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AGRO-INVEST

AGRO-INVESTMENT CORPORATION

Facilitating Agri-Business Investments



Facilitating Agri-Business Investments

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EXECUTIVE SUMMARY

Farm Size:	20 acres (8 hectares)
Project Description:	<p>The project intends on establishing a 20-acre Breadfruit Orchard.</p> <p>The average annual net profit over a 10-year period is projected to be approximately JM\$737, 500.</p> <p>The accumulated 10-year net profit is projected to be approximately JM\$ 7,546,221</p>
Project Sector	Agriculture: Crop Production of Breadfruit
Financial and Economic Analysis and Recommendation	<p>Internal Rate of Return: 81% (at normal investment assumptions)</p> <p>Net Present Value: JM\$42.77M (at normal investment assumptions)</p> <p>Based on the outcomes of the analysis, the project is considered to be viable</p>

PRODUCT PROFILE



Botanical Name and Origin: Breadfruit (*Artocarpus altilisas*) a close relative to the breadnut (*A. camansi*), belongs to the botanical family, Moraceae.

The breadfruit is said to be a native of Polynesia. The acquisition and subsequent introduction of breadfruit to Jamaica between 1782 and 1793 by captain William Bligh was intended to serve as a staple crop for slaves. It is said that the breadfruit germplasm from Bligh's second voyage was kept and cultivated in the Bath Botanical Gardens in eastern St. Thomas from which propagules were distributed to other parishes.



Species: The three main types of breadfruit found in the Caribbean are the yellow heart, the white heart, and the prickly breadfruit, more commonly known as chataigne. However, the white and yellow heart breadfruit is most known in Jamaica.

Health Benefits: Breadfruit is an excellent source of carbohydrates and protein. The leaves are sometimes boiled to make a drink which is regarded as useful for relieving symptoms of heart diseases and high blood pressure.

Value Added Products:

- Flour,
- Chips,
- Fries
- Baked products
- Beer/ distilled liqueur
- Flavored dips
- Flavored drinks and preserves



AGRONOMICS

Suitable Locations: The crop can be found in most parishes however the prominent parishes for Breadfruit production are Hanover, Portland, St. Mary, St. Thomas, Westmoreland, St. Catherine, and St. James.

Drainage: Breadfruit trees needs good drainage, it prefers deep, fertile, well-drained soils. It can only tolerate waterlogged soils for brief periods thereafter the tree will die.

Soil type: Breadfruit flourishes on a wide range of soil types with pH from 5.5 to 8.5 and at altitude ranging from sea level to 3500 feet. The plant performs best within a temperature range of 60oF to 100oF, a relative humidity of 70% to 80% and a nominally distributed rainfall of 80” to 100” per year.

Reap: Breadfruit trees begin bearing in approximately 3 years after field establishment. The first crops begin to mature at the top of the tree where flowering and fruiting begins due to better light receipt. The fruits should be harvested at the stage of maturity that is required for the method of preparation for consumption. The fruit bruises easily when it is fully ripe, so it is generally picked when mature but not yet ripe. The skin will be a green, yellow in color with some brown cracking and a bit of dried sap or latex are the main indicators of the stage of fruit maturity for these species.

At full maturity, a tree may produce 100 – 250 fruits depending on the cultivar, age, and management. Early fruit falls, approximately 6 to 8 weeks after bearing begins. It should be noted that breadfruit yields tend to increase when there is heavier rainfall; and, conversely, the yield declines during periods of drought.

Har yell vesting Methods: When the fruit is at its peak and ripe and flavorful, it will turn ow, sometimes brownish, and often with lots of old sap on it.

If the fruit is higher up, use a ladder and sharp knife, a scythe, or a long pole with a sharp, curved knife taped to it. Either attach a basket or net to the end of the cutting tool or have someone ready to catch the fruit as it falls in a cushioned box or something to keep the fruit from getting bruised. Whatever mechanism is used, the fruit must not fall to the ground. This will cause bruising (battering), leading to spoilage. Thereafter, turn the fruit upside down to let the latex bleed from the cut stem.

Post-harvest handling: Sorting and grading must be done in the field once the fruits are harvested. All bruised, damaged, scarred, and fruits without stem must be separated and removed from the batch. The stems must be cleaned and trimmed to 1.5 cm long. Fruits can be dipped in water to wash of excess latex. All clinging insects e.g., mealy bugs must be removed.

