

Regional Initiative for Caribbean Water Scarcity, Climate Uncertainty, and the Fight Against Poverty in SIDS: The Critical Role of Irrigation in the Caribbean Region – Phase 1 Hand in Hand Investment Forum

14-17 October 2025 - Rome, Italy



**Ministry of Agriculture
Fisheries & Mining**

Jamaica



**Ministry of Agriculture,
Food & Nutritional
Security**

Barbados



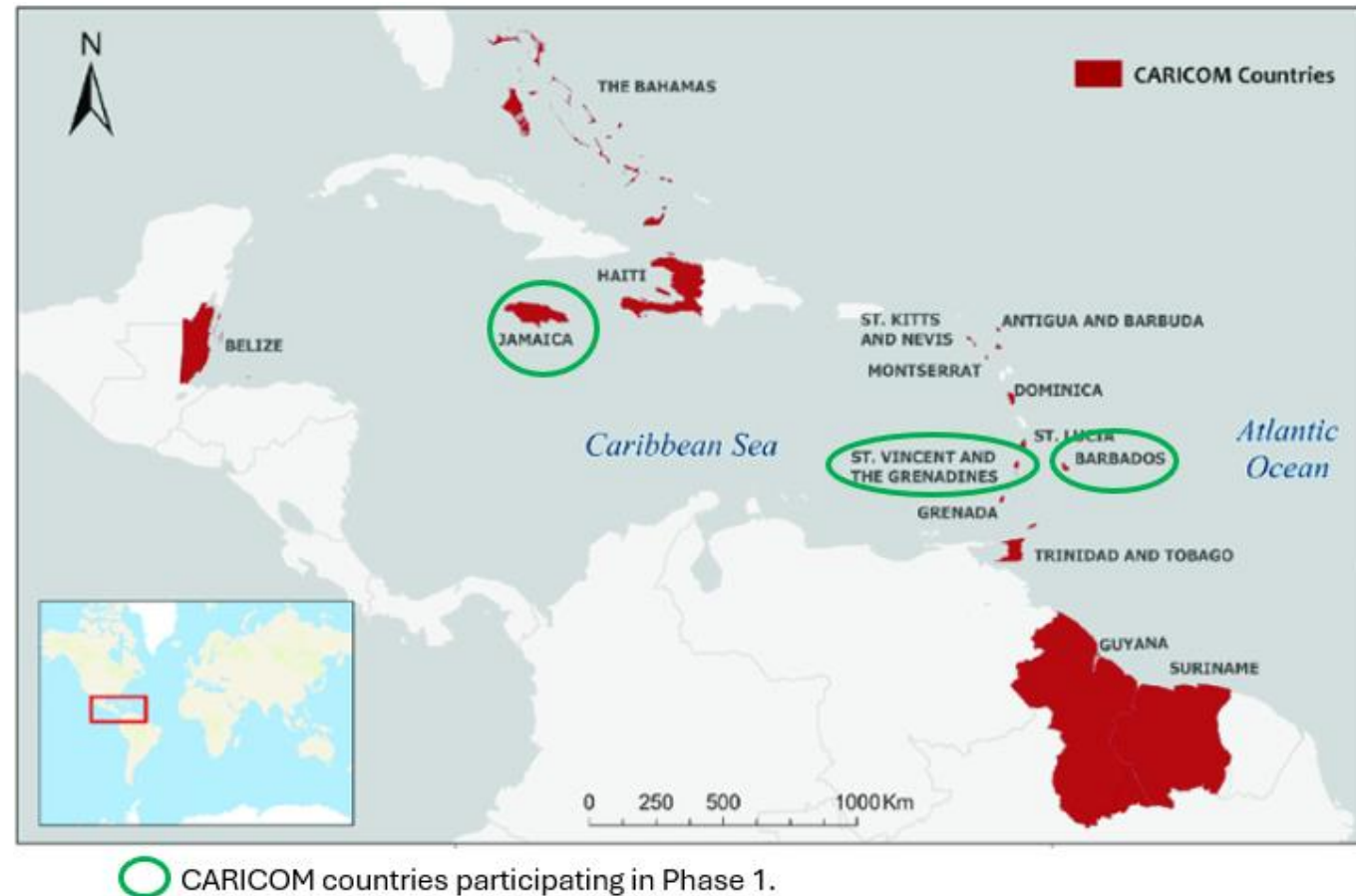
Saint Vincent & the Grenadines

Content

1. ***Caribbean Overview***
2. ***Digitalization: A Regional Priority of CARICOM countries***
3. ***Enabling Environment***
4. ***Key Bottlenecks and Investments Needed***
5. ***Investment Proposals***



Pond at River Plantation, St Philip, Barbados
Photo by Frederick Inniss, Barbados Agricultural Development and Marketing Corporation (BADMC)



Source: Ramsewak D., 2022. [Unoccupied Aerial Systems: A Review of Regulatory and Legislative Frameworks in the Caribbean](#).

Caribbean shared challenges linked to irrigation and climate change:

General agricultural challenges

- Farmers are the most vulnerable
- Net food importing countries
- Small-scale farming
- Agriculture prone to extreme weather (hurricanes, storms, and floods)
- Limited flat arable lands

Specific irrigation challenges

- Water scarcity and increasing demand
- Water quality and pollution
- Inefficient irrigation practices
- Limited and aged irrigation infrastructure
- Limited control of water resources

Overview of the Caribbean agricultural sector and key indicators

Indicator	Caribbean	Barbados	Jamaica	SVG
Total population, individuals	44,182,048	281,635	2,839,175	110,000
Rural population, %	27.9	69.0	43.3	46.0
Poverty level, %	30.0	25.7	12.6	30.0
Food import dependency rate, %	67.0	80.0	45.0	68.0
Agricultural employment, %	32.0	3.0	18.3	10.0
Agriculture contribution to GDP, %	7.3	1.5	7.5	9.0
Prevalence of undernourishment, %	16.3	3.0	8.3	5.7
Moderate and severe food insecurity, %	43.0	31.1	54.0	33.3
Child malnutrition (under 5 years old), %	11.3	6.8	6.5	NA
Anemia among women (15-49 years), %	29.6	17.0	20.0	17.0
Obesity in adults (18 years and +), %	28.1	25.9	24.7	27.1

Sources: Various official and UN sources. Poverty indicators from:
 Barbados: Barbados Survey of Living Conditions: 2016 (Government document)
 Jamaica: ECLAC, 2024. Population and development in the Caribbean (2018–2023).
 SVG: Country Poverty Assessment 2007/2008 (Government document).

