PROJECT INFORMATION DOCUMENT (PID)
APPRAISAL STAGE

Report No.: 71008

Project Name	Cunha Canal Rehabilitation Project
Region	LATIN AMERICA AND CARIBBEAN
Country	Guyana
Sector	Flood protection (100%)
Lending Instrument	Co-financing Grant
Project ID	P132408
{If Add. Fin.} **Parent Project ID**	N/A
Borrower(s)	GOVERNMENT OF GUYANA
Implementing Agency	Ministry of Agriculture - Agriculture Sector Development Unit (ASDU)
Environmental Screening Category	{ }A { X }B { }C { }FI
Date PID Prepared	07/11/2012
Estimated Date of Appraisal Completion	07/20/2012
Estimated Date of Board Approval	09/03/2012
Decision	Project authorized to proceed to negotiations upon agreement on any pending conditions and/or assessments.

I. Country Context

Guyana is a low-lying country, the third smallest country in South America after Suriname and Uruguay. With a GNI per capita of US$3,270 in 2011, it one of the poorest country in Latin America and the Caribbean. Nevertheless, Guyana has achieved significant advances in the reduction of moderate and extreme poverty rates, which fell 14.5 and 17 percent respectively between 1992 and 2006. After years of volatility, the economic performance of the country has improved in recent years with increasing foreign direct investment and GDP growth, estimated at 4.8 percent for 2011. Further growth is expected to be supported by key public infrastructure investment projects, increases in productivity linked to the implementation of the sugar modernization plan, and growth in other commodity export sectors[1].

Guyana has one of the lowest population densities in the world. Ninety percent of its 760,000 inhabitants live on the narrow coastal plain, which represents 10 percent of the country's area[2]. This is an area of reclaimed lands, much of which lies below sea level, situated between a water storage basin and a protective seawall complex. The coastal zone is transected by a dense network of drainage and irrigation canals, which links up with several water conservancies, including the East Demerara Water Conservancy (EDWC), a water storage system that provides regional agricultural lands and urban areas with irrigation and drinking water.

[1] World Bank Group (2012) "Guyana Country Brief"
[2] World Bank Group (2012) "Guyana at a Glance"

Guyana's agrarian economy is highly dependent on this coastal drainage and irrigation system, which allows for bi-annual harvests of rice and sugar that account for approximately 27 percent of the nation's GDP. This system also provides flood control that is crucial for the protection of property, life and economy in the country. Over the past three decades however, the operational capacities of this network of dams, canals and sluices have declined. Intense flooding in 2005 and 2006 demonstrated the increased vulnerabilities of the drainage system and revealed shortcomings in the existing infrastructure. Present rates of sea level rise associated with global climate change exacerbate this threat: estimates from the 2009 *National Adaptation Strategy to address Climate Change in the Agriculture Sector of Guyana* suggest that the sea level can be expected to reach one meter by the end of the century, which could potentially result in the flooding of about 200,000 hectares, where 70 percent of the population resides, 40 percent of the agricultural land is located and 48 percent of the GDP is produced[3].

II. Sectoral and Institutional Context

Guyana Coastal Drainage and Flood Control

Guyana's coastal zone consists of a low-lying system of marine and riverine deposits which formerly comprised an extensive network of tidal deltas. Human settlement and infrastructure is concentrated in the reclaimed coastal plain much of which is below the mean high tide level. In this area the population is distributed according to the availability of suitable land for housing and services, with the highest population densities found in the vicinity of the capital, Georgetown, and adjoining areas.

The country's drainage and irrigation system and the reclamation of this coastal zone were undertaken during the colonial period. To compensate for high levels of rainfall and the low elevation of the populated regions, the colonial powers (Netherlands 1616-1814 and England 1814-1966) developed an intricate drainage system requiring constant monitoring and maintenance. Land reclamation in the coastal zone began under their tender and continued through the British colonial period.

Located to the south of Georgetown in Administrative Region 4, the EDWC is estimated to have a total catchment area of 582 km^2. The conservancy is formed by an embankment of approximately 60 km long which forms a water conservancy with a surface area is of the order of 450 km^2. Drainage of the conservancy is necessary during rainfall events to avoid overtopping of the dam and is managed through the use of sluices that release water through a series of canals and is often augmented by mobile pump units at hotspots along the coastal plains. This system is under increasing stress owing to its age. The EDWC dam is also known to be in poor structural condition, with little or no freeboard during floods and insufficient capacity during droughts and the limited capacity of the canal system pose a significant risk to flooding of the populated coastal zone during high rainfall events.