The fruits should not be stored below 12° C as this result in chilling injury which may cause decolorization of the skin, increased water loss and susceptibility to decay and change in flavour.

Disease Control: There is a low incidence of the Breadfruit tree being affected by pests and disease. On rare occasions there may be fungus or root rot.

Intercropping: Intercropping may be practiced in the first 3 years of establishment. An investor can intercrop with annual vegetables, pineapple, pumpkin, and sweet potato.

SWOT ANALYSIS FOR THE ESTABLISHMENT OF 20 ACRE BREADFRUIT ORCHARD

<p>Strengths</p> <ul style="list-style-type: none"> • Health benefits/ Gluten free • Wide range of soils and elevations • Low incidence of pests and diseases • Drought resistant • High yielding/Productive crop • Agro processing potential • Trees can produce fruit for many decades • Natural disaster and climate change resilient • Access to experts and good networks (RADA, AIC and JAMPRO). 	<p>Opportunities</p> <ul style="list-style-type: none"> • Good local and export potential • Can be used as an import substitute for rice, wheat etc. • Seed multiplication as a business • Investment in mobile processing units. • Accessing the services of the Praedial Larceny Unit at MICAF. • Prospects for climate change mitigation
<p>Weakness</p> <ul style="list-style-type: none"> • Initial layout of the crop orchard is expensive • Long production cycle • Poor post-harvest practices. • Limited financial resources to fund growth and development. • Lack of on-farm storage facilities 	<p>Threats</p> <ul style="list-style-type: none"> • Increase in land prices. • Natural disasters eg. hurricane and floods • Severe market changes and fluctuations in prices. • Shortage of reliable labour • Praedial larceny. • Stringent Government regulation for export and registration • Increase in GOJ taxes • Exploitation of farmers by traders and brokers

MARKET ANALYSIS

Researchers' believe that breadfruit can assist in the fight against world hunger due to its effortless nature to grow and maintain. The breadfruit tree is one of the most productive and adaptable in the world. It can grow in a wide range of soil types and elevations. The tree is also high yielding, and an investor stands to benefit from the tree producing for decades.

There are not enough organized breadfruit markets around the world to effectively determine the size of the global market.

Export Potential: Breadfruit is grouped under the International Harmonised System (HS) code 081090, which has a broad description of edible fruits and nuts and includes fresh tamarinds, cashew apples, jackfruit, lychees, sapodillo plums, passion fruit, carambola, pitahaya, and other edible fruit. The markets with greatest potential for Jamaica's exports of Breadfruit are the United States, Canada, and the United Kingdom.

In 2021, Jamaica exported a value of US\$1,520,629.00 of fresh breadfruit to the United States and Canada following behind receiving exports valued at US\$348,465.00. (see table).

TABLE 1 : JAMAICA'S EXPORT OF BREADFRUIT IN 2021 (PRELIMINARY) (UPDATED)

	JM\$	US\$	COUNTRIES
BREADFRUIT FRESH	230,919,644	1,520,629	United States of America
	52,876,364	348,465	Canada
	36,634,885	240,901	United Kingdom
	23,447	157	Egypt
	Not Available	Not Available	Cayman Islands
	Not Available	Not Available	Cambodia (Democratic Kampuchea)
	Not Available	Not Available	Guadeloupe
	Not Available	Not Available	St. Maarten (Dutch Part)
	320,454,340	2,110,152	

Source: STATIN, 2022

Import Potential: The United States and Canada are potential markets for fresh and processed breadfruit products, specifically communities where there is a high concentration of Pacific and Caribbean individuals.

Data for the year 2020 shows that the imported value for products within the HS group 081090 was valued at approximately US\$ 3.4M, with China being the largest importer and the United States second in line.

