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MULTILATERAL INVESTMENT FUND

JAMAICA

**AQUAPONICS: INCREASING ACCESS TO CLIMATE-SMART AGRICULTURE IN
JAMAICA**

JA-T1134

DONORS MEMORANDUM

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PROJECT SUMMARY

JAMAICA

AQUAPONICS: INCREASING ACCESS TO CLIMATE-SMART AGRICULTURE IN JAMAICA (JA-T1134)

Small and medium scale farmers are among the most vulnerable to the current and future effects of climate change because they lack the technology, knowledge and financing to implement adaptive measures. In Jamaica, climate-related events have been identified as major threats to the agricultural sector, which represents about 7 percent of GDP and employs about 18 percent of the country's population. As climate change threatens economic opportunities for small-scale farmers, it is imperative to introduce new business models and technologies that will enable farmers to not only adapt, but to thrive in a new context.

By working with INMED Caribbean, the proposed project aims to address these challenges by piloting the commercial use of aquaponics, an innovative climate-smart farming system which has the potential to promote water efficiency, build resilience, and enhance livelihoods for small-scale commercial farmers supplying the local market. The innovative factor of this promising technology is that it can produce up to 10 times more vegetables and crops in the same amount of space as traditional agriculture. The recirculating system uses between 80 and 95 percent less water than traditional farming methods and uses up to 75 percent less energy than mechanized agriculture.

The project will take a commercial approach to promote aquaponics technology in fresh vegetables and fish production. It seeks to implement an agri-business development program focused on making aquaponics a commercially viable technology for small and medium scale Jamaican farmers while improving their market access and resilience to climate change. The project aims to improve market linkages to buyers and financial institutions and to provide 300 farmers with the technical and business skills needed to successfully manage a commercial-scale aquaponics enterprise.

MIF funding would play a critical role in developing the tools and technical assistance needed to crowd in key players and accelerate the adoption of the technology. This funding is expected to accelerate commercial partnerships with key private sector stakeholders such as Grace Kennedy Agro Processors and Sandals Resorts. In addition, the project has the capacity for replication and scaling to other countries in the Caribbean with similar limitations to Jamaica.

This project is aligned with the MIF's Climate-Smart Agriculture thematic area as it seeks to promote climate adaptation and access to finance to improve the resilience of farmers in Jamaica. It will be executed by INMED Partnerships for Children, a registered non-profit organization through its INMED Caribbean office based in Kingston, with contributions from the Caribbean Development Bank and the Government of Jamaica.

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AVAILABLE IN THE TECHNICAL DOCUMENTS SECTION OF MIF PROJECT INFORMATION SYSTEM

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ACRONYMS AND ABBREVIATIONS

AOP	Annual Operating Plan
AAP	Adaptive Agriculture Program
CASE	College of Agriculture, Science and Education
CDB	Caribbean Development Bank
CEF	Credit Enhancement Facility
CIAT	Center for International Tropical Agriculture
CSA	Climate Smart Agriculture
DBJ	Development Bank of Jamaica
FAO	United Nations Food and Agricultural Organization
GHG	Green House Gas
IDB	Inter-American Development Bank
IIC	Inter-American Investment Corporation
LAC	Latin America and the Caribbean
MICAF	Ministry of Industry Commerce, Agriculture and Fisheries
MIF	Multilateral Investment Fund
MECJC	Ministry of Economic Growth and Job Creation
OR	Operating Regulations
PEU	Project Executing Unit
PIOJ	Planning Institute of Jamaica
PSR	Project Status Report
RADA	Rural Agricultural Development Authority
SDC	Social Development Commission
SIDs	Small Island Developing States
UNEP-DTU	United Nations Environment Programme and Danish government partnerships
USAID	United States Agency for International Development

PROJECT INFORMATION

JAMAICA

AQUAPONICS: INCREASING ACCESS TO CLIMATE-SMART AGRICULTURE IN JAMAICA (JA-T1134)