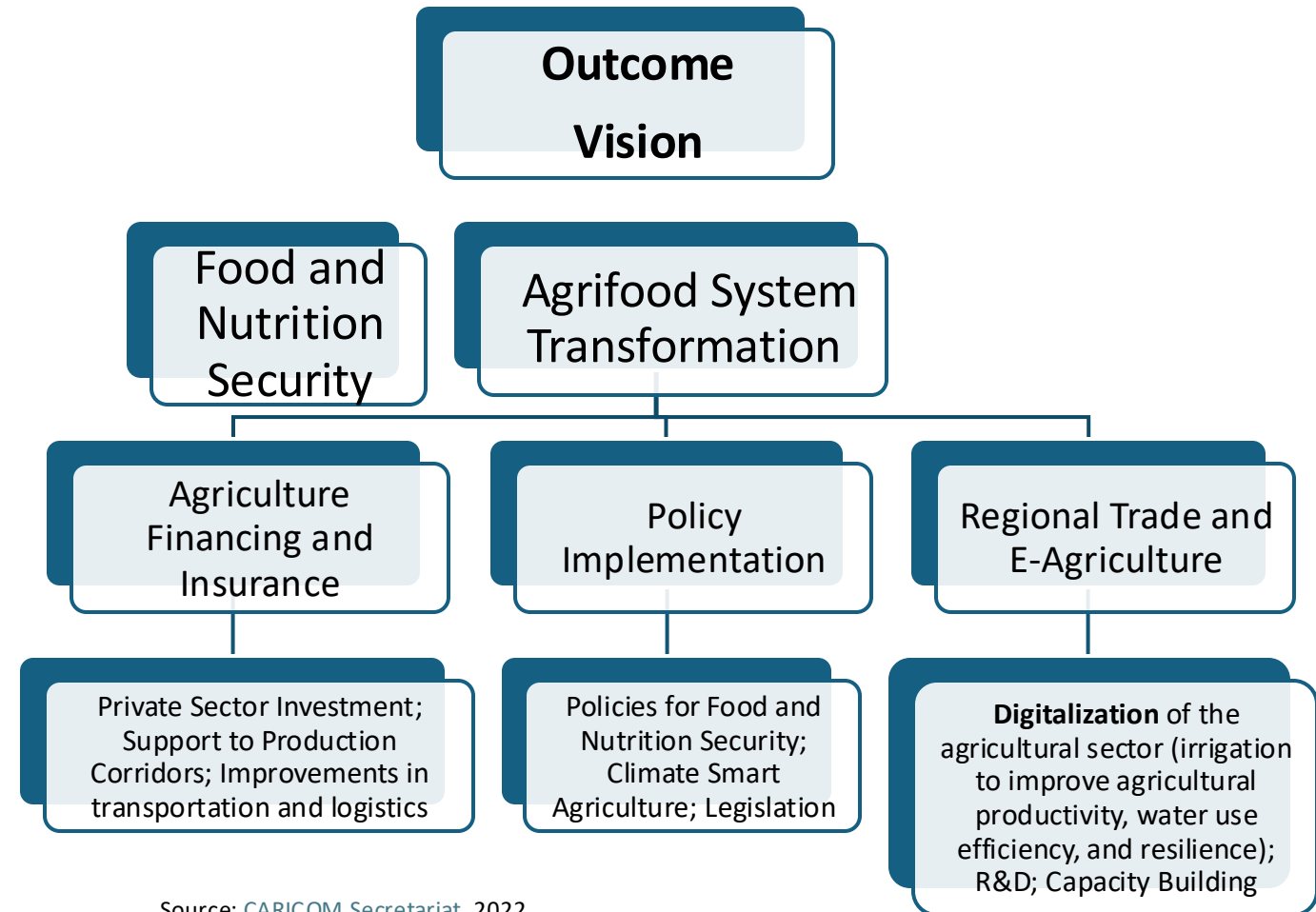
Regional Food Security Priorities for CARICOM Countries

Outcome: “A Viable, Sustainable and Prosperous Community for All”

Vision: Reducing the Region’s large food import bill by 25% by 2025

#	Priority Action	Objective
1	Improving policy development and Implementation to facilitate agri-food trade	Removing the barriers to market access, and securing greater private sector participation
2	De-risking of the Agricultural Sector	Providing alternate financing and insurance options for the sector
3	Improving the transportation and logistics throughout the region	Increasing availability of transportation services for agri-food products
4	Developing production, research, climate-smart adaptation	Investing on HR development, and adaptation to climate smart production mechanisms
5	Digitalizing the Region’s Agricultural Sector	Implementing an E-Agriculture Strategy
6	Improving trade and private sector investment	Revisiting Rules of Origin and revising CET and Suspensions Regime

Source: [CARICOM Secretariat](#), 2022.



Source: [CARICOM Secretariat](#), 2022.

