

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

HAITI

**AGRICULTURAL AND AGROFORESTRY TECHNOLOGICAL INNOVATION
PROGRAM - PITAG**

(HA-L1107, HA-G1038)

GRANT PROPOSAL

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ELECTRONIC LINKS

REQUIRED (REL)

1. [Pluriannual Execution Plan \(PEP\) and Annual Operational Plan \(POA\)](#)
2. [Monitoring and Evaluation Arrangements](#)
3. [Environmental and Social Management Report \(ESMR\)](#)
4. [Procurement Plan](#)

OPTIONAL (OEL)

1. [Technical Documents for Component I](#)
2. [Technical Documents for Component II](#)
3. [Economic Analysis](#)
4. [Draft Operational Manual](#)
5. [Technical References](#)
6. [Safeguard Policy Filter \(SPF\) and Safeguard Screening Form \(SSF\)](#)

ABBREVIATIONS	
APAGRO	Agroalimentary Productive Support Program
CIRAD	<i>Centre de Coopération Internationale en Recherche Agronomique pour le Développement</i>
CRF	Corporate Results Framework
CRI	Climate Risk Index
CRIAR	Direct Supports for the Creation of Rural Agrifood Initiatives
IDB	Inter-American Development Bank
IFAD	International Fund for Agricultural Development
IICA	Inter-American Institute for Cooperation on Agriculture
INDC	Intended National Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
EA	Executing Agency
ESMP	Environmental and Social Management Plan
ESMR	Environmental and Social Management Report
ESS	Environmental and Social Strategy
FAMV	Faculty of Agronomy and Veterinary Medicine
FAO	Food and Agriculture Organization of the United Nations
FIES	Food Insecurity Experience Scale
FONRED	<i>Fonds national de recherche pour un développement durable</i>
GAfsp	Global Agriculture and Food Security Program
GDP	Gross Domestic Product
GHI	Global Hunger Index
GSSE	General Services Support Estimate
KBA	Key Biodiversity Areas
LAC	Latin America and the Caribbean
MARENA	Natural Resources and Water Basins Management Program
MARNDR	Ministry of Agriculture, Natural Resources and Rural Development
MOU	Memorandum of Understanding
NAIP	National Agriculture Investment Plan
PAES	Environmental Program of El Salvador
PATCA	Technological Innovation Program
PEU	Project Execution Unit
PITAG	Agricultural and Agroforestry Technological Innovation Program
PMDN	Natural Disaster Mitigation Program
POD	Proposal for Operation Development
POM	Program Operating Manual
PSE	Producer Support Estimate
PSG	Project Specific Grant
PTTA	Technology Transfer to Small Farmers Program
RESEpAG	Agricultural Services Strengthening Program
RGA	General Agricultural Census

ABBREVIATIONS

SECAL	Food Security Support Program
SIGI	<i>Système Intégré de Gestion des Informations</i>
SME	Small and Medium Enterprises
SPF	Safeguard Policy Filter
SSF	Safeguard Screening Form
TSE	Total Support Estimate
UEP	Studies and Planning Unit
UNDP	United Nations Development Program
UPMP	<i>Unité de Passation des Marchés Publics</i>
USAID	United States Agency for International Development
WFP	World Food Program

PROJECT SUMMARY

HAITI

AGRICULTURAL AND AGROFORESTRY TECHNOLOGICAL INNOVATION PROGRAM - PITAG

(HA-L1107, HA-G1038)

Financial Terms and Conditions				
Beneficiary: Republic of Haiti			Amortization Period:	N/A
Executing Agency (EA): Ministry of Agriculture, Natural Resources and Rural Development (MARNDR)			Disbursement Period:	60 months
Source	Amount (US\$)	%	Grace Period:	N/A
IDB (Grant Facility – HA-L1107):	55,000,000	71.6	Supervision and Inspection Fee:	N/A
Other/Co-financing (GAFSP – HA-G1038):	10,000,000	13	Interest rate:	N/A
Other/Co-financing (IFAD)^(a):	10,859,305	14.1	Credit Fee:	N/A
Local:	1,000,000	1.3	Currency of Approval:	US Dollars
Total:	76,859,305	100		
Project at a Glance				
Project Objective/Description: The general objectives of the program are to increase agricultural income and food security for smallholder farmers in selected areas of Haiti. The specific objectives are to increase agricultural productivity and improve the use of natural capital through the adoption of sustainable technologies.				
Special Contractual Clauses prior to the first disbursement of the financing: (i) the approval by the Executing Agency and entry into effect of the Program Operating Manual (POM) according to the terms and conditions previously agreed with the Bank (¶13.1); (ii) see Annex III that includes a special disbursement; and (iii) see Environmental and Social Management Report (ESMR) (REL-3).				
Special Contractual Clauses of execution: see (i) ESMR (REL-3); and (ii) special execution requirements contained in Annex III.				
Exceptions to Bank Policies: None.				
Strategic Alignment				
Challenges^(b):	SI <input type="checkbox"/>	PI <input checked="" type="checkbox"/>	EI <input type="checkbox"/>	
Cross-Cutting Themes^(c):	GD <input checked="" type="checkbox"/>	CC <input checked="" type="checkbox"/>	IC <input type="checkbox"/>	

^(a) International Fund for Agricultural Development (IFAD) contribution is, as of today, parallel (co-financing) but might be received by the Bank as a Project Specific Grant (PSG), subject to IFAD's Board approval.

^(b) SI (Social Inclusion and Equality); PI (Productivity and Innovation); and EI (Economic Integration).

^(c) GD (Gender Equality and Diversity); CC (Climate Change and Environmental Sustainability); and IC (Institutional Capacity and Rule of Law).

I. DESCRIPTION AND RESULTS MONITORING

A. Background, Problem Addressed, and Justification

- 1.1 **The agricultural sector and food security in Haiti.** With a per capita annual Gross Domestic Product (GDP) of US\$818 (2015) and 59% of the population living in poverty ([World Bank, 2012](#)),¹ Haiti stands among the poorest countries in the world. The United Nations Development Program (UNDP) Human Development Index's socio-economic indicators for 2014 placed Haiti 163rd out of 188 countries.² According to the World Bank Group,³ in rural areas, the poverty rate is even higher (75%), and more than 80% of Haitians who live in extreme poverty live in rural areas, where access to basic services remains very limited. In fact, it is estimated that only 10% of the rural population has access to electricity and less than 8% to drinkable water.
- 1.2 **Food insecurity is widespread in Haiti.** The country is ranked 115th out of 118 countries in the 2016 Global Hunger Index (GHI). Results of a recent World Food Program (WFP) analysis (2015) indicate that approximately 47% of the households are moderately or severely food insecure. In addition, households with children of less than five years of age are much more exposed to frequent food shortages.⁴ Therefore, one fifth of children less than five years old are chronically malnourished ([DHS, 2012](#)).⁵
- 1.3 In this setting, the performance of the agricultural sector is strategic to help raise rural households' incomes and improve their food security. The sector contributes 25% of GDP and 85% of employment in rural areas ([UNDP, 2015](#)). Haitian agriculture, though, presents very low levels of productivity, even when compared to other countries in the region (Table I-1 shows yields for the main crops grown in Haiti as a proxy for productivity), and per capita income in the Haitian agricultural sector has stagnated in recent years. Annual agricultural GDP per capita is currently estimated at US\$400 per year.

Table I-1. Yields for main Haitian crops compared to regional yields*

Product	Haiti's yields as % average yields in Central America and the Caribbean
Cocoa	99%
Mango	91%
Sorghum	39%
Avocado	47%
Banana	25%

* Countries considered for this comparison are Central American and Caribbean countries included in the FAOSTAT database, years 2010-2014.

- 1.4 Agricultural productivity can be influenced by a wide range of factors such as land tenure status, human capital level, availability of agricultural inputs, access to finance, agricultural services provision (such as information, agricultural research

¹ Please see [OEL-5](#) for complete Technical References.

² UNDP Human Development Index.

³ Haiti: Des opportunités pour tous-Diagnostic-Pays Systématique, May 2015.

⁴ World Bank and ONPES, 2014.

⁵ Haiti Demographic and Health Surveys.

and technology transfer, irrigation, agricultural health and food safety) and macroeconomic and trade policies. Some of the main factors that exacerbate low productivity include:

- a. **Low level of investment and access to technologies.** Most producers in Haiti are still using basic techniques predominantly for subsistence agriculture and lack of access to certified high-quality seeds, appropriate soil conservation techniques, inputs for production (i.e. pesticides and fertilizers)⁶ as well as basic tools and equipment. The General Agricultural Census (RGA) shows that only 7% of the farmers used mechanical equipment. Also, the baseline data collected for Technology Transfer to Small Farmers Program (PTTA) show that only 9% of the farmers had used improved seeds and only 22% have knowledge of certified seeds. The number of providers is limited in the country and their geographical locations do not allow to serve the vast majority of smallholder farmers.⁷ In addition, a constrained access to factors of production (capital, land, labor, water availability)⁸ greatly limits the capability of farmers to increase productivity. This is explained in part by the significant financial constraints faced by farmers, due notably to the lack of agricultural credit, particularly in rural areas, where financial markets are thin or non-existent. Data collected for the evaluation of the agroforestry technology provided by PT TA in the North Department show that 28% of the farmers have a bank account and 19% have received a credit for agricultural purposes. Lack of information about existing technologies, farming techniques, access to markets, natural risks and climate change is also a contributing factor.
- b. **Lack of financial and human resources to develop agricultural innovation.** Agricultural research and extension has been virtually non-existent in Haiti for nearly three decades, ([Cirad, 2015](#)). Aggregate numbers show that over the last three decades technical efficiency in the Haitian agricultural sector has fallen drastically, at a -1.8% average yearly rate ([Nin-Pratt, A. et al. 2015](#)). Factors that contribute to explain these findings are the outdated institutional research framework, and the lack of technology transfer and extension systems. The lack of local expertise in applied and adaptive agricultural research as well as technology transfer is in turn partially explained by the very limited training and educational opportunities in these areas (some universities, such as FAMV, offer academic courses, but the quality of their curriculum remains low).⁹ The institution in charge of agricultural research is the Innovation Directorate of the MARNDR, which has 71 employees distributed across the country, with only 6% of them having an education sufficient to conduct research activities. The 2009 RGA reports that 43% of the farmers identified weak agricultural research and extension services as a constraint for the development of the sector. Moreover, only 2.6% of farmers mentioned receiving some type of technical assistance.

⁶ In a study conducted by USAID in the North of Haiti in 2017, it is estimated that 28% of farmers use pesticide. Fertilizers is used by 4% of cacao producers, 13% of banana producers and 95% of rice producers.

⁷ See Technical Document for Component II (Bellande, 2016).

⁸ Only 13% of agricultural land has access to water, according to the 2009 General Agricultural Census.

⁹ [Cirad, 2015](#).