Country and Geographic Location:	Jamaica. The project will be implemented island wide but will focus initially on the parishes of Westmoreland, Trelawny, Hanover, and St. James.		
Executing Agency:	INMED Caribbean		
Focus Area:	Climate-Smart Agriculture		
Coordination with Other Donors/Bank Operations:	Agricultural Competitiveness Programme (JA-L1012) Caribbean Development Bank		
Project Beneficiaries:	300 small-scale farmers who will receive technical and business training on operating an aquaponics farm		
Financing:	Technical Cooperation:	US\$ 970,206	
	Equity:	0	
	Loan:	0	
	TOTAL MIF FUNDING:	US\$ 970,206	50%
	Counterpart:	US\$ 970,206	50%
	TOTAL PROJECT BUDGET:	US\$ 1,940,412	100%
Execution and Disbursement Period:	48 months of execution and 54 months of disbursement.		
Special Contractual Conditions:	Conditions prior to first disbursement will be, to the Bank's satisfaction: (i) selection of the Project Manager; (ii) hiring of the consulting firm to develop the online training program; (iii) establishment of the Steering Committee; (iv) Signed MOUs confirming in-kind and cash contributions from UDP, RADA and SDC; and (v) letter of commitment from INMED Caribbean certifying its counterpart contribution to the project.		
Environmental and Social Impact Review	This operation was screened and classified as required by the IDB's safeguard policy (OP-703) on February 13, 2017. Given the limited impacts and risks, the proposed category for the project is C.		
Unit responsible for disbursements	MIF/CJA		

I. The Problem

A. Problem Description

- 1.1. Climate change poses a challenge to agricultural development and food security in Latin America and the Caribbean. Small island states like Jamaica are expected to be severely affected by rising sea levels, an increased frequency of storms, higher temperatures, and greater scarcity of fresh water resources over the next three decades¹. Long term changes in temperature and precipitation are expected to shift agricultural production curves as well as disease and pest patterns. These climate-related events have been identified as major threats to the Jamaican agricultural sector, which represents about 7 percent of GDP and employs about 18 percent of the country's population. Small and medium scale farmers in Jamaica are among the most vulnerable to the effects of climate change because they lack the technology, knowledge and financing to implement adaptive measures.
- 1.2. To address the interrelated challenges of food security and vulnerability to climate threats, INMED Caribbean, a registered nonprofit organization in Jamaica working on sustainable food systems, launched an adaptive agriculture program in 2011. The cornerstone of this program is aquaponics, an intensive, climate-smart food production technique combining aquaculture (fish farming) and hydroponics (soilless crop production) in a closed system that dramatically conserves water and space, requires minimal inputs, and yields abundant and marketable fresh produce and protein-rich fish². INMED Caribbean piloted and installed aquaponics systems in 13 locations in seven parishes across the island, primarily on small farms, in technical schools, agricultural cooperatives, and community institutions. Compared to commercially-available kits, INMED's system is a much lower-cost and simplified version of aquaponics suitable for small-scale farmers. The adapted modules piloted by INMED effectively demonstrated the technical feasibility to produce high value crops in different geographic settings and microclimates across the country.
- 1.3. The adapted aquaponics system is exceptionally resource efficient. It requires substantially less water, energy, labor and input costs compared to traditional agriculture and can be built using locally available materials. Aquaponics produces up to ten times more vegetables and crops in the same amount of space as traditional agriculture. Furthermore, it uses between 80 and 95 percent less water than traditional farming methods. It consumes up to 75 percent less energy than mechanized agriculture, and utilizes solar power systems that reduce energy consumption and emissions even further. Moreover, it is resilient to extreme weather events such as hurricanes, droughts, and floods.
- 1.4. The market for aquaponics produce includes Jamaica's hotel chains, supermarkets, restaurants, and agroprocessors. The system can be used to produce crops such as green leafy vegetables, tomatoes, cucumbers, bell

¹ Jamaican State of the Climate Report 2015

² Jamaica Adaptive Agriculture Program. Value Chain Mapping and Lessons Learned. January 2016.

peppers, and variety of culinary herbs for which demand is increasing. The market for fresh fruits and vegetable among Jamaican hotel operators is estimated at US\$52 million annually³. Among specialty hotels and restaurants, there is also a growing interest in “farm-to-table” provisioning. The majority of these buyers would prefer to source locally provided they can buy products in the quality and quantities that they require.