Enabling Environment for Investments

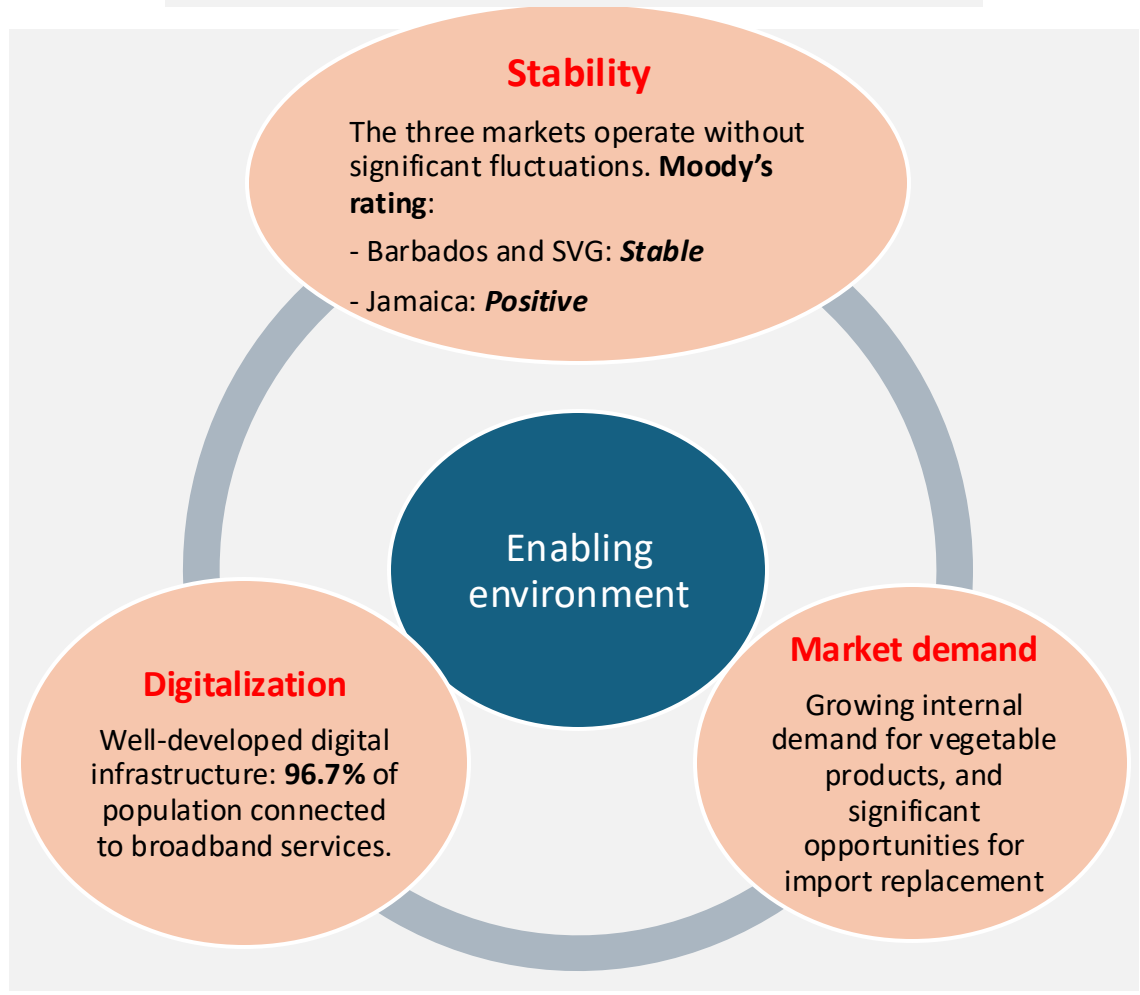
Barbados, Jamaica, and Saint Vincent & the Grenadines

Offer very good enabling environment that fosters economic stability, connects farmers to markets, and makes supply responsive to market demand, which are all crucial for sustainable economic growth and development.

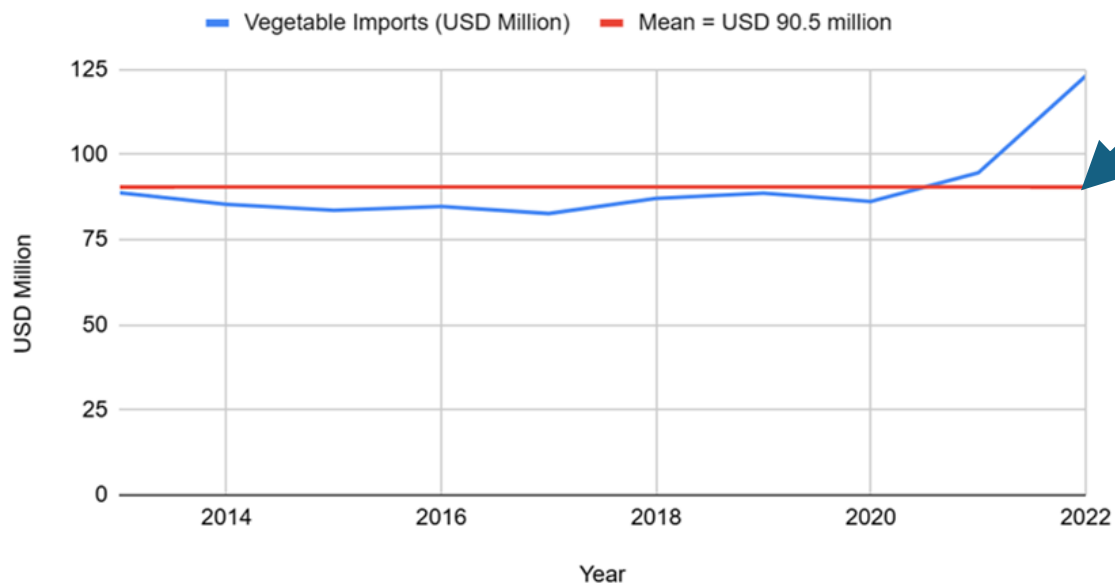
Indicators (three countries):

- | | |
|---|---|
| • Macroeconomic stability | 2% yearly regional growth |
| • Fiscal prudence that led to low inflation | 6.9% average inflation rate in 2023 |
| • Stable GDP and monetary system | 4.23% average GDP growth in 2023 |
| • Reliable ease doing business environment | 61.03 score WB Doing Business Report |
| • Lower business cost than regional average | 8.5% vs. 30.6% of GNI per capita |
| • Strong bilateral trade relationships | Various regional and bilateral agreements |
| • Strong cross-sectoral partnerships | With various international institutions |

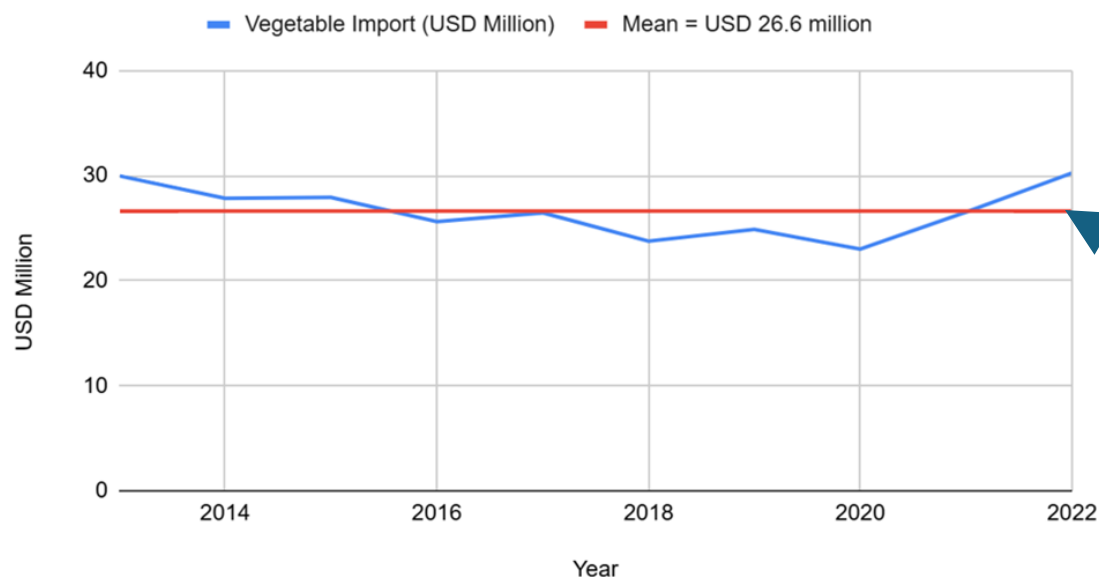
Barbados, Jamaica, and Saint Vincent & the Grenadines