- c. **Climate risks.** Haiti is one of the countries with the highest Climate Risk Index ([CRI Germanwatch, 2016](#)) and natural disaster risk index in the world ([WB, 2005](#); [UNDP, 2004](#)), including climate hazards ([Kreft et al., 2015](#)). The climatic risks faced by farmers and their ability to cope with them also limit the long-term growth of the productivity of the agricultural sector in Haiti, especially in a context where watersheds are characterized by severe soil erosion risk and, on average, 50% of the upper watersheds is deforested.¹⁰ For instance, hurricane Matthew caused severe economic damages and estimated losses that amounted to US\$1.9 billion. The damages and losses in perennial crops (coffee, cocoa, breadfruit, coconut, avocado, citrus and other fruit), which are extremely important for food security and rural income, were particularly high and represented US\$433 million, further decreasing capital assets and sources of income for Haitian farmers. For the future, climate models predict temperatures to increase up to 0.8°C for the 2020s; and precipitation scenarios a drying trend in the mid-2020s with 3 to 4% less rainfall in the annual mean (IDB, 2016), translating into losses of 25% in average key crops such as banana, manioc and beans ([UNDP, 2015](#)). The limited access of farmers to agricultural technologies (§1.4a) reduces their ability to cope with these natural and climate risks.
- 1.5 **The agricultural sector policy context.** According to the Inter-American Development Bank (IDB) Agrimonitor database, total public support to the agricultural sector represented, on average, 5.3% of GDP in the period 2006-2012, but only 3.2% of the resources are allocated to finance public goods (the lowest level in Latin America and the Caribbean (LAC), with funding to research basically inexistent), although, in LAC, such public spending has proven higher economic return rates than expenditures directed to the financing of private goods ([Anriquez et al., 2016](#)).
 - 1.6 **Recent reforms.** In recent years, the Government of Haiti, with the support of the IDB through Policy Grants 2731/GR-HA and 2945/GR-HA, has progressed in key areas of agricultural policy that would improve agricultural productivity and competitiveness in Haiti, as summarized below.
 - a. **Agricultural Research.** In 2013 the Ministry of Agriculture, Natural Resources and Rural Development (MARNDR) and other agricultural research stakeholders, with the support of the IDB: (i) reviewed and analyzed the agricultural research programs and activities implemented in the last three decades; (ii) worked on the strategic issues on which research financing should focus; and (iii) reviewed different research financing instruments. This work resulted in the drafting of a new research institutional framework and a financing mechanism (*Fonds National de Recherche pour un Développement Durable*, FONRED), which is expected to be implemented in 2017.

¹⁰ Agricultural exploitation stressed the environment and have led to soil erosion and deforestation to be endemic problems in Haiti (McClintock, 2003). The great deforestation of the country began during the colonial period and was intensified in 1730 with coffee introduction, then other agricultural practices as monoculture and clean-cultivation caused rapid erosion and exhausted soil nutrients (Paskett and Philoctete, 1990). Most hillsides are eroded and a third of the land is severely degraded (White and Jickling, 1995). Also, gully erosion is chronic, which compromises soil fertility, infrastructure quality, and productivity (Wahab et al., 1986).

- b. **Farmers’ access to technologies.** A two-fold strategic approach was proposed to address the limited access of farmers to improved technologies: (i) create a legal and policy framework for a modern agricultural research system in the country (see above); and (ii) expand progressively the incipient market-friendly system of “smart subsidies” for promoting the adoption of agricultural technologies, reducing the supply-driven distribution of subsidized inputs and avoiding the crowding out of private suppliers.
 - c. **Institutional reform of the Ministry of Agriculture.** In 2013, the MARDNR created a procurement unit (UPMP, *Unité de Passation des Marchés Publics*) to improve its capacity to absorb and administer financial resources. The Studies and Planning Unit (UEP) was staffed with high-level professionals, and launched the preparation of programmatic plans, with the objective of rationalizing budget preparation.
- 1.7 In Haiti, the Bank is already financing investments for the provision of several agricultural public goods (agricultural health and food safety, land administration, fisheries management, rural infrastructure) through the following operations: Natural Disaster Mitigation Program II (3622/GR-HA), Artisanal Fisheries Development Program (3492/GR-HA), Modernization of Public Agricultural Health Services (3260/GR-HA) and Land Tenure Security Program in Rural Areas (2720/GR-HA). Investments in agricultural research and technology transfer complement the existing portfolio.
 - 1.8 **Synergies with other initiatives.** Several national and international institutions are partnering with the MARNDNR on the provision of incentives to smallholder farmers and on applied agricultural research and training in Haiti: (i) the World Bank, USAID and the French Development Agency for the agricultural incentives program; and (ii) FAO, the Embassy of France in Haiti, USAID, IICA, the University of Quisqueya, the Faculty of Agronomy and Veterinary Medicine (FAMV), and NGOs for applied agricultural research and training.
 - 1.9 On the Bank side, the second phase of the Natural Disaster Mitigation Program (PMDN II - HA-L1097/HA-G1031), implemented by the MARNDNR since 2016, offers possible synergies, notably related to watershed protection (combination of infrastructure provided by PMDN and sustainable farming practices promoted by PITAG), and to the strengthening of the FAMV curriculum. Other synergies (both on content and geographical areas) are envisaged with the Land Tenure Security Program in Rural Areas (2720/GR-HA), Water Management Program in the Artibonite Basin (3089/GR-HA), the Program to Establish a Partial Credit Guarantee Fund for Enterprise Development (2416/GR-HA), and MIF interventions in all suitable intervention areas. Collaboration with the last two programs will be particularly useful to facilitate the integration of farmers into the value chain and their access to broader markets.
 - 1.10 In order to maximize synergies, avoid duplication and adequately define the activities of PITAG, a coordination process was conducted with the various initiatives of the institutions listed above and will be continued during program execution through regular meetings and especially through the Agricultural Sectorial Group (a donor coordination mechanisms) that the Bank’s chairs in Haiti.

- 1.11 **Lessons Learned.** During the period 2011-2016, the MARNDR implemented the PTTA (2562/GR-HA), through funding provided by the Bank and the Global Agriculture and Food Security Program (GAFSP), and the Natural Disaster Mitigation Program (PMDN – 2187/GR-HA). These programs covered a total area of 20,240 hectares across the South, North and Northeast departments. They benefitted a total of 43,956 small agricultural producers: 9,043 for PMDN and 34,913 for PTTA 1. While PMDN focused on the promotion of agroforestry technological packages, PTTA promoted technological packages for irrigation, sisal, annual crops (rice, sweet potato, peanuts and vegetables), and agroforestry (coffee, cocoa, diversified crop systems). Qualitative and quantitative evaluations assessed that with an average adoption rate of 80%, and with average incentive values of US\$595/farmer for PMDN and US\$700/farmer for PTTA, agroforestry technological packages have generated positive results, since they contributed to the reforestation of about 13,082 hectares in the country, and led to significant increases in gross value added per plot ranging from 10% to 109%. The evaluations also found that results have been more limited for the annual crops (rice and vegetables), with no significant improvement of gross value added, since farmers did not modify their agricultural production practices. However, the subsidies contributed to reduce farmer decapitalization, as farmers used the vouchers to avoid selling cattle (an average effect of US\$227) or contract informal and expensive credit to buy agricultural inputs (a 10% points difference between treatment and control groups).
- 1.12 From a conceptual and operational standpoint, the proposed operation has been therefore designed on the basis of the lessons learned through PTTA and several other programs that implemented similar incentive mechanisms in Haiti: (i) the Agricultural Services Strengthening Program I and II (RESEPAG), financed by the World Bank and GAFSP; (ii) the Natural Disaster Mitigation Program II (PMDN II- 3622/GR-HA), financed by Bank; and (iii) the Food Security Support Program (SECAL), financed by the European Union and the French Development Agency. Other similar programs have been financed by the IDB in other countries, such as: (i) the Direct Supports for the Creation of Rural Agrifood Initiatives II (CRIAR) in Bolivia (3536/BL-BO); (ii) the Agroalimentary Productive Support Program (APAGRO) in Nicaragua (2055/BL-NI); and (iii) the Technological Innovation Program II (PATCA) in the Dominican Republic (2443/OC-DR). In addition to the lessons learned through the aforementioned operations, the design of the proposed operation takes into account: (i) the Review of the Bank's Support to Agriculture, 2002-2014, published (OVE, 2015); and (ii) the analysis of the performance of the incentive mechanism of the programs implemented in Haiti (IRAM, 2015). The main lessons learned and their inclusion in the design of the program are summarized in Table I-2.

Table I-2. Incorporation of Lessons Learned in the Design of the Proposed Program

Lesson Learned	Source of the Lesson	How the lesson shaped the design of the program
(i) PTTA provided vouchers to rice and vegetable producers in order to purchase inputs such as labor, fertilizer, and pesticides. The results of the evaluation show that while the vouchers led to some adjustments in crop choices and input use, these changes did not translate into increased agricultural productivity or income.	A randomized control trial impact evaluation of PTTA (rice and vegetable vouchers) (Gignoux et al., 2016).	Agricultural and Agroforestry Technological Innovation Program (PITAG) shifts its focus from subsidies to inputs that are widely known and used by farmers (i.e. most rice-growers reported to have applied urea (88%), other chemical fertilizer (71%), and pesticide (79%) in the baseline survey), towards the promotion of more suitable technologies and agroforestry systems, which enhance soil conservation and generate positive environmental externalities.
(ii) Agroforestry vouchers could be used for services such as pruning and grafting, or inputs such as seedlings and pesticides. The evaluation shows that, compared to the control group, beneficiary farmers increased the total number of plots planted and specifically the number of plots with annual crops. The project also had a positive impact on the use of labor and increased the expenditure in permanent seedlings. In addition, the program determined a 23% increase in farmers' expected production, 38% in expected income and 78% in expected profits.	An impact evaluation using a propensity score matching on agroforestry vouchers provided by PTTA (Fahsbender et al., 2017)	
(iii) Include robust monitoring and evaluation arrangements in project design that will establish with certainty which elements of the program are effective.	OVE, 2015	PITAG is built on the lessons learned through rigorous impact evaluations, and will measure its impacts through a rigorous monitoring and evaluation strategy.
(iv) In designing projects, place as much emphasis on technical assistance as on the productive capital goods to be offered to beneficiaries.	OVE, 2015	Technical assistance to farmers and technology providers has been strengthened in PITAG, through specific activities included in Component II.
(v) The design of new technological packages must be directly related to the results of applied agricultural research, while considering the diversity of climates and social contexts in which they will be implemented.	IRAM, 2015; PMDN I Mid-Term and Final Evaluations	PITAG includes applied research component (Component I).
(vi) The menu of technologies should be designed as to enhance agricultural productivity and contribute to climate change adaptation, without damaging the environment. Also, the promotion of technologies and practices should be avoided if certain conditions related to access to factors of production (especially water) are not fulfilled.	IRAM, 2015; PMDN I Mid-Term and Final Evaluations	PITAG makes a particular effort at identifying specific technologies that will facilitate climate change adaptation.
(vii) It is necessary to develop synergies and complementarities among projects at local level (i.e., watershed protection through the combination of infrastructure, adoption of sustainable cropping practices and land tenure security; value chain development through support to agribusiness and Small and Medium Enterprises (SME) and adoption of sustainable cropping practices) to maximize impacts.	PMDN I Mid-Term and Final Evaluations	PITAG is designed in coordination with other complementary initiatives (see par. 2.7-2.9).