- 1.5. The early success of the pilot validated the market potential and farmer acceptance of aquaponics as a viable production system. For example, the Belmont Academy harvested nearly 90 times more scallions in their aquaponic system compared to their conventional farm plot. The aquaponic scallions grew twice as fast, weighed more per unit, were of higher quality, and had a longer shelf life compared with the soil-grown types. All scallions harvested at Belmont were sold to the nearby Bluefields Villas luxury resort. Similarly, the Westmoreland Organic Farmer’s Society cultivated high-value herbs such as basil and cilantro with its aquaponic system with better yields than traditional organic farming. The cooperative sells both fresh and dried herbs to Sandals Whitehouse. Lastly, the Knockalva Agricultural School reported that its aquaponic crops fetch a higher price than conventionally grown produce. For example, its romaine lettuce commands a market price of J\$2.00/lb., compared to J\$1.00/lb. for conventionally grown romaine.
- 1.6. With the success of INMED Caribbean’s pilot program, and the growing market for local organically grown fresh fish, fruits, and vegetables, there is potential for aquaponics to be adopted as a commercial food production system for small-scale farmers. The main problem this project aims to address is the limited commercial adoption of aquaponics as an adaptive farming technology by small and medium-scale farmers in Jamaica. The main causes of this problem include systemic challenges facing the local supply chain for fresh produce as well as specific gaps and barriers for aquaponics.
- 1.7. **Few aggregation models for marketing fresh produce.** Jamaica's agricultural sector is characterized by thousands of independent small and medium farms. There is a low degree of farmer organization as few producers are aggregated in associations or producer groups. The lack of organization and small farm size, results in high costs (inputs, logistics, marketing etc.), and limited opportunities to achieve economies of scale in production and to strengthen negotiating power. This lack of aggregation makes it difficult to ensure a consistent supply in sufficient quantities for buyers on a reliable basis. Many farmers rely on local intermediaries, known as purveyors, who aggregate produce from farmers in their vicinity and supply hotels and restaurants. Purveyors are important in that they provide an avenue for small farmers to market their produce, however their relationship with farmers is informal and can be plagued by issues of mistrust and lack of transparency regarding prices and payment terms. Thus, there is a need for efficient and transparent marketing channels to link buyers and sellers in a way that creates security and ensures sustainability for both sides.

³ Ministry of Tourism and Entertainment, “Tourism Demand Study – Linkages Hub”, October 2015.

- 1.8. **Lack of coordination and communication between farmers and buyers.** Private sector buyers have expressed interest in increasing their purchases of fresh produce, however there is a lack of coordination and communication between buyers and farmers. This is a systemic problem that affects both traditional farmers and aquaponics producers. For instance, demand for fresh produce by hotels and restaurants fluctuates based on occupancy and seasonality. Since most buyers do not directly communicate their demand forecast, farmers cannot plan their production and either produce too much for the market or too little. Therefore, poor market information creates uncertainty for both buyers and sellers. Farmers face fluctuating demand and unstable prices. At the same time, buyers face uncertainty in sourcing produce in terms of quality, quantity and timeliness. Few buyers have put in place formal contractual arrangements with farmer organizations or farming clusters in the supply chain.
- 1.9. **Barriers to finance for farmers.** Establishing a medium sized commercial aquaponics system requires a start-up investment of about US\$16,000 related to build out and operational costs. These include investments in building materials, solar panels, water catchment systems and outlays for inputs such as seedlings and fingerlings. A major barrier in establishing a new system is the significant start-up capital required, which is not readily available to most small-scale producers. This is further complicated by the collateral requirements and high interest rates offered by commercial banks. Although a number of banks in Jamaica have experience in lending to agricultural producers, most have no exposure in lending for aquaponics and are unfamiliar with the specific risks and opportunities related to the systems. Therefore, adoption of the technology requires a specialized financing package for farmers who are enthusiastic and dedicated to pursuing aquaponics.
- 1.10. **Lack of support services for aquaponics.** Farmers interested in commercial aquaponics production have limited options for support services and technical assistance to build out and maintain the systems. While INMED Caribbean has been a leader in setting up and piloting systems in Jamaica, there is a need for an ecosystem of reliable support services to enable growth of the industry. Much of the support currently available is in the form of self-guided explainers for back yard systems, rather than hands-on training and service provision for commercial enterprises. For example, the value chain needs skilled builders to assemble the systems and a dependable group of distributors to provide affordable access to materials and components. Inputs such as seeds, fish fingerlings, and fish feed must be available as well as trained technicians to extension service providers who can troubleshoot problems.
- 1.11. Despite the growth in aquaponics technology in countries around the world and the success of INMED's pilot, the use of aquaponics for commercial production is still a relatively new concept in Jamaica and the Caribbean. The project aims to facilitate the adoption of commercial aquaponics for small-scale farmers as a form of sustainable agriculture and to improve linkages to stable buyers, local financial institutions, and support services.
- 1.12. The project will be implemented island-wide based on demand from farmers, but will focus initially in the parishes of Westmoreland, Trelawney, St. James and Hanover. There is significant farmer interest and demand according to surveys