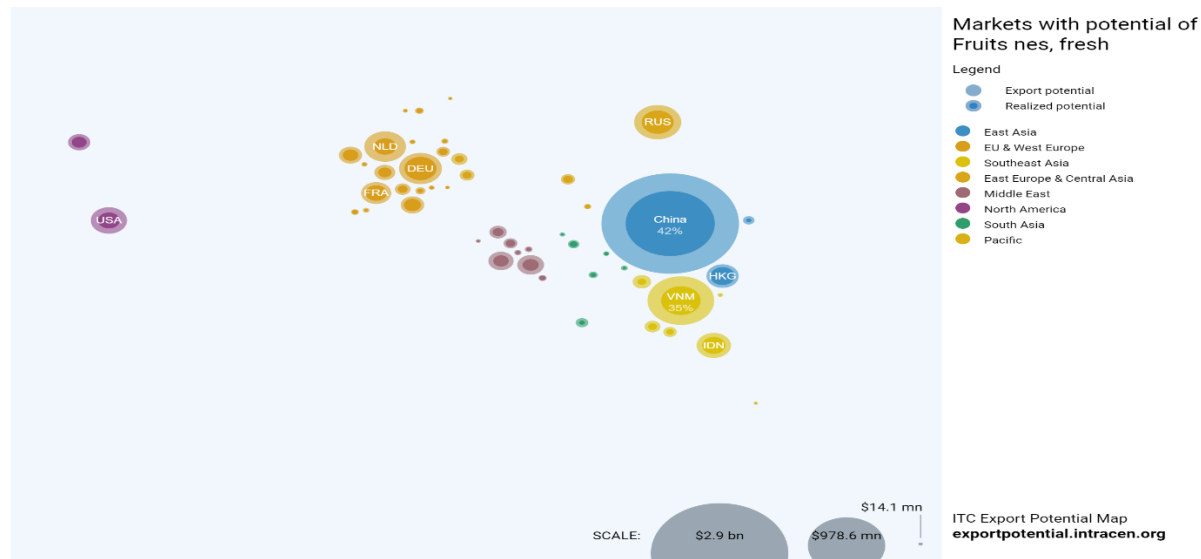
Local Breadfruit Production: Breadfruit is grown in every parish in Jamaica; however, the most suited for the establishment of a breadfruit orchard are Portland, St. Mary, St. Thomas, Westmoreland, St. Catherine, Hanover, and St. James.

It was estimated that in 2017, Jamaica produced locally 24,198,040kg (24,198Mt) worth of breadfruit and exported 1,258,269kg (1,258Mt). While preliminary reports for 2020 indicates that 805,440kg of breadfruit was exported (see table 1). This decline in numbers may be due to the fact that the local market has a 93.85% consumption of fresh and agro processed breadfruit (Ministry of Agriculture and Fisheries).

Market Prices: The market prospects are favorable for breadfruit production and its value-added products. It is estimated that the farmgate price per kg for breadfruit is JM\$ 88 (Ministry of Agriculture and Fisheries, 2020). Breadfruit is a reliable crop and Jamaica's breadfruit has gained a reputation for consistency of its quality.

World Export Characteristics: Based on the wider group class that breadfruit falls under, the total untapped export potential stands at US\$ 4.6bn, with China, Viet Nam and Russian Federation showing the greatest potential for World's exports. It is estimated that China has opportunities to realize additional exports worth \$1.7 bn. Local requirements for food processors to export breadfruit include contacting the National Compliance & Regulatory Authority (NCRA) which will outline the processing and labelling requirements. For exports to the United States, the Food Drug Administration (FDA) will have to be engaged to register the product and the packaging plant as the food facility. Labelling requirements for foods; especially food products for the U.S markets must comply with the applicable US requirements.