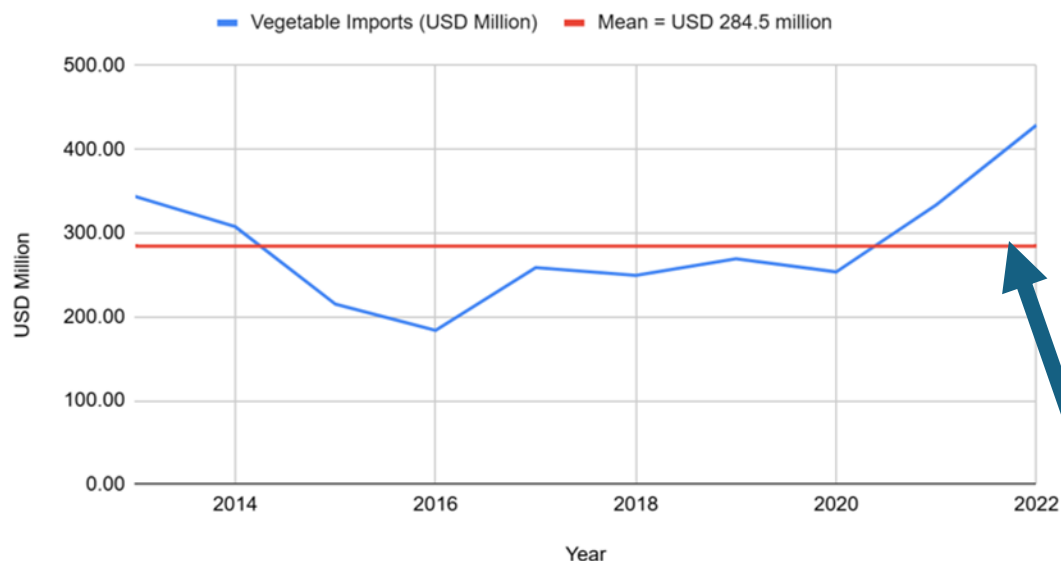
Market Demand & Replacing Food Import Opportunities



Barbados: Ten-year mean (2013-2022) vegetable import value is USD 90.5 million



SVG: Ten-year mean vegetable (2013-2022) import value is USD 26.6 million



Jamaica: Ten-year mean vegetable (2013-2022) import value is USD 285.5 million

Market Demand & Replacing Food Import Opportunities

Barbados: Producing high-value horticulture crops

Item	Indicator
• Food import dependence ratio	About 80%
• Value of food imports	USD 408.5 million in 2022
• Imported agricultural goods consumed by the tourism sector	About 60%
• High demand for fresh vegetables	USD 50 million in 2020 (broccoli, lettuce, sweet pepper, okra, and tomato)
• Growing intra-regional (CARICOM) trade of agricultural products	25% of total trade
• Top food imports (2018)	Processed foods (26%), primary agricultural products (26%), fish (5%)
• Key export markets for agricultural products	Trinidad and Tobago, Guyana, Jamaica, and Saint Lucia
• Investments to increase food trade	Barbados logistical hub
• Growing demand of local agricultural produce	Culinary tourism (the Oistins Fish and the Food and Rum Festivals)

Conclusion: Significant internal demand for vegetables, and opportunities for import replacement

Jamaica: Producing high-value horticulture crops

Item	Indicator
• Food import dependence ratio	About 45%
• Growing food demand due to tourism (2022)	3.3 million visitors, USD 3.7 billion in revenue
• Growing tourist arrivals	117% more visitors and 71% more earnings in 2022 compared to 2021
• Growing agro-industry demand for raw inputs (million USD)	34 processed foods; 34 fruits, and 10 vegetables
• Steady tourism sector growth	36% outpacing the total economic growth of 10%
• Growing demand for agricultural and manufactured good (USD million)	365 million for processed foods, 34 million for fruits, and 10 million for vegetables
• Growing demand for vegetables and other foodstuffs	Onion, Irish potato, sweet potato, hot pepper, cassava, fruits, herbs, poultry, meat, and seafood
• Demand value of agricultural products (USD million)	125 million with the poultry, meats, seafood, and fruits accounting for 75%
• Share of agrifood imports from CARICOM countries	30% of total agricultural imports

Conclusion: Internal demand for vegetables is steadily increasing with significant opportunities for import replacement

Market Demand - Replacing Food Import Opportunities

Saint Vincent & the Grenadines: A tourism-based economy that offers opportunities for high-value production of horticultural crops

Item	Indicator
• Food import dependence ratio	About 68%
• Main food suppliers	USA, Guyana, Barbados, Trinidad and Tobago, and the Netherlands
• Average food import bill	USD 217 million
• High demand for fresh vegetables and fruits	Sweet pepper, tomato, cabbage, sweet corn, watermelon, banana and plantains
• Increasing internal food demand due to tourism	Demand on organic products mainly
• SVG main market is CARICOM countries	68% of total exports
• Share of food exports in total exports	Food is 69% the total export value
• Primary export destinations	St. Lucia, Barbados, Dominica, St. Kitts and Nevis, and Antigua and Barbuda
• Investments to increase production	Modernizing port and promotion of new flight connections
• AS founding member of CARICOM and the OECS	Substantial portion of exports go to Caribbean countries

Conclusion: High internal demand for vegetables, and opportunities for import replacement



Key Bottlenecks and Regional Irrigation Investments Needed (three countries – Phase 1)

Key Bottlenecks	Key Investment Needed
Insufficient surface irrigation infrastructure to promote agricultural production and development	Coordinated investments in irrigation infrastructure in three countries using surface water irrigation technologies for vegetable and fruits with high demand in the Caribbean region
Limited irrigation networks (pumping, distribution) limiting yields and resilience	Promote suitable irrigation infrastructure (pond, surface reservoirs, irrigation basin) and distribution mains suitable to communities and individual agricultural households
Inadequate capacities to manage irrigation schemes	Strengthen farmers capacities to effectively manage irrigation systems and equipment (small reservoirs, drip irrigation kits, ponds), including strengthening capacities to ensure adequate governance/management of water resources

