

Production, Processing and Supplying of Diversified Moringa Products to Domestic and Export Markets

Business Plan

**Prepared by
Dr. Firew Beshah**

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PROCESSING AND MARKETING MORINGA PRODUCTS TO DOMESTIC & EXPORT MARKETS

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1. EXECUTIVE SUMMARY

This proposal is designed to establish a Moringa Plantation farm on 15 ha of land in Swan Hill, Victoria, Australia, which will be expected to produce high quality Moringa products for local and export markets.

The main aim of the project is to strategically produce high quality Moringa seed oil, powdered Moringa pods, leaves, stems and flowers and package then in various forms and sizes at an organic level, at a premium price.

Due to a restriction in the ANZ market, Moringa products will be supplied in their raw forms, to manufacturers for the inclusion in personal care products, as well as companies that process water treatment and bio-fuels and for Livestock feed additives. In the long term, processed products will also be supplied to the ANZ market for Food, Nutrition and Medicinal purposes, once Australia and New Zealand change the listed category of Moringa products and clear them for human consumption.

The strategic context and the rationale of the project is to produce and supply Moringa as a commodity as summarised below:

Moringa: Increased awareness of the multiple benefits of Moringa leaves, pods and seed oil both for domestic and international purposes, is leading to increased domestic and foreign demands. This is creating the need to find more efficient ways of producing diversified Moringa products to meet the growing domestic and export markets. The focuses of this project is to utilise improved Moringa species such as Moringa Oleifera and Moringa stenopetala, using organic fertilisers, together with appropriate agronomic and integrated pest management practices to produce high quality and quantity of processed and unprocessed Moringa products and supply to markets.

Financial and Economic analysis: The basic assumptions behind the financial analysis are, high quality certified Moringa seeds will be planted in 10ha of land for the purpose of leaf, flower and pod production, also, separately on 5ha of land Moringa seed will be sown for seed as well as seed oil production. Annual yields of dried Moringa leaves will equate to (12.5 ton/ha/yr), (7.5-ton seed/ ha/yr) and 375 kg seed oil/ha is expected.

Conclusions: High financial NPVs is observed and due attention and priority will be given to the efficient implementation of the proposed project. The positive NPV value indicates that the production and marketing of Moringa is financially viable and economically feasible because the benefits of the project are expected to outweigh the costs and have the capacity to generate significant economic profits to the investor, as well as equating to substantial contribution to the regional and national economy.

2. The Business

2.1. Description

2.1.1. Description of Swan Hill Project Area

The Swan Hill region is known as the heart of Australia's food bowl and is home to one of the most productive and diverse agricultural sectors in Australia. A major attribute of the region is the ability to grow a variety of agricultural products, assisted by skilled workforce, favourable climate, rich fertile soil, diverse farmland and modern irrigation infrastructure.

Major agriculture products and commodities include:

- Irrigated horticultural – stone fruit, vegetables, nuts (almonds and pistachios), olives, citrus, grapes, pasture hay and rice.
- Broadacres cropping – grain including wheat, barley and vetch.
- Livestock – cattle and sheep

The Swan Hill region currently claims the biggest almond farms in the Southern Hemisphere, the largest Australian concentration of fresh stone-fruit, pistachios and table grapes and after Sunraysia, the second largest wine grape production region in Victoria. The municipality has a reputation for the production of consistent yields of quality grains and growing high-quality disease-free fruit, vegetables and nuts (Swan Hill Rural City Council, Report,2015).

According to Australian Bureau of Statistics - Value of Agricultural Commodities Produce 2010-2011, the total value of agricultural output in Swan Hill Rural City was \$602 million, an increase from \$343 million in 2005-2006.

The largest commodity produced was cereal crops, which accounted for 27.3% of Swan Hill Rural City's total agricultural output.

The region's competitive advantages include:

- The ability to grow a variety of agricultural products, both dryland and irrigated
- The ability to service fresh food markets at both ends of the season
- Well-developed transport, packing and logistics infrastructure
- A committed and stable workforce
- Direct access to both domestic and international fresh produce markets
- Centrally located within the Murray Basin food bowl
- Easy access to major capital cities and seaports

(Swan Hill Rural City Council Report,2015).

2.2. The Moringa Plant

Although *Moringa oleifera*, known as Moringa, is indigenous to north India, today it has spread throughout the tropics. Moringa is also known as horseradish tree, drumstick. It grows fast and reaches up to 12m. Moringa requires an annual rainfall of between 250 and 3,000mm. It is drought resistant, though in drought conditions it may lose its leaves. This does not mean it is dead and it should recover when the rains arrive. It grows best at altitudes up to 600m but it will grow at altitudes of 1,000m. It can survive in a temperature range of 25°C to 40°C but has been known to tolerate temperatures of 48°C and light frosts.

Moringa prefers neutral to slightly acidic soils and grows best in well-drained loam to clay-loam. It tolerates clay soils but does not grow well if waterlogged.

Moringa is free flowering plant. flowering generally occurs 4–12 months after planting, depending on the type. Some species flower 4–5 months after planting. Plants from seed can grow very rapidly under ideal conditions. Moderate use of nitrogen fertilisation and avoiding waterlogged clay soils can prevent most problems. Neem oil, horticultural soap, and sulfur are low impact pesticides that can control mites, aphids, and other pests. Although there are few reports on variability in pest tolerance within Moringa germplasm, local varieties are most likely to be best adapted for local conditions and should be included in new plantings. For maximum productivity the recommended fertiliser application rates would be 300g of complete fertiliser or 0.5–2 kg of manure per tree at planting. Prune the seedlings at 1m tall or 2 months after planting to stimulate side branching. The crop will be irrigated particularly during dry periods depending on the severity of the dry period to maximise yield.