conducted by RADA in May 2015, which determined that 74 percent of respondents expressed an interest in working with aquaponics. The intervention is expected to benefit 300 farmers who will be equipped with the technical and business skills needed to successfully manage a commercial-scale aquaponics enterprise.

- 1.13. The target farmer for the project will be a small to medium-scale farmer with some level of traditional or greenhouse farming experience or a track record in successfully operating a small business. Working with experienced farmers will better position the project for success with buyers, input suppliers, and financial institutions and improve the path for scaling. A pipeline of suitable farmers will be identified through an outreach program in collaboration with the government extension service (RADA). In the pilot phase of the project, there was strong participation from women, who were involved in site preparation, unit construction, training, and the daily operation of the systems. The project will aim to maintain or improve this level of engagement with women through its outreach and training activities.

II. The Innovation Proposal

A. Project Description

- 2.1. The project objective at the impact level is to increase economic opportunities for small-scale farmers while reducing vulnerability to climate change and minimizing adverse environmental impacts. The project objective at the results level is to implement an agri-business development program focused on making aquaponics a commercially viable technology for small and medium Jamaican farmers while improving their market access and resilience to climate change.
- 2.2. **Intervention Model.** Building on INMED's successful pilot, the project will take a commercial approach to develop the supply chain for fresh fish and vegetables produced with aquaponics technology. The project aims to improve market linkages to buyers and financial institutions and to provide farmers with the technical and business skills needed to successfully manage a commercial-scale aquaponics enterprise. To address the market failures identified in the problem diagnosis, the intervention model will be structured around the following three elements:
- 2.3. **Access to training.** The project will equip farmers with the technical knowledge and basic business planning and management skills needed for commercial farm operations. This will be done through a training and prequalification program consisting of three interactive online modules focused primarily on aquaponics technology and implementation, understanding financing and loans, and developing business plans and markets. Once participants have passed the online training program and completed a business plan, they will be eligible to apply for loan financing with a pre-selected group of financial institutions. As soon as farmers begin build out of their systems, they will receive intensive hands-on training and close monitoring to support productivity and planning. A group of pre-

approved input suppliers has been identified to provide materials and inputs for the aquaponics systems.

- 2.4. **Access to finance.** The project will work with a selected group of financial institutions to provide financing for prequalified farmers that have completed the online training program. With support from the project, the financial institution will develop specialized loan products for qualified farmers with modified collateral requirements, affordable interest rates, and appropriate repayment terms. To reduce the risk for banks, the project has secured a commitment from the Development Bank of Jamaica, through its credit enhancement facility, to guarantee loans (up to 80 percent) to farmers in the program. A medium-size aquaponics system requires an initial investment of around US\$16,000 and is expected to generate approximately US\$15,000 in sales of fish and vegetables in year 1 and US\$20,000 in subsequent years based on conservative projections by INMED Caribbean.
- 2.5. **Access to markets and coordination building.** The project will expand commercial relationships with a group of selected buyers and aggregators in order to create a guaranteed market for aquaponics produce. First, this will involve identifying feasible aggregation models for farmers, for example by consolidating farmers into groups or clusters, working with lead farmers, or implementing contract farming arrangements with buyers. Second, INMED Caribbean will play a facilitation role in linking farmers to large buyers. Several buyers have already purchased or expressed an interest in purchasing aquaponics production, including Sandals Resorts, Grace Kennedy, and a number of specialty hotels and restaurants. For example, Grace Kennedy, Jamaica's largest retailer of processed food, agreed to purchase sweet peppers from the aquaponic system at the Knockalva Agricultural School and has also expressed willingness to purchase aquaponic produce that can be used to make the company's sauces and seasonings. These buyers will form a list of pre-arranged purchasers, who together will provide the guaranteed market for farmers participating the project.
- 2.6. **Innovation.** The project is innovative in that it aims to facilitate the adoption of a promising technology to help farmers adapt to climate change in Jamaica. It takes a holistic approach to market development by addressing constraints related to markets, financing, and knowledge. The technology in itself is innovative because it requires substantially less water, energy, labor and inputs compared to traditional agriculture, while also producing more and yielding superior quality harvest. Aquaponics crops weigh more per unit, have a longer shelf life, and can command higher prices compared to soil grown types. By using substantially less water, aquaponics can far surpass traditional farming production in times of drought, and save resources year-round. Another innovative element is that aquaponics does not require the use of soil and can be set up in areas where soil quality is compromised. The system has demonstrated its ability to produce food and income in the wake of hurricanes on the one hand and persistent seasonal drought on the other. Its capacity for replication and scaling to other countries in the Caribbean with similar limitations has the potential to be transformational. The online training program can be easily scaled for implementation in any country.