Risks	Mitigation measures
Technical difficulties in building irrigation infrastructure	Engage experienced builders during the design and execution
Shortfalls in funding leading to project slowdowns	Secure financing before project commencement
Poor management of water network distribution	Implement robust water management service

Prioritized HIH Caribbean Irrigation Investments:

Barbados: Construction of irrigation **pond capturing** water from Spring Hall watershed

Jamaica: **Surface reservoirs** for irrigation with waters coming from the White River

Saint Vincent & the Grenadines: Irrigation **basin** with waters coming from the Rabacca River

How the Digitalization Will Work

Barbados	Jamaica	Saint Vincent & the Grenadines
The three countries are expected to implement digitalized drip irrigation systems. Drip lines and emitters will be laid down along plant rows, ensuring that each plant receives water through emitters at its root zone. Main pipelines are going to be connected to the water source (pond or reservoir) and valves will be installed for water regulation		
The three countries have planned to implement Geographic Information System (GIS) to enhance precision and sustainability in water use. By dividing farm into smaller management zones based on variations in soil moisture, crop type, and elevation, GIS will identify which zones need be irrigated based on their unique water needs.		
Ultrasonic Volumetric Meters (UVM) are going to be used to improve efficiency in water flow utilization. UVM measure the time it takes for ultrasonic pulses to travel through water within a pipe	Automatic Meter Reading (AMR) is planned to be used to remotely monitor the amount of water usage in irrigation systems. AMR are going to be installed at key points in the irrigation network (i.e. the main water supply)	Temperature, humidity, wind speed, and precipitation sensors are planned in the project to provide a local weather station with real-time climatic data

Ultrasonic Volumetric Meters (UVM)



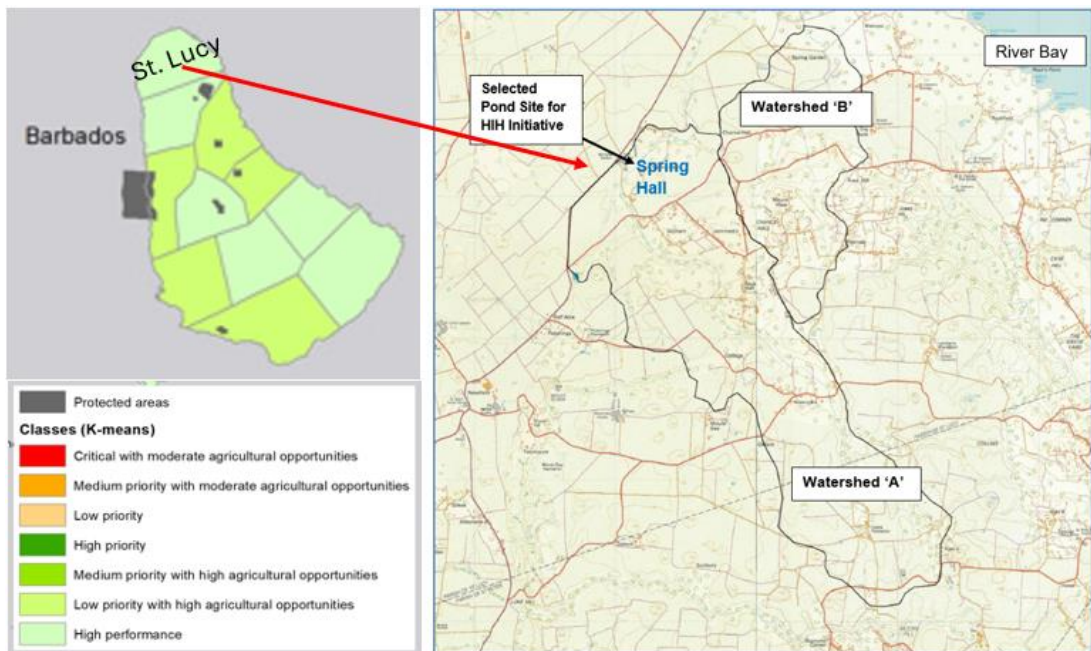
Drip irrigation systems



Geographic Information System (GIS)



Barbados

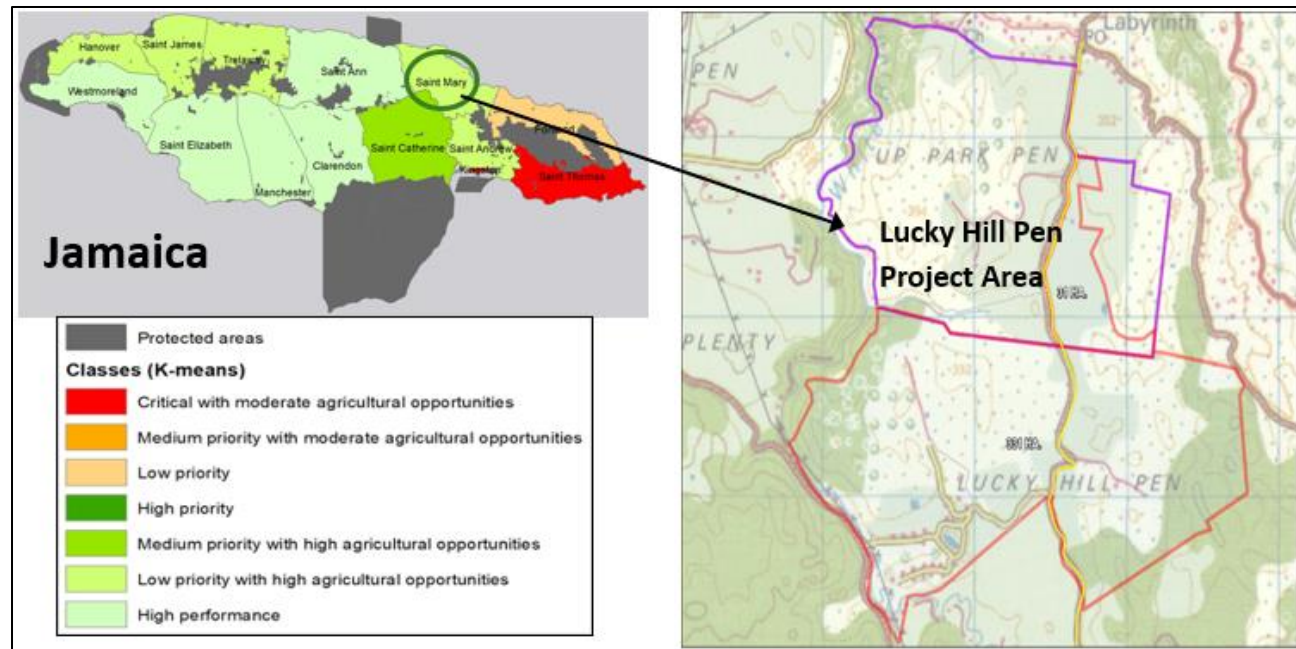


Main investment components

Investment (USD)