It provides masses of leafy material useful when using alley cropping systems (HDRA, 2016). All of the parts of the tree can be used in a variety of ways. Moringa is full of nutrients and vitamins and is good as novel food as well as livestock feed. Moringa also has environmental benefits such as helping to clean contaminated water and can be processed as a biofuel. It has proven benefit in personal care products, and is a useful source of medicines (Palada and Chang 2003).

2.3. The Business

The business will produce high quality and organic Moringa products. These products have tremendous benefits to both the nutritional marketplace, as well as potential medical uses.

There is increasing interest in the health and nutritional benefits of Moringa and this is attracting investors to engage in the production and supply of Moringa globally.

This business will establish a Moringa Plantation on 10 hectares of land in Swan Hill, in the state of Victoria. It will produce high quality Moringa products such as Oil, Powder, Leaves, Stems and Flowers. These products will be processed and packaged for both the local and international markets.

2.4. Uniqueness of Product

Almost all parts of the Moringa tree are used as “novel food”, oil, fibre, and/or medicine. In the Pacific, the most important products are pods and leaves. Young pods are consumed as a vegetable in daily cooking. Very young pods are fibreless, and can be cooked like string beans. Because the weight is low on very young pods, most commercial production involves larger, more fibrous pods that are used in soups, stews, and curries.

Moringa has long been considered a panacea for improving the nutrition of poor communities in the tropics and subtropics. Protein content of leaves is high (20–35% on a dry weight basis). Most important is that the protein is of high quality having significant quantities of all the essential amino acids. This amino acid balance is very unusual in plant foods. Moringa leaves also contain high quantities of nutrients (per 100 g fresh weight): vitamin A (7564 IU), vitamin C (51.7 mg), calcium (185 mg) and potassium (337 mg) (Foid and Paul, 2008).

Moringa powder is utilised heavily in Africa and other parts of the world as a food supplement, where 1–2 tablespoons of dried powder are added to soups and stews daily to enhance the protein content and nutritional value of food. In Africa, 25g of Moringa powder is administered to pregnant women daily to improve prenatal nutrition (Diatta, 2001). The tree has in recent times been advocated as an outstanding indigenous source of highly digestible protein, Ca, Fe, Vitamin C, and carotenoids suitable for utilisation in many of the “developing” regions of the world where undernourishment is a major concern.

2.5. Product Processing and Packaging

After harvesting the leaves with the smaller branches along with the flowers, unwanted materials will be removed by hand and washed with sterilised water and dried with minimum temperature (50-55⁰C), dried leaves will be placed in a sealed bag and transported to store for grinding purpose. The leaves along with the flowers branches fruits will be ground into fine particulate. Samples of ground powder will then be analysed for multi-proteins, multi-minerals, multi-vitamins and multi-antioxidants compositions. The products will be packed into different product variations and sizes.

In collaboration with a public health professional, the daily intake or requirement gm/person/day will be determined and these values along with the analytical chemical composition will be compared with the relevant scientifically credible literature and will be used for labelling.

Moringa tea can also be prepared by separately harvesting the leaves, flower and stems, drying, grinding and packing in tea bags of different sizes.

Moringa seed kernels contain oil that is valued for culinary and cosmetic use. The oil contains 60–75% oleic acid and is comparable to olive oil in taste and value in cooking characteristics. The oil has a high antioxidant content, which makes it slow to go rancid. Oil yields using a screw press can be improved to 20% if the seed is first crushed, and 10% by volume of water

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is added, followed by gentle heating over low heat for 10–15 minutes, taking care not to burn the seed. Seed oil can be extracted and annually 350 kg of oil per hectare can be produced. Samples of Moringa seed oil will be analysed for chemical composition. The seed oil will be packed in various sizes and forms and labelled. Packed oil and Moringa tea bags will be supplied to both domestic and export markets.

2.6. The Target Market and Industry Background

Organic Moringa Australia states Moringa Oleifera products are approved for human consumption in most parts of the world including North America, Europe and Asia, however, the FSANZ (Food Standards Australia and New Zealand) has currently listed this product as a Novel food. This means that Moringa Oleifera has not had a recognised history as a food in Australia or New Zealand. They state that the products have a well-documented history of use by Australians who originate from the sub-continent, Asia, Europe and the Americas. Because Food Standards Australia and New Zealand have listed as a Novel Food it cannot be sold as a food or nutritional supplement for people in ANZ.

The Australian Department of Agriculture, Fisheries & Forestry report on Moringa states that because of its richness in nutrients, it can, and is, being widely used for forage & nutritious food for animals from poultry to cattle as well as for medicinal treatments for vast ranges of ailments.

The Queensland Government has stated that Moringa Oleifera products are not permitted under provision of the Food Act 2006 as it is not an approved Novel Food in accordance with Standard 1.5.1 of the Food Standards Code.

2.7. Business Potential

To secure competitive advantage, products will also be differentiated and supplied to local and export markets. From the total harvest 70% will be supplied to export markets and 30% will be supplied to domestic markets.

Moringa has been a staple food and has a long history in folk medicine since ancient times. It's potential and benefits have also been known to developing countries as a low cost product with high nutritional value. This awareness is now being dispersed into western society and the demand is rapidly growing where supply cannot keep up with demand globally (Rockwood et al. 2013).

3. INDUSTRY, PRODUCT AND GROWTH STRATEGY

3.1 The Industry

The business will cater for both the international and domestic markets. The international demand from Moringa is strong in both emerging countries, as well as established countries within Europe and North America. Europe and North America do require stringent codes, testing and classifications around the production of the product.