- 1.13 **Justification for public intervention.** From an economic perspective, several reasons justify public investment in agricultural research and training, as well as technology transfer services to farmers. Public investment in agricultural research and technology transfer schemes show high rates of social and economic returns (Alston et al., 2000). In addition, the proposed program will focus its support in promoting technologies (mainly agroforestry) that will generate positive environmental externalities. Moreover, with regards to technology transfer interventions, the literature also recognizes the existence of several market failures that hinder the process of agricultural technology adoption in developing countries, including: (i) lack of access to information and/or asymmetric information; (ii) input and output market inefficiencies ([Feder, Just and Zilberman, 1985](#); [Jack, 2013](#)); (iii) liquidity constraints and insufficient access to credit; and (iv) risk aversion.
- 1.14 The lack of information limits technology adoption not only because agricultural producers lack knowledge on the effective use of these technologies, but also because they lack information regarding location of private providers or costs of production. For instance, in the case of Nepal, Joshi and Pandey (2005) show that farmers' perceptions regarding different rice varieties influence adoption decisions. Therefore, the authors conclude that it is important to disseminate information broadly using different methods to form accurate perceptions of the technologies to be promoted among farmers. Similarly, Conley and Udry (2004) demonstrate the importance of learning and information effects on the technological adoption in Ghana. Specifically, the authors show that pineapple producers changed their input use patterns only when they gained access to information regarding production yields from neighboring farmers. Finally, Bentley et. al (2011) measured the effect of farmers' field schools where free information regarding plant health and agricultural practices is provided to farmers in Bolivia. The authors found that adoption rates are higher (about 82%) for producers who received the information, in comparison with the control group.
- 1.15 As for the presence of thin markets for technology providers in rural regions, this is mainly caused by the small population density spread in remote and large areas without accessible roads and high transaction costs ([IFAD, 2003](#)). Therefore, it is not profitable for technology providers to be located in areas under these conditions without certainty of a demand for their technologies. On the other hand, it is difficult for farmers to reach technology providers as these are primarily located in urban or suburban areas. The presence of liquidity constraints and credit restrictions is one of the principal factors that limit smallholder farmers' technology adoption, as mentioned in ¶1.4.
- 1.16 Finally, the fourth obstacle that limits technology adoption is risk aversion. This factor limits technology adoption because producers prefer certainty regarding the future yields that will be obtained with new technologies before incurring the initial cost. Thus, producers tend to postpone technology investments until they can confirm the benefits associated with the adoption of such technologies through experience from other farmers (Feder, 1980). Several studies provide evidence on the negative impact of risk aversion on technology adoption such as Abadi Ghadim, Pannell y Burton (2005) and Besley and Case (1994), which in the case of Haiti could be further accentuated by climate uncertainty.

- 1.17 The Agricultural and Agroforestry Technological Innovation Program (PITAG) aims to improve technology adoption by reducing the aforementioned market failures. Specifically, the provision of a matching grant that partially covers the cost of an agricultural technology aims to ease liquidity and credit constraints faced by smallholder farmers. Secondly, the provision of technical assistance to farmers aims to reduce the barriers related to risk aversion and information asymmetry. Lastly, the implementation of technology fairs aims to reduce the lack of information and eliminate problems related to shortage of supply and thin markets by bringing together demand (small farmers) and supply (technology private providers). Given the ability of the program to mitigate these three market failures, together with high social returns of agricultural research and technology transfer and the positive environmental externalities the program would produce, public intervention is justified.
- 1.18 **Evidence of the relevance of the selected thematic areas of intervention.** Agricultural productivity can be influenced by a wide range of factors such as land tenure status, human capital level, availability of agricultural inputs, climate change, access to finance, the provision of agricultural services (such as information, agricultural innovation, irrigation, agricultural health and food safety) and macroeconomic and trade policies. A strategy to improve the agricultural sector's performance requires a set of well-defined policies geared towards promoting efficient factor and product markets.
- 1.19 The economic literature presents ample evidence of the linkage between agricultural services and agricultural productivity, which is a main driver of competitiveness. Research and technology transfer have been shown to be among the key determining factors of improvements in agricultural productivity over the past 50 years ([Pardey et al., 2012](#)). Food and Agriculture Organization of the United Nations ([FAO, 2012](#)) reports that research and technology transfers are priorities in order to meet the growing demand for food because of their high returns. Specific studies obtain rates of return ranging from 43% to 67% for investments in research and technology transfer ([Alston et al, 2014](#); [Jin and Huffman, 2015](#)).
- 1.20 In addition to the PTTA impact evaluations (mentioned above), other studies have analyzed the impact of similar programs in Latin America and the Caribbean. Gonzalez et. al. (2009) evaluate the impact of an agricultural technology transfer program, Technological Support in the Agricultural Sector, that aims to reduce the barriers that limit technology adoption among farmers in the Dominican Republic. The study presents evidence that the adoption of the promoted technologies increases productivity levels for beneficiary producers of rice and livestock. As for technologies that aim to increase agricultural productivity through the promotion of environmentally friendly technologies, there is evidence of their impact on income and productivity. Specifically, different studies of the Environmental Program of El Salvador (PAES), which promoted the adoption of conservation technologies and product diversification show that the project had positive effect on household income ([Cocchi and Bravo-Ureta, 2007](#); [Bravo-Ureta, 2006](#)). Also, ([Bravo-Ureta et al. \(2010\)](#)) analyze the impact of the Natural Resources and Water Basins Management Program (MARENA) in Honduras, which promoted agroforestry and soil conservation technologies with the goal to increase diversified farming and

enhance soil, water and forest management. They find positive results of the project on the total value of agricultural production.

- 1.21 The adoption of sustainable practices can increase the resilience of crop yields, which are expected to drop between 5-10% by 2060 because of temperature increase and shift in precipitation patterns,¹¹ and improve watershed management and soil conservation. The promotion of resilient crops, through the adoption and multiplication of agroforestry, and the dissemination of climate change awareness has proven to increase system resilience and, therefore, enhance livelihoods. For example, use of cover crops in Brazil over maize increased its production by 198-246% ([Altieri, 2001](#)), and intercropping can enhance soil fertility, reduce reliance on chemical fertilizers, and therefore reduce the carbon footprint of the agricultural sector ([Conant, 2010](#)).
- 1.22 Finally, with regards to food security, ([Salazar et. al., 2016](#)) assesses the impact of the CRIAR program in Bolivia that aims to improve access to agricultural technologies through a voucher-based subsidy scheme. The results show that beneficiary households are 20–30% more likely to be food secure than the control group and 22% less likely to be concerned about lack of food. This increase was driven both by food availability and food access. The annual value of production per hectare increased by 92% and the value of production sold by 360%, and the results also show that participation in CRIAR increased net annual agricultural household income by 36% and per capita household income by 19%. Also, an ongoing study of the PATCA II, that provides voucher-based subsidies to farmers to improve agricultural technology adoption, shows that beneficiary farmers increased food security by 27% (Salazar et. al., 2016).
- 1.23 **Consistency with national priorities.** The proposed program is consistent with the 2010-2025 Agriculture Policy Document, the 2010-2016 and 2016-2021 National Agriculture Investment Plan (NAIP), the 2011-2016 Agricultural Extension Plan, and Haiti's Intended National Determined Contribution (INDC, 2015). These documents envision to build-up and strengthen a modern agricultural sector based on the efficiency and effectiveness of family agriculture and agribusiness.
- 1.24 **Strategic alignment.** The program is consistent with the Update to the Institutional Strategy (UIS) 2010-2020 (AB-3008) and is strategically aligned with the development challenges of: (i) productivity and innovation, through the generation of sustainable agricultural technologies and improving access to those technologies, as reflected by the impact indicator "Annual household value of agricultural production." The program is also aligned to the cross-cutting themes of: (i) climate change and environmental sustainability, through the generation and promotion of climate change adaptation and sustainable technologies, as reflected in the result indicators "Beneficiaries who adopted soil protection and restoration

¹¹ According to a vulnerability study for the agricultural sector in Haiti's National Adaptation Plan of Action (PANA), the temperature increase is estimated to vary between 1°C by 2030 and up to 1.7°C by 2060 and precipitation patterns are expected to decrease between 20% by 2030 and up to 35.8% by 2060, with a specific impact on irrigated crops. Corn projection scenarios foresee a decrease of 4% by 2030 and 7.7% by 2060; b) for rice decreases will attain 9% by 2030 and 15% by 2060 and potato will reach a 5% decrease by 2030 and 10% by 2060.

technologies,” “Additional hectares of land applying agroforestry technologies,” and (ii) gender equality and diversity, through the reduction of gender inequalities and the promotion of women’s participation, as reflected in the result indicator “Women beneficiaries of economic empowerment initiatives.” The program contributes to the Corporate Results Framework (CRF) 2016-2019 (GN-2727-6) through the indicators of: “beneficiaries of improved management and sustainable use of natural capital,” “women beneficiaries of economic empowerment initiatives,” “farmers with improved access to agricultural services and investments” and “beneficiaries of IDBG projects that contribute to at least one key dimension of food security. The program is aligned with the Bank’s Country Strategy with Haiti 2011-2015¹² (GN-2646), which sets agriculture as a priority sector of intervention. The program is also included in the 2017 Operational Program Report (GN-2884) and is aligned with the Country Strategic Objective “Protect the environment, respond to climate change and enhance food security”. The program is also consistent with the “Agriculture and Natural Resources Management Sector Framework Document” (GN-2709-5) as it focuses on the provision of public agricultural goods and promotes access to technology, with the “Food Security Sector Framework” (GN-2825-3), as it will increase agricultural productivity and therefore contribute to food security, and the “Climate Change Sector Framework” (GN-2835-3) as the program enhances resiliency of vulnerable farmer communities through adaptation measures. According to the [joint MDB approach](#) on climate finance tracking, an estimated 64.56% of total IDB funding for this project result in climate change mitigation and adaptation activities. This contributes to the IDBG’s climate finance goal of 30% of combined IDB and IIC operational approvals by year’s end 2020.

