MINISTRY OF AGRICULTURE
FISHERIES & MINING

THE NEW F.A.C.E. OF FOOD

AGRO-INVEST
AGRO-INVESTMENT CORPORATION

INVEST IN JAMAICA'S AGRICULTURAL FUTURE

INVESTMENT FOCUS ON

TURMERIC

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COP - Cost of Production

FAO - Food and Agriculture Organization of the United Nations

GOJ - Government of Jamaica

ITC - International Trade Center

JMD - Jamaican Dollars

MICAF - Ministry of Industry, Commerce, Agriculture and Fisheries

STATIN - Statistical Institute of Jamaica

U.K. - United Kingdom

USA/U.S. - United States of America

USD - United States Dollars

EXECUTIVE SUMMARY

Farm Size:	5 acres (2.02 hectares)
Project Description:	The profile is seeking to establish 5 acres of Turmeric.
	The average annual net profits over 3 years is projected to be approximately **J$7.1 million**
	The accumulated 3-year net profit is projected to be approximately J$ **21.4 M**
Project Sector	Agriculture: Crop Production of Turmeric
Financial and Economic Analysis	
Internal Rate of Return:	**67%** (at normal and Recommendation investment assumptions)
	Net Present Value: **J$7.9M** (at normal investment assumptions)
	Based on the outcomes of the analysis, the project is considered to be viable

Product Profile

Table 1: Product Profile for Turmeric

Turmeric

Botanical Name and Origin: The turmeric (Curcuma longa) has its origins in Southeast Asia.

Species and Description: It is an herb of the ginger family and like ginger has a thick, round rhizome with short "fingers". As many as 133 species of Curcuma have been identified worldwide.

Nutritional Value:

Nutrient	Unit	1Value per 100 g
Water	g	12.85
Energy	kcal	312
Protein	g	9.68
Total lipid (fat)	g	3.25
Carbohydrate, by difference	g	67.14
Fiber, total dietary	g	22.7
Sugars, total	g	3.21
Calcium, Ca	mg	168
Iron, Fe	mg	55
Magnesium, Mg	mg	208
Phosphorus, P	mg	299
Potassium, K	mg	2080
Sodium, Na	mg	27
Zinc, Zn	mg	4.5
Vitamin C, total ascorbic acid	mg	0.7
Thiamin	mg	0.058
Riboflavin	mg	0.15
Niacin	mg	1.35
Vitamin B-6	mg	0.107
Folate, DFE	µg	20
Vitamin B-12	µg	0
Vitamin A, RAE	µg	0
Vitamin A, IU	IU	0
Vitamin E (alphatocopherol)	mg	4.43
Vitamin D (D2 + D3)	µg	0
Vitamin D		IU
Vitamin K (phylloquinone)	µg	13.4

Fatty acids, total saturated	g	1.838
Fatty acids, total monounsaturated	g	0.449
Fatty acids, total polyunsaturated	g	0.756
Fatty acids, total trans	g	0.056

Source: USDA 2019

Medicinal Uses: Turmeric may be used for the treatment of rheumatoid arthritis, conjunctivitis, urinary tract infections, and liver ailments (Dixit, Jain, and Joshi 1988). It is also used for digestive disorders; for abdominal pain and distension (Bundy et al. 2004).

By-Products: Before turmeric can be used, the turmeric rhizomes must be processed. Rhizomes are boiled or steamed to remove the raw odor, gelatinize the starch, and produce a more uniformly colored product. Turmeric is also used in manufactured food products such as canned beverages, dairy products, baked products, ice cream, yellow cakes, yogurt, orange juice, biscuits, popcorn, sweets, cake icings, cereals, sauces, and gelatins. It is a significant ingredient in most commercial curry powders.

Agronomy

Turmeric (Curcuma longa) (Family: Zingiberaceae) is used as condiment, dye, drug and cosmetic in addition to its use in religious ceremonies. India is a leading producer and exporter of turmeric in the world. Andhra Pradesh, Tamil Nadu, Orissa, Karnataka, West Bengal, Gujarat, Meghalaya, Maharashtra, Assam are some of the important states cultivates turmeric, of which, Andhra Pradesh alone occupies 35.0% of area and 47.0% of production.

Climate and soil

Turmeric can be grown in diverse tropical conditions from sea level to 1500 m above sea level, at a temperature range of 20-35oC with an annual rainfall of 1500 mm or more, under rainfed or irrigated conditions. Though it can be grown on different types of soils, it thrives best in well-drained sandy or clay loam soils with a pH range of 4.5-7.5 with good organic status.

Varieties

A number of cultivars are available in the country and are known mostly by the name of locality where they are cultivated. Some of the popular cultivars are Duggirala, Tekurpeta, Sugandham, Amalapuram, Erode local, Alleppey, Moovattupuzha, and Lakadong. The improved varieties of turmeric and their salient features are given in the following table.

Table 2. Characteristics of Improved Turmeric Varieties

Sl.No.	Variety	Mean yield (fresh)(t/ha)	Crop duration (days)	Dry recovery (%)	Curcumin (%)	Oleoresin (%)	Essential oil (%)
1	Suvarna	17.4	200	20.0	4.3	13.5	7.0
2	Suguna	29.3	190	12.0	7.3	13.5	6.0
3	Sudarsana	28.8	190	12.0	5.3	15.0	7.0
4	IISR Prabha	37.5	195	19.5	6.5	15.0	6.5
5	IISR Prathibha	39.1	188	6.2	6.5	16.2	6.2
6	Co-1	30.0	285	19.5	3.2	6.7	3.2
7	BSR-1	30.7	285	20.5	4.2	4.0	3.7
8	Krishna	9.2	240	16.4	2.8	3.8	2.0
9	Sugandham	15.0	210	23.3	3.1	11.0	2.7
10	Roma	20.7	250	31.0	9.3	13.2	4.2
11	Suroma	20.0	255	26.0	9.3	13.1	4.4
12	Ranga	29.0	250	24.8	6.3	13.5	4.4
13	Rasmi	31.3	240	23.0	6.4	13.4	4.4
14	Rajendra Sonia	42.0	225	18.0	8.4	-	5.0
	IISR Alleppey						
15	Supreme	35.4	210	19.3	6.0	16.0	4.0
16	IISR Kedaram	34.5	210	18.9	5.5	13.6	3.0

Cultivation

Preparation of land

The land is prepared with the receipt of early monsoon showers. The soil is brought to a fine tilth by giving about four deep ploughings. Hydrated lime @ 500 kg/ha has to be applied for laterite soils and thoroughly ploughed. Immediately with the receipt of pre-monsoon showers, beds of 1.0 m width, 15 cm height and of convenient length are prepared with spacing of 50 cm between beds. Planting is also done by forming ridges and furrows.