The domestic market in ANZ is still forming and Government standards and compliance still need to be met.

3.2. The Product

3.2.1. Nutritional Value

- The plant contains specific compounds (Isothiocyanates) which is particularly effective against *Helicobacter pylori*, a bacterial pathogen of human beings in medically underserved areas and poor populations worldwide (Fahey, 2005).
- Isothiocyanates and related products from the cabbage family have been shown to have anti-tumor and anti-carcinogenic effects.
- Work at Johns Hopkins University and elsewhere is supporting traditional use of Moringa to treat cancer (Fahey, 2005).
- The strong tradition of medical uses of Moringa combined with recent scientific work supporting these traditions has resulted in increased marketing of supplements and so-called “super foods” based on Moringa.
- Moringa contains multivitamins, multi-proteins, multi-minerals and nearly **46 antioxidants** that can slow down the aging processes and also **prevent and cure more than 300 different types of diseases**
- It has also been cited in the scientific literature as having antibiotic, anticancer, antitrypanosomal, hypotensive, antispasmodic, antiulcer, anti-inflammatory, hypocholesterolemic, and hypoglycemic activities.
- As well as having considerable efficacy in water purification by flocculation, sedimentation, antibiosis and even reduction of Schistosome cercariae.
- Numerous studies now point to the elevation of a variety of detoxication and antioxidant enzymes and biomarkers as a result of treatment with Moringa or with phyto-chemicals isolated from Moringa plant (Rockwood et al. 2013).

3.2.2. Medicinal Value

The most common direct medical use of the plant is as dressing of the leaves and bark applied directly to wounds as an anti-microbial and to promote healing. The anti-fungal and anti-bacterial properties of Moringa extracts are well documented in the scientific literature. The plant contains specific compounds (Isothiocyanates) which is particularly effective against *Helicobacter pylori*, a bacterial pathogen of human beings in medically underserved areas and poor populations worldwide (Fahey, 2005).

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Moringa contains multivitamins, multi-proteins, multiminerals and nearly 46 antioxidants that can slow down the aging processes and also prevent and cure more than 300 different types of diseases. It has also been cited in the scientific literature as having antibiotic, anticancer, antitrypanosomal, hypotensive, antispasmodic, antiulcer, anti-inflammatory, hypo-cholesterolemic, and hypoglycemic activities, as well as having considerable efficacy in water purification by flocculation, sedimentation, antibiosis and even reduction of Schistosoma cercariae. Numerous studies now point to the elevation of a variety of detoxication and antioxidant enzymes and biomarkers as a result of treatment with Moringa or with phytochemicals isolated from Moringa plant (Rockwood et al. 2013).

Because of the high concentration of multi vitamins, multi minerals, multi proteins and multi antioxidants present in Moringa, it has the ability to prevent and cure more than 300 diseases; hence, the use of Moringa for food purpose has indirect side benefits of preventing and curing various ailments.

3.2.3. As livestock Feed

Leaves are readily eaten by cattle, sheep, goats, pigs, chick-ens and rabbits and can also be used as food for fish. Several studies demonstrate that significant proportions of traditional fodder can be replaced with Moringa leaf. It can increase milk production by 43-65% and cattle weight by 32% respectively.

3.2.4. Moringa oil as skin care products and cosmetics

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Moringa Farm Australia state Pure Graded Moringa Oleifera SKIN CARE OIL is mainly chosen for its many well documented antioxidants and skin-rejuvenating properties. It contains four times as much collagen as carrot oil, helping to repair the skin's collagen fibres. The inherent Vitamin C stabilises collagen and helps reduce fine lines and repair damaged skin cells. It contains **Zeatin** (Studies published in 'Rejuvenation Researches' shows the undeniable youth-preserving effects of Zeatin are due to its ability to regulate cell division & growth, plus delay cell aging. With Moringa's Zeatin, new skin cells grow at a faster rate than old skin cells die. This results in a marked reduction of look and feel of wrinkles on the face and other parts of the body, and a more youthful skin appearance) and Moringa contains several thousand times more Zeatin than any known plant.

3.2.5. Moringa oil Biofuel

Jaipur, Rajasthan, India (PR Underground) October 16th, 2015, stated that an Indian based Advanced Biofuel Centre (ABC) has been working on Moringa since last decade with a focus on understanding the unique properties of the plant that can be manipulated to coax it to reach its fullest potential addressing horticultural practices, agronomics and sustainability issues. ABC's arm Moringa India has analysed the Present and future dynamics of Global Moringa Market.

Eco-business published a press release on 'The Global Moringa 2015' which state the oil from the Moringa tree is a more sustainable biodiesel feedstock as it can yield both food and fuel. Among those searching for solutions to feed the hungry, Moringa is well known. The greatest potential for this species is currently thought to be in its cultivation for the production of biodiesel. Yields of about 20 metric tons of pods per hectare per year are achievable for this species. This would equate to between 3000 and 4000 litres of biodiesel per hectare per annum. It is particularly desirable because it is a very low water-use crop and may be cultivated on marginal land commercially (Wahidul KB, 2008).

3.2.6. Seed extracts as water purification

The press cake left over after extracting seed oil is utilised as a fertiliser and as a flocculent for water clarification. The seed cake contains positively charged compounds that are effective in settling suspended solids out of water (flocculation) because most particles have a net negative surface charge while suspended in aqueous solution. There is international interest in using Moringa-based flocculants as a locally produced, biodegradable substitute for aluminium sulphate, which is commonly used to clarify water (Rockwood et al. 2013).

