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HONDURAS

CHOCOLATE-4-ALL: DIGITIZING THE COCOA VALUE CHAIN IN HONDURAS

(HO-T1313)

DONORS MEMORANDUM

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PROJECT SUMMARY

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The project aims to improve the quality of life for 1,000 small-scale family cocoa producers in the department of Olancho, Honduras, by enhancing the value, profitability, and resilience of the cocoa agroforestry system, and promoting a living wage. The cocoa sector in Honduras includes 3,649 cocoa producers, only 57% of whom are members of producer cooperatives or associations. This sector holds much potential for alleviating rural poverty and contributing to the Millennium Sustainable Development Goals (MSDGs), and is also a priority of the Honduran Government Development Plan, the Honduras Agrifood Sector Strategic Plan 2014-2018, and the Framework Competitiveness Agreement for the Cocoa Agrifood Chain.

Small-scale cocoa production faces several challenges, especially the low levels of resilience and profitability of cocoa farms, due to the impacts of climate change, inadequate management practices, and low levels of technology. This results in low productivity, limited quality, scant production volume, and low prices, all of which increase the economic vulnerability of producer families. To address these challenges, the Chocolate-4-All project identifies and promotes grassroots social innovation and technology to scale, focusing on knowledge management and transfer to strengthen cocoa sector competitiveness locally and nationally.

The project will facilitate innovative solutions with the aim of improving access to quality and differentiated markets, and reduce vulnerability to climate change. Its most notable technological innovations will be: blockchain-based traceability management for open use of cocoa value chain data; the use of drones and sensors to monitor farms; the use of ShadeMotion simulation software for more precise cocoa crop management; and production yield optimization.

From a market perspective, the project promotes a commercial partnership with Chocolats Halba, a Swiss chocolatier with a presence in San Pedro Sula. With a view to satisfying market demand, the company is looking to increase its current cocoa purchases in Honduras (500 metric tons) to 1,000 metric tons. Strengthening local-national partnerships and direct business collaboration with Chocolats Halba and other market actors will help improve production yields, cocoa quality, and also generate a living wage. The promotion and use of innovative technologies such as blockchain and applied research, which are aligned with the sector's competitiveness agenda, also make the project a unique pilot in technology that can be scaled up nationally as well as at the regional level in Central America.

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ABBREVIATIONS

CATIE	Tropical Agricultural Research and Higher Education Center
CRF	Corporate Results Framework
CROP	Centro de Recursos de Operación de Proyectos [Project Operation Resources Center]
HPI-Honduras	Heifer Project International, Inc. (Honduras)
SINATEC	Sistema Nacional de Asistencia Técnica para el Sector Cacaotero [National System of Technical Assistance for the Cocoa Sector]
UNA	Universidad Nacional de Agricultura

PROJECT INFORMATION

HONDURAS
CHOCOLATE-4-ALL: DIGITIZING THE COCOA VALUE CHAIN IN HONDURAS
(HO-T1313)

Country and geographic location:	Honduras, department of Olancho, municipios of Dulce Nombre de Culmí, Catacamas, and Patuca		
Executing agency:	Heifer Project International Honduras, Inc. (HPI-Honduras)		
Focus area:	Climate-smart agriculture		
Coordination with other donors/Bank operations	Designed in coordination with the Tropical Agricultural Research and Higher Education Center (CATIE), a technical and research partner. This initiative is also being coordinated with the Swiss Cooperation Office (COSUDE) in Honduras to channel other assistance.		
Project beneficiaries:	The project will directly benefit 1,000 cocoa farming families, 735 of which belong to six producer organizations. Another 265 unaffiliated cocoa farmers will benefit. Indirect beneficiaries: 1,500 families in the cocoa chain.		
Financing:	Technical cooperation:	US$1.7 million	50%
	Investment:	-	
	Loan:	-	
	Other (explain)	-	
	Total MIF contribution:	US$1.7 million	
	Counterpart:	US$1.7 million	50%
	Cofinancing:	-	
	Total project budget:	US$3.4 million	100%
Execution and disbursement period:	36 months for execution and 42 months for the final disbursement		
Special contractual conditions:	As a special condition precedent to the first disbursement of the technical cooperation resources, HPI-Honduras will present, to the satisfaction of the IDB/MIF, the following documents: (i) interagency agreement between HPI-Honduras and CATIE for the coexecution of the project; (ii) the interagency agreement between HPI-Honduras and the Universidad Nacional de Agricultura (UNA); and (iii) the interagency agreement between HPI-Honduras and commercial partner Chocolats Halba.		
Environmental and social impact review:	This operation was screened and classified on 4 October 2018, in accordance with the requirements of the IDB Environment and Safeguards Compliance Policy (Operational Policy OP-703). Given the limited impacts and risks, the project is proposed as a category “C” operation.		
Unit responsible for disbursement:	MIF/CHO		

I. PROBLEM TO BE ADDRESSED

A. Context and description of the problem

1.1 According to International Cocoa Organization estimates,[1] world production in the 2016-2017 harvest surpassed 4.7 million metric tons, which is an 18.7% increase over the 2015-2016 harvest, and 32% over the last decade.[2] World cocoa production is distributed among more than 40 tropical countries in Africa, Asia, and Latin America, with 84%[3] concentrated in five countries: Côte d'Ivoire, Ghana, Indonesia, Nigeria, and Cameroon, employing between five million and six million people, and another 14 million indirectly. At least 90% of world cocoa production comes from small family farms, averaging 2 to 5 hectares, and constitutes the primary activity and source of income for those who work them.

