PROJECT INFORMATION DOCUMENT (PID)
APPRAISAL STAGE

Report No.: PIDA633

Project Name	Adaptation of Nicaraguas Water Supplies to Climate Change (P127088)
Region	LATIN AMERICA AND CARIBBEAN
Country	Nicaragua
Sector(s)	General water, sanitation and flood protection sector (100%)
Lending Instrument	Technical Assistance Loan
Project ID	P127088
Focal Area	Climate change
Borrower(s)	Republic of Nicaragua
Implementing Agency	Ministry of Environment and Natural Resources (MARENA)
Environmental Category	B-Partial Assessment
Date PID Prepared	03-Oct-2012
Estimated Date of Appraisal Completion	20-Jul-2012
Estimated Date of Board Approval	13-Nov-2012
Decision	

Public Disclosure Authorized
Public Disclosure Copy

I. Project Context

Country Context

Nicaragua remains the second poorest country in Latin America after Haiti. Although economic gains have reduced the scale and severity of poverty in Nicaragua, the poverty rate is still high with 46 percent of the population living below the poverty line as of 2005. Access to safe drinking water improved from 74 percent in 1990 to 85 percent in 2008, and Nicaragua will likely attain the Millennium Development Goal (MDG) target of 87 percent coverage by 2015. However, this gain belies continuing challenges, including frequent water rationing, high system losses, lack of domestic metering, low collection rates, and poor water quality, especially in rural areas.

In view of these challenges and the need to achieve the MDGs on health and environmental sustainability, the Government of Nicaragua (GoN) defined the increase of Nicaragua's water supply and sanitation access, associated with better service quality, as one of the pillars of the country's 2008-2012 National Development Plan and as an essential element of the World Bank Group's Country Partnership Strategy 2008–2012 (Report No. 39637-NI, discussed by the Executive Directors on October 11, 2007). Achieving these objectives may be compromised by increasing climate variability and climate change unless adequate provision is made for improving resilience in this sector.

Extreme climate events, food insecurity, biodiversity loss, health risks, and especially the increasing water scarcity are among the most critical climate change impacts in the Central American region. Between 1930 and 2009, Central America experienced 259 major extreme climate-related events of which 85 percent accounted altogether for floods, storms, landslides and mudslides, and 10 percent accounted for droughts (ECLAC 2011). In the past three decades, the number of disasters has been growing at an estimated annual rate of 5 percent compared to the levels recorded during the 1970s. There is growing consensus that the increasing intensity of hurricanes and other storms is related to climate change, and that this intensity could increase between 5 and 10 percent during the current century relative to the last four decades (IPCC, 2007a).

Nicaragua's strategic water resources for current and future water supplies are vulnerable to the effects of climate change due to the high frequency of extreme weather events, droughts, floods and hurricanes, in addition to pollution pressures from untreated wastewater, agricultural runoff and other sources. Climate variability and extreme events have high economic costs for Nicaragua, and a large share of these costs results from having too much or too little water. During the increasingly frequent dry El Niño years, many rural areas are often affected by drought and the availability of water for household uses falls, particularly for the poorer communities in rural areas and small towns that rely on shallow groundwater wells. Water supplies in other areas become unavailable or polluted by wastewater from solid and liquid wastes during flood periods, significantly affecting health and the incidence of waterborne diseases.

As suggested by the Diagnostic Study "Climate Change Impacts on Water Resources, and Adaptation in the Rural Water Supply and Sanitation Sector in Nicaragua," which combined a review of projections from global circulation models and from hydrological models, climate change projections indicate that water availability will likely decrease in most of Nicaragua's basins (World Bank 2012). A rapid field assessment has also confirmed that rural water supplies are highly vulnerable to the increasingly frequent drought and flood events, which are caused partly by unsustainable land use and watershed management practices, and partly by the changing climate.

The key finding of the Diagnostic Study is that the net effect of climate change on the water balance in Nicaragua by 2050 is likely to be negative. The analysis of the global climate models also indicates that the already dry areas of Nicaragua are likely to be affected by more frequent severe droughts. Current flood-prone areas on Nicaragua's Pacific and Atlantic coasts will likely be exposed to higher runoff. This means that rural water supplies will come under increasing pressure, especially in the areas that depend on surface water or on groundwater sources with small recharge areas.

