses on aggregating avocado from a wide network of SHFs, who may potentially be part equity owners of the subsidiary

Variable commodity prices could tempt cooperatives or out-growers to breach supply contracts if more lucrative prices can be found elsewhere. This factor is widely highlighted by businesses currently operating in Rwanda, many of whom bemoan poor judicial enforcement of contracts. Mitigation steps would include:

¹⁴ S&P Capital IQ

- Arranging fixed-pricing agreements / contracts with producers
- Consistently enforcing contracts through the bolstering of contract law; regular checkups to ensure contracts are upheld, with set punishments for breach of contract

2. Political / Regulatory Risks

Investors may face **unforeseen or hidden costs** related to the importation and transport of plant and machinery during the setup phase. Interviews with companies in Rwanda reveal that despite assurances, businesses are sometimes charged unexpected import duties for the port storage or import of required machinery. Mitigation steps would include:

- Obtaining defensible guarantees that no such costs will be incurred and ensuring Government involvement and availability throughout the setup process to provide support when necessary

The **shortage of available land** in Rwanda could mean the 100 hectares required to set up operations of the nucleus farm could be very difficult to obtain. Based on the experiences of several companies, acquiring land in Rwanda is often a lengthy process. Mitigation steps would include:

- Engaging directly with local municipal authorities who have the ability to grant land tenure
- Contracting a cooperative that owns and operates a 100 hectare nucleus farm that could supply avocado exclusively to the avocado exporter; this arrangement could entail a small equity stake in the avocado exporting firm for the cooperative

3. Market Risks

The need to get out-growers to plant improved avocado varieties runs the risk of **limited smallholder farmer uptake**, as many may be reluctant to change their farming practices or adopt new inputs and production methods. Mitigation steps would include:

- Offering crop insurance to lower the risk to farmers who adopt new practices and crops
- Expanding the size of the nucleus farm to cover more or all input requirements

The **failure to secure EU certification** from the RBS means that avocados may have to be sold at low prices, if they can be sold at all. Mitigation requirements would include:

- Piloting certification standards with early stage avocado exports
- Establishing early dialogue with EU buyers to ensure that outputs will meet their standards, and to ensure that contractual obligations are clear and well understood

4. Collaboration Risks

Inability to distribute inputs to out-growers at a reasonable cost could lead to insufficient usage of proper inputs. Mitigation steps would include:

- Government ensuring the availability and distribution of inputs with support of donors
- Securing direct agreements with input providers

Government or donors may have an **unwillingness to finance input provision**, also leading to insufficient usage of proper inputs. Mitigation steps would include:

- Providing inputs on credit to out-growers and taking the payment for the inputs out of the price paid on collection of production

- Covering input costs as an operational expense

3.6.2 Sensitivity Analysis

Sensitivity analyses were conducted by adjusting the input factors that will be impacted by the risks outlined above. For example if Hass cultivation does not become widespread then there will be a lower supply of suitable avocados and the exporter will have to pay more for those avocados, driving up procurement costs. Adjusting procurement cost assumptions allows for the analysis of the effect of low take-up of Hass cultivation will have on projected returns. Cost of procurement and operating costs (specifically packaging and transport costs) were identified as the inputs with the highest uncertainty factors, and mitigation steps will be critical in addressing these. Project returns are most susceptible to changes in procurement and operating costs, as well as sales prices changes.

Costs of procurement will be impacted by the prevailing commodity price levels, the available supply of Hass avocados and the ability to enforce contractual obligations. Given the potential uncertainty around Hass cultivation and overall costs of procurement a 15% buffer has been built into the base case to increase the comfort level associated with this input.

Changes to **additional operating costs** will significantly impact the forecast financials. The ability to lower these through experience gains, and increased bargaining power through scale, will be hugely beneficial for the project. Transport and packaging costs specifically will need to be carefully negotiated, and watchfully managed going forward. The cost of packaging material is the most susceptible to external market factors. Packaging material needs will be met through imports, as Rwanda does not have any production capacity in this regard. To increase the comfort level associated with both packaging material and transport costs a 15% buffer has been built into the base case for these cost items.

Capital expenditure will be impacted by land availability and pricing, as well unforeseen charges on machinery importation. On the low side reductions in capital expenditure will be realizable through reduction or elimination of land acquisition costs; something which past foreign investors have been able to achieve through careful negotiation with the Government of Rwanda.

