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IMPLEMENTATION COMPLETION AND RESULTS REPORT

ON AN INTERNATIONAL DEVELOPMENT LOAN (IDA) CREDIT No. 5895-NI

IN THE AMOUNT OF US$20.1 MILLION EQUIVALENT

TO THE

Republic of Nicaragua

FOR THE

Caribbean Regional Communications Infrastructure Program (CARCIP) Nicaragua

May 25, 2023

Digital Development Global Practice

Latin America And Caribbean Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective May 10, 2023)

Currency Unit	=	Nicaraguan Córdoba (NIO)
NIO 36.5	=	US$1
US$	=	SDR 1

FISCAL YEAR
July 1 – December 31

Regional Vice President:	Carlos Felipe Jaramillo
Country Director:	Michel Kerf
Regional Director:	Christine Zhenwei Qiang
Practice Manager:	Doyle Gallegos
Task Team Leader(s):	Rocio Sanchez Vigueras
ICR Main Contributor:	Julian Najles

ABBREVIATIONS AND ACRONYMS

2G	Second Generation Mobile Technology
3G	Third Generation Mobile Technology
4G	Fourth Generation Mobile Technology
ACS	Association of Caribbean States
BTS	Base Transceiver Stations
CARCIP	Caribbean Regional Communications Infrastructure Program
CPF	Country Partnership Framework
CTU	Caribbean Telecommunications Union
ENATREL	Empresa Nacional de Transmisión Eléctrica (National Electricity Transmission Company)
ENITEL	Empresa Nicaragüense de Telecomunicaciones (Nicaraguan Telecommunications Company)
ESMF	Environmental and Social Management Framework
FBP	Fixed Broadband Penetration
GDP	Gross Domestic Product
GNI	Gross National Income
GRID	Green, Resilient, and Inclusive Development Framework
GoN	Government of Nicaragua
NHDP	National Human Development Plan of Nicaragua
IADB	Inter-American Development Bank
ICR	Implementation Completion and Results Report
ICT	Information and Communication Technology
INIDE	Instituto Nacional de Información de Desarrollo (National Institute of Development Information)
IRR	Internal Rate of Return
IDA	International Development Association
IT	Information Technologies
IT/ITES	Information Technology/Information Technology-Enabled Services
LAC	Latin America and the Caribbean
MBP	Mobile Broadband Penetration
M&E	Monitoring and Evaluation
mbps	Megabits per second
MTR	Midterm Review
MOU	Memorandum of Understanding
NPV	Net Present Value
OECD	Organisation for Economic Co-operation and Development
PDO	Project Development Objective
PAD	Project Appraisal Document
PCU	Project Coordination Unit
PPP	Public-Private Partnership
RF	Results Framework
SIECA	Secretaría de Integración Económica Centroamericana (Secretariat for Central American Economic Integration
SMEs	Small and Medium Enterprises
TELCOR	Instituto Nicaragüense de Telecomunicaciones y Correos (Nicaraguan Institute for

	Telecommunications and Postal Service)
WBG	World Bank Group

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DATA SHEET

BASIC INFORMATION

Product Information

Project ID	Project Name
P155235	Caribbean Regional Communications Infrastructure Program (CARCIP)
Country	**Financing Instrument**
Nicaragua	Investment Project Financing
Original EA Category	**Revised EA Category**
Partial Assessment (B)	Partial Assessment (B)

Organizations

Borrower	Implementing Agency
Republic of Nicaragua	ENATREL, TELCOR

Project Development Objective (PDO)

Original PDO

Increase access to regional broadband networks and advance the development of an IT/ITES industry in Nicaragua and the Caribbean Region.

FINANCING

	Original Amount (US$)	Revised Amount (US$)	Actual Disbursed (US$)
World Bank Financing			
IDA-58950	20,100,000	20,100,000	20,100,000
Total	**20,100,000**	**20,100,000**	**20,100,000**
Non-World Bank Financing			
Borrower/Recipient	2,600,000	0	0
Total	**2,600,000**	**0**	**0**
Total Project Cost	**22,700,000**	**20,100,000**	**20,100,000**

KEY DATES

Approval	Effectiveness	MTR Review	Original Closing	Actual Closing
02-Aug-2016	02-Feb-2017	21-Aug-2020	31-Jul-2022	31-Jul-2022

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US$M)	Key Revisions
22-May-2020	9.42	Change in Implementing Agency Change in Legal Covenants Change in Procurement

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Satisfactory	Satisfactory	Substantial

RATINGS OF PROJECT PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US$M)
01	18-Dec-2016	Moderately Satisfactory	Moderately Satisfactory	0

02	04-Mar-2017	Satisfactory	Satisfactory	0
03	12-Oct-2017	Satisfactory	Satisfactory	2.00
04	21-May-2018	Satisfactory	Moderately Satisfactory	2.54
05	20-Dec-2018	Satisfactory	Satisfactory	4.02
06	10-Aug-2019	Satisfactory	Satisfactory	7.16
07	18-Jan-2020	Satisfactory	Satisfactory	8.80
08	19-Aug-2020	Satisfactory	Moderately Satisfactory	10.66
09	07-Mar-2021	Satisfactory	Moderately Satisfactory	13.72
10	19-Sep-2021	Satisfactory	Satisfactory	14.99
11	14-Apr-2022	Satisfactory	Satisfactory	18.15

SECTORS AND THEMES

Sectors

Major Sector/Sector	(%)
Information and Communications Technologies	**100**
ICT Infrastructure	40
Other Information and Communications Technologies	60

Themes

Major Theme/ Theme (Level 2)/ Theme (Level 3)	(%)
Private Sector Development	**40**
Business Enabling Environment	40
Investment and Business Climate	5
Innovation and Technology Policy	35
Jobs	100
Enterprise Development	5
Entrepreneurship	5
Regional Integration	25

Urban and Rural Development	**30**
Rural Development	30
Rural Infrastructure and service delivery	30

ADM STAFF

Role	At Approval	At ICR
Regional Vice President:	Jorge Familiar Calderon	Carlos Felipe Jaramillo
Country Director:	J. Humberto Lopez	Michel Kerf
Director:	Pierre A. Guislain	Zhenwei Qiang
Practice Manager:	Boutheina Guermazi	Doyle Gallegos
Task Team Leader(s):	Doyle Gallegos, Elena Gasol Ramos	Rocio Sanchez Vigueras
ICR Contributing Author:		Julian Najles

I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Country Context

1. **Nicaragua is a small commodity export driven economy with significant urban-rural disparities.** At appraisal, roughly one-third of Nicaragua's Gross Domestic Product (GDP) was closely linked to the country's natural resource base through the agriculture, timber and fishery sectors.[1] The external sector depended on traditional export products such as coffee, meat and sugar. In 2015, Nicaragua's national poverty rate was 30 percent, with 70 percent of the poor concentrated in rural areas, many of whom were living in remote communities with limited access to services and infrastructure.[2] Prior to appraisal, the amount per capita invested in infrastructure in Nicaragua was lower than in neighboring countries.[3]

2. **Nicaragua joined Caribbean nations to address common challenges due to their small export-driven economies and high vulnerability to climate risks.**[4] Countries in this sub-region have typically relied on commodity exports making them vulnerable to external shocks. Additionally, low public and private sector capacities have limited their integration into global markets resulting in a lack of access to external capital and know-how. Prior to appraisal, Nicaragua and other Caribbean countries were engaged in a regionwide discussion facilitated by the Association of Caribbean States (ACS), of which Nicaragua is a founding member, on a strategic approach to boost economic growth. In this context, in 2014, the ACS, identified the development of trans-border Information and Communications Technology (ICT) as a key component for increasing competitiveness in the sub-region.

Sector Context

3. **In 2002 the Government of Nicaragua (GoN) adopted important reforms in the ICT sector.** Nicaragua privatized the Nicaraguan Telecommunications Company (Empresa Nicaragüense de Telecomunicaciones, ENITEL), the state-owned provider of telecom services; established the Institute for Telecommunications and Postal Service (Instituto Nicaragüense de Telecomunicaciones y Correos, TELCOR) as the sector regulator; and awarded licenses to two new private operators. Despite these reforms, Nicaragua's telecom market had limited competition due to a weak regulatory structure in the sector and insufficient telecommunications infrastructure, particularly in rural areas, resulting in low coverage and relatively high prices.[5] At appraisal, Nicaragua had one of the lowest broadband penetration rates in the Latin American and the Caribbean (LAC) region with only 2.5 percent of fixed broadband penetration, 1.4 percent of mobile broadband penetration, with rural areas particularly underserved.[6] At appraisal, Nicaragua lacked adequate coverage of backbone and last-mile networks with most of them concentrated in the western region of the country

[1] *IMF Article IV. 2016.*
[2] Ibid
[3] *Nicaragua – Country Partnership Strategy for the Period FY13-FY17 (Report No. 69231-NI). Washington, D.C. : World Bank Group. Available at: http://documents.worldbank.org/curated/en/828301468290161276/Nicaragua-Country-partnership-strategy-for-the-period-FY13-FY17*
[4] Nicaragua shares with neighboring countries, high risk levels for disasters related to weather and other natural phenomena and high vulnerability to the effects of climate change. *Nicaragua – Catastrophe Risk Insurance Project. (P149895)*
[5] *Rivera, Eugenio, 2008. "Models of privatization and development of competition in telecommunications in Central America and Mexico," Copublicaciones, Naciones Unidas Comisión Económica para América Latina y el Caribe (CEPAL), number 1973, July. Available at: https://ideas.repec.org/b/ecr/col014/1973.html*
[6] *International Telecommunication Union. The State of Broadband 2015. Available at: https://www.itu.int/pub/S-POL-BROADBAND.13-2015*

connecting the main cities and leaving rural areas underserved.

4. **Nicaragua's under-developed telecom infrastructure and lack of skilled labor were the primary obstacles for the development of the country's ICT industry.** The private sector reported limited skills among ICT specialists and universities were unable to meet the industry's evolving needs. Seven of the ten main universities in the country offered IT studies, with only 7 percent of enrollment in IT studies. Moreover, there was a big gender gap with women representing only 36 percent of students enrolled in IT university programs. [7] At Appraisal, there were only 65 local software providers in Nicaragua, most of them Small and Medium Enterprises (SMEs) with the largest firm having only 40 employees, and mostly located in the capital city of Managua. [8]

5. **In 2012, the GoN prioritized telecom and ICT as key sectors to diversify the economy and to boost socioeconomic development.** [9] In this context, the GoN looked to join the already existing Caribbean Regional Communications Infrastructure Program (CARCIP), which was established by the World Bank to address regional ICT challenges and whose first phase was implemented in 2012.[10] On this basis, the World Bank devised a second phase of the CARCIP to accommodate the request of the GoN and designed the CARCIP Nicaragua Project (the "Project") aiming to contribute to the objectives of the World Bank Country Partnership Strategy (CPS) FY13-17 for Nicaragua [11] by improving access, quality, and use of telecom and ICT services, especially in the poorest areas of the country, as well as the development of skilled labor. At the regional level, the Project aimed to strengthen the resilience of CARCIP countries to disaster risk and adaptation to climate change.