The Diagnostic Study also indicates that the issue of the vulnerability of rural water supply to climate variability and climate change is inseparable from that of sanitation. In Nicaragua's specific geological conditions and mountainous terrain with thin and fragile soils, more

frequent droughts mean that the increasingly concentrated pollutant loads from latrines could easily reach water wells or local surface water supplies. Thus, finding new solutions to address these issues and going beyond traditional approaches are critical in view of the changing climate. The types of solutions and the approach to their implementation depend on the prevailing environmental, institutional and physical characteristics and typologies of approaches to facilitate adaptation to climate change in the water supply and sanitation sector need to be developed that can later be scaled up by the broader sectoral investment programs. Such approaches will be developed by the Adaptation Project in a sample of four municipalities, with the total rural population of over 60,000 people, and with distinct climatic, physical and socio-econo mic conditions.

Water supplies in the Corn Islands off the Caribbean coast of Nicaragua and in other flood-prone coastal areas may be more vulnerable to the pressures of climate change than in any other part of the country. The Great and Little Corn Islands—the fifth municipality covered by the Project—are small, but with a total population of around 9,000 and a high rate of population growth they are the most densely populated area in the Caribbean with Great Corn's Island's 700 people per square kilometer (km2), and have the highest recognized tourism potential in the country. The local population and the government are alarmed about saltwater intrusion and pollution of the islands' groundwater aquifers and about coastal erosion. Another issue of concern is the apparent shrinking of the island, whic h the Nicaraguan Institute of Land Studies and Meteorology (Instituto Nicaragüense de Estudios Territoriales, INETER) and the local communities attribute in part to climate change and the rising sea levels. An assessment of the extent of these problems, carried out as part of the 2010 Country Environmental Analysis (World Bank 2010), has revealed that the groundwater aquifers—the only source of potable water on the Corn Islands—are indeed under severe pressure from overextraction of groundwater and poor management of the islands' wetlands. This situation is expected to worsen with the additional pressures from climate change and rising sea levels.

II. Sectoral and Institutional Context

The 2010–2015 National Environment and Climate Change Strategy (NCCS) and its Climate Change Action Plan for Critical Watersheds in Nicaragua have identified a set of priority adaptation measures. These include strengthening environmental and climate change education and information systems at the national and municipal levels; supporting watershed protection actions, such as conservation, protection of forest cover, and water harvesting; protection of critical ecosystems such as forests and mangroves; and sustainable land management in agriculture.

Five strategic areas are defined in Nicaragua's 2010–2015 NCCS and in its Action Plan: (i) environmental education, (ii) protection of natural resources, (iii) conservation, rehabilitation of watersheds, and water harvesting, (iv) mitigation, adaptation and management of climate-related risks, and (v) sustainable land management. The proposed Adaptation of Nicaragua's Water Supplies to Climate Change Project (the Adaptation Project) is fully consistent with four of these areas. More specifically, the Action Plan has identified wetland and mangrove protection as a priority within the broader area of natural resources management and climate adaptation due to the important role that these areas play as biological filters and for the provision of clean water. Within the area of water sources protection and water harvesting, the priority measures defined include watershed protection measures, forest conservation, and water harvesting for a range of household and agricultural uses. The proposed Adaptation Project will directly support the GoN with the achievement of the strategy's objectives through its support of water sources protection, rain harvesting, and wetland management in pilot areas with high vulnerability to climate change, and climate education and information systems.

The GoN has set ambitious targets to increase water supply and sanitation coverage in rural areas, which the Adaptation Project aims to affect by integrating the climate dimension in the sector's investment and planning. The World Bank has been asked by the GoN to play a prominent role in the sector and also to actively promote the coordination of donor support. As a result, the Bank is providing financial and technical assistance through the FY09 Nicaragua Greater Managua Water and Sanitation Project (Proyecto de Agua y Saneamiento en el Gran Managua, PRASMA (P110092) US$40 million, effective in May 2009) and the FY08 Nicaragua Rural Water Supply and Sanitation Project (Proyecto de Abastecimiento de Agua en las Zonas Rurales, PRASNICA (P106283) US$20 million, effective in March 2009). PRASNICA supports: (i) increasing rural water supply and sanitation coverage, (ii) institutional strengthening of rural water supply and sanitation management institutions, and (iii) pilot projects to strengthen municipal-level water supply and sanitation systems and the protection of water sources. The additional financing for PRASNICA totaling US$5 million has been requested by the GoN and included in World Bank's lending pipeline for 2013, which, if approved by the World Bank's Executive Directors, will bring PRASNICA's total to US$25 million.