Projected returns will be heavily influenced by **sales volumes**. It will be up to the investor to ensure that marketing and certification efforts are fruitfully carried out. Finding and contracting buyers in the EU will be an ongoing process, which will require careful and sustained marketing activities.

Similarly to volume, **sales prices** will heavily impact projected returns. The ability to achieve recommended price levels will thus be very important. Hence conservative prices have been used in the assessment. The comfort level associated with sales prices is further boosted by Rwanda's ability to match avocado supply with the periods of high demand and high prices in the EU.

The following methodology was used for sensitivity analysis:

- Identification of five input levers for which to test sensitivities; (i) Cost of Procurement, (ii) Additional Operating Costs, (iii) Capital Expenditure, (iv) Sales Volumes, and (v) Sales Prices
- Set the range of values for each of the input levers at 20% above and 20% below the base case
- Observation of the effect of changing input values upward and downward on key outputs

Figure 14: Sensitivity Analysis (Percentage Changes)

	Cost of Procurement		Additional Operating Costs		Capital Expenditure		Sales Volumes		Sales Prices	
	High	Low	High	Low	High	Low	High	Low	High	Low
NPV	-65%	65%	-127%	126%	-40%	40%	55%	-57%	331%	-335%
Project IRR	-25%	21%	-53%	40%	-18%	22%	18%	-22%	91%	-321%
ROIC (yr 5)	-20%	20%	-36%	36%	-12%	14%	8%	-10%	82%	-99%
NOPAT Margin (yr 5)	-20%	20%	-36%	36%	-3%	3%	-1%	2%	66%	-99%
Total Investment	-	-	5%	-	17%	-17%	-	4%	-	35%
Revenues (yr 5)	-	-	-	-	-	-	20%	-20%	20%	-20%
NOPAT (yr 5)	-20%	20%	-36%	36%	-3%	3%	19%	-19%	99%	-99%
Operating Cash Flow (yr 5)	-36%	36%	-64%	64%	-2%	2%	15%	-15%	158%	-158%
Sales (MT) (yr 5)	-	-	-	-	-	-	20%	-20%	-	-

4. Financial Projections and Assumptions

4.1 Financial Forecasting Model

In order to develop a comprehensive business plan for the proposed avocado exporter a detailed financial spreadsheet model was created. The model builds revenue and cost forecasts, as well as associated capital expenditures. The model was designed with the following key objectives:

- Provide flexibility to test and alter assumption and inputs in the future
- Identify and capture the key input levers which drive financial requirements and return
- Identify and assess the expected financial and economic results

The key variables used in the model are:

- **Inputs:** High level inputs such as the costs of property, plant and equipment, operating costs, sales volumes and prices, working capital requirements, and the debt ratio.
- **Cost of Capital:** Calculation of the appropriate discount rate for the proposed operations, taking into consideration key determinants such as the risk-free rate, marginal risk premium, and the unlevered beta coefficient.
- **Development Benefits:** Determination of the number of SHFs involved, changes to their incomes, and costs of involvement.
- **Sales:** Processing capacity and projected sales volumes across each over time.

The main outputs of the model include:

- **Debt:** Breakout of the schedule for debt repayments, including principal and interest portions.
- **Model:** Income statement, balance sheet, and cash flow statements, including key performance measures.
- **Outputs:** Summary of the key return metrics and capital requirement.

4.2 Assumptions

The model makes a number of assumptions based on available information. Where assumptions have been made they are based on the best available data and have been cross-checked with alternative sources where possible. When making these assumptions caution has been favored at all times so as not to overstate the potential of the investment opportunity.

4.2.1 Capital Expenditure

Capital expenditure costs have been sourced from discussions with firms currently operating in the avocado sector in Rwanda, Kenya and South Africa, as well as from local stakeholder interviews and public information. The financial model tracks capital expenditures, with the assumption that all material capital investments will be incurred in 2013 and 2014 (years one and two). This is a conservative assumption and capital expenditure may well be spread out over the initial years of operation.

