

## TC Document

### I. Basic Information for TC

▪ Country/Region:	HAITI / CDH
▪ TC Name:	Improvement of Sediment Management in the Peligre Reservoir
▪ TC Number:	HA-T1206
▪ Team Leader/Members:	Bruno Jacquet (RND/CHA), Team leader; Kenol Thys (ENE/CHA), Co-Team Leader; Géraud Albaret (RND/CHA); Anastasia Touati (CDH/CHA); Tsuneki Hori, Carmine Paolo De Salvo and Yolanda Valle (CSD/RND); Renaud Tahon (VPS/ESG); Romina Kirkagacli (PDP/CHA); Marise Etienne (PDP/CHA); Regine Lafontant (CDH/CHA); and Louis-Francois Chrétien (LEG/SGO)
▪ Indicate if: Operational Support, Client Support, or Research & Dissemination	Operational Support
▪ If Operational Support TC, give number and name of Operation Supported by the TC:	HA-L1032; HA-L1038; HA-L1087
▪ Date of TC Abstract authorization:	April 5th, 2016
▪ Beneficiary (countries or entities which are the recipient of the technical assistance):	Republic of Haiti
▪ Executing Agency and contact name	Ministry of Agriculture, Natural Resources and Rural Development Farnel Jacques Louis. farjaclouis@yahoo.fr
▪ Donors providing funding:	Infrastructure Project Preparation Fund (INFRAFUND) (IPF) and Sustainable Energy and Climate Change IDB Special Program (SCI)
▪ IDB Funding Requested:	US\$900,000
▪ Local counterpart funding, if any:	US\$180,000 (in kind)
▪ Disbursement period (which includes Execution period):	18 months
▪ Required start date:	August 2016
▪ Types of consultants (firm or individual consultants):	Firms
▪ Prepared by Unit:	CSD/RND and INE/ENE
▪ Unit of Disbursement Responsibility:	CDH/CHA
▪ TC Included in Country Strategy:	Yes
▪ TC included in CPD:	Yes
▪ GCI-9 Sector Priority:	(i) Protect the environment, respond to climate change, promote renewable energy, and ensure food security.

### II. Description of the Associated Grants

- 2.1 Through the operations HA-L1032, HA-L1038 and HA-L1087 financed by the Bank, the Government of Haiti is actively engaged in recovering the capacity of Peligre reservoir and its hydro-power plant (Péligre Hydroelectric Plant - PHP) in order to manage its core functions related to flood risk mitigation, irrigation management, and production of energy. For instance, equipment renewal and management are partly being addressed through HA-L1032 and HA-L1038 operations (ENE/CHA) whose objective is to recover the capacity to generate renewable energy and to feed the

capital Port au Prince and the Center Province. On the other hand, the HA-L1087 operation (RND/CHA) was set to decrease agricultural and infrastructure losses due to floods through better water management at the watershed level.

- 2.2 Several evaluations and technical studies highlighted the fact that the severe sedimentation of Peligre reservoir is threatening the sustainability of the infrastructure since the lake lost 50% of its storage capacity between 1980 and 2008<sup>1</sup>. The current technical cooperation is therefore designed to address this issue in complementarity with HA-L1032, HA-L1038 and HA-L1087 operations, and may result in a future investment program aimed to improve sediment management in the reservoir.

