



The Business Case for Investing in the Processing and Canning of Common Beans in Rwanda

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Prepared by
MONITOR GROUP

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1. Executive Summary

The Market Opportunity

Common beans are the second most cultivated crop in Rwanda and serve as an important staple in the Rwandan diet, with the average Rwandan consuming 60 kilograms of dry beans annually. Currently, 28% of Rwanda's arable land is devoted to bean cultivation, with annual yields topping 330,000 metric tons. The popularity and dietary importance of common beans extends to most countries in the region; indeed, Rwanda and Burundi have the highest per capita bean consumption in the world. While demand is strong across the common bean varietal, the two most popular types of common beans are red kidney beans and white navy / haricot beans.

In Rwanda, common beans are part of the government's Crop Intensification Program and enjoy increasing funding, research, and development effort. Rwanda's soil and climate conditions are also particularly well suited to bean cultivation, allowing for the production of two harvests a year. Yet despite these comparative advantages, Rwanda remains a net importer of beans. As Rwanda's middle class expands and its income levels increase, demand for canned beans in particular, beans that have been processed and packaged into more convenient, ready-to-eat form, is rising rapidly. Yet there are no bean canning facilities established or operating in Rwanda.

To date, investor interest in the processed bean industry has been low, largely due to a lack of knowledge about the industry and its potential to attract the growing middle-class consumer base in Rwanda and East Africa more broadly. Yet the competitive landscape for processed beans in Rwanda is attractive for new entrants. Currently, the market is served by a single, weakly positioned local processor (RABI) and expensive, imported canned products. A new entrant could target a price point between these two extremes and capture market share from both. Establishing a bean processing and canning facility in Rwanda will allow investors to secure first-mover advantage in serving local and regional consumers, as well as public institutional buyers. These markets have revenue potential of \$50 million to \$85 million. Given the weak competitive landscape, a new entrant is projected to capture 40% market share.

Investment Highlights

The identified investment opportunity is the establishment of a greenfield bean processing and canning plant with an output capacity of 12,000 metric tons per year. This capacity will be driven by the supply dynamics as well as the potential medium-term demand for processed beans. The initial product range identified consists of canned red kidney beans and white haricot beans.

The local target consumer market for processed beans is the roughly 1.2 million urbanized, middle class, discretionary consumers in Rwanda (12% of Rwanda's total population). Under the assumption that 10% of all common beans consumed by this market segment are processed, there is market potential for 14,829 metric tons of processed beans per year. Similarly the middle class market segment in nearby regional areas total about 300,000 people, with market potential for 3,629 metric tones of processed beans per year. Supplementing these consumer markets is the institutional market in Rwanda, which has market potential for 2,628 metric tons of processed beans per year.

Processed and canned beans will be sold to local supermarkets, such as Nakumatt and Simba, supported by sales to two to three key wholesalers and distributors. The recommended channel prices are \$0.75 for a 400 gram tin of red beans and \$0.94 for a 400 gram tin of white beans, while institutional selling prices will be compressed by high public sector price sensitivity.

Production costs will be driven by the costs of raw materials, labor, packaging, and general processing. The cost of procuring beans and the cost of packaging material are adjudged to have the highest uncertainty and both have been adjusted upwards by 15% to increase the comfort level. Selling costs reflect the need to invest in educating the market and stimulating initial purchases across a consumer market which has historically consumed dry beans.

Given the local context, the nucleus-centered out-grower scheme will be the most effective business model for sourcing common beans as inputs. 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 no less than 30% of inputs, which will require the farm to be about 450 hectares.

Financial Projections and Assumptions

The annual revenue forecast for 2017 is projected to be \$20 million, requiring an initial investment of \$8.6M. The capital investment centers on the acquisition of a 450 hectare nucleus farm (\$3M), and the construction of a 12,000MT bean canning plant (\$4.6M) in eastern Rwanda. The nucleus farm provides input supply assurance to the processing and canning facility, a supply which is shored up by contract farming arrangements with out-growers.

The investment is projected to deliver an IRR of 32% without leverage, and returns will improve with the addition of leverage (53% IRR at 50% debt). Operationally, the bean processing facility is forecast to be cash positive by 2015 (year three). The 2017 EBITDA margin of 21.7% compares favorably with listed regional comparatives.

Enabling Requirements

Several key risks must be addressed to ensure the success of the bean processing facility. The categories of risk associated with this investment opportunity include supply chain risks (e.g., adverse weather 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 slow consumer adoption); and collaboration risks (e.g., inability to distribute inputs and government / donor unwillingness to finance input provision). For each of these risk areas clear mitigation steps have been identified. For example, concerns about slow consumer adoption could be addressed by investments in product awareness and market education, while the risk of losing crops to bad weather could be mitigated by extending weather and crop insurance to growers.

Support for the development of Rwanda's bean processing sector is forthcoming from the Government of Rwanda, as well as from public and donor stakeholders, through their efforts to mitigate risks and improve the business environment. For example, the government is working to make the land acquisition process more straightforward by simplifying acquisition procedures and shortening lead times for investors. New regulations for the strict enforcement of contracts between processors, cooperatives, and other suppliers, along with a similarly robust legal framework around contract law, are also being developed. Additionally, it is implementing new measures designed to eliminate hidden costs for investors — particularly costs incurred at customs.

Capacity building of smallholder farmers by improving their access to, and use of, the inputs they require to operate optimally is ongoing through multiple donor, NOG and public sector initiatives. The provision of credit to smallholder farmers will facilitate access to quality inputs and help ensure consistency in production through mechanization and other means. 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 benefit from 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 Government of Rwanda has set bold targets for economic progress and is highly supportive of investments that can play a role in delivering against those targets. With more than 80% of Rwanda's population primarily involved in agriculture, this investment will be a critical building block in this effort. Specifically, this investment is expected to contribute to developing the agricultural sector through small holder farmer training and better access to inputs such as seeds. The investment is also expected to provide incomes to 7,000 out-growers and 2,000 direct employees, 9,000 people in total. Real incomes for out-growers are expected to improve by more than 70% as a result of the investment. Ongoing collaboration efforts by investors towards the Government and donors will be necessary to better understand and enhance the social impact outcomes of this investment in order to maintain the level of support that will be required to successfully build a bean processing business in Rwanda.

The Way Forward

This investment is particularly well suited for regional staple-crop processors that already possess the requisite platforms and experience to make the opportunity operational. Global enterprises not presently active in the East Africa region but active in the growing and processing of staple crops are also well positioned. For both segments, expanding into bean processing in Rwanda will enable them to increase their volumes, build scale, expand their sourcing activities, and extend their market reach. Financial investors with operational experience and market linkages might 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 model and food security 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, MINICOM, and USAID, among others, will ease the land allocation and market entry process and also strengthen investors' efforts to secure institutional contracts.

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. Market Opportunity

This business case outlines the investment opportunity for bean processing and canning in Rwanda. To date, investor interest in the processed bean industry has been low, largely due to a lack of knowledge about the industry and its potential to attract Rwanda and East Africa's growing middle-class customer base. This business case aims to address that knowledge gap by providing potential investors with more information on the market for processed bean products, the competitive environment, and the key financials and capital requirements associated with this opportunity.

2.1 Common Beans

Common beans are the second most cultivated crop, after bananas, in Rwanda. Currently, more than 320,000 hectares — or 28% of total arable land — is devoted to bean cultivation.¹ In 2011, yields of common beans topped 330,000 metric tons. Rwanda's soil and climate conditions are particularly well suited to bean cultivation, allowing for the production of two harvests a year. Yet despite these comparative advantages, Rwanda remains a net importer of beans — processed beans in particular.