1.2 Honduras produces 1,500 metric tons of fine or flavor cocoa each year, which is used to make gourmet chocolate, generating roughly US$3.8 million in foreign exchange.[4] Owing to its high quality, the fine cocoa produced by Honduran growers was rated ninth in the world by France's Salon du Chocolat in October 2015, based on 146 samples from 36 countries. With regard to the countries of Central America, Honduras ranks second overall for cocoa bean flavor and quality.

1.3 World cocoa demand is expected to increase by one million metric tons in 2020. Moreover, reduced production is being forecast for the two African countries—Côte d'Ivoire and Ghana—that currently produce more than 50% of the world's cocoa, due to aging plantations and the effects of climate change, triggering a deficit in the cocoa futures market.[5]

1.4 The unequal distribution of profits among the different links in the supply chain is a major problem for the global cocoa sector, resulting in high levels of poverty for the five to six million small-scale cocoa producers. They currently receive between 3% and 6% of the final price of chocolate.[6] The cocoa industry is also grappling with the effects of climate change, which are having a considerable impact on cocoa productivity and quality, putting the global availability of cocoa at risk.[7]

1.5 National cocoa production in Honduras experienced a boom in the 1980s, which continued until 1997. During that period, there were some 3,500 cocoa producers in Honduras, cultivating 8,500 *manzanas* and producing approximately 5,500 metric tons of cocoa annually. Current cocoa production is concentrated in the northwestern part of the country along the Atlantic Coast, including the departments

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1 International Cocoa Organization.

2 Globally, 16% of the cocoa produced comes from Latin American countries (primarily Brazil and Ecuador), and another 11% from Asia and Oceania. In 50 years, cocoa production has grown sustainably, albeit erratically, given that it is highly dependent on climate conditions.

3 *Estado actual sobre la producción y el comercio del cacao en América*. Arvelo, Miguel A., Tanya Delgado, Steven Maroto, Javier Rivera, Inocencio Higuera, and Alejandra Navarro. San José, Costa Rica. Inter-American Institute for Cooperation on Agriculture, 2016

4 Revista Estrategia & Negocios, November 2017.

5 World Cocoa Conference, 2014.

6 Consultores Para el Desarollo–CODESA, 2015.

7 Adiós al chocolate: el cacao se extinguirá a causa del cambio climático.

of Atlántida, Colón, Yoro, and Olancho, comprising approximately 4,468 hectares in agroforestry systems established by some 3,469 producers.

1.6 During the 2015-2016 harvest, cocoa production amounted to approximately 1,500 metric tons, although much more land could be used for its cultivation.[8] According to the Honduran Foundation for Agricultural Research (FHIA), some 32,000 hectares of land are potentially suitable for cocoa cultivation. However, only 5,500 hectares are currently under cultivation—less than 18% of potential.

1.7 Cocoa production in the department of Olancho is carried out by small-scale growers, only 57% of whom belong to cooperative organizations.[9] While 685 growers belong to such organizations in Olancho, there are more than 800 who are not. While more than 55% of cocoa growers cultivate less than 0.7 of a hectare, medium-scale growers with between 0.7 and 3.5 hectares under cultivation account for approximately 41% of production, with an average yield of 240 kilograms per hectare (5.3 quintals per hectare), which is relatively low.

1.8 The primary cocoa buyer in Olancho is Chocolats Halba, a Swiss chocolatier with a presence in San Pedro Sula. Marketing companies purchase fermented cocoa[10] from producer organizations based on quality criteria: for example, organic grade "A" sells for US$4,000 per metric ton; organic grade "B," at US$3,950 per metric ton; and conventional grade "C," at US$3,700 per metric ton. At the community level, intermediaries purchase conventional cocoa from farm to farm, and later deliver it to medium and large buyers affiliated with the Central American market.

1.9 Like the other departments of Honduras, Olancho is affected by climate change. Rising temperatures and excess rainfall are the most relevant climate threats projected, generating greater water and heat stress on cocoa crops, and reducing the crop's range of tolerance and productivity in the medium term. Climate change increases the incidence and frequency of pests and disease, especially frosty-pod rot,[11] black-pod rot, and the absorption of cadmium, which compromise cocoa beans and degrade their quality.[12]

1.10 The **main problem** for small-scale cocoa producer families in the target area is the *low profitability and resilience of cocoa farms. The interrelated causes of this problem are listed below*.

1.11 Low-yield cocoa farms. The low yields of cocoa farms in the project target area is due to a variety of factors, including the use of unsuitable genetic material, low planting density (280-560 trees per *manzana*),[13] low cocoa yields (5 to

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8 PRONAGRO, Cadena de Cacao, June 2017 http://pronagro.sag.gob.hn/cadenas-agroalimentarias/cadena-de-cacao/.