Capital expenditure has been split across two components:

- The acquisition cost for the required land parcel of 100 hectares, on long lease

- The construction and purchase costs for plant and equipment required for the export of raw avocados, with total annual capacity of approximately 4,000 metric tons, incurred in 2014 (year two)

Figure 15: Capital Expenditure (USD Million)

Fixed Assets	
Land Costs ¹⁵	0.72
Building and Equipment Costs ¹⁶	1.75
Total Fixed Assets	2.47

Source: Processor and Farmer Interviews; Monitor Analysis

4.2.2 Capital Structure

To provide a foundation for different types of investors to evaluate optimal financing structures, the base case assumes no debt funding. This enables the model to provide an accurate reflection on the returns to equity, without the complexity of assuming debt financing terms that are available to different investors. However, the model has the flexibility to include debt in the capital structure should an investor require this functionality.

4.2.3 Revenues

Revenue forecasts are driven by two components; sales volumes and sales prices.

The assumption is that production will start in 2015 (year three), as export grade Hass seedlings will need to be distributed and planted, and will take two years to reach a harvest state. This is a conservative assumption as Hass is already cultivated in small quantities in Rwanda, and production could therefore start earlier.

Sales volumes have been adjusted downwards, under the conservative assumption that it will take a few years to ramp up to a state where the outputs from operating at full capacity can be sold to the market. Sales volumes in the third year have been set at 35% of potential capacity, with volumes reaching 75% and 100% of capacity in the fourth and fifth years respectively.

In 2011 the EU imported a total of over 350,000 metric tons of avocado¹⁷. The output capacity of the avocado exporter represents approximately 1% of the total imports to the EU, and 4% of EU imports sourced from Africa¹⁸. South Africa and Kenya are the leading African suppliers to the EU, and together supply 28% of the EU's total imports. Analysis and interviews with exporters suggest that Rwanda can significantly complement this supply.

¹⁵ Processor and Farmer Interviews; Monitor Analysis; Current land costs are in the region of RWF2.1 million for half a hectare; this was multiplied by 100, the required land area needed for plant and nucleus farm setup. The initial CapEx cost has been based on research into the costs of setting up plants of a similar size and scale in both Rwanda and neighboring countries

¹⁶ Processor and Farmer Interviews; Monitor Analysis

¹⁷ ITC Trademap

¹⁸ ITC Trademap

Figure 16: Export Sales

	2013	2014	2015	2016	2017
Capacity (MT)	0	0	4,000	4,000	4,000
Realized Capacity (%)	0%	0%	35%	75%	100%
Sales (MT)	0	0	1,400	3,000	4,000

Channel sales prices have been set at \$1.75 per kilogram in 2013 (year one) for raw avocados. The price reflects the commodity nature of trade in avocados, and represents the FOB destination price. The price has conservatively been set at the level received in the EU by Kenyan exporters. Kenyan avocado is traditionally targeted at the cheap end of the market, which creates upside price potential to the extent that higher quality avocados can be produced. The potential to match supply to the EU cold-season creates further upside price potential. The average price paid for avocados in the UK during the cold-season is 50%–100% higher than the average price. Sales prices have been assumed to increase year-on-year at the EU midterm forecast inflation rate of 2.7%.

Figure 17: Channel Prices (USD per kg)

Fresh Avocado	1.75
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4.2.4 Costs

Operational costs were informed by the actual cost structures of benchmarked avocado operations, and where necessary have been adjusted based on directional guidance from parties currently involved in the avocado industry in Rwanda, in order to reflect local conditions.

The primary driver of operational costs is the cost of goods sold, which comprises a number of factors, including cost of procurement, direct labor cost, packaging cost, and transport costs. The cost of procuring avocados and the costs of packaging material and transport were adjudged to have the highest level of uncertainty. These cost items have been adjusted upwards by 15% to increase the comfort level.

Figure 18: Cost of Goods Sold (per kg)

Purchased Avocados ¹⁹	0.47
Cultivated Avocados	0.09
Other	
Preparation & Other ²⁰	0.15
Transport ²¹	0.30
Packaging Material ²²	0.21

Source: Processor and Farmer Interviews; U.S. International Trade Commission; World Bank; African Shipping Lines; Monitor Analysis.

¹⁹ Processor and Farmer Interviews; Monitor Analysis; Based on 280 RWF per kilogram for export grade avocados

²⁰ Processor Interviews; Monitor Analysis; Based on EAG's cost structure

²¹ African Shipping Lines; World Bank; Monitor Analysis; Based on cost to ship container to EU of \$1,900, cost to truck container to Kigali of \$2,600, and facilitation fees required enroute are \$850

²² Processor and Farmer Interviews; African Shipping Lines; World Bank; Monitor Analysis; Based on cost per box of 0.5 EUR and 4 kg per box, in addition to transport from the coast

It was calculated that avocados sourced from SHFs will cost nearly five times what the cost of sourcing avocados from the nucleus farm. The cost to source from SHFs will become more competitive as market linkages are established and Hass cultivation spreads.

