



Ministry of Agriculture & Fisheries

Agricultural Services Unit

Opportunities in Agriculture

Fresh Water Fish Production in Jamaica



Introduction

Investing in freshwater fish production could provide timely relief for Jamaicans concerned about increasing local food production, reducing the food import bill, improving the nation's food security and generating income. The main breeds of freshwater fish widely eaten in Jamaica are the tilapia and basa fish. Freshwater fish is seen as one of the healthiest sources of proteins, hence the strong local demand. Table one shows that investment in freshwater fish production is lucrative as indicated by a 87.5 % mark up of farm-gate price over variable cost of production for 2022 (table 1).

Table 1. Per cent Mark Up of Farm-gate Price on Cost of Production for the Production of Tilapia

Variety	Cost of Production (\$/kg)	Farm-gate Price (\$/kg)	Per cent (%) mark up
Tilapia	528	990	87.5

NFA (2022)

Indicated by Table 2, Tilapia is an affordable fish compared to other popular fish varieties such as snapper and salmon.

Table 2. Retail Prices of Fish Varieties (J\$/Kg)

Fish	Price (kg)
Tilapia	1,594
Snapper	2,827
Salmon	3,080

MDAF (2022)

Table 3. Imports of Tilapia Fillet into Jamaica: 2015-2021

Year	MT	J\$CIF	Country
2015	38	13,024,492	USA
2016	38	13,024,492	China
2017	23	13,037,646	USA, Mexico & UK
2018	.23	106,572	
2019	-	-	
2020	.33	60,719	USA

STATIN (2021)

The importation of tilapia fillet has decreased significantly from 38 MT in 2015 to .33 MT in 2020, representing a 99.13% decline. The decline could be attributed to the COVID-19 pandemic, which caused countries to reduce exports in light of their own national food security as well as decreased food demand from the hotel sector. This a lucrative opportunity for investing in local freshwater fish production.

Production

There are 140 active fish farmers in Jamaica rearing fish on 1,061.5 hectares of pond across the island. Aquaculture is mainly practised on the south central plains of St. Catherine and Clarendon; with smaller operations in St. Elizabeth, Westmoreland, St. Mary, Portland and Trelawny. These areas have suitable topography, good clay soils and available water supplies. Tilapia production experienced three consecutive years of decline from 1,213 MT in 2018 to 912 MT in 2020 (see Table 4), reversing five years of steady increase from 2012–2017. The decline in harvest stemmed from an unavailability of juvenile fishes for farmers to grow, setback by the COVID-19 pandemic and tropical storm which resulted in fish wash-out, infrastructural and road damage (ESSJ 2020).

Table 4. Annual Tilapia& Basa Production in Jamaica

Year	Metric Tons	% Change
2016	1,021	-
2017	1,334	30.7
2018	1,213	-9%
2019	1,146	-5.5
2020	912	-20.4

ESSJ (2021)

The tilapia stocking density ranges from 10,000 to 20,000 fingerlings per grow-out cycle for a 0.4 hal (1 acre) fish pond. On average, the mature fish weighs approximately 1.48kg each (3.25 Lbs/fish). There are two and a half (2.5) crop cycles per year in Jamaica.

The Basa fish stocking density is about 40,000 fingerlings per grow-out cycle for a 0.4 hectare pond. One and a half (1.5) to 2 cycles per year is possible depending on the size fish that is required by market. Basa fish is harvested at 2.5kg each (10 months grow-out) or 1.5kg each (6 months grow out).

Distribution Channels

The main distribution channels for freshwater fish produced in Jamaica are: wholesalers (50.2%), grocery stores (23.2%), retailers (16.9%) and hotels and (9.7%) (The Jamaica Aquaculture Industry, 2017).

Baby Tilapia in Aquaponics System



Value-added Products

Traditionally, tilapia is consumed unprocessed in various culinary dishes , including fried, steamed, brown stew etc. Recently, companies have started the processing of tilapia into various value added products like fish fillets and fish nuggets. Employing appropriate processing technologies to develop value-added products from tilapia is important to increase economic returns from high-end consumer markets. Here are few value added products for tilapia.

- Tilapia Fillet
- Tilapia Nuggets
- Tilapia Tocino
- Tilapia Longganisa

Table 5. Establishment cost for Fish Pond: 5.4 acre Water Pond

Item	Cost
Pond Renovations	1,080,000
Pond Drain Assemble (5 at \$50,000)	250,000
Pump (4" Honda Trash)	250,000
Seine (250 ft with Harvesting bag)	250,000
Other Costs (Dip net, scale & buckets)	40,000
Total	1,870,000

National Fisheries Authority (2022)



Why Invest in Fresh Water Fish Production?