9 HPI-Honduras and VECO Mesoamérica, 2016. *Situación actual de la cadena de valor del cacao en Honduras: Análisis de la cadena de cacao: Reporte Final*.

10 Fermented cocoa is considered to be better quality, since it is processed according to specific protocols to effect ideal flavor and aroma.

11 Frosty pod rot, *Moniliophthora roreri* (Cif. and Par.), is one of the most obvious phytosanitary concerns for the cocoa industry during the rainy season, when damp conditions favor the growth of this pathogen. It is a fungus that only attacks cocoa pods or fruit of any age, causing the seeds to rot.

12 Other common names for this disease include: moniliasis, cocoa pod rot, Quevedo disease, and watery pod rot.

13 A unit of measure equal to 0.7 of a hectare.

12 quintals/manzana/year) due to practices that are ineffective in terms of counteracting the effects of climate change, and the presence of uncontrolled fungal diseases.

1.12 High economic vulnerability. The low prices received are attributable to poor cocoa quality. Not all cooperatives in the area have organic certification or suitable cocoa fermentation, drying, and storage management protocols. The absence of suitable technologies for shade, propagation, and plant protection management, has an adverse impact on product yield and quality.

1.13 Weak business model. One challenge is that the business structure of producer organizations and cooperatives may not be aligned with their business model. Their governance models also need strengthening to make them more transparent and inclusive, including linkages with support services for the sector, such as business services, financing, and formal market partnerships. Only two of the six target organizations have formal market partnerships.

1.14 Management not based on scientific knowledge or applied research. At the farm level, cocoa management is not based on proven scientific knowledge. For example, cocoa crops are planted in areas with unsuitable levels of shade and soil analysis is not consistently performed. Partnering with local research centers—including universities and the Commission of the National System of Technical Assistance for the Honduran Cocoa Sector (SINATEC)—is therefore needed to ensure that good practices in diversified agronomic/agroforestry management, and the use of proven technological innovations can be introduced and adopted nationally.

1.15 **Project location and beneficiaries.** The project will target the municipios of Dulce Nombre de Culmí, Catacamas, and Patuca in the department of Olancho. It will directly benefit 1,000 cocoa growing families, 735 of which belong to the following cooperatives and associations: Asociación de Productores de Sistemas Agroforestales de Cacao Orgánico de Olancho (APROSACAO); Cooperativa Agroforestal del Río Plátano (COAFORPLA); Asociación Villa Nueva; Cooperativa Cafetalera Pech de Desarrollo Limitada (COCAPEDEL); Asociación de Productores de Cacao de Capapan (APROCAPAPAN); and Empresas Campesinas de Parque Nacional (ECAPAN). In addition, the project will directly benefit 265 families that do not belong to producer associations. The project's impact will also extend to another 1,500 families that will be able to provide services within the cocoa value chain.

1.16 The average cocoa grower in Olancho is 48 years old. One in four is illiterate and only 45% have some level of primary schooling. Forty-three percent are not affiliated with producer associations. Only 10% have access to credit and only 70% have received technical assistance. Producer organizations are not closely aligned with market-based systems, which limits their commercial performance. Moreover, the family income of cocoa growers is estimated at US$1.30 per capita per day, putting them below the international poverty line of US$1.90 per day.[14] The estimated monthly income of small-scale cocoa growing families is US$200,

[14] Based on the final external evaluation of a CODESA project promoting agribusiness initiatives to improve the productivity and competitiveness of cocoa growers in the Maya Corridor of Honduras, 2015.

placing them in a highly vulnerable economic situation. The monthly living wage,[15] as estimated by HPI-Honduras, is US$400.

II. INNOVATION PROPOSAL

A. Project description

2.1 The project seeks to address the challenges of climate-smart agriculture and the integration of small-scale cocoa growers in high-value global markets in a resilient and sustainable way. The **main objective** *is to improve the profitability, income, and cocoa system resilience of 1,000 small-scale family growers in Olancho*.

2.2 **The project's theory of change** will address four underlying problems: (i) low productivity of cocoa farms; (ii) high economic and environmental vulnerability; (iii) weakness of the business model; and (iv) management not based on scientific knowledge. Four strategies have been developed to address these problems: (a) developing quality markets and social entrepreneurship; (b) cocoa farm profitability and resilience; (c) digital finance technologies; and (d) learning, science, and knowledge management for scalability. The project focus areas are market-driven demand; work with small-scale cocoa cooperatives and associations, and with the project's strategic business partner, Chocolats Halba; and the search for differentiated quality markets.

2.3 **The innovation** lies in the project's dual strategic focus. On the one hand, it promotes a model for increasing value, enhancing profitability, and ensuring a living wage. And on the other, it seeks to strengthen the resilience of the cocoa production system. The model prioritizes climate-smart agriculture, the adoption of technological innovations, and efficient business management in Olancho. This is considered a pilot project due to its high degree of digital and technological innovation, social entrepreneurship coordination, and the social capital and science it brings to bear with impact at the national level.