Figure 19: Cost of Cultivation on Nucleus Farm (USD)

Cultivated Plot Size	100
Annual Output (kg)	1,600,000
Input Cost, per ha ²³	103.33
Labor Cost, Total ²⁴	110,053
Number of Farm Laborers ²⁵	508
Management Cost, Total ²⁶	25,000
Cost per kg of Output	0.09

Source: U.S. Department of State; International Labour Organization; Processor and Farmer Interviews; Monitor Analysis.

Selling costs reflect the fact that sales will be to retailers and distributors in markets with strong, excess demand, and will therefore not require significant or sophisticated marketing efforts at the company level. Selling costs have been set at 5% of total sales revenues, in line with industry standards. General and administrative costs are fixed in nature, and reflect the cost items which will be incurred at a set level regardless of production level. These fixed costs include factory overheads, indirect labor and general staffing.

Figure 20: General and Admin Costs (USD)

Maintenance ²⁷	87,500
Admin Staff and Floor Managers ²⁸	25,000
Executives ²⁹	165,000
Other ³⁰	200,000
Total	477,500

Source: FAO; Processor and Farmer Interviews; MINICOM; Karisimbi; Monitor Analysis.

²³ Monitor Analysis; Calculated as multiplication of harvest cost/ha and number of harvests/annum

²⁴ U.S. Department of State; International Labour Organization; Monitor Analysis; Based on 5 labors per hectare earning 500 RWF per day

²⁵ 5 laborers required per hectare and nucleus farm size of 100 hectares

²⁶ Processor and Farmer Interviews; Monitor Analysis; Based on 5 farm managers - salary of 250,000 RWF per month

²⁷ FAOSTAT; Based on recommended food processor maintenance charge in African countries of 3-5% of acquisition value of fixed investment

²⁸ Processor and Farmer Interviews; Monitor Analysis; Based on 5 admin employees for plant with 4,000 metric tons annual capacity - salary of 250,000 RWF per month

²⁹ Monitor Analysis; Based on one fulltime chief executive and two senior executives

³⁰ Processor and Farmer Interviews; Monitor Analysis; Based on the overheads to run a similar facility, as forecast by local processors

The final substantial, non-operating cost item is depreciation. The relevant depreciable assets are plant and equipment, which are depreciated at 5%³¹ on the acquisition cost in line with Rwandan accounting regulations.

Figure 21: Depreciation (USD)

	2013	2014	2015	2016	2017
Depreciation	70,000	70,000	70,000	70,000	70,000

4.2.5 Other Financial Model Input Assumptions

Other input assumptions cover working capital requirements, corporate tax rates, treatment of tax losses, and the opportunity cost of capital. These inputs have largely been drawn from analysis of benchmarked companies operating in the avocado industry, as well as information obtained from Rwandan tax authorities. These inputs are detailed below.

Figure 22: Working Capital Requirements

Percent of Sales	25%
Working Capital Considerations:	
Inventory Days ³²	60
Credit Terms with Suppliers	0
Credit Terms with Distributors ³³	30

Source: Processor and Farmer Interviews; RABI; Monitor Analysis.

Figure 23: Tax Treatments

Corporate Tax Rate	30%
Straight line depreciation (years)	25
Carry for Tax Losses (years)	5

Source: Ernst & Young Rwanda.

The opportunity cost of capital (also known as the weighted average cost of capital) was determined using the capital asset pricing model. The zero debt cost of capital aligns closely with the average return levels (25%³⁴) that investors have indicated they would require for equity investments in Rwanda.

³¹ Ernst & Young Rwanda

³² Based on year round processing and shipping

³³ Processor and Farmer Interviews; Monitor Analysis

³⁴ Investor interviews carried out by the Monitor Group (n=93)

Figure 24: Opportunity Cost of Capital

Risk-free Rate	9.5%
Unlevered Beta	1
MRP	13.5%
Tax Rate	30%
Long-term Debt Ratio	0%
D/E Target	0
D/V Target	0%
Levered Beta	1
Opportunity Cost of Debt	17%
Unlevered Cost of Capital	23.0%
OCC	23.0%

Source: National Bank of Rwanda;
Damodaran; Monitor Analysis.