Growing interest in the health and nutritional benefits of Moringa is likely to see an increase in production in Australia and research is also being carried out on its nutritional and medicinal properties of the plant in most parts of the world.

The increased awareness of the multiple uses of Moringa leaves for both domestic and industrial purposes is leading to an increased demand for it. This is creating the need to find

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more efficient ways of producing Moringa leaves, pods seeds and oil to meet the growing domestic and export demands.

3.3. The Product Life cycle

The Return of Investment is quick because the leaves will be harvested in 60-90 days after sowing /planting. The leaves from high density Moringa fields can be harvested after plants grow 1.5–2.0 meters. Subsequent harvesting can be done every 35-40 days. Once the Moringa trees established, it can grow and produce leaf biomass without the addition of commercial fertilisers, however, the addition of organic composts will also make the tree stronger and produce plentiful nutrient rich leaves. Moringa tree naturally resists different types of pests, hence, the tree can easily be established and produce leaves and seed in environmentally friendly conditions (Wahidul KB, 2008).

3.4. Entry and Growth Strategy

The strategy of the company will be to start with Animal Food (Live Stock), Personal Care (Skin care and Cosmetic) Products, Bio-fuel and Water Purification. Once the local market matures; the company will branch out into Human Food and Nutritionals, as well as Medicinal products.

4. MARKET RESEARCH AND ANALYSIS

4.1. The Customer

Pods and leaves are suited for local markets where South and Southeast Asian foods are sold. Important new potential markets will include ethnic groups not traditionally using the crop, restaurants, and health food stores. Leaves, seed oil, medicinal, and value-added products have potential for shipment to Europe, Middle East and Asia. Given the increased awareness of the high nutritional value of Moringa, health food stores may be the most receptive new market in the short term. Moringa products, particularly the pods, may be retailed at higher prices if marketed in certain venues as exotic, nutrient dense vegetables.

Based on super food trends, producers of processed juices and smoothies may also be a potential high-value market to supply Moringa products. Strong potential for Internet sales exists, particularly for oil and supplements because of product stability and established or emerging markets.

4.2. Target Market

Moringa products have transitioned to a new multi-billion industries. World food and nutritional supplements companies are predicting the Moringa superfood phenomenon shall acquire more than 10% share of the industry in coming years.

Cosmetics companies are also looking for significant product differentiation and enthusiastic embrace from their customers within their industry. Currently the Moringa Market is estimated at more than US\$ 4 billion, which expected to cross US\$ 7 billion by 2020 at 9 percent per annum.

4.3. Competitive Analysis

Results of the marketing assessment and research indicated that in Australia, there is only one Moringa producer and suppliers (Moringa Farm Australia”) based in Cairns, QLD. This company produce, process and supply various Moringa products to domestic and export markets. However, there are some private small business traders in Victoria who import powdered Moringa from Thailand, India and Kenya, thus, the competitive environment is weak and this can be a good opportunity for competitive advantage. The company could gain an advantage by producing, processing and supplying fresh both unprocessed and processed products based on customer demand.

For exporting unprocessed Moringa seed, seed oil, processed oil to produce skin and hair care products, shampoo, soap and biofuel to Europe and the Middle East, currently there are no big competitors supplying the above mentioned products particularly pharmaceutical products.

As the company plans to export most of its products to middle East, Asia and to Europe, analysis of both the macro and micro-environment, including the internal and external environment of the business enterprise is of crucially important, Hence, the political, economic, social, technological, legal and natural environments surrounding of the company (PESTLE analysis), particularly for selected nations will be conducted before exporting products to politically highly volatile countries. Table 2 below also shows results of the preliminary SWOT analysis for the Moringa Business Enterprise.

SWOT ANALYSIS

From assessment of the Moringa business the internal and external environment of the enterprise strengths and weaknesses of the business enterprise are summarised in table 1 below.

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Table 1 Shows preliminary results of the SWOT analysis for the Moringa company	
STRENGTH	WEAKNESS
<ul style="list-style-type: none"> ● Conducive climatic factors to produce sufficient masses of Moringa for domestic and export markets ● Availability of technology to extract, process & pack the seed oil for various livestock feed additives and pharmaceutical purposes ● Significant potential to create the demand & improve domestic market share through advertising and direct contact with potential customers through promotional campaigns ● Availability of highly skilled manpower committed to work hard and bring about positive change in the organisation 	<ul style="list-style-type: none"> ● Unable to frequently access face to face communication with branch offices located overseas ● High transport related cost for supplying the products to overseas markets ● As the product is perishable, requires various refrigerating equipment to keep the product fresh before supplying to both markets ● Greater marketing costs associated with advertisement & promotional costs to create awareness & penetrate potential markets ● The need for additional product to start and sustain the business
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> ● Because of the uniqueness of the product (multivitamins, minerals, multi-protein and multiple antioxidants), there is a huge potential for future expansion of the business ● Growing supply by being the second company in Australia to produce and supply organic Moringa products ● Improve the health of the community by providing customers with multi-nutrient and antioxidant packed products that include medicinal value ● Increasing popularity of the product mainly in Europe and the Middle East. 	<ul style="list-style-type: none"> ● Government segmentation of product as a Novel Food which cannot be sold for general human consumption ● Emergence of substitute herbal products that can be seen as alternatives in the local market ● Insufficient awareness and funding to sustain the emergence and maturity of the Moringa products in ANZ ● Unexpected natural calamities and droughts may negatively impact the production and supply

4.4. Estimated Market Share

Informal contacts through telephone and in person were made with some the agents and distributors working in the various countries listed in table 2, the agents are willing to accept the Moringa products and distribute the product in their respective countries

Table 2 Domestic and export market destinations and number of potential suppliers for Moringa product Markets.