Common beans are a staple in the Rwandan diet, with the average Rwandan consuming 60 kilograms of dry beans annually. The popularity and dietary importance of beans extends to most countries in the region; indeed, Rwanda and Burundi have the highest per capita bean consumption in the world.² While demand is strong across the common bean varietal, the two most popular types of common beans are red kidney beans and white navy / haricot beans.

Staple crops — including common beans — have strong Government focus in Rwanda due to their importance for nutrition and food security. That importance will only increase in the coming years, as Rwanda's population continues to grow, urbanization expands, and income levels rise; all of these are expected to drive increases in food consumption. Considerable investment has been made in cash and staple crops in Rwanda over the last decade; for example, recent investments in maize, wheat, and rice have created surplus processing capacity for these crops. In contrast, the capacity to process beans remains limited. This is true not just in Rwanda but in East Africa more broadly: there are very few successful or sophisticated bean processors in the region, despite strong demand. Currently, there are no bean canning facilities in Rwanda. The only processor of any real scale is RABI, which produces packaged, ready-to-eat beans. However, RABI is heavily indebted and produces well below the volume required for financial breakeven.

2.2 Market Potential for Processed Beans

Local consumers in Rwanda and neighboring countries primarily purchase beans in their dry, unprocessed form. In terms of purchase cost, dry beans are 55% cheaper than the least expensive processed bean product. However, dry beans must undergo considerable preparation before they are ready for consumption. If one were to factor in the cost of the fuel and water used to prepare and cook dry beans, their *true* cost is actually much higher — only 15% cheaper than the least expensive processed bean product (see **Figure 25** in the appendix for dry bean preparation time and cost). This cost is further compounded by the inconvenience of long preparation and cooking times.

¹ MINAGRI, Rwanda; CIA World Factbook, 2012.

² Technical Centre for Agriculture.

Not surprisingly, Rwanda’s rapidly expanding middle class—now more than 1 million consumers strong — is driving a greater demand for more processed food products, including canned bean. Across East Africa, increasing numbers of middle-income consumer, many of them city dwellers, are now able and willing to pay for convenience. Increasing their consumption of pulses and vegetables is a high priority for this segment.³ Three categories of consumers in particular are creating new market potential for processed beans: local consumers, regional consumers, and public institutional consumers (e.g., prisons, schools, and the armed forces).

Figure 1: Market Potential for Processed Beans (MT)

	2013	2014	2015	2016	2017
Local Consumer Target Market	14,829	15,867	16,978	18,166	19,438
Regional Consumer Target Market	3,629	3,829	4,039	4,261	4,496
Local Institutional Target Market	2,628	2,812	3,008	3,219	3,444

Local consumer market. The local target consumer market for processed beans consists of the roughly 1.2 million urbanized, middle-class, discretionary consumers who occupy the higher income brackets in Rwanda. These consumers have easier access to the formal retail trade and strong purchasing power; they are also seeking, and willing to pay for, convenience. As mentioned above, the average Rwandan consumes 60 kilogram of dry beans per year, which is equal to 120 kilograms of processed beans.⁴ Assuming that 10% of the beans purchased by this target segment are processed rather than dry, the potential domestic consumer market size for processed beans in 2017 is estimated at \$54.4 million⁵.

However, this potential might be quite a bit higher. Extrapolation from South Africa suggests that the market potential for processed beans in Rwanda could be as high as \$85 million (see **Figure 2**). While South Africa has a larger emerging middle-class population, common beans are not traditionally a mainstay of the South African diet. South African consumer demand for dry beans is equivalent to 6.2 kilograms per person — a mere 10% of the per capita consumption in Rwanda.⁶ Despite this, the South African canned bean market had revenues of \$140 million in 2011.⁷ Among the companies active in bean processing in South Africa are Tiger Brands, Pioneer Foods, and Heinz.

³ Comprehensive Food Security and Vulnerability Analysis and Nutrition Survey, 2009.

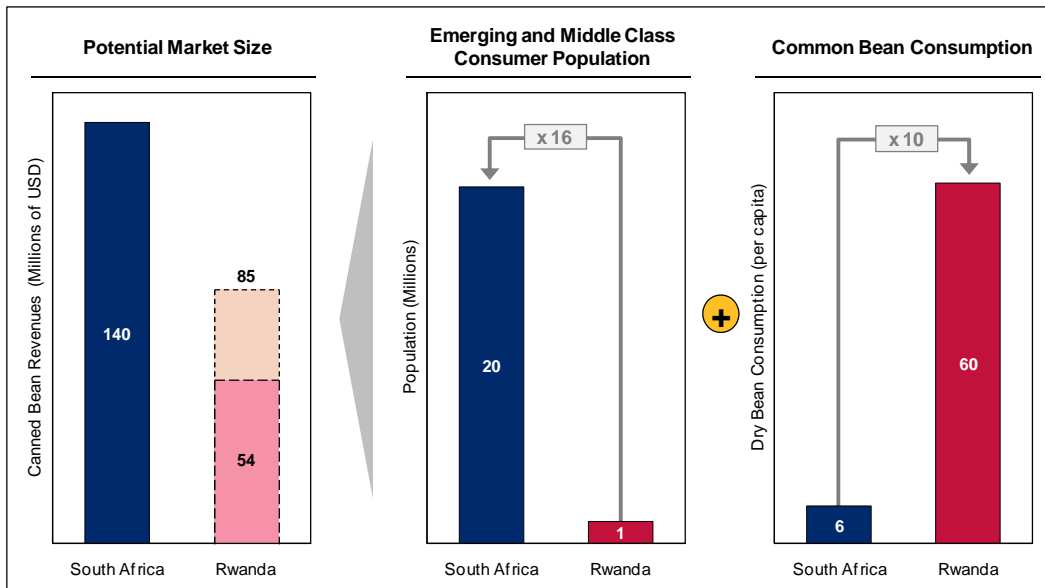
⁴ Karisimbi; RAB; Monitor analysis. 120 kilograms is based on a 1:2 conversion ratio from dry to processed beans. This is a conservative estimate founded on discussions with industry experts.

⁵ \$54.4 million are the total revenues if the average retail price for 400g of processed beans is \$1.25

⁶ South African Department of Agriculture, Forestry, and Fisheries.

⁷ “Canned/Preserved Food in South Africa,” Euromonitor International, 2011.

Figure 2: Potential Market Size for Canned Beans, Rwanda vis-à-vis South Africa^{8,9,10}



Regional consumer market. Across East Africa, demand for dry beans is approximately 2 million metric tons per year.¹¹ Rwanda’s central location in the region makes it well suited to serve key markets in neighboring countries. The largest cities in Tanzania, Uganda, Burundi, and the Democratic Republic of the Congo that are close to the Rwandan border have a combined population of about 2.5 million people, with the target consumer market consisting of about 300,000 people (12%). The potential and attractiveness of these markets is reinforced by the fact that RABI already sells about 200 metric tons of processed beans into Uganda alone, with very little marketing effort or support.

Institutional market. The total institutional market consumes the equivalent of 13,138 metric tons of dry beans annually.¹² This market is extremely price sensitive; retailers typically receive slim margins when selling to institutions. However, the institutional market is still important, as securing a steady source of demand will reduce the cost per unit sold and improve bottom-line performance. Accessing the institutional market as part of investment negotiations (e.g., investment incentives) would potentially enable investors to generate “quick” sales in the first few years of operation while the domestic and regional markets are being developed.

2.3 Competitive Landscape

The competitive landscape for processed beans in Rwanda is attractive for new entrants. At present, RABI is the only direct local competitor in the processed beans market, producing packaged beans in

⁸ African Development Bank; World Bank; National Institute of Statistics Rwanda; “The Evolution of Poverty in Rwanda From 2000 to 2011”; Monitor analysis. Figure for South Africa’s emerging middle-class population is based on AfDB’s reported figure. Figure for Rwanda’s emerging middle-class population is based on Monitor Group’s analysis of urbanized, discretionary consumers and is more conservative than AfDB’s reported figure.