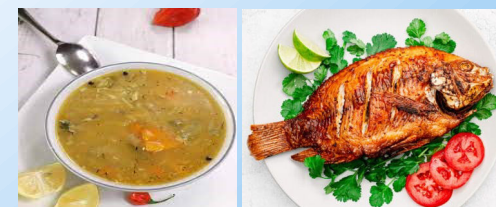
- High rate of return on investment, and moderate level of risks
- GOJ incentive programme e.g. duty concessions on farm related equipment and farm vehicles
- GOJ assistance with access to farm lands
- The availability of good quality water
- High demand for tilapia and not enough suppliers

Health Benefits

- Excellent source of omega-3 fatty acid
- Assists in reducing blood clotting
- Lowers cholesterol
- Improves bone health
- Decreases risk of strokes and heart failure

Popular Fish Dishes

- Fry Fish
- Fish Tea (Fish Soup)
- Escovitch Fish
- Brown Stew Fish



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Opportunities in Agriculture

Ginger Production in Jamaica



Introduction

Ginger (*Zingiber officinale*) is a herbaceous perennial crop cultivated in many tropical countries of the world, including China, India, Nigeria, Australia, Jamaica, and Haiti. Ginger has 47 genera and more than 1,000 species. Ginger is a versatile crop, utilized across the world as a spice, flavouring ingredient and herbal medicine. It is also processed and used as powders, oil, and oleoresin. Jamaican ginger is highly regarded for its high quality, unique flavour and oil content. The crop is cultivated in locations with steep topography, cold temperatures, and clay-rich soils. The major ginger-growing areas in Jamaica are Clarendon, Manchester, Trelawny, St. Ann, and St. Thomas.

Table 1. Per cent Mark up of Farm-Gate Price on Cost of Production for Ginger 2021

	Cost of Production (\$/kg)	Farm-gate Price (\$/kg)	Per cent (%) mark up
Ginger	147	419.50	185.37

AMID (2021)

In 2021, the cost of production for ginger was JM \$149.33 per kg and the farm-gate price was JM \$419.50, representing an approximate mark up of 181% on farm-gate price over variable cost of production for 2021.

Production

Table 2. Annual Ginger Production (MT), by Quarter 2017-2021

Year	Jan to Mar	Apr to Jun	Jul to Sep	Oct to Dec	Total production
2017	352	71	4	173	600
2018	367	90	20	168	645
2019	354	108	25	225	712
2020	413	159	38	260	869
2021	414	213	53	299	979

AMID (2021)

Ginger production increased by 69% , from 600 metric tonne in 2017 to 979 MT in 2021. The largest increase in production was observed in 2020, where total production was 869 MT moving up from 712 MT in 2019 (22% increase). Although ginger is not a seasonal crop, the quarterly production from 2017 to 2021 shows that production is usually highest in the first quarter (January to March) of each year.



Jamaican Blue

Jamaican Yellow



Production Cnt'd

The varieties grown in Jamaica include the Jamaica Yellow, Jamaica Blue, Chinese and Hawaiian. The local ginger varieties are in demand by high-value, agro-processing markets because of its flavour profile. Agro-processors are able to process ginger into powder, seasonings, sauces, beverages, teas and baked items.

Area Reaped and Yield per Hectare

The total area reaped for ginger islandwide increased by approximately 52.8% to reach 298 hectares in 2021, up from 195 hectares in 2017. The average yield per hectare increased by 4.2%, moving from 3.07MT/ha in 2017 to 3.2MT/ha in 2021.

Year	Production (MT)	Area Reaped (ha)	Yield MT/ha)
2017	600	195	3.07
2018	645	208	3.1
2019	712	233	3.05
2020	869	268	3.24
2021	979	298	3.2

AMID (2021)

Global Market

The main markets for Jamaica's exports of ginger are the United States of America, Barbados and Trinidad and Tobago (STATIN, 2021). These countries accounted for 47 MT (39%), 15.3 MT (13%) and 8 MT (7%), respectively, of total ginger export in 2021.

Tables 4 and 5 below show that crushed and fresh ginger exports have both been experiencing growth in the export market. However, crushed ginger is exported in larger volumes and is the higher foreign exchange earner of the two (table 5). Therefore, ginger in its crushed state is highly demanded and is likely to be utilized for agro-processing in foreign markets.

Year	Metric Tonne (MT)	J\$CIF
2017	15.26	5,418,089
2018	8.03	5,287,169
2019	21.01	18,775,364
2020	12.13	9,820,335
2021	22.68	11,147,664

(STATIN, 2022)

**Ginger, neither crushed nor ground*

Year	Metric Tonne (MT)	J\$CIF
2017	68.81	65,928,581
2018	73.54	65,455,668
2019	54.92	76,799,728
2020	86.33	161,852,183
2021	99.28	173,969,247

(STATIN, 2022)

**Ginger, crushed or ground*

Why Invest in Ginger Production?