Planting

In Kerala and other West Coast areas where the rainfall begins early, the crop can be planted during April-May with the receipt of pre-monsoon showers.

Seed material

Whole or split mother and finger rhizomes are used for planting and well developed healthy and disease free rhizomes are to be selected. Small pits are made with a hand hoe on the beds with a spacing of 25 cm x 30 cm. Pits are filled with well decomposed cattle manure or compost, seed rhizomes are placed over it then covered with soil. The optimum spacing in furrows and ridges is 45-60 cm between the rows and 25 cm between the plants. A seed rate of 2,500 kg of rhizomes is required for planting one hectare of turmeric.

Manuring and fertilizer application

Farmyard manure (FYM) or compost @ 30-40 t/ha is applied by broadcasting and ploughed at the time of preparation of land or as basal dressing by spreading over the beds or into the pits at the time of planting. Fertilizers @ 60 kg N, 50 kg P2O5 and 120 kg K2O per hectare are to be applied in split doses as given in Table 2. Zinc @ 5 kg/ha may also be applied at the time of planting and organic manures like oil cakes can also be applied @ 2 t/ha. In such case, the dosage of FYM can be reduced. Integrated application of coir compost (@ 2.5 t/ha) combined with FYM, biofertilizer (Azospirillum) and half recommended dose of NPK is also recommended.

Table 3: Fertilizer schedule for turmeric (per ha)

Schedule	N	P_2O_5	K_2O	Compost/cow dung
Basal application	-	50 kg	-	30-40 tonnes
After 45 days	30 kg	-	60 kg	-
After 90 days	30 kg	-	60 kg	-

Mulching

The crop is to be mulched immediately after planting with green leaves @ 12-15 t/ha. Mulching may be repeated @ 7.5 t/ha at 45 and 90 days after planting after weeding, application of fertilizers and earthing up.

Weeding and irrigation

Weeding has to be done thrice at 60, 90 and 120 days after planting depending upon weed intensity. In the case of irrigated crop, depending upon the weather and soil conditions, about 15 to 23 irrigations are to be given in clayey soils and 40 irrigations in sandy loams.

Mixed cropping

Turmeric can be grown as an intercrop in coconut and arecanut plantations. It can also be raised as a mixed crop with chillies, 10abelling, onion, brinjal and cereals like maize, ragi, etc.

Plant protection

Diseases

Leaf blotch

Leaf blotch is caused by Taphrina maculans and appears as small, oval, rectangular or irregular brown spots on either side of the leaves which soon become dirty yellow or dark brown. The leaves also turn yellow. In severe cases the plants present a scorched appearance, and the rhizome yield is reduced. The disease can be controlled by spraying mancozeb 0.2%.

Leaf spot

Leaf spot is caused by Colletotrichum 11abelli and appears as brown spots of various sizes on the upper surface of the young leaves. The spots are irregular in shape and white or grey in the centre. Later, two or more spots may coalesce and form an irregular patch covering almost the whole leaf. The affected leaves eventually dry up. The rhizomes do not develop well. The disease can be controlled by spraying zineb 0.3% or Bordeaux mixture 1%.

Rhizome rot

The disease is caused by Pythium graminicolum or P. aphanidermatum. The collar region of the pseudostem becomes soft and water soaked, resulting in collapse of the plant and decay of rhizomes. Treating the seed rhizomes with mancozeb 0.3% for 30 minutes prior to storage and at the time of sowing prevents the disease. When the disease is noticed in the field, the beds should be drenched with mancozeb 0.3%.

Nematode pests

Root knot nematodes (Meloidogyne spp.) and burrowing nematode (Radopholus similis) are the two important nematodes causing damage to turmeric. Root lesion nematodes (Pratylenchus spp.) are of common occurrence in Andhra Pradesh. Wherever nematode problems are common, use only healthy, nematode- free planting material. Increasing the organic content of the soil also checks the multiplication of nematodes. Pochonia chlamydosporia can be applied to the beds at the time of sowing @ 20 g/bed (at 106 cfu/g) for management of nematode problems.

Insect pests

Shoot borer

The shoot borer (Conogethes punctiferalis) is the most serious pest of turmeric. The larvae bore into pseudostems and feed on internal tissues. The presence of a bore-hole on the pseudostem through which frass is extruded and the withered central shoot is a characteristic symptom of pest infestation. The adult is a medium sized moth with a wingspan of about 20 mm; the wings are orange- yellow with minute black spots. Fully-grown larvae are light brown with sparse hairs. Spraying malathion (0.1%) at 21 day intervals during July to October is effective in controlling the pest infestation. The spraying has to be initiated when the first symptom of pest attack is seen on the inner most leaf.

Rhizome scale

The rhizome scale (Aspidiella hartii) infests rhizomes in the field (at later stages of the crop) and in storage. Adult (female) scales are circular (about 1mm diameter) and light brown to grey and appear as encrustations on the rhizomes. They feed on sap and when the rhizomes are severely infested, they become shrivelled and desiccated affecting its

germination. Treat seed material with quinalphos (0.075%) (for 20-30 minutes) before storage and also before sowing in case the infestation persists. Discard and do not store severely infested rhizomes.

Minor pests

Adults and larvae of leaf feeding beetles such as Lema spp. Feed on leaves especially during the monsoon season and form elongated parallel feeding marks on them. The spraying of malathion (0.1%) undertaken for the management of shoot borer is sufficient to manage this pest.

The lacewing bug (Stephanitis typicus) infests the foliage causing them to turn pale and dry up. The pest infestation is more common during the post monsoon period especially in drier regions of the country. Spraying dimethoate (0.05%) is effective in managing the pest.

The turmeric thrips (Panchaetothrips indicus) infests the leaves causing them to roll, turn pale and gradually dry up. The pest infestation is more common during the post monsoon period especially in drier regions of the country. Spraying dimethoate (0.05%) is effective for the management of the pest.

Organic Production

Conversion plan

For certified organic production, at least 18 months the crop should be under organic management i.e. only the second crop of turmeric can be sold as organic. The conversion period may be relaxed if the organic farm is being established on a land where chemicals were not previously used, provided sufficient proof of history of the area is available. It is desirable that organic method of production is followed in the entire farm; but in the case of large extent of area, the transition can be done in a phased manner for which a conversion plan has to be prepared.