Product Type	Market	Number of Suppliers
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	Destination	
Unprocessed seed	Europe	5
	Australia	10
	New Zealand	4
Unprocessed Seed Oil	Australia	12
	New Zealand	5
	Europe	5
	Asia	3
Unprocessed Fresh Leaf	Australia	5
	New Zealand	3
Skin and Hair Product	Europe	3
	Middle East	7
	Asia	2
	Australia	10
	New Zealand	5
Livestock Feed supplement	Europe	2
	Middle East	-
	Asia	3
	Australia	12
	New Zealand	4
Detergents	Europe	3
	Middle East	7
	Asia	4
	Australia	10

The results were obtained through informal contacts with small business owners in each of the countries

4.5. Marketing Plan and Strategy

In order to create products with superior value, managers of the Moringa company will put maximum effort to strengthen and build the company's competitive positions and attain the firm's specific objectives.

In line with this, a preliminary marketing assessment has already been conducted specific to evaluating the internal and external environment of the firm and short and long-term objectives have been identified and plan of actions to achieve the objectives has been formulated.

The company has developed marketing strategy focusing on customer value creation, maintenance and defence. These include diversifying/differentiating the Moringa product based on demand driven and client oriented marketing strategy, and formulating a particular marketing mixes (4P's) for geographically and demographically segmented markets (customers) and targeting and positioning those prioritised segmented markets (Kotler and Keller,2012).

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4.6. Product Sales and Distribution

The possible potential domestic and export markets were to some extent assessed and researched, agents, distributors and retailers particularly in Norway, Austria, Italy and the Middle East countries including Saudi Arabia have been contacted and strong business connections has already been created. Based on results of the preliminary market assessment and research, potential demands both in the local and international areas were identified and selected to supply diversified processed Moringa products. With the cooperation of marketing agents, distributors and retailers marketing channels will further be expanded and strengthened.

Pods and leaves are suited for local markets where South and South-east Asian foods are sold. Important new potential markets will include ethnic groups not traditionally using the crop, restaurants, and health food stores.

Leaves, seed oil, medicinal, and value-added products have potential for shipment to Europe and Middle East. Given the increased awareness of the high nutritional and medicinal values of Moringa, health food stores may be the most receptive new market in the short term. The tree is relatively easy to grow organically and organic certification may increase consumer appeal.

Moringa products, particularly the pods, may be retailed at higher prices if marketed in certain venues as exotic, nutrient dense vegetables.

Based on super food trends, producers of processed juices and smoothies may also be a potential high-value market to supply Moringa products.

Strong potential for Internet sales exists, particularly for oil and supplements because of product stability and established or emerging markets. To secure competitive advantage, products will also be differentiated and supplied to local and export markets. Powdered Moringa (leaves, fruits flower) and extracted Moringa seed oil and tea 70% of them will be supplied to export markets whereas 30% will be supplied to domestic markets.

4.7. Pricing

In table 3 below, the company's tentative selling price for Moringa products are compared with average competitors' prices of the same products assessed from suppliers' website.

Product	Package Size	Company Price	Competitor Price	Price/kg
Powder	250 g	42.30	45.12	169.2
Seed	10 g	19.74	22.56	1974
Oil	250 mL	141.00	155.10	564

4.8. Advertising and Promotions

The medicinal, nutritional and skin and hair care values of the raw and processed differentiated Moringa products will be advertised in TV. A website will be also designed for online promotion of the products.

5. Sustainable Development Measures of Performance

5.1. Sustainability

The project will take into account the benefits of working in collaboration with government and private sectors, these will include staffs from the Department of Primary Industry and Environment and other private companies and rural development divisions.

Sustainable supply of Moringa products: For long term sustained production and marketing of processed Moringa products, the following factors need to be considered.

- Selection of high yielding and productive Moringa species adaptive to the local climatic conditions.
- Design strategic plan to prevent and control pests and diseases.
- Harvesting at the right time, care during storage, processing and packaging.
- Create quality brand and clearly labelling the medicinal and nutritional chemical composition and quantities of daily intake
- Ensuring organic production of Moringa free from pesticide and clean and tidy production, processing and packaging technique
- Continuously assess potential domestic and export markets and timely supply the products at competitive price

The sustainability performance of the investment project will be quantified following the Triple Bottom-line approach; these include:

Economic measures: Personal income, employment, job growth, business and diversity
Environmental measures: measuring toxic gas emissions, degree of contamination due to project activities, energy consumption, solid & hazard wastes, whereas social measures include: unemployment, crime per capita, household income, health conditions (Fiskel et al. 1999).

5.2. Environmental Impact Assessment

The production and marketing of Moringa is categorised under agricultural projects. The expected environmental impact of the project enterprise is described below:

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As the project intends to produce Moringa trees without the addition of commercial fertiliser and spraying pesticides, it is expected that there is zero environmental impact from the application of chemicals, however, if the project land was previously used for either livestock grazing, bush land forest or the local people settling in the project site, it would have some impact on the livestock grazing in the area, or because of loss of bushy forest and loss of bio diversity. But, viewing the project site as part of the bigger ecosystem, there can possibly be some strategic options/ activities that should be undertaken so as to significantly minimise the expected impacts, and these include:

- The use of alternative grazing lands in the area.
- Strategic development of livestock forage plants in degraded non-crop and crop lands.
- Revitalisation of forests with strong participation of stakeholders.
- Soil sampling and analysis for physical-chemical properties and application of fertilisers on optimum level based on results of soil chemical tests.
- Regular supervision of the farm and take appropriate measures at early stages before the identified pest or diseases spreads and cover larger areas.
- The use of integrated pest management and environmentally friendly pesticide to prevent and control pests and plant diseases.