- The local ginger varieties are preferred by agro-processing markets
- Government of Jamaica (GOJ) initiative in developing pathogen free plant material to increase production and export.
- Globally, Jamaican ginger is known for its high quality, uniqueness of flavours and oil content
- Ginger can be intercropped in coconut, coffee and orange orchards
- GOJ incentive programme e.g. duty concessions on farm related equipment and farm vehicles
- GOJ assistance with access to farm lands

Health Benefits

- Supports cardiovascular health
- Lowers cancer risk
- Relieves nausea
- Reduces gas and improves digestion
- Reduces inflammation
- Improves skin health

Products

- Teas
- Baked Goods
- Soft Drinks
- Sauces and Seasonings

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Opportunities in Agriculture

Rabbit Meat Production in Jamaica



Introduction

There are 48 distinct rabbit breeds, of which, according to the American Rabbit Breeders Association (ARBA) are primarily grown for their fur, laboratory research, as pets, or for consumption. The rabbit meat industry in Jamaica is dominated by small-scale and backyard farmers. These farmers primarily provide small amounts of rabbit meat to residents of local neighborhoods and, to a lesser extent, to commercial enterprises.

Rabbit meat serves a niche market in Jamaica, but there is potential for its development especially with the continuous increase in the prices of meats. However, the primary obstacle to the production of rabbit meat in Jamaica is the perception of rabbits as pets or rodents rather than as food. Therefore, societal and cultural beliefs could prevent widespread consumption of rabbit meat. Rabbit meat production in Jamaica will require intensive marketing to develop a viable segment of the local meat industry. Marketing should be targeted at altering cultural views to increase consumption of rabbit meat in Jamaica.

In 2017, according to the market research firm, IndexBox, the global rabbit meat market was valued at US\$6.4 billion. The country with the largest volume of rabbit meat consumption was China (925K tonnes), followed by Korea (154K tonnes) and Egypt (57K tonnes).

Production

The main breeds of rabbit, in the domestic production of meat, are the Flemish Giant, Checkered Giant and the New Zealand White and Black Rabbits (Ministry of Agriculture & Fisheries, 2014). The best breed for meat production is the New Zealand White, since it offers the optimum balance in terms of flesh-to-bone ratio when evaluated to the other breeds. Furthermore, their litters are generally large and have a fast grow-out time, making them economically efficient. Increasing rabbit meat production is relatively easy compared to other meats such as pork or chicken, as it is one of those animals that can multiply rapidly.

Dressed Weight

Rabbits will yield a higher dressing percentage if their live weight and body condition score are average or slightly above average. The dressed weight of a rabbit vary on the quality of the animal at slaughter; its breed and age; the amount of fat on its body; and the number of internal organs left with the carcass.

Economic Factors	
Gestation Period	31 days
Average litter Size	6 kittens
Number of litter per Doe per year	4
Weaning age	42 days
Average age of Maturity	5 months
Average dressed weight per rabbit	3.75 lbs
Dressed weight percentage of rabbits	45-55%
Average life span of rabbits	2-3 years
Buck: Doe Ratio	1:10
Mortality rate	5%

Feed

Rabbits are raised on one of two nutrition plans:

- (1) hay and grain diets
- (2) commercial pellet rations.

In addition to commercial pellets, grass and forages such as Napier grass, King grass, Spanish needle, Mulberry plant and *Synedrella nodiflora* (fatten borrow) are available in abundance island-wide. Pellets satisfies all of a rabbit's nutritional requirements and as of June 2022 are sold in Jamaica at a cost of \$2,496/25kg by main rabbit feed distributors. Bucks and Does without litters need 6 to 8 ounces of pellets each day, but pregnant Does and those with litters should be fed as much as they can consume in a day.

Rabbits also need fresh, clean water every day. However, a Doe and her litter will need one (1) gallon of water per day in warm weather. An automated watering system is preferable because it provides a constant water supply, while minimizing waste and the chance of contamination.

Nutrition

Rabbit meat is lower in calories, lower in fat, and higher in protein than pork. It is nutrient dense and entirely white meat, therefore, it may be consumed on a variety of diets. It is a great substitute for chicken or pork in any dish.

Meat Type	Cost of Production (\$/kg)	Farm-gate Price (\$/kg)	Per cent (%) mark up
Rabbit Meat	1,497.18	1,980	32.25
MOAF (2022)			

Development of the Rabbit Industry

The Jamaica 4-H Club is actively pushing rabbit meat as "the other white meat" and as a healthy alternative for people trying to improve their diets. This is an effort to convince Jamaicans to eat more of it. The 4-H Club has long played an integral role in the development of the rabbit industry. They take part in trade events and provide consumers samples of rabbit meat prepared in various ways. This is in an effort to sensitize people about the existence and use of rabbit meat, over and above its known trademark of making good pets.