Turmeric as a best component crop in agri-horti and silvi-horti systems, recycling of farm waste can be effectively done when grown with coconut, arecanut, mango, Leucaena, rubber etc. As a mixed crop it can also be grown or rotated with green manure/ legumes crops or trap crops enabling effective nutrient built up and pest or disease control. When grown in a mixed cultivation system, it is essential that all the crops in the field are also subjected to organic methods of production.

In order to avoid contamination of organically cultivated plots from neighboring non-organic farms, a suitable buffer zone with definite border is to be maintained. Crop grown on this isolation belt cannot be treated as organic. In sloppy lands adequate precaution should be taken to avoid the entry of run-off water and chemical drift from the neighboring farms. Proper soil and water conservation measures by making conservation pits in the

interspaces of beds across the slope have to be followed to minimize the erosion and runoff. Water stagnation has to be avoided in the low-lying fields by taking deep trenches for drainage.

Management practices

For organic production, traditional varieties adapted to the local soil and climatic conditions that are resistant or tolerant to diseases, pests and nematode infection should be used. All crop residues and farm wastes like green loppings, crop residues, grasses, cow dung slurry, poultry droppings etc. available on the farm can be recycled through composting, including vermicomposting so that soil fertility is maintained at high level. No synthetic chemical fertilizers, pesticides or fungicides are allowed under organic system. Farmyard manure may be applied @ 40 t/ha along with vermi compost @ 5-10 t/ha and mulching with green leaves @ 12- 15 t ha-1 at 45 days intervals. Based on soil test, application of lime/dolomite, rock phosphate and wood ash have to be done to get required quantity of phosphorus and potassium supplementation. When the deficient conditions of trace elements become yield limiting, restricted use of mineral/chemical sources of micronutrients by soil application or foliar spray are allowed as per the limits of standard setting or certifying organizations. Further, supplementation of oil cakes like neem cake (2 t/ha), composted coir pith (5 t/ha) and suitable microbial cultures of Azospirillum and phosphate solubilizing bacteria will improve the fertility and yield.

Use of biopesticides, biocontrol agents, cultural and phytosanitary measures for the management of insect pests and diseases forms the main strategy under organic system. Spraying Neemgold 0.5% or neemoil 0.5% during July-October (at 21-day intervals) is effective against the shoot borer.

Selection of healthy rhizomes, soil solarization and incorporation of Trichoderma, seed treatment and soil application of biocontrol agents like Trichoderma or Pseudomonas multiplied in suitable carrier media such as coir pith compost, well rotten cow dung or quality neem cake may be done at the time of sowing and at regular intervals to keep the rhizome rot disease in check. To control other foliar diseases spraying of Bordeaux mixture 1% may be done restricting the quantity to 8 kg copper per hectare per annum. Application of quality neem cake mentioned earlier along with the bioagents Pochonia chlamydosporia will be useful to check the nematode population.

Certification

Under organic farming, processing methods also should be based on mechanized, physical and biological processes to maintain the vital quality of organic ingredient throughout each step of its processing. All the ingredients and additives used in processing should be of agriculture origin and certified organic. In cases where an ingredient of organic agriculture origin is not available in sufficient quality or quantity, the certification programme authorizes use of non-organic raw materials subject to periodic re-evaluation.

Labelling should clearly indicate the organic status of the product as "produce of organic agriculture" or a similar description when the standards requirements are fulfilled. Moreover, organic and non-organic products should not be stored and transported together except when labelled or physically separated.

Certification and 14 abelling is usually done by an independent body to provide a guarantee that the production standards are met. Govt. of India has taken steps to have indigenous certification system to help small and marginal growers and to issue valid organic certificates through certifying agencies accredited by APEDA. The inspectors appointed by the certification agencies will carry out inspection of the farm operations through records maintained and by periodic site inspections. Documentation of farm activities is must for acquiring certification especially when both conventional and organic crops are raised. Group certification programmes are also available for organized group of producers and processors with similar production systems located in geographical proximity.

Harvesting

Depending upon the variety, the crop becomes ready for harvest in 7-9 months after planting during January-March. Early varieties mature in 7-8 months, medium varieties in 8-9 months and late varieties after 9 months.

The land is ploughed, and the rhizomes are gathered by hand picking or the clumps are carefully lifted with a spade. The harvested rhizomes are cleared of mud and other extraneous matter adhering to them.

Processing

Curing

Fresh turmeric is cured for obtaining dry turmeric. The fingers are separated from mother rhizomes. Mother rhizomes are usually kept as seed material. Curing involves boiling of fresh rhizomes in water and drying in the sun.

In the traditional method of curing, the cleaned rhizomes are boiled in water just enough to immerse them. Boiling is stopped when froth comes out and white fumes appear giving out a typical odour. The boiling should last for 45-60 minutes when the rhizomes turn soft. The stage at which boiling is stopped largely influences the colour and aroma of the final product. Over cooking spoils, the colour of the final product while under-cooking renders the dried product brittle.

In the improved scientific method of curing, the cleaned fingers (approximately 50 kg) are taken in a perforated trough of 0.9 m x 0.5 m x 0.4 m size made of GI or MS sheet with extended parallel handle. The perforated trough containing the fingers is then immersed in a pan; 100 litres of water is poured into the trough so as to immerse the turmeric fingers. The whole mass is boiled till the fingers become soft. The cooked fingers are taken out of the pan by lifting the trough and draining the water into the pan. The water used for boiling turmeric rhizomes can be used for curing fresh samples. The processing of turmeric is to be done 2 or 3 days after harvesting. If there is delay in processing, the rhizomes should be stored under shade or covered with sawdust or coir dust.

Drying

The cooked fingers are dried in the sun by spreading them in 5-7 cm thick layers on bamboo mats or drying floor. A thinner layer is not desirable, as the colour of the dried product may be adversely affected. During nighttime, the rhizomes should be heaped or covered with material which provides aeration. It may take 10-15 days for the rhizomes to become completely dry. Artificial drying, using crossflow hot air at a maximum temperature of 60oC also gives a satisfactory product. In the case of sliced turmeric, artificial drying has clear advantages in giving a brighter coloured product than sun drying which tends to undergo surface bleaching. The yield of the dry product varies from 10-30% depending upon the variety and the location where the crop is grown.

Polishing

Dried turmeric has a poor appearance and a rough dull outer surface with scales and root bits. The appearance is improved by smoothening and polishing the outer surface by manual or mechanical rubbing.

Manual polishing consists of rubbing the dried turmeric fingers on a hard surface. The improved method is by using a hand operated barrel or drum mounted on a central axis, the sides of which are made of expanded metal mesh. When the drum filled with turmeric is rotated, polishing is affected by abrasion of the surface against the mesh as well as by

mutual rubbing against each other as they roll inside the drum. Turmeric is also polished in power operated drums. The yield of polished turmeric from the raw material varies from 15-25%.