⁹ Rwanda Agricultural Research Institute; South African Department of Agriculture, Forestry, and Fisheries; “Canned/Preserved Food in South Africa,” Euromonitor International, 2011; Monitor analysis. South African bean consumption is extrapolated from the combined consumption of dry and canned beans.

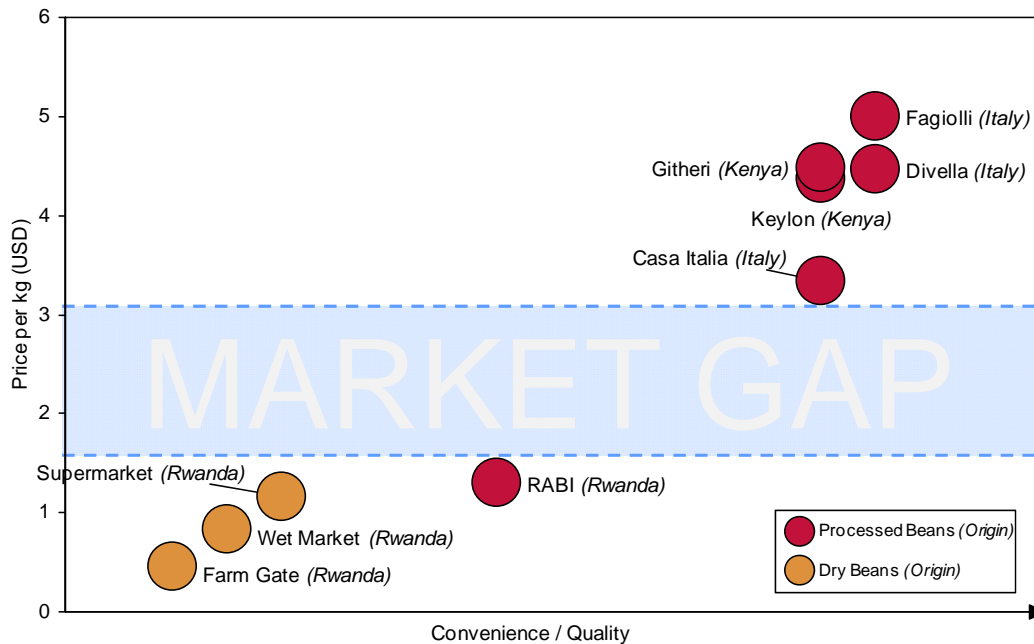
¹⁰ Monitor analysis; “Canned/Preserved Food in South Africa,” Euromonitor International, 2011.

¹¹ FAOSTAT, last updated 2 June 2010.

¹² Conservative assumption, informed by “RABI’s Draft Bean Market Analysis” 2011.

ready-to-eat form. RABI holds a small market share and has weak relationships with retailers.¹³ These retailers also stock imported products (from neighboring countries and Europe) that are significantly more expensive than RABI’s locally processed product. Market investigations suggest that there is ample room for domestically produced bean products offered at a price point between the RABI product and imported products.

Figure 3: Market Map: Red Kidney Bean Products in Rwanda¹⁴

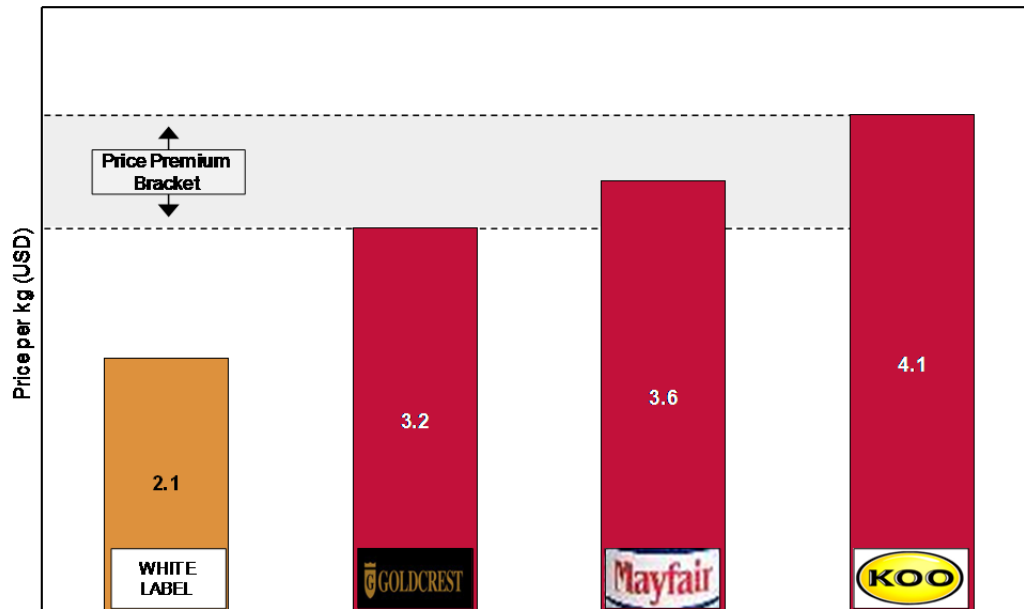


The current dearth of domestically produced canned beans also suggests that an early mover could create competitive advantage by building strong brand awareness among local consumers. Investigations of the canned bean market in South Africa show that top branded canned beans retail at premiums of 50% to 100% over white label and non-branded canned beans. Because dry beans currently dominate the market in Rwanda and neighboring countries, introducing processed bean products to consumers will require investment in awareness creation, market education, and purchase stimulation.

¹³ Ibid.

¹⁴ Nakumatt; Simba; Anarax Supermarket; Umurungi supermarket; Ndoli supermarket; processor and farmer interviews; Monitor analysis. Convenience/quality assessment is based on product preparation time in combination with consumer perceptions, as indicated by major Kigali supermarkets.

Figure 4: Premiums for Branded Canned Beans in South Africa¹⁵



2.4 Enabling Environment

The bean processing investment opportunity is augmented by the attractiveness of Rwanda’s business environment. In its 2012 “Doing Business” index, the World Bank ranked Rwanda as the No. 1 most business-friendly country in East Africa and the third most business-friendly in all of sub-Saharan Africa.¹⁶ Rwanda presents investors with less bureaucratic red tape than many countries; it also offers easier access to credit and lower tax rates than its neighbors. Moreover, the Government of Rwanda is actively seeking to attract private sector investment — particularly into its agriculture sector. Meanwhile, the work of large NGOs and development partners, such as USAID, in Rwanda is further strengthening the environment for investment in Rwanda’s agribusiness sector.

Economically, Rwanda has experienced robust GDP growth in the last few years, with an 8.2% CAGR between 2006 and 2010.¹⁷ From 2007 to 2009, foreign direct investment (FDI) into Rwanda increased by 20%.¹⁸ The country’s political and macroeconomic stability relative to other countries in the region should bolster investor confidence, particularly if they are first time investors on the continent.

Furthermore, the Government is committed to investments in infrastructure that facilitate intra-regional trade originating from Rwanda.¹⁹ 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 springboard into regional markets over the medium to long-term.

¹⁵ Pick n Pay; Monitor analysis.

¹⁶ IFC and World Bank, “Doing Business,” 2012.

¹⁷ BNR.

¹⁸ World Investment Report 2011.

¹⁹ “Brief on Rwanda: Agricultural Investment opportunities in Rwanda’s Food Baskets,” Grow Africa Forum, 2011.

2.5 Long-term Potential Market Developments

There is significant scope for a local bean processing plant to serve as a catalyst for the food processing market in Rwanda. Further and similar investment opportunities could arise across legumes in general. This has been the case in South Africa, where the canned beans industry drove the development of the local market for canned foods in general. In South Africa, canned beans remain the largest and fastest growing sector within canned foods.