The organisation has also created a Rabbit Farmers Association with the aim of educating and sensitizing farmers on the requirements of caring for rabbits and dealing with rabbit meat commercially.

Health Benefits

- Excellent sources of iron
- Excellent sources of the B Vitamins
- Healthy protein source
- Contributes to heart health

Establishment Cost Unit	Estimate (J\$)
Stock (100 Does & 10 Bucks)	550,000
Rabbit House (60 ft x 20 ft)	1,000,000
Metal Cages (160)	1,280,000
Water Tank	72,025
Nest Boxes (80)	16,000
Total	2,918,025

Why Invest in Rabbit Production?

- GOJ incentive programme, e.g. duty concessions on farm related equipment
- GOJ assistance with access to farm lands
- It is adaptable to Jamaica's ecology
- Good substitute for pork and chicken
- Production multiplies quickly

By-products

Rabbit manure

Charms

Rabbit pelt (skin products)

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Goat Milk Production in Jamaica



Introduction

Traditionally, goat rearing has supplemented the domestic nutritional needs by being a readily available source of fresh milk for families in rural communities. Goat milk has also been touted as a superior option to other milks, and current trends indicate a strong demand and attractive pricing for goat milk and its products. Expansion of the dairy goat sector will support the policy objective of import substitution while providing additional employment and boosting food security (JDDB, 2022). Goats are reared in all parishes of Jamaica; however, they tend to thrive better in the southern parishes where the plains experience variable (low) rainfall and dry vegetation. Currently there are 380,540 heads of goats islandwide, comprising the main goat breeds; Anglo-Nubian, Saanen, Toggenberg, Alpine, Boer and Native (RADA, 2019). The main challenges in Jamaica are praedial larceny and dog predation; however, the main threat is the lack of a significant production base coupled with the high and increasing initial capital outlay required.

Composition of Goat Breeds in Jamaica as at April-2019			
Breeds	Description	Count	
Anglo-Nubian	Full/Pure bred	38,054	
Boer	Full/Pure bred	114,162	
Graded	Mix of full & Pure	171,243	
Native	Local/Creole/ Original	19,027	
Other	Mix of Alpine, Toggenberg & Saanen	38,054	
Total population		380,540	
Comparative Water Requirements and Dry Matter Conversion Rate			
	Unit	Goat	Cow
Daily water requirement per animal	% Body weight	3 to 4	8 to 10
	Litre	2.6	27 to 47
Dry Matter to Milk	%	6	6

Caribbean Agricultural Research and Development Institute (CARDI)

Sam Motta Demonstration and Training Centre, Knockpatrick, Manchester operated by CARDI, provides on-site training for selected farmers in the care and management of dairy goats, the preservation and packaging of fresh goat's milk and the processing of goat milk into cheese at their milking facility. Other areas of research include forage-based feeding systems, high-yielding grass/legumes, improved breed types and sustainable production systems.

Small Ruminants Association of Jamaica (SRAJ)

The SRAJ meets at the Bodles Research Station with the main aim of sustainable expansion of the sheep and goats sectors across the island. The SRAJ promotes rapid herd expansion using the Embryo Transplant technology done at the Hounslow Demonstration Centre, St. Elizabeth; and Bodles, Old Harbour, St. Catherine.

Preparation for Dairy Goats

- Adequate shelter, proper ventilation and sufficient spacing for separating kids and breeding does.
- Feed supplement (concentrate) to boost kid and milk production while maintaining an accepted Body Condition Score (BCS) of mothers.
- These ruminants should be vaccinated, inspected regularly and treated for any disease or pest, where necessary.
- Semi-intensive– Graze in pasture and held housing (secured)

Milking

- Milk stands - Single, Herring Bone or Rotary (hand/equipment).
- Utensils are sterilized and the animal is prepped before extraction and a sample is first taken and examined to ensure quality standards are met.
- The milk should be cooled rapidly after extraction or pasteurized (heating milk to 165 degrees Fahrenheit for 15 seconds) then cooling immediately.
- Milking animals should have a suitable Body Condition Scoring (BCS) to ensure sufficient milk yield and rapid kid development.
- Milking does or mothers should commence two weeks after kidding.

Goat Feeds

Forages - King grass, African Star, Napier, Guinea Grass, Breadnut, Mulberry, and other wild shrubs and grass.

Concentrates - Goat ration, wheat medley, rice chips and cracked corn and other inputs have been supplied by two main distributors .

Other Feed Source - Orange pulp from the juice factories

Silage - A type of fodder made from green foliage crops which has been preserved by fermentation to the point of acidification. This is done on a small scale at the Bodles Research Station.

Markets - USA, Reunion Islands, Canada, Guadeloupe and Martinique

Chinese FDA - Approved new regulations for infant formula to be developed from goat's milk. Distributed in 500 g sachets.