2.4 HPI-Honduras will supplement the model with social capital strengthening,[16] to include individual and group capacity building, the identification of solutions based on local potential, and grassroots adoption of innovations.

2.5 From a **market perspective**, cocoa cultivation in the department of Olancho has the potential to increase small-scale farmers' income. Accordingly, the project calls for a formal business partnership with Chocolats Halba, with the aim of increasing its cocoa purchases to 1,000 metric tons—which is double the amount it currently purchases—in order to satisfy market demand.

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[15] The estimated daily per-capita income of cocoa growing families in Honduras is US$1.30. A living wage means that all household income earned, generated, or transferred, whether in cash or in kind, is sufficient to allow all members of the family to have a decent standard of living. It includes the family's ability to send their children to school, provide them with nutritious food every day, and have suitable housing, water, hygiene, and all other essential resources.

[16] This encompasses the set of ethical principles and values that the members of an organization or community practice among themselves, which is acquired through learning processes on different subject areas: organizational, productive, accounting and/or administrative, environmental, among others.

2.6 The project promotes **climate change adaptation** by developing and implementing good practices and climate-smart technologies, including: the use of ShadeMotion[17] software and drones for cocoa shade management, which will facilitate calculation of the position, shape, and accumulation of tree shade on the ground and on the canopies of understory crops, with the aim of optimizing yields. The use of **digital technologies**, such as **blockchain**,[18] is also proposed to facilitate access to financial services,[19] as well as record and openly operate cocoa value chain traceability data. All production-related technological innovations will be designed and implemented on the basis of solid scientific knowledge about cocoa cultivation, and will prioritize the transfer of knowledge and capacity building at the local level with strategic support provided by CATIE in partnership with local universities such as UNA.

B. Components and activities

2.7 The project is structured in four components: (i) ***business development, quality management, and market access,*** with the aim of strengthening producer organizations' business management, social entrepreneurism coordination, and quality management; (ii) ***increasing cocoa farm productivity and resilience*** through good practices in sustainable agricultural production, implementation of innovative agricultural technologies (shade, propagation, plant and genetic protection), and use of digital technologies (drones and ShadeMotion software); (iii) ***technological innovation in cocoa chain management and financial services***, through the use of blockchain for traceability and access to finance; and (iv) ***learning, science, and knowledge management for scalability***, making use of applied research, innovation laboratories, and the sharing of experience and knowledge at the regional level.

2.8 **Component I: Business development, quality management, and market access (MIF: US$310,350; counterpart US$328,750).** The objective of this component is to develop and offer services to strengthen the business management, organization, and leadership capabilities of small-scale individual cocoa growers and their associations and cooperatives, to improve their access to differentiated and inclusive quality markets through the implementation of new business models, sustainable business practices, and a total quality model with the aim of satisfying the requirements to access certified markets. The intervention strategy facilitates opportunities for public-private collaboration at the regional and national levels, including the Olancho Regional Cocoa Board (MESCAOLA) and the National Cocoa Board, which will constitute mechanisms for reaching consensus in cocoa sector land-use planning in Olancho. The strategic lines include: (a) organizational strengthening; (b) local business development; (c) public-private partnerships for greater social inclusion, and local governance and social entrepreneurship coordination; and (d) quality management though differentiation strategies and links to support services.

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17 *ShadeMotion 4.0* is a CATIE software that calculates the position, shape, and accumulation of tree shade on the ground and on the canopies of understory crops, such as cocoa and coffee.

18 The use of blockchain-based traceability helps to create a digital identity for the farmer, which records his or her transaction history with buyers. This enables the farmer to build a reputation and a verifiable production history, which can then be used to access financial services.

19 HPI-Honduras will partner with Institución Financiera FAMA, which already designs financial products tailored to the needs of small-scale cocoa growers.

2.9 The following activities will be financed: (i) business mapping and diagnostic assessment of producer organizations to identify obstacles to their cooperative coordination and business practices; (ii) design and implementation an advisory services program on Chocolats Halba's demand, and business strengthening for six producer organizations;[20] (iii) training in developing business growth and business model strategies; (iv) training in internal management and governance for producer organizations, with a focus on the inclusion of women producers in governing bodies; (v) design and implementation of cocoa sector business models and ventures; (vi) strengthening of governance and coordination through multisector dialogue; and (vii) hiring of cocoa processing and business consulting specialists.

2.10 The **quality standards** to be adopted will take into account: (i) ideal fermentation and drying protocols for Olancho cocoa and its organoleptic quality profiles; (ii) training in good practices for quality assurance, post-harvest management, and organic certification; (iii) investments in equipment, technologies, and good practices for quality assurance in post-harvest processes; (iv) development of cocoa differentiation strategies though quality, organic, or other types of certification that increase financial returns; and (v) coordination workshops to connect qualified small-scale cocoa entrepreneurs with the private sector (Chocolats Halba).