Baseline Investment for the Adaptation Project. The Adaptation Project will be financed by a US$6,000,000 grant from the Special Climate Change Fund administered by the Global Environment Facility (SCCF-GEF). All of the proposed activities as part of the Adaptation Project will help to strengthen the resilience to climate variability and climate change of the baseline investments in the water supply and sanitation sector, and specifically the investments financed by two independent projects: the World Bank-supported PRASNICA implemented by the New Emergency Social Investment Fund (Fondo de Inversión Social de Emergencia, or Nuevo FISE), and the new 2012–2016 Technical Assistance Program for Water and Sanitation (Programa de Asistencia Técnica en Agua y Saneamiento, PROATAS) implemented by the recently established National Water Authority (Autoridad Nacional del Agua, ANA) with the support of German Development Cooperation (Deutsche Gesellschaft für Internationale Zusammenarbeit, GIZ). The Adaptation Project's baseline consists of the interventions already planned by those two projects. These projects finance the provi sion of water supply and sanitation and water resources management in the case of PROATAS, and water supply and sanitation in the case of PRASNICA. The amount of financing provided by both of those projects totals US$31.25 million (US$25 million from PRASNICA, including the US$5 million under preparation, and US$6.25 million from PROATAS), which is considered as the baseline investment for the Adaptation Project.

The Adaptation Project will influence those baseline investments by introducing the complementary dimension of adaptation to climate variability in the planned activities. This is urgently needed in order to ensure the long-term provision of water supply services to Nicaragua's rural population. The Adaptation Project has been designed in close coordination with the activities supported by PRASNICA and PROATAS.

Project Description

The Adaptation Project will finance a program of climate adaptation measures in Nicaragua's water supply and sanitation sector through the following three components: (i) pilot projects supporting investments in supply- and demand-side measures to increase the resilience of drinking water availability in vulnerable areas through supply-augmenting and demand-control measures, combined with the protection of microwatersheds and water supply sources from climate-induced vulnerabilities (droughts and floods); (ii) coastal wetland protection and reduction of vulnerability to sea level rise in order to reduce climate-induced impacts on drinking water supplies in vulnerable areas (Corn Island); and (iii) institutional strengthening for the integration of climate impacts in the water supply and sanitation sector.

Public Disclosure Copy

The pilot projects will be implemented in four municipalities—Juigalpa, Murra, San Ramon and San Juan de Limay—which are at least partially within the following sub-basins, selected to represent diverse socioeconomic and ecological conditions and the range climate change impacts (upland and lowland regions in drought- or flood-prone zones): the Río Mayales, Jicaro-Susucayan, Río Upa-Wuabule, and Río Negro Sub-Basins.

Project Components

The Adaptation Project will support the following three components:

Component 1. Pilot Adaptation Initiatives to Enhance Climate Resilience in the Selected Municipalities (US$3.6 million). This component will support integrated adaptation projects to be implemented in four pilot municipalities (Juigalpa, Murra, San Ramon and San Juan de Limay). The diversity of the local conditions will ensure that the implementation of the adaptation activities in these pilot areas generates lessons learned that can be replicated on a broader scale through subsequent adaptation investments.

(a) Subcomponent 1.1. Demand- and supply-side measures to enhance climate resilience and improve the efficiency of water use (US $1.6 million). This component will support: (i) water harvesting, water storage, rehabilitation and construction of additional wells and aqueducts and the associated household connections, and the development of alternative water sources in drought-prone areas; (ii) introduction of approaches to strengthen the efficiency of water use and reduce climate vulnerability of drinking water supplies (e.g., introduction of water-saving technologies, metering and rational water-use campaigns); and (iii) investment in climate-resilient sanitation solutions (improved traditional latrines better adapted to climate extremes in areas where increased climate stress exacerbates pollution of water sources by latrines). This component will also enhance the quality of life of women and children who regularly spend several hours a day collecting water from distant, often polluted sources.