Benefits of Goat Milk Consumption

- Higher nutritional content than cow's milk
- Source of minerals for daily consumption by humans
- Anti-inflammatory properties that aid in gut health
- Promotes skin health

General

- Gestation period—154 days
- Lactation period - 284 days with peak performance at 4 to 6 weeks after kidding.
- Breed once per year and twice in 18 months
- Goats reach their optimum performance at 5 to 7 years
- Average milk yield per goat is 90 liters per year
- Milking mature does can range from 9 to 10 months
- Curtail milking 2—3 months before next kidding season

Products (Direct and value added) and Costs

Direct - Milk (fresh), meat (rams culled ewes mothers), animals as breeding stock and manure.

Value added - milk (whole/evaporated milk/powder), cheese, butter, yogurt, ice cream and skin care/cosmetics

Cost of live dairy goats— Average cost of a mature ram ranges between \$90,000 to \$120,000 and doe from \$60,000 to \$80,000.

Graded goat (mix of Boer and Nubian) are more affordable.

Initial investment - A typical housing unit for 100 heads of goats is expected to cost \$5,757,405,95 for chevron production (AIC, 2019). It is expected to cost a similar amount for a dairy goat house; but more partitions are needed to separate kids from mothers to promote increased milk production .

Yield and Storage

- After kidding, lactating mothers are milked once every 12 or twice daily (2 to 3 litres in total) until about 2 months before the next litter.
- The milk is to be kept refrigerated at 35 to 38 degrees Fahrenheit and will typically last 5-10 days if pasteurized. Frozen milk can be stored for 3 to 6 months but it tends to lose its smooth texture.

Opportunities - Why Dairy Goat Enterprise?

- As Gross Domestic Product per capita increases, the demand for superior protein such as goat's milk also increases at premium prices.
- The amount of feed required for a cow can be used to feed 10 goats which collectively will yield twice as much milk per day.
- Start of mobile milking of graded goats on meat-producing farms
- Thriving domestic market with low level of local supplies.
- An existing Small Ruminant Association of Jamaica (SRAJ)
- Good genetic material with no known diseases



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Opportunities in Agriculture

Sweet Potato Production in Jamaica



Introduction

Sweet potato (*Ipomoea batatas*) is a warm-weather vegetable native to Central and South America, that belongs to the convulvaceae family. The sweet potato, which is an excellent source of carbohydrate is a major staple in Jamaica. The tuber is highly demanded in fresh food markets, export markets and the agro processing industry (AMID, 2018). After yams and cassava, it is the third most extensively produced root tuber in Jamaica. In 2021, approximately 57,485 metric tonnes (MT) of sweet potato was produced, of which 1,463.42 MT were exported and 56,022 MT consumed locally. Currently, 97.8% of sweet potato production is consumed locally. Sweet potato is also one of seven world foods with an annual production of more than 100 million metric tonnes per year (AMID, 2018), hence, sweet potato is essential to combat world hunger as well as a source of income for the rural population. The ideal conditions to support maximum productivity of sweet potatoes are sandy soils and warm climatic conditions with available moisture and nutrients. Soil testing must be simplified and tailored to suit the crop requirement, due to the soil's natural variability in structure and nutrients.

Table 1. Percentage Mark Up of Farm-gate Price on Cost of Production for Sweet Potato 2021

Variety	Cost of Production (\$/kg)	Farm-gate Price (\$/kg)	Per cent (%) mark up
Sweet Potato	51	170.26	234
AMID (2021)			

Production

Sweet potato production increased by 19.74% from 2016 to 2021, moving from 48,006 MT in 2016 to 57,485 MT in 2021. Although sweet potato is not a seasonal crop, it is observed over a six year period (2016-2021) that the fourth quarter of each year is the most productive quarter.

Table 2. Annual Total Sweet Potato Production (MT) by Quarter: 2016 -2021

Year	January to Mar	Apr to Jun	Jul to Sept	Oct to Dec	Total production
2016	11,056	13,278	12,028	11,644	48,006
2017	10,474	10,486	10,309	10,727	41,996
2018	11,073	12,460	10,860	11,017	45,410
2019	10,847	11,094	9,785	11,462	43,188
2020	12,506	12,351	12,168	12,948	49,972
2021	13,002	14,945	14,307	15,231	57,485

AMID (2021)

Table 3. Annual Sweet Potato Farmgate Prices 2016 - 2021

Year	Farm-gate Price (\$/kg)
2016	119.71
2017	146.59
2018	138.90
2019	176.74
2020	208.43
2021	170.26

AMID (2021)

Supply Availability

Sweet Potato is available all year round and cultivated islandwide, and the parishes of Manchester, St. Elizabeth, Clarendon and St. Ann are the major producers.