Theory of Change (Results Chain)

6. **The Project was designed to increase access to regional broadband networks and advance the development of an IT/ITES industry in Nicaragua and the Caribbean region.** A Theory of Change was not a requirement of the Project Appraisal Document (PAD) at the time of Project Appraisal and the following Theory of Change was developed for this Implementation Completion and Results Report (ICR).

[7] Information on Universities comes from analysis performed by Project team using data from *Report of Statistical Information of the member Universities. CNU. 2010*

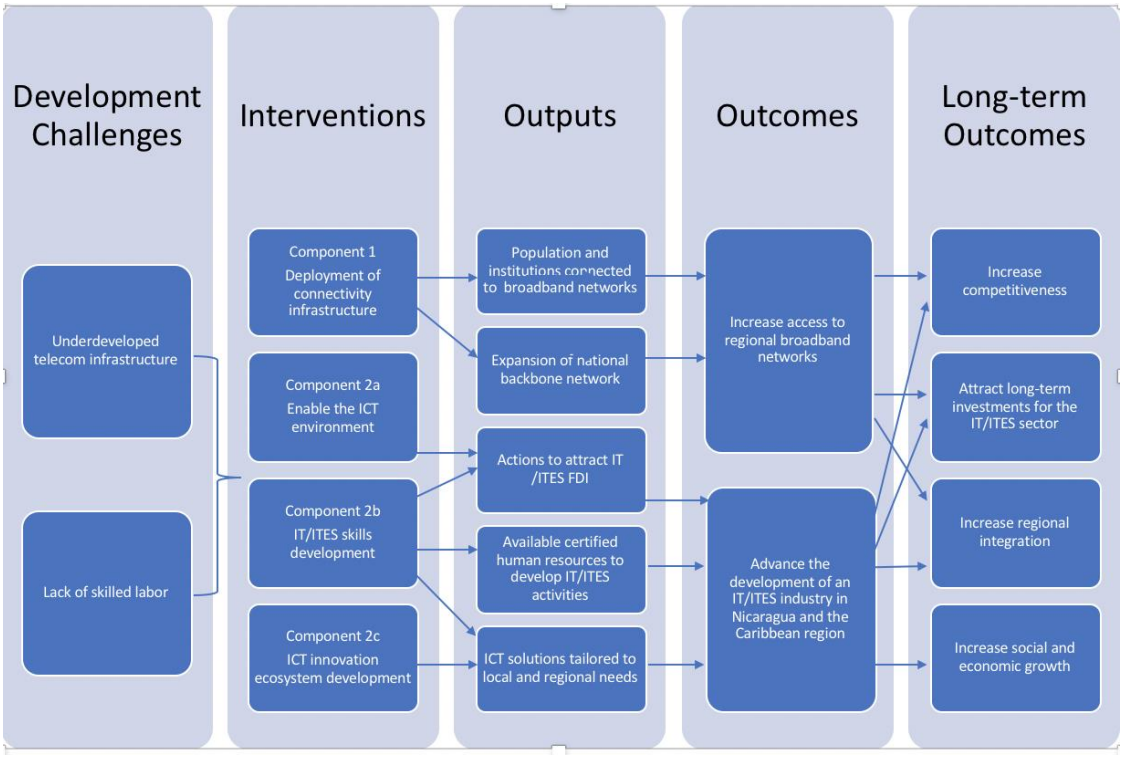
[8] Information on software providers comes from analysis performed by Project team using SMEs data provided by Ministry of Development, Industry, and Commerce

[9] *Nicaragua's National Human Development Plan for 2012-2016 Available at: https://observatorioplanificacion.cepal.org/sites/default/files/plan/files/NicaraguaPlanNacionaldeDesarrolloHumano.pdf*

[10] The CARCIP First Phase Project (P114963) was effective on December 2012 and included Saint Vincent and the Grenadines, Saint Lucia, and Grenada, and had the specific objectives of increasing access to regional broadband networks and advancing the development of an ICT-enabled services industry.

[11] The Project was aligned with the second pillar of the CPS that mandated WB interventions to "Raise incomes by enhancing competitiveness and diversifying exports". *Country Partnership Strategy (CPS) FY13-17 for Nicaragua. World Bank Group. 2012 Nicaragua – Country Partnership Strategy for the Period FY13-FY17 (Report No. 69231-NI). Washington, D.C. : World Bank Group. Available at: http://documents.worldbank.org/curated/en/828301468290161276/Nicaragua-Country-partnership-strategy-for-the-period-FY13-FY17*

Figure 1. Results Chain



Critical assumptions:

- *Public - Private collaboration to enable the implementation of the Project's IT/ITEs training and certification program.*
- *Private sector willingness to participate in the deployment of broadband infrastructure under a Public-Private Partnerships and to contribute additional financing.*
- *Financing contribution from the GoN for the deployment of fiber optic networks.*

Project Development Objectives (PDOs)

7. **The Project Development Objectives as stated in the Financing Agreement of the CARCIP Nicaragua Project, signed on August 17, 2016, are to: (i) increase access to regional broadband networks, and (ii) advance the development of an IT/ITES industry in Nicaragua and the Caribbean region".**

Key Expected Outcomes and Outcome Indicators

8. **To assess the Project's performance, the PDO is unpacked into the following objectives and corresponding indicators:**

PDO1.- To increase access to regional broadband networks.

Indicator for PDO1:

- Broadband Penetration on the Caribbean coast (Percentage)

PDO2.- To advance the development of an IT/ITES industry in Nicaragua and the Caribbean region.

Indicators for PDO2:
- Trainees certified under the skills and training program (Percentage)
- Services or applications created as a result of the ICT Innovation Ecosystem activities (Number)
- IT companies' satisfaction with the IT/ITES skills training and certification program (Percentage)

Components

9. **At approval, the Nicaragua CARCIP Project was structured into three components with a total estimated cost of US$20.1 million financed with US$8.5 million from National IDA resources and US$11.6 million Regional IDA resources**.[12] ***See Table 1 for details on cost per component and sources of funding.***

Table 1. Project Components

Components	*Projected Outcome*	*Actual Outcome*
Component 1: Deployment of Connectivity infrastructure. (National IDA: US$2 million; Regional IDA: US$4 million. Total Financing: US$ 6 million) This component aimed to achieve PDO1 by filling key gaps in broadband connectivity in the Caribbean coast of Nicaragua. The intermediate-results indicators in Component 1 included: • 85 new locations with access to broadband connectivity resulting in 157,337 direct beneficiaries from the deployment of telecom infrastructure. Initial expectations were to connect 44 locations with 110,000 direct beneficiaries. • 115 kilometers (km) of deployed fiber optic infrastructure and 25 4G-enabled Base Transceiver Stations (BTS) installed in remote areas. The initial plan included an additional 140 km of fiber optic infrastructure and a total of 32 BTS to be installed. In the Efficacy and Key Factors During Implementation sections are discussed the reasons of the differences in the intermediate results. However, it is worth highlighting that the deployed infrastructure yielded larger coverage than initially anticipated, allowing for the achievement of PDO1	Broadband Penetration: 14 percent	Broadband Penetration: 19 percent

[12] At Appraisal the Project also expected the GoN to contribute an additional US$2.6 million, however, the financing from the GoN did not materialize. Further discussion on this issue is detailed in Key Factors during implementation.

Component 2a: To Enable the ICT Environment. (National IDA: US$0.5 million; Regional IDA: US$1 million; Total Financing US$1.5 million) This subcomponent sought to establish a harmonized framework at the regional level to promote the productive use of the broadband infrastructure. The main activities in this sub-component included holding events to promote the IT/ITES industry and attract FDI in Nicaragua and in the Caribbean.		
Component 2b: IT/ITES Skills Development and Certification Program.-(National IDA: US$4.7 million; Regional IDA: US$4.7 million; Total Financing US$9.4 million) This subcomponent aimed to help the IT/ITES industry from Nicaragua and the Caribbean region to compete globally by increasing the quantity, and improving the quality of skilled manpower. The main activity of this sub-component featured the design of a training and internationally-recognized certification program in ICT skills	Percentage of trainees certified by the ICT training program: 70 percent. IT companies´ satisfaction rate with the ICT training and certification program: 65 percent.	Percentage of trainees certified by the ICT training program: 84.6 percent. IT companies´ satisfaction rate with the ICT training and certification program: 40 percent.

Component 2C: ICT Innovation Ecosystem Development. (National IDA: US$0.6 million; Regional IDA: US$0.6 million; Total Financing US$1.2 million) This subcomponent was intended to promote the nascent ICT Innovation Ecosystem in Nicaragua by establishing a platform for industry-university collaboration platform to create innovation centers.	Number of ICT-based services: 8	Number of ICT-based services: 63
Component 3: Project implementation. (National IDA: US$0.7 million; Regional IDA: US$1.3 million; Total Financing US$2 million) This component provides resources for Project implementation through a PCU		
Total Project Cost and sources of funding: National IDA: US$8.5 million; Regional IDA: US$11.6 million; Total Financing US$20.1 million)		

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION

10. **The Project adjusted the number of km of fiber optic to be deployed**. At Appraisal the Project expected to deploy a total of 255 km of fiber optic cable which included one optic carrier of 140 km from the town of Bilwi to Waspan in the northern Caribbean coast of Nicaragua. As the Project became effective in February 2017, the recipient notified the World Bank that it was no longer necessary to build the Bilwi-Waspan fiber optic infrastructure because National Electricity Transmission Company (Empresa Nacional de Transmisión Eléctrica - ENATREL) was doing it with funding from the Inter-American Development Bank (IDB). This led the Project team to adjust the intermediate results target to 115 km of fiber optic connecting the southeastern towns of Laguna de Perlas, Kukra Hill, and El Rama. This adjustment at the output-level did not compromise the achievement of PDO. Additional details are given in Bank Performance section – Quality at Entry section.

11. **On May 22, 2020, the Project had a Level 2 restructuring which added ENATREL as an additional implementing agency.** The reason for the restructuring was because the procurement process conducted for the deployment of the 115 km of fiber optic infrastructure to connect Laguna de Perlas, Kukra Hill, and El Rama (Component 1) under a Build, Own, and Operate scheme was voided. [13] The unsuccessful tender received two offers in February 2019, one from ENATREL, which was disqualified due to conflict of interest since ENATREL is

[13] A Build, Own, and Operate scheme is a mechanism in which a government entity grants to a private sector party the right to design, construct, own and operate a project

a government entity, and another offer from a private operator that was also voided because the financial bid was nearly 300 percent higher than the estimated value of the contract. The Level 2 restructuring (outlined in a Restructuring Paper[14]) added ENATREL as the technical implementor for the fiber optic line between El Rama, Kukra Hill, and Laguna de Perlas. The new arrangement also stipulated that ENATREL was not authorized to receive or manage IDA funds, or conduct any procurement process, reiterating TELCOR's authority in these areas. Once the installation of the fiber optic infrastructure was completed, ENATREL was given responsibility for the commercialization of the services derived from the new telecom infrastructure.