5. Enabling Requirements

The Government of Rwanda, financial institutions, and donor organizations — working both separately and together — are either considering or actively implementing a number of enabling requirements designed to facilitate sustainable, private sector-driven development of Rwanda’s avocado exporting sector. Several of these requirements are outlined below.

5.1 Land Acquisition, Contract Enforcement, and Hidden Costs

As part of its ongoing efforts to further improve the environment for doing business in Rwanda, the Rwandan Government is actively working to make the land acquisition process more simple and straightforward. At present, a Government-sponsored initiative is underway to comprehensively map the land acquisition process for investors. Ultimately, the Government wants to identify critical points in this process so that it might intervene at these points in order to simplify acquisition procedures and shorten lead times for investors.

The Government is also developing regulations for the strict enforcement of contracts between processors, cooperatives, and other suppliers, along with a similarly robust legal framework around contract law. Meanwhile, stricter regulation of cooperatives will further enhance the enforcement of contracts while also ensuring fair dealings with out-growers. Finally, the Rwandan Government is working to eliminate hidden costs for investors — particularly costs that may be incurred at customs — by creating strict assurances about the real costs of investing and setting up processing operations in Rwanda.

5.2 Transportation and Cross-Border Administration

The Government of Rwanda and donors are working on a number of coordinated projects to upgrade road and rail infrastructure across Rwanda, and the broader region. Currently it costs between \$2,600 and \$3,500 to transport a 20 foot container by road to Nairobi, and these costs can often be exacerbated by the need to pay “facilitation fees” enroute. Development of a land transportation network of highways and rail connections, between Rwanda and coastal ports, is a priority to help reduce transport costs. Similarly, elimination of hidden costs at cross-border customs and other checkpoints can also reduce total transport costs.

Improvements in the land transportation infrastructure have been ongoing for some years now, and especially within Rwanda the primary road network is now amongst the best in the region, if not the best. Plans for a regional railway (Kigali-Isaka-Dar es Salam) which will address many of these concerns are underway, and construction is due to begin in early 2014.

5.3 Reliability and Quality of Raw Material Supply, and Formation of Cooperatives

Several initiatives by donors, NGOs, and the public sector are underway to build the capacity of smallholder farmers by improving their access to, and use of, the inputs they require to operate optimally. These stakeholders already play a crucial role in the provision of inputs to farmers operating across select value chains, either through direct funding and provision or through supporting partnerships to deliver these inputs. For example, the extension of fertilizer subsidies, as well as seed R&D and provision, to avocado growers are expected to improve the reliability and quality of their production.

The public sector in partnership with donors, will to continue the distribution of export-grade avocado seedlings to SHFs. On the ground involvement will be necessary to ensure that SHF uptake of new avocado seedlings is sustained. Where SHFs stand to lose temporary incomes because of a switch to new avocado types the public sector will need to consider methods of short-term income substitution to offset losses.

At an aggregation level avocado trade in Rwanda is currently controlled by traders. As with other key crop value chains the Government and public sector play a formative role in establishing cooperatives, which should be farmer led. The investor will also benefit from involvement in the establishment of cooperatives, to ensure they are setup in such a way as to meet key requirements.

The provision of credit to smallholder farmers will facilitate access to quality inputs and help ensure the consistency in their production through mechanization and other means. Several private and PPP initiatives are underway to improve Rwandan farmers' access to credit. For example, Banque Populaire du Rwanda (BPR) offers rural microcredit and agricultural loan schemes to smallholder farmers. However, because these schemes place stringent requirements on borrowers (e.g., 125% collateral obligations), they are insufficient on their own. The Rwandan Government is considering the adoption and facilitation of other donor and PPP initiatives currently in place in other countries, such as AGRA's Innovative Financing Initiative, which provides loan guarantees to reduce bank lending risks in Kenya, Uganda, Tanzania, Ghana, and Mozambique.

Improving smallholder farmers' access to affordable insurance is also a priority. Having insurance will lessen the economic impact on farmers who encounter difficulties — such as climate-related crop destruction and low market demand for raw materials — during the early phase of adjusting to new methods and inputs. Both Soras and Sonarwa — in partnership with BPR, the United Nations, and the Rwandan Government and underwritten by Hollard and Swiss Re — are currently piloting weather and livestock insurance programs in Rwanda.