Sweet Potato Varieties

The Uplifter, Quarter Million, Eustace, Big Red, Clarendon, Blue Bud and Dor are the most popular varieties in Jamaica. The Beauregard variety was imported in Jamaica to boost production mainly for the export market.

Area Reaped and Yield per Hectare

The total area reaped for sweet potato islandwide in 2021 increased by approximately 20% to 3,308 hectares moving from 2,752 in 2016. Also, in 2021, the average yield per hectare decreased slightly to 17.37 MT, in 2021 from 17.44 MT in 2016.

Table 4. Percentage Mark Up of Farm-gate Price on Cost of Production for Sweet Potato 2021

Variety	Cost of Production (\$/kg)	Farm-gate Price (\$/kg)	Per cent (%) mark up
Sweet Potato	51	170.26	234

AMID (2021)

Export Market

In 2020, Jamaica exported 1,401.9 MT of sweet potatoes (fresh, artificially dried, naturally dried, chilled, frozen) valued at JM \$621,936,356. In the years 2016 to 2020, sweet potato export increased by 11.6% from 1,258.45 MT in 2016 to 1,401.9 MT in 2020. The United Kingdom and Canada are Jamaica's main export destinations, accounting for 85.26% of the export quantity. There are 12 exporters and 3 agro-processors of sweet potatoes islandwide, of which all processors have expressed a desire to produce sweet potato wedges and pudding mix from either fresh potato or potato flour.

Table 5. Annual Total Quantity (MT) Exported to Main Destination: 2016 - 2020

Year	United Kingdom	Canada	Cayman Islands	Other countries	Total
2016	643	481	104	297	1,525
2017	572	532	140	42	1,287
2018	599	631	118	37	1,385
2019	615	587	155	1.4	1,358.4
2020	544	660	194	3.9	1,401.9

(STATIN, 2020)

**Fresh, artificially dried, naturally dried, chilled, frozen sweet potato*



Why Invest in Sweet Potato Production

- High rate of return on investment, and moderate level of risks
- Increasing demand
- GOJ incentive programme, e.g. duty concessions on farm related equipment and farm vehicles
- GOJ assistance with access to farm lands
- High demand in both local and export market
- It is adaptable to Jamaica's ecology
- Great foreign exchange earner
- Agro processing opportunities
- Easy access to plant material
- Versatile for culinary practices

Health Benefits

- Rated the most nutritious of all tubers.
- Rich source of antioxidants for protection against heart disease, stroke, cancer and delaying the progression of Alzheimer's disease
- Very good source of vitamin B6, vitamin C and manganese
- Good source of carbohydrate

By-products

- Baked Goods (pudding, pies, cakes etc.)
- Gluten Free Flour
- Pet Food
- Beverages



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Opportunities in Agriculture

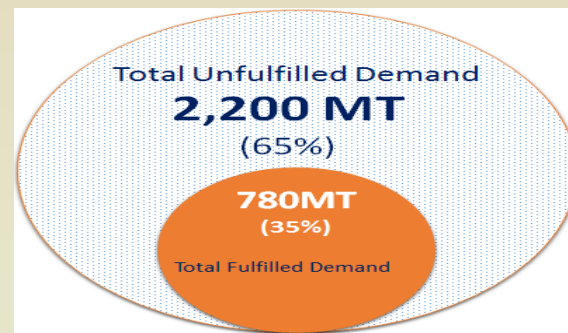
Tumeric Production in Jamaica



Introduction

Turmeric, also called *Curcuma longa*, is bright yellow-orange in appearance when cut/crushed. Turmeric belongs to the rhizomatous herbaceous perennial plant family of ginger and is classified as a rhizome (underground stem). It is believed to be native to Southeast Asia. Its usage spans medicinal and culinary applications and is the primary source of curcumin. Turmeric is touted to be a “superfood”, being able to positively affect health based on its properties. Its applications as well as culinary appeal as a spice have made Jamaican turmeric a feasible prospect for commercial investment, to cater to local and international markets.

The Jamaican government is seeking to develop turmeric, as a prime export crop, as the island has suitable conditions for its successful cultivation. Jamaican grown turmeric contains strong characteristics in flavour, colour and curcumin content. Analysis of the local consumption has revealed that almost 90% of the dried turmeric used is imported. In partnership with the Food and Agriculture Organization (FAO) and Jamaica Agricultural Commodities Regulatory Authority (JACRA), the Ministry of Agriculture and Fisheries started the initiative to increase commercial production



Cultivating Turmeric

Currently, local turmeric production is mostly saturated in the parishes of Hanover, Westmoreland, St. Elizabeth, St. James, Clarendon, St. Catherine, St. Mary, and St. Thomas. Turmeric will require well-drained soil and 1,000 to 2,000mm of rain annually or supplementary irrigation. It also thrives best on loamy or alluvial fertile soils and cannot stand waterlogging. Heavy shade will reduce the yield but light shade is beneficial. Ideally, for best yield cultivation should be done in areas where the temperature ranges from 20 °C to 30 °C. and 5cm to 7 cm in soil depth.. It is recommended to commence planting in September or October and it is expected to grow to maturity within 7 months, Harvest ready turmeric is indicated by the drying of the plant and stem. The rhizome bunches should be carefully dug out by hand picking or manually dug with a spade. The leaves should then be cut before lifting the rhizomes.