As established in the Grant Agreement, this Subcomponent will support the following activities to reduce climate vulnerability of drinking water supplies in areas (within the Selected Municipalities) to be selected in accordance with the criteria set forth in the Operational Manual: (i) the construction and rehabilitation of water harvesting and storage systems including, inter alia, wells, tanks, spring catchments, small reservoirs (excluding any dams) and aqueducts (including the relating household connections), and the development of alternative water sources such as surface and ground water basins; (ii) the installation of metering systems and the provision of training to promote rational water-usage; and (iii) the construction of improved latrines based on the criteria set forth in the Operational Manual.

(b) Subcomponent 1.2. Protection of water sources and the use of economic instruments to strengthen water supplies' resilience to climate variability and change (US$2 million). This component will help strengthen the implementation of watershed and water source protection measures by enhancing the resilience of water sources to climate change. This will include the implementation of a pilot program of Compensation for Environmental Services (CES) to protect micro-watersheds, using a combina tion of institutional and economic incentives to promote changes in agriculture production processes that would result in sustainable land uses for the protection of water supply sources. The areas to be protected under this sub-component will be defined in the Municipal-Level Climate Change Adaptation Plans (Planes Municipales de Adaptación a Cambio Climático, PACCs) to be supported under Component 3. Compensation to landholders who adopt land use practices that protect downstream water supplies from the impacts of climate change will be financed by the Adaptation Project. The specific criteria for the selection of the pilot areas in which such compensation will be offered will be described in the Operational Manual. The proposed actions to protect microwatersheds under this component will not involve the restriction of local communities' access to natural resources in legally designated parks and protected areas.
As established in the Grant Agreement, this Subcomponent will support developing, carrying out and monitoring, in areas (within the Selected Municipalities) to be selected in accordance with the criteria set forth in the Operational Manual, initiatives to implement institutional and economic incentives aimed at promoting the adoption of agroforestry and silvopastoral practices, all for purposes of achieving an improved protection of water resources.

The PACCs, which will define the specific activities to be implemented at the community level, will be prepared in an inclusive manner with all relevant stakeholders, including indigenous groups if they are present, in any given pilot area. This instrument will promote the integration and complementarity of the actions under subcomponents 1.1 and 1.2 (wherever technically justified), thus enhancing the Project's impact.

Component 2. Coastal Wetland Protection and Reduction of Vulnerability to Sea Level Rise in the Municipality of Corn Islands) (US$0.9 million). This component will support the following activities in the Atlantic Coast region of Nicaragua, specifically in the Corn Islands pilot municipality:

(a) Subcomponent 2.1: Environmental protection and climate change adaptation program (US$0.5 million): (i) implementation of a Wetland Protection and Mangrove Restoration Program to reduce vulnerability to sea level rise, including such measures as mangrove and coastal zone restoration; assessments of ecosystem response to climate variability; and, subject to further technical studies and Environmental Impact Assessment, small coastal protection works to protect wetlands and other coastal areas from storms and saline intrusion in wetlands, (ii) establishment of an Environmental and Climate Change Monitoring Program including the monitoring of such parameters as precipitation and temperature, and (iii) development of an education program on adaptation to climate change and protection of the islands' natural capacity to withstand climate pressures and protect its water sources. The proposed actions to rehabilitate wetlands under this component will not involve the restriction of local communities' current forms of access to the wetlands.

As established in the Grant Agreement, this Subcomponent will support the following activities in areas (within the Municipality of Corn Island) to be selected in accordance with the criteria set forth in the Operational Manual: (i) the implementation of a wetland protection and mangrove restoration program to reduce vulnerability to sea level rise, which program shall include, inter alia, the carrying out of: (a) assessments of ecosystem response to climate variability; and (b) small coastal protection works to protect wetlands and other coastal areas from storms and saline intrusion in wetlands, based on the criteria set forth in the Operational Manual; (ii) the establishment of an environmental and climate change monitoring program to keep track of parameters such as precipitation levels and temperatures; and (iii) the development of education programs for local communities on climate change adaptation measures.