2.11 The expected **outputs** are: (i) six producer organizations will have completed their business mapping and diagnostic assessment; (ii) six producer organizations will have implemented a business improvement plan based on their original diagnostic assessment; (iii) six producer organizations will have women serving of at least 25% of their governing bodies; (iv) 200 producer members will have been trained in business development, agribusiness, and gender equity; (v) six producer organizations will have been trained in good practices for quality assurance, post-harvest management, and organic certification.

2.12 **Component II: Increasing cocoa farm productivity and resilience (MIF: US$377,302; counterpart US$238.100).** The objective of this component is to offer services that will increase cocoa farm productivity and resilience. It will focus on adopting good practices in climate-smart agriculture, diversifying production with optimal agroforestry systems (e.g. nurse crops, firewood, charcoal, fruit, and timber) for family consumption or for sale, and reducing production costs with innovative technologies that increase the value of cocoa farms. The component will be developed in coordination with the project's strategic partner, CATIE,[21] which will implement an applied research process on farms of small growers as a base for Farm Field Schools (FFS). It will also build the capacity of producer organizations' technical teams and of SINATEC, in coordination with UNA.

2.13 From a technical standpoint, the project will leverage new technologies and climate-smart agriculture practices, including diagnostic assessment of cocoa farm agroforestry designs using drones, sensors, and ShadeMotion 4.0 simulation

[20] To this end, HPI-Honduras will establish processes to connect these organizations with financial institutions that provide finance to the cocoa sector, thereby enabling them to secure the financing they need to invest in and grow their business.

[21] CATIE has ample experience in the design and management of cocoa development projects in several Latin American countries, including initiatives with various indigenous groups, e.g. the Ngöbe and Naso in Panama; the Bribri and Cabécar in Costa Rica; the Aymara, Quechua, and Mosetén in Bolivia; and some Maya ethnicities in Belize and Guatemala.

software for shade canopy design. A digital device will be developed to facilitate the optimal design of cocoa agroforestry systems. It will include X-Copter drones to take low-altitude (30 to 50 meters) aerial photos of cocoa farms, using a camera and other sensors to build a three-dimensional model of the agroforestry system. It will inventory and take measurements of trees and other shade canopy plants (e.g. species, trunk height, crown height and width, crown type, and crown transparency) and of the cocoa (e.g. population, leaf area, and water stress).

2.14 The following activities will also be financed: (i) conduct interactive workshops with farm families to craft dynamic and optimal agroforestry designs tailored to each farm; (ii) provide technical and financial assistance to producer families for grassroots implementation of cocoa farm agroforestry plans; (iii) model the financial flows of current cocoa farms and target cocoa farms; (iv) hire a cocoa specialist, technicians, and paratechnicians; (v) organize field schools; (vi) establish and rehabilitate Olancho's clonal garden; (vii) identify the nutrient balance, assess fertility (including heavy metals, e.g. cadmium, lead, and aluminum) of 500 hectares of cocoa farms, and develop specific fertilizer recommendations for each; and (viii) provide technical and financial assistance to producers to implement good agricultural practices.

2.15 **Other climate change adaptation strategies:** (a) medium-term crop combinations that are able to adapt to the landscape; (b) income diversification with optimal agroforestry systems and cocoa quality improvement strategies; and (c) transformative adaptation, including restoration of degraded soils and selection of cocoa planting sites.

2.16 **The expected outputs are:** (i) clonal gardens established and/or rehabilitated; (ii) diagnostic assessment using ShadeMotion or other technologies completed for 500 cocoa farms; (iii) 500 cocoa farms benefitting from the soil and fertility analysis (including heavy metals, e.g. cadmium, lead, and aluminum); (iv) 1,000 cocoa producers have receive technical assistance for converting their cocoa farms to agroforestry systems; and (v) a financial flow model and analysis of the cocoa farms have been completed.

2.17 **Component III: Technological innovation in cocoa chain management and financial services (MIF: US$362,000; counterpart: US$80,040).** The objective of this component is to facilitate access to innovative digital technologies and blockchain for traceability in the cocoa value chain, as well as financial inclusion of small-scale cocoa growers. The following actions will be financed:

2.18 **Commerce.** The project will innovate by registering the cocoa supply chain on blockchain. Farm-to-table digitization of the cocoa supply chain will provide greater optimization of business processes, as well as the shared value provided by blockchain transparency. This will give consumers more confidence in regard to the origin and quality of the cocoa they buy.

2.19 **Financial inclusion.** Financial inclusion will be fostered through FinTech and digital-financial training. Accordingly, suppliers of financial and nonfinancial business development services that serve specific areas relevant to the cocoa sector will be mapped. Additionally, financial inclusion alternatives, new technologies, and the financing needs of the Olancho cocoa sector will be evaluated. This area of focus will be supplemented by a proof of concept or pilot in the use of blockchain to record,

store, and freely access data on, *inter alia*, inventories, management, finance, environmental footprint, soil, and organoleptic properties.

2.20 **Outputs.** The expected outputs are: (i) blockchain proof of concept (i.e. log, storage, traceability, and environmental footprint) completed; (ii) 500 producers will have received financial training; (iii) 500 producers will have a blockchain-based digital identity and "economic passport"; (iv) four cocoa cooperatives and associations will be accessing financial products and services focused on the cocoa sector; and (v) 400 producers will be accessing relevant financial products and services.