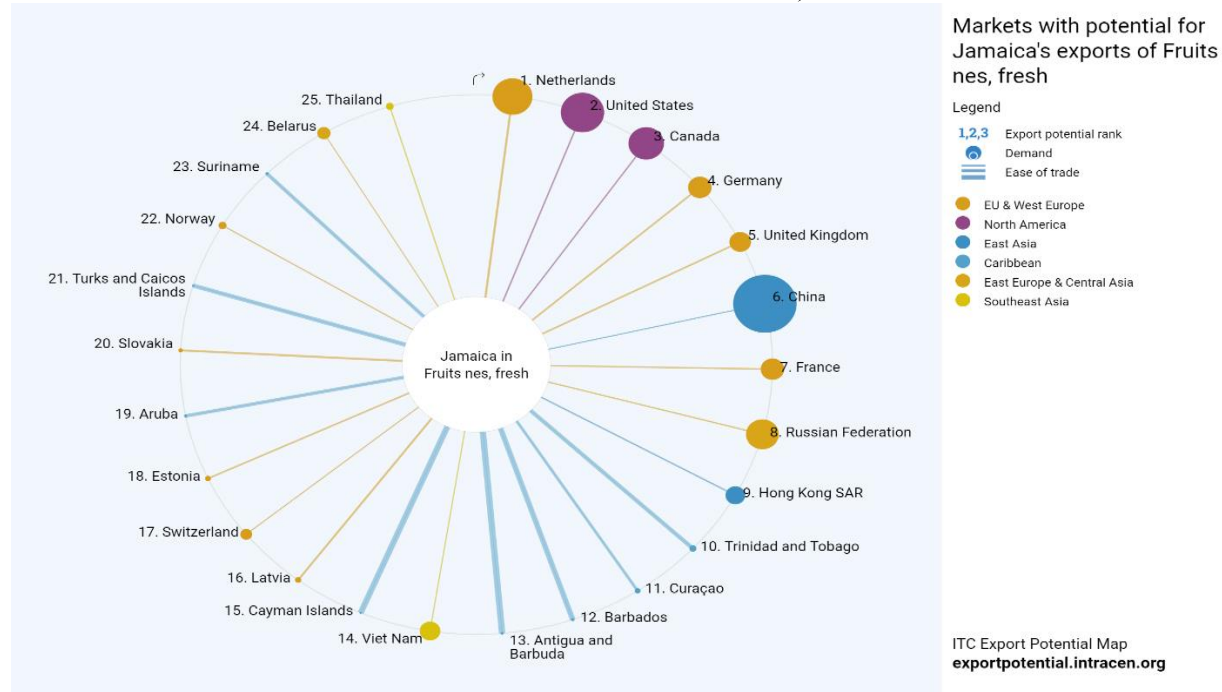
FIGURE 1: SHOWING THE MARKETS WITH THE GREATEST POTENTIAL FOR EXPORT OF FRUITS NES, FRESH



Jamaica Exports to the World: Data from the International Trade Centre (ITC), shows that Jamaica has an export potential of US\$60.1MN and an untapped potential remaining of US\$28.1mn. Breadfruit has been dehydrated and processed into flour for export, especially with one of the new health trends being ‘Gluten Free’ foods, which breadfruit is. Pre-packaged, sliced vacuum-sealed breadfruit, with a shelf life of 30 days refrigerated and 6 months frozen are also being exported to supermarkets in Florida, USA. Canned breadfruit chunks are prepared for the external market as well as packaged breadfruit chips.

The markets with greatest potential for Jamaica’s exports of 0810XX Fruits nes, fresh are Netherlands, United States and Canada (see figure 2). The Netherlands has the capability of realizing additional exports worth US\$454.8 k however, China has the greatest market with the highest demand potential.

FIGURE 2: MARKETS WITH POTENTIAL OF FRUITS NES, FRESH



ITC, 2021

Jamaica exported 805,440kg of fresh breadfruit in 2020 valuing US\$1,124,819 with the United States being its largest market. It is important to highlight that there was an increase in the number of countries that Jamaica exported breadfruit to in 2020 as opposed to 2016, therefore increasing the volume of exports. (see table 2).

TABLE 2: JAMAICA’S VOLUME OF EXPORT OF BREADFRUIT FROM 2016 - 2020

Countries	KG 2017	KG 2018	KG 2019	KG 2020	COUNTRIES
Bermuda	59	Not available	105	180	Not Available
Cambodia (Democratic Kampuchea)	Not Available		0	108	Not Available
Canada	329,401	315,930	271,867	151,827	79,6930.21
Cayman Islands		10	0	280	Not Available
Guadeloupe			0	146	Not Available
St. Maarten (Dutch part)	1,099	623	403	97	339
Sudan			0	3,060	Not Available
United Kingdom	90,736	106,470	48,862	32,364	54,668.64

United States of America	838,251	647,553	574,207	617,487	792,564.89
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Value-added Opportunities: There is a lot of potential to be realized from the organized production of breadfruit. According to the Agriculture and Consumer Protection Department at the FAO, breadfruit has an excellent potential for contributing to food and nutrition security, viable livelihoods, sustainable environments, and adaptation to climate change. This potential can be realized through promoting entrepreneurial efforts and development of the breadfruit industry.