- 1.25 **Gender mainstreaming.** In the context of PTTA, a gender gap analysis was conducted. This study combined qualitative data from focus groups and quantitative data from the baseline survey. The main conclusions are the following: (i) women heads of household have less time to allocate to agricultural activities and therefore, have higher labor expenditures than men (310 Gdes vs. 280 Gdes); (ii) women heads of household have smaller plots and less access to land; (iii) women sell a lower proportion of their production and allocate more to home consumption compared to men (52% vs. 64% in the case of rice); (iv) more female-headed households face severe food insecurity (86% vs 71%); (v) female-head of households are less educated than men (55% never attended school vs. 30%); and (vi) female-headed households have lower annual income (US\$176 vs. US\$347) (Coelho, 2015).
- 1.26 As a result of the gender gap assessment the following activities will be included as part of PITAG, with the objective of reducing gender inequalities and promoting women’s participation. First, PITAG will include an information campaign that targets women directly. Second, Component I will allocate financial resources to five applied research projects with the objective of developing new agricultural technologies that are directly targeted towards women’s needs or crops usually grown by women. Third, Component II will promote post-harvest technologies that are targeted towards agricultural activities usually conducted by women (i.e. mills and moisture meters). Fourth, the agroforestry packages will include crop varieties that aim to reduce food insecurity such as moringa and mirlinton, which are usually

¹² Currently in effect until December 2017 (GN-2646-2).

grown by female farmers. Fifth, the program will be monitored and evaluated using sex-disaggregated indicators.

- 1.27 **Climate change.** The National Determined Contribution of Haiti defines a conditional target of 31% GHG emissions reduction, and includes key agricultural adaptation and mitigation actions such as development of crops resilient to climate change, sustainable practices and conservation of agricultural genetic resources, soils and water resources to attain its commitment. The program contributes to the NDC target through the development and promotion of sustainable and climate resilient technologies (mainly focusing on agroforestry packages), which will also contribute to the reforestation of the country and the reduction of net emissions.¹³

B. Objective, Components and Cost

- 1.28 The general objectives of the program are to increase agricultural income and food security for smallholder farmers in selected areas of Haiti. The specific objectives are to increase agricultural productivity and improve the use of natural capital through the adoption of sustainable technologies. The channels through which increases in agricultural productivity are expected to increase food security are twofold. First, higher agricultural productivity will translate into higher agricultural yields, increasing food production for home-consumption. Second, higher agricultural productivity will increase agricultural income from increased production sales which, in turn, will improve household's purchasing power for, amongst other goods, foodstuffs. To achieve its objectives, the program will be structured in two components.

- 1.29 **Component I. Applied research and training (US\$14,600,000).** The objective of this component is to generate and disseminate applied agricultural research and it will finance the following activities: (i) applied and adaptive agricultural research projects developed and implemented by national and/or international institutions. These research projects will create, improve and/or adapt sustainable agricultural technologies that will enhance the supply of technological options available to farmers. Eight main projects (total budget: US\$9,318,000) were identified through a prioritization exercise based on an index that summarized economic, social, and environmental indicators as well as the yield gap *vis-à-vis* other countries in the region. All research projects will include climate considerations and foster adaptation and mitigation measures. Seven additional smaller projects will be demand-driven (total budget: US\$3,080,000) and will be selected through a similar prioritization exercise; (ii) the strengthening of the higher education curriculum through activities conducted within the research projects (scholarships, among others), in order to improve applied and adaptive research and technology transfer capabilities in Haiti; and (iii) the institutional strengthening of the MARNDR Innovation Directorate (ID), through: (a) technical and scientific support; (b) materials and equipment; (c) strengthening of the technical and scientific profile of its professionals; and (d) an innovation information system. The component will be executed by the ID of the MARNDR. The selection of the various proposals will be conducted by a panel composed by Ministry staff and external experts (faculty

¹³ According to the Intergovernmental Panel on Climate Change (IPCC), agroforestry is a climate smart practice, as it has a mitigation potential of 1.1–2.2 Pg carbon over the next 50 years and also provides proven resiliency assets.

members from Haiti and abroad). The results of Component I will progressively provide inputs for the technology menu promoted by Component II, including climate considerations. A behavioral study will be also conducted to determine farmers' willingness to pay for the new technologies (resulting from the adaptive research) to be introduced in the menu. The activities of the component are consistent with the recent reforms supported by the IDB as represents a first opportunity of application of the FONRED guidelines, whose development was supported by the IDB.

1.30 **Component II: Promotion of sustainable agricultural technologies (US\$55,909,305).**

This component will finance the adoption of profitable, climate smart, and sustainable agricultural technologies that will improve farm profitability, generate positive environmental externalities, and facilitate the mitigation of and adaptation to climate change. The component will be implemented through the agricultural incentives mechanism implemented by the MARNDR. A preliminary technology menu has been selected through a prioritization exercise based on the relative importance of the different crops, their socio-economic relevance and their environmental sustainability. This menu will include: pre-harvest, harvest and post-harvest technologies, as well as sustainable soil recovery and conservation practices (i.e. agro-forestry systems, sustainable soil management techniques).¹⁴ This menu will be updated each year, taking into consideration the results of Component I. To become beneficiaries of this component, interested farmers will participate in a series of fairs that will be organized to match demand and supply for the various technologies. The component will cover 90%¹⁵ of the costs of the technologies through a matching grant, and farmers will cover, in cash, the remaining 10%. The maximum amount of subsidy will depend on the specific technology chosen by farmers and will go up to US\$2,000, with a weighted average of US\$950. Given the damages experienced by farmers in the areas affected by hurricane Matthew (South and Grand'Anse Departments), the component will finance the total cost of the technologies in these regions. The demonstrated results of the selected technologies ensure the sustainability of the intervention (see Table I-2). The component will also finance: an information system for program implementation, technical assistance for farmers (specific assistance on how to choose and apply the technologies and general, strategic assistance on farm management and commercialization), and technical assistance for technology providers (mainly focused on quality control and environmental management). Technical operators will facilitate the implementation of the Program in the different intervention areas.

- 1.31 **Other project costs (US\$6,350,000).** Other activities to be financed include: (i) administration (e.g., consultants, travel, equipment, operational costs, audits); (ii) mid-term, final, and impact evaluations; and (iii) contingencies.

C. Key Results Indicators

- 1.32 The Results Framework (Annex II) has been agreed with the Government of Haiti and includes the program's objectives, impacts, results and products, as well as

¹⁴ The initial list of technologies includes: motor-pompes, animal traction, cane mills, threshers, stocking equipment, different types of agroforestry packages, different types of forestry packages, forages.

¹⁵ This percentage is meant to represent an average across technologies, and was determined on the basis of previous experiences, income data, and indicators collected during the evaluation of related programs.

their respective indicators. Table I-3 summarizes the program’s key impact indicators, measurement period and selection rationale.

Table I-3. Key Indicators

Impact/ Results indicator	Measurement period	Selection rationale
(i) Percentage of male-headed households who are severely food insecure using the Food Insecurity Experience Scale (FIES)	Y1 and Y5	This indicator measures the degree of food insecurity faced by the household, and it will be measured separately for male and female headed households, and compared with a control group.
(ii) Annual value of agricultural production (US\$/household)	Y1 and Y5	This indicator is a proxy for agricultural productivity.
(iii) Additional hectares of land applying agroforestry technologies	Y1 and Y5	This indicator will measure the adoption of agroforestry technologies and monitor forest coverage, and will be measured separately for male and female farmers.

1.33 **Economic analysis.** The program’s ex-ante economic analysis is based on a cost benefit methodology that examines the economic viability for each of the technologies selected as well as for the program as a whole. The costs considered include the investment (i.e., asset cost, technical assistance and private investment), operation, maintenance and reposition of the technologies as well as additional production costs and opportunity costs. The net benefits attributed to the adoption of the technologies were estimated using technical coefficients for labor and inputs obtained from the impact evaluation of agroforestry technologies provided with PTTA as well as from the technical report for Component II. The results of the analysis, using efficiency prices, an adoption rate of 75%, a 12-year horizon, and a discount rate of 12%, confirm that the program is economically viable with a net present value of US\$28,000,000 and Internal Rate of Return (IRR) of 27%. Table I-4 shows the expected effects from each of the options offered in the technological menu with their respective IRR.

Table I-4. Expected Effects and Internal Rates of Returns for the Technologies

Technology	Direct Effects	IRR
Agroforestry	Increase productivity and improve soil quality	41.7%
Irrigation	Increase productivity and crop diversification	67.9%
Animal traction	Increase production	22.7%
Post-Harvest equipment	Increase income due to food processing	49.3%

1.34 **Beneficiaries.** The program will have the following beneficiaries: (i) 3,000 direct beneficiaries of the agricultural applied research and training projects (Component I); and (ii) 65,048 farmers that will directly benefit from the matching grant mechanism promoting the adoption of technologies (Component II). It is expected that women would represent at least 40% of these beneficiaries. The departments targeted by the program are: North, North-East, Artibonite, South, and Grand’Anse. The first three departments have been selected because of the foreseen synergies with other complementary programs and the South and Grand’Anse were included to re-capitalize these departments after the damages caused by hurricane Matthew. Based on information obtained through PTTA, the expected beneficiaries will be farmers who, on average, have access to

1.4 hectares of land and plant 0.7 hectares; have low levels of income (US\$248 annual household agricultural income and US\$208 income from livestock); and low levels of schooling (53% are illiterate, 26% have incomplete primary school, 9% finished primary school and 2% have a high school degree). Given the program's limited resources, the proposed targeting will help to: (i) ensure the coordination with other rural development programs financed by the Bank and other partners (see ¶2.6); and (ii) focus attention on farmers who are in most need of the proposed technological changes.

II. FINANCING STRUCTURE AND MAIN RISKS

A. Financing Instruments

- 2.1 The total program amount is US\$76,859,305. The Grant Facility will finance US\$55,000,000, the GAFSP¹⁶ will finance US\$10,000,000, and International Fund for Agricultural Development (IFAD)¹⁷ will finance the remaining US\$10,859,305. The local counterpart will finance US\$1,000,000 to cover recurrent costs. IFAD might elect, by the end of 2017, to contribute to the project through a Project Specific Grant (PSG) administered by the Bank, in place of a parallel cofinancing, for the budgeted amount. Such additional non-reimbursable funding will contribute to the project according to Table II-1. In this case, the Bank would establish a commitment from IFAD through an administrative agreement without the requirement of preparing or approving a separate project proposal. Under such administrative agreement, the resources provided by the donor will be administered by the Bank. The Bank will not charge an administrative fee for donor contributions to projects in Haiti. The Board is therefore requested to authorize the President, or such representative as he shall designate, to enter into such agreements as may be necessary with IFAD and with the Republic of Haiti to receive, administer, and allocate to this operation the PSG resources aimed at supporting and executing the components of this operation. Table II-1 provides the cost summary by investment categories and components. The budget includes all costs associated with risks mitigation measures identified in the [ESMP](#) and the risk analysis.

¹⁶ This co-financing is subject to the entry into effect of a specific agreement for the financing of this program to be signed between the IDB and GAFSP.

¹⁷ This parallel financing is subject to IFAD's approval.

Table II-1. Costs and Sources of Financing (US\$)

Investment categories	IDB	GAFSP	IFAD	Local	Total
Components					
Component I. Applied research and training	14,600,000				14,600,000
Component II. Promotion of sustainable agricultural technologies	35,050,000	10,000,000	10,859,305		55,909,305
Other project costs					
Administration	4,000,000			1,000,000	5,000,000
Audits	150,000				150,000
Monitoring & Evaluation	700,000				700,000
Contingencies	500,000				500,000
TOTAL	55,000,000	10,000,000	10,859,305	1,000,000	76,859,305

- IFAD contribution is, as of today, parallel (co-financing) but might be received by the Bank as a PSG, subject to IFAD's Board approval.