Such measures would undoubtedly minimise the impact of utilising agro chemicals on the receiving soil.

The Project will formulate a detailed Environmental and Social Monitoring Plan to monitor key elements of both the biophysical and social environments. The underlying principle of this monitoring will be to ensure that significant impacts were properly identified in the assessment process, then to monitor the effectiveness of the mitigation measures. The results of monitoring activities will be regularly reviewed to determine if existing management measures are adequate, or if those measures should be revised, deleted, or supplemented.

5.3. Carbon Emission Reduction

One of the options to combat climate change and compensate for the numerous unpreventable carbon dioxide emissions is to plant trees. This is because trees take carbon dioxide out of the atmosphere and they release oxygen in return. The type of trees planted will have a great influence on the environmental outcome. According to a Japanese study, the rate of absorption or assimilation of carbon dioxide by the Moringa tree is twenty times (20x) higher than that of general vegetation and fifty times (50x) higher when compared to the Japanese cedar tree. The Moringa tree therefore will be a useful tool in the prevention of global warming in that, one Moringa tree will be equivalent to the effectiveness of fifty Japanese cedar tree in absorbing carbon dioxide. For instance, if Moringa plantation is expanded from one hundred thousand (100,000) hectares worldwide to one million (1,000,000) hectares, that would equate to five (5) giga tonnes of CO₂e being sequestered. Reviewing how the demand for other super foods took their rightful positions in the world market would help to develop policies and programs to greatly drive demand for Moringa products in all markets (Villafuerte, and Villafurte-Abonal, 2009).

.5.4 Carbon Footprint Measures

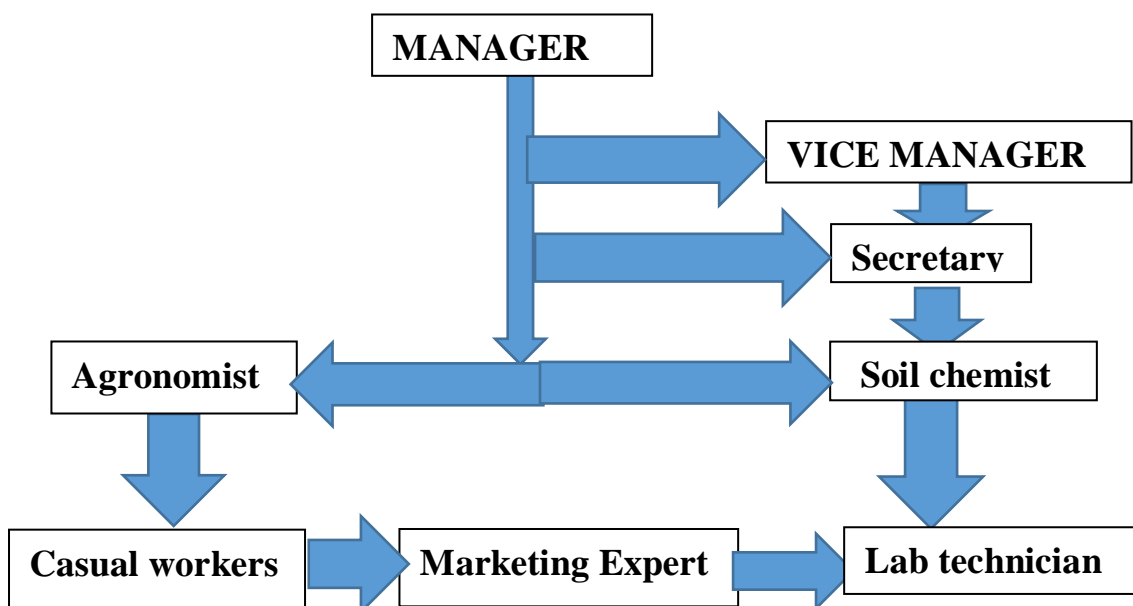
As tree seedlings are planted, it is expected that the project will have low carbon footprints, however the possible low carbon prints expected to be generated particularly in the processing parts and other project activities, the company will give due attention to minimise its carbon foot prints as much as possible.

5.5. Plan to use Renewable

The company will have a future plan to utilise solar energy as source of renewable energy for most of its activities and reduce its costs and work in an environmentally friendly manner.

6. Management

For the effective implementation and realisation of project outputs five permanent professional staffs and 20 casual workers selected from the local community will be recruited. The permanent staffs include agronomist, soil Chemist, secretary typist, marketing expert, lawyer and Laboratory technician. The human resource structure at the start of the project is shown below.



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7. Financials

7.1. Project Cost Analysis

Details of the annual costs including the investment cost, operational costs and labour costs of the project are described in table4 below. The total annual cost of the project will be 584,042 AUD from this, 35% of it (204,414) will be covered by family and friends as matching fund and the rest of the finance (379,628) is expected to be covered by business angels.