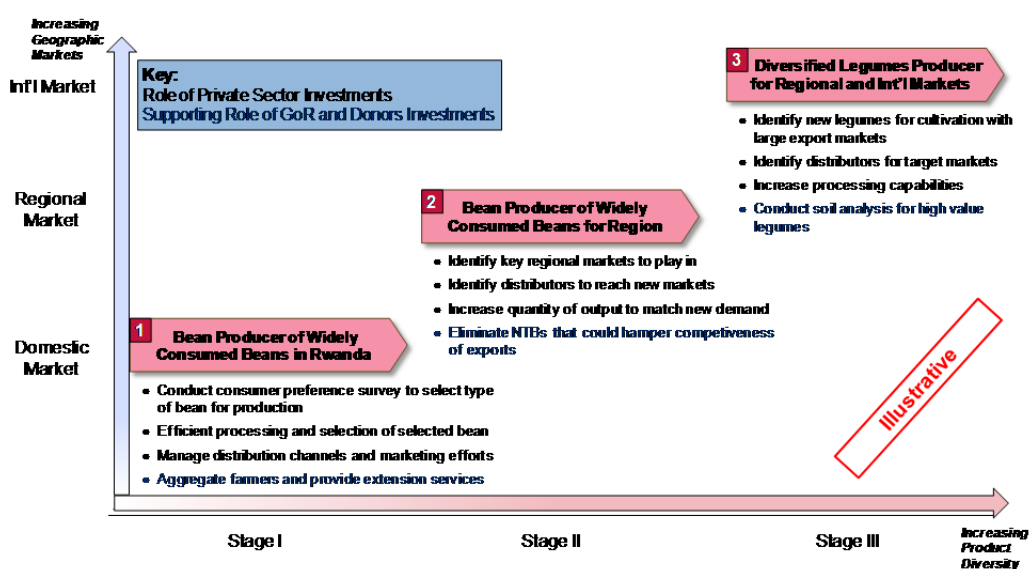
The successful establishment of a bean processing industry will open the market to increased competition, in turn leading to the development of new products and new market expansion opportunities while also pushing farmers to produce more efficiently. Throughout the evolution of the industry, the benefits accruing to smallholder farmers will motivate other farmers to grow beans and engage the commercial market, generating a larger supplier and input base for processors active in this market.

There is a clear and compelling roadmap for creating this more developed and lucrative market for processors. In the first phase, new market entrants will produce a small range of products (most likely red kidney beans and white haricot beans, given consumer popularity and raw supply availability) destined for domestic and regional markets. The focus of this phase will be on developing production capacity among growers, establishing processing operations, refining processing techniques, and building brands.

The second phase will see further investment in new product lines such as chickpeas and yellow beans. With this broader product range, sector processors will begin to look beyond regional markets to elsewhere on the African continent and possibly to overseas markets.

Once a substantial market footprint, productive capacity, and a deeper understanding of the industry and export markets are achieved, the third phase will be to diversify into increasingly sophisticated products and production methods. Products with high value-added potential, such as lentils, will be introduced. These products could potentially supply markets across Europe, Asia, and the Middle East.

Figure 5: Potential Development Stages of the Food Processing Industry



3. Investment Highlights

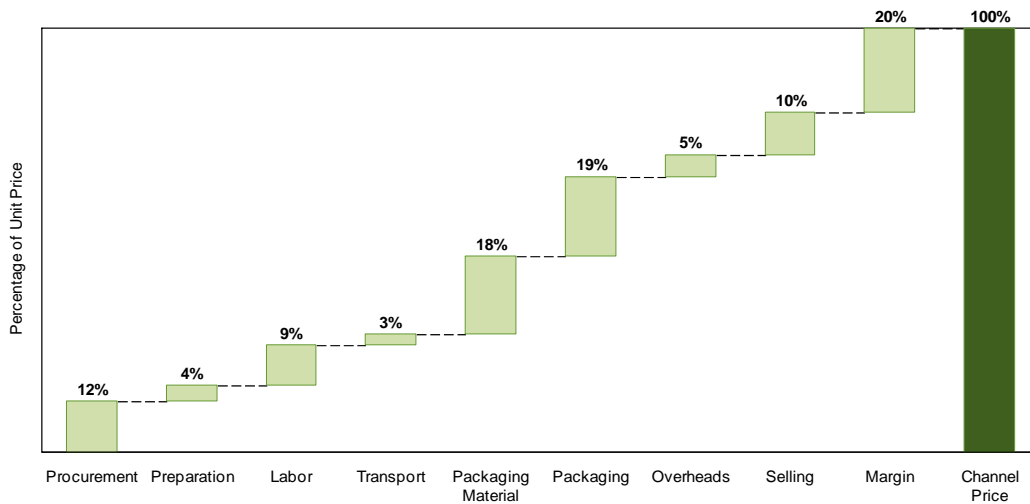
3.1 Opportunity Definition

The identified investment opportunity is the establishment of a greenfield bean processing and canning plant with an output capacity of 12,000 metric tons per year. This capacity will be driven by the supply dynamics as well as the potential medium-term demand for processed beans.

Due to favorable agro-climatic conditions, bean cultivation is well distributed across Rwanda. The North (23%), East (25%), South (23%) and West (28%) provinces all have similar shares of total common bean output, while Kigali province provides just 2% of total common bean output. Given RABI's base in the South (Huye district) and land availability factors, the plant will ideally be located in the eastern part of the country. However, the key determinant of its final location will be where the most suitable plot can be sourced.

The initial product range could consist of canned red kidney beans and white haricot beans. In line with industry standards, the unit size for canned beans is 400 grams. As a processed product, white haricot beans can be sold either as canned white beans or as baked beans — both of which could command premium prices. The channel price for canned red kidney beans is \$0.75, including a 20% margin. The sales channel will primarily cover direct sales to local supermarkets, such as Nakumatt and Simba, and direct sales to institutional buyers. This will be further supported by sales to 2–3 key wholesalers and distributors.

Figure 6: Channel Cost Structure for a Can of Red Kidney Beans



The recommended retail price for canned red kidney beans is RWF 740 (~\$1.25), taking into account the observed channel margins. Importantly, this price is just 10% higher than RABI's retail price for red kidney beans (RWF 670).²⁰ Although RABI's products are much cheaper on a per-kilogram basis, they are packaged in the nonstandard size of 850 grams per can. As such customer perception will be that the new product is similar in price to RABI's product, on a sales unit basis.

²⁰ Nakumatt.

3.2 Opportunity Specific Attraction

Investment in this bean processing and canning plant is forecast to result in an IRR of 32%, which can be improved with leverage. Operations are projected to have an average EBITDA margin of 15% over the first five years, with positive operational cash flows from 2015 (the third year of production).

The opportunity to process and can beans is considerable due to the weak competitive landscape and high domestic and regional bean consumption. While Rwanda's population is small, the country is well-situated geographically to offer an entry point to the immediate regional market (i.e., the Democratic Republic of the Congo, Burundi, Uganda, Kenya, and Tanzania) as well as African countries situated further afield. Products could also be exported to overseas markets as logistics infrastructure improves in surrounding countries, particularly along the routes leading to the ports of Mombasa in Kenya and Dar es Salam in Tanzania. Finally, there is an established base of local smallholder farmers who currently produce more than 330,000 metric tons of beans per year, much of which would be available for processing. At present, Rwanda ranks third among East African countries in terms of bean yields (after Burundi and Ethiopia).²¹

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 common beans as inputs (see **Figure 26** in the appendix 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 no less than 30% of inputs, which will require the farm to be about 450 hectares — a sizable piece of land in the Rwandan context.