2.2 The program is an investment grant operation and it is designed to be disbursed in 60 months. The disbursement calendar is presented in Table II-2 and is based on the Pluriannual Execution Plan (PEP) (see [REL-1](#)).

Table II-2. Disbursement Projections (US\$)

Source	Year 1	Year 2	Year 3	Year 4	Year 5	Total
IDB	3,123,865	4,150,926	14,565,837	16,471,691	16,687,681	55,000,000
GAFSP	1,000,000	2,000,000	3,000,000	3,000,000	1,000,000	10,000,000
IFAD	1,000,000	2,859,305	3,000,000	2,000,000	2,000,000	10,859,305
Local	200,000	200,000	200,000	200,000	200,000	1,000,000
TOTAL	5,323,865	9,210,231	20,765,837	21,671,691	19,887,681	76,859,305
%	6.9	12.0	27.0	28.2	25.9	100

A. Environmental and Social Safeguard Risks

2.3 According to OP-703, the program was classified as Category "B." The expected negative impacts are considered to be low, and avoidable through adequate mitigation measures. During project preparation, an Environmental Assessment and an Environmental and Social Management Plan (ESMP) were prepared and consulted.¹⁸ Key project impacts and risks include: (i) water resource exploitation by the introduction of water pumps for irrigation purposes. This risk will present a negligible negative impact, based on an ex-ante hydrological assessment of the accumulated pumping capacity of the small number of water pumps (450 over all

¹⁸ The preliminary draft of the Environmental Assessment (and ESMP) was posted on the Ministry of Agriculture's website (<http://agriculture.gouv.ht/view/01/>) on January 13, 2017 for public view, as well as on the [IDB website on January 17, 2017](#). An updated version, integrating the results of the first consultations, was posted on February 16, 2017, prior to QRR. No further update was needed after last consultation events in September 2017.

intervention zones) to be financed throughout the life of the program. Moreover, a Water Resource Assessment will be completed prior to project execution to allow for a better understanding of the present state of water resources in the proposed intervention zones. The use of these water pumps will also be monitored; (ii) possible conflicts generated by program activities regarding agricultural use of land in protected areas/Key Biodiversity Areas (KBA).¹⁹ To mitigate this risk, the program will only take place in areas where management plans exist and are in effect, and will be implemented in accordance with the respective protected area management plan, including abiding by existing sustainable development zoning regulations; (iii) possible promotion of the use of invasive species. To address this concern, during the first year of the program's implementation, a study on invasive and non-invasive species will be completed to identify alternatives. If no alternative is found, a management plan relating to the use of the invasive species will be prepared and implemented. The beneficiary shall comply with the environmental, social, health and safety and labor requirements set forth in the Environmental and Social Management Report (ESMR); and (iv) emissions associated with energy forests. To address this risk, for the first years of the PITAG project, energy forest packages will not be offered. Rather, during this time more research will be completed to determine the emissions (particularly of carbon dioxide and black carbon) that may be released due to energy forests. This research will examine the relationship between carbon emissions and sequestration, and the possible contribution to climate change, as well as potential human health impacts from burning biomass (in the form of charcoal or fuelwood).

B. Fiduciary Risk

- 2.4 An update of PTTA/RESEPAG institutional assessment related to its financial management and internal control processes was completed in January 2017. Based on its results, the Bank considers PTTA/RESEPAG overall risk rating to be medium due to following weaknesses: (i) financial reports are prepared manually, which increases the possibility of errors in financial reporting as SYSCOMPTE does not automatically generate financial reports; (ii) limitations identified in the *Système Intégré de Gestion des Informations* (SIGI), system used for the management of subsidies to farmers; and (iii) absence of a code of ethics. To mitigate those risks the EA: (i) has launched an evaluation of the functionality and the design of the SIGI information system which will advise on the best option to choose for the implementation of PITAG; (ii) will need to set up SYSCOMPTE parameters to allow the automatic generation of financial reports and the monitoring and execution of budget; and (iii) includes a code of ethics and professional conduct in the POM. The fiduciary risk related to procurement delays is classified as medium and its mitigation measures include: (i) anticipation and good planning for complex procurement processes; (ii) strengthening of the UPMP; and (iii) support to the MARNDR to simplify the procedures for contract approval and signature.

C. Other Key Issues and Risks

- 2.5 The design of the program used the methodology "Program Risk Analysis for Sovereign Guaranteed Loans." A risk identification and management workshop

¹⁹ Sites contributing significantly to the global persistence of biodiversity.

was conducted during program preparation, to identify program risks and mitigation measures. All main counterparts (IDB, MARNDR, private sector, development partners) have been consulted as part of the definition of the risk matrix and its mitigation measures. The high risk identified is the insufficient quality and quantity of technology providers. Several mitigation measures were identified for this risk, namely: (i) strengthened selection process of potential providers, including quality and quantity control; (ii) trainings; (iii) updated quality standards for technologies; (iv) possibility to exclude providers who do not follow the rules; and (v) technology transfer to providers through Component I. The development risk related to the cash constraints of suppliers is medium, and its mitigation measures include: (i) strengthened selection process of potential providers, including quality and quantity control; (ii) promotion of link with microfinance institutions, including programs financed by IDB and Ministry of Commerce; and (iii) good planning of the campaigns in terms of areas and quantities of subsidies. The development risk linked to the lack of local financial counterpart is medium and its mitigation measure is the preliminary planning and communication with the Ministry of Finance. Extreme climatic events have been identified as a medium development risk and the related mitigation measures are: (i) promotion of technologies that are resilient to climate change; (ii) research on climate resilience; and (iii) good planning of the campaigns in terms of areas and seasons. The complexity of the subsidy management process is a medium development risk and its mitigations measures include: (i) updated operational procedure, based on PTTA experience; and (ii) improvement of information system (SIGI). The limited number of actors that can execute quality research in the country is a medium development risk, whose mitigation measures are: (i) promotion of consortia with national and international research centers; and (ii) efforts to give maximum visibility to calls for proposals. The limited transfer of research outputs to producers is a medium development risk and its mitigation measures include: (i) strengthening of coordination between the two Components, the Innovation Directory of the MARNDR; (ii) inclusion of dissemination activities in Component I; and (iii) monitoring of research activities in the country. The difficulty to access intervention areas has been identified as a medium governance risk, whose mitigation measure is the timely preparation of providers and the selection of providers that will have access to difficult areas. Finally, a medium sustainability risk was identified: value added by the technological packages absorbed by household consumption expenses. Its mitigation measures include: (i) promotion of synergies with microfinance initiatives; and (ii) introduction of the matching grant mechanism.

- 2.6 The Government of Haiti and the MARNDR expressed high interest in this program and are committed to the sustainability of the activities supported by the Program beyond its execution period, since the program is aligned with the Road Map of the current administration, the 2010-2025 Agriculture Policy Document, the 2010-2016 and 2016-2021 National Agriculture Investment Plan (NAIP), the 2011-2016 Agricultural Extension Plan, and Haiti's Intended National Determined Contribution (INDC, 2015).

III. IMPLEMENTATION AND MANAGEMENT PLAN

A. Summary of Implementation Arrangements

- 3.1 The beneficiary of the program will be the Republic of Haiti, and the EA will be the MARNDR, which has been in charge of the execution of most Bank-financed operations in the sector, and currently manages an active portfolio totaling approximately US\$140 million. The EA will manage the program through: (i) the technical and administrative team of PTTA/RESEPAG executing unit (PEU); and (ii) the UPMP, which have demonstrated their capacity to execute similar programs in the past. The EA will be responsible for the overall administration of the program, including: planning and reporting technical and fiduciary aspects; execution of procurement activities; supervision of firms and service providers; financial and accounting management; risk management; monitoring and evaluation; supervision and execution of the environmental and social management plan. The Innovation Directorate will be responsible for the planning and technical supervision of Component I. **The approval by the Executing Agency and entry into effect of the Program Operating Manual (POM) according to the terms and conditions previously agreed with the Bank constitutes a Special Contractual Clause prior to the first disbursement of the financing,** justified by the need to have designated personnel for the execution of the program and clear procedures that will guide its implementation.
- 3.2 **Program Operating Manual (POM).** The POM, which establishes standards and procedures for the MARNDR with regard to programming activities, procurement audits, and monitoring and evaluation, among others, will govern program execution. The POM will include, among others, the following: (i) a detailed description of the implementation agreement of each component; (ii) roles and responsibilities of the agencies involved in the implementation of the program; (iii) criteria and procedures to select and contract goods and services; (iv) criteria and procedures for management and financial control of the program; (v) monitoring and evaluation arrangements; (vi) specific environmental and social measures of the program, as described in the ESMR (annexed to the POM); (vii) presentation of evidence that the MARNDR has selected a program coordinator and a financial officer according to the terms and conditions previously agreed with the Bank; and (viii) a provision according to which a technical verification of the use of agricultural subsidy funds by the beneficiary will be performed on a quarterly basis by an individual consultant who will be hired according to the terms and conditions previously agreed with the Bank. A preliminary manual of procedures was prepared during program preparation.
- 3.3 The following are some salient elements that will be included in the POM regarding the execution of Component II. The main selection criteria for beneficiaries are the following: (i) to be registered in the MARNDR farmers' registry; (ii) to be domiciled in the area of intervention; (iii) to work on an area equal to or greater than 0.25 Ha; (iv) not having received a previous MARNDR technology subsidy; and (v) to meet the specific criteria for the desired technical package. The selected farmers will pay their contribution to a financial institution and technology providers will provide the technology to the farmers. The program will pay the remaining part of the cost of the technology to technology providers once it has been verified that they have

delivered the technology to the farmers. All the transactions and validation will be tracked by an updated version of the SIGI.

- 3.4 **Procurement.** All program-related procurement activities will be performed following Bank's Procurement Policies: Policies for the Procurement of Goods and Works financed by the Bank (GN-2349-9) and Policies for the Selection and Contracting of Consultants financed by the Bank (GN-2350-9) as applicable.
- 3.5 **Financial and Auditing reports.** The program will submit to the Bank the following documents: (i) semi-annual financial reports of the program included in the semi-annual progress report; (ii) annual financial statements of the program, audited by an independent auditor are to be submitted to the Bank within 120 days at the end of each fiscal year, beginning with the fiscal year in which the first expenditures are incurred; and (iii) a final financial audit report of the program is to be submitted by the MARNDR within 120 days after the date of the last disbursement.