[3] Development Policy and Management Consultants, Guyana (2009), "National Adaptation Strategy to address Climate Change in the Agriculture Sector of Guyana: Synthesis and Assessment Report", Caribbean Community Climate Change Centre

A key element of the system that is currently not functioning is the Cunha Canal, located on the western side of the EDWC discharging into the Demerara River. Around 1990, the canal was diverted from its original alignment to a smaller discharge channel. This diversion reduced the discharge capacity of the canal and both the diversion and the canal itself went into disuse soon afterwards. The discharge through the canal was reestablished during the 2005 flood with a limited capacity, as it is affected by circuitous routing and hydraulic restrictions imposed by bridge and culvert structures constructed to accommodate local access and flow under the Public Road. Rehabilitation of the canal would remove hydraulic restrictions, resulting in improved discharge volumes and a more efficient functioning of the system.

Key challenges facing the sector

Condition of infrastructure: Over the past three decades, the operational capacities of the EDWC have declined due to insufficient physical investments and inadequate disaster preparation and management capacity for the monitoring, operation and maintenance of the system.

Impacts of climate change: The infrastructure challenges are compounded by the likely influence of climate change on sea-levels and rainfall pattern. Sea level in the region of Guyana is increasing at a rate of more than 10 mm/year, or 2 to 5 times faster than the global estimate.[4,5] As sea level rises, the systems discharge window from low tide to mean tide is shrinking. If the discharge flow is not improved, the system will increasingly suffer from a limited ability to release water during storm events and ultimately result in the overtopping and breach of the system's levees. In parallel, the country is likely to experience a decrease in average rainfall and an increase in rainfall intensity[6]. A drying trend of this nature will not only increase intensity of rainfall events, but also lead to greater reliance on the EDWC water storage system during dry seasons.

Strategies to address the sector's challenges

Improving EDWC planning and management: The floods of 2005 and 2006 highlighted the significance of the risks posed by the weakened containment and drainage capacities of the EDWC system. With flooding re-occurring the following year, the Government of Guyana (GoG) and the international community recognized flood management to be crucial to Guyana's economic, social and political well-being. In response to these needs, the GoG requested the World Bank to develop the Conservancy Adaptation Project (CAP), which was approved by the World Bank's Board in October 11, 2007 with financing from the Global Environment Facility Special Climate Change Fund (GEF SCCF). The CAP's development objective is to reduce Guyana's vulnerability to the catastrophic flooding of its low-lying coastal area, due in part to

[4] B.C. Douglas (1995) "Global sea level changes: determination and interpretation." *Rev. Geophys*., Vol. 33, pp. 1425-1432.

[5] Government of Guyana (2002) "Guyana Initial National Communication In Response To Its Commitments To The UNFCCC 2002"; Republic of Guyana (2002) "Initial National Communications Report to the UNFCCC"; Government of Guyana, Environmental Protection Agency (2002) "Guyana's National Vulnerability Assessment to Sea Level Rise".

[6] According to forecasts from the *Initial National Communications Report* and the *National Vulnerability Assessment* (2002), temperature in Guyana is expected to rise by an average of 1.2°C in the period 2020 to 2040, and rainfall is expected to decrease by an average of 10 mm per month.

the rise in sea level as a result of global climate change. The CAP is financing the development of the technical foundation for a master plan of future interventions within the EDWC and lowland drainage systems, as well as specific short term upgrading works and operational improvements. Main activities include institutional strengthening activities; investments in specific adaptation measures; and pre-investment studies for engineering design of works, which have been contracted and are advancing on schedule. Results of this study will be published shortly, and a series of workshops and information sessions held to disseminate its findings. Investments in specific adaptation measures have been ongoing and key repairs to the system have been executed. As a priority investment to improve drainage capacity of the EDWC, the Cunha Canal Rehabilitation Project falls under the broader umbrella of the Conservancy Adaptation Project (CAP) program.

In parallel to these initiatives the GoG has made significant investments and improvements in drainage management and EDWC operational capacity including works to strengthen critical dam sections and to open EDWC internal flow networks, significantly improving east to west flow regimes.

Financing: The GoG has also made efforts to establish a means of financing that can be used to finance upgrades in the system and reduce vulnerability to climate and disaster risk. In June 2008 Guyana formally entered into partnership with the World Bank's Forest Carbon Partnership Facility (FCPF), and initiated activities to prepare the country to engage in carbon finance transaction under the REDD+ (reducing emissions from deforestation and forest degradation, and conservation of standing forests). In 2009, the GoG launched a Low Carbon Development Strategy (LCDS), outlining how Guyana's economy can be aligned along a low carbon trajectory, by investing payments under REDD+ into strategic low carbon sectors. In the same year, Guyana and Norway signed a Memorandum of Understanding (MOU) and a Joint Concept Note in which Norway committed to providing financial support of up to US$250 million by 2015 for results achieved by Guyana in REDD+, which will support the implementation of Guyana's LCDS. Under the MOU, contributions from Norway are channeled toward priority projects in the LCDS through the multi-contributor Guyana REDD+ Investment Fund (GRIF), established in October 2010. These initiatives build on earlier components of the country's policy and legislative framework, including the National Environmental Action Plan (NEAP) and the Environmental Protection Act (EAP) and include projects to reduce their vulnerability to climate change and disaster risk management. The GRIF steering committee in 2011 began approving projects under the LCDS and approved the preparation of the Cunha Canal Rehabilitation Project proposal in June 2012.