Colouring

The colour of the processed turmeric influences the price of the produce. For an attractive product, turmeric powder (mixed with little water) may be sprinkled during the last phase of polishing.

Preservation of seed rhizomes

Rhizomes for seed purpose are generally stored by heaping in well-ventilated rooms and covered with turmeric leaves. The seed rhizomes can also be stored in pits with saw dust, sand along with leaves of Strychnos nuxvomica (kanjiram). The pits are to be covered with wooden planks with one or two openings for aeration. The rhizomes are to be dipped in quinalphos (0.075%) solution for 15 minutes if scale infestations are observed and in mancozeb (0.3%) to avoid storage losses due to fungi.

Crop Production

Table 4: Cost of Production

Item	Unit	Quantity			Rate/Unit	Total ($)
Land Prep						
Land Cleaning	man day		5		$ 13,000.00	$ 65,000.00
Ploughing	acre		1		$ 11,600.00	$ 11,600.00
Harrowing	acre		1		$ 11,600.00	$ 11,600.00
Furrowing	acre		1		$ 11,600.00	$ 11,600.00
Subtotal						**$ 99,800.00**
Labour Activities						
Transplanting	MD		5		$ 4,000.00	$ 20,000.00
Prepare Planting Material	man day	3			$ 4,000.00	$ 12,000.00
Planting	man day	10			$ 4,000.00	$ 40,000.00
Pesticide Application	MD		16		$ 4,000.00	$ 64,000.00
Weed Control	MD		28		$ 4,000.00	$ 112,000.00
Fertiliser Application			4		$ 4,000.00	$ 16,000.00
Weed Control	man day	24			$ 2,000.00	$ 55,200.00
Harvesting			**50**		$ 4,000.00	$ 200,000.00
Subtotal						**$ 519,200.00**
Planting Imput						
Planting Material	kg	1,600.00			$ 77.00	$ 123,200.00
Fertilizer						$ 27,600.00
Fungicide						$ 11,500.00
Herbicide						$ 5,520.00
Water	month			7	$ 3,450.00	$ 24,150.00
Subtotal						**$ 191,970.00**
Other Cost						
****Tools discounted for 5 years**						$ 12,000.00
Transporation (10 percent of material)						$ 19,197.00
Irrigation						$ 400,000.00
Land Charges per cropy cycle						$ 20,000.00
Supervision (15% of labour & material)						$ 106,675.50
Subtotal						**$ 557,872.50**
Total Operating Expenditure Per Crop Cycle						**$ 1,368,842.50**

Crop Maturity: 7 months

Reaping Period: 2 months

Project Viability: Investment in the production and exportation of the Jamaican Turmeric is lucrative as supported by financial projections.

Gross Revenue: Under favourable conditions, investors can expect a gross revenue of $4.5M JMD.

Net Income: Investors can expect a net income of$7.7M JMD over a period of 3 year.

Return on Investment: Turmeric farming guarantees a ROI of 97%.

Suitable Locations: Suitable locations for commercial turmeric production are in the parishes of Hanover, Westmoreland, St. Elizabeth, St. James, Clarendon, St. Catherine, St. Mary and St. Thomas.

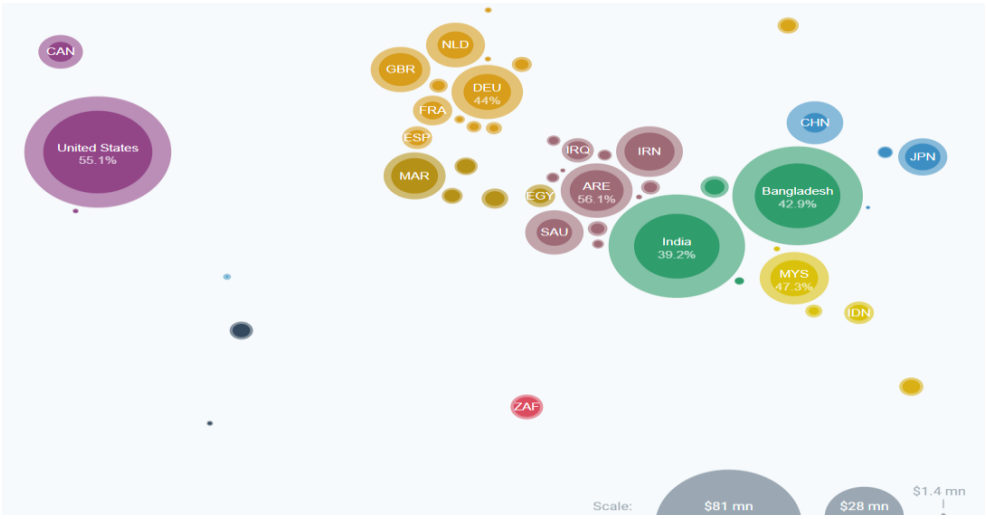
Drainage: It requires a well-drained soil with sufficient nutrient supply.

Harvesting Methods: Turmeric readiness for harvest is indicated by the drying of the plant and stem. The rhizome bunches should be carefully dug out by hand-picking, manually dug with a spade. It is recommended to first cut the leaves before lifting the rhizomes. Rhizomes are then cleaned by soaking in water. (FAO 2004).

Market Opportunities

Export Potential: Turmeric falls under the International Harmonised System code 091030, comprising of "Turmeric 'curcuma'". The markets with greatest potential for World's exports of 091030 Turmeric are United States, India and Bangladesh. India shows the largest absolute difference between potential and actual exports in value terms, leaving room to realize additional exports worth $43 mn. (See Figure 1).