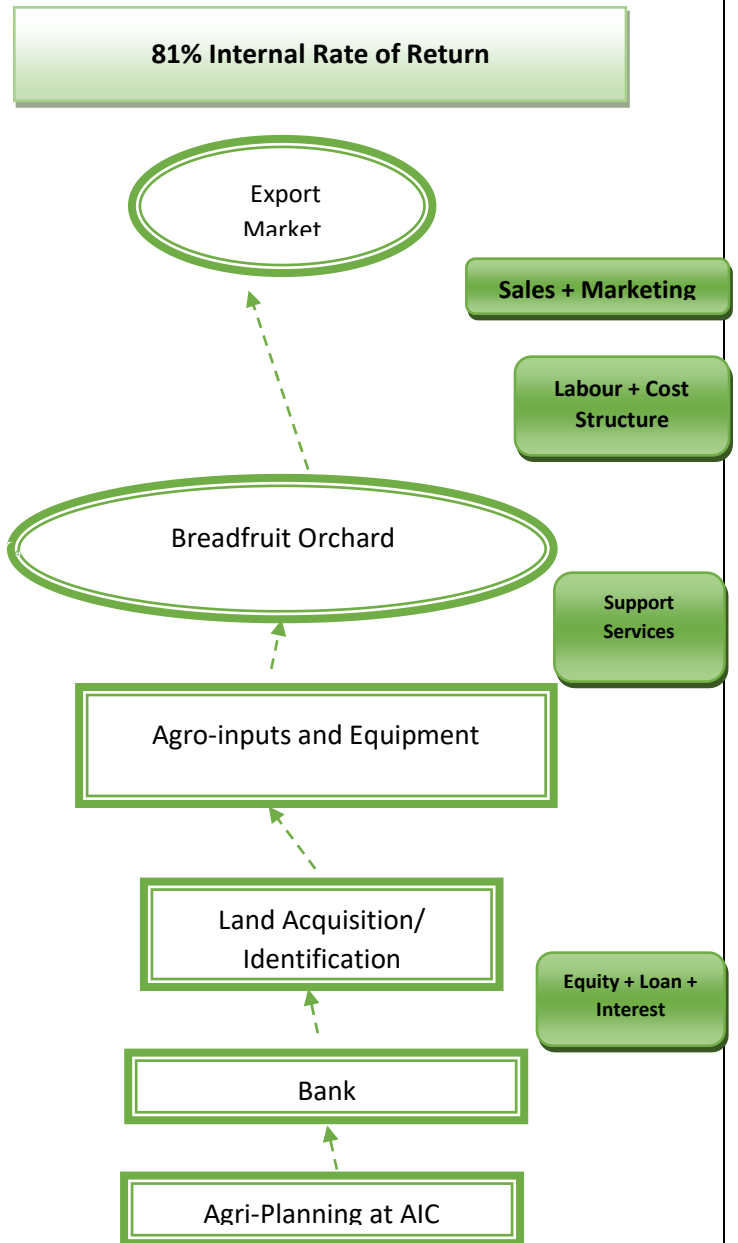
Of late, there has been a move towards the consumption of gluten free products. This trend has presented a plethora of opportunities for investors, such as breadfruit flour, chips and dough. As of 2017, the world demand for gluten free flour n free aspect of breadfruit, an investor can explore breadfruit flour or baked products made from breadfruit. An investor can also explore vacuum packed or frozen breadfruit, providing the relevant cold storage is in place to ensure the integrity of the latter.

BUSINESS MODEL AND FINANCIAL ANALYSIS FOR INVESTMENT IN BREADFRUIT ORCHARD

INVESTMENT OPPORTUNITY

- JM\$2.7M needed to invest in a 20-acre breadfruit orchard.
- Sell produce (washed and packaged) to processors and exporters for international markets.
- Value added opportunities
- High yielding – a tree can yield up to 200 fruits per season under favourable circumstances.
- Intercropping of cash crops can be practiced gaining additional income.
- The first crop is expected within the first three (3) years of maturity
- The investment will be financed by 60% equity and 40% loan financing at an interest rate of 10%
- The estimates are made for a 10-acre area of production.
- Land rate is J\$10,000 per acre per annum.

BUSINESS MODEL



FINANCIALS SUMMARY

Investment Cost

The initial investment cost for the first phase of the 20-acre breadfruit orchard is estimated at **JM\$345,179 per acre** (See Appendix 1 - Cost of Production).