Rationale for Bank Involvement

The Bank is currently centrally involved in the improvements in the EDWC through the implementation of the CAP Program, which identified upgrading of the Cunha Canal as a key short-term investment that would have a high immediate impact on the EDWC by increasing its real time drainage capacity. Although the Cunha Canal rehabilitation works were initially included as part of the CAP's implementation, they were subsequently removed from the CAP's US$3.8 million GEF Grant. The Cunha Canal Rehabilitation Project, funded by a US$2.5 million

co-financing grant from the GRIF, is therefore proposed as a stand-alone operation fitting within the broader CAP program[7].

The proposed Project would be the first project financed by the GRIF with the World Bank as a partner entity, providing a proof of concept of the use of this financing mechanism. The successful implementation of the Co-financing would open up the opportunity for the World Bank to act as a partner entity in the financing of a larger set of investments under the US$250 million GRIF fund.

The CAP, including the Cunha Canal works, is part of the World Bank Group's Country Assistance Strategy 2009-2012, discussed by the Executive Directors on May 26, 2009. One of the two main pillars defined in the CAS includes "strengthening environmental resilience and sustainability". The CAS also states that the GoG will continue to execute major infrastructure works to mitigate the country's vulnerability to climate change, and identifies the following priority areas: (i) protecting the environment and managing natural resources with simultaneous sustainable social and economic development, and (ii) managing the impacts from sea level rise and changes in rainfall patterns through disaster mitigation. Cunha Canal rehabilitation is well in line with these strategic goals.

III. Project Development Objectives

The Project Development Objective of the Cunha Canal Rehabilitation Project is to improve relief drainage in the East Demarara Water Conservancy (EDWC), thereby contributing to the CAP program-level objective of reducing Guyana's vulnerability to the catastrophic flooding of its low-lying coastal area, due in part to the rise in sea level as a result of global climate change.

The Project will contribute to this goal through rehabilitation of the current drainage channel to allow for increased flow into the Demerara River, and rehabilitation and reinforcement of a sluice to prevent inflow of river water during high tides.

IV. Project Description

The CAP program is financing the development of the technical foundation for a master plan of future interventions within the EDWC and lowland drainage systems, as well as specific upgrading works and operational improvements. Cunha Canal works were initially contemplated as one of the investments in specific adaptation measures considered under Component 2 of the CAP, and an engineering design for the modified Cunha outlet was financed within the CAP's US$3.8 million GEF Grant. As of the March 2011 restructuring of the CAP, however, carrying out of civil works to rehabilitate the Cunha Canal is no longer financed with the CAP's US$3.8 million GEF Grant. The Cunha Canal Rehabilitation Project, funded by a US$2.5 million co-financing grant from the GRIF, is proposed as a stand-alone operation fitting within the broader CAP program.

[7] The GoG developed the draft design and site-specific environmental assessment for these works under the CAP, and requested Co-financing through the GRIF with the World Bank as the partner entity.

The proposed Project will finance the following two activities:

Carrying out of civil works to rehabilitate the Cunha Canal.

(a) *Rehabilitation of the drainage channel.* The channel will be re-routed along its original alignment, widened and excavated to remove the earth fill and weeds and allow for a straight flow into the Demerara River that eliminates hydraulic restrictions.

(b) *Rehabilitation and reinforcement of a sluice.* This sluice will be used to control the discharge of water and to prevent river water from entering the canal during high tide. The canal will be operated using this sluice in conjunction with the water control structures located at the EDWC dam which was rehabilitated by the Government after the 2005 flood.

(c) *Construction of a bridge on the EBD Public Road.* A new bridge will be constructed at the point where the canal will intercept the EBD Public Road to allow vehicular traffic to traverse the area.

Implementation of Abbreviated Resettlement Plan. The proposed civil works require the acquisition of a portion of land owned by Barama Lumber Company (BLC) and the relocation of certain assets that are within this area. Land acquisition will be carried out by the Government of Guyana, and compensation for other related expenses, detailed below, will be provided by the Project. The Project will finance the implementation of the Abbreviated Resettlement Plan (RAP), specifically:

(a) *Relocation of assets.* Assets to be relocated include a log bridge, a steel bridge, a lumber shed, a saw dust pen, equipment, a fence, two guard huts, fuel storage, and utilities. BLC will be responsible for relocation of their displaced assets within an agreed period of six months.