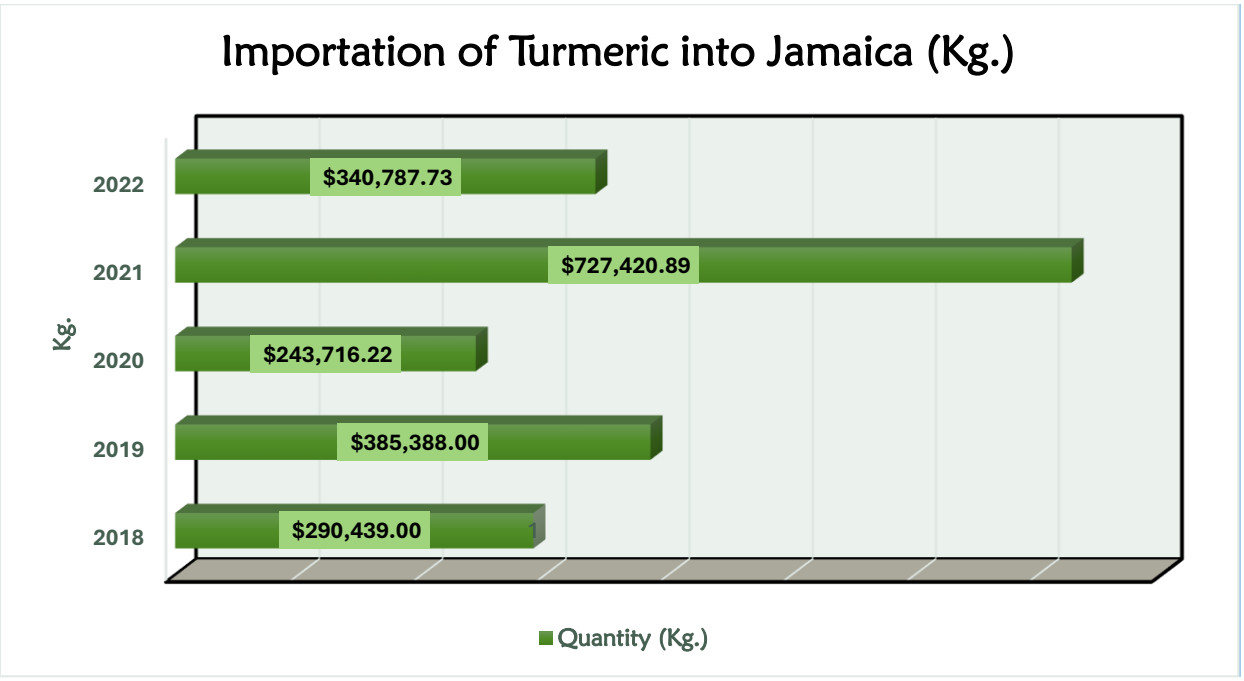
Figure 1: Markets with the Greatest Potential for Jamaica's Exports of Turmeric



Source: ITC (2024)

Market Analysis

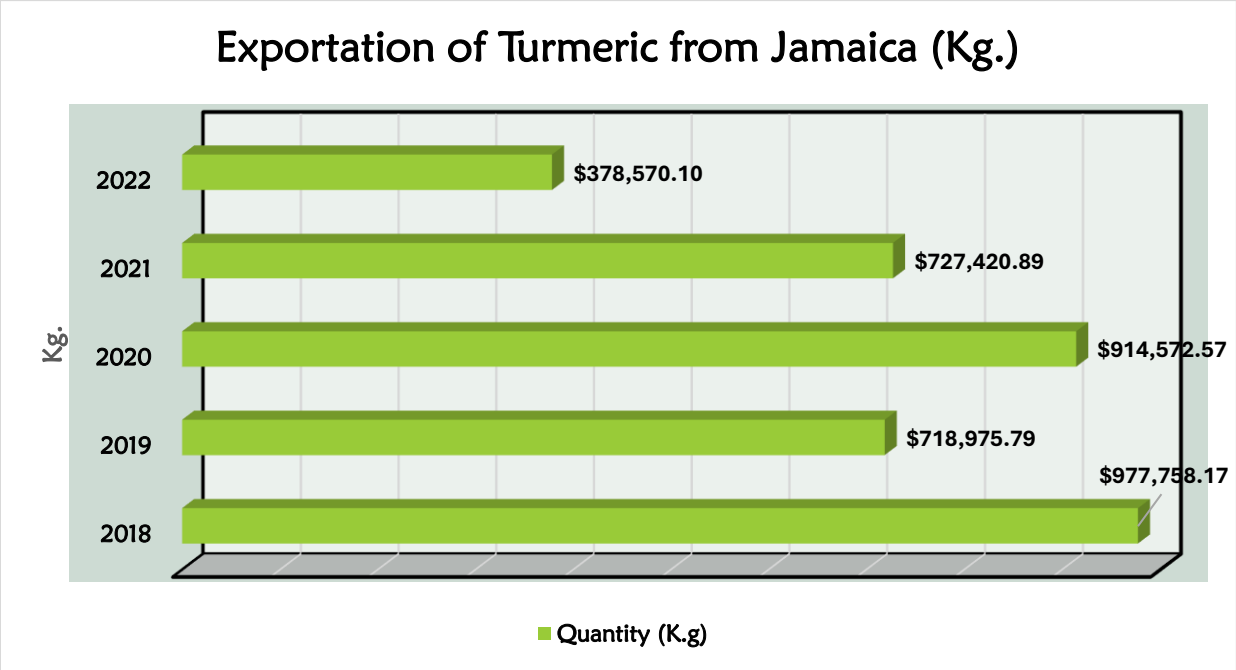
Figure 2. Importation of Turmeric into Jamaica



Source: STATIN, 2023

The import quantity for 2018 was 290,439 kg. In 2019, the quantity of turmeric imports increased to 385,388 kg, a significant growth from the previous year, reflecting high demand or expansion in the turmeric market. In 2020, imports totalled 243,716.22 kg, a noticeable drop from 2019, possibly due to supply chain disruptions caused by the COVID-19 pandemic or changes in demand. In 2021, imports surged to 727,420.89 kg, more than doubling the previous year's figure. This could indicate a sharp rise in demand for turmeric, possibly for health-related uses or increased food production. The import quantity for 2022 was 340,787.73 kg, a decrease from 2021 but still significantly higher than 2018-2020 levels, suggesting possible market stabilization after the sharp rise in 2021.