Jamaican Turmeric Drying



Global Market

Global export value of turmeric in 2020 was US\$124.38 million (AIC,2019). The United States represents a potential share of 100% of Jamaica's exports of turmeric. Investors would face competition from India, the biggest exporter of turmeric to the United States representing US\$22 million (ITC 2019), According to AIC (2019) Jamaica ranks number 17 with the greatest potential to supply turmeric in the world out of 23 countries. Also, Jamaican turmeric, being very potent, with a curcumin level of 4%, is valued at the higher end of the turmeric trade and is highly sought after as a culinary ingredient and for curry manufacturing (MICAF, 2012).

Table 1 reveals the estimated export price for turmeric increased by 38% to \$287.93/Kg in 2021 from \$207.97/ Kg in 2016. The estimated export value (J\$CIF) of Jamaican turmeric for 2016-2021 is \$1.56 billion, with the yearly breakdown as follows.

Table 1: Export Quantity (Kg) and Value (J\$) of Turmeric (kg) from Jamaica: 2016-2021

Year	Kg	J\$CIF	\$J/Kg
2016	664,113.33	138,115,483	207.97
2017	1,023,425.51	226,366,015	221.18
2018	1,942,902.10	512,925,531	264.00
2019	718,986.79	202,897,404.	282.20
2020	914,572.57	266,267,419	291.14
2021	721,921.56	207,863,107	287.93

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Global Market cont'd

- Value added products reached US \$53.5 million in 2019.
- Its pharmaceutical/therapeutic industry is valued at US \$28. 3 million in 2019
- The cosmetics application segment accounted for an estimated US \$2.2 million in 2019
- Food application segment accounted for US \$21.4 million in 2019

.Local Market

In addition to local turmeric production, 1.6 billion kg (valuing J\$CIF 500 million) was imported during 2016-2021. This represents an opportunity for import substitution. There is a sizeable need for facilities which are able to dry and convert the turmeric into a powdered form, allowing easier use. The table below represents the quantity and value of imports.

Table 2: Import Quantity (Kg) and Value (J\$) of Turmeric (kg) into Jamaica: 2016-2021

Year	MT	J\$CIF '000'
2016	307	81,482
2017	358	96,098
2018	290	75,333
2019	385	100,660
2020	243	59,516
2021	275	89,606

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Why Invest in Turmeric Production?

- GOJ initiative in developing turmeric production for it to become a leading export crop.
- GOJ incentive programme e.g. duty concessions on farm related equipment and farm vehicles
- GOJ assistance with access to farm lands
- Fees have been waived for the export of turmeric

Assumed Health Benefits

- Treatment for rheumatoid arthritis,
- Treatment for urinary tract infections
- Liver ailments treatment
- Digestive disorders treatment
- Prevention of Alzheimer's
- Cancer preventative properties

Products

- Cosmetics
- Curcumin powder
- Beverages (teas/golden milk/etc.)
- Culinary spices



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Opportunities in Agriculture

Yellow Yam Production in Jamaica



Introduction

Yellow yam (*Dioscorea Cayenensis*), also known as Guinea yam is the general name given to plant species of the genus *Dioscorea*. Yellow yam is one of the 18 varieties of yams and there are two types of yellow yam; the Round Leaf and the Black Whisp, differentiated by leaf formation and other noticeable features. Yellow yam is categorized as an annual plant that matures in 9 to 12 months and requires fertile soils that are deep and well drained. If soils for cultivation are too compact, there is a possibility the yam will develop tuber malformation. Planting is typically done between the months of April and June, just before the rainy season, while harvesting is usually at its peak from November to January.

Yellow yam has long been promoted as an energy giving food and was substantiated scientifically. It was revealed to be a high energy food being nutrient dense in carbohydrate, potassium, protein, vitamins B1 (thiamin), B2 (riboflavin), B3 (niacin), B6 (pyridoxine), folic acid, and pantothenic acid.