B. Summary of Arrangements for Monitoring Results

- 3.6 It will be the PEU's responsibility to put in place a monitoring system to collect data related to all the indicators in the Results Framework. This system will be instrumental for the PEU to be able to submit to the Bank semi-annual progress reports that will describe, among others: (i) the physical progress of the program (i.e., in terms of output indicators); (ii) the progress made in terms of outcomes and impacts, as stipulated in the Results Framework; and (iii) the status of applicable environmental and social mitigation measures.
- 3.7 An impact evaluation will be conducted to measure the program's impact and results. Specifically, the impact evaluation will be a combination of experimental and quasi-experimental techniques. Component I will be evaluated using a before and after calculation. On the other hand, Component II will use a randomization methodology to analyze the impact of the adoption of those technologies that will experience a demand higher than project's capacity to supply it (i.e., irrigation), and combine it with a quasi-experimental approach of difference-in-difference for technologies such as agroforestry and post-harvest. For this purpose, a sample of 2,000 farmers (1,000 beneficiaries and 1,000 control, representative by gender) will be surveyed for baseline and a follow-up surveys. The data collection will be representative of female-headed households and separate analysis will be performed in order to measure impact by gender. The total budget for the impact evaluation amounts to US\$550,000 that will be covered with resources from this grant. Details on the monitoring and evaluation activities are provided in the [Monitoring and Evaluation Plan](#) prepared for the program.

C. Significant Design Activities Post Approval

- 3.8 There will be no significant design activities post approval.

Development Effectiveness Matrix		
Summary		
I. Corporate and Country Priorities		
1. IDB Development Objectives	Yes	
Development Challenges & Cross-cutting Themes	-Productivity and Innovation -Gender Equality and Diversity -Climate Change and Environmental Sustainability	
Country Development Results Indicators	-Beneficiaries of improved management and sustainable use of natural capital (#)* -Women beneficiaries of economic empowerment initiatives (#)* -Farmers with improved access to agricultural services and investments (#)* -Beneficiaries of IDBG projects that contribute to at least one key dimension of food security (#)*	
2. Country Development Objectives	Yes	
Country Strategy Results Matrix	GN-2646	Protect the environment, respond to climate change, and enhance food security.
Country Program Results Matrix	GN-2884	The intervention is included in the 2017 Operational Program.
Relevance of this project to country development challenges (If not aligned to country strategy or country program)		
II. Development Outcomes - Evaluability		
		Evaluable
3. Evidence-based Assessment & Solution	10.0	
3.1 Program Diagnosis	3.0	
3.2 Proposed Interventions or Solutions	4.0	
3.3 Results Matrix Quality	3.0	
4. Ex ante Economic Analysis	8.5	
4.1 The program has an ERR/NPV, a Cost-Effectiveness Analysis or a General Economic Analysis	4.0	
4.2 Identified and Quantified Benefits	0.0	
4.3 Identified and Quantified Costs	1.5	
4.4 Reasonable Assumptions	1.5	
4.5 Sensitivity Analysis	1.5	
5. Monitoring and Evaluation	9.6	
5.1 Monitoring Mechanisms	2.5	
5.2 Evaluation Plan	7.1	
III. Risks & Mitigation Monitoring Matrix		
Overall risks rate = magnitude of risks*likelihood	Medium	
Identified risks have been rated for magnitude and likelihood	Yes	
Mitigation measures have been identified for major risks	Yes	
Mitigation measures have indicators for tracking their implementation	Yes	
Environmental & social risk classification	B	
IV. IDB's Role - Additionality		
The project relies on the use of country systems		
	Fiduciary (VPC/FMP Criteria)	
	Non-Fiduciary	
The IDB's involvement promotes additional improvements of the intended beneficiaries and/or public sector entity in the following dimensions:		
	Gender Equality	
	Labor	
	Environment	
Additional (to project preparation) technical assistance was provided to the public sector entity prior to approval to increase the likelihood of success of the project		
The ex-post impact evaluation of the project will produce evidence to close knowledge gaps in the sector that were identified in the project document and/or in the evaluation plan	Yes	There is an impact evaluation plan that aims to measure the effect of the program on the adoption of agricultural technologies.

Note: (*) Indicates contribution to the corresponding CRF's Country Development Results Indicator.

The objective of the program is to lower the levels of poverty and food insecurity in rural areas of Haiti by improving access to adequate and climate resilient agricultural technologies and increasing agricultural productivity among smallholder farmers. To increase adoption of such technologies, the program proposes the provision of agricultural incentives and technical assistance, as well as the development of applied and adaptive agricultural research projects, along with a strengthening of the high education curriculum and institutional capacities to conduct and apply research. The documentation is well-structured. The diagnostic is based on empirical evidence of the major challenges faced by the country with regards to the vulnerability of Haiti's agricultural sector and outlines various market, environmental, and institutional factors contributing to the current levels of low productivity. The proposed solution is then linked to the problems identified. The results matrix (RM) reflects the objectives of the program and establishes a clear vertical logic, including impact indicators that can capture the program's overall effect on income and food security. The RM includes SMART indicators at the impact (except one), outcome and output level, with their respective baseline values and targets and the means to gather information. The economic analysis includes a Cost-Benefit Analysis that considers the intervention's benefit on the income of targeted smallholder farmers as measured in terms of gross value added. In general, the benefits are based on a good understanding of the theory of change, and the economic costs include all resource costs as well as costs from a social perspective. However, the quantification of benefits under Component I and II does not clearly separate between the distinct beneficiaries, which may lead to issues of double counting. Overall assumptions appear reasonable and appropriate; a sensitivity analysis contemplates key parameters and various break-even points. The monitoring and evaluation plan presents all outputs and associated costs. The evaluation plan proposes a before-after comparison for Component I (no attribution), as well as a randomized control trial with an instrumental variable approach and a difference-and-difference method with matching for Component II. The plan provides sufficient detail on methodological and logistical considerations, though the power calculations should have been conducted separately for male and female beneficiaries given the focus on heterogeneous impact by gender. The risk matrix identifies eleven risks; three are classified as Low, seven as Medium, and one as High. All of them seem reasonable and include appropriate mitigating actions and compliance indicators.

RESULTS MATRIX

Project Objective: To increase food security and agricultural income for smallholder farmers in selected areas of Haiti.

Specific Objective: Increase agricultural productivity and improve the use of natural capital through the adoption of sustainable technologies.

EXPECTED IMPACTS

Indicators	Unit	Baseline		Goals		Means of verification	Observations
		Value	Year	Value	Year		
IMPACT 1: Improve Food Security							
Indicator 1.1: Percentage of male-headed households who are severely food insecure using the Food Security Scale (ELCSA)	%	71	2013	35	2022	Agricultural Household Surveys for baseline and follow-up.	The baseline number will be updated through surveys to be conducted prior to program implementation. The baseline values correspond to baseline values of PTTA. Target numbers are based on the CRIAR impact evaluation conducted in Bolivia and apply to program beneficiaries.
Indicator 1.2: Percentage of female-headed households who are severely food insecure using the Food Security Scale (ELCSA)	%	86	2013	50	2022	Agricultural Household Surveys for baseline and follow-up.	The baseline number will be updated through surveys to be conducted prior to program implementation. The baseline values correspond to baseline values of PTTA. Target numbers are based on the CRIAR impact evaluation conducted in Bolivia and apply to program beneficiaries. “Pro Gender Flag”
Indicator 1.3: Beneficiaries of IDBG projects that contribute to at least one key dimension of food security	#	0	2017	65,048	2022	Records of beneficiaries from the Ministry.	This number corresponds to the total number of program beneficiaries. IDB finances 39,679 beneficiaries, GAFSP 13,010, and IFAD 12,359.
IMPACT 2: Increase Agricultural Income							
Indicator 2.1: Annual agricultural income	USD/household	170	2015	268	2022		The baseline number will be updated through surveys to be conducted prior to program

Indicators	Unit	Baseline		Goals		Means of verification	Observations
		Value	Year	Value	Year		
<ul style="list-style-type: none"> Annual agricultural income for female-headed agricultural households 	USD/ household	68	2015	107	2022	Agricultural Household Surveys for baseline and follow-up.	implementation. The baseline and target values are obtained from the impact evaluation of the PTTA. The income increase corresponds to 58%. Targets apply to program beneficiaries.
<ul style="list-style-type: none"> Annual agricultural income for male-headed agricultural households 	USD/ household	197	2015	311	2022		This includes only income from crop related agricultural activities (livestock is not included) “Pro Gender Flag”
Indicator 2.2: Annual agricultural profits	USD/ household	98	2015	160	2022	Agricultural Household Surveys for baseline and follow-up.	The baseline number will be updated through surveys to be conducted prior to program implementation. The baseline and target values are obtained from the impact evaluation of the PTTA. The profit increase corresponds to 63%. Targets apply to program beneficiaries.
<ul style="list-style-type: none"> Annual agricultural profits of female-headed agricultural households 	USD/ household	30	2015	49	2022		
<ul style="list-style-type: none"> Annual agricultural profits of male-headed agricultural households 	USD/ household	116	2015	189	2022		
IMPACT 3: Increase Agricultural Productivity							
Indicator 3.1: Annual value of agricultural production	USD/ Household /year	347	2015	478	2022	Agricultural Household Surveys for baseline and follow-up.	This corresponds to an increase of 38% in the value of production. This target corresponds to the results obtained in the impact evaluation of PTTA. Targets apply to program beneficiaries.

EXPECTED RESULTS

Results	Unit	Baseline		Goals		Means of verification	Observations
		Value	Year	Value	Year		
RESULT 1: Improve use of Natural Capital							
Indicator 1.1: Beneficiaries of improved management and sustainable use of natural capital.	#	0	2017	61,224	2022	Records of beneficiaries from the Ministry.	This number corresponds to beneficiaries from agroforestry technologies. IDB finances 37,347 beneficiaries, GAFSP 12,245, and IFAD 11,632.
Indicator 1.2: Beneficiaries who adopted soil protection and restoration technologies	#	0	2017	45,918	2022	Records of beneficiaries from the Ministry.	This number corresponds to beneficiaries from agroforestry technologies multiplied by an adoption rate of 75% (adoption rate observed in similar projects in the region). IDB finances 28,011 beneficiaries, GAFSP 9,183, and IFAD 8,724.
Indicator 1.3: Additional hectares of land applying agroforestry technologies	Has	0	2017	27,900	2022	Agricultural Household Surveys for baseline and follow-up.	The target corresponds to estimates made for the economic analysis. IDB finances 17,019 hectares, GAFSP 5,580, and IFAD 5,301.
RESULT 2: Improve Agricultural Innovation Services							
Indicator 2.1: Research and development expenditure as percentage of Agricultural GDP	%	0.12	2017	0.3	2022	Ministry's executed budget.	Baseline is taken from IDB Agrimonitor estimations for the average of the period 2008-2012. This indicator will be measured before and after the implementation (reflexive methodology). The target is based on calculations that include the value of the investment in research made by this and other related programs of the Ministry.
Indicator 2.2: New technologies developed or	#	0	2017	8	2022	Records of beneficiaries from the Ministry.	These new technologies correspond solely to those

Results	Unit	Baseline		Goals		Means of verification	Observations
		Value	Year	Value	Year		
adapted by new applied research projects							developed by the Ministry of Agriculture.
Indicator 2.3: Male farmers who adopt the technologies developed by new applied research projects.	#	0	2017	1,800	2022	Records of beneficiaries from the Ministry.	These new technologies correspond solely to those developed by the Ministry of Agriculture.
Indicator 2.4: Female farmers who adopt the technologies developed by new applied research projects.	#	0	2017	1,200	2022	Records of beneficiaries from the Ministry.	These new technologies correspond solely to those developed by the Ministry of Agriculture. “Pro Gender Flag”
RESULT 3: Increase Adoption of Agricultural Technologies							
Indicator 3.1: Percentage of beneficiary producers who adopt agricultural technologies.	%	0	2017	75%	2022	Agricultural Household Surveys for baseline and follow-up.	The target represents the percentage of adopters observed in similar projects in the region including the PATCA in Dominican Republic and CRIAR in Bolivia.
Indicator 3.2: Percentage of beneficiary women who adopt agricultural technologies	%	0	2017	75%	2022	Agricultural Household Surveys for baseline and follow-up.	The target represents the percentage of adopters observed in similar projects in the region. “Pro Gender Flag”
Indicator 3.3. Farmers who adopt agricultural technologies	#	0	2017	48,786	2022	Agricultural Household Surveys for baseline and follow-up.	The target represents the percentage of adopters observed in similar projects in the region. IDB finances 29,760 farmers, GAFSP 9,757, and IFAD 9,269.