The nucleus-centered out-grower scheme is a form of contract farming whereby the processor does not rely solely on the output of contracted farmers.²² Typically, agreements or contracts will be signed between the processor 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 processor. Such contracts usually specify the quantity and quality of product to be delivered. Prices are typically fixed, although adjustments may be made according to current market prices at the time of sale. Processors can provide upfront inputs, the cost of which may be deducted from the final selling price realized by the out-grower.

With a nucleus farm of 450 hectares, projections suggest that 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. Some intervention will be necessary to support smallholder farmers in increasing their yields and ensuring the quality and consistency of their bean production. Out-growers will benefit from training in improved farming methods and access to inputs such as improved 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 the processor to compete in markets around the globe.

²¹ FAOSTAT, updated 23 February 2012.

²² "Making the Most of Agricultural Investment: A Survey of Business Models That Provide Opportunities for Smallholders," IFAD, 2010.

As farmers will have the security of a ready buyer for their raw beans, 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 beans as a viable cash crop for farmers, improving incomes and creating a multiplier effect. The nucleus-centered out-grower scheme will thus help transform smallholder farmers from subsistence farmers to small-scale commercial farmers.

Common bean yields on the nucleus farm are conservatively projected to be 2 metric tons per hectare per harvest.²³ At capacity, this will leave a raw material supply gap of 4,200 metric tons per year for smallholder farmers to fill.²⁴ At present, average bean yield for individual farmers is roughly 0.7 metric tons per hectare per harvest, but this can be improved to 1.2 metric tons per hectare per harvest.²⁵ At these yields, each smallholder farmer will produce, on average, 1.34 metric tons of common beans per year (see **Figure 27** in the appendix for production calculation). At capacity, more than 7,000 smallholder farmers will be involved as out-growers.

Government and donor support for this business model is likely, given that this scheme provides a model for training and up-skilling local farmers.

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 returns with 50% capital and 50% equity investment. The full capital investment required at 100% equity is approximately \$8.6 million. The majority of this capital investment covers the upfront costs of purchasing land (\$3 million) and the costs of acquiring and constructing the plant and required machinery (\$4.6 million). The balance will cover working capital requirements and early stage operational losses.

3.4.2 Forecast Financials

Cash flow and income have been forecast on a comprehensive basis, as well as on an operational basis. (There are no financing cash flows for a 100% equity-funded investment.)

²³ FAOSTAT, last updated 23 February 2012. Yield of 2 metric tons per hectare is based on median yield of top 20 countries with highest bean yields as listed by FAOSTAT. Assumed to be realistic due to the investment that will be put into the nucleus farm, as well as conducive agro-climatic conditions in Rwanda.

²⁴ With a production capacity of 12,000 metric tons, approximately 6,000 metric tons of dry beans will be required as inputs. At projected yields, the nucleus farm will produce 1,800 metric tons of dry beans per year.

²⁵ Processor and farmer interviews; "Global and Regional Trends in Production, Trade, and Consumption of Food Legume Crops 2011," Department of Agriculture, Food and Resource Economics, Michigan State University; FAOSTAT, last updated 23 February 2012.

Figure 7: Forecast Income Statement Assuming a 100% Equity-Funded Investment (Million USD)

	2013	2014	2015	2016	2017
Total Revenues	2.42	5.62	9.73	15.03	21.77
Total COGS	1.49	3.40	5.98	9.45	13.88
Gross Profit	0.92	2.22	3.75	5.58	7.89
SG&A Total	0.98	1.36	1.83	2.43	3.17
EBITDA	-0.06	0.86	1.92	3.16	4.72
<i>EBITDA %</i>	<i>-2.6%</i>	<i>15.3%</i>	<i>19.7%</i>	<i>21.0%</i>	<i>21.7%</i>
Depreciation	0.18	0.18	0.18	0.18	0.18
Interest	0	0	0	0	0
Earnings Before Taxes	-0.25	0.68	1.73	2.97	4.54
Taxes	0	-0.13	-0.52	-0.89	-1.36
Net Income / NOPAT	-0.25	0.55	1.21	2.08	3.18

Figure 8: Forecast Cash Flow Statement (Million USD)

	2013	2014	2015	2016	2017
Cash Flow from Operations					
Earnings from P&L	-0.25	0.55	1.21	2.08	3.18
Depreciation	0.18	0.18	0.18	0.18	0.18
Net Interest (after tax)	0	0	0	0	0
(Change in net working capital)	-0.72	-0.96	-1.23	-1.59	-2.02
Total Cash Flow from Operations	-0.79	-0.23	0.17	0.67	1.34
Investment (Capex)	-7.61	0	0	0	0
Free Cash Flows	-8.39	-0.23	0.17	0.67	1.34
Cumulative Cash Flows	-8.39	-8.62	-8.46	-7.78	-6.45

The forecast EBITDA margin ranges from -2% to 22% as sales volumes gain traction. The 2017 (Year 5) EBITDA margin of 21.7% compares favorably with listed regional comparables; key companies in the food processing sector across Africa realized average EBITDA margins of 19.5%, with a range from -14% to 36%, in 2010.²⁶

3.5 Projected Returns

Projected returns have been projected for four key metrics: the net present value (NPV), the project's internal rate of return (IRR), the return on invested capital (ROIC) in 2017 (Year 5), and the NOPAT (or net income) margin in 2017 (Year 5).

²⁶ S&P Capital IQ.

Figure 9: Projected Returns with 0% Debt

NPV (\$M)	\$2.27
Project IRR	32%
ROIC (yr 5)	24%
NOPAT Margin (yr 5)	15%

These projections indicate that the bean processing and canning plant will generate a positive return and create value for equity investors. ROIC will range from -3% to 24% over the first five years of operation and compares very strongly to listed regional comparables, with key companies in the food processing industry across Africa generating average ROICs of 12%, with a range from -10% to 23%.²⁷

With approximately 50% leverage, the projected IRR would improve to 53%. Under this scenario, fixed assets would be funded with 50% debt, requiring a debt investment of \$3.8 million and an equity investment of \$4.9 million. This demonstrates that an investor's ability to secure debt funding will have a positive impact on the project's return outcome.

Figure 10: Projected Returns with 50% Debt on Fixed Assets

NPV (\$M)	\$4.91
Project IRR	53%
ROIC (yr 5)	23%
NOPAT Margin (yr 5)	14%

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 risks — along with suggestions for mitigating them — are summarized below.

1. Supply Chain Risks

Environmental factors such as droughts or excessive rains may adversely affect harvests and lead to insufficient raw beans to meet required production volumes. Mitigation steps would include:

- Using appropriate inputs and provision of extension services, on both the nucleus farm and across out-growers
- Investing in irrigation systems
- Identifying alternative sources of raw material (common beans)
- Offering weather and crop insurance to growers, especially out-growers

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:

²⁷ 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** 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 450 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 450 hectare nucleus farm that could supply beans exclusively to the bean processing facility; this arrangement could entail a small equity stake in the bean processing facility for the cooperative

3. Market Risks

The need to get out-growers to plant improved bean 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

In target markets there could be **slow consumer adoption** of the introduced canned bean products. Mitigation steps would include:

- Seeking institutional market opportunities such as donor food schemes or Government contracts (schools, hospitals, etc.) to diversify the consumer market risk
- Testing consumer preferences for taste, variety, etc.
- Investing in marketing and advertising to create awareness and stimulate purchase

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

Based on the risks outlined above, sensitivity analyses were conducted to assess and interpret the effects of changes to the input assumptions underscored by the risk factors. For example, slow consumer adoption will affect projected returns by driving sales volumes down; adjusting sales volume assumptions allows for the analysis of the effect that slow consumer adoption would have on returns. Sales volumes and costs of procurement were identified as the inputs with the highest uncertainty factor, and mitigation steps will be critical in addressing these. Returns are most susceptible to changes in additional operating costs, as well as sales volumes and prices.