Component I. Enhancing Technical and Business Capacity for Aquaponics Production (MIF: US\$670,400; Counterpart: US\$501,909).

- 2.7. The objective of this component is to equip farmers with the technical, managerial and organizational capabilities needed to successfully implement aquaponics farms at a commercial scale. INMED Caribbean will lead farmer outreach with the goal of 300 business-minded farmers completing the online training and prequalification program⁴. The content of trainings will include: (i) training on aquaponics fundamentals: to understand system operation and maintenance; (ii) market requirements and value chain insertion: to help farmers understand the requirements they need to fulfill to be able to be inserted in the value chain; and (iii) financial management, entrepreneurship and business, aimed at supporting farmers in creating feasible business plans for income generation. This training program will be developed in collaboration with key buyers and input suppliers. Farmers successfully completing the pre-qualification program will receive individual assistance in business planning and will be eligible to apply for aquaponics financing. At the second stage, farmers that have qualified for and received financing will then receive intensive hands-on training and technical assistance to assure optimal system installation, operation, and management, and information on the participating buyers with whom they can contract. To embed sustainability and build local capacity, the technical assistance will be provided by a group of extension agents and service providers in the value chain in collaboration with local experts from the Rural Agricultural Development Authority (RADA) and the College of Agriculture, Science and Education (CASE).
- 2.8. The expected outputs of this component include: (i) development of an online training program; (ii) 40 field agents (including RADA extension officers) trained in aquaponics for sustainability post project; (iii) 300 farmers completing the online training in aquaponics, business planning, and financing (iv) Establishment of an aquaponics demonstration center.

Component II. Building Stronger Linkages for Aquaponics Production (MIF: US\$46,600; Counterpart: US\$137,067).

- 2.9. The objective of this component is to strengthen collaborative arrangements between aquaponics farmers as well as commercial relationships with buyers and input suppliers. It will facilitate the development of key horizontal and vertical links based on the experiences and lessons learned from INMED's pilot phase.
- 2.10. First, this component will undertake an assessment to identify and implement suitable aggregation models led by the private sector. These models may include aggregation through farmer groups or producer organizations, through larger (lead) farmers who buy from multiple small farmers, or through contract farming arrangements with wholesalers and anchor companies. The assessment will provide a careful analysis of the aggregation structures, financial viability, market feasibility, and a business plan for implementation. A second element will focus on securing commercial relationships with buyers such as supermarkets, hotels, restaurants, exporters, and agro-processors with the objective of creating

⁴ 500 farmers will register and start the program. Assuming a 60% pass rate, 300 will complete the program.

transparent win-win relationships between firms and farmers. A third complementary element will focus on establishing better linkages with input suppliers and service providers who will ensure the consistent provision of materials, seeds, and fingerlings. These partnerships will be forged through engagement and communication with buyers with a view to formalizing buyer relationships through contracts and forward pricing so that farmers would have identified a buyer for their products and set a minimum price before crops are planted.

- 2.11. The expected outputs of this component include: (i) assessment and implementation plan on farmer aggregation models completed; (ii) business case and market study for aquaponics completed; (iii) written commitments from 5 buyers detailing their participating and purchasing commitment to the project; (iv) 2 input and service providers arranged; and (v) 8 buyer meetings and engagement events concluded.

Component III. Structuring customized financial product in partnership with local financial institutions (MIF: US\$36,600; Counterpart: US\$5,490).