2.21 **Component IV. Learning, science, and knowledge management for scalability (MIF: US$390,599; counterpart: US$369,530).** This objective of this component is to provide small-scale cocoa producers, the technical teams of grower organizations, the academic community, and other cocoa sector stakeholders with access to up-to-date information and better knowledge about agroforestry production of cocoa in Olancho, by strengthening learning at the sector and national levels regarding the management of high-value and diversified cocoa agroforestry systems, based on applied scientific research. The information generated by the project will therefore be documented and published, and the data will be open-access for everyone on the **DATAVERSE** platform.[22] The technical series and open-access publications of HPI-Honduras and CATIE will also be available for free consultation on the websites of CATIE and its Orton libraries, as well as those of HPI-International, SINATEC, the National Cocoa Board, and area universities.

2.22 Specifically, the following activities will be financed: (1) implementation of the documented databases and their placement in open access on the DATAVERSE platform; (2) design field school curriculum and supporting documentation; (3) design the curriculum and supporting documentation for cocoa total quality, entrepreneurship, and financial training; (4) develop fertilizer manuals for Olancho cocoa; (5) conduct an assessment of the bromatological and sensory quality of Olancho cocoa; (6) build teaching staff capabilities and provide them with training in coordination with the UNA and the Instituto Tecnológico de Costa Rica;[23] (7) outfit the UNA's Agribusiness Laboratory with the basic equipment needed to offer soil analysis services to different categories of local producers, such as cocoa, corn, beans, and livestock; (8) strengthen methodological and research capacities of local universities (UNA, Centro Universitario Regional Nor-Oriental, Universidad Cristiana Evangélica Nuevo Milenio, Universidad Católica); and (9) implement the systematization and dissemination of outcomes at the national and international levels.

2.23 The key outputs include: (i) implementation of an open-access repository of useful information for producers on the DATAVERSE platform; and (ii) 100 teachers and students trained in the design of the updated curriculum and/or technological innovations; (iii) three exchange and scientific events (regional and international) to share successful practices in the cocoa sector.

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[22] The DATAVERSE Network is a software application to publish, share, reference, extract, and analyze data. It is free at http://thedata.harvard.edu/dvn/faces/login/LoginPage.xhtml?clearWorkflow=true.

[23] Subject matter includes: (1) design and management of dynamic cocoa agroforestry canopies; (2) comprehensive moniliasis management; (3) nutrient budget, soil fertility analysis, nutrient balance, and cocoa fertilization design; (4) cocoa pruning to create and maintain donor trees; and (5) cocoa genetics.

C. Project outcomes, measurement, monitoring, and evaluation

2.24 Project indicators are adjusted to the Bank's Corporate Results Framework (CRF) and the ideal indicators for climate-smart agriculture. The project should achieve the following outcomes at the conclusion of the three-year implementation period: (i) 800 farm families[24] whose income has increased by 25% as a result of cocoa and agroforestry system activities (CRF 320100); (ii) six cocoa cooperatives/associations have increased their gross business revenues by at least 10% annually (CRF 330101); (iii) six producer organizations selling cocoa to strategic market partners (CRF 230200); (iv) two buyers supplied with cocoa directly from producer organizations and family growers involved in the project; (v) average yield of 400 kilograms per hectare for farmers using the new technology and agroforestry practices (compared to current yield of 240 kilograms/hectare); and (vi) 800 cocoa producers have adopted sustainable production processes and technologies to manage their cocoa farms (CRF 230100).

2.25 **Monitoring and evaluation system.** With respect to monitoring, HPI-Honduras anticipates using the Project Operational Resource Center (CROP) system, which facilitates online verification of the individual beneficiary growers' and grower organizations' records, geographic location, and project resource and knowledge-delivery transactions. The CTO survey tool will be used to collect information digitally via tablet, transmitting it to the CROP system where it can be seen immediately (online).

2.26 **Evaluations.** A midterm and final evaluation will be prepared for the project to assess the model's effectiveness and replicability. Several elements will be analyzed in the midterm report, including: (i) growers' rate of technology adoption; (ii) gains in cocoa farm productivity, (iii) execution and effectiveness of the blockchain pilot for traceability and financial inclusion; and (iv) strengthening of producer organizations and their commercial relationship with the chain's strategic buyers and partners. The final project outcomes will be evaluated and documented in a final evaluation. Key questions that may arise in the review of outcomes and impacts in the final project status report include: (i) How effective was the agricultural technology in terms of yield, income, and resilience? (ii) How successful was the blockchain program? and (iii) How might the model be replicated in other supply chains (specifically in other Honduran departments and other Central American countries)?

III. Alignment with the IDB Group, Scalability, and Risks

A. Alignment with the IDB Group

3.1 The project is aligned with the IDB Institutional Strategy by supporting social inclusion, productivity, and innovation, and addressing crosscutting themes such as climate change and environmental sustainability. It also addresses the MIF priority area of climate-smart agriculture.