Revised PDOs, PDOs Indicators, and Outcome Targets

Revised Components

12. **There were no revisions to the PDO, indicators or targets.**

13. **In June 2021, the Project reallocated US$941,895 from Component 2 to finance additional deployment of connectivity infrastructure in Component 1.**[15] With only one year remaining until project completion, and considering the available funds after the adjustments made to Component 1 as described in paragraph 10, as well as the fact that the GoN did not provide the financial contribution intended for Component 1; the Project team decided to focus on the deployment of wireless telecom infrastructure which could allow to see further impacts as the BTS deployed were yielding larger coverage than expected. The reallocation of resources led to dropping activities conceived to link trainees from the training program to potential employment opportunities. The reallocation of resources did not compromise the performance of PDO2.

[14] Gallegos, Doyle.2020. Disclosable Restructuring Paper - Caribbean Regional Communications Infrastructure Program (CARCIP) - P155235. Washington, D.C. : World Bank Group. Available at: https://documentsinternal.worldbank.org/search/32060091

[15] Per World Bank Procedure, the amount of resources reallocated between Project components did not require a Project restructuring. World Bank. Bank Procedure. Investment Project Financing Implementation Support to Project Completion. Available at: https://worldbankgroup.sharepoint.com/sites/ppfonline/PPFDocuments/abbda076b3a1408c968e7815a9ffb880.pdf

Other Changes

14. **There were no other significant changes to the Project during implementation.**

Rationale for Changes and Their Implication on the Theory of Change

15. **The changes had no implications on the Theory of Change.** After voiding the procurement process for the fiber optic link between Laguna de Perlas, Kukra Hill, and El Rama (Component 1) in February 2019, the Project team determined that launching a new procurement process would likely lead to the same results and following consultation with the World Bank's legal, procurement, and financial management teams, it was agreed that the best option to guarantee satisfactory achievement of the PDO was to include ENATREL as a technical implementor for the fiber optic infrastructure. Although the Level 2 restructuring required an amendment to the Financing Agreement to reflect the changes in the implementation arrangements, there were no changes to PDO, project closing date, or project risk ratings and had no effect on the Project's logical framework.

II. OUTCOME

A. RELEVANCE OF PDO

16. **The relevance of the PDOs is rated as High.** From Project appraisal to its completion, the PDO remained aligned with the National Human Development Plans (NHDP) of Nicaragua (2012-2016 and 2017-2022)[16] and the World Bank's Country Partnership Framework (CPF) for Nicaragua for the period FY18-FY22.[17] PDO1, which aims to improve telecommunications infrastructure, is aligned with the CPF's Objective 3 that establishes the improvement of Rural Connectivity and Energy Production Mix as a strategic objective. PDO2, which aims to advance the development of an IT/ITES industry, is aligned with Objective 1 of the CPF that includes Improved Learning Conditions and Employability as a strategic objective. Additionally, the PDO remains highly relevant for Nicaragua as the ICT sector was highlighted as a key area for socioeconomic development in both relevant NHDPs of Nicaragua that included a pledge to expand broadband penetration especially in rural areas and to use technology to improve the weak business and innovation environment, and high costs of trade in products and services.

17. **In the context of the COVID-19 pandemic and the Global Crisis Response, the Project's PDO gained higher relevance as the digitalization of the economy and broadband expansion increased in importance.** The COVID-19 pandemic underscored the importance of broadband connectivity to navigate and respond to crises while fostering inclusive recovery. The Project's PDO is aligned with the World Bank Group's COVID-19 Response which calls for enhancing connectivity and strengthening resilience and security of networks, as well

[16] Nicaragua's National Human Development Plan for 2012-2016 Available at: *https://observatorioplanificacion.cepal.org/sites/default/files/plan/files/NicaraguaPlanNacionaldeDesarrolloHumano.pdf* ; Nicaragua's National Human Development Plan for 2016-2022 Available at: *http://www.pndh.gob.ni/documentos/planesanteriores/03_PNDH_2017-2021(12dic2017).pdf*

[17] Nicaragua - Country partnership framework for the period FY18-FY22 (English). Washington, D.C. : World Bank Group. (Report No. 123026-NI) Available at: http://documents.worldbank.org/curated/en/419731521338434751/Nicaragua-Country-partnership-framework-for-the-period-FY18-FY22

leveraging the use of ICTs, as a strategy to recover from the pandemic.[18] Furthermore, the PDO is aligned with the World Bank's framework for supporting Green, Resilient, and Inclusive Development (GRID) which called to support investments that expand coverage of basic services such as digital connectivity which are considered crucial in IDA countries to target resilience, service gaps, and jobs.[19] Lastly, the PDO is aligned with the Global Crisis Response Framework (GCRF) in its four pillars and, especially in pillar number four, which stresses the need for strengthening digital infrastructure.

18. **At Project completion, the PDOs are aligned with the Country Partnership Framework (CPF) for Nicaragua for the period FY18-FY22.** The PDO 1 that aims to improve telecommunications infrastructure is aligned with the CPF's Objective 3 which includes the improvement of Rural Connectivity and Energy Production Mix. Additionally, the PDO2 aims to advance the development of an IT/ITES industry and is aligned with CPF's Objective 1 that includes Improved Learning Conditions and Employability as an objective.

B. ACHIEVEMENT OF PDO (EFFICACY)

19. **The Financing Agreement states that the Project was established to: (i) increase access to regional broadband networks, and (ii) advance the development of an IT/ITES industry in Nicaragua and the Caribbean region.**

PDO1. To increase access to regional broadband networks

20. **The Project financed the deployment of new telecommunications infrastructure in selected areas in the Caribbean coast of Nicaragua and increased broadband penetration from a baseline of zero percent to 19.3 percent and exceeding the outcome target of 14 percent.** The selected areas where the Project deployed telecommunications infrastructure had zero broadband penetration, until project implementation, with connectivity previously provided via older generation technologies that delivered basic telephone and short message services, and in some areas with no connectivity at all.[20]

21. **The achievement of PDO1 is supported by the provision of broadband telecom infrastructure to 85 rural communities on the Caribbean coast of Nicaragua and offering leapfrog opportunities to approximately 157,337 people that can help bridge the urban-rural disparities in Nicaragua.** [21] By providing broadband connectivity for the first time in remote rural communities, the Project established an effective inclusion tool that is likely to improve employment opportunities, access to knowledge and general information, and the delivery of essential services such as education and healthcare, thus fostering socioeconomic inclusion. [22] In

[18] *World Bank, ITU, Global System for Mobile Communication Association (GSMA), World Economic Forum COVID-19 Crisis Response: Digital Development Joint Action Plan and Call for Action. Available at: https://thedocs.worldbank.org/en/doc/788991588006445890-0190022020/original/SpeedboatPartnersCOVID19DigitalDevelopmentJointActionPlan.pdf*

[19] World Bank, Saving Lives and Livelihoods while Supporting Green, Resilient and Inclusive Development (GRID). Available at: *https://thedocs.worldbank.org/en/doc/9385bfef1c330ed6ed972dd9e70d0fb7-0200022021/original/DC2021-0004-Green-Resilient-final.pdf*

[20] TELCOR's Project Completion Report. CARCIP Nicaragua. Component 1

[21] The total number of communities connected, and beneficiaries is stated in TELCOR's Project Completion Report. CARCIP Nicaragua. Component 1

[22] Connecting for Inclusion: Broadband Access for All. World Bank Brief. Available at: https://www.worldbank.org/en/topic/digitaldevelopment/brief/connecting-for-inclusion-broadband-access-for-all

fact, the Project launched a pilot program that selected, within the newly connected areas, 14 health centers to receive a dedicated broadband connection and staff training in digital literacy. Similarly, it selected five elementary schools to receive broadband access points as well as digital literacy training. More details of these interventions are included in the Other Outcomes and Impacts section. (See Annex 6 for a list of all locations connected with broadband infrastructure and details on the number of direct beneficiaries).

22. **The wireless telecom infrastructure deployed by the Project yielded greater broadband coverage than expected at Appraisal, due to their installation in more advantageous locations, which led to a greater broadband penetration.** The Project subsidized two Public-Private Partnerships (PPPs) under schemes of Build, Own, and Operate that required the private operator to provide mobile broadband service in selected locations in consultation with the communities, while allowing the operator to choose the technology that best met the service specifications in each location.[23] Although the Project initially planned to install 32 BTS, by Project completion, the private operator had deployed 25 BTS with 4G technology installed in better sites that allowed larger coverage providing broadband access for the first time to 81,165 people in 75 rural communities which are mostly geographically isolated. Prior to the Project, these individuals had to travel approximately 40 minutes by car to reach 4G signal. According to national data, between 2019 and 2022, more than 3.2 million of mobile internet connections were added. [24] Likewise, there was an increase in the market penetration of internet mobile subscribers during the project implementation from 35.63 percent of the population in 2018 to 46.46 percent in the second quarter of 2022, representing an increase of more than 10 points. [25]

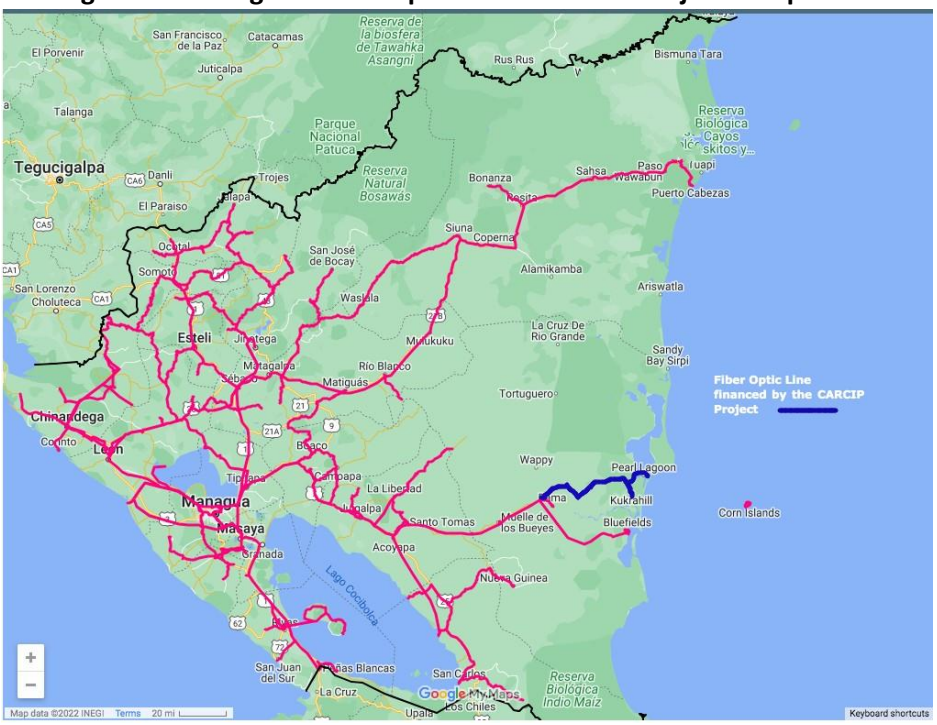
23. **The Project also financed the deployment of 115 km of high-speed fiber optic infrastructure in the middle-mile, connecting the southeastern towns of Laguna de Perlas and Kukra Hill, and the town of El Rama located in the interior of the south Caribbean coast of Nicaragua.** The new fiber optic infrastructure connected ten locations and will provide fiber-to-the premises connectivity to about 76,172 people.[26] The new telecom infrastructure connects locations with significant economic activity in sectors such as agroindustry and tourism, and will support high-capacity data transactions, serving as the cornerstone for the future digitalization of public and private sector services. Furthermore, offering high-speed fiber optic connection will provide the infrastructure required to create jobs in ICT sector while also catalyzing job skill development; and in line with PDO2, it will offer reliable connectivity to attract potential investments in the IT/ITES industry as the pool of available talent, generated through activities under Component 2, increases**.**