Table 4 First Year Annual Project Cost Analysis for Moringa Leaf, Seed and Oil Production (AUD)					
No	Description of items	Unit	Unit Price birr	Quantity	Total cost
1	Investment Cost				
	Tractor	No	40000	1	40000
	Rotary Hoe	No	1700	1	1700
	Truck	No	20000	2	40000
	Double Cabin Toyota		25000	1	25000
	Store		20000	1	20000
	Office rent	Monthly	1200	12	14400
	Soil Analytical Equipment	Lump sum	15000		15000
	Office equipment	Lump sum	10000		10000
	Grinding Machine	No	2400	1	2400
	Seed oil Extractor	No	2570	1	2570
	Seed for Planting	Kg	10	100	1000
	Scissors	No	10	20	200
	Wheel barrow	No	50	10	500
	Gloves	Pack	100	5	500
	Hair Net	Pack	20	10	200

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	Lab Coat	No	30	10	300
	Fencing	Lump sum			20000
	Land Rent	ha	10000	15	150000
	Subtotal				343770
2	Operational Cost				
	Land Preparation	Lump sum			5000
	Herbicide	Lt	35	5	175
	Herbicide Application	Hr	150	10	1500
	Plowing	Hr	25	10	250
	Fertiliser (Urea)	ton	331	7	2317
	Fertiliser Application (Urea)	Hr	30	10	300
	Insecticide	Lt	40	5	200
	Insecticide Application	Hr	25	10	250
	Planting	Hr	60	100	6000
	Watering/irrigation	Hr	25	96	2400
	Weeding	Hr	25	32	800
	Harvesting	Hr	25	1120	28000
	Seed collection	Hr	25	300	7500
	Transporting to store	Hr	30	24	720
	Grinding leaves, flower, pods		25	150	3750
	Seed oil extraction		25	150	3750
	Analytical Cost	No	250	4	1000
	Packing powder & Oil		25	1600	40000
	Labeling cost				1000
	Subtotal				104912
3	Labor Cost				
	Soil Chemist (casual)	Hr	40	32	15360
	Lab Technician	No	3500	1	42000
	Agronomist (Permanent)	No	3500	1	42000
	Secretary Typist (Permanent)	Monthly	3000	1	36000
	Subtotal				135360
	Total Budget Needed				584,042
4	Matching Fund	35% total			204,414
5	Required Fund				379,628

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7.2. Annual Projected Production Capacity

Table 5 shows the projected annual production (ton/ha) of Moringa products, it is assumed that production increases over time because in the 1st year 5 ha of land, in the 2nd year 8 ha, in the 3rd year 10ha, in the 4th year 10 ha and finally 10 ha of land in the 5th will be cultivated. And annual production/ha is shown in table5 below for the three harvest types.

Table 5 Expected Annually Projected Production Capacity of Moringa Products (ton/ha)							
Commodity Type	Annual	Expected Annual Production of Moringa Products, (Kg/ha)					
	Production (ton/ha)	2016	2017	2018	2019	2020	Total
Leaves (FM)	100	500	800	1000	1000	1000	4300
leaves (DM)	12.5	62.5	100	125	125	125	537.5
Seed	7.5	37.5	37.5	37.5	37.5	37.5	187.5
Oil	0.375	1.875	1.875	1.875	1.875	1.875	9.375

7.3. Revenue Projection

Table 6 Expected Annual Revenues Projected from the sale of Moringa Products (AUD)							
Product	Price/Kg	2016	2017	2018	2019	2020	Total
Powder	169.2	10575000	16920000	21150000	21150000	21150000	90945000
Seed	1974	74025000	74025000	74025000	74025000	74025000	370125000
Oil	564	1057500	1057500	1057500	1057500	1057500	5287500

7.4. Annual Cash Flow (Net Present Value)

The basic assumptions behind the financial analysis are, high quality certified Moringa leaves, seeds and seed oil will be produced from a total of 5 ha for seed production and 10 ha for leaf, pods and flower production respectively. Annual yields of dried Moringa leaves (12.5 ton/ha/yr), seeds (7.5-ton seed/ ha/yr) and 0.375 kg seed oil/ ha are expected.

During the analysis, 10% annual depreciation rate on fixed assets were considered. In addition to this, 10% discount rate is assumed. Results of the analysis indicated a high positive NPV value is computed indicating that, showing that the project is financially viable, Table 7.

Table 7 Cash flow statement equity for Financial NPV (incremental) analysis for Moringa Leaf, Seed and Oil Production						
	2016	2017	2018	2019	2020	2021

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Moringa Production						
Investment Cost						
Tractor	40000					
Rotary Hoe	1700					
Truck	40000					
Double Cabin Toyota	25000					
Store	20000					
Office rent	14400					
Soil Analytical Equipment	15000					
Office equipment	10000					
Grinding Machine	2400					
Seed oil Extractor	2570					
Depreciation (10%) on Fixed Assets	171070	17107	17107	17107	17107	17107
Fencing	20000					
Masonry work	12000					
Electricity Installation	2500					
Water Pipe line	1500					
Total Investment Cost	207070					
Operational Cost						
Seed for planting		500	800	1000	1000	1000
Land Preparation		5000	8000	10000	10000	10000
Herbicide		175	280	350	350	350
Herbicide Application		1500	2400	3000	3000	3000
Plowing		300	480	600	600	600
Fertilizing and fertilizer Application		2615	4184	5230	5230	5230
Insecticide & application		450	720	900	900	900
Planting & watering		8400	13440	16800	16800	16800
Weeding		800	1280	1600	1600	1600
Harvesting & Seed Collection		17750	28400	35500	35500	35500
Transporting Cost		3600	5760	7200	7200	7200
Grinding & Packaging the leaf, Flower		3750	6000	7500	7500	7500
Seed oil extraction & Packaging		5000	8000	10000	10000	10000
Packaging powder & Oil		20000	32000	40000	40000	40000
Labelling cost		1000	1600	2000	2000	2000
Labor Cost (5 Permanent)		135360	135360	135360	135360	135360
Land Rent		50000	80000	100000	100000	100000
Analytical cost		1000	1000	1000	1000	1000
Safety items		1700	2720	3400	3400	3400

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Total Out Flows		276007	349531	398547	398547	398547
Revenues from Ground Leaf & flower		10575000	16920000	21150000	21150000	21150000
From Seed		74025000	74025000	74025000	74025000	74025000
Total Inflows		84600000	90945000	95175000	95175000	95175000
Net Cash Flow		84323993	90595469	94776453	94776453	94776453
PV (12%)		76658175.5	74872288	71206952	64733593	58848721
NPV (10%)		346112659				

8. Risks

Although the crops are tolerant of drought and infertile soils, it will not produce well under these conditions. The tree can be susceptible to high winds. Some insects and diseases may attack the tree, but growers are able to control losses with available management practices. Thus some of the expected risks and measures that need to be taken are shown in table 8 below.