Results	Unit	Baseline		Goals		Means of verification	Observations
		Value	Year	Value	Year		
Indicator 3.4. Women beneficiaries of economic empowerment initiatives	#	0	2017	26,019	2022	Agricultural Household Surveys for baseline and follow-up. Project Report.	This includes the total number of women to benefit from the program (40% of total beneficiaries from component I and II). IDB finances 15,872 beneficiaries, GAFSP 5,204, and IFAD 4,943. “Pro Gender Flag”

PRODUCTS

Products	Unit	Base line	Year 1	Year 2	Year 3	Year 4	Year 5	Final Goal	Means of verification	Observations
Component I: Applied research and training										
1.1. Applied agricultural research projects implemented for the development/adaptation or improvement of new agricultural technologies	#	0	0	2	2	6	5	15	Project progress report.	The initial research projects will include: rice, banana, tubers, horticulture products, legumes, and agroforestry.
MS. 1.1.1. Applied agricultural research projects implemented for the development/adaptation or improvement of agricultural technologies that specifically target female farmers	#	0	0	0	0	0	3	3	Project progress report.	Research projects on horticulture, tubers, and legumes “Pro Gender Flag”
MS. 1.1.2. Applied agricultural research projects implemented for the development/adaptation or improvement of agricultural technologies that specifically target climate change adaptation or mitigation	#	0	0	0	0	0	3	3	Project progress report.	Three research projects on agroforestry.
1.2. Scholarships to support the implementation of new innovation projects delivered to research fellows	#	0	0	2	3	3	2	10	Project progress report.	Research fellows include students, scientists and academics from Haiti that work in the new lines of agricultural research developed by the project.

Products	Unit	Base line	Year 1	Year 2	Year 3	Year 4	Year 5	Final Goal	Means of verification	Observations
1.3. Directorate of Innovation strengthened	#	0	0	0	0	1	1	1	Project progress report	Strengthening of the Innovation Directorate includes provision of equipment and contracting a supervisor for the research program. Also, the implementation of the innovation information system.
MS. 1.3.1. Innovation information system implemented	#	0	0	0	1	1	1	1	Project Progress Report	This corresponds to a system to monitor the research initiatives in the country. This system will be implemented by the MARDR.
Component II: Promotion of sustainable agricultural technologies										
2.1. Beneficiary farmers who received technological packages	#	0	3,252	6,505	19,514	19,514	16,262	65,047	Project progress report.	IDB finances 39,679 beneficiaries, GAFSP 13,010, and IFAD 12,359.
MS. 2.1.1. Female farmers who received technological packages	#	0	1,301	2,602	7,806	7,806	6,504	26,019	Project progress report.	This corresponds to 40% of total beneficiaries. IDB finances 15,872 beneficiaries, GAFSP 5,204, and IFAD 4,943. “Pro Gender Flag”
MS. 2.1.2. Beneficiary farmers who received technological packages for climate change adaptation and mitigation.	#	0	3,061	6,122	18,367	18,367	15,306	61,223	Project progress report.	This number corresponds to beneficiaries receiving agroforestry technologies. IDB finances 37,347 beneficiaries, GAFSP 12,245, and IFAD 11,632.
2.2. Beneficiary farmers who received technical assistance	#	0	1,650	3,300	9,900	9,900	8,250	33,000	Project progress report.	IDB finances 24,750 beneficiaries, and IFAD 8,250.

FIDUCIARY ARRANGEMENTS

COUNTRY:	Republic of Haiti
PROGRAM N°:	HA-L1107/HA-G1038
NAME:	Agricultural and Agroforestry Technological Innovation Program - PITAG
EXECUTING AGENCY (EA):	The Ministry of Agriculture, Natural Resources and Rural Development (MARNDR)
FIDUCIARY TEAM:	Marise E. Salhave and Romina Kirkagacli (FMP/CHA)

I. EXECUTIVE SUMMARY

- 1.1 The general objectives of the program are to increase agricultural income and food security for smallholder farmers in selected areas of Haiti. The specific objectives are to increase agricultural productivity and improve the use of natural capital through the adoption of sustainable technologies. The EA will be the MARNDR, which will implement all program components through: (i) its Executing Unit named “PTTA/RESEPA,” which will ensure program technical and financial management; and (ii) the procurement unit of the MARNDR named “UPMP,” which will perform procurement activities. The program is composed of two components: Component I - Applied research and training and Component II – Promotion of sustainable agricultural technologies. The total program amount is estimated at US\$76,859,305; financed by the IDB Grant Facility for up to the amount of US\$55,000,000; the GAFSP will co-finance up to the amount of US\$10,000,000; the IFAD will finance the remaining US\$10,859,305. The national counterpart will finance US\$1,000,000 to cover recurrent costs linked to Component I and administrative expenses.
- 1.2 The latest evaluation of the public financial management systems of the Republic of Haiti is contained in the Public Expenditure and Financial Accountability (PEFA) assessment report conducted in 2011 and published in February 2012. The Government of Haiti has shown continued commitment in improving the country system and has adopted in May 2014 Public Financial Management reform strategy including an action plan 2014-2016 to consolidate basic public financial management functions focus on: (a) continuing the implementation of a Single Treasury Account (STA) with the support of IMF; (b) reaffirming the role of public accountants in the monitoring of expenses in all line ministries, and (c) improving the monitoring of public debt. Despite these measures, the country financial management systems and external control mechanism would require further improvements prior to conform to levels consistent with their utilization for the fiduciary management of Bank’s funded programs. As a result, no country systems will be used for the financial management of program. An evaluation of the National Procurement System was performed in 2013, applying the methodology established by the Organization for Economic Co-operation and Development. A certain number of recommendations were identified through an action plan for the modernization of the national procurement system. Based on the current situation and the need to align the national system to international standards and best practices, the Bank’s procurement policies will govern procurement activities foreseen under this program. Therefore, to mitigate these risks the Bank will continue in the foreseeable future to: (i) rely on special program executing units for the

execution of all programs while at the same strengthening institutional capacities; and (ii) to implement special fiduciary arrangements for program implementation and to conduct close supervision of program executing units. External control will be performed for all Bank operations by independent audit firms acceptable to the Bank in accordance with the Bank's financial reporting and audit guide.

II. EXECUTING AGENCY'S FIDUCIARY CONTEXT AND COLLABORATION WITH OTHER ENTITIES

- 2.1 The EA will be responsible for the overall program execution and administration, including: planning and reporting technical and fiduciary aspects; execution of procurement activities; supervision of firms and service providers; financial and accounting management; risk management; monitoring and evaluation; supervision and execution of the environmental and social management plan. The MARNDR will execute the aforementioned tasks through: (i) its Executing Unit named "PTTA/RESEPAG," which will ensure the financial management of the program; and (ii) the procurement unit of the MARNDR named "UPMP", which will perform the procurement activities of the program. The PEU has gained experience in the execution of Bank financed operations over the past five years, during the execution of the Technology Transfer Program for Small Farmers Program (HA-L1059, 2562-GR-HA, PTTA I). The program coordinator will report to MARNDR's General Director. The EA will be responsible for the fiduciary aspects of the program and overall administration including financial reporting.
- 2.2 The UPMP, which is the procurement unit of MARNDR, was created through a Ministerial Decree "M-AIDG/(C-17)09-13:1659 (bis)" of September 17, 2013, has been in place and operational since early 2014. Based on findings of the technical assistance conducted by the Bank's Procurement team, this unit has proved to possess a solid technical knowledge in the application of the Bank's procurement policies. As of now, 12 procurement specialists are working in the unit. The UPMP can count on an organized system to treat purchase requests and conduct procurement processes, and is developing an improved filing system.
- 2.3 A Steering Committee (SC) will be created after program start-up workshop to ensure strategic overall guidance and coordination among the different institutions involved in program implementation. The SC will meet at least once a year in order to discuss strategic issues, as well as to approve the multi-year execution plan, annual operation plans and progress reports. This committee will be chaired by MARNDR's General Director.

III. FIDUCIARY RISK EVALUATION AND MITIGATION ACTIONS

- 3.1 An update of PTTA/RESEPAG institutional assessment related to its financial management and internal control processes was completed in January 2017. Based on the results, the Bank considers PTTA/RESEPAG overall risk rating to be medium due to following weaknesses: (i) financial reports are prepared manually which increases the possibility of errors in financial reporting as SYSCOMPTE does not automatically generate financial reports; (ii) Limitations identified in SIGI information system used for the management of subsidies to farmers; and (iii) absence of a code of ethics. To mitigate those risks the EA: (i) has launched an evaluation of the functionality and the design of the SIGI information system which will advise on the best option to choose for the implementation of new program; (ii) will need to set up parameters SYSCOMPTE to allow the automatic generation of financial reports and the monitoring and execution of budget;

and (iii) include a code of ethics and professional conduct in the POM. The fiduciary risk related to procurement delays is classified as medium and its mitigation measures include: (i) anticipation and good planning for complex procurement processes; (ii) strengthening of the UPMP; and (iii) support to the MARNDR to simplify the procedures for contract approval and signature.

- 3.2 Based on the most recent capacity evaluation of the UPMP conducted by the Bank, the risk level in terms of procurement is considered as medium. However, the following risks and mitigation measures have been identified: (i) a heavy workload is being handled by UPMP with the execution of several parallel programs financed by the IDB and other donors. Mitigation: hiring a new procurement specialist or designating a specific procurement specialist already working with the Unit to support the additional workload; (ii) a lengthy contract approval process at the level of the Ministry, which impacts the program timeframe. Mitigation: the EA will submit an annex to the POM describing the procedure and timeframe applicable to the MARNDR's internal and external approval process for procurement contracts; (iii) with a centralized structure, the important number of transactions may also negatively impact on the execution timeframe. Mitigation: the Unit will work on consolidated procurement plans for the Ministry in order to improve its planning capacity and identify recurring purchases so as to reduce transactional costs and achieve best value for money; and (iv) contract archives are well organized but not yet available in electronic version. Mitigation: the program will support some of UPMP's operational costs which will also be used to support the development of an electronic filing system.