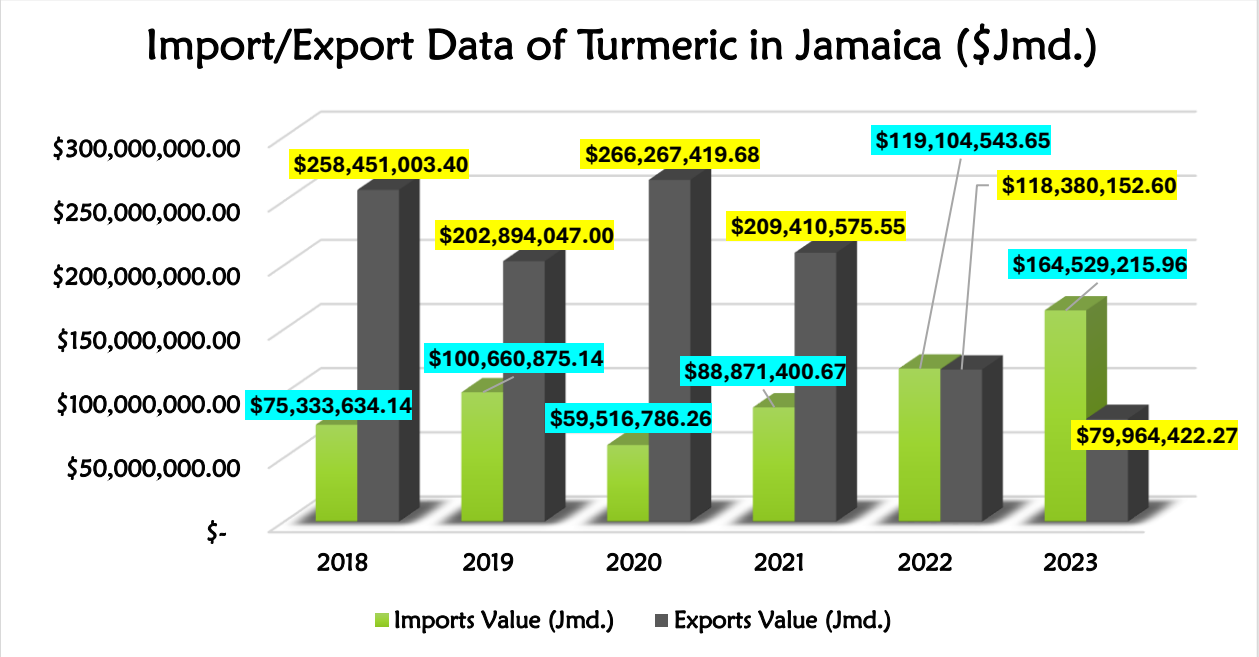
Figure 3. Exportation of Turmeric from Jamaica



Source: STATIN, 2023

In 2018, the export quantity of turmeric was 977,758.17 kg. Jamaica exported a significant quantity of turmeric, marking a high point in the five-year period. Exports in 2019 totalled 718,975.79 kg, a noticeable decline from 2018, indicating reduced export demand or a dip in production levels. In 2020, exports reached 914,572.57 kg, reflecting a recovery in turmeric exports, potentially spurred by global demand for immune-boosting products during the COVID-19 pandemic. In 2021, exports amounted to 727,420.89 kg, a slight decline compared to 2020 but still stable, suggesting consistent international demand. In 2022, exports dropped to 378,570.10 kg, a significant decrease from previous years, possibly due to reduced production capacity, competition from other exporters, or changing demand dynamics.

Figure 4. Import/Export Data of Turmeric in Jamaica



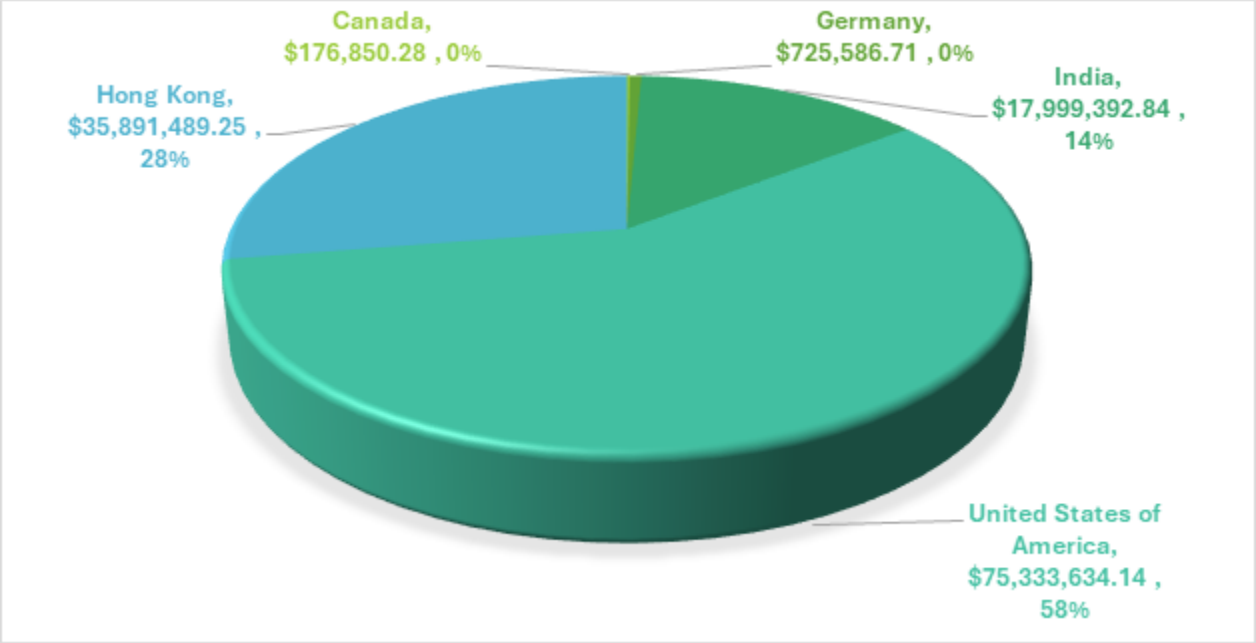
Source: STATIN, 2023

In the year 2018, Turmeric imports were valued at $75,333,634.14 JMD, compared to exports of $258,451,003.40 JMD, indicating that exports significantly exceeded imports by 243%, suggesting strong production and demand in international markets. In 2019, imports were valued at $100,660,875.14 JMD, and exports at $202,894,047.00 JMD. Exports remained higher than imports, though the gap narrowed. The increase in imports indicates growing local demand for turmeric or potential supply shortages. In 2020, imports were valued at $59,516,786.26 JMD, and exports at $266,267,419.68 JMD. Export value peaked, showing an outstanding year for Jamaica's turmeric exports. Imports fell by 40.9% compared to 2019, suggesting a recovery in local production.

In 2021, turmeric imports were valued at $88,871,400.67 JMD, and exports at $209,410,575.55 JMD. Exports dropped from the previous year's peak, though they remained substantial. Imports increased again, signalling persistent demand or potential supply challenges in the local market. In 2022, imports were valued at $119,1043,543.65JMD, and exports at $118,380,152.60JMD. The value of imports continued to rise, while exports decreased. This may indicate growing domestic consumption, possibly outpacing local production. In 2023, imports were valued at $164,529,215.6 JMD, and exports at $79,964,422.27 JMD. Imports remained high, while exports dropped significantly, marking the lowest export value in the period. This could point to reduced production, increased local consumption, or growing international competition.

Turmeric exportation values from various countries to Jamaica by percentage per country, 2018

Figure 5.