24. **In line with CARCIP's regional strategy the telecom infrastructure strengthens the regional broadband network and enhances its resilience.** The rollout of fiber optic infrastructure expands the national backbone network by 115 km and connects to the Central American Telecommunications Network (Red Centro Americana de Telecomunicaciones - REDCA) ¬via the El Rama substation¬, and to the regional submarine cable

[23] The Build, Own, and Operate schemes required private operators to provide broadband service with download speeds of at least 2 megabits per second (mbps) within a 5 km radius.
[24] TELCOR Statistics. Available at: https://telcor.gob.ni/acceso-internet/
[25] GSMA Intelligence. Available at: https://data.gsmaintelligence.com/
[26] At Project Completion the 115 km of fiber optic infrastructure was installed and ready to be commercialized by ENATREL. The number of beneficiaries and thereby the broadband penetration from the fiber optic infrastructure is estimated on projected figures based on the population data where the infrastructure was deployed.

via the Bluefields substation in the southeast coast of Nicaragua. The connections to regional networks allow for rapid rerouting of traffic when there is a technical failure in a particular location, thereby improving resilience and strengthening regional broadband infrastructure, which is especially important in areas as vulnerable to natural disasters as the Caribbean region. Additionally, the deployment of broadband wireless networks also reached interconnection points with existing regional backbone networks.

Figure 2. Nicaragua's Fiber Optic Network after Project Completion



Source: Author's own design based on TELCOR's fiber optic network map. The map has been cleared by the WB Cartography office

PDO 2. To advance the development of an IT/ITES industry in Nicaragua and the Caribbean region

25. **The Project improved Nicaragua's IT/ITES skilled labor capacity to support the development of the IT/ITES industry.** To improve qualified ICT labor skills, the Project designed a training scheme using multiple educational vendors, including international suppliers (e.g., Coursera) that offered internationally recognized certifications on English, technical and soft skills related to IT/ITES. The training program had 7,887 participants from which 84.65 percent obtained internationally recognized certifications. Based on consultations with the IT sector, the training program was tailored for the market conditions of the nascent IT/ITES industry and focused on skills needed for Business Process Outsourcing.[27] Certifications on English accounted for 37 percent

[27] The Business Process Outsourcing subsector requires an entry to medium qualification level. Examples of this subsector include Enterprise Resource Management such as Finance and Accounting, supply management, and document management. Human resource Management - and Customer Relation Management – such as Contact Centers or call centers.

of all certifications whereas soft skills accounted for 35 percent and 27 percent were certifications on technical skills. A trainee survey conducted at the end of the Project documented that those who earned the certification, reported a labor market insertion rate of 53.58 percent and a 19 percent salary increase due to the certification program. The labor market insertion reached 64.71 percent in those cases when the graduates obtained a technical certification. [28] Through virtual training platforms, the certification program experienced an increase in admissions of more trainees outside Managua and from other CARCIP countries including St. Vincent and the Grenadines, Grenade, and St. Lucia.

26. **Given that the development of the IT/ITES industry requires the collaboration between academia and the private sector, the Project established innovation centers to facilitate industry-academia collaboration, impacting digital adoption and social innovation.** Using a replicable Open Innovation Methodology, the Project established a network of nine Open Innovation Centers to generate activities from conception through implementation, as well as developing a user-friendly Open Innovation Toolkits. The methodology's ability to be replicated allowed for the establishment of nine innovation centers, as opposed to the two that had been originally planned. By Project completion, the innovation centers generated 63 ICT-based services, surpassing the target of eight planned at Appraisal. These services included robotic solutions, the design of prototype and simulations, virtual reality platforms, web design and mobile applications, software design, among others. These services were designed to support 43 communities in the Caribbean region of Nicaragua, to boost local productivity in agroindustry, cocoa, retail, tobacco, fishing, and mining sectors; and to improve public services. (Annex 6.2 includes further details on the type of ICT-based services generated, the economic sector, and location of service). The innovation centers created a network of 250 Digital Innovation Mentors, which reached urban as well as rural areas thus serving as platform of inclusion that could potentially reduce economic urban-rural disparities. Also, network sustainability was achieved by signing MOU agreements with the National Committee of Universities and participating universities[29], committing to maintaining the spaces and staff running after the completion of the Project. In addition, the Network was acknowledged by the GoN as a key piece in deploying its *Nicaragua Creativa (Creative Nicaragua)* national initiative, which aims to develop the creative economy in the country by facilitating digital adoption.[30] The innovation centers established by the Project are expected to continue to support the development of IT/ITES industry in the long-term.

27. **The satisfaction rated of IT companies with the Project's IT/ITES skills training program was below the expected targets, possibly because of an unrepresentative sample.** The satisfaction survey had the participation of three IT companies out of the fifty firms that were initially expected to participate, which led to a potentially unreliable result. The small number of participants in the survey was due to the private sector's decision to reduce their participation in activities due to the 2018 political crisis described in paragraph 45. The satisfaction rate of IT companies with the Project's IT/ITES skills training program was 40 percent, which is below the intended target of 65 percent due to a smaller sample than expected. In addition, the survey's results contrast other impact-related data such as those mentioned in paragraph 25 that included responses from

[28] The trainee survey collected data from 2,400 program participants.
[29] Consejo Nacional de Universidades (CNU) UNAN Managua - Farem Esteli, UNAN- Leon, BICU, URACCAN
[30] https://www.cnu.edu.ni/comision-de-innovacion-de-cnu-instrumento-estrategico-para-el-programa-nacional-nicaragua-creativa/

training beneficiaries that documented a labor market insertion rate of 53.58 percent in 60 private companies from which 22 are IT/ITES focused companies.[31] Furthermore, 31.43 percent of training beneficiaries who were employed at the time they got the training scholarship, reported an average pay increase of 19 percent which could indicate that employers perceived the benefits of the training program. Further analysis on the quality of the satisfaction survey as outcome indicator is included in the Monitoring and Evaluation section of this document.

28. **The project contributed to improving capabilities to attract foreign direct investment in the IT/ITES sector in Nicaragua and the Caribbean region.** The Project supported the design and implementation of a strategy to foster the IT/ITES Industry in Nicaragua and in the Caribbean Region that served as a roadmap for all investment attraction actions carried out within the program's framework. Under this strategy, the Project trained technicians of the Nicaraguan Investment Promotion Agency (ProNicaragua) [32] technicians as well as personnel from investment-promoting agencies of Granada and Santa Lucia, where they were provided with different market prospecting tools (e.g., access to international databases and business platforms) to improve the efficiency of the actions carried out to promote investments in the IT/ITES sector. In parallel, the Project supported the organization of 22 events to promote and attract Foreign Direct Investment in IT/ITES field in Nicaragua and in the Caribbean. These events included sessions aimed at promoting reinvestment in the country by foreign or mixed-capital transnational companies in the IT/ITES sector already established in Nicaragua. These events also served to inform investors of the improvements in skill labor capabilities derived from the training and certification program as well as the collaboration between academia and the IT sector through the innovation centers.

29. **By Project completion, it is likely that the activities financed by the Project to support the development of the IT/ITES industry contributed to an increase in IT related jobs, Foreign Direct Investments, and ICT services exports.** During the period of Project implementation between 2016 and 2021, Nicaragua experienced an increase in IT related jobs from 6,438 in 2016 to 13,371 in 2021. [33] This increase in IT jobs is likely related to the expansion of the pool of IT/ITES certified talent. In addition, the focus on prospective investors resulted in new IT/ITES investment initiatives totaling US$7.8 million and creating 2,040 new jobs in the Business Process Outsourcing subsector which include positions that require soft skills, English, and technical skills.[34] . At the same time, Nicaragua increased the proportion of ICT services exports from 11.2% of total exports in 2018 to 21.8% of total exports by 2021.

Justification of Overall Efficacy Rating

30. **The Project's Overall Efficacy is rated as Substantial. The Project increased the access to regional broadband networks by expanding broadband penetration in areas previously unattended and connecting to regional broadband networks.** The Project also advanced the development of the IT/ITES industry in Nicaragua and the

[31] The survey was conducted on 2,400 training beneficiaries that received the program certification.
[32] ProNicaragua is the Nicaraguan Investment Promotion Agency, established in 2002. A non-profit, public-private institution whose mission is to generate economic growth and job creation in Nicaragua by attracting high-quality foreign direct investment.
[33] ProNicaragua with CNZF data
[34] Data provided by ProNicaragua

Caribbean region by enhancing the quality and quantity of qualified workforce for the IT/ITES industry and improving the ICT innovation environment through productive partnerships between academia and private sector. The Project's substantial Efficacy is supported by the Project's performance that surpassed the expected outcome target associated with broadband penetration, number of internationally certified IT/ITES trainees, and the number of ICT-based services generated by the Project.

C. EFFICIENCY

Assessment of Efficiency and Rating

31. **Overall Efficiency of the project is assessed as "High".**

32. **The Financial Analysis (FA) shows that the Project's total Cash Flow yields a positive Net Present Value (NPV) of US$7.1 million.** The updated FA uses the same conceptual model as the ex-ante analysis. The analysis demonstrates higher levels of benefits for Nicaragua in the form of tax revenue earned via the Project, versus the costs associated with funding the Project. Revenues to the GoN come from corporate tax and Universal Service Fund tax, both paid by private operators in charge of operating the broadband service made possible by Component 1; and the Income Tax paid by employed individuals that participated in the ICT training and certification program of Component 2. In contrast, expenses are related to debt service costs to cover the World Bank's loan. (See Annex 4 for details on assumptions used in the analysis and a link to the Excel file for the respective calculations). The updated NPV is greater than the ex-ante estimated NPV of US$3.75 million making the Project more efficient than expected at appraisal. The Project receives larger revenues from Component 1 than expected which is related to the Project's higher penetration rate, particularly from the deployment of wireless broadband infrastructure, which enables private operators to generate larger profits leading to higher Corporate Tax revenues for the Government. Higher than expected revenues from Component 2 come from the high number of participants in the ICT training and certification program which the FA assumed would result in a higher number of employed individuals and thus higher income tax revenues.