Construction of Pond (including drip irrigation)	3,673,555
Construction of pump house	33,514
Digitalization (Ultrasonic volumetric meters; Sensors for temperature, humidity, wind speed, and precipitation measurement; and GIS)	51,123
Installation of perimeter security	18,404
TOTAL (USD)	5,640,350

Jamaica

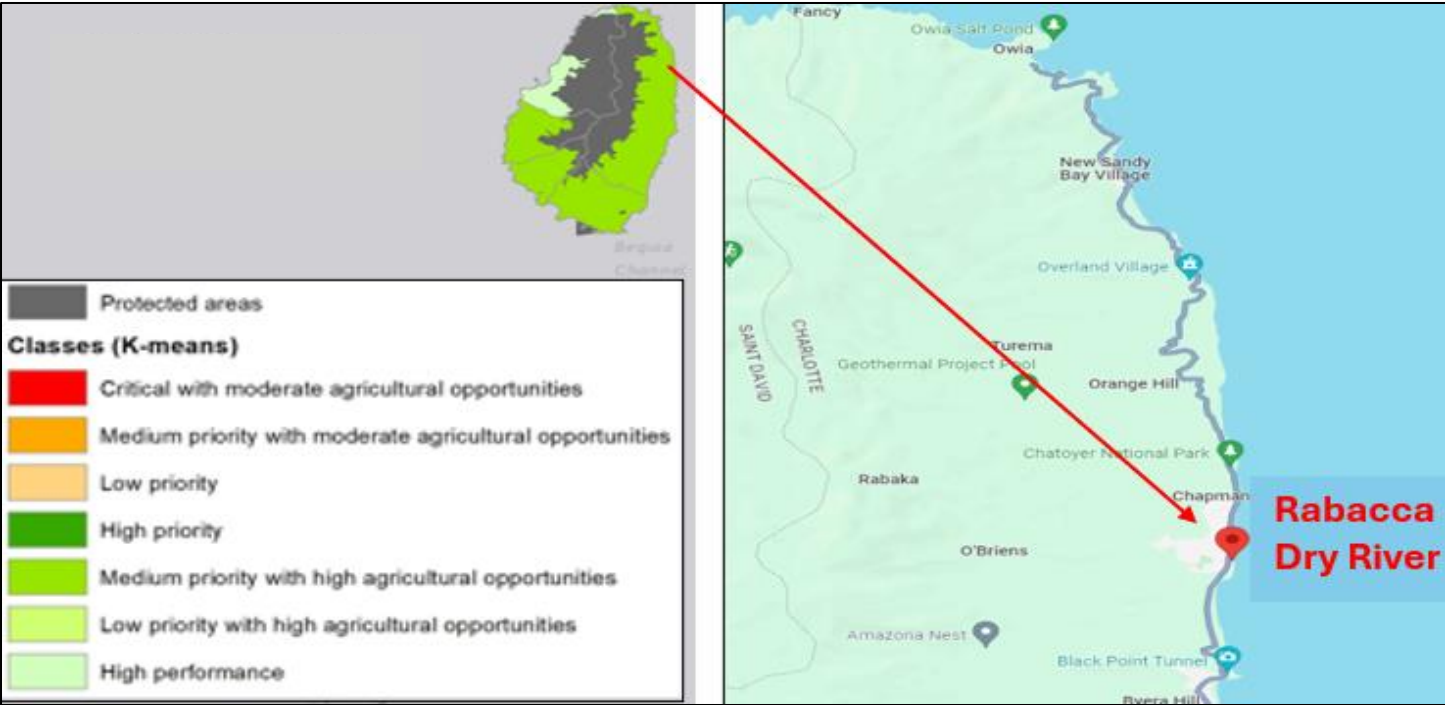


Main investment components

Investment (USD)

Preliminaries	439,269
Supply and installation of pumps	711,677
Pipe distribution network	2,919,708
Digitalization (Automatic Meter Reading, Drip Irrigation, GIS, and Remote-control irrigation)	418,759
Farmer training	204,380
Global GAP Combo Structures (construction)	510,949
TOTAL (USD)	7,576,865