(b) *Provision of other resettlement assistance.* During the relocation period the company will outsource the work of the affected facilities. Compensation for this cost will be provided by the Project under this Component.

1. Financing

($m.)

Source:
Borrower/Recipient 0.0
IBRD 0.0
IDA 0.0
Others (GRIF) 2.51

Total 2.51

2. Implementation

The Project will follow implementing arrangements used for works under the CAP program, as described below. A key risk identified by the CAP program, which also applies to the Cunha Canal works, is the limited capacity for procurement and financial management as well as safeguards and technical oversight. This risk was proactively identified during Appraisal of the CAP and has been mitigated through its implementation. While the risk remains "substantial", supervision and capacity support as part the CAP program are considered adequate to manage it in the context of the Cunha Canal Rehabilitation Project. Risk mitigation measures in place are provided under Annex 4 (ORAF).

Ministry of Agriculture: The implementing agency for the Cunha Canal Rehabilitation Project is the Agriculture Sector Development Unit (ASDU) within the Ministry of Agriculture (MoA). The ASDU will manage the fiduciary, safeguards and administrative aspects of the Project and the procurement process, including issuance of the tenders, undertaking financial reporting for the Co-financing, and making payments to contractors. Construction of the new sluice and rehabilitation will fall under the responsibility of the ASDU while operation and maintenance of the Cunha Canal and sluice will also fall under the responsibility of the National Drainage and Irrigation Authority (NDIA), which is under the MoA and is the national authority responsible for management and maintenance of drainage and irrigation canals. Once works on the Cunha Canal and sluice are complete, the NDIA will take over operations and maintenance in accordance with their mandate. Operation and maintenance costs will be funded through regular government appropriations for these types of activities.

Ministry of Public Works and Communications: Similarly, the ASDU will manage the construction and related fiduciary, procurement and contract management responsibilities for the bridge, while the Ministry of Public Works and Communications (MoPWC) will assume management and maintenance responsibility of the completed structure. The MoA and the MoPWC have signed a MoU outlining the arrangements for the construction design approval and supervision, maintenance and operation of the proposed works. Responsibilities in terms of design, bid preparation, firm selection, contracting, technical supervision, operation, routine maintenance and repair of the works involved are also outlined in this MoU. The MoPWC will be responsible for providing approvals for the final design of the bridge works to assure it is consistent with national requirements. Upon completion of the works, the ownership of the bridge will be transferred to MoPWC who will maintain the bridge after construction is complete, through funding from regular government appropriations for these types of activities. While performance can be improved, these appropriations are adequate for basic maintenance of the system. With the GoG's increasing emphasis on flood issues, national capacity and attention to operating the system properly has increased steadily in the past few years.

GRIF Oversight: The works under the proposed Project will receive strategic direction and guidance from the technical unit and designated representatives of the GoG for the GRIF. The Office of the President (OP) represents the GoG in the GRIF Steering Committee and determines the portfolio of projects that will be financed by the GRIF. As an interim arrangement, the OP is also currently managing the GRIF Secretariat, which prepares operational manuals and procedures, facilitates Steering Committee meetings and decisions, processes project proposals, and manages public communication. While the OP selects and approves GRIF financed projects, Project implementation would be led by an implementing agency, which in this case would be

the MoA's ASDU. Under the GRIF arrangement, the World Bank (as a GRIF partner entity) would enter into a grant agreement with the implementing agency (MoA) for the Cunha Canal Rehabilitation Project.

3. Safeguard Policies (including public consultation)

Safeguard Policies Triggered by the Project	Yes	No
Piloting the Use of Borrower Systems to Address Environmental and Social Issues in Bank-Supported Projects (OP/BP 4.00)		X
Environmental Assessment (OP/BP 4.01)	X	
Natural Habitats (OP/BP 4.04)	X	
Pest Management (OP 4.09)		X
Physical Cultural Resources (OP/BP 4.11)		X
Involuntary Resettlement (OP/BP 4.12)	X	
Indigenous Peoples (OP/BP 4.10)		X
Forests (OP/BP 4.36)		X
Safety of Dams (OP/BP 4.37)	X	
Projects in Disputed Areas (OP/BP 7.60)*	not eligible for piloting under OP 4.00	
Projects on International Waterways (OP/BP 7.50)	not eligible for piloting under OP 4.00	

4. Contact point at World Bank and Borrower

World Bank

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Implementing Agencies

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* *By supporting the proposed project, the Bank does not intend to prejudice the final determination of the parties' claims on the disputed areas*

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5. For more information contact:

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