33. **The Project's investment in connectivity infrastructure through the implementation of Component 1 yields an Internal Rate of Return (IRR) of 81 percent.** The updated IRR of Component 1 is significantly higher than the ex-ante IRR of 19 percent estimated at appraisal. The main differences between actual and expected financial returns from Component 1 are related to lower amounts of Capital Expenditures (CAPEX) and larger revenues derived from a greater broadband penetration than planned at Appraisal. The actual CAPEX amount invested in the deployment of infrastructure is US$6.4 million with an assumption of projected reinvestments of US$8.5 million from the wireless broadband operators, whereas at Appraisal the Project estimated an initial CAPEX amount of US$10.1 million and assumed reinvestments of US$12.4 million from private operators. The actual implementation of Component 1 adjusted CAPEX amounts due to three issues: (i) the recipient's proposed financing for an amount of US$2 million did not materialize, (ii) the private operator that won the tender for the deployment of wireless broadband service was not required to bring in additional financing as was initially expected at Appraisal, and (iii) because the actual deployment of the fiber optic infrastructure (115 km) was through the acquisition of goods and installation services instead of a PPP under a Build, Own, Operate scheme, there are no additional reinvestments projected as part of the Project. Despite the fact that the Project

invested less in CAPEX, resulting in less deployed infrastructure than anticipated (expected: 255 km of fiber optic and 35 BTS vs. actual: 115 km of fiber optic and 25 BTS), the Project was able to generate larger revenue cashflows due to a wider broadband coverage from the wireless infrastructure deployed, which enabled the Project to capture a greater number of beneficiaries and generate higher revenues. At Appraisal, the analysis of broadband coverage was conducted with conservative estimates and based on potential locations that, after the Project's public consultations and with the expertise of the private operator, turned out to be in more advantageous areas, resulting in a higher broadband penetration than anticipated at Appraisal

34. **A qualitative Economic Analysis suggests that the Project yields higher economic returns than financial benefits.** Although difficult to quantify, the Project is likely to generate positive economic externalities including an overall improvement in the economic prosperity of the population that received broadband services for the first time, in particular remote communities with high levels of poverty and social and economic exclusion, including two indigenous communities. The Project Coordination Unit (PCU) documented anecdotal evidence from beneficiaries that suggests improvements in citizens' security, reduction of transportation costs with beneficiaries no longer having to travel to larger towns to obtain internet access, and expansion in education access through virtual learning, higher productivity, among others. The expansion of the backbone fiber optic network improves reliability and increases the resilience of the national and regional networks by improving the capacity of response which will likely render economic benefits, especially during natural disasters. The Project's improvements of the supply of ICT skilled labor through Component 2 also brings positive externalities, as it is estimated that for every person employed in ICT, at least three new indirect jobs will be created in the economy. In addition, University had acquired new methodologies (such open innovation) that could be used after the closure of the project.

D. JUSTIFICATION OF OVERALL OUTCOME RATING

35. **The overall outcome rating is Satisfactory**. The assessment of the Project found that the PDOs were relevant and were mostly achieved against the expected targets established at appraisal, and their performance was carried out efficiently. The minor shortcoming was found in the Project's inability to achieve the expected target related to the satisfaction survey of the Project's certification program.

E. OTHER OUTCOMES AND IMPACTS

Gender

36. **The Project was successful at reaching women through the deployment of telecom infrastructure as well as tailoring the training and certification program to attract women beneficiaries.** 60 percent of the Project direct beneficiaries of new broadband connectivity are women, overperforming the proposed target of 40 percent. Therefore, it is likely that access to broadband connectivity, digital platforms, and digital financial services, will offer leapfrog opportunities for women and can help bridge the divide by giving women the possibility to increase employment opportunities, and access knowledge and general information. In terms of the Project's training and certification program, there was a female participation rate of 55.3 percent in soft

skills courses which attracted the most women, followed by English language courses with a rate of 49.5 percent, which is one of the skills more required to access to the international labor market. For the training of technical skills, the Project tailored the training program for women already participating in ICT careers and had a participation of 39.8 percent which is in line with a relatively lower participation of women in technical ICT careers.

Institutional Strengthening

37. **The Project contributed to TELCOR's institutional strengthening.** The Project assisted TELCOR in the design and implementation of complex PPPs linked to the deployment of wireless broadband infrastructure. When the business environment did not provide incentives for private sector participation, the Project altered its expectations and was able to attract private sector participation and ultimately enable the tender's implementation. TELCOR's capabilities were increased as a result of the experience gained in processing innovative procurements, in which TELCOR designed results-based tenders for training and education services that required providers to have a minimum number of trainees, certifications, and scholarships, which proved beneficial for PDO success.

Poverty Reduction and Shared Prosperity

38. **By providing ICT equipment and dedicated lines of access to the wireless broadband network, the Project improved the quality of health and education services in 19 locations in Nicaragua.** As part of the public consultations prior the deployment of infrastructure, the Project selected five elementary schools located in five different communities to pilot an intervention where the Project connected schools to the wireless broadband network. The Project allocated US$171,000 to train the selected schools in implementing digital classrooms. The intervention in the schools benefited roughly 1,228 students. Additionally, the Project and local communities selected 14 health centers to finance US$107,000 in ICT equipment, provide digital literacy training, and to provide a dedicated broadband connection.

39. **Under the Project, the broadband operator offered ICT literacy seminars to seven communities including two indigenous communities.** The operator offered free of charge training seminars on the use of broadband to improve productivity in public and private services. The seminars invited key members of local municipalities, educators, community leaders, and radio reporters among others. There were also seminars conducted in two indigenous communities where the training was done in local language. There was a total of 241 individuals that attended the ICT literacy seminars.

Other Unintended Outcomes and Impacts

40. **As the Project had periodic consultation with community members where the Project was to implement activities, the Project seized the opportunity to incorporate indigenous groups in the IT/ITES training and certification program.** Although unintended at appraisal, the IT/ITES certification program identified that some indigenous communities did not have access to IT/ITES knowledge due to the language barrier, therefore it tailored the training program in their respective languages to include direct beneficiaries from five ethnic groups including Creole, Garifuna, Mayagna, Misquitos, and Rama.

41. **The first deployment of broadband connectivity by July 2019 proved to be crucial to support poor communities during the first months of the COVID-19 pandemic.** Before the COVID-19 pandemic began in spring of 2020, the Project deployed 18 BTS that provided broadband access to at least 37 communities which proved to be highly important as it allowed individuals to remain connected to information and services such as telemedicine and education, even as the pandemic precipitated a decline in the movement of people. There are approximately 46,926 people in the connected communities that benefited from broadband access during 2020. The second deployment of seven BTS was effective in July 2022.

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

42. **Limited availability of data related to the IT/ITES sector, made the development of a robust outcome indicator for PDO2 difficult.** During preparation, the establishment of adequate indicators for PDO2 faced data access and data collection limitations. At the time when the Project was structured, Nicaragua's public sector only measured IT/ITES service export jobs, while the IT/ITES sector lacked a public body to collect data from the industry. Considering the nascent stage of the sector in the country and that human capital skills were identified as the main barrier to growth in the sector, it was decided to measure the outcome of PDO2 through a satisfaction survey. At that time, the collaboration between the IT/ITES sector and ProNicaragua was constructive; therefore, it was assumed that the sector's willingness from the sector to share data would continue through the implementation of the Project. However, as it will be discussed in paragraph 45, the collaboration between private sector and government deteriorated during implementation which affected data collection related from the private sector. More details on issues related to the quality of this indicator are included in the Quality of Monitoring and Evaluation section.

B. KEY FACTORS DURING IMPLEMENTATION

43. **At appraisal, the Project expected non-bank financing coming from the recipient for an amount of US$2.6 million to support the funding for the achievement of PDO.** However, once the Project was declared effective on February 2, 2017, the recipient notified the World Bank that the financial contribution for the Project will not materialize because lack of available resources. Although the lack of the recipient's contribution impacted the scope of certain activities described in the following paragraph, the achievement of PDO and of the Project was not compromised.

44. **The Project deployed a lower-than-expected number of 4G-enabled BTS, yet the PDO was not compromised.** At Appraisal, the Project expected to install 32 4G-enabled BTS, whereas the project deployed 25 4G-enabled BTS. The difference is likely explained by two reasons, first, the fact that the recipient's financial contribution did not materialize, thus limiting the acquisition of base stations. Second, higher costs related to base stations acquisitions and logistics costs related to their installation. However, in collaboration with the private operator, the Project was able to deploy the BTS in more strategic locations that allowed an enhanced establishment of linkages between BTS, resulting in larger broadband coverage which led to greater penetration.

45. **Nicaragua's socio-political crisis of 2018 disrupted the collaboration between the public sector and IT private sector firms, making it difficult to adequately measure the achievement of the Project's IT/ITES training and certification program (PDO2).** In April 2018, a series of pension reforms announced by the GoN sparked social protests.[35] The response following these events led to the deterioration of the relationship with the private sector including IT/ITES private firms that were involved in the implementation and evaluation of the Project's training and certification program (Component 2). The Project created an ad-hoc Talent Committee to facilitate coordination with the private sector; however, due to the crisis, firms reduced their participation on it. This resulted in a decrease in the number of participants in the survey to determine the level of satisfaction with the training program.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION (M&E)

M&E Design

46. **The Project's M&E design is rated as Substantial as it presented moderate shortcomings.** The Project presented an adequate logical framework which was illustrated in a Results Framework (RF) which included measurable indicators at the PDO level as well as intermediate results. However, the indicators devised in the RF did not capture the regional nature of PDO, as they were primary focused on benefits generated in Nicaragua. By not including indicators that reflect the regional nature of the Project, the M&E was limited to the country-level.

M&E Implementation

47. **Implementation of the M&E framework is rated as Substantial as it presented moderate shortcomings.** Most of the data related to the RF indicators was collected and analyzed adequately. The results framework included a well-defined and measurable set of indicators, and the entities in charge of data collection were chosen during the design phase. The Project team followed best practices and after changes in scope for the deployment of fiber optic infrastructure, the team adjusted the number of km of fiber optic from 255 km to 115 km to reflect the new output-level scope of Component 1. A moderate shortcoming occurred, since the Project received less data than expected related to the PDO2 indicator that aimed to measure the IT companies' satisfaction rate in regards of the training and certification program as mentioned in Paragraph 42

M&E Utilization

48. **The M&E framework is rated as High as it presented no shortcomings.** The Project team used the M&E data to periodically assess the progress of the Project. To this end, the Project team held weekly meetings with the PCU and different stakeholders to analyze the M&E data collected. Quarterly monitoring reports were

[35] The GoN's response to the civil unrest triggered legislation by the European Union, the United States, Canada, and the United Kingdom restricting relations with specific individuals and agencies of the GoN.

published, and a survey was carried out to obtain testimonies relating to the project. A mid-term review (MTR) was conducted in August 2020 to identify gaps in achieving the PDO along with corrective measures It is worth mentioning that although one of the indicators related to PDO2 was weakened during the Project's M&E, the PDO2 was designed with two additional indicators that supported the adequate M&E of PDO2.

Justification of Overall Rating of Quality of M&E

49. **M&E quality is rated as Substantial as the M&E quality presented moderate shortcomings in M&E design and implementation.** The M&E system as designed and implemented was generally sufficient to test the links in the results chain and was mostly adequate to assess the achievement of the objective at the country-level. However, the M&E design and implementation had shortcomings that ultimately weakened the quality of M&E of the Project.