### **III. Objectives and Justification of the TC**

- 3.1 The Peligre dam was initially built in 1956 to control flooding and provide irrigation in the Artibonite floodplain. The water flows coming from the 9,000 km<sup>2</sup> Artibonite watershed were periodically damaging downstream economic infrastructure and human settlements, and the downstream floodplain represented a good opportunity to develop the country's largest agricultural irrigated district (potentially, 32,000 ha). In 1971, the power plant was added and started the generation of renewable energy (54 Megawatt). Nowadays, the dam is able to reduce flood peaks by 500 m<sup>3</sup>/s for 10 year-return period events, and provides water to irrigate 29,000 ha producing 75% of the average 130,000 tons of rice annually grown in the country. In 2017 the PHP will recover its full capacity which will represent 30% of the country available energy supply.
- 3.2 However, the reservoir is progressively losing its capacity to manage these core functions (flood prevention, irrigation and production of energy) mainly because of: i) mismanagement, ii) lack of equipment renewal, and iii) severe process of sedimentation. As explained above, the issues of management and equipment are being addressed through HA-L1032, HA-L1038 and HA-L1087 operations. Since 2013 a Committee has been reactivated to gather the Ministry of Agriculture, Natural Resources and Rural Development (MARNDR), the Artibonite Valley Development Organization (in charge of managing the irrigated district) and the Haitian Electricity Company (EDH), with the support of the Inter-Ministerial Committee For Territorial Development (CIAT, for its acronym in French), in order to improve decision-making processes regarding multipurpose water management. Furthermore, the PHP electro-mechanical parts and transmission lines are being renewed in the framework of the operations HA-L1032, HA-L1038 and HA-L1100. However, the problem of sedimentation still needs detailed studies in order to find technical solutions and, in that sense, increase the life-time of the reservoir and the PHP. According to different studies and projections (GL Morris, 2008; Artelia, 2013), the dam may reduce its storage capacity from its actual 300 million m<sup>3</sup> to 10 million m<sup>3</sup> by 2068, if sediment are not managed adequately either by flushing, extraction or upstream retention.
- 3.3 In 2015, a set of terms of reference has been prepared to launch the following studies: i) update of the topo-bathymetry of the reservoir (the last one is dated 2008), ii) analysis of the evolution and dynamic of the sedimentation process and, iii) design of a sediment management project, including the environmental and social management plan. In fact, the topo-bathymetry study is expected to be finalized

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<sup>1</sup> #IDBDocs1670215 - Sedimentation Study Peligre Reservoir, Haiti - Gregory L. Morris Engineering, P.S.C - 2008

during the summer 2016, while the two others still remain to be developed. In this framework, the Government of Haiti (GoH) requested support of the Bank to improve sediments management of the Peligre reservoir through: i) a detailed analysis of the evolution of the sedimentation in the reservoir, on the basis of historical measurement and the one currently being carried out and, ii) a feasibility study of a project to manage sediments, including the environmental and social management plan.

- 3.4 Both studies would support the design of a new operation to be financed in the framework of the Bank's next Country Strategy for 2016-2020, which would aim to finalize the rehabilitation of the Péligre Hydroelectric Plant (PHP) and dam, and therefore improve water management and multipurpose use in the Artibonite watershed (flood risk management, irrigation and energy production).
- 3.5 The objective of the TC is therefore to provide strategic and technical information to improve sediment management in the Peligre reservoir.
- 3.6 The technical cooperation is aligned with Bank's Country Strategy with Haiti for 2011-2015 (GN-2646), since it sets agriculture and energy as priority sectors and the Peligre dam is a major infrastructure combining energy and agricultural production in the country. The proposed TC is aligned with the InfraFund (IPF) and the Sustainable Energy and Climate Change Initiative Fund (SCI) which support the preparatory activities required for infrastructure investment, such as prefeasibility studies and measures aimed to protect infrastructure against climate change effects. This TC contributes to two lending program priority targets outlined in the Report on Bank's Ninth General Increase Capital (AB-2764) and its Results Framework: (i) small and vulnerable countries; and (ii) support climate change initiatives, renewable energy and environmental sustainability, by promoting efficiency and sustainability of water management for flood risk management, irrigation and energy production. The TC is consistent with GCI 9 strategic priority "Protect the environment, respond to climate change and enhance food security".

#### **IV. Description of Activities/Components and Budget**

- 4.1 The technical cooperation will implement the following component.
- 4.2 **Component: "Analysis of sedimentation and feasibility study of sediment management in Peligre reservoir" (US\$980,000).** This component will finance a set of studies that will include: (i) **basic studies**, including (a) a detailed analysis of the sedimentation process of the Peligre reservoir, on the basis of historical and updated data (analysis of type, volume, shape, localization of sediments, distance from the dam, historical evolution, etc.); (b) a modeling of the sedimentation process and its technical and economic impacts on the three core functions of the dam (flood control, irrigation and energy), using an integrated water management modeling tool; (c) an update of the dam operation manual according to the current and forecasted evolution of the storage capacity of the reservoir; (ii) taking into account the results of the modeling, a **prefeasibility study of the management of sediments in the reservoir**, including technical design of different alternatives, cost estimates, effects on the management of the reservoir, cost-benefits analysis and preliminary environmental and social impact assessment ; and (iii) the **detailed design of the technical option to be selected**, including detailed technical features, dimensions, detailed costing, a detailed environmental and social impact assessment, and the corresponding environmental and social management plan.