IV. ASPECTS TO BE CONSIDERED IN THE SPECIAL CONTRACTUAL CONDITIONS OF THE GRANT

- 4.1 **Prior to first disbursement of the financing. Special Accounts and authorized signatures:** PTTA/RESEPAG will open four separate bank accounts at the Haitian Central Bank (two accounts for each financing source (IDB and GAFSP), one in US Dollars and one in Gourdes)..
- 4.2 **Adoption of program operation manual¹.** PTTA/RESEPAG shall update to the satisfaction of the Bank, their operations manual (OM) which shall set out the procedures to be followed by the EA with regard to planning and reporting of activities, financial management, audits, procurement and contracting, risk management, and monitoring and evaluation. The OM shall include, among others: (i) the role of each participant and collaborating institution for the implementation of the program; (ii) a code of ethics section; (iii) an annex describing the procedure and timeframe applicable to the MARNDR's internal and external approval process for procurement contracts; (iv) the framework of Environmental and Social Management Plans; (v) the Monitoring and Evaluation Plan, procedures for the safeguard of financial information; and (vi) a chart of accounts.
- 4.3 **Audit special requirements:** PTTA/RESEPAG will be responsible for the recruitment of external auditors eligible to the Bank to perform the financial audit of the program as follows: (i) annual financial audit of the program to be submitted within 120 days after the closure of each fiscal year for each executing unit; and (ii) a final financial audit of the program to be submitted within 120 days after the date of the last disbursement. Audit may include audit of procurement processes under ex-post modality (this specific activity will be confirmed in the Terms of reference of the audit firm). For the audit of financial

¹ The adoption of a program operating manual is considered critical and essential for insuring the efficient and effective execution of the program.

statements, the Haitian fiscal year will be used. For Component II, a technical verification of the use of funds by the beneficiaries will be performed on a quarterly basis by an individual consultant based on terms of reference approved by the Bank.

- 4.4 **Special disbursement.** To enable the EA to fulfill all the conditions prior to first disbursement, an initial disbursement of up to US\$150,000 will be made to the extent the beneficiary fulfills, to the Bank's satisfaction, all the standard general conditions prior to disbursement set forth in the grant agreement. Funds will be used to finance the contracting of technical and fiduciary personnel, update the POM, prepare program's chart of accounts and update program accounting and information systems (see ¶3.1).

V. FIDUCIARY ARRANGEMENTS FOR PROCUREMENT EXECUTION

- 5.1 The procurement fiduciary arrangements establish the conditions applicable to all procurement execution activities in the program.

A. Procurement Execution

- 5.2 All program related procurement activities will be performed by the MARNDR Procurement Unit (UPMP) and will be governed by the Bank's Procurement Policies: Policies for the Procurement of Goods and Works financed by the Inter-American Development Bank (GN-2349-9) and Policies for the Selection and Contracting of Consultants financed by the Inter-American Development Bank (GN-2350-9).

- a. **Procurement of Works, Goods and Non-Consulting Services:** The contracts for Works, Goods, and Non-Consulting Services² generated under the program and subject to International Competitive Bidding will be executed through the use of the Standard Bidding Documents (SBDs) issued by the Bank. The processes subject to National Competitive Bidding (NCB) will be executed through the use of National Bidding Documents agreed to by the Bank.
- b. **Selection and Contracting of Consultants:** The consulting services contracts generated under this program will be executed through the use of the Standard Request for Proposals (SRFPs) issued or agreed to by the Bank. Research entities, Firms or Universities will be selected to develop research programs using Selection Based on Quality as procurement method. Approximately eight contracts will be signed for a total amount of US\$13,000,000.

B. Recurring Expenses

- 5.3 Certain recurring expenses will be procured using program funds. These procurement activities will be carried out in accordance with the administrative procedures of the EA with the prior approval of the Bank who will assess and approve the use of these procedures.

² Policies for the Procurement of Goods and Works Financed by the Inter-American Development Bank ([GN-2349-9](#)) paragraph 1.1: The services different to consulting services have a similar process as procurement of Goods.

C. Main Procurement Activities

Table V-1. Procurement Activities

Activity	Procurement Method	Estimated Date	Estimated Amount 000'US\$
FIRMS			
Development and implementation of research programs	SBQ	First two contracts to be signed in 2018	1,500,000 per contract
Development of an information system to monitor and manage the research programs and the provision of agricultural subsidies	SBQC	December 2017	500,000
Technical assistance and management of the agricultural subsidies scheme	SBQC	December 2017	5,000,000
Technical assistance and training of service providers	SBQC	February 2018	600,000
INDIVIDUALS			
Supervisor of research program	QIC	March 2018	500,000 for the entire duration of the program

*To access the 18-month procurement plan, click [here](#)

D. Procurement Supervision

5.4 Based on the risks identified under Section II above, the major procurement activities foreseen under this operation will be subject to ex ante review by the Bank. Procurement activities using the shopping method for goods, works, non-consulting services and the recruitment of individual consultants selected under a competitive method might be subject to ex post review, as confirmed in the Procurement plan.

E. Records and Files

5.5 The EA will be required to keep files and track records of all procurement activities financed by the Bank in such a way that it be available for supervision visit by the fiduciary team. As confirmed by recent inspection visits, the UPMP is provided with an organized archiving system, despite space limitations which will be addressed with the creation of an electronic filing system with support from the Bank. Until the national legislation in Haiti will not recognize electronic documents, electronic archiving should not replace paper files.

VI. FINANCIAL MANAGEMENT

A. Programming and Budget

6.1 PTTA/RESEPAG will provide an annual operation plan (AOP), procurement plan and a 12-month detailed financial plan. The financial plans and will respect the budget lines defined in the grant agreement (investment categories).

B. Accounting and Information Systems

6.2 SYSCOP will be used for program financial management. Detailed annual budget including activities to be financed will be included in system to facilitate the comparison

of Actual vs Budget forecast at the end of each month and the production of financial reports by source of funds.

C. Disbursements and Funds Flows

6.3 Program financial management will be guided by OP-273-6. PTTA/RESEPAG will prepare annual planning of program cash flows to be revised every four months. Financial plans will be based on activities derived from the Annual Operation Plan and Procurement Plan and payment terms agreed with suppliers. Advance of funds methodology will be used for the disbursement of program funds. For each new advance, PTTA/RESEPAG will need to justify 80% of cumulated advance received. Disbursement Supervision will be ex-post. Local national counterpart will be used to finance recurring costs related to activities financed under Component I. Exchange rate on the date of conversion of the currency in which the disbursement is made will be used to record all expenses made in local currency; the Central Bank of Haiti exchange rate published for that date will be used at the reference rate. Payment of subsidies will be made via a financial institution which will be hired through a competitive bidding process. Payments by the financial institution will be subject to the farmer meeting set technical requirements to be validated by the Departmental Directorate of Agriculture (DDA) and the payment of a small contribution. The DDA will inform the EA that all technical requirements have been met following which the EA will send payment authorization to the financial institution. Amount to be disbursed will be subject to terms defined in matching grant agreement.

D. Internal Control and Audit

6.4 The internal control environment of the program will be strengthened with: (i) the updating and implementation of an operation plan; (ii) the updating of the current accounting system to include a module for budget preparation and monitoring and the automatic preparation of financial report; and (iii) the use of an information system for the management of subsidies to the farmers.

E. External Control and Reporting

6.5 Audits of financial statements will be performed in accordance with Bank's Guidelines for Financial Reports and External Audits (OP-273-6) as described in Section IV of the Guidelines. Financial audit cost will be financed by IDB grant and estimated at US\$150,000, including the audit of procurement aspects.

F. Financial Supervision Plan

6.6 During the first year of execution, fiduciary personnel of the Bank will perform inspection visits to review the execution of financial plan every four months and on a semi-annual basis for the following years, however the frequency of visits is subject to change based on findings from supervision missions.

G. Execution Mechanism

6.7 PTTA/RESEPAG will maintain proper financial management systems and will prepare an AOP and Procurement Plan and a twelve-month financial plan indicating cash flow needs. Disbursement of advances of funds will be for the equivalent of funding needs required for four months of program execution. Fund flows will be executed as stated in point 6.3 (Disbursement and Fund Flows) above.

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PROPOSED RESOLUTION DE-___/17

Haiti. Nonreimbursable Financing ___/GR-HA to the Republic of Haiti
Agricultural and Agroforestry Technological
Innovation Program - PITAG

The Board of Executive Directors

RESOLVES:

That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, as Administrator of the IDB Grant Facility (hereinafter referred to as the "Account"), to enter into such contract or contracts as may be necessary with the Republic of Haiti, as Beneficiary, for the purpose of granting it a nonreimbursable financing to cooperate in the execution of the Agricultural and Agroforestry Technological Innovation Program - PITAG. Such nonreimbursable financing will be for an amount of up to US\$55,000,000, which form part of the Account, and will be subject to the Terms and Financial Conditions and the Special Contractual Conditions in the Project Summary of the Grant Proposal.

(Adopted on __ _____ 2017)

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PROPOSED RESOLUTION DE-___/17

Haiti. Nonreimbursable Financing GRT/___-_____-HA to the Republic of Haiti
Agricultural and Agroforestry Technological
Innovation Program - PITAG

The Board of Executive Directors

RESOLVES:

1. That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, as Administrator of the Global Agriculture and Food Security Program (GAFSP) Trust Fund (hereinafter referred to as the "Trust Fund"), to enter into such agreement or agreements as may be necessary with the Republic of Haiti, as Beneficiary, for the purpose of granting it a nonreimbursable financing to cooperate in the execution of the Agricultural and Agroforestry Technological Innovation Program - PITAG. Such nonreimbursable financing will be for an amount of up to US\$10,000,000, which form part of the Trust Fund, and will be subject to the Terms and Financial Conditions and the Special Contractual Conditions in the Project Summary of the Grant Proposal.

2. That the authorization granted in paragraph 1 above shall be effective only once the Bank has entered into the specific contribution agreements.

(Adopted on ___ _____ 2017)

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PROPOSED RESOLUTION DE-___/17

Haiti. Nonreimbursable Financing GRT/___-_____-HA to the Republic of Haiti
Agricultural and Agroforestry Technological
Innovation Program - PITAG

The Board of Executive Directors

RESOLVES:

1. That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such agreements as may be necessary, and to take such additional measures as may be pertinent, to receive, administer and approve the use of nonreimbursable financing resources chargeable to the resources provided by the International Fund for Agricultural Development (IFAD) described in Document PR-____, up to the amount of US\$10,859,305 for the co-financing of any component to this nonreimbursable financing.

2. That the authorization granted in paragraph 1 above shall be effective only once the Bank has entered into the specific contribution agreements.

(Adopted on ___ _____ 2017)