Costs of procurement will be impacted by prevailing commodity prices and the ability to enforce contractual obligations. Given the potential uncertainty around 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 projected financials. The ability to lower these through movement up the experience curve, and increased bargaining power through scale, will be hugely beneficial. On the downside, these costs will need to be carefully managed through watchful monitoring of operational activities. Within “additional operating costs,” 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 packaging material costs, a 15% buffer has been built into the base case for this cost item.

Capital expenditure will be affected 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 that other foreign investors have been able to achieve through careful negotiation with the Rwandan Government.

Projected returns will be heavily influenced by **sales volumes**. It will be up to the investor to ensure that substantial marketing and advertising efforts are carried out. Marketing activities will need be sustained as processed beans gain consumer traction through to market maturity. Developing deep consumer understanding will also help to support sales volumes.

Sales prices will also heavily impact project returns. The ability to achieve recommended price levels will be very important but is forecast to be strong. Prices have been carefully set to fill the existing market gap and are below the prices observed in comparative markets for canned bean products. The comfort level associated with sales prices is further boosted by the fact that all competing canned bean products available in Rwanda at present are more expensive. The recommended per unit sales price represents a 10% premium to RABI’s per unit sales price for red kidney bean packets.

The following methodology was used for sensitivity analysis:

- Identifying five input levers for which to test sensitivities: (1) cost of procurement, (2) additional operating costs, (3) capital expenditure, (4) sales volumes, and (5) sales prices
- Setting the range of values for each of the input levers at 20% above and 20% below the base case
- Observing the effect of changing input values upward and downward on key outputs

Figure 11: 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	-34%	34%	-261%	260%	-67%	67%	395%	-398%	418%	-423%
Project IRR	-9%	8%	-86%	60%	-20%	25%	84%	-173%	89%	-196%
ROIC (yr 5)	-8%	8%	-50%	50%	-12%	14%	65%	-75%	70%	-78%
NOPAT Margin (yr 5)	-8%	8%	-50%	50%	-3%	3%	52%	-72%	55%	-76%
Total Investment	-	-	21%	-6%	19%	-19%	-5%	35%	-5%	40%
Revenues (yr 5)	-	-	-	-	-	-	20%	-20%	20%	-20%
NOPAT (yr 5)	-8%	8%	-50%	50%	-3%	3%	82%	-78%	86%	-81%
Operating Cash Flow (yr 5)	-18%	18%	-119%	119%	-4%	4%	164%	-154%	175%	-161%
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 bean processing operation, a detailed financial spreadsheet model was created. The model, which builds revenue and cost forecasts as well as associated capital expenditures, was designed with the following key objectives:

- To provide flexibility to test and alter assumption and inputs in the future
- To identify and capture the key input levers that drive financial requirements and return
- To 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 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 smallholder farmers involved, changes to their incomes, and costs of involvement
- **Market Size:** Sizing of the three core markets (local, regional, institutional) and projected sales volumes across each over time
- **Pricing:** Comparison of prices for competitor / substitute products

The main outputs of the model include:

- **Debt:** Breakdown 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

Any assumptions included in the model are based on the best available data and have been cross-checked with alternative sources whenever possible. All assumptions are intentionally conservative so as not to overstate the potential of the investment opportunity.

4.2.1 Capital Expenditure

Capital expenditure costs have been sourced from (1) discussions with private firms currently operating in the beans sector in Rwanda and the broader region and (2) local stakeholder interviews and public information. The financial model tracks capital expenditure with the assumption that all material capital investments will be incurred in 2013 (Year 1). This is a conservative assumption; capital expenditure may well be spread out over the initial years of operation.

Capital expenditure has been split into two components:

- The acquisition cost for the required land parcel of 450 hectares, on long lease

- The construction and purchase costs for plant and equipment required for the processing and canning of beans, with total annual capacity of approximately 12,000 metric tons

Figure 12: Capital Expenditure (USD Million)

Fixed Assets	
Land Costs ²⁸	3.00
Building and Equipment Costs ²⁹	4.60
Total Fixed Assets	7.61

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 of 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 it.

4.2.3 Revenues

Revenue forecasts are driven by two components: sales volumes and sales prices. The assumption is that production of processed beans will start in 2013 (Year 1), as beans are already widely grown. While there will be some requirement to switch farmers to higher quality seeds, the short growing season means that lead times will be minimal.

The local consumer target market is 1.2 million people (12% of the population), with a market potential for 14,829 metric tons of processed beans per year. This market is forecast to grow at pace with domestic GDP (7%). With sparse competition, a well-managed new entrant is assumed to be capable of capturing 40% market share. Ten percent of local consumer market sales are expected to be white beans, which is in line with observed consumption patterns in Rwanda at present.³⁰ Under the conservative assumption that it will take a few years to ramp up to full capacity, sales volumes in the first five production years have been set at 20%, 40%, 60%, 80%, and 100% of the optimal market share, respectively.

²⁸ Processor and farmer interviews; Monitor analysis. Current land costs are in the region of RWF 2.1 million for half a hectare; this was multiplied by 451, the required land area needed for the plant and nucleus farm setup. The initial capital expenditure cost is based on research into the costs of setting up plants of a similar size and scale in both Rwanda and neighboring countries.

²⁹ Processor and farmer interviews; Monitor analysis. Based on \$4.67 million cost advice from RABI, and \$4 million cost comparative in Ethiopia (and advice that this price would be ~15% higher in Rwanda).

³⁰ "RABI's Draft Bean Market Analysis" 2011

Figure 13: Local Consumer Market Sales

	2013	2014	2015	2016	2017
Target Market (MT) ³¹	14,829	15,867	16,978	18,166	19,438
Optimal Market Share (40%)	5,932	6,347	6,791	7,266	7,775
Capture of Optimal Market (%)	20%	40%	60%	80%	100%
Capture of Optimal Market: White Beans (MT)	119	254	407	581	778
Capture of Optimal Market: Red Beans (MT)	1,068	2,285	3,667	5,232	6,998

The middle class percentage in Rwanda was applied to the populations of the border regions to determine an approximate regional consumer target market. This market amounts to 302,418 people, with a market potential for 3,629 metric tons of processed beans per year. This market is forecast to grow at approximately the rate of regional GDP (6%). Although this market has a lower level of competition than the local market, it has conservatively been estimated that a local Rwandan player could capture 10% market share. To reduce the complexity of marketing, only red beans will be sold into regional consumer markets (at least in the initial timeframe under consideration).

Figure 14: Regional Consumer Market Sales

	2013	2014	2015	2016	2017
Target Market (MT)	3,629 ³²	3,829	4,039	4,261	4,496
Optimal Market Share (10%)	363	383	404	426	450
Capture of Optimal Market (%)	20%	40%	60%	80%	100%
Capture of Optimal Market (MT)	73	153	242	341	450

The institutional market potential is expected to be 2,628 metric tons per year.³³ Given the predominance of dry beans and consumers' price sensitivity, it was conservatively assumed that a new entrant could capture 10% market share (compared to RABI's 25% market share). Under the conservative assumption that it will take longer to ramp up in the institutional market than in the local and regional consumer markets — and given the importance of building relationships in the business development effort — no sales in this market are expected to take place in 2013 (Year 1). Due to high price sensitivity, the institutional market is expected to only consume red beans (at least in the initial timeframe under consideration).

³¹ Monitor analysis. Target market size calculated as the market size (number of people) multiplied by the estimated per capita annual consumption of beans.

³² Monitor analysis. Target market size calculated as the market size (number of people) multiplied by the estimated annual per capita consumption of beans.

³³ "RABI's Draft Bean Market Analysis" 2011. Calculated as 10% of total institutional dry bean consumption in Rwanda, as observed in current market participants (prisons, military and police, secondary and tertiary schools, hospitals, hotels, and reeducation camps).