Production

Yellow Yam annual production increased throughout the period 2016–2021, with the exception of 2017 where there was a 5% decrease in annual production. However, in 2019 yellow yam received a major 15.03% increase in production (see table 4). Yellow yam is the most produced yam variety in Jamaica, averaging 75% of total yam production annually from 2015-2021 (MOAF). It is cultivated islandwide, however, Trelawny and St. Ann are the major producers. Trelawny is Jamaica's third largest supplier of domestic agricultural production with 9,956 registered farmers. Eighty per cent (80%) of agricultural production in Trelawny consists of yams, sold both domestically and internationally in large volumes, fuelling Jamaica's global export dominance with an ownership of 22.2% of the export market (FAOSTAT, 2021).

Consumption

The local consumption of yam from 2015–2021 has continuously been significantly greater than the exportation of the crop. Since 2017 there has been a continuous increase in both the exportation of yam and in its production (See Table 1).

Table 1: Estimate Annual Yam Local Consumption Percentage and Export Percentage of Production (Metric Tonne/MT)

	Export (MT)	Marketable Yield (MT)	Local Consumption (MT)	Exp %	LC%
2015	9,037	68,051	59,014	13.28	86.72
2016	11,583	78,245	66,662	14.8	85.2
2017	13,391	73,957	60,566	18.11	81.89
2018	10,641	75,229	64,588	14.14	85.86
2019	13,022	86,536	73,514	15.05	84.95
2020	11,506	88,774	77,268	12.96	87.04
2021	13,045	101,242	88,197	13	87.11

AMID (2020)

*Post harvest loss accounted for

Table 2. Per cent mark up of Farm-gate Price on Cost of Production for the Production of Yellow Yam 2021

Variety	Cost of Production (\$/kg)	Farm-gate Price (\$/kg)	Per cent (%) Mark up
Yellow Yam	72	319.77	344.13

AMID (2021)



Table 3: Total Estimate Annual Fresh & Naturally Dried Yam Export 2015 - 2021

Year	Metric Tonne (MT)	JM\$CIF
2015	9,037	2,240,311,101
2016	11,583	3,041,135,285
2017	13,391	3,503,234,190
2018	10,641	3,477,240,699
2019	13,022	3,765,111,312
2020	11,505	4,997,865,305
2021	13,045	5,503,394,572

STATIN (2022)

Table 4: All-Island Estimates of Yellow Yam Productions 2015 – 2021 (Unit: Metric Tonne)

Year	Production	% Change
2015	97,216	-
2016	111,778	14.98
2017	105,653	- 5.48
2018	107,470	1.72
2019	123,623	15.03
2020	126,820	2.59
2021	144,631	14

MOA (2021)

Table 5. Annual value (\$JMD '000) of Fresh & Naturally Dried Yam Exported by Destination: 2015 - 2021.

Year	United Kingdom	Canada	Cayman Islands	United States of America
2015	150,798	329,308	47,033	1,692,805
2016	165,676	382,609	50,204	2,433,264
2017	212,822	426,391	58,586	2,801,222
2018	168,498	400,158	65,951	2,840,151
2019	201,428	442,063	83,305	3,026,073
2020	240,540	702,254	93,560	3,946,541
2021	192,614	755,649	159,899	4,389,659

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Export Market

Jamaica exported approximately 23,000 MT of yam in 2018, valued at JM \$5.3 billion. The highest exportation seen over the seven year period from 2015 to 2021. Twenty-five (25) exporters of yam were identified islandwide; the United States of America and Canada are Jamaica's main export destinations, accounting for 90% of the export market share.

The relationship between farmers and agro-processors are encouraged by the government and they are to benefit from increased support under the Rural Agricultural Development Authority's (RADA) Agro-Processing Incubator Project. This project aims at supporting the development of small-scale rural enterprises. This will lay the foundation for value addition development and exportation of yam by-products such as yam flour, yam fries, etc.

External demand for yellow yam and value-added items continues to increase, despite the ongoing COVID-19 pandemic. Yellow yam has emerged and continues to be Jamaica's leading domestic export crop (STATIN 2021).

Global Trade

According to the Food and Agriculture Organization, at a value of US \$37.3 million, Jamaica was the top earner of yams globally in 2020, followed by Ghana at US \$32.4 million and the United States at US \$27 million. The variety of yams being exported from Jamaica in large quantities are yellow, negro and sweet yams.

Why Invest in Yellow Yam Production

- GOJ incentive programme, e.g. duty concessions on farm related equipment and farm vehicles
- GOJ assistance with access to farm lands
- High demand in both local and export market
- Great foreign exchange earner
- Yellow yam contributes to over 70% of total yam exports between 2015 and 2020.

Health Benefits

The following are some of the benefits associated with the consumption of yellow yam:

- Good for heart rate control and blood pressure
- Reduces the risk of colon cancer
- Boosts immune system
- Associated with neuron growth and enhanced brain functions
- Facilitates hair growth

Products of Yellow Yam

- Yellow Yam Fries
- Yellow Yam Salad
- Yam Flour
- Yam Wine
- Yam Cup Cake
- Yellow Yam Sweet Bread



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