(b) Subcomponent 2.2: Strengthening climate resilience of water supply and sanitation systems and water sources in Corn Islands (US

Public Disclosure Copy

$0.4 million): (i) implementation of a Groundwater Climate Resilience Program, including investments in well construction and upgrading, that would be guided by the Technical and Environmental Management Practices specified in the Operational Manual and (ii) technical assessments of groundwater aquifers' hydrology and the additional pressures from climate variability and the rising sea level.

As established in the Grant Agreement, this Subcomponent will support the following activities in areas (within the Municipality of Corn Island) to be selected in accordance with the criteria set forth in the Operational Manual: (i) the construction and upgrading of wells; (ii) the rehabilitation of water supply infrastructure; and (iii) the provision of trainings and technical assistance to the municipality's personnel to address climate risks.

Component 3. Institutional Strengthening, Project Management and Monitoring (US$1.5 million). This component will strengthen institutional capacity and coordination mechanisms at national and municipal levels to facilitate the integration of climate change adaptation into Nicaragua's water supply and sanitation and water resources management sectors. It will support the move from the current isolated and fragmented approach to planning and investments in water supply and sanitation to a more coordinated, multisectoral and integrated approach based on the protection of critical natural resources within the watershed. This approach is aimed at improving resilience to climate variability and climate change. Key knowledge products, planning mechanisms and monitoring and evaluation tools will be supported.

(a) Subcomponent 3.1: Climate Change-Water Resources Knowledge Base (US$0.5 million). This subcomponent will support water resources monitoring information system improvements and specific technical studies to improve the planning of investments in the sector by taking account of climate risks.

As established in the Grant Agreement, this Subcomponent will support: (i) the implementation, at the national level, of an information system to monitor data relating to: (a) climate change, including, inter alia, historical weather data, seasonal forecasts, and downscaled weather projections; and (b) water resources, including, inter alia, surface and ground water levels and runoff in selected pilot sites; (ii) the carrying out of hydrogeological studies to analyze, inter alia, the aquifer recharge, the water transmission and discharge processes and the water usage in the Recipient's territory; and (iii) the provision of technical assistance to ANA in relation with climate change adaptation issues.

(b) Subcomponent 3.2: Climate Change Adaptation Institutional Capacity (US$0.6 million). This subcomponent will build the institutional capacity for climate change adaptation at the national level, and in selected municipalities by developing the PACCs, aimed at integrating climate-related risks and threats and other climate change considerations into broader multi-annual municipal development plans and programs. The subcomponent will also provide support for training on climate change adaptation to the CAPS (and other community-based water associations) in project areas. In addition, the subcomponent will finance a baseline and impact evaluation studies to monitor the project and to identify lessons learned in the integration of climate change adaptation into water supply and sanitation.

As established in the Grant Agreement, this Subcomponent will support: (i) the creation of PACCS in the Participating Area; (ii) the implementation and provision of training programs on climate change adaptation to the members of the CAPS and other community-based associations, based on the criteria set forth in the Operational Manual; (iii) the carrying out of baseline and impact evaluation studies in the Participating Area in order to assess the Project's results; and (iv) the design of inter-institutional collaboration mechanisms in the rural water supply sector.

(c) Subcomponent 3.3: Project Management (US$0.4 million). Project implementation management, monitoring, reporting and coordination.

As established in the Grant Agreement, this Subcomponent will support MARENA and FISE to implement, manage, monitor and evaluate the pertinent parts of the Project through, inter alia, the carrying out of training, the provision of technical assistance, the acquisition of goods (including office equipment) and the provision of other incremental Operating Costs.

Public Disclosure Copy

III. Global Environmental Objective(s)

The Development Objective of the Project is to enhance climate resilience of investments made in Nicaragua's rural water supply sector in order to cope with: (i) increasing climate variability; (ii) expected adverse impacts of climate change in selected areas.