5.4 Empowerment of the Certification Board

The Government of Rwanda's ongoing efforts to develop the horticultural sector can be seen through the establishment of and investment in, a strong institutional and regulatory base. Historically Rwanda's export standards institution, the Rwanda Standards Bureau (RBS), has been criticized for unreliable service and poor quality certification capabilities. This has created a need to for institutional improvements through capacity building and alignment with the certification and standards boards in output destination countries.

The Government has demonstrated awareness of the importance of widely accepted standards through recent investments into the RBS that have focused on improved quality control systems and increased manpower. These efforts have gained traction with the recent twinning of the RBS with the British Standards Institute (BSI). These ongoing efforts will bring further focus to the implementation of international standardization interventions in partnership with the advanced BSI. Going forward there will be a role for export-oriented investors to become involved in setting outcomes for further investment into capability building at the RBS.

5.5 Small Holder Farmer Development

Several donor initiatives are underway to help develop the knowledge and skills of smallholder farmers, including USAID's Sustaining Partnerships in Rural Enterprise and Agribusiness Development (SPREAD)

project. Prospective investors in avocado exporting can leverage these existing initiatives to build the capacity of farmers and cooperatives and/or monitor and evaluate improvements in farming practices, incomes, and livelihoods.

Investments into extension services are providing the impetus for continued training and development of smallholder farmers, particularly in the adoption of new farming techniques and the proper use of appropriate inputs. However, investments in capacity building could be extended to cooperatives to enhance their ability to manage the relationship between farmers and the avocado exporter. Such training could be designed, funded, and implemented in collaboration with donors and/or NGOs already active in local capacity building.

Government support in rolling out extension services to relevant avocado farmers will compliment existing efforts to ensure these farmers are provided with the required skills and capacity to engage with avocado exporters as out-growers. The implementation of a subsidy system to encourage farmers to grow avocado would further support the development of avocado exports from within Rwanda.

The actual cost of inputs per farmer is expected to be \$18 upfront and \$3 annually. The annual cost comprises the ongoing costs of recommended fertilizers, while the upfront cost covers the initial investment in high-grade seedlings; these costs do not cover extension training. This translates into a total cost of \$105,000 upfront and \$18,000 annually (at capacity). See **Figure 28** in the appendix for cost calculation.

6. Development Benefits

The Government's support and enthusiasm to work with and alongside a committed investor and ensure the success of avocado exporting is driven by the beneficial social impact the investment will have. The Government of Rwanda has set aggressive economic development goals for Rwanda and favors investments which drive toward the realization of this mandate. With over 80% of the population primarily involved in agriculture, this investment will be a critical building block in this effort.

6.1 Sector Development

Considering newly planted Hass seedlings will take two year to reach maturity, the investment case conservatively assumes that out-growers will not be required for the first two years of operations. Rather, this time will be critical for organizing smallholder farmers and cooperatives, building their capacity, and ensuring that they are properly equipped and able to perform optimally when engaged as out-growers. Some intervention will be necessary to support farmers in increasing their yields and improving the quality and consistency of their avocado production; out-growers will benefit from training in improved farming methods and access to inputs, such as better seeds, fertilizers, and pesticides (funded initially by the Government or through the use of donor aid). This will be an invaluable investment moving forward, as having a large supply of high-quality raw materials will enable avocado exports to compete in markets around the globe.

Because farmers will have the security of a ready buyer for their avocado, their production volumes are expected to increase and be more consistent over time. Yields are also expected to improve through better farming methods and use of inputs. Greater production and improved yields will help establish avocado as a viable cash crop for SHFs, improving incomes and creating a multiplier effect. The nucleus-centered out-grower scheme will thus help transform subsistence farmers into small-scale commercial farmers.

6.2 Job Creation

In 2017 (Year 5) more than 6,000 smallholder farmers are projected to be involved as out-growers. As export quantities grow over the first five years and further capacity is utilized by the plant, increasing numbers of out-growers will be contracted and benefits will radiate to surrounding communities. An estimated 500 additional employees will be needed on the nucleus farm and within the export operations.