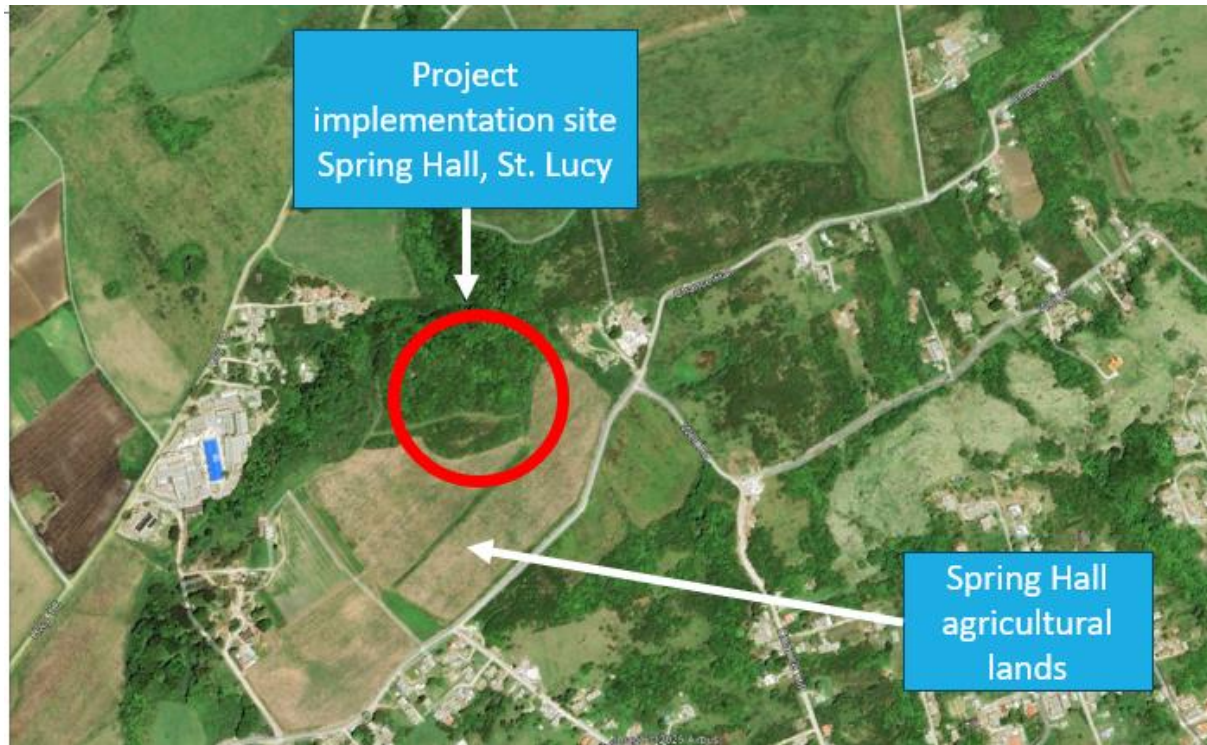
Investment Location



Main investment components	Investment (USD)
Development of Engineering Drawings	89,259
Project construction and digitalization in irrigation system: Automated Irrigation (drip and sprinkler systems); GIS; water intake re-build; pipelines; water distribution system	2,847,519
Project Management and Supervision	174,444
Contingency (20%)	622,244
On-farm irrigation network	2,252,078
TOTAL (USD)	5,985,544

Investment Locations (Aerial Perspective)

Barbados

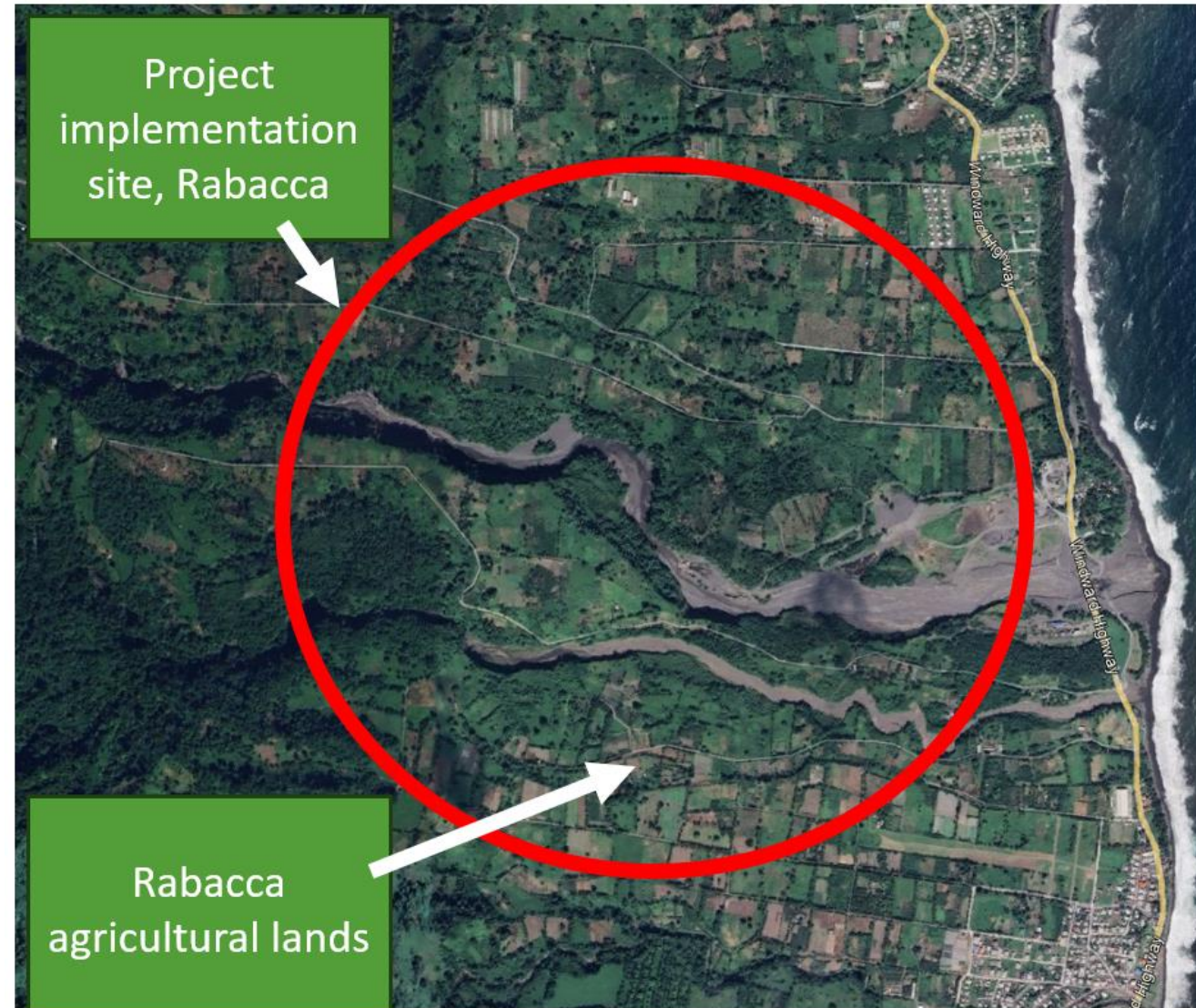


Jamaica



Investment Locations (Aerial Perspective)

Saint Vincent and the Grenadines



Estimated Economic Results (Phase 1-three countries)

Item	Barbados	Jamaica	Saint Vincent & the Grenadines
Investment title	Spring Hall Pond	Lucky Hill Pen Project	Rehabilitation of Rabacca Irrigation System
Total Investment (USD)	5,640,350	7,576,865	5,985,544
Government contribution (USD)	564,000	758,000	599,000
Irrigated area (has)	40	400	324
Direct beneficiary farm families	100	200	335
Indirect beneficiaries (individuals)	698	1,292	2,010
Expected per capita income increase (USD/ha/year/person)	1,157	1,311	1,236
Main crops	Lettuce, Okra, Sweet Pepper, Tomatoes	Onion, Irish potato, sweet potato, hot pepper, cassava, and mango	Sweet pepper, tomato, cabbage, sweet corn, watermelon, banana and plantains
Production cycles/year with project	Between 2 to 3 production cycles	2 (except for mango that is 1 cycle/year)	2
Productivity increase	NA	40%	NA
Total production increase	NA	60%	NA
NPV (USD, 12%, 20 years)	4,923,943	6,051,790	9,279,361
IRR (%)	21.0%	20.9%	29.6%