Figure 15: Institutional Market Sales

	2013	2014	2015	2016	2017
Target Market (MT)	2,628	2,812	3,008	3,219	3,444
Optimal Market Share (10%)	263	281	301	322	344
Capture of Optimal Market (%)	0%	15%	30%	60%	100%
Capture of Optimal Market (MT)	0	42	90	193	344

Channel sales prices were set at \$0.75 for a 400-gram tin of red beans to the consumer market, \$0.60 for a 400-gram tin of red beans to the institutional market, and \$0.94 for a 400-gram tin of white beans to the consumer market. The recommended consumer market prices reflect a strategy of pricing within 10% of RABI's competitor product (and thus address the market gap between imported products and RABI's product). The consumer prices fall within the preferred range marked on the low end by the all-in cost of production, and on the high end by the prices of competing products from Kenya, South Africa, and Europe. Prices have been assumed to increase at inflation.

Figure 16: Channel Prices (USD per 400g can)

Consumer Red Beans	0.75
Institutional Red Beans	0.60
Consumer White Beans	0.94

4.2.4 Costs

Operational costs were informed by analysis of the cost structures of global, regional, and local food processors (with directional correction as necessary to adjust for the Rwandan context) and reflect local conditions. The primary driver of operational costs is the cost of goods sold, which includes the cost of raw materials, direct labor cost, packaging cost, and other processing costs. The cost of purchased beans and the cost of packaging material were adjudged to have the highest level of uncertainty. Both these cost items have been adjusted upward by 15%.

Figure 17: Cost of Goods Sold (USD per 400g can)

Purchased Beans ³⁴	0.10
Cultivated Beans	0.06
Other	
Preparation ³⁵	0.03
Labor ³⁶	0.07
Transport ³⁷	0.02
Packaging Material ³⁸	0.14
Packaging ³⁹	0.14

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

It was calculated that beans sourced from smallholder farmers will be 60% more expensive than beans sourced from the nucleus farm.

Figure 18: Cost of Cultivation on Nucleus Farm (USD)

Cultivated Plot Size	450
Annual Output (kg)	1,800,000
Input Cost, per ha ⁴⁰	99.33
Labor Cost, Total ⁴¹	487,500
Number of Farm Laborers ⁴²	2,250
Management Cost, Total ⁴³	50,000
Cost per kg of Output	0.32

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

³⁴ Processor and farmer interviews; Monitor analysis. Based on calculated nucleus farm production costs (for 200g).

³⁵ Ibid. Based on average purchasing price of raw beans in Rwanda (for 200g).

³⁶ Processor interviews; U.S. International Trade Commission; Monitor analysis. Based on RABI's full capacity production labor of 30 employees at RWF 80,000 per month, in addition to labor required for canning process of \$0.07 to \$0.09 per kilogram.

³⁷ World Bank; Monitor analysis. Based on cost per kilometer for private transport on a heavy truck (~7 metric tons) of \$2.22, where distance transported equals the distance from Butare to Kigali (~120 kilometers).

³⁸ U.S. International Trade Commission; African Shipping Lines; World Bank; Partner Foods UK; Nampak; UCLA; Monitor analysis. Based on cost per can of \$0.25 in addition to transport from China, where cost to ship container to Mombasa is \$1,260, cost to truck container to Kigali is \$2,600, and bribes required en route are \$850.

³⁹ U.S. International Trade Commission; Monitor analysis. Based on packaging cost of \$0.24 per kilogram in China and \$0.40 per kilogram in Spain. As the cost of electricity in China (\$0.16/kWh) is more comparable with Rwanda than Spain (\$0.27/kWh), a cost of approximately \$0.30/kg has been conservatively assumed.

⁴⁰ Monitor analysis. Calculated as multiplication of harvest cost per hectare and number of harvests per year.

⁴¹ U.S. Department of State; International Labour Organization; Monitor analysis. Based on three laborers per hectare earning RWF 500 per day.

⁴² Three laborers required per hectare and nucleus farm size of 450 hectares.

⁴³ Processor and farmer interviews; Monitor analysis. Based on two farm managers with a salary of RWF 250,000 per month.

Selling costs reflect the need to heavily promote processed beans to a market that historically has consumed dry beans; investments in creating awareness, educating the market, and stimulating initial purchases will be required. Selling costs have been set at 10% of total sales revenues, in line with industry standards. General and administrative costs are fixed and reflect the cost items that will be incurred at a set level regardless of production level. These fixed costs include factory overheads, indirect labor, and general staffing.

Figure 19: General and Admin Costs (USD)

Maintenance ⁴⁴	230,000
Admin Staff and Floor Managers ⁴⁵	100,000
Executives ⁴⁶	165,000
Other ⁴⁷	247,500
Total	742,500

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

The final substantial non-operating cost item is depreciation. The relevant depreciable assets are plant and equipment, which are depreciated at 5% of the acquisition cost in line with Rwandan accounting regulations.⁴⁸

Figure 20: Depreciation (USD)

	2013	2014	2015	2016	2017
Depreciation	184,000	184,000	184,000	184,000	184,000

4.2.5 Other Financial Model Input Assumptions

Among the other key input assumptions are 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 beans industry and information obtained from Rwandan tax authorities.

⁴⁴ FAOSTAT. Based on recommended food processor maintenance charge in African countries of 3 to 5% of the acquisition value of a fixed investment.

⁴⁵ Processor and farmer interviews; Monitor analysis. Based on 20 employees with a salary of RWF 250,000 per month at a plant with an annual capacity of 10,000 to 15,000 metric tons.

⁴⁶ Monitor analysis. Based on one fulltime chief executive.

⁴⁷ MINICOM; Karisimbi; Monitor analysis. Assumes that an average of 35% of overheads will consist of “other” cost items.

⁴⁸ Ernst & Young Rwanda.

Figure 21: Working Capital Requirements

Percent of Sales	30%
Working Capital Considerations:	
Inventory Days ⁴⁹	90
Credit Terms with Suppliers	0
Credit Terms with Distributors ⁵⁰	15

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

Figure 22: 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%) that investors have indicated they would require for equity investments in Rwanda.⁵¹

Figure 23: 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.

⁴⁹ Based on two harvests and stable sales patterns throughout the year.

⁵⁰ Based on 30% of payment on the spot, and the remainder three weeks after delivery.

⁵¹ Investor interviews carried out by the Monitor Group (n=93).

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 bean processing 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 Reliability and Quality of Raw Material Supply

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 common-bean growers are expected to improve the reliability and quality of their production.

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.

5.3 *Smallholder 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 bean canning and processing 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 bean processor. 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 bean farmers will compliment existing efforts to ensure these farmers are provided with the required skills and capacity to engage with bean processors as out-growers. The implementation of a subsidy system to encourage farmers to grow beans would further support the development of bean production within Rwanda.

The actual cost of inputs per farmer are expected to be \$85 upfront and \$55 annually. The annual cost comprises the ongoing costs of recommended fertilizers, while the upfront cost covers the initial investment in high-grade seeds, which can then be replicated for subsequent harvests; these costs do not cover extension training. This translates into a total cost of \$650,000 upfront and \$385,000 annually (at capacity). See **Figure 29** in the appendix for cost calculation.

6. Development Benefits

6.1 Sector Development

Projections suggest that for a nucleus farm of 450 hectares, out-growers will not be required to produce beans in 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 bean 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 the plant to compete in markets around the globe.