**Table 1. Results Matrix**

Results		Unit of measure	Baseline	End of Project	Means of verification
<b>Outcome:</b> Accurate information available to improve management and decision-making processes with regard to Peligre dam management <b>Indicator:</b> Studies available and used to take decision		Study	0	6	Peligre Committee meeting report
<b>Component: Analysis of sedimentation and feasibility study of sediment management in Peligre reservoir</b>					
<b>Basic studies</b>	<b>Output 1:</b> Detailed analysis of the sedimentation process of the Peligre reservoir developed	Study	0	1	Report accepted by the Peligre Committee
	<b>Output 2:</b> Modeling of the sedimentation process elaborated	Model	0	1	Idem
	<b>Output 3:</b> Dam operation manual updated according to the current storage capacity of the reservoir	Manual	0	1	Idem
<b>Prefeasibility study</b>	<b>Output 4:</b> Prefeasibility analysis of different technical alternatives for the management of sediments in the reservoir elaborated	Study	0	1	Idem
<b>Detailed design</b>	<b>Output 5:</b> Detailed design of the selected technical option elaborated	Study	0	1	Idem
	<b>Output 6:</b> Detailed environmental and social impact assessment and environmental and social management plan elaborated	Plan	0	1	Idem

**Table 2. Indicative Budget**

Outputs		IDB/Fund		Counterpart (in kind)	Total
		IPF	SCI		
<b>Basic studies</b>	<b>Output 1:</b> Detailed analysis of the sedimentation process of the Peligre reservoir developed	50,000		25,000	75,000
	<b>Output 2:</b> Modeling of the sedimentation process elaborated	50,000		25,000	75,000
	<b>Output 3:</b> Dam operation manual updated according to the current storage capacity of the reservoir	50,000			50,000
<b>Prefeasibility studies</b>	<b>Output 4:</b> Prefeasibility analysis of different technical alternatives for the management of sediments in the reservoir	225,000		50,000	275,000
<b>Detailed design</b>	<b>Output 5:</b> Detailed design of the technical option to be selected	200,000		20,000	220,000
	<b>Output 6:</b> Detailed environmental and social impact assessment and environmental and social management plan elaborated		300,000	60,000	360,000
<b>Contingencies</b>		25,000			25,000
<b>TOTAL</b>		<b>600,000</b>	<b>300,000</b>	<b>180,000</b>	<b>1,080,000</b>

## V. Executing agency and execution structure

- 5.1 **Responsible parties.** The Executing Agency for the TC will be the Ministry of Agriculture, Natural Resources and Rural Development (MARNDR). The MARNDR has been in charge of the execution of most Bank's-financed operations in the sector for the past thirty years, and currently manages an active portfolio totaling approximately US\$190 million. The Executing Unit will be the PROGEBA Unit, which is executing the HA-L1087 operation, related to water management in the Artibonite valley. The Peligre dam Committee will supervise the consultants hired under this TC and validate the different expected products.
- 5.2 **Procurement.** Procurement activities will be conducted by the MARNDR's Procurement Unit (UPMP, for its French acronym), whose risk has recently been evaluated as medium to low. The UPMP, was created with Bank's support in 2013, and has been responsible for all MARNDR's procurement activities since early 2014, with experienced staff assigned and officially approved procedures. All procurement activities will be performed in accordance with Bank rules and procedures, with no exceptions to the application of the Policies for the Selection and Recruitment of Consulting Services (GN-2350-9). The TC will be subject to the special provisions for procurement activities in Haiti (GN-2654) for as long as they will be in force. The regular thresholds will be applicable upon the expiration of said provisions. Procurement processes and contract management will require Bank's no-objections. It is expected to carry out three procurement processes (refer to procurement plan).
- 5.3 **Financial management.** Financial risk is low. Financial activities will be limited to the submission of direct payment requests by PROGEBA unit to the Bank, which works under Bank's ex-post supervision due to previous excellent performances. The MARNDR will not have to open a bank account, to manage funds, to provide financial reports nor to conduct external audit. The TC does not contemplate reimbursement of expenses. For expenses incurred in local currency, the Central Bank of Haiti exchange rate valid at the day of the transaction will be used.
- 5.4 **Contractual conditions.** Considering the above-mentioned simplified executing mechanisms, conditions to be fulfilled prior to first disbursement only include the submission of the signatures of people authorized to communicate with the Bank and to submit direct payment requests.
- 5.5 The sector specialists of RND and ENE divisions based in the Haiti Country Office will supervise the execution of the TC. ESG will also contribute to the supervision. Monthly meetings will be held, in collaboration with the members of the Peligre Committee.