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

50. ***Environmental and Social Compliance:*** **The Environmental and Social Management Framework (ESMF) was implemented at high standard and following World Bank policies.** The ESMF guided the implementation of public consultations with communities that could be impacted by the installation of telecom infrastructure, which resulted in valuable feedback that enabled the installation of BTS in locations that provided greater coverage than anticipated, thereby improving the performance of telecom infrastructure deployment (PDO1). The implementation of the Resettlement Policy Framework (RPF) documented risks of resettlement and through the implementation of the Peoples Planning Framework as well as Afro-descendants Planning Framework, the Project increased ownership in the respective communities by implementing public consultations in local tongues for Miskitas and Mayangnas communities. The Grievance Redress Mechanism was implemented in accordance with the Project ESMF, including the screening and mitigation measures set forth therein, with no breaches in compliance at Project closing**.** This mechanism was used throughout the Project. No complaints were received during Project implementation.

51. ***Fiduciary Compliance***: **The Project adopted adequate Financial Management and Procurement practices.** The Project team along with the PCU conducted regular reviews on aspects of budgeting, accounting, reporting, funds flow, and internal control. The Project hired an External Auditor to conduct audits for each year of Project execution, with each audit resulting in an unqualified opinion confirming that the financial statements were presented adequately. Procurement for the Project was carried out in accordance with the World Bank's Procurement Guidelines. The Project had a PCU that had previous experience in complex procurement financed by Multilateral Development Banks, which enable adequate procurement management and ensured complete and satisfactory documentation of the procurement activities.

C. BANK PERFORMANCE

Quality at Entry

52. **The World Bank's strategy at entry is rated as Satisfactory.** The Project team's entry approach was consistent with

the institutional priorities of the World Bank as well as the development priorities of the country and the region. The Project design relied on experiences from previous operations,[36] which allowed the Project team to focus on country and regional priorities and ownership, and to develop a sound logical framework with two relevant and clear Project components that directly addressed the country and the region's development challenges. The Project design also ensured flexibility to adapt to changes during implementation, which proved to be crucial for the successful implementation of the Project. The only shortcomings at entry were that despite coordination efforts between the Project team and the IDB as well as the client, the Bank was not informed about client's decision to use IDB funding for the deployment of the carrier between Bilwi and Waspan. The decision taken by the client and the IDB was not notified until after the Project was already effective in February 2016. However, this is considered a minor shortcoming as this did not affect the achievement of PDO. In addition, as indicated in the quality of M&E at entry, the Bank designed an M&E system that did not account for the regional nature of PDO, thereby limiting monitoring capabilities.

53. **Project design adequately addressed potential risks and provided clear mitigation measures.** The Project design was built on realistic assumptions at the time and addressed potential risks that were related to the fact that the IT sector was incipient before Project intervention and that the Project's activities would be innovative. The Project team planned to mitigate risks by approaching the program in phases, applying tested models and ensuring full stakeholder involvement. The Project design also considered the political and governance risk that at the time was rated as "Moderate" and established ambitious but realistic objectives.

Quality of Supervision

54. **The World Bank's quality of supervision is rated as Highly Satisfactory.** The Project team restructured the Project to adjust activities to changing circumstances to ensure achievement of PDOs. During supervision, the Project team recognized the difficulty to mobilize the private sector for the fiber optic rollout and opted to restructure the Project to accommodate an additional implementing agency and ensure the achievement of the associated PDO.

55. **The Project benefited from regular supervision support from the World Bank.** Implementation support missions included an adequate mix of specialists including ICT policy specialists, social development and environmental specialists, M&E specialists, and procurement specialists. Throughout the 2018 crisis, World Bank missions continued to support the PCU in Project implementation and to proactively adjust Project design to the changing circumstances and assure the attainment of PDOs.

Justification of Overall Rating of Bank Performance

56. **Bank performance is rated as Satisfactory as there was only a minor shortcoming in quality at entry and no shortcomings in quality during supervision.**

[36] The Project drew from experiences from the first project under the CARCIP (Project P114963) and Mexico's IT Industry Development Project (P106589); as well as other international projects such as the Central African Backbone Project (P108368), Leveraging Bangladesh's ICT Growth, Employment and Governance Project (P122201), and East Asia - Pacific Regional Connectivity Program (P113184).

D. RISK TO DEVELOPMENT OUTCOME

57. **The risk to development outcome is rated Low.** A reliable broadband connectivity and improved skilled labor remain critical to Nicaragua and the Caribbean region and is in line with their long-term aspirations of having a vibrant digital economy. After the deployment of infrastructure financed by the Project, private operators have the incentives to continue operating the broadband access. Additionally, the actions carried out to reduce the lack of skilled labor are likely to continue as agreements signed by TELCOR and universities commit them to the continuation of Innovation Centers for at least three additional years after Project completion. Furthermore, the innovation kits, methodologies at the participating universities are likely to facilitate the execution of future innovation programs and continued to be implemented as expressed by universities during the mission conducted to prepare the ICR.

V. LESSONS AND RECOMMENDATIONS

58. **Good collaboration with other MDBs can enhance Project implementation and avoid duplication of efforts.** Rather than having a division of labor approach, a deeper collaboration would be beneficial for World Bank Projects in sector where other MDBs are also present. Although the CARCIP Nicaragua Project managed to adjust to the changing circumstances as the recipient decided to finance a fiber optic line with the IDB, those modifications might have been avoided with greater collaboration with the IDB at Project Appraisal**.**

59. **A regional approach for the development of the IT/ITES sector requires long-term engagement with stakeholders, continue investments and a trusted leadership.** Although the CARCIP Nicaragua Project was able to demonstrate the achievement of benefits on the ground after six years of implementation, the IT/ITES sector continues to face significant challenges, which can continue to benefit from a regional approach. In the context of small states, the case for adopting regional approaches to economic development has some merit. These engagements require ongoing technical assistance, technical and implementation capacity building, and funding to continue operations for an extended length of time, particularly in locations with limited capability as the case of Caribbean states. In a multi-stakeholder setting, as is the case with all regional engagements, a lack of technical leadership impedes the ability to implement projects successfully, necessitating continual engagement at the regional and national levels.

60. **Although the deployment of telecom infrastructure was successful in terms of expanding broadband penetration, the Project might have provided additional benefits for the public through a more deliberate alignment with other sectors such as education and health**. The CARCIP Project was limited to a pilot program that involved local communities to select health centers and schools for broadband connectivity. However, the benefits and impact could be greater if a multisector approach is included at the strategic level during Project design.

61. **A flexible approach to training courses, vendors, and training schemes proved to be successful and could be replicated.** The implementation approach for the Training and Certification Program implementation increased the coverage and impact. The Digital Skills and certification Program took advantage of a mix of providers, local and international. By doing so, the local offering was improved since local vendors (i.e., universities and country-based training centers) leveled up their course offering (i.e., higher level of English courses) and quality (i.e., higher certification rate). The international providers brought new skills to the

country (i.e., cybersecurity) and access to international coaches. In addition, by providing access to Platform training (i.e., Coursera courses), the courses offered broadly facilitated trainees to develop skills based on their career path. Lastly, the Digital skills and certification development Program adjusted to the COVID-19 pandemic by switching to an all-online scheme. To do so, the Program used the resources meant to pay for onsite locations to provide mobile data chips to trainees. Thereby, people could continue their training, reducing transport time and costs. Online training also favored people from other cities besides Managua to get the advantage of the scholarships provided.

62. **Further research is needed to measure the progress of the IT/ITES sector in the digital economy.** The CARCIP Nicaragua Project faced challenges when measuring the progress of the IT/ITES sector due to the absence of IT/ITES job data at the country level since only jobs of international firms granted fiscal export are recorded. The opted alternative, to measure the satisfaction rate expressed by IT companies in relation to the training programs financed by the Project, faced data collection challenges due to the 2018 crisis and left out the opinion of online freelancers and Program graduates. If similar future projects are deployed in the country, a different indicator could be used to capture the Project's impact in traditional IT/ITES jobs and online freelance jobs. A country methodology would be needed to include all country IT/ITES jobs, including domestic firms, international firms granted fiscal export benefits, and online freelances. The latter will require the participation of the National Institute of Development Information (*Instituto Nacional de Información de Desarrollo*) and international practices support to develop such a methodology, which can be challenging considering there is no international consensus on how to best measure the advancement of digital labor platforms. An alternative is to improve the satisfaction survey of the training and certification program to incorporate in the calculation the satisfaction of both demand (firms) and supply (program graduates). The composite indicator can consider new or improved jobs in firms (informed by firms and graduates) and those that become online freelancers (graduates). More research is needed to find better indicators that can be used in Projects that have short timelines such as CARCIP Nicaragua, including online freelancers using digital labor platforms who offer their services regardless of the client's location.

ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: Broadband Penetration in Caribbean Coast

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Broadband Penetration in Caribbean Coast	Percentage	0.00 01-Oct-2016	14.00 03-Oct-2016	19.37	19.37 29-Jul-2022
Comments (achievements against targets):					

Objective/Outcome: Trainees certified under the skills and training program

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Trainees certified under the skills and training program	Percentage	0.00 01-Oct-2016	70.00 03-Oct-2016		84.65 29-Jul-2022

Comments (achievements against targets):

Objective/Outcome: Services or applications created as a result of the ICT Innovation Ecosystem activities

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Services or applications created as a result of the ICT Innovation Ecosystem activities	Number	0.00 01-Oct-2016	8.00 03-Oct-2016		63.00 29-Jul-2022

Comments (achievements against targets):

Objective/Outcome: IT companies' satisfaction with the IT/ITES skills training and certification Program

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
IT companies´ satisfaction with the IT/ITES skills training and certification Program	Percentage	0.00 01-Oct-2016	65.00 01-Oct-2019		40.00 29-Jul-2022

Comments (achievements against targets):

A.2 Intermediate Results Indicators

Component: Component 1: Regional Connectivity Infrastructure

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Direct Project Beneficiaries	Number	0.00 01-Oct-2016	110,000.00 03-Oct-2016		157,337.00 29-Jul-2022
of which female	Percentage	0.00	40.00		60.00

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Locations connected under Project	Number	0.00 01-Oct-2016	44.00 03-Oct-2016		85.00 29-Jul-2022

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion

3G-enabled base stations in rural locations	Number	0.00 01-Oct-2016	32.00 03-Oct-2016		25.00 29-Jul-2022

Comments (achievements against targets):
* The indicator should be "**4G**-enabled base stations in rural locations"

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Length of Fiber Optic Network Built (km)	Kilometers	0.00 01-Oct-2016	255.00 03-Oct-2016	115.00	115.00 29-Jul-2022

Comments (achievements against targets):

Component: Component 2: ICT-Enabled Innovation

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Implementation of a Strategy to Foster the IT/ITES Industry in Nicaragua and in the Caribbean Region launched	Yes/No	No 01-Oct-2016	No 03-Oct-2016		Yes 29-Jul-2022

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Events organized to promote IT/ITES industry and attract FDI in Nicaragua and in the Caribbean	Number	0.00 01-Oct-2016	25.00 03-Oct-2016		22.00 29-Jul-2022
Comments (achievements against targets):					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Other CARCIP countries with access to IT/ITES skills training	Number	0.00 01-Oct-2016	3.00 03-Oct-2016		3.00 29-Jul-2022
Comments (achievements against targets):					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion

Number of Manpower Trained under the Project (number of people)	Number	0.00 01-Oct-2016	5,500.00 03-Oct-2016		7,887.00 29-Jul-2022
of which from other CARCIP countries	Number	0.00	120.00		97.00
of which female	Percentage	0.00	40.00		45.30
Comments (achievements against targets):					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Collaboration agreements between University and firms under the Innovation Ecosystem	Number	0.00 01-Oct-2016	50.00 03-Oct-2016		88.00 29-Jul-2022
Comments (achievements against targets):					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion

Solutions created under the Innovation Ecosystem	Number	0.00 01-Oct-2016	30.00 03-Oct-2016		32.00 29-Jul-2022
Comments (achievements against targets):					

Indicator Name	**Unit of Measure**	**Baseline**	**Original Target**	**Formally Revised Target**	**Actual Achieved at Completion**
Open Innovation Events in the Collaboration Spaces	Number	0.00 01-Oct-2016	25.00 03-Oct-2016		320.00 29-Jul-2022
Comments (achievements against targets):					

B. KEY OUTPUTS BY COMPONENT

Objective/Outcome 1 To increase access to regional broadband networks	
Outcome Indicators	1. Broadband Penetration on the Caribbean coast (Percentage)
Intermediate Results Indicators	1. Direct Project Beneficiaries (Number) 2. Locations connected under Project 3. 4G-enabled base stations in rural locations 4. Length of Fiber Optic Network Built (km)
Key Outputs by Component (Linked to the achievement of the Objective/Outcome 1)	1. 19.3 percent of Broadband penetration 2. 157,337 direct beneficiaries of broadband connectivity 3. 85 locations connected with telecom infrastructure 4. 25 4G-enabled Base stations in remote locations 5. 115 km of fiber optic infrastructure
Objective/Outcome 2 To advance the development of an IT/ITES industry in Nicaragua and the Caribbean region	
Outcome Indicators	1. IT companies' satisfaction with the IT/ITES skills training and certification program (Percentage) 2. Trainees certified under the skills and training program (Percentage) 3. Services or applications created as a result of the ICT Innovation Ecosystem activities (Number)
Intermediate Results Indicators	1. Implementation of a Strategy to Foster the IT/ITES Industry in Nicaragua and in the Caribbean Region launched 2. Events organized to promote IT/ITES industry and attract FDI in Nicaragua and in the Caribbean 3. Other CARCIP countries with access to IT/ITES skills training

	4. Number of Manpower Trained under the Project (number of people) 5. Solutions created under the Innovation Ecosystem 6. Open Innovation Events in the Collaboration Spaces
Key Outputs by Component (Linked to the achievement of the Objective/Outcome 2)	1. 22 Events organized to promote IT/ITES industry and attract FDI 2. 7,887 trainees 3. 88 Collaboration agreements between university and firms 4. 32 IT/ITES Solutions created under the Innovation Ecosystem 5. 320 Open Innovation Events in the Collaboration Spaces

ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

Name	Role
Preparation	
Doyle Gallegos, Elena Gasol Ramos	Task Team Leader(s)
Jose M. Martinez	Procurement Specialist(s)
Enrique Antonio Roman	Financial Management Specialist
Andrea Ruiz-Esparza	Team Member
Tatiana Cristina O. de Abreu Souza	Team Member
Marco Antonio Zambrano Chavez	Social Specialist
Ricardo Jose Castellon Zamora	Social Specialist
Sofia De Abreu Ferreira	Counsel
Rocio Sanchez Vigueras	Team Member
Jose Antonio Galaso Cerezo	Team Member
Claudia Ivette Garcia Romero	Team Member
Elene Allende Letona	Team Member
Supervision/ICR	
Rocio Sanchez Vigueras	Task Team Leader(s)
Monica Lehnhoff, Mary Lou M. Veizaga	Procurement Specialist(s)
Alvaro Gilberto Fernandez Trigoso	Financial Management Specialist
Sandra Lisette Flores De Mixco	Financial Management Specialist
Julian Najles	Team Member
Susana Toledo Camacho	Environmental Specialist
Marisol Ruelas	Team Member

Claudia Ivette Garcia Romero	Team Member
Marta Jordao Henriques	Environmental Specialist
Kristell Marie Parchment	Procurement Team
Erica Virginia Piber	Social Specialist
Karla Rodriguez Meyer	Procurement Team
Jacqueline Beatriz Veloz Lockward	Counsel

B. STAFF TIME AND COST

Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US$ (including travel and consultant costs)
Preparation		
FY16	4.225	150,732.48
FY17	6.375	116,285.85
FY18	0	195.95
Total	**10.60**	**267,214.28**
Supervision/ICR		
FY17	1.250	8,381.02
FY18	21.969	125,058.58
FY19	17.800	126,967.92
FY20	12.915	116,691.05
FY21	17.873	108,049.26
FY22	22.401	110,977.60
FY23	19.007	98,432.84
Total	**113.22**	**694,558.27**

ANNEX 3. PROJECT COST BY COMPONENT

Components	Amount at Approval (US$M)	Actual at Project Closing (US$M)	Percentage of Approval (US$M)
Component 1: Regional Connectivity Infrastructure	0	6.00	0
Component 2: ICT-Enabled Innovation	0	12.10	0
Component 3: Implementation Support	0	2.00	0
Total	**0.00**	**20.10**	**0.00**

ANNEX 4. EFFICIENCY ANALYSIS

The Efficiency Analysis was carried out following the same conceptual model and main assumptions used at Appraisal.

Methodology and Assumptions

1. Revenues from Component 1 – Regional Connectivity Infrastructure: The projected increase in the number of broadband subscribers, year to year, resulting from Component 1, was based on the actual average number of current subscribers in similar locations in Nicaragua. A gradual take-up rate increase was used, as new subscribers are added to the network in the first few years of operation of services. The following assumptions were used:

- Population/household ratio: 5.3, based on the population census 2005, carried out by the National Institute for Development Information
- Take-up ratios:
  - Fixed Broadband Connections/households: 20 percent, 30 percent, 40 percent for years 1, 2, 3 and thereafter, respectively.
  - Mobile Broadband New Subscribers/population: 10 percent, 20 percent, 30 percent, 50 percent for years 1, 2, 3, 4 and thereafter.
  - Mobile Broadband for Migrated localities,35 Subscribers/population: 10 percent for
  - year 1, 5 percent increase per year for years 2 to 9.
  - Revenue per subscriber/household was based on current averages for Nicaragua as follows:36
  - Fixed Broadband revenue per household/building: US$20/month
  - Mobile Broadband revenue per new user (voice and data): US$24/month Mobile Broadband revenue per migrated user (data only): US$8/month

2. Revenues from Component 2 – ICT-Enabled Innovation: The analysis starts with an estimation of the expected number of graduates from ICT courses. Then the turnover rate was estimated, based on actual data for Nicaragua for: (1) BPO (38 percent); (2) ITO (3.5 percent); and (3) Multimedia (5 percent). Based on this, the pro-rated average turnover was calculated resulting in an average of 25 percent, assuming that there will be three times the number of employees in BPO than in ITO or Multimedia. This turnover ratio was used to calculate the numbers of employees expected to be needed on an annual basis.
3. The average salary of employees of the ICT Industry assumed was US$492 per month (Versus an estimated monthly salary of US$500 assumed at Appraisal). These estimations although conservative, because ITO or Multimedia employees would likely earn more than BPO employees. the monthly salary of US$492 was reported in a survey of beneficiaries. Income tax for this level of salary is 9 percent, as per the income tax tables from the Ministry of Finance. Income tax paid for each year was then calculated by multiplying the number of employees by income and by tax rate.
4. Estimation of operational expenditures for Component 1: Operational expenditures were estimated as follows:
   - Operational expenditures were estimated as a percentage of total revenues based on Industry averages for major operators (Claro and Telefónica) for LAC. The average Operational expenditures /Revenue ratio used was 68 percent.
   - (ii) Expenses for rental of Internet capacity were estimated, using the current rates in Nicaragua for wholesale Internet purchases of similar capacity (international and local segments), and using a declining scale (the trend in these expenses is a declining scale) using

Telegeography forecasts.38 The rental costs assumed were:

- Rental of 1 megabit per second capacity to the Internet gateway: US$100/month in 2016.
- Decline of unit costs for capacity to the Internet gateway: 10 percent per year for every year from 2018 to 2036.

- Then, traffic for both fixed and mobile broadband subscribers was calculated with the following assumptions:
  - Fixed Broadband Internet download capacity, first year of operation: 1 Mbps
  - Oversubscription rate: 20 to 1
  - Rate of increase of download capacity, per year: 10 percent, for every year
  - Mobile Broadband Internet download capacity, minimum (at cell edge): 1 Mbps, for all years
  - Oversubscription rate: 40 to 1
- Traffic was multiplied by number of users, oversubscription rates and cost per megabit to estimate rental of capacity costs.
  - Investments – Component 1 – Regional Connectivity Infrastructure: The investments for Component 1 were calculated with 100 percent of investment costs financed by the IDA Credit.
  - Investments – Component 2 – ICT-Enabled Innovation: Investments were calculated dividing the total investment cost of US$10.6 million into five equal portions for each of the five years of the Project, in the Investment Tab.
  - Calculation of Depreciation costs: Depreciation of equipment and plant was calculated using the following assumptions, which are common in the telecommunication industry worldwide: Use of the straight-line method (equal amounts for the life of the plant, per year); Useful lives of plant: Cables and infrastructure - 20 years, Equipment - 8 years.

5. Financing Costs: An IDA Credit of US$20.1 million will be provided, under the following terms:

- Amortization Period: 25 years
- Grace Period: 5 years
- Interest Rate: 1.25 percent
- Repayment ratios: 3.3 percent of accumulated outstanding amounts for years 6 to 15
- 6.7 percent of accumulated outstanding amounts for years 16 to 25

ANNEX 5. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS

The Report from the borrower is in the Folder Annex ICR under the Project folder.

The Nicaraguan Telecommunications and Postal Institute (TELCOR), in its capacity as executing agency of the Communications Infrastructure Program for the Caribbean Region of Nicaragua (CARCIP), loan No. 5895-NI; kindly state that the "High" rating granted by the World Bank to the relevance of the results of the Development Objectives of the CARCIP Program, is a clear sign of the efficient and transparent execution by the Government of Nicaragua in relation to the funds financed by the World Bank.

It is important to highlight that the Government of Nicaragua executed the CARCIP Program in strict compliance with environmental and social safeguards, which is recognized by the World Bank, having qualified this aspect as "High Level".

The foregoing is consistent with the World Bank's statement that the "Risk of development results" for this program has been classified as "Low", which shows that the results obtained within the framework of the execution of the CARCIP Program can be sustainable over time by the key actors benefited by the Program.

Regarding what was stated by the World Bank in numeral 60 of Section V "Lessons and Recommendations", referring to the possibility of "...having provided additional benefits for the public if there had been a more deliberate alignment with other sectors, such as education and health."; We are pleased to comment that the Government of Nicaragua agrees with said approach, which is consistent with the decision of the executing body to have included the pilot project to benefit Health Centers and Schools with broadband connectivity. In this sense, this scope could be an objective for a new project financed by the World Bank in Nicaragua.