Because farmers will have the security of a ready buyer for their raw beans, 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 beans as a viable cash crop for smallholder farmers, 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 4,000 smallholder farmers will be involved as out-growers. As demand for processed beans grows and further capacity is utilized by the plant, more out-growers will be contracted and further benefits will radiate to surrounding communities. Eventually, approximately 7,000 smallholder farmers will be required as out-growers; meanwhile, an estimated 2,000 additional employees will be needed on the nucleus farm and within the processing factory.⁵²

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).⁵³ This low income average can be largely attributed to the lack of an established market in which farmers can sell their beans; in the absence of such a market, bean farmers typically sell their product to informal traders at low prices directly after harvest. However, as demand from the processing plant grows and as yields improve, income increases can be expected. Average incomes for out-growers who produce and harvest beans for the proposed processing plant are expected to rise to \$252 per year — which is \$105 (or 71%) more than their current average yearly income. (See **Figure 28** in the appendix for income improvement calculation.)

⁵² RABI report; Monitor interviews and analysis.

⁵³ Processor and farmer interviews; Monitor analysis.

7. Way Forward

7.1 *Profile of Target Investors*

The bean processing Investment outlined in this document is well suited to several investor segments. First, regional staple-crop processors 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 into bean processing in Rwanda can enable these firms to increase their volumes, build scale, and expand their sourcing reach. The second segment includes global firms that, while not presently active in the East Africa region, are active in the growing and processing of staple crops for which there are established regional and global markets. For these multinationals, bean processing in Rwanda can expand both their sourcing activities and their consumer market reach.

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, fixed asset base, and high scalability within the regional consumer market. 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 model and food security 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, MINICOM, and USAID, among others, will ease the land allocation and market entry process and also strengthen investors' efforts to secure institutional contracts. Other actions that investors will need to undertake include launching a sustained advertising and marketing campaign designed to educate and create awareness in the consumer market; 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 surface consumer preferences and test their willingness to pay.

Prospective investors interested in exploring this opportunity further might consider attending the WEF / AU / NEPAD Grow Africa Forum on May 8–9, 2012, during which the Rwandan Government will formally present this and other investment opportunities, as well as its overall action plan for mobilizing private sector investment in the agribusiness sector. Investors can also seek further information from the Rwanda Development Board, the Ministry of Agriculture, or Monitor Group.

8. Appendix

8.1 Additional Figures

Figure 24: The True Cost of Dry Beans⁵⁴

	Retail Price (\$/kg)	Soaking Time (hr)	Cooking Time (hr)	Fuel & Water Cost (\$/kg)	Real Cost (\$/kg)	Real Time Required (hr)
Red or White Beans	500	12	2	167	667	14

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 ⁵⁵
Provision of inputs and training to farmers, as well as easier access to credit, either directly from the processor 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

⁵⁴ "RABI's Draft Bean Market Analysis" 2011

⁵⁵ "Making the Most of Agricultural Investment: A Survey of Business Models That Provide Opportunities for Smallholders," IFAD, 2010.

Figure 26: SHF Production and Selling Patterns

Land Devoted to Beans	80%
Average Plot Size for SHF (ha)	0.70
Average Bean Plot (ha)	0.56
SHF Bean Yield per ha per Harvest (MT)	1.2
Percentage of Beans Sold	50%
Percentage of Side Selling (average)	10%
Aggregate SHF Bean Production p.a. (MT)	1.34

Figure 27: Expected Improvements to Out-Grower Incomes

Price to SHF (RWF per kg)	250
Current SHF Yields per hectare (MT)	0.7
Average SHF Income from Beans (RWF)	88,200
Average SHF Income from Beans (USD)	147
Projected SHF Yields per hectare (MT)	1.2
Potential SHF Income from Beans (RWF)	151,200
Potential SHF Income from Beans (USD)	252
Increase in Income (USD)	105
Increase in Income (%)	71%

Source: Processor and Farmer Interviews; Monitor Analysis.

Figure 28: Economic Cost of Improving Farmer Output

Annual Harvest Cost (per ha)	49.7
NPK	13.7
Urea	36.0
Average Annual Cost per Bean SHF (USD)	55.6
Total Annual Cost (USD)	386,296
Once-off Harvest Cost (per ha)	83.3
Seeds	83.3
Average Once-off Cost per Bean SHF (USD)	
Total Once-off Cost (USD)	648,148

Source: 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	2,268,172	1,500,704	3,035,639	-34%	34%
Project IRR	32%	29%	35%	-9%	8%
ROIC (yr 5)	24%	22%	26%	-8%	8%
NOPAT Margin (yr 5)	15%	13%	16%	-8%	8%
Total Investment	8,622,858	8,622,858	8,622,858	-	-
Revenues (yr 5)	21,771,225	21,771,225	21,771,225	-	-
NOPAT (yr 5)	3,176,194	2,935,804	3,416,585	-8%	8%
Operating Cash Flow (yr 5)	1,338,749	1,098,358	1,579,140	-18%	18%
Sales (MT) (yr 5)	8,569	8,569	8,569	-	-

Figure 30: Additional Operating Costs

		Actual Change		Percentage Change (%)	
		High	Low	High	Low
NPV	2,268,172	(3,643,279)	8,164,443	-261%	260%
Project IRR	32%	4%	52%	-86%	60%
ROIC (yr 5)	24%	12%	36%	-50%	50%
NOPAT Margin (yr 5)	15%	7%	22%	-50%	50%
Total Investment	8,622,858	10,432,377	8,144,145	21%	-6%
Revenues (yr 5)	21,771,225	21,771,225	21,771,225	-	-
NOPAT (yr 5)	3,176,194	1,582,083	4,770,306	-50%	50%
Operating Cash Flow (yr 5)	1,338,749	(255,363)	2,932,860	-119%	119%
Sales (MT) (yr 5)	8,569	8,569	8,569	-	-

Figure 31: Capital Expenditure

		Actual Change		Percentage Change (%)	
		High	Low	High	Low
NPV	2,268,172	741,076	3,795,267	-67%	67%
Project IRR	32%	26%	40%	-20%	25%
ROIC (yr 5)	24%	21%	27%	-12%	14%
NOPAT Margin (yr 5)	15%	14%	15%	-3%	3%
Total Investment	8,622,858	10,222,334	7,023,382	19%	-19%
Revenues (yr 5)	21,771,225	21,771,225	21,771,225	-	-
NOPAT (yr 5)	3,176,194	3,085,931	3,266,457	-3%	3%
Operating Cash Flow (yr 5)	1,338,749	1,285,286	1,392,212	-4%	4%
Sales (MT) (yr 5)	8,569	8,569	8,569	-	-

Figure 32: Sales Volumes

		Actual Change		Percentage Change (%)	
		High	Low	High	Low
NPV	2,268,172	11,219,568	(6,762,532)	395%	-398%
Project IRR	32%	59%	-23%	84%	-173%
ROIC (yr 5)	24%	40%	6%	65%	-75%
NOPAT Margin (yr 5)	15%	22%	4%	52%	-72%
Total Investment	8,622,858	8,176,576	11,650,205	-5%	35%
Revenues (yr 5)	21,771,225	26,125,469	17,416,980	20%	-20%
NOPAT (yr 5)	3,176,194	5,774,728	713,134	82%	-78%
Operating Cash Flow (yr 5)	1,338,749	3,532,994	(720,022)	164%	-154%
Sales (MT) (yr 5)	8,569	8,569	8,569	-	-

Figure 33: Sales Prices

		Actual Change		Percentage Change (%)	
		High	Low	High	Low
NPV	2,268,172	11,755,682	(7,331,317)	418%	-423%
Project IRR	32%	61%	-	89%	n/a
ROIC (yr 5)	24%	41%	5%	70%	-78%
NOPAT Margin (yr 5)	15%	23%	4%	55%	-76%
Total Investment	8,622,858	8,160,050	12,060,071	-5%	40%
Revenues (yr 5)	21,771,225	26,125,469	17,416,980	20%	-20%
NOPAT (yr 5)	3,176,194	5,919,368	618,600	86%	-81%
Operating Cash Flow (yr 5)	1,338,749	3,677,634	(814,556)	175%	-161%
Sales (MT) (yr 5)	8,569	8,569	8,569	-	-