Revenue

Average revenue for the ten years is expected to amount to approximately **JM\$27M**.

Return on Investment

The estimated financials of the project are promising show an **Internal Rate of Return (IRR) of 81%** and **Net Present Value (NPV) of JM\$42.77M** when future cash flows were discounted utilizing a rate of 10% percent based on the going bank lending.

Projected Cash Flow

The cash flow projections for breadfruit production on a 20-acre breadfruit orchard are negative for the first two years and then becomes positive for the remainder of ten-year period. The net cash flow after debt service is expected to average **JM\$23.8M** (See Appendix 2).

AGRICULTURAL INCENTIVES AND SUPPORT SERVICES

A 20-acre breadfruit orchard can benefit from agricultural incentives which comprises of two levels, the general approval for benefits of the Productive Inputs Relief (PIR) and the higher-level approval that includes Income Tax relief.

An entity or individual must be registered with the Rural Agricultural Development Authority (RADA) in their respective parish offices in which the farm exists to benefit from the Productive Input Relief Incentive for the Agricultural Industry.

The approval for the Productive Input Relief benefit requires that the Commissioner of Customs be satisfied that the items imported are to be used in primary production/approved farming activity. It should be noted that PIR can last from six (6) months to three (3) years.

A farmer can also benefit from a twenty percent (20%) concession on farm vehicles. A 20-acre breadfruit orchard can access a motor vehicle waiver for a maximum of two vehicles every five years.

SUPPORT SERVICES

Agro-Investment Corporation (Agro-Invest)

The Agro-Investment Corporation is an agricultural investment and business facilitation agency under the Ministry of Agriculture and Fisheries. The agency is responsible for agricultural investment promotion and facilitation, as well as project and market

development. Agro-Invest provides investment support to entrepreneur, covering the investment chain from the identification of opportunities through to feasibility studies, business planning, fundraising, operations management, long term business performance monitoring and technical support.

Jamaica Promotions Corporation (JAMPRO)

JAMPRO's continuous mission is to promote brand Jamaica, attract and land jobs and wealth-creating investments to Jamaica and secure lucrative markets for quality brand Jamaican products. As the Agency seeks to facilitate local investments, several support services are available, namely:

- Provision of business information and advisory services
- Trade and investment incentives
- Export-related training
- Creation of business linkages

Rural Agricultural Development Authority (RADA)

The Rural Agricultural Development Authority promotes agricultural development in Jamaica through an extension service. Farmers can solicit information and technical assistance in areas such as agronomy, plant health, irrigation post-harvest techniques, production, and marketing.

Value-Added Support Services

Jamaica Manufacturers and Exporters Association (JMEA)

The Jamaica Manufacturers & Exporters Association (JMEA) serves as the voice of exporters, manufacturers, service providers micro, small and medium enterprises (MSMEs). The JMEA provides vital support to the industry through advocacy, strategic partnerships, export services, research, capacity building and access to finance. The JMEA remains instrumental in helping local companies expand and export which is evident in the long-term success of renowned Jamaican brands.

Bureau of Standards Jamaica (BSJ)

The Bureau of Standards Jamaica is a statutory body established by The Standards Act of 1969 to promote and encourage standardization in relation to commodities, processes, and practices. However, over the years, its role has expanded to include the provision of services in relation to conformity assessment (certification, testing, and calibration) and metrology.

Scientific Research Council (SRC)

The SRC supports the growth and development of the agro-industrial sector in Jamaica through research, adaptation of available technologies, creation of new and appropriate technologies and the provision of training and technical assistance. The Scientific Research Council is the only institution with a mandate by law to “collect, collate and review

information concerning scientific research schemes or programmes relevant to the development of the resources of Jamaica (and) to establish and maintain a scientific information center for collection and dissemination of scientific and technical information”.

Contact our Investment Team today for more information on available investment opportunities!