3.2 The proposal is aligned with the current IDB country strategy with Honduras, and with the new country strategy (2019-2022), which identifies agricultural innovation and productivity as a priority. It highlights actions designed to strengthen public- and

[24] Of the 1,000 grower families that will benefit from the project, 800 should be able to increase their income by adopting new practices.

private-sector actors, sustainable management of agricultural, forest, and biodiversity systems, land use and management for climate change mitigation and adaptation, and fulfill nationally determined contributions to reduce greenhouse gas emissions.

3.3 The project supports IDB Invest's priority business areas of increasing access of micro, small, and medium-sized enterprises (MSMEs) to finance and technical assistance, supporting innovation, and fostering green growth. It also focuses on improving market linkages to agricultural value chains—a key sector of IDB Invest activities.

3.4 Approximately 30% of IDB resources allocated for this operation are to be invested in climate change adaptation activities, based on the joint methodology of the multilateral development banks for tracking climate finance. These resources contribute to the IDB Group target of increasing financing for climate-related projects to 30% of approvals by the end of 2020.

B. Scalability

3.5 The project promotes grassroots knowledge management and human capital development of Olancho cocoa sector support entities, which will remain there even after the project has been completed. Considering the technologies to address climate change, as well as spatial prioritization for transformational adaptation, the approach tested in the project could be implemented in other countries or regions to identify spatial priorities and other optimal sites for cocoa using available data about the potential impacts of climate change.

3.6 In partnership with SINATEC and the National Cocoa Committee, the lessons learned and technological developments resulting from the project in Olancho will be scaled up for implementation at the national level, in all subregions where cocoa production is clustered in the country. For example, training in how to use the methodological tool to remodel and innovate cocoa farm design, and in training methodologies for technicians and teachers in collaboration with the Regional Cocoa Committee.

3.7 **Scale-up of knowledge management.** This will be promoted by capitalizing on research results, carrying out on-farm experiments, dissemination of genetic composition studies and analyses of cocoa clones used in Olancho, and of profitability and valuation of diversified agroforestry cocoa farms, by developing the capacities of local technicians, research center professors and teachers, and training cocoa experts, in coordination with UNA, the Instituto Tecnológico de Costa Rica, and SINATEC.

C. External risks

3.8 **Market risk.** There is a risk that producer organizations may not ultimately connect with markets that recognize the value added of sustainable cocoa production and marketing, which facilitate greater income. Another is that these organizations may not diversify their market channels. **Mitigation:** HPI-Honduras will conclude an interagency cocoa marketing agreement with Chocolats Halba, which has stated its need for more quality cocoa. To that end, it has prioritized small-scale producer organizations in its supply chain. While the market risk (especially price volatility) is difficult to avoid, partnerships formed to identify differentiated markets will help

mitigate its impact. The opening of a second market channel is planned for conventional cocoa (40% of total production).

3.9 **Risk of lack of access to finance.** Cocoa producer associations and cooperatives lack access to finance for their business ventures and direct investment in producer member farms to enhance their quality and production volume. **Mitigation:** With resources from HPI-Honduras and local financial operators, loans will be made to producers based on the value chain needs analysis and of the level of financing of each producer organization. The project will also implement a pilot program featuring the use of new financial inclusion technologies based on **FinTech** and **blockchain**.

3.10 **Climate risk.** Weather events will likely occur that adversely impact cocoa quality and productivity. **Mitigation:** As part of cocoa management, roundtable discussions will be held to develop plans for managing risk (environmental and climate) and for climate change adaptation. Management protocols will be established for moniliasis and other pests and diseases.

3.11 **Risk of economic dependence on monoculture.** To compensate for dependence on cocoa as the sole source of income and to avoid the associated risks of crop loss, the diversification strategy, which integrates agroforestry systems, provides for other income flows and facilitates markets with direct buyers.

IV. BUDGET INSTRUMENT AND PROPOSAL

4.1 The project's total cost is US$3.4 million, of which US$1.7 million (50%) will be contributed by the MIF as nonreimbursable technical-cooperation funding, and the remaining US$1.7 million (50%) will be a counterpart contribution. The counterpart consists of contributions from: (i) HPI-Honduras; (ii) CATIE, through innovation systems developed to facilitate agroforestry designs for existing cocoa farms. These provide for the use of drones, sensors, and simulation software (ShadeMotion 4.0) for shade canopy design, as well as field availability of cocoa varietal clones; (iii) Chocolats Halba, through expert advisory services on quality and integrated pest management protocols; (iv) availability of UNA teaching and technical staff; and (v) local government contributions for trade and communication infrastructure.