Turmeric importation values from various countries to Jamaica by percentage per country, 2023

Figure 6.

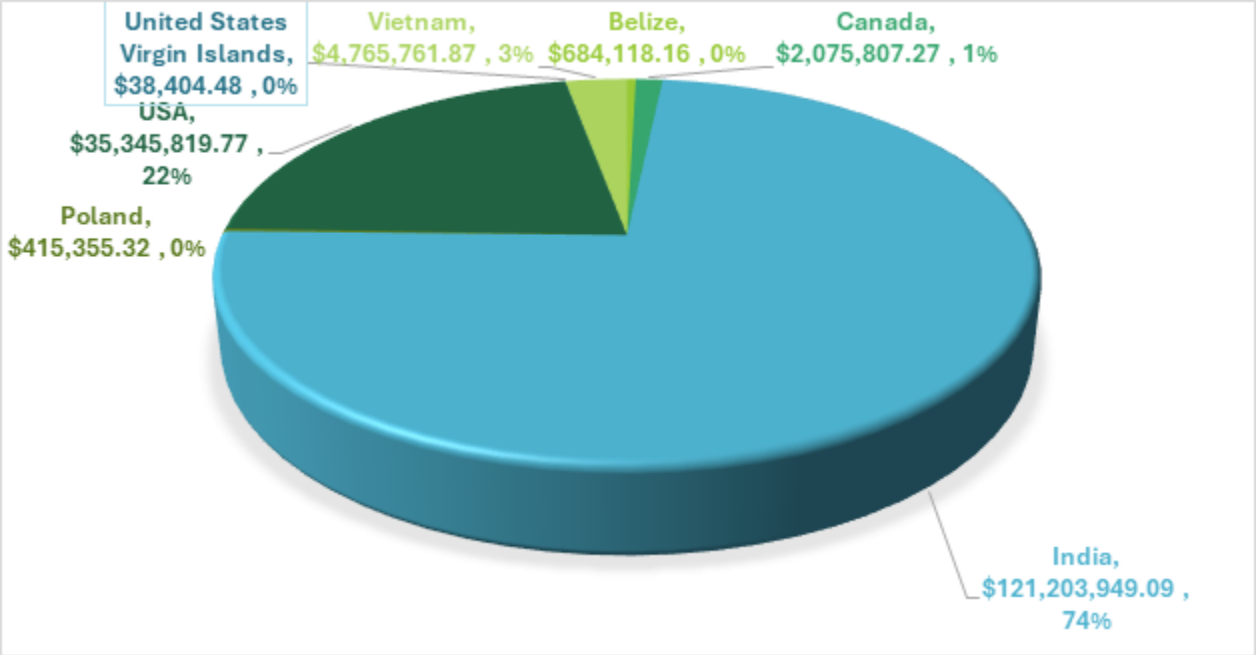


Table 5: List of countries Jamaica Exported Turmeric to in 2017, Preliminary Data

Kg	J$	US$	Country
9,227	1,878,272	14,683	Canada
436	151,628	1,184	Cayman Islands
7	3,888	30	Dominican Republic
954	178,197	1,395	United Kingdom
1,012,802	224,154,031	1,749,522	United States of America

Source: (STATIN, 2017)

Table 6: List of Countries Jamaica Exported Turmeric to in 2023, Preliminary Data

Countries	$Value, JMD
1. Antigua & Barbuda	344,743
2. Canada	779,371
3. United Kingdom	56,056
4. Cayman Island	9,615
5. Saint Lucia	53,801
6. Montserrat	26,152
7. St Maarten (Dutch Part)	131,373
8. United States of America	78,270,507
9. Bermuda	292,803

Source: (STATIN, 2023)

World Import Data

Table 7: List of Top 12 Importers of Turmeric in 2023

Turmeric (curcuma) Imports by country in 2023								
Reporter	Trade Flow	Product Code	Product Description	Year	Partner	Trade Value 1000USD	Quantity	Quantity Unit
United States	Import	91030	Turmeric (curcuma)	2023	World	50,824.75	11,976,300	Kg
European Union	Import	91030	Turmeric (curcuma)	2023	World	32,953.12	15,866,400	Kg
India	Import	91030	Turmeric (curcuma)	2023	World	15,413.12	13,134,500	Kg
Germany	Import	91030	Turmeric (curcuma)	2023	World	15,023.84	5,337,310	Kg
Malaysia	Import	91030	Turmeric (curcuma)	2023	World	12,912.83		
Morocco	Import	91030	Turmeric (curcuma)	2023	World	12,725.24	10,970,500	Kg
China	Import	91030	Turmeric (curcuma)	2023	World	11,359.89	13,978,300	Kg
Netherlands	Import	91030	Turmeric (curcuma)	2023	World	11,199.99	5,498,950	Kg
United Kingdom	Import	91030	Turmeric (curcuma)	2023	World	11,113.88	4,899,310	Kg
United Arab Emirates	Import	91030	Turmeric (curcuma)	2023	World	10,131.25	4,631,780	Kg
Japan	Import	91030	Turmeric (curcuma)	2023	World	9,323.38	4,006,580	Kg
Canada	Import	91030	Turmeric (curcuma)	2023	World	7,798.41	2,294,650	Kg

Source: World Integrated Trade Solution, 2023

In 2023, Top importers of Turmeric (curcuma) are United States ($50,824.75K, 11,976,300 Kg), European Union ($32,953.12K, 15,866,400 Kg), India ($15,413.12K, 13,134,500 Kg), Germany ($15,023.84K , 5,337,310 Kg), Malaysia ($12,912.83K).

Market Price

According to Jamaica Agricultural and Commodities Regulatory Authority (JACRA, 2021), "Current farm gate price of local fresh turmeric ranges from J$30 – J$60 per lb. Commercial production has the potential to bring the cost of production down significantly and increase producer profit margins and offer high returns on investment".

Potential Available Market Potentials

- Farmers' markets and local retail
- Local Processors and Manufacturers
- Hotels and Resorts Industry
- International Markets
- Caribbean Regional Markets
- Jamaica's Domestic Market

Conclusion

In conclusion, the analysis of Jamaica's turmeric market reveals significant fluctuations in both import and export values over the past several years. While import values have generally increased, signalling growing domestic demand and potential supply shortages, exports have shown a more volatile trend, with notable declines in recent years. The sharp rise in imports during 2021 and 2022 reflects both increased local consumption and challenges in local production. Despite the promising export performance in 2018 and 2020, recent figures indicate a potential shift, where domestic consumption may be outpacing local production, or international competition has become more intense.