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APPENDIX 1: COST OF PRODUCTION FOR A 20-ACRE BREADFRUIT ORCHARD

Item	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6	Yr. 7	Yr. 8	Yr. 9	Yr. 10
Labour Operations:										
Land preparation	150,000									
Head trenches/maint.	10,500	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
Line & peg	6,000									
Dig holes	6,000									
Apply manure	2,500	2,500								
Head & drop plants	1,800									
Plant & stake	1,725									
Apply fertilizer	3,600	5,400	5,400	5,400	5,400	5,400	5,400	5,400	5,400	5,400
Supply seedlings	1,800									
Apply herbicide	3,600	3,600	3,600	3,600	3,600	3,600	3,600	3,600	3,600	3,600
Apply slugbait	1,800	1,800	1,800							
Apply pesticides	1,800	3,600	5,400	5,400	5,400	7,200	7,200	7,200	7,200	7,200
Prune plants	4,200	4,200	4,200	6,300	6,300	6,300	8,400	8,400	10,500	10,500
Harvest produce			17,850	24,990	53,550	89,250	89,250	107,100	107,100	107,100
Sub - total	195,325	24,100	41,250	48,690	77,250	114,750	116,850	134,700	136,800	136,800
Material Inputs: -										
 Packaging Material										
Transportation										
Pegs	1,000									
Seedlings	40,800									
N.P.K fertilizer	4,920	9,840	14,760	19,680	24,600	29,520	34,440	39,360	44,280	44,280
Manure	2,000	2,000								
Slugbait	6,000	6,000	6,000	6,000	6,000					
Fungicide	8,640	8,640	8,640	8,640	17,280	17,280	17,280	17,280	17,280	17,280
Insecticide	9,600	9,600	9,600	10,800	10,800	10,800	10,800	10,800	10,800	10,800
Sub - total	72,960	36,080	39,000	45,120	58,680	57,600	62,520	67,440	72,360	72,360

Equipment: -										
Mist Blower & knap sack sprayer	95,000									
Irrigation Equipment	132,000									
Sub - total	227,000									
Other Costs:										
Contingencies	26,829	6,018	8,025	9,381	13,593	17,235	17,937	20,214	20,916	20,916
Tools	3,648	1,804	1,950	2,256	2,934	2,880	3,126	3,372	3,618	3,618
Land Charges	6,175	6,175	6,175	6,175	6,175	6,175	6,175	6,175	6,175	6,175
Supervision	40,243	9,027	12,038	14,072	20,390	25,853	26,906	30,321	31,374	31,374
Sub - total	76,894	23,024	28,188	31,884	43,092	52,143	54,144	60,082	62,083	62,083
TOTAL	345,179	83,204	108,438	125,694	179,022	224,493	233,514	262,222	271,243	271,243

APPENDIX 2: PROJECTED CASH FLOW

Projected Cash Flow											
Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Inflows											
Revenues		0	0	11,424,000	15,993,600	34,272,000	57,120,000	57,120,000	68,544,000	68,544,000	68,544,000
Loan (60%)	4,142,151										
Equity(40%)	2,761,434										
Total Inflows		0	0	11,424,000	15,993,600	34,272,000	57,120,000	57,120,000	68,544,000	68,544,000	68,544,000
Outflows											
Capital costs	6,903,585										
Capital Replacement						1,161,600					
Operating costs		2,303,174	2,476,618	2,594,461	2,716,471	2,851,908	2,991,400	3,130,364	3,280,113	3,433,116	3,591,668
Total Outflows	6,903,585	2,303,174	2,476,618	2,594,461	2,716,471	4,013,508	2,991,400	3,130,364	3,280,113	3,433,116	3,591,668
Net Cash flow Before Debt Service		-2,303,174	-2,476,618	8,829,539	13,277,129	30,258,492	54,128,600	53,989,636	65,263,887	65,110,884	64,952,332
Debt Service:											
Principal		678,473.90	746,321.29	820,953.42	903,048.76	993,353.64	-	-	-	-	-
Interest		414,215.10	346,367.71	271,735.58	189,640.24	99,335.36	-	-	-	-	-
Total Debt Service	6,903,585	1,092,689	1,092,689	1,092,689	1,092,689	1,092,689	0	0	0	0	0

Net Cash flow after Debt Service		-3,395,863	-3,569,307	7,736,850	12,184,440	29,165,803	54,128,600	53,989,636	65,263,887	65,110,884	64,952,332
<i>Cumulative Net Cash flow</i>		1,894,027	-1,675,280	6,061,570	18,246,010	47,411,813	101,540,413	155,530,049	220,793,935	285,904,819	350,857,151