## VI. Major issues

Issues	Mitigation
Delay in product delivery resulting from limited coordination among institutional stakeholders (EDH, MARNDR, others)	The firm and consultants will be supervised by the PROGEBA unit, with the support of EDH, Peligre Committee and other relevant stakeholders.
Delay in product delivery resulting from local difficulties (political, administrative and logistical)	Close supervision of contract by MARNDR and IDB. Realistic planning.

**VII. Exceptions to Bank policy**

- 7.1 There is no exception to Bank policy.

**VIII. Environmental and Social Strategy**

- 8.1 This technical cooperation (TC) is associated with the design and implementation of activities that could have significant environmental and social impacts and risks such as impacts to the livelihood of numerous families or impacts to Artibonite river ecology (e.g. in the case that emptying the dam is the retained solution to improve sediments' management). The TC will precisely include an alternative analysis study or the various options to improve sediments' management, and a detailed Environmental and Social Study - as the case may be an Environmental and Social Impact Assessment and Compensation Plan - for the chosen option. As a consequence and as per Policy OP-703, this TC is categorized as A (see [Safeguards Filter Reports](#)).

**IX. Annexes:**

- [Letter of Request from the client](#) (TC is included in the Country Program Document 2016 agreed with the Government of Haiti)
- [Terms of Reference](#)
- [Procurement Plan](#)

## IMPROVEMENT OF SEDIMENT MANAGEMENT IN THE PELIGRE RESERVOIR

HA-T1206

### CERTIFICATION

I hereby certify that this operation was approved for financing under the Fund Infrastructure Project Preparation Fund (INFRAFUND) (IPF) for **US\$600,000** and the Fund Sustainable Energy and Climate Change IDB Special Program (SCI) for **US\$300,000** through a communication signed on **April 11, 2016** by Mr. Felipe Caicedo. Also, I certify that resources from both funds are available for up to **US\$900,000** in order to finance the activities described and budgeted in this document. This certification reserves resources for the referenced project for a period of **Six (6) calendar months** counted from the date of eligibility from the funding source. If the project is not approved by the IDB within that period, the reserve of resources will be cancelled, except in the case a new certification is granted. The commitment and disbursement of these resources shall be made only by the Bank in US dollars. The same currency shall be used to stipulate the remuneration and payments to consultants, except in the case of local consultants working in their own borrowing member country who shall have their remuneration defined and paid in the currency of such country. No resources of the Fund shall be made available to cover amounts greater than the amount certified herein above for the implementation of this operation. Amounts greater than the certified amount, may arise from commitments on contracts denominated in a currency other than the Fund currency, resulting in currency exchange rate differences, for which the Fund is not at risk.

ORIGINAL FIRMADO

07/12/2016

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Sonia M. Rivera  
Chief  
Grants and Co-financing Management Unit  
ORP/GCM

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Date

Approved: ORIGINAL FIRMADO

07/13/2016

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Juan Pablo Bonilla  
Manager  
Climate Change and Sustainable Development  
CSD/CSD

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Date