Moving forward, Jamaica's turmeric market presents opportunities for expansion, particularly through increased production to meet both local and international demand. Targeting new export markets and strengthening production capacity can help stabilize the trade balance and position Jamaica as a key player in the global turmeric industry. The potential markets, including farmers' markets, local processors, hotels, and regional partners, further emphasize the scope for growth within this sector.

Opportunity for Investment in Turmeric Farming

J$6,844,212.5 Startup capital needed to cultivate 5acres of turmeric.

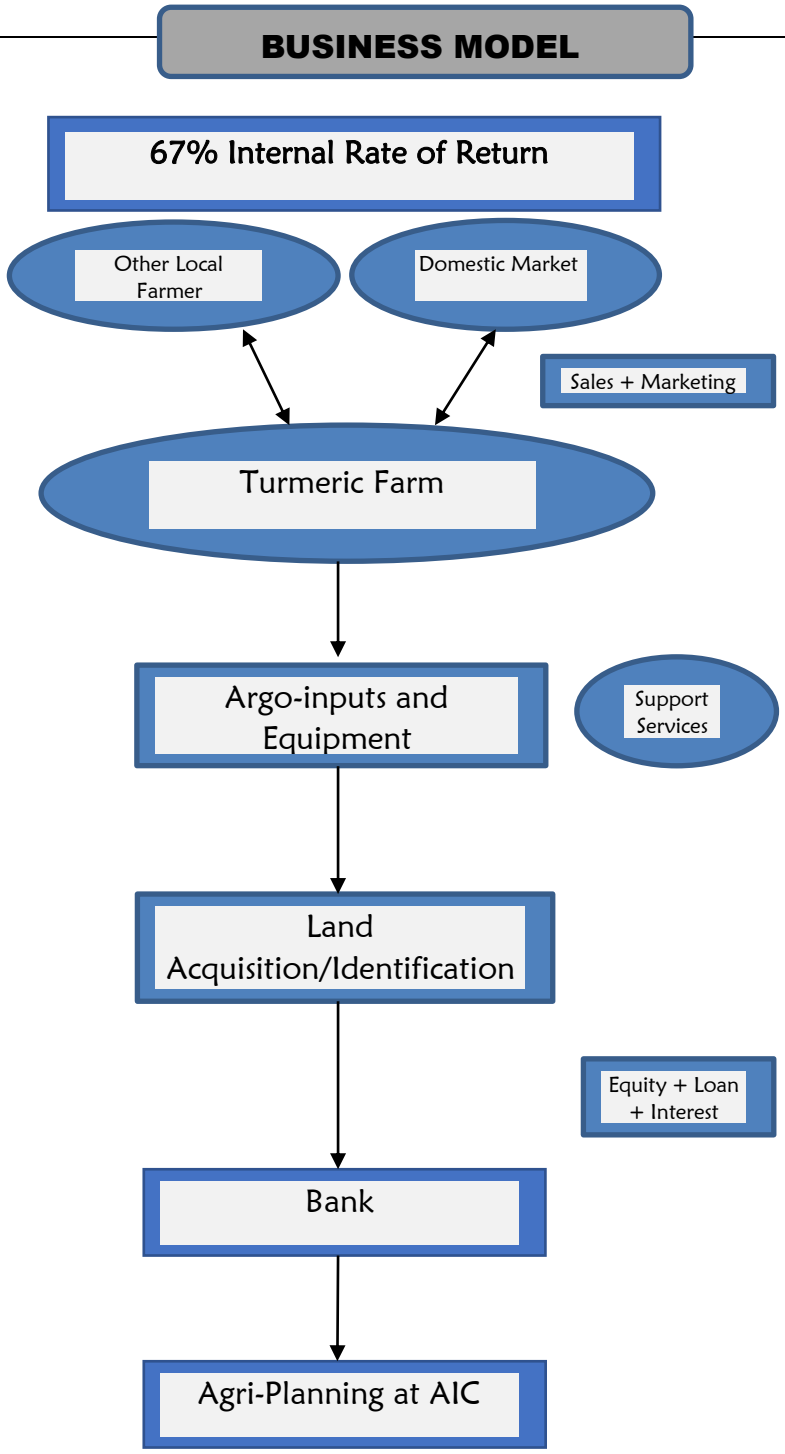
Produce to be sold to domestic buyers and processors for local markets.

This venture requires investment in drip irrigation.

The first sale is expected to occur 9-12 months after planting.

The investment will be financed 100% by owners' equity.

Land will be sought by investor.



FINANCIALS

Investment Cost

The initial investment is estimated at **J$ 6,8M** for 5 acres of turmeric

Net Profit

Average net profit for the 3 years is expected to amount to be **J$7.1 M**

Return on Investment

The estimated financial project shows an **Internal Rate of Return (IRR) of 67% and Net Present Value (NPV) of J$7.9 M** when future cash flows were discounted utilizing a rate of 10% based on the going bank lending rate.

Projected Cash Flow

The cash flow projections for 5 acres of turmeric are positive for the first year and then increase incrementally year after year. The accumulated 3-year net profit is projected to be approximately **J$21.4 M.**

Agricultural Incentives and Support Services

A project of this size 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. Farmers would have to contact the (RADA) agency within their parish for more information.

Support Services

Agro-Investment Corporation (AIC)

The Agro-Investment Corporation (AIC) is an agricultural investment facilitation, advisory and management agency, which functions as the Ministry of Agriculture and Fisheries business facilitation department. The agency is responsible for agricultural investment promotion and facilitation, as well as project and market development. AIC provides investment support to entrepreneurs, 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.

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

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Telephone: 1 876 923 9268
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E-mail: info@agroinvest.gov.jm

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, a number of 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 (RADA) 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.

The Ministry of Health and Wellness (MOHW)

in Jamaica, The Ministry of Health and Wellness plays a crucial role in ensuring food safety and public health by regulating and supporting food establishments across the island. Their mandate includes protecting consumers from foodborne illnesses and promoting safe food handling practices. The Ministry's Environmental Health Unit, under the Public Health Act, carries out inspections of food establishments to ensure they comply with local health and safety standards.

DISCLAIMER: The financial projections presented in this business plan are estimates based on the current market conditions, historical data, and available information at the time of preparation. These projections are provided for informational purposes only and should not be construed as guarantees of future performance. Actual results may vary significantly due to factors such as market fluctuations, changes in regulations, unforeseen operational challenges, and other external variables beyond the control of the business.

Readers are advised to conduct their own due diligence and consult with financial, legal, or investment professionals before making any business decisions based on these projections. The company assumes no liability for any loss or damage resulting from reliance on these estimates.