- 2.12. The objective of this component is to promote access to affordable financing for farmers who have been prequalified by the project to set up commercial aquaponics farms. The project has engaged three financial institutions with experience in agricultural lending and a willingness to finance small business aquaponics. The project will support the banks to develop new loan products with terms and conditions suitable for aquaponics farms. The project will also strengthen the banks' capacities to rollout the new products and supervise the portfolio. Depending on the financial situation of the client and determined by the individual financial institutions, loans may be unsecured based on criteria such as the borrower's character, purchase contracts, and the future cash flows of the business. In all cases, farmers must have successfully completed the prequalification training and created a business plan with the help of an advisor. Participating financial institutions will carry out due diligence for each applicant, which shall include an assessment of financial history, business plan, production targets, and expected cash flow for the business. The loan application and supporting information will be evaluated by the financial institution, which will make a recommendation on the application in consultation with INMED Caribbean. To reduce exposure for participating financial institutions, the loans will be covered by the Development Bank of Jamaica's Credit Enhancement Facility (CEF).⁵
- 2.13. The project expects that out of the 300 farmers who complete the online training and prequalification program, 120 will be approved for a loan by a financial institution. The expected outputs of this component include: (i) 3 financial institutions participating in the program (ii) 6 credit officers trained (iii) 1 loan

⁵ The DBJ will guarantee 80% of small loans up to J\$6.25M (US\$48,000) up to a maximum guarantee coverage of J\$5M (38,000 USD). DBJ provides this guarantee through its approved financial institutions (AFI) with which it has signed an administration agreement. The AFI is responsible for the financial due diligence and supervision of the loan portfolio. The loans will be offered in local currency. Indicative terms are 9.5% to 10.0% for up to 7 years.

product specially adapted for aquaponics program (iv) US\$1,900,000 in credit mobilized for aquaponics.

B. Project Results, Measurement, Monitoring and Evaluation

- 2.14. The project's indicators are aligned with the Bank's Corporate Results Framework and the aspirational indicators for Climate-Smart Agriculture. The project is expected to achieve the following results by the end of the four-year implementation period: (i) 150 agro-entrepreneurs adopting new climate-smart aquaponics technology (CRF 230100); (ii) 150 aquaponics farms linked with strategic business partners (CRF 230200); (iii) US\$17,000 average annual sales by aquaponics farms participating in the project (CRF 330600); and (iv) 120 aquaponics enterprises accessing credit (CRF 230500).
- 2.15. **Baseline:** The baseline survey will include data on all farmers beginning with their registration in the online training and prequalification program. Farmers participating in the project will be registered with a unique identifying code. This identifying code will be used to track all training and services each farmer receives from the project e.g. attendance at training events, extension visits, credit etc. This data will include demographic data including age, sex, income, location, education, farming and business experience. For those farmers setting up aquaponics systems, baseline data on farm size, production capacity, access to finance and links to buyers will be collected. All baseline findings will be disaggregated by sex where appropriate and for measuring results in the project's PSRs, mid-term evaluation and final report.. This information will be gathered by the project's technical field team.
- 2.16. **Monitoring.** The project team will be responsible for establishing the project's monitoring systems, ensuring the collection of baseline, mid-term and end line data, contributing to progress reports, and ensuring the completion of supervision reports. The project will monitor key indicators every six months, including key production data such as yields, sales, employment generation, and market linkages. Data will be gender disaggregated where relevant. Aquaponics extension agents will be trained and equipped with tools to capture data and complete field reports.
- 2.17. **Evaluation:** The project will produce a mid-term evaluation report. The mid-term report will assess among other issues: (i) the adoption rate of the technology among farmers; (ii) efficacy of technical farmer training; (iii) progress in establishing workable aggregation models; (iv) progress in meeting production targets; and (v) progress related to improving access to finance with selected banks.
- 2.18. Final project results will be assessed and documented through the final Project Supervision Report. Key questions for the streamlined review of results and impacts in the final PSR may include: (i) How effective were the aggregation models created by the project?; (ii) To what extent did the project create sustainable linkages between farms and the market?; (iii) To what extent are farmers sustainably generating income?; (iv) How successful was the loan program with selected financial institutions?; (v) How can the model be replicated in other countries across LAC?