Expansion of Pond at Lears Plantation, Barbados



Lucky Hill Pen, Jamaica



Rabacca River, SVG



Sensitivity Analysis

Country	IRR (%) base case scenario	Reduced project benefits			Increased project costs		Delayed benefits		Reduced adoption rate	
		-30%	-20%	-10%	10%	20%	1 year	2 years	60%	55%
Barbados	21.0%	11.4%	15.3%	18.4%	19.8%	18.6%	15.0%	11.1%	7.5%	4.0%
Jamaica	20.9%	13.0%	15.9%	18.5%	18.8%	16.8%	17.0%	14.0%	12.8%	7.3%
Saint Vincent & the Grenadines	29.6%	-3.1%	11.4%	21.2%	27.5%	25.5%	21.5%	16.5%	22.5%	16.8%

Note: Discount rate = 12%

Key messages

Barbados: Project still profitable if (IRR > 12%):

- 1) 10% or 20% reduced project benefits
- 2) 10% or 20% increased project cost
- 3) Project takes 1 extra year to produce benefits

Jamaica: Project still profitable if (IRR > 12%):

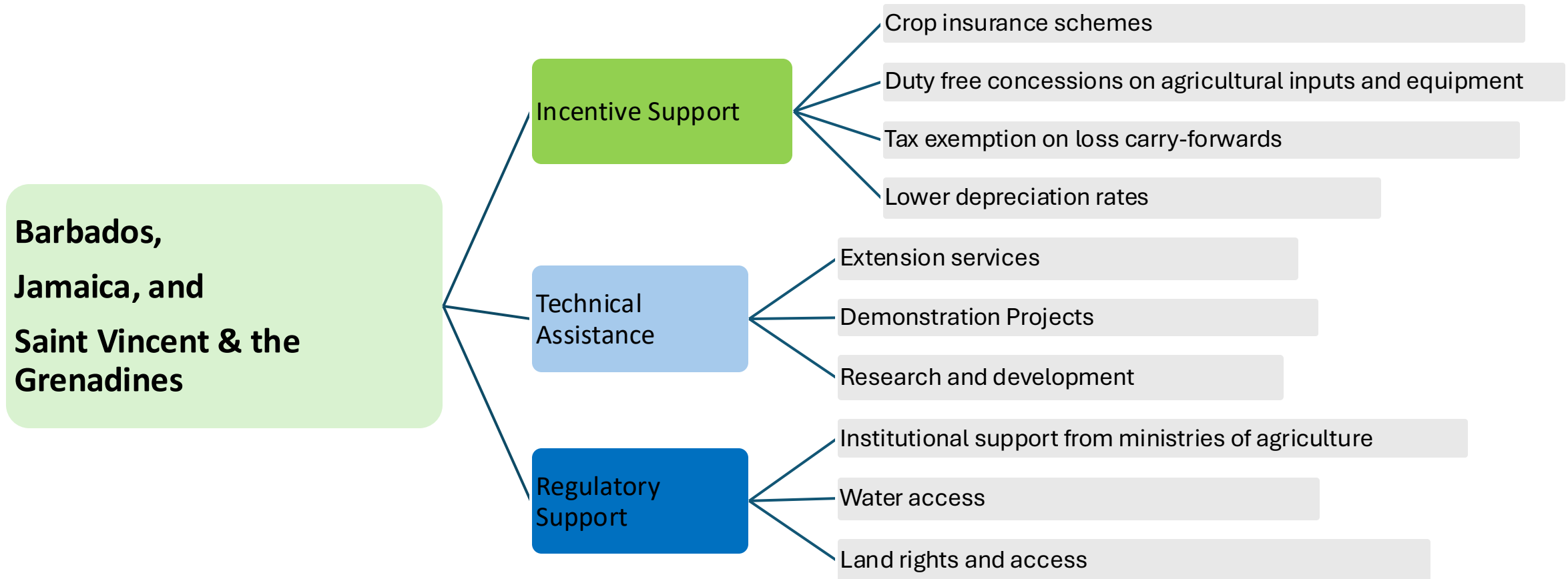
- 1) 10%, 20% or 30% reduced project benefits
- 2) 10% or 20% increased project cost
- 3) Project takes 1 or 2 extra years to produce benefits
- 4) 60% of farmers adopt irrigation

Saint Vincent & the Grenadines: Project still profitable if (IRR > 12%):

- 1) 10% reduced project benefits
- 2) 10% or 20% increased project cost
- 3) Project takes 1 or 2 extra years to produce benefits
- 4) 55% or 60% of farmers adopt irrigation

Government Support to Investment Proposals

The governments of Barbados, Jamaica, and Saint Vincent & the Grenadines have already invested in producing pre-feasibility studies (such as Cost/benefit analysis, hydrological assessments, project scoping, and farmers' engagement), valued at **USD 1,921,000**. Additional in-kind contributions planned include:



Regional investment in Digitalized Irrigation – Phase 1

Total invest. (USD): **21,123,759**
Gov. contrib. (USD): **1,921,000**
Investment gap (USD): 19,202,759

Average IRR (%): **23.8**

Direct beneficiary farm
families: **635**

Indirect beneficiaries: **4,000**

Total NPV (USD):
20,255,094

Average income
increase (USD): **1,235**

Production cycles/year with
irrigation: **2-3**

Barbados

Title: Digitalized Irrigation - Spring Hall Pond Project (expansion)

Investment gap (USD): 5,640,350

IRR (%): 21.0

NPV (USD): 4,923,943

Gov. contribution (USD): 564,000

Sustainability Benefits

Direct beneficiary families: 100

Indirect beneficiaries (individuals): 698

Expected per capita income increase (USD/ha/year/person): 1,157

Irrigated area (has): 40

Investment type: Public-Private Partnership

Jamaica

Title: Digitalized Irrigation - Lucky Hill Pen Project

Investment gap (USD): 7,576,865

IRR (%): 20.9

NPV (USD): 6,051,790

Gov. contribution (USD): 758,000

Sustainability Benefits

Direct beneficiary families: 200

Indirect beneficiaries (individuals): 1,292

Expected per capita income increase (USD/ha/year/person): 1,311

Irrigated area (has): 400

Investment type: Public-Private Partnership

Saint Vincent & the Grenadines

Title: Digitalized Irrigation - Rehabilitation of Rabacca Irrigation System

Investment gap (USD): 5,985,544

IRR (%): 29.6

NPV (USD): 9,279,361

Gov. contribution (USD): 599,000

Sustainability Benefits

Direct beneficiary families: 335

Indirect beneficiaries (individuals): 2,010

Expected per capita income increase (USD/ha/year/person): 1,236

Irrigated area (has): 324

Investment type: Public-Private Partnership