Project categories	MIF	Counterpart	TOTAL	%
Component I: Business development, quality management, and market access	$301,350	$328,725	$630,075	19%
Component II: Increasing cocoa farm productivity and resilience	$377,302	$238,100	$615,402	18%
Component III: Technological innovation in cocoa chain management and financial services	$362,000	$80,040	$442,040	13%
Component IV: Learning, science, and knowledge management for scalability	$390,599	$369,530	$760,129	22%
Project administration	$211,569	$152,835	$364,404	10.7%
Midterm and final impact evaluation	$42,180	$41,000	$83,180	3%
Other HPI-Honduras contributions	-	$489,770	$489,770	14.4%
Ex post review	15,000	-	15,000	
Grand total	**$1,700,000**	**$1,700,000**	**$3,400,000**	**100%**
% of Financing:	**50%**	**50%**		

V. EXECUTING AGENCY AND IMPLEMENTATION STRUCTURE

A. Description of the executing agency

5.1 HPI-Honduras will be the project's executing agency. It is a private, nonprofit nongovernmental organization that was established under the laws of the State of Arkansas, United States of America, and recognized as a corporate entity in that country. Since March 2003, HPI-Honduras has had the right to operate in Honduras. Its head office is located in Tegucigalpa, where all administrative, coordination, follow-up, and representation work is done. It also has three regional offices located in Honduras's western (Gracias), central-west (La Esperanza), and eastern (Catacamas) regions. HPI-Honduras's work in the country covers a period of 40 years of project implementation in 17 of the country's 18 departments. Through its social capital model and training of promoters and cocoa business leaders and their organizations, HPI-Honduras will strengthen organizational, production, and business models, as well as community values in terms of achieving greater profitability and resilience in cocoa. HPI-Honduras will partner with public entities, such as the Ministry of Agriculture, the Cocoa Chain Committee, Olancho Business Development Centers (CDEs), and local authorities in participating municipios, SINATEC, the National Cocoa Board, and the private sector–Chocolats Halba–to strengthen the sector, the lessons learned from applied research, and replication in other regions for greater scale and impact.

5.2 **Strategic partner.** With more than 70 years of experience in cocoa cultivation research, education, and development, CATIE is a strategic partner of the project. It also has the largest international cocoa collection in the area with more than 1,200 different high-yield, industrial quality genotypes that are resistant to black pod rot (*Phytophthora palmivora*) and frosty pod rot (*Moniliophthora roreri*). CATIE's role will focus on the identification and design of agroforestry systems (models), the training of technical staff, and direct transfers to grassroots organizations and universities.

5.3 **Chocolats Halba.** Chocolats Halba, a Swiss company of the private sector, will play a strategic role in supporting post-harvest technical assistance, primarily to ensure good cocoa bean quality by training cooperatives in grade-A quality requirements and the fermentation and drying management processes necessary for the international market. Each year, the company produces more than 12,000 metric tons of high-quality Swiss chocolate for renowned brands, private retail labels, and industry worldwide.

5.4 Other partners include the local Olancho, Culmí, and Patucas governments, as well as the Business Development Centers in the three municipios; HeiferLab in the United States for digitization and use of blockchain technology, and the cocoa producer cooperatives and associations.

5.5 **Eligibility criteria. To participate in the project, producer associations or cooperatives must:** (i) be legally established; (ii) have established coca areas that can be expanded for organic-system production; (iii) comply with Ministry of Agriculture regulations;[25] (iv) demonstrate an interest in adopting good agricultural practices and climate-smart agriculture; (v) have at least 30 active cocoa farmer members; (vi) preferably have a minimum level of production infrastructure; (vii) be open to associative marketing and organic certification in order to partner with the project's strategic commercial partner, Chocolats Halba, which is interested in purchasing more volume and offering a differentiated price for quality cocoa.

B. Implementation structure and mechanism

5.6 HPI-Honduras will be responsible for the project's administration. Accordingly, it will form an executing unit that answers to HPI-Honduras management. The unit will be comprised of a project manager, an administrative-financial specialist, a cocoa value chain specialist, a business and technology specialist, 10 paratechnicians, and a business advisor. The aforementioned manager will have operational and administrative responsibility for the project.

5.7 A **project advisory council or governance board** will be formed, led by HPI-Honduras, which will serve as a forum for technical dialogue and strategic coordination, and for feedback and reporting progress and outcomes. The advisory council will be comprised of one representative of each of the project's strategic partners, which include HPI-Honduras, CATIE, UNA, and Chocolats Halba. Two representatives of cocoa producer organizations could be considered as observer members. An IDB/MIF representative may participate as a nonvoting member.

VI. Fulfillment of Milestones and Special Fiduciary Arrangements

6.1 **Results-based disbursements and fiduciary arrangements.** The executing agency will agree to standard MIF arrangements for results-based disbursements, to the Bank's procurement policies,[26] and the financial management arrangements[27] specified in Annex V and Annex VI.

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[25] Possess land-tenure credentials and permits and/or environmental certifications.

[26] See Policies for the Procurement of Goods and Works Financed by the Inter-American Development Bank.

[27] See Financial Management Guidelines for IDB-financed Projects.

VII. ACCESS TO INFORMATION AND INTELLECTUAL PROPERTY

7.1 **Access to information.** According to the Bank's Access to Information Policy, this document is available to the public.

7.2 **Intellectual property.** The Bank will hold the relevant intellectual property rights regarding all technical work and outcomes obtained from research under the Chocolate-4-All project, with the exception of the shared rights related to the blockchain pilot, which will be held by both parties and will be used to benefit the Honduran cocoa sector.