IV. Project Description

Component Name

Component 1. Pilot Adaptation Initiatives to Enhance Climate Resilience in the Selected Municipalities

Component 2. Coastal Wetland Protection and Reduction of Vulnerability to Sea Level Rise in the Municipality of Corn Island

Component 3. Institutional Strengthening, Project Management and Monitoring

V. Financing *(in USD Million)*

For Loans/Credits/Others	Amount
BORROWER/RECIPIENT	0.00
Global Environment Facility (GEF)	6.00
Total	6.00

VI. Implementation

The Implementing Agencies. The Republic of Nicaragua will be the recipient of the proposed grant. The Adaptation Project will have two implementing agencies: MARENA and Nuevo FISE, and a project-beneficiary agency ANA. These three institutions are the main Nicaraguan agencies that manage policies and investments in the area of climate change adaptation, water resources management, and water supply and sanitation investment in rural areas (Annex 3). ANA's role will be limited to technical guidance and technical implementation of activities within one sub-component of the Project in coordination with the implementing agencies MARENA and Nuevo FISE, and its technical contribution to the

Project's implementation in its capacity as part of the Steering Committee for the Project; ANA will not carry out financial management and procurement for any of the Project's activities.

Overall Coordination. The overall coordination function for the Project will be carried out by MARENA as the focal point for the Global Environmental Facility (GEF) and the SCCF, including technical supervision of the Project's activities, assurance of the integration and coordination of the Adaptation Project's components and activities, and monitoring of the achievement of the PDO. MARENA will also be responsible for centralizing and consolidating monitoring documents, such as the Adaptation Project's progress reports and indicators, compiled from the two implementing agencies MARENA and Nuevo FISE, and the project-beneficiary agency ANA. The Project's Operational Manual will include a detailed description of each implementing agency's role, responsibilities and coordination mechanisms.

Nuevo FISE will be in charge of financial management and procurement for the subcomponents that are under its responsibility as well as the ANA subcomponent. MARENA will be responsible for procurement and financial management of the subcomponents for which it has the overall responsibility. An Inter-Institutional Agreement will be signed by ANA and Nuevo FISE for the administration of the financial management and procurement aspects of Subcomponent 3.1 by Nuevo FISE on behalf of ANA.

Steering Committee. The Steering Committee, led by MARENA, will be created to ensure fluid coordination of the activities implemented by the two implementing agencies and ANA. Its permanent members will be MARENA (coordinator), Nuevo FISE, and ANA. Other agencies (for example, the Autonomous Government of the Southern Atlantic Region (Gobierno Regional Autónomo del Atlántico Sur, GRAAS) and the representatives of the Corn Islands municipality for the activities supported under Component 2) may join the committee for specific purposes as needed during project implementation. The Operational Manual will also describe the Steering Committee's modus operandi. The Steering Committee will be officially established through an inter-institutional agreement prior to the Adaptation Project's negotiations.

VII. Safeguard Policies (including public consultation)

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	X	
Natural Habitats OP/BP 4.04	X	
Forests OP/BP 4.36	X	
Pest Management OP 4.09	X	
Physical Cultural Resources OP/BP 4.11	X	
Indigenous Peoples OP/BP 4.10	X	
Involuntary Resettlement OP/BP 4.12	X	
Safety of Dams OP/BP 4.37		X
Projects on International Waterways OP/BP 7.50	X	
Projects in Disputed Areas OP/BP 7.60		X

VIII.Contact point

World Bank

Contact: Irina I. Klytchnikova
Title: Senior Economist
Tel: 458-0292
Email: iklytchnikova@worldbank.org

Borrower/Client/Recipient

Name: Republic of Nicaragua
Contact: Roberto Araquistain (MARENA)
Title: Vice Minister, MARENA
Tel: 22631343
Email: raraquistain@marena.gob.ni

Implementing Agencies

Name: Ministry of Environment and Natural Resources (MARENA)
Contact: Denis Fuentes
Title:
Tel: (505) 226-32864
Email: dfuentes@marena.gob.ni

IX. For more information contact:

The InfoShop
The World Bank
1818 H Street, NW
Washington, D.C. 20433
Telephone: (202) 458-4500
Fax: (202) 522-1500
Web: http://www.worldbank.org/infoshop

Public Disclosure Copy