III. Alignment with IDB Group, Scalability, and Risks

A. Alignment with IDB Group

- 3.1. The project is aligned with Jamaica's National Development Plan – Vision 2030, which provides the framework to ensure that climate change issues are mainstreamed into national policies and development activities. This project is aligned with the MIF's Climate-Smart Agriculture area of focus and contributes to efficient use of resources focused on protecting the environment and improving the resilience of farmers in Latin America and the Caribbean.
- 3.2. This project complements the IDB's Agricultural Competitiveness Programme (JA-L1012) which seeks to increase productivity and competitiveness of farmer to access national and international markets and hence to contribute to increase farm income in Jamaica.
- 3.3. This project also aligns with the IIC's Priority Business Areas of improving access to finance and technical assistance for MSMEs, supporting innovation, enhancing private provision of basic goods and services and fostering green growth. Its focus on promoting an innovative technology and improving market links with food value chains and the tourism industry correspond with key IIC business sectors.

B. Scalability

- 3.4. The project has been designed to engage and crowd-in a range of public and private sector actors that can accelerate the adoption of the technology and the path to scale. With a broad range of private sector partners such as Grace Kennedy, Sandals Resorts, and financial institutions, the project aims to create the conditions for successful commercial uptake. Similarly, the strong and early participation of the public sector, through the Ministry of Industry Commerce Agriculture and Fisheries (MICAF) and RADA is expected to create support and greater access to public sector services for aquaponics farms. Participation is expected to scale at a consistent growth of 10 percent annually. INMED Caribbean estimates that from the initial 300 trained farmers and 150 adopters of the aquaponics technology, the number can be scaled up to 1,715 aquaponics farmers over 10 years.
- 3.5. As part of the activities to strengthen stakeholder engagement and scalability, the project envisions: (i) a video case study to convey the lessons learned and key achievements of the project; and (ii) a workshop with all the stakeholders involved to assess the outcomes achieved and identify critical elements to guarantee sustainability beyond MIF involvement.

C. Project and Institutional Risks

- 3.6. Effective Demand. One of the main risks to the project is insufficient participation in the program and low uptake of the aquaponics technology among farmers. This risk will be mitigated through an island-wide outreach program to identify and

recruit qualified farmers into the program in collaboration with RADA. In addition, the on-line training program will clearly explain the technology, the market potential, and the financial model (e.g. capital investment, operational costs, and revenue projections) to ensure the potential investors understand the revenue generating potential.

- 3.7. **Technical Challenges.** Aquaponics is more technical than traditional farming and there is a risk that farmers may face a learning curve in operating the system. These challenges could cause production losses and reduce profitability. This risk will be mitigated by hands-on technical assistance to promote experiential learning by farmers. The project will also provide business advisory services to ensure that farmers are maximizing income through a favorable mix of high value crops and fish for optimal performance.
- 3.8. **Post-harvest crop losses.** Poor quality transport, storage and handling practices may cause damage and quality deterioration to crops. Because the project will not finance infrastructure investments in the supply chain, such as packing and handling facilities and cold chain storage, there is a risk that these gaps may affect the quality of fresh produce. To mitigate this risk, the project will carefully train farmers on proper harvesting, storage and handling for crops, and provide advice on required equipment.. At the same time, it will seek alliances and partnerships with private sector actors who may already have access to the equipment and storage facilities. Alternatively, the project can leverage its close relationship with banks and financial institutions to help farmers attain access to finance for these types of post-harvest investments.

IV. Instrument and Budget Proposal

- 4.1. The project has a total cost of US\$1,940,412 of which US\$970,206 (50%) will be provided by the MIF through a non-reimbursable technical cooperation grant, and US\$970,206 (50%) through counterpart resources. The counterpart funding will be provided by INMED Caribbean (30%), the Caribbean Development Bank (11%), the Government of Jamaica (9%).
- 4.2. INMED Caribbean will receive a non-reimbursable technical cooperation grant. This instrument is warranted by the project's early stage efforts to develop a commercial market for aquaponics technology. Market uptake is still uncertain and grant support is required to crowd-in key market players and put in place an enabling environment for growth. The mechanics of the disbursements will be based on performance benchmarks.
- 4.3. **Retroactive Recognition of Counterpart Funds.** The project will retroactively recognize counterpart resources in the amount of US\$113,100 that were provided to INMED Caribbean by the United Nations Environmental Programme and Danish government partnership (UNEP-DTU Partnership or UDP) to undertake a market assessment and conduct work on the financial and business model for small-scale commercial aquaponics systems.