It has been observed that in ODP 1. Increase access to regional broadband networks, Page 22, subparagraph 19, it is textually mentioned: “...broadband penetration on the Caribbean coast of Nicaragua at 19.3%, exceeding the target of 14 %”.
Due to the aforementioned, the Bank is requested to proceed with the correction of the indicator of the table of results indicators, located on Page 36 of the document. In the Actual Achieved at Completion” Percentage column: 19.3% instead of 10.0%

Objective/Outcome: Broadband Penetration in Caribbean Coast

Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Percentage	0.00 01-Oct-2016	14.00 03-Oct-2016	19.37	10.00 29-Jul-2022

ANNEX 6. SUPPORTING DOCUMENTS

Annex 6.1 Locations Connected under the Project and Number of Direct Beneficiaries

OPTIC FIBER EL RAMA - KUKRA HILL - LAGUNA DE PERLAS			
Region	**Municipality**	**Community**	**Population**
RACCS	El Rama	El Rama	55,722
RACCS	El Rama	Empalme Las Lapas,	1,000
RACCS	Kukra Hill	Kukra Hill	5,250
RACCS	Kukra Hill	Chalmeca	780
RACCS	Kukra Hill	San Ramón Viejo	1,200
RACCS	Kukra Hill	La Fonseca	1,345
RACCS	Kukra Hill	Flor de Pino	650
RACCS	Kukra Hill	Samuel Law	1,225
RACCS	Laguna de Perlas	Laguna de Perlas	5,500
RACCS	Laguna de Perlas	Haulover	3,500
Total Population			**76,172**

Comunidades and Población conectada por 18 BTS				
#	**Región o Departamento**	**Municipio**	**comunidad**	**Población**
1	RACCN	Waspam	Francia Sirpe (BTS)	1,228
1.1	RACCN	Waspam	Miguel Bikan	1,200
1.2	RACCN	Waspam	El Cocal	806
2	RACCN	Waspam	Santa Clara (BTS)	1024
2.1	RACCN	Waspam	Esperanza del Wawa	525
3	RACCN	Waspam	Wisconsi (BTS)	2,730
4	RACCN	Waspam	Awastingni (BTS)	1,118
4.1	RACCN	Waspam	La Piñera	350
5	RACCN	Puerto Cabezas	Manitwatla (BTS)	2,166
5.1	RACCN	Puerto Cabezas	Comunidad 51	260
5.2	RACCN	Puerto Cabezas	Comunidad 43	548
6	RACCN	Puerto Cabezas	Sukatpin (BTS)	2,950
6.1	RACCN	Puerto Cabezas	Klinak	535
7	RACCN	Puerto Cabezas	Yulu (BTS)	1,297
7.1	RACCN	Puerto Cabezas	Wawa Bum	320
8	RACCN	Rosita	Wasakin (BTS)	1,325
8.1	RACCN	Rosita	Los Pinos	350
8.2	RACCN	Rosita	Walanwas	850
9	RACCN	Siuna	Mongallo (BTS)	3,000
9.1	RACCN	Siuna	Yaoya	1,020
9.2	RACCN	Siuna	El Arenaloso	250
9.3	RACCN	Siuna	La Estrella	180
10	RACCN	Siuna	Guayabo Central (BTS)	2,300
10.1	RACCN	Siuna	El Resbaladero	165
11	RACCN	Waslala	Kusuli(BTS)	4,129
11.1	RACCN	Waslala	Zinica	3207
11.2	RACCN	Waslala	Guabo	350
12	RACCN	Waslala	Ocote - Tuma (RPT-BTS)	2,799
12.1	RACCN	Waslala	Los Chiles	230
13	RACCN	Waslala	Ocote - Tuma (BTS)	1,922
13.1	RACCN	Waslala	Tuma - Dudu	120
14	Río San Juan	Almendro	Las Latas (BTS)	1,646
14.1	Río San Juan	Almendro	Camastro	180
14.2	Río San Juan	Almendro	Garabato	540
14.3	Río San Juan	Almendro	Aparejo	635
15	Río San Juan	San Carlos	Papaturro (BTS)	2,796
16	RACCS	El Tortuguero	Waspado	1,875
Población Total:				**46,926**

Comunidades and Población conectada por 4 BTS				
#	Región o Departamento	Municipio	Comunidad	Población
1	RACCN	Waspam	Kururia	1,650
1.1	RACCN	Waspam	Bull kiamp	1,250
1.2	RACCN	Waspam	Laimus	380
1.3	RACCN	Waspam	Kapri	320
1.4	RACCN	Waspam	Bull Sirpi	320
1.5	RACCN	Waspam	Ibilhna Taman	180
1.6	RACCN	Waspam	Santa Inés	230
1.7	RACCN	Waspam	Polo Lakia Sirpi	430
2	RACCN	Waspam	Saupuka	3,000
2.1	RACCN	Waspam	Bilwas	2,450
2.2	RACCN	Waspam	Ulwah.	950
3	RACCN	Waslala	Kaskita	2,250
3.1	RACCN	Waslala	San Jose de Kaskita	230
3.2	RACCN	Waslala	Guano.	180
3.3	RACCN	Waslala	Cuculmeca	230
3.4	RACCN	Waslala	Bayas abajo	150
3.5	RACCN	Waslala	San Ramón las Bayas	320
3.6	RACCN	Waslala	Santa María de Taswah	160
3.7	RACCN	Waslala	Betania	120
3.8	RACCN	Waslala	Caño el zapote	150
4	RACCN	Rosita	Susun central	2,000
4.1	RACCN	Rosita	Susun arriba	520
4.2	RACCN	Rosita	Okonwas Central	480
4.3	RACCN	Rosita	Empalme Wasminona	350
Poblacion Total:				18300

Comunidades beneficiadas y sus aledañas con las 3 BTS, Municipio Siuna.

Tingnitara (BTS)- 2379 h.
Ramplita 550 habitantes
Salto verde 1200 habitantes.

Floripón (BTS)- 1820 h
San Juan 850 habitantes
Rampla 750 habitantes

Madriguera (BTS)- 3270 h.
Guasimito 620 habitantes
Campo dos central 920 habitantes
Campo dos sector tres 580 habitantes
La tortuga 600 habitantes
Sector el plato 1300 habitantes
El perol 450 habitantes.
Líbico 650 habitantes.

Annex 6.2 ICT-Based Services generated by the Project-financed Innovation Centers

N°	UNIVERSIDAD	UBICACIÓN CIA/LIA	ZONAS DE INCIDENCIA TERRITORIAL	SECTORES PRIORIZADOS DE ATENCIÓN	AREA(S) DE ESPECIALIZACIÓN
1	BICU	CIA Bluefields	• Municipio de Bluefields	• Pesca • Agropecuario • Comercio	• Espacio audiovisual • Prototipado y simulación

N°	UNIVERSIDAD	UBICACIÓN CIA/LIA	ZONAS DE INCIDENCIA TERRITORIAL	SECTORES PRIORIZADOS DE ATENCIÓN	AREA(S) DE ESPECIALIZACIÓN
			• Corn Island • Laguna de Perlas	• Turismo	
2	BICU	CIA Bonanza	• Municipio de Bonanza • Bilwi • Rosita	• Minería	• Espacio audiovisual • Robótica • Prototipado y simulación
3	BICU	LIA El Rama	• Municipio de El Rama • Muelle de los bueyes • Laguna de Perlas	• Agropecuario • Agroindustria • Cacaotero • Comercio	• Espacio audiovisual • Robótica • Prototipado y simulación
4	URACCAN	CIA Bilwi	• Municipio de Bilwi • Waspam	• Pesca • Comercio • Economía comunitaria • Turismo	• Diseño de aplicaciones y sitios web • Realidad virtual y agrandada • Prototipado y simulación
5	URACCAN	CIA Las Minas	• Municipio de Siuna • Rosita • Bonanza • Waslala	• Agropecuario • Cacaotero • Economía comunitaria	• Diseño de aplicaciones y sitios web • Realidad virtual y agrandada • Prototipado y simulación

N°	UNIVERSIDAD	UBICACIÓN CIA/LIA	ZONAS DE INCIDENCIA TERRITORIAL	SECTORES PRIORIZADOS DE ATENCIÓN	AREA(S) DE ESPECIALIZACIÓN
6	URACCAN	LIA Nueva Guinea	• Municipio de Nueva Guinea. • Bluefields	• Agropecuario • Comercio • Economía comunitaria	• Diseño de aplicaciones y sitios web • Realidad virtual y agrandada • Prototipado y simulación
7	UNAN León	CIA León	• Municipio de León • Achuapa • El Jicaral • El Sauce • La Paz Centro • Larreynaga • Nagarote • Quezalguaque • Telica • Santa Rosa del Peñon • Somoto • Somotillo • Jinotega	• Agropecuario • Agroindustria • Comercio • Turismo	• Sistemas de Información geográficos para la Georefenciación de fincas agroturísticas, mapeo de artesanos de Mipymes. • Simuladores para reproducir actividades o circunstancias en las empresas que simularían una actividad real • Creación de app y sitio web para cooperativas y MYPIMES

N°	UNIVERSIDAD	UBICACIÓN CIA/LIA	ZONAS DE INCIDENCIA TERRITORIAL	SECTORES PRIORIZADOS DE ATENCIÓN	AREA(S) DE ESPECIALIZACIÓN
					• Generación de tecnología en el área agropecuaria, incluyendo la domótica y robótica para automatización de procesos productivo, maneo de inventarios, entre otros. • Robótica médica: Creación de prótesis, manejo de expedientes, automatización de equipos de diagnóstico. • Visitas virtuales: Usando código QR para ingresar a visitas virtuales de sitios turísticos emblemáticos

N°	UNIVERSIDAD	UBICACIÓN CIA/LIA	ZONAS DE INCIDENCIA TERRITORIAL	SECTORES PRIORIZADOS DE ATENCIÓN	AREA(S) DE ESPECIALIZACIÓN
					de la ciudad, tecnologías escalables a otras ciudades. • Software para estudios de mercado, software contable que ayuden a mejorar la productividad de las MYPIMES • Prototipado: Evaluar las propuestas en el mercado con prototipos funcionales de nueva oferta de productos para el mercado- Impresora 3D
8	UNAN Managua	CIA FAREM Estelí	• Municipio de Estelí • Pueblo nuevo • Condega	• Agroindustria • Comercio • Turismo • Tabacalera	• Audiovisual. • Prototipado y simulación.

N°	UNIVERSIDAD	UBICACIÓN CIA/LIA	ZONAS DE INCIDENCIA TERRITORIAL	SECTORES PRIORIZADOS DE ATENCIÓN	AREA(S) DE ESPECIALIZACIÓN
			• San Juan de Limay • San Nicolas • La trinidad • Mozonte (Nueva Segovia) • Somoto (Madriz)		
9	UNAN Managua	CIA UNAN Managua	• Municipio de Managua • Chontales • Matagalpa • Carazo	• Tecnología de la información • Agroindustria • Turismo • Social • Medicina	• Robótica • Audiovisual