No	Expected Risks	Measures to manage Risks
1	Lack of rainfall or heavy rains and floods occurrence could be a threat to Moringa plantations	Plan and implement flood mitigation strategy such as watershed management, soil and water conservation activities
2	Drought and unexpected pest outbreaks	The use of irrigation agronomy with integrated pest management to control water shortage pest infestation
3	The trees can be susceptible to high winds	Establish dense fences as wind break to counteract wind problem
4	Transferring information on how the business production, processing and marketing operates	The business process needs to be kept confidential. Confidentiality should be considered as the first priority of the company
5	Stray domestic animals around the plantation area could affect tree safety	Someone should always be in the area of plantation in watch for strayed cattle which can threaten the plants

8.1. Potential Problems

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Moringa does not grow in cool temperatures, low sunlight, or wet soil conditions. Although tolerant of drought and infertile soils, it will not produce well under these conditions. The tree can be susceptible to high winds. Some insects and diseases may attack.

Compliance is also another potential problem in ANZ. Should the FSANZ (Food Standards Australia and New Zealand) fail to reclassify Moringa, this will restrict the potential product variations that can be supplied into ANZ.

8.2. Environmental Risks

The project activities that will affect the vegetation and the terrestrial habitats will include land clearing and levelling, building access roads and establishment of site facilities. When the project is implemented there would be a slight change in the natural vegetation of the area. In case, there is fungal diseases and insect pest outbreak, the utilisation of pesticides, together with application of some fertilisers that may leach down the soil profile from the farm fields are expected to be the main contaminant sources that may cause an impact on soil and on the groundwater bodies found in the project area.

Biosecurity Queensland states that *Moringa oleifera* is regarded as potentially invasive or moderately invasive in tropical regions of the world. It has escaped from gardens in northern Australia, and is currently naturalised in north Queensland and northern Western Australia. Currently, it is considered a minor weed in northern Australia, but its status may change over time. The Queensland Governments states that *Moringa oleifera* appears to spread relatively slowly, eventually forming dense thickets around parent trees. Like other tree species with similar ecological characteristics, it may pose a long-term threat to certain natural ecosystems in the wet/dry tropics of northern Australia. The large-scale commercial cultivation of this species might accelerate the rate of naturalisation and population development in northern Australia (<https://www.Moringa-oleifera.com.au/>).

8.3. Alternative Course of Action

In case the project fails, it is expected that Blueberry and Blackberry fruits are expected to be produced replacing part of the Moringa production farm

9. MILESTONE SCHEDULE

9.1. Timing and Objectives

Details of the schedules for implementation of the specific business activities are described in table 9. The yearly plan of action is divided into four quarters of the year, and each quarter numbered stands for three months as shown below.

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Table 9 The company's Schedule of the key tasks and plan of action to Implemented

NO	Major Activities	Plan of Action							
		2016				2017			
		1	2	3	4	1	2	3	4
1	Preparation of Investment Project Proposal, obtain Investment license and suitable land to establish the farm		*	**					
2	Organise and Conduct community consultation and arrange participatory focus group discussion with the community regarding the project ideas, objectives and implementation strategy in a transparency manner			**					
3	Purchase the necessary materials and complete masonry work, fencing and construction of store				**				
4	Identify and separate project items to be purchased from domestic markets				**				
5	Purchase agricultural tools, seeds, packaging materials, safety items and furniture				**				
6	Procure rotary Hoe, grinding machine and Double cabin Toyota vehicle					**			
7	Procure soil analytical instruments and irrigation equipment				**				
8	Rent office in Swan Hill area					**			
10	Recruit 4 permanent staffs								
11	Recruit 10 casual workers					**			
12	Organise and Transport the procured materials to the project site					**			

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13	Soil sampling and analysis for physical & chemical properties for fertiliser application purposes					**			
14	Land preparation and establish Moringa plantations using cuttings/direct sowing					**			
15	Establish Moringa seedling Developmental nursery					**	*		
16	Transplant seedlings after 5-15 days to replace those cutting failed to survive					**	*		
17	Regularly supervise and monitor the Moringa farm					**			
18	Asses and search domestic and export markets and create connections with agents/distributers to supply various processed Moringa products	**	**	**	**	**	**	**	**
19	Harvest and pack Moringa branches containing leaves, pods, flowers and steams and transport to grinding room						*	**	
20	Grind the Moringa leave, pods, flower and steam together and pack in different forms and sizes, separately pack fresh Moringa leaves							***	
21	Take samples and send it to Australian Laboratory Services for product analysis, approval and certification (Quality Purpose)							*	
22	As per the requirements of Standards and quality agency, label the packed Moringa types and supply to domestic and export markets							*	
23	Advertise the health and nutritional benefits of Moringa in TV					**	**	**	**
24	Based on market intelligence feedback, identify potential domestic and export markets and expand product supply areas		***	***	***	***	***	***	***
25	Regularly monitor and evaluate the financial and economic performance of the project and				**	**	**	**	**

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make adjustments as needed									
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