6.3 Income Improvements

On average, Rwandan smallholder farmers' incomes are exceptionally low at \$147 per year (\$0.40 per day), which is less than half the commonly accepted poverty cutoff rate of \$365 per year (\$1 per day).³⁵ This low income average for avocado farmers can be largely attributed to the lack of an established market in which farmers can sell their avocado; in the absence of such a market, avocado farmers typically sell their product to informal traders, if they sell them at all. However, as demand for avocado grows and as yields improve, income increases can be expected. Average incomes for out-growers who produce and harvest avocado for the proposed exporter are expected to increase by \$187 per year —

³⁵ Processor and farmer interviews; Monitor analysis.

which is a more than 100% increase on their current average yearly income. (See **Figure 27** in the appendix for income improvement calculation.)

7. Way Forward

7.1 *Profile of Target Investors*

The avocado exporting investment opportunity outlined in this document is well suited to several investor segments. First, regional horticultural exporters already operating in East Africa are particularly well positioned for this investment, as they already possess the requisite platforms and experience to make the opportunity operational. Expanding their sourcing network to Rwanda can enable these firms to increase their volumes, build scale, and diversify their sourcing reach. The second segment includes global firms that, while not presently active in the East Africa region, are active in the selling of horticulture crops for which there are established regional and global markets. For these multinationals, avocado exporting in Rwanda can expand their sourcing activities and their ability to serve new consumer markets.

While the greenfields nature of this investment will require operational experience, there may also be a role for financial investors attracted by the opportunity's potential returns, strong global demand, and high scalability across the region. Financial investors with operational experience and markets linkages can serve as funding partners or even as backers for this venture. Furthermore, investors with social impact mandates can directly support the smallholder farmer engagement goals of these efforts with their investment.

7.2 *Next Steps*

To successfully execute this investment, prospective investors will need to build relationships and with both public and donor stakeholders, including the Government of Rwanda, relevant financial institutions, and donor organizations. Establishing connections with RDB, MINAGRI, NAEB, and USAID, among others, will ease the land allocation and market entry process and also strengthen efforts to distribute Hass seedlings for widespread cultivation. Other actions that investors will need to undertake include identifying and contracting EU buyers; driving down procurement costs through careful negotiation and relationship building with out-growers and cooperatives; implementing their own due diligence process focused on negotiated cost structures and contractual efforts; and conducting market research to investigate the ongoing success of the establishment of increased Hass cultivation.

Prospective investors interested in exploring this opportunity further can seek further information from the Rwanda Development Board, the Ministry of Agriculture, or Monitor Group.

8. Appendix

8.1 Additional Figures

Figure 25: Pros and Cons of a Nucleus-Centered Out-Grower Scheme

Pros
Regularity and quality of raw material supply, with less commercial and political risks; nucleus-centered model may increase political acceptability through the inclusion of local farmers and their direct benefit
Promotes efficiency in farming; some evidence suggests that contract farmers operate more efficiently than large plantations ³⁶
Provision of inputs and training to farmers, as well as easier access to credit, either directly from the packager or indirectly from banks who use the contract as a basis to provide loans
Provides access to larger, more lucrative markets for SHFs and reduces market risks, thereby increasing income stability for SHFs
Provision of associated employment opportunities, particularly in the linked processing facilities and thus additional skills development opportunities for the local community
Cons
Contract enforcement: preventing side-selling when open market prices outperform contract prices, or ensuring that purchasers honor their purchase agreements
Supply risk may remain for purchasers if SHFs are unable to produce required quantity and quality of raw materials
Lack of bargaining power of SHFs, resulting in contracts that heavily favor the buyer
High transaction costs when numerous SHFs are involved

Figure 26: Avocado Production Averages

Potential SHF Yield (kg per tree)	100
Potential Nucleus Farm Yield (kg per tree)	125
Number of Trees per SHF	5
Trees per Hectare (Nucleus Farm)	140
Average SHF Yield (MT)	0.5
Average Nucleus Farm Yield (MT)	17.5

³⁶ IFAD, "Making the Most of Agricultural Investment: A survey of business models that provide opportunities for smallholders", 2010

Figure 27: Expected Improvements to Out-Grower Incomes

Price to SHF (RWF per kg)	280
Average SHF Yield (MT) after wastage	0.4
Income from Avocados (USD)	187

Source: Processor and Farmer Interviews; Monitor Analysis.