Project Categories	MIF (US\$)	Counterpart (US\$)	Total (US\$)
Component 1: Enhancing Technical and Business Capacity Through Aquaponics Training	670,400	501,909	1,172,309
Component 2: Strengthening stakeholder partnerships in Aquaponics Value Chain	46,600	137,067	183,667
Component 3: Structuring Aquaponics Financial Products	36,600	5,490	42,090
Scalability Strategy Activities	25,000	10,600	50,600
Project Administration (Executing Unit costs)	120,000	247,800	367,800
Monitoring, Mid Term and Final Reports	30,000	67,340	82,340
Ex Post Reviews	32,000		32,000
Contingencies	9,606		9,606
Grand Total	970,206	970,206	1,940,412
% of Financing	50%	50%	100%

V. Executing Agency (EA) and Implementation Structure

A. Executing Agency Description

- 5.1. INMED Caribbean will be the Executing Agency of this project and will sign the agreement with the Bank. INMED Partnerships for Children is an international NGO that has been working in Jamaica since 2002. INMED Caribbean is a locally incorporated subsidiary that has been developing aquaponics in Jamaica as a strategic approach to addressing the interrelated issues of poverty and food security, conservation of water and natural resources, and preparing local communities to adapt to climate change. During this time, the organization has demonstrated its technical capacity in the development of aquaponics system but also its capacity to engage a wide network of partners, buyers, financial institutions, government agencies and other stakeholders to collaborate in this initiative. These partners include:
- 5.2. **Leading private sector buyers and input suppliers:** INMED Caribbean has engaged selected buyers and wholesalers of fish and vegetables such as Grace Kennedy, RainForest Seafoods, and hoteliers such as Sandals and Round Hill Resort with a view to securing purchase commitments. Similarly, a group of pre-approved input suppliers has been identified to provide materials and inputs for the aquaponics systems.
- 5.3. **Financial Institutions:** INMED Caribbean has engaged several local banks (e.g. First Global, First Heritage Co-operative Credit Union Limited) to develop a loan program for aquaponics farmers. To further mobilize private funding, these loans would be covered by an 80 percent guarantee provided by the Development Bank of Jamaica.

- 5.4. **Public Sector:** The Ministry of Industry Commerce Agriculture and Fisheries, Ministry of Economic Growth and Job Creation will provide counterpart funding and will be involved in the delivery of technical assistance and extension services to aquaponics farmers through RADA and the College of Agriculture, Science and Education.

B. Implementation Structure and Mechanism

- 5.5. INMED Caribbean will establish an executing unit and the necessary structure to execute project activities and manage project resources effectively and efficiently. INMED Caribbean will also be responsible for providing progress reports on project implementation. Details on the structure of the execution unit and reporting requirements are in Annex V in the project technical files.
- 5.6. The project will be executed from INMED Caribbean's office in Kingston. The project execution unit will be staffed by a Project Manager, a Lead Extension Officer, and an Administrative Assistant/Accountant. The Project Manager will be responsible for the implementation of the work program and management of project staff. He will be supported by a field-based technical team of extension officers and an agri-business coach. The Project Manager and staff of the executing unit will be supervised by the Director of Global Partnerships at INMED's International Headquarters in Sterling, Virginia. The unit will also receive financial and administrative backstopping from accounting and monitoring and evaluation staff in headquarters.
- 5.7. A Steering Committee will be established to provide strategic oversight and guidance on project implementation. Its role will involve overseeing the delivery of the project outputs and the achievement of results. The committee will consist of representatives from the project's financial sponsors and key partners including: MIF, INMED, the Ministry of Industry Commerce Agriculture and Fisheries (MICAFA), Grace Kennedy Agro Processors, and the Development Bank of Jamaica. Other members may be invited to participate on an ad-hoc basis. The committee will meet quarterly to align with the milestones and reporting schedule of the project.

VI. Compliance with Milestones and Special Fiduciary Arrangements

- 6.1. **Disbursement by Results, Fiduciary Arrangements.** The Executing Agency will adhere to the standard MIF disbursement by results, Bank procurement policy⁶ and financial management⁷ arrangements as specified in Annex V and VI.

⁶ Link to the Policy: [Procurement of Works and Goods Policy](#)

⁷ Link to the document [Financial Management Operational Guidelines](#)