Figure 28: Economic Cost of Improving Farmer Output³⁷

Annual Cost (per SHF)	3.0
<i>DAP</i>	1.3
<i>Urea</i>	1.7
Total Annual Cost (USD)	18,000
Once-off Seedling Cost (per tree)	3.5
<i>Urea</i>	3.5
Once-off Cost per SHF (USD)	17.5
Total Once-off Cost (USD)	105,000

Source: Processor and Farmer Interviews; Monitor Analysis.

³⁷ Processor and Farmer Interviews; Monitor Analysis

8.2 Sensitivity Analysis

Figure 29: Cost of Procurement

	Base Case	Absolute Change		Percentage Change (%)	
		High	Low	High	Low
NPV	1,008,853	353,546	1,664,160	-65%	65%
Project IRR	38%	29%	47%	-25%	21%
ROIC (yr 5)	26%	21%	31%	-20%	20%
NOPAT Margin (yr 5)	13%	11%	16%	-20%	20%
Total Investment	2,913,281	2,913,281	2,913,281	-	-
Revenues (yr 5)	7,787,173	7,787,173	7,787,173	-	-
NOPAT (yr 5)	1,043,288	833,886	1,252,690	-20%	20%
Operating Cash Flow (yr 5)	588,204	378,802	797,605	-36%	36%
Sales (MT) (yr 5)	4,000	4,000	4,000	-	-

Figure 30: Additional Operating Costs

		Actual Change		Percentage Change (%)	
		High	Low	High	Low
NPV	1,008,853	(269,556)	2,282,822	-127%	126%
Project IRR	38%	18%	54%	-53%	40%
ROIC (yr 5)	26%	16%	35%	-36%	36%
NOPAT Margin (yr 5)	13%	9%	18%	-36%	36%
Total Investment	2,913,281	3,068,667	2,913,281	5%	-
Revenues (yr 5)	7,787,173	7,787,173	7,787,173	-	-
NOPAT (yr 5)	1,043,288	664,122	1,422,454	-36%	36%
Operating Cash Flow (yr 5)	588,204	209,037	967,370	-64%	64%
Sales (MT) (yr 5)	4,000	4,000	4,000	-	-

Figure 31: Capital Expenditure

		Actual Change		Percentage Change (%)	
		High	Low	High	Low
NPV	1,008,853	607,897	1,408,439	-40%	40%
Project IRR	38%	32%	47%	-18%	22%
ROIC (yr 5)	26%	23%	29%	-12%	14%
NOPAT Margin (yr 5)	13%	13%	14%	-3%	3%
Total Investment	2,913,281	3,406,903	2,419,658	17%	-17%
Revenues (yr 5)	7,787,173	7,787,173	7,787,173	-	-
NOPAT (yr 5)	1,043,288	1,017,129	1,069,448	-3%	3%
Operating Cash Flow (yr 5)	588,204	576,044	600,363	-2%	2%
Sales (MT) (yr 5)	4,000	4,000	4,000	-	-

Figure 32: Sales Volumes

		Actual Change		Percentage Change (%)	
		High	Low	High	Low
NPV	1,008,853	1,562,138	431,452	55%	-57%
Project IRR	38%	45%	30%	18%	-22%
ROIC (yr 5)	26%	28%	23%	8%	-10%
NOPAT Margin (yr 5)	13%	13%	14%	-1%	2%
Total Investment	2,913,281	2,913,281	3,036,560	-	4%
Revenues (yr 5)	7,787,173	9,344,607	6,229,738	20%	-20%
NOPAT (yr 5)	1,043,288	1,238,634	847,942	19%	-19%
Operating Cash Flow (yr 5)	588,204	678,532	497,875	15%	-15%
Sales (MT) (yr 5)	4,000	4,800	3,200	-	-

Figure 33: Sales Prices

		Actual Change		Percentage Change (%)	
		High	Low	High	Low
NPV	1,008,853	4,345,069	(2,374,114)	331%	-335%
Project IRR	38%	73%	-85%	91%	n/a
ROIC (yr 5)	26%	47%	0%	82%	-99%
NOPAT Margin (yr 5)	13%	22%	0%	66%	-99%
Total Investment	2,913,281	2,913,281	3,921,137	-	35%
Revenues (yr 5)	7,787,173	9,344,607	6,229,738	20%	-20%
NOPAT (yr 5)	1,043,288	2,078,982	10,849	99%	-99%
Operating Cash Flow (yr 5)	588,204	1,518,881	(339,219)	158%	-158%
Sales (MT) (yr 5)	4,